ARIZONA BALD EAGLE MANAGEMENT PROGRAM
2013 SUMMARY REPORT

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Photo by Kurt Licence

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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 2013. Those include: Gretchen Henne and Zoe Johnston, Cliff Breeding Area (BA); Joe Peddie and Marta Peddie, Crescent and Luna BAs; Lisa Helgren and Jean Spilker, Goldfield BA; Brian Long and Emily Willard, Orme, Granite Reef, and Rodeo BAs; Rya Rubenthaler and Russell Seeley, Ladders and Bartlett BAs; Dave Janssen and Margaret Kennedy, Pleasant BA; Jen Ottinger and Leah Vader, Sycamore, Doka, and Ft. McDowell BAs; Brian Long, Kristina McComber, and Ryan Mong, Bachelor Cove BA; Hailee Newman and Wyatt Nimitz, Campaign Bay and Pinto BAs; Lisa Helgren, Dave Janssen, and Margaret Kennedy, Woods Canyon BA; Gretchen Henne, Margaret Kennedy, Kristina McComber, and Emily Willard, Show Low Lake BA.

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ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2013 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 5 others (USFWS 1982). In Alaska, the USFWS did not list the species 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, 2007). In August 2006, the USFWS denied a petition to recognize bald eagles breeding in the Sonoran Desert of central Arizona as a Distinct Population Segment (DPS). As a result of a lawsuit challenging this decision, the U.S. District Court for the District of Arizona issued a ruling in March 2008 ordering the USFWS to conduct a status review to determine if listing the population as a DPS was warranted, and if so then to decide if listing the DPS as threatened or endangered under the ESA was warranted (USFWS 2008). Following the court order, USFWS designated bald eagles in central Arizona as a threatened DPS while the status review was undertaken (USFWS 2008). In February 2010, the USFWS determined that the Sonoran Desert Area population did not satisfy the definition of a DPS and was therefore not eligible for listing (USFWS 2010). In October 2010, the Court lifted its injunction against USFWS. On September 2, 2011, the USFWS removed bald eagles in the Sonoran Desert Area from the list of endangered and threatened species (USFWS 2011). In November 2011, a further legal challenge resulted in another court order to draft a new 12-month finding on the basis that the previous one was procedurally flawed. In the revised finding announced in April 2012, the USFWS again determined that the Sonoran Desert Area population did not satisfy the definition of a DPS and was therefore not eligible for listing (USFWS 2012), and further concluded that listing would not be warranted even if the population met the DPS criteria. In October 2012, the Center for Biological Diversity and Maricopa Audubon Society filed a lawsuit against USFWS over the revised 12-month finding.

The bald eagle remains protected in the state under Arizona Revised Statute Title 17 and nationally under the Bald and Golden Eagle Protection Act, Migratory Bird Treaty Act, Lacey Act, Airborne Hunting Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna.

To enhance coordination, increase communication, and provide oversight for Arizona bald eagle management, land and wildlife management agencies formed the Southwestern Bald Eagle Management Committee (SWBEMC) in 1984. Today, the members include: Arizona Game and Fish Department (AGFD), Arizona Department of Transportation, Arizona Public Service (APS), Arizona State Parks Department, American Eagle Research Institute, Arizona Army National Guard, Fort McDowell Yavapai Nation (FMYN), Geo-Marine (U.S. Air Combat Command), Gila River Indian Community (GRIC), The Hopi Tribe, Maricopa County Parks and Recreation Department (MCPRD), Freeport McMoRan, Navajo Nation Fish and Wildlife, Salt River Pima-Maricopa Indian Community (SRPMIC), Salt River Project (SRP), San Carlos

Apache Tribe (SCAT), Tonto Apache Tribe, U.S. Army Corps of Engineers (ACE), U.S. Bureau of Indian Affairs, U.S. Bureau of Land Management, U.S. Bureau of Reclamation (USBR), U.S. Department of Defense (Luke Air Force Base), U.S. Forest Service (USFS), USFWS, U.S. National Park Service, and White Mountain Apache Tribe. In 2007, some members of the SWBEMC signed the Conservation Assessment and Strategy for Bald Eagles in Arizona (CAS), which describes bald eagle management in the state and outlines the strategy for continuing management (Driscoll et al. 2006). The CAS also specifies current threats facing bald eagles in Arizona and identifies management actions necessary to maintain their distribution and abundance in the state following delisting.

STUDY AREA

Statewide monitoring and surveys were conducted primarily within 6 biotic communities (Brown 1994): Rocky Mountain (Petran) and Madrean Montane Conifer Forest, Great Basin Conifer Woodland, Plains and Great Basin Grasslands, Sonoran Desertscrub-Arizona Upland Subdivision, Interior Chaparral, and Sonoran Riparian Deciduous Forest and Woodlands. Other biotic communities visited included Chihuahuan Desertscrub, Mohave Desertscrub, Great Basin Desertscrub, Semidesert Grassland, Subalpine Grassland, Madrean Evergreen Woodland, and Sonoran Desertscrub-Lower Colorado River Valley Subdivision.

Most bald eagle breeding areas (BAs) are in central Arizona between elevations of 329 m (1,080 ft) and 1,341 m (4,400 ft). They are primarily found within the riparian areas of the Sonoran Riparian Scrubland and Sonoran Interior Strands as described in Brown (1994) (Figure 1). Representative riparian vegetation includes Fremont cottonwood (*Populus fremonti*), Goodding willow (*Salix gooddingii*), Arizona sycamore (*Platanus wrightii*), and nonnative salt cedar (*Tamarix* spp.). Surrounding uplands include the Sonoran Desertscrub biome-Arizona Upland subdivision, Interior Chaparral biome, and Great Basin Conifer Woodland biome. These areas are commonly vegetated with blue palo verde (*Parkinsonia florida*), mesquite (*Prosopis* spp.), ironwood (*Olneya tesota*), saguaro (*Carnegiea gigantea*), teddy bear cholla (*Opuntia bigelovii*), juniper (*Juniperus* spp.), and pinyon pine (*Pinus edulis*).

Fifteen BAs are located outside of or do not include Sonoran Riparian Scrubland areas (Brown 1994). The Becker, Silver Creek, and Sullivan Lake BAs are within the Plains and Great Basin Grassland biome where the nests are in isolated stands of Fremont cottonwoods. Crescent, Dupont, Greer Lakes, Lower Lake Mary, Luna, Lynx, Show Low Lake, White Horse, and Woods Canyon BAs are in Rocky Mountain and Madrean Montane Conifer Forest, where riparian vegetation includes narrow-leaf cottonwood (*Populus angustifolia*), thin-leaf alder (*Alnus tenuifolia*), Bebb's willow (*Salix bebbiana*), and coyote willow (*S. exigua*) (Brown 1994). Rock Creek is located in Rocky Mountain Montane Conifer Forest surrounded by Interior Chaparral, consisting mainly of pinyon-juniper woodland, shrub live oak (*Quercus turbinella*), and pointed (*Arctostaphylos pungens*) and pringle manzanita (*A. pringlei*). Canyon De Chelly BA is located in a Rocky Mountain Conifer forest mixed with Great Basin Conifer Woodland and Desertscrub, consisting mainly of big sagebrush (*Artemisia tridentata*), blackbrush (*Coleogyne ramosissima*), and shadscale (*Atriplex confertifolia*). The Gilbert BA is located in the

Phoenix metropolitan area and includes no natural riparian communities, with only artificial water formations such as recharge basins, urban ponds, and canals.

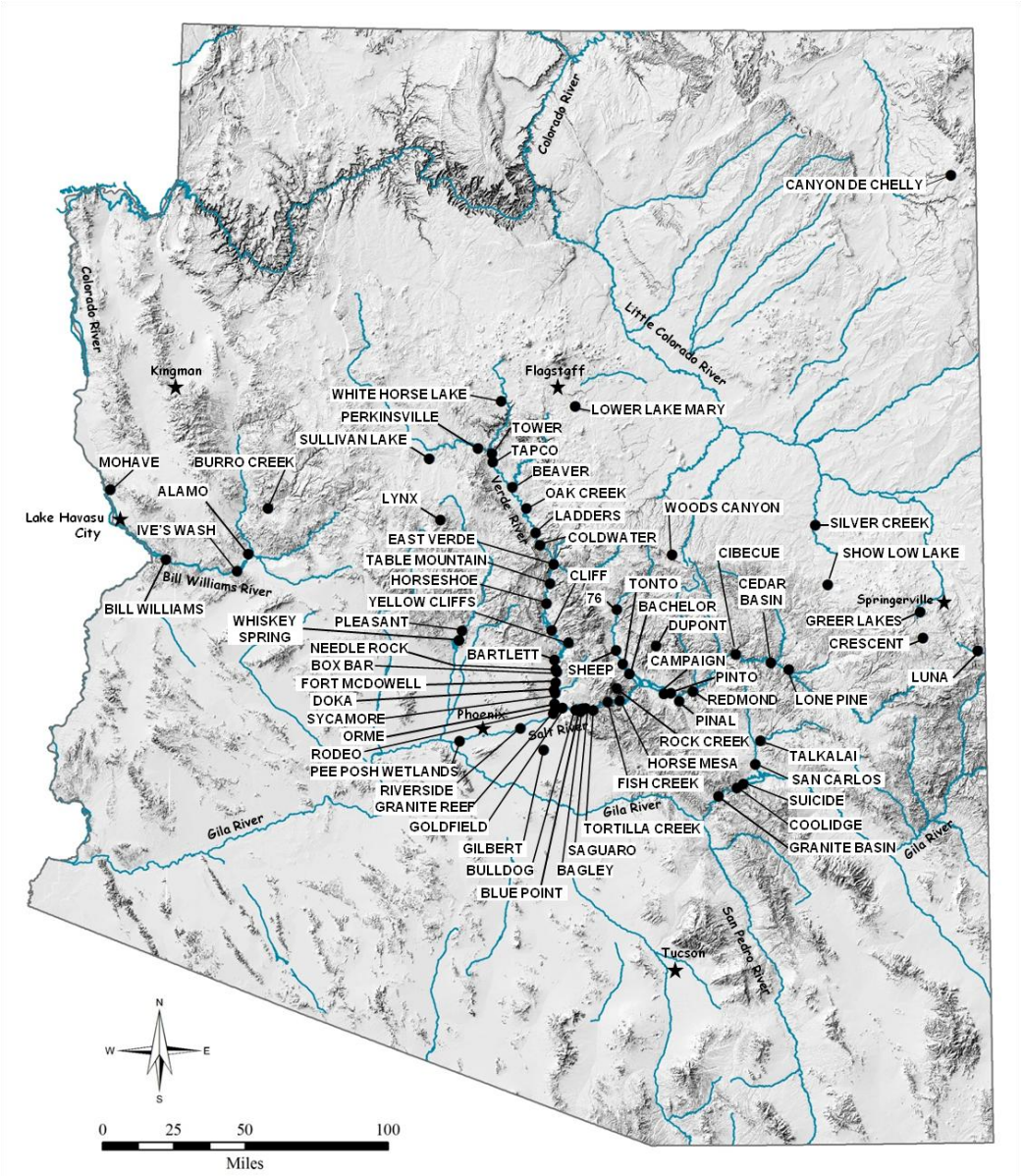


Figure 1. Location of known bald eagle BAs in Arizona, 2013.

With the exception of the Dupont, Mohave, and Rock Creek BAs, bald eagles in Arizona nest within a mile of water. BAs were located along: Burro, Cibecue, Oak, Pinal, Silver, Tangle, Tonto, and Walnut creeks; Alamo, Apache, Bartlett, Crescent, Greer, Horseshoe, Lower Lake Mary, Luna, Lynx, Pleasant, Roosevelt, Saguaro, San Carlos, Talkalai, and Woods Canyon lakes or reservoirs; and the Agua Fria, Bill Williams, Colorado, Little Colorado, Gila, Salt, San Carlos, San Francisco, and Verde rivers. Nests within these drainages are usually on cliff ledges, rock pinnacles, and in cottonwood trees. However they also have been found in junipers, pinyon and

ponderosa pines, sycamores, willows, snags, and 1 artificial structure (Horseshoe BA in 1980) (Grubb 1980).

ARIZONA BALD EAGLE WINTER COUNT

INTRODUCTION

Because bald eagles are nomadic in winter, national winter surveys are an effective tool to monitor the species throughout its range (Stalmaster 1987). The knowledge of wintering bald eagle habitat use allows for the consideration and implementation of management to protect important wintering areas. Even though the USFWS delisted the species nationwide in 2007 (USFWS 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 (Steenhof et al. 2002, 2008).

The National Wildlife Federation (NWF) initiated and organized the national midwinter bald eagle count from 1979-1992. Coordination shifted to the U.S. Geological Survey, Forest and Rangeland Ecosystem Science Center, Snake River Field Station (USGS), which in 2007 partnered with the ACE, who now coordinates the national winter count effort. Arizona participated in the program from the 1970s to the early 1980s (e.g. 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 2 or more years). Due to Arizona's lack of "concentrations", we contributed minimal information in 1986 and 1987, and surveyed only specific management areas in 1989-1991 such as Roosevelt Lake and Nankoweap Creek (e.g. Brown and Stevens 1992). Arizona's statewide winter counts resumed in 1992, using a combination of terrestrial (foot, snowmobile, vehicle), boat, and aircraft surveys (e.g. McCarty and Jacobson 2012). In 1995, AGFD 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 included new routes for future surveys. If a route produced 3 or fewer birds during the past 10 years of surveys, the route was dropped per USGS protocol. As a result, in 2006 we dropped 23 routes and added 12 new routes to the survey for a net result of 104 standardized routes. Additionally, in order to simplify reporting of data to ACE we dropped two more routes in 2008, Lake Mead and Lake Mohave, for a total of 102 standardized routes. These routes covered areas along the Colorado River both in Arizona and Nevada, and are reported by the state coordinators of the Nevada winter count.

METHODS

We continued to use, and strived to complete, the established 102 standardized survey routes for the 2013 Arizona bald eagle winter count. Additional routes were completed and integrated into this document for management purposes, but were not included in the results submitted to the ACE. We scheduled the winter count for January 7-13, 2013, which included weekdays for agency personnel and a weekend for volunteers. The short survey period minimized the chance for any large-scale bald eagle movements between survey routes and related duplicate counts.

We used a variety of survey methods due to the diverse habitats in Arizona and our desire to maximize (but not duplicate) statewide coverage in a narrow period with minimal effort. The best method to survey the rugged terrain and deep canyons of linear drainages was by helicopter. USBR and SRP contributed a total of 4 days of helicopter time for 2-3 biologists and a pilot to fly 25 routes. While the helicopter's altitude and speed were dependent upon terrain, height and density of power lines, and wind speed, a height of 31-61 m (100-200 ft) above ground level and 55-65 knots (63-75 mph) was optimum for observing bald eagles. 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. We supplied survey forms from ACE and instructed participants on the National Survey Protocol.

We classified the bald eagle sightings into adult and subadult age classes. In addition, we included sightings of unknown age bald eagles and unidentified eagles in our totals in order 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. We also recorded sightings of golden eagles (*Aquila chrysaetos*) during the survey, but did not report them in this document. We divided the data into 2 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, 4 counties are no longer surveyed by ground methods for wintering bald eagles. These include Greenlee, Maricopa, Pima, and Pinal counties. However, Greenlee, Maricopa, and Pinal counties are surveyed for wintering bald eagles, in part, by the helicopter flights.

RESULTS AND DISCUSSION

The 2013 Arizona bald eagle winter count tallied 255 bald eagles, including 169 adults (66%), 76 subadults (30%), and 10 unknown eagles (4%) (Tables 1 & 2). Participants covered 98 of 102 standardized routes (96%) and survey effort was above the long-term average with a total of 9,902 minutes (165 hours) (Table 2).

The highest total number of bald eagles observed during ground surveys occurred in Coconino County, however the largest concentration seen on a single ground survey occurred at Alamo Lake in Mohave County (n=7) (Appendix A). Also, a large number of bald eagles were observed by helicopter along the lower Salt River route (n=47), especially at Roosevelt Lake (Figure 2). An additional three bald eagles were counted on four non-standardized routes (Appendix A), but were not included in summary results.

The total of 255 bald eagles counted in 2013 was below the average of 295 birds counted annually during standardized counts, 1995-2012. The age composition of this year's count was 66% adults, 30% subadults, and 4% unknown, and represents the typical ratio of adults to subadults seen in Arizona's winter counts, which has averaged 65% adults, 32% subadults, and 3% unknown (Table 2).

Table 1. Summary of the Arizona bald eagle winter count 2013.

County	Routes surveyed	Minutes	Adult	Subadult	Unknown[1]	Total	Total/ Hour
Apache	15	950	13	6	4	23	1.5
Cochise	1	150	2	0	0	2	0.8
Coconino[2]	34	4,660	26	7	5	38	0.5
Graham	Not surveyed.						
Mohave	1	120	2	5	0	7	3.5
Navajo	16	837	9	3	0	12	0.9
Santa Cruz	1	120	0	0	0	0	0
Yavapai	6	1,940	10	8	1	19	0.6
Yuma and La Paz	1	300	2	1	0	3	0.6
Verde River drainage	3	202	27	8	0	35	10.4
Salt River drainage	9	373	63	20	0	83	13.4
Gila River drainage	8	225	13	18	0	31	8.3
Various helicopter	3	25	2	0	0	2	4.8
Totals	98	9,902	169	76	10	255	1.5

[1] Unknown age bald eagles and unidentified eagles.
[2] Includes one route for which survey time was not recorded, but averaged from previous year's counts.

Table 2. Summary of Arizona bald eagle winter counts 1995-2013.

Year	Survey time (min)	Surveys completed	Birds/minute	Adults	Subadults	Unknown[3]	Total
1995	9,563	103	0.025	164 (66%)	76 (31%)	8 (3%)	248
1996	7,255	102	0.049	232 (64%)	127 (35%)	2 (1%)	361
1997	7,718	96	0.044	193 (56%)	134 (39%)	16 (5%)	343
1998	7,190[1]	93	0.041	183 (63%)	103 (36%)	4 (1%)	290
1999	8,378[1]	105	0.050	248 (62%)	144 (36%)	11 (3%)	403
2000	9,402[1]	110	0.034	202 (62%)	115 (35%)	8 (2%)	325
2001	8,726[1]	108	0.024	141 (66%)	70 (32%)	5 (2%)	216
2002	9,032	109	0.044	236 (59%)	147 (37%)	19 (5%)	402
2003	10,036[1]	110	0.036	232 (64%)	118 (33%)	12 (3%)	362
2004	10,587	110	0.034	243 (66%)	113 (31%)	13 (3%)	369
2005	8,910	97	0.069	153 (68%)	56 (25%)	15 (7%)	224
2006[2]	10,074	104	0.031	239 (74%)	77 (24%)	7 (2%)	323
2007	11,632[1]	100	0.024	192 (68%)	81 (29%)	8 (3%)	281
2008	9,362	96	0.020	152 (82%)	29 (16%)	4 (2%)	185
2009	9,357	94	0.022	139 (68%)	62 (30%)	3 (2%)	204
2010	9,138[1]	96	0.028	159 (63%)	81 (32%)	12 (5%)	252
2011	8,713[1]	93	0.025	157 (71%)	57 (26%)	8 (4%)	222
2012	10,320	100	0.026	189 (63%)	94 (32%)	15 (5%)	298
2013	9,902[1]	98	0.026	169 (66%)	76 (30%)	10 (4%)	255
Average	9,226	101	0.034	191 (65%)	93 (32%)	9 (3%)	293

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

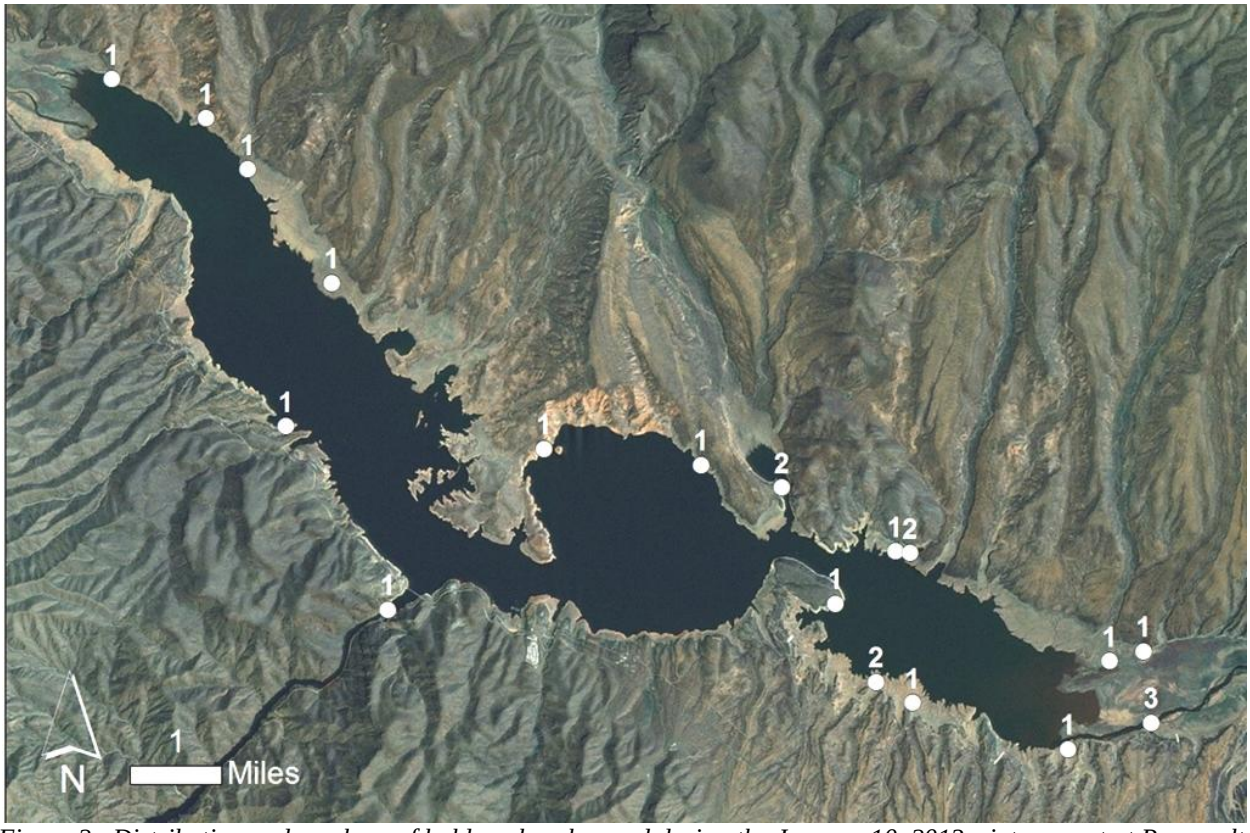


Figure 2. Distribution and numbers of bald eagles observed during the January 10, 2013 winter count at Roosevelt Lake, Gila County, Arizona.

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. Most responded that this year's weather was normal (65%), harsh (21%), or mild (13%) and one responded very mild (1%). There were no responses for very harsh weather. Similarly, ice cover was rated as being normal (53%), more than normal (30%), less than normal (13%), much more than normal (2%) and much less than normal (1%).

MANAGEMENT RECOMMENDATIONS

1. Maintain the current 102 standardized routes.
2. Continue to assess non-standardized routes and add new routes for areas with consistent sightings of more than 3 bald eagles. The national coordinators require at least 4 years of data before a route is included in trend analyses.
3. Maintain winter count consistency by following established routes and methods to enable long-term analysis.
4. Continue updating the Nongame Branch bald eagle winter count database with information from the standardized survey forms.
5. Compile spatial data from winter count survey maps to document the location and abundance of wintering bald eagles (e.g., Figure 2), spatially identify important habitat use areas, and develop statewide maps for distribution to cooperating agencies.

ARIZONA BALD EAGLE NEST SURVEY

INTRODUCTION

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

In 1972, concern about bald eagle population declines nationwide prompted surveys for the species throughout Arizona (Rubink and Podborny 1976). These annual surveys have continued to the present, excluding 1976 and 1977 (e.g. McCarty and Jacobson 2012). The AGFD administered and performed the 2013 nest surveys in cooperation with the SWBEMC.

METHODS

Habitat quality, the presence of nests, previous bald eagle sightings, and spacing between BAs prioritized survey effort. We monitored breeding activity at current and historical BAs, and nest sites discovered between 1992 and 2012 (e.g. McCarty and Jacobson 2012). We also investigated reports of bald eagles and nests by other agencies, biologists, and the public. A two to three-person team conducted surveys between January and June 2013. Winter count flights (January), monthly Occupancy and Reproductive Assessment (ORA) flights (February to May), and nest search flights (April and May) were used to locate nests and survey for new BAs. Timing of the ORA flights corresponded with the timing of different breeding stages (incubation, hatching, nestling, and fledging). We also opportunistically visited some BAs during aerial searches for golden eagle nests (February-May).

Boats, helicopters, and vehicles were used to access survey areas. Helicopters, provided by APS, SRP, and USBR, flew at approximately 60 meters (200 ft) above ground level and at 50-60 knots (58-70 mph). Drainage topography, high-tension wires, and wind influenced altitude and speed. If nest occupancy could not be determined from the air, a ground survey ensued. We used Questar® spotting scopes (40-160x), binoculars (10x), nest map atlases from Hunt et al. (1992) and SRP (2010), and handheld GPS units to relocate historical BAs and find alternate nests in existing BAs. New nests were numbered consecutively according to the last number assigned within that BA as reported in previous Arizona bald eagle nest survey reports (e.g. McCarty and Jacobson 2012).

Determination of breeding status followed operational definitions derived from Postupalsky (1974, 1983) and Steenhof and Kochert (1982) (Appendix B). Additionally, we use the terms "tall" and "short" in this section to describe heights of cliffs, and "large" and "small" to describe the size of trees and nests. "Tall" and "large" refer to substrates and nests we deemed suitable for breeding bald eagles as compared to current bald eagle nests and locations in Arizona (e.g., Grubb and Eakle 1987). The terms "small" and "short" refer to structures and nests of inadequate height and size. A "nest site" refers to a nest of large size (unless otherwise noted) in

appropriate bald eagle habitat that has not been documented as having been built or used by bald eagles, but which is routinely monitored for its potential to be utilized by eagles.

RESULTS

All known BAs (n=68) were examined for breeding activity (Fig. 1). Of 54 occupied BAs, 49 pairs were active, and 35 pairs successfully produced 58 fledglings (Table 3; Appendix C). Significant findings of the 2013 nest survey included 3 new bald eagle BAs, 4 new alternate bald eagle nests, 5 fallen or partially fallen nests within BAs (Coolidge #4, Tapco #1 and #2, 76 #4, Tonto #2), and 24 new potential nests at 10 sites. Additionally, we surveyed one BA on the Nevada side of the Colorado River, which was discovered in 2010 by the NPS, however only nests on the Arizona side of the river were included in summaries.

Table 3. Summary of Arizona bald eagle productivity 2013.

Number of BAs	68	Number of Active BAs	49
Number of Occupied BAs	54	Number of Failed Breeding Attempts	14
Number of Eggs	79+	Number of Successful Breeding Attempts	35
Nest Success = 35/54	0.65	Number of Young Hatched	71
Mean Brood Size = 58/35	1.66	Number of Young Fledged	58
		Productivity = 0.65*1.66	1.07

Results of the individual flights are located in Appendix D. Areas worthy of further discussion (bald eagle observations, fallen nests, new nests, potential nest sites) are described here. Nest locations are sensitive data, considered confidential by AGFD, and omitted from this report. Management agencies requiring specific locations should contact the AGFD Heritage Data Management System at (623) 236-7612.

New Locations Surveyed (Table 4)

Bachelor Cove. – In late January, the USFS discovered a new bald eagle nest in a live cottonwood at Roosevelt Lake, and confirmed incubation by February 5. ABENWP contractors reported the adult male as having a blue VID (visual identification) band, and the adult female having no bands.

Campaign Bay. – During the 2012 breeding season, the USFS and ABENWP contractors reported observing a pair of adult bald eagles in the Campaign Bay area of Roosevelt Lake that were responding to the resident eagles at the nearby Pinto BA with territorial behavior. In late 2012 and early January 2013, the USFS saw this new pair constructing a nest (#1) and confirmed incubation between January 16-18.

Kaibab Lake. – On May 8, a pair of adult bald eagles was soaring over the area, but there was no evidence of nesting. We examined the lake and found six large nests, with ospreys active in nests #1-4 and perched by nests #5-6. Ospreys have nested at Kaibab Lake prior to this year, but were not formally documented in prior management reports since the lake was not included in bald eagle surveys. We will continue to monitor this area.

Oak Creek. – On February 4, a search of Oak Creek from the Oak Creek BA to just south of the Sedona area yielded one adult bald eagle north of Bubbling Ponds fish hatchery. On March 14, we saw no eagles but found a new cliff nest (#1) in the area which was potentially large enough for eagles to use. Throughout February and March, a local photographer observed a pair of eagles in the area of the hatchery, which included one unbanded adult eagle with a narrow eyestripe and some other brown markings on its head, and an adult male with blue VID band 20/N (2007 fledgling from Beaver BA). We will continue to monitor this area.

Popcorn Canyon. – On February 5, an adult bald eagle was seen along the Salt River by Popcorn Canyon, in the same area adults have been seen in previous years. No new nests were found, and we will continue to mointor the area.

Rainbow Lake. – On March 15, no large nests were found and no eagles were seen during a search of Rainbow Lake and Lake of the Woods. The shoreline is very developed with housing around the perimeter, and while the immediate area seemed unlikely as a preferred breeding location for eagles it is potential foraging habitat.

Roosevelt Lake. – On January 10, an adult bald eagle was foraging near the dam at Roosevelt Lake, and we located a large cliff nest (#1) in the area. On February 26, the USFS reported a pair of adults in the same area nest-building and carrying nest materials. On March 15, we found two other large nests in the area (#2-3) and observed an adult golden eagle perched on the cliff above them. On April 15, a pair of adult bald eagles was standing in nest #2, on the upper part of the cliff above #3. We will continue to monitor this area.

Sheep Creek. – On January 7, one adult bald eagle was perched at the confluence of the Verde River and Sheep Creek, and on February 4 there were two adult bald eagles in the area. No new nests were found, and we will continue to monitor this area.

Sunset Mountain. – During a survey for golden eagle nests near Horseshoe Lake on April 22, we observed a pair of adult bald eagles and two large cliff nests (#1-2). One of the adults was perched near a nest (#1) which was in fair condition and surrounded by whitewash but there was no evidence of an active breeding attempt. With the lack of activity at the Horseshoe BA 5 miles away, it was not clear if this represented a new pair. We will continue to monitor this area.

Whiskey Spring. – Early in the 2012 breeding season, a pair of near-adult bald eagles was observed inspecting nest #2 within the Lake Pleasant BA, however the pair did not attempt nesting. On January 18, 2013 there was a pair of adults perching in nest #2 and a second pair of adults copulating in the area of nest #3. On February 1, adults were incubating in both nests. We split the Pleasant BA into two territories and named the new breeding area Whiskey Spring. The Pleasant BA nest #2 was re-assigned to Whiskey Spring BA as nest #1.

Table 4. 2013 Arizona bald eagle nest survey summary, new locations.			
Location	Date(s)	Survey Method	Results
Ashurst Lake	5/8	Helicopter	No new nests. One immature bald eagle in area.
Bachelor Cove	2/8, 3/15, 4/15	Helicopter, Ground	2/5: USFS reports adult incubating in new nest #1.
Campaign Bay	1/10, 1/31, 2/5	Helicopter, Ground	1/10: Adult standing in new nest #1. 1/31: Adult incubating.
Goldwater Lake	4/19	Helicopter	No new nests or bald eagles.
Kaibab Lake	5/8	Helicopter	Ospreys active at new nests #1-4. Ospreys perched by new nests #5-6. Pair of adult bald eagles in area.
Kinnikinick Lake	5/8	Helicopter	No new nests. No bald eagles.
Oak Creek	2/4, 3/14, 4/19	Helicopter	2/4: One adult in area. 3/14: New cliff nest #1 empty.
Popcorn Canyon (Salt River)	1/8, 2/5, 3/15	Helicopter	2/5: One adult in area.
Rainbow Lake	3/15	Helicopter	
Roosevelt Lake	1/10, 3/15, 4/15	Helicopter	1/10: One adult in area of dam. One new large cliff nest #1. 3/15: Two new cliff nests #2-3 found. One adult golden eagle in area. 4/15: Pair of adult bald eagles perched in nest #2.
Sheep Creek	1/7, 2/4	Helicopter	1/7: One adult in area. 2/4: Two adults in area.
Sunset Mountain	4/22	Helicopter	Two adults and two new large cliff nests (#1-2).
Whiskey Spring	1/18, 2/1, 2/14	Helicopter, Boat	1/18: Pair of adults at Pleasant BA nest #2. 2/1: Adult incubating.

Survey Sites with Existing Large Nests (Table 5)

Bear Canyon Lake. – On May 8, ospreys were active in nest #1. No bald eagles were seen.

Blue Ridge Reservoir. – On May 31, a pair of ospreys was seen at nest #2. Nest #5 was not found for the third consecutive year and was presumed fallen. No bald eagles were seen.

Chevelon Canyon Lake. – On May 8, an adult bald eagle was seen perched at the south end of the lake. Nest #3 was not seen and nest #2 was mostly fallen. In July, we received a report of eagles at the lake, and during a ground survey July 15-17 observed a pair of adults perching and intermittently vocalizing. Both adults had blue VID bands on their left legs, and one was identified as 20/V (fledged in 2007 at the Oak Creek BA). This adult no longer had the USFWS band on its right leg which was put on when banded as a nestling. No young were observed and there was no evidence of nesting, however there was a new large nest (#4) found in a live pine which was loosely shaped and not maintained. We will continue to monitor this area.

Deadman Mesa. – On March 14, a golden eagle was seen incubating in nest #1. On April 19, the nest was empty and failed.

Dogtown Lake. – On May 8, we found a new large nest (#2) in a live pine in good condition. No bald eagles were seen.

Granite (Verde River). – On February 4 and March 14, one golden eagle was seen incubating in nest #2. The attempt failed and the nest was empty on April 19.

Hess Creek. – On February 5, an adult bald eagle was seen in the area of nest #1. Although confirmed as a golden eagle nest in 2012, the habitat is favorable for bald eagles and we will continue to monitor this area.

JD Dam Lake. – On May 8, an osprey was incubating in nest #2. No bald eagles were seen.

Mormon Pocket. – On February 4, there were two adult bald eagles in the area. On March 14, a golden eagle was incubating in nest #2. The nest failed and was empty on April 19.

Sunflower Flat. – On May 8, ospreys were active in nest #1. No bald eagles were seen.

Tremaine Lake. – On May 8, we found a new large nest (#2) in a tall snag, and also saw an immature and a pair of adult bald eagles at the lake. The USFS reported having seen a pair of eagles near a nest structure in late summer or early fall of 2012, however no eagles were present during the winter count on January 9, 2013. We will continue to monitor this area.

Watson Lake. – On February 4, one bald eagle was seen perched by the lake, and on March 14 a golden eagle was perched in the the area of nest #1, which was empty.

Willow Springs Lake. – On May 8, ospreys were active in nests #1-6. No bald eagles were seen.

Table 5. 2013 Arizona bald eagle nest survey summary, potential nest sites.

Location	Date(s)	Survey Method	Results
Bear Canyon Lake	5/8	Helicopter	Ospreys active in nest #1. New snag nest # 2 empty.
Blue Ridge Reservoir	5/8	Helicopter	Ospreys active in nest #2. Nest #5 not found. No bald eagles.
Chevelon Canyon Lake	5/8, 7/15-7/17	Helicopter, Ground	5/8: Nest #2 mostly fallen, #3 not seen. One adult bald eagle in area. 7/15-1/17: Two adults in area.
Deadman Mesa	3/14, 4/19	Helicopter	3/14: Golden eagle incubating in nest #1.
Dogtown Lake	5/8	Helicopter	New tree nest #2 empty. No bald eagles.
Eagle (Eagle Creek)	1/9	Helicopter	No new nests or bald eagles.
George's Basin	1/7	Helicopter	All known nests empty. No bald eagles.
Granite (Verde River)	1/7, 2/4, 3/14, 4/19	Helicopter	2/4 & 3/14: Golden eagle incubating in nest #2. 4/19: Failed. Nest empty.
Hess Creek (Salt River)	1/10, 2/5, 3/15	Helicopter	All known nests empty. 2/5: One adult bald eagle in area.
JD Dam Lake	5/8	Helicopter	Osprey active in nest #2. No bald eagles.
Knoll Lake	5/8	Helicopter	Nests #1-4 not seen. No bald eagles.
Mormon Pocket (Verde River)	1/7, 2/4, 3/14, 4/19	Helicopter	2/4: Two adult bald eagles in area. 3/14: Golden eagle incubating in nest #2. 4/19: Failed. Nest empty.
Nevada Bay (CO River)	3/25	Helicopter	All known nests empty. No bald eagles.

Table 5 continued.

Location	Date(s)	Survey Method	Results
Ringbolt Rapids (CO River)	3/26	Helicopter	All known nests empty. No bald eagles.
Sunflower Flat	5/8	Helicopter	Ospreys active in nest #1.
Tremaine/Soldier Annex/Soldier/Long Lakes	5/8	Helicopter	New snag nest #2 empty. Two adult and one immature bald eagles in area.
Watson Lake	1/7, 2/4, 3/14	Helicopter	2/4: One adult bald eagle by lake. 3/14: One adult golden eagle in area.
Willow (Willow Creek)	1/9	Helicopter	No new nests or bald eagles.
Willow Springs Lake	5/8	Helicopter	Ospreys active in nests #1-6.

Historic Breeding Areas (Table 6)

Hell Point. – On March 14, there was a golden eagle incubating in nest #4, which was also seen incubating or brooding on April 19.

Upper Lake Mary. – On May 8, ospreys were incubating in eight nests (#1-4 and new snag nests #7-10).

Table 6. 2013 Arizona bald eagle nest survey summary, historic breeding areas.

Location	Date(s)	Survey Method	Results
Canyon	1/10, 3/15	Helicopter	All known nests empty. No bald eagles.
Devil's Post	3/14	Helicopter	All known nests empty. No bald eagles.
Hell Point	1/7, 2/4, 3/14, 4/19	Helicopter	3/14: Golden eagle incubating in nest #4. 4/19: Golden eagle incubating or brooding.
Mule Hoof	1/7, 2/5	Helicopter	All known nests empty. No bald eagles.
Upper Lake Mary	5/8	Helicopter	Ospreys active in nests #1-4 and new nests #7-10. Nests #5-6 not seen.

Breeding Areas (Table 7)

Bagley BA and Blue Point BA. – On January 10, one adult bald eagle was standing in Bagley nest #1, and an adult was incubating in Bagley nest # 2 (formerly Blue Point nest #10). Although the identity of the nesting eagles was not confirmed through band reading, we believe it was the Bagley adults since they were the last pair known occupying the area, and no other pairs were observed.

Black Canyon BA (Colorado River). – On February 25, an adult bald eagle was incubating in nest #1, and a pair of three-week old nestlings were seen on March 25.

Coolidge BA. – An immature bald eagle was in the area on January 10, and an adult and two immatures on March 15. On April 15, nest #4 was not seen and appeared to have fallen.

Doka BA. – On January 7, an adult bald eagle was incubating in a new nest (#7) built higher within the same tree as nest #6, which was present but not maintained.

Dupont BA. – This year marked the tenth consecutive year that this site has been unoccupied. Dupont will now be designated as a historic BA. We will continue to monitor the area.

Greer Lakes BA. – On June 5, we found a 7-week old bald eagle nestling in a new nest (#5) in a live pine.

Mohave BA. – On February 28, an adult bald eagle was perched in nest #1. It flew off and perched nearby, and the nest was empty.

Pee Posh Wetlands BA. – On January 7, an adult bald eagle was incubating in a new nest (#4) built in the same snag that had been partially burned by fire in 2012.

76 BA. – On January 10, nest #4 had fallen.

Tapco BA. – On January 7, nest #1 had fallen. An adult bald eagle was incubating in nest #2 on February 4, however on April 10 the nest was found to have fallen after a period of two days of high winds.

Tonto BA. – The nest tree has deteriorated and a lot of branches have fallen over the past few years. Nest #2 fell sometime before or early in the breeding season. A pair of adults was observed maintaining a new nest (#5) within the same tree.

Woods Canyon Lake BA. – On May 8, a pair of adult bald eagles was in nest #3 with two small nestlings. We also found four new snag nests in the area. Ospreys were incubating at two of the nests (#4 and 7), and a pair of ospreys was perched by another (#5). One nest (#6) was empty but appeared to have been built by ospreys.

Table 7. 2013 Arizona bald eagle nest survey summary, breeding areas (continued next page).

Location	Date(s)	Survey Method	Results
Bagley & Blue Point	1/10, 2/5, 3/15, 4/15	Helicopter	1/10- Adult incubating in nest #2 (Blue Point #10).
Black Canyon (NV)	2/25, 3/25	Helicopter	2/25: incubating or brooding in nest #1. 3/25: Two nestlings, 3 weeks old.
Burro Creek	3/14	Helicopter	No new nests or bald eagles.
Cedar Basin	1/7, 2/5, 3/15	Helicopter	All known nests empty. No bald eagles.
Coolidge	1/10, 2/5, 3/15, 4/15	Helicopter	1/10: One immature in area. 3/15: One adult and two immatures in area. 4/15: Nest #4 fallen.
Doka	1/7, 2/4, 3/14, 4/19	Helicopter	1/7: Adult incubating in new tree nest #7.
Dupont	3/15, 4/30	Helicopter	All known nests empty. No bald eagles.
Greer Lakes	2/5, 3/15, 6/5, 6/6	Helicopter, Ground	6/5: One nestling, 7 weeks old, in new nest #5.

Table 7 continued.

Location	Date(s)	Survey Method	Results
Horseshoe	1/7, 2/4, 3/14, 4/19	Helicopter	All known nests empty. No bald eagles.
Mohave	2/28, 3/28	Helicopter	2/28: One adult at nest #1.
Pee Posh Wetlands	1/7, 2/4, 3/14, 4/19	Helicopter, Ground	1/7: Adult incubating in new nest #4.
Rock Creek	2/5, 5/8	Helicopter	All known nests empty. No bald eagles.
76	1/10, 2/5, 3/15	Helicopter	1/10: Nest #4 fallen.
Tapco	1/7, 2/4, 3/14, 4/10, 4/19	Helicopter, Ground	1/7: Nest #1 fallen. 4/10: Nest #2 fallen.
Tonto	1/10, 2/5, 3/15, 4/15	Helicopter	1/10: Adult perched by new nest #5.
Tower	1/7, 2/4, 3/14	Helicopter	All known nests empty. No bald eagles.
White Horse Lake	4/4, 5/8	Helicopter	4/4: Nest #4 empty, no bald eagles.5/8: Ospreys active at nests # 1,2, 5 and new nest #6. Nest #3 not seen. Nest #4 empty, no bald eagles.
Woods Canyon Lake	5/8	Helicopter	New snag nests #4-7 found. Ospreys active at new nests #4 and 7. Pair of ospreys by new nest #5.

Overview

Significant findings of the 2013 nest survey include: 3 new bald eagle BAs, 4 new alternate bald eagle nests within BAs, 5 fallen or partially fallen nests within BAs, and 24 new potential nests at 10 sites sites. In 2013, we documented a record number of total BAs (Table 8).

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

	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
Number of BAs	68	66	62	62	59	56	53	50	47	46
Number of occupied BAs	54	54	55	52	50	48	48	43	39	40
Number of eggs (minimum)	79	80	79	69	78	71	74	68	57	59
Number of active BAs	49	50	51	48	48	44	45	39	36	39
Failed breeding attempts	14	19	17	21	19	14	20	11	12	12
Successful breeding attempts	35	31	34	27	29	30	25	28	24	27
Young hatched	71	66	66	57	68	65	61	55	48	50
Young fledged	58	52	56	44	47	53	42	42	37	42
Nest success	0.65	0.57	0.62	0.52	0.58	0.63	0.52	0.65	0.62	0.67
Mean brood size	1.7	1.7	1.6	1.6	1.6	1.8	1.7	1.5	1.5	1.6
Productivity	1.07	0.96	1.0	0.85	0.94	1.10	0.87	0.98	0.95	1.05

Two of the new BAs were discovered at Roosevelt Lake. In recent years, the lake has supported some of the state's highest counts of wintering bald eagles, however nesting substrate in parts of the lake is limited or distant. At one of the new BAs (Campaign Bay), the pair laid eggs in a nest precariously built among the branches of dead willow trees which had been submerged in 2012 when the lake was at full capacity. The attempt failed, and the long-term viability of this BA is

questionable. At the other new BA at Roosevelt Lake (Bachelor Cove), the pair apparently took over a Zone-tailed hawk breeding area and successfully fledged one young. Lastly, sightings of two adults together at several new nests near the dam indicate the potential for expansion of the breeding population at Roosevelt Lake again next year, or may represent movement of the Rock Creek BA closer to the lake.

The third new BA (Whiskey Spring) was established at the exisiting Pleasant BA. A second pair of bald eagles laid eggs in the downstream nest (#2) within the BA, while the traditional pair used the nest upstream (#3). Neither attempt was successful, however the failures do not appear to have been due to competition. Evidence suggests the Whiskey Spring nest failed due to predation of the eggs. Also, for the past three years the Pleasant BA has failed prior to or immediately after hatching, which may be a result of an ageing adult male.

The continued creation of new breeding areas and nests, and the loss of alternate nests, coupled with the potential for changes in the distribution of Arizona bald eagles further demonstrates the necessity and importance of ORA flights. These flights allow for the consistent monitoring of bald eagle demography, including population size, distribution, and reproductive success, in the rugged terrain of Arizona. Without the aid of these flights, we would not be able to accurately document these important population parameters.

MANAGEMENT RECOMMENDATIONS

1. Future survey efforts should continue to monitor historic BAs, potential breeding habitat, large nests, and sightings of adult eagles reported in previous nest survey reports. These documents are useful tools for identifying occupancy trends, locating new BAs, and monitoring population expansion.
2. Surveyors should continue to use the nest survey, ORA, and winter count flights, in concert with follow-up ground surveys to inspect areas. From the air, surveyors can easily cover large sections of bald eagle habitat. From the ground, surveyors can investigate areas in more detail.
3. Confirm the band status and identify blue-banded adults observed at all new and recent breeding areas, including Bachelor Cove, Bill Williams Refuge, Campaign Bay, Greer Lakes, Mohave, Show Low Lake, Tapco, and White Horse Lake.
4. Bald eagles banded in Arizona have been observed near or on El Novillo Reservoir, Sonora, Temecula Lake, California, and southwestern New Mexico, suggesting that the current distribution may extend into northern Mexico, southern California, and western New Mexico. Identifying breeding bald eagles through banding, visual identification, and transmitters would clarify the extent to which the bald eagles hatched in Arizona reach into these surrounding areas, and would help to accurately estimate survivorship.
5. Determine the identification of the breeding pair at Copper Basin, CA and yearly band the nestlings.
6. Examine the following areas for breeding bald eagles and/or nests:
    - Agua Fria River drainage – Up and downstream from Lake Pleasant.
    - Anderson Mesa Lakes – Ashurst Lake, Deep Lake, Horse Lake, Kinnikinick Lake, Long Lake, Marshall Lake, Potato Lake, Prim Lake, Tremaine Lake, Yaeger Lake.

- Big Sandy River drainage.
- Bill Williams River drainage – Bill Williams National Wildlife Refuge.
- Black River drainage – Little and Big Bonito creeks to the confluence of the Black River, Paucity Creek, Pacheta Creek, Reservation Creek, and Osprey nesting areas on East and West Fork and main stem of the Black River.
- Central and Eastern Mountain Lakes – Bear Canyon, Black Canyon, Blue Ridge, Chevelon Canyon, Cholla, Dry, JD Dam, Knoll, Lyman, Nash Creek, Pacheta, Point of Pines, Reservation, Rogers, Tonto, Willow Springs.
- Colorado River drainage – Lake Havasu, Topock Marsh, Lake Mead (Grand Wash), Nankoweap Creek, Lee's Ferry.
- North Fork of White River – Known osprey nesting locations.
- Gila River drainage – Lower Blue River, San Francisco River to Gila River confluence, Gila Box.
- Salt River Drainage – Redmond BA to Canyon BA, Cibecue BA to Cedar Basin BA, Tonto Creek north of Tonto BA, Pinto Creek, Salome Creek, Tanks Canyon, George's Basin.
- Verde River drainage – Beaver Creek, East Verde River, Oak Creek, Sheep Creek, West Clear Creek.
- White Mountain Lakes – Carnero, Christmas Tree, Horseshoe Cienega, Hawley, Lee Valley Reservoir, Nelson Reservoir, Nutrioso, Pacheta, Reservation.
- White River – Whiteriver to confluence with Black and Salt rivers.

ARIZONA BALD EAGLE NESTWATCH PROGRAM

INTRODUCTION

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

To address the continuing management needs for Arizona's breeding bald eagles, the ABENWP operates under 3 goals: conservation, data collection, and education. 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. Possibly the most tangible benefit of the ABENWP is determining when the bald eagles are in life threatening situations. Daily monitoring allows biologists to intervene in these situations, and eliminate or reduce the threat.

In this report, we summarize significant discoveries at each BA monitored by the ABENWP in 2013. Detailed reports of each monitored BA are centralized at AGFD, and distributed to the appropriate land and wildlife management agencies.

METHODS

We selected the BAs to be monitored by weighing the level of recreation activity and management needs. Included are those with seasonal closures (Bartlett, Cliff, Crescent, Goldfield-Kerr, Ladders, Luna, Pinto, Pleasant, Show Low, Whiskey Spring, and Woods Canyon), those without (Bachelor Cove, Campaign Bay, Orme, Rodeo, Sycamore), and those monitored opportunistically for information (Doka, Fort McDowell, Granite Reef, Rodeo). In the fall of 2012, we advertised the ABENWP contract positions through newsletters, web pages, and at university and college job placement services nationwide. Presentations, brochures, and word-of-mouth also contributed to the pool of applicants.

We held two orientation meetings, and three question and answer sessions for the selected ABENWP contractors. The two meetings offered an introduction to the program, background information on the ABENWP's role in bald eagle management, and an explanation of data forms and emergency protocols. After the orientation meetings, the contractors 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 forms, consistency in data collection, requirements for the final report, and any additional concerns or comments. When appropriate, additional problems or questions were handled on an individual basis.

Fieldwork began February 8, 2013 and continued until nestlings fledged. If the nesting attempt failed, nestwatchers were moved to alternate sites for the remainder of the season. Teams of two nestwatchers maintained a 10 days on/4 days off schedule. During each work period, weekend observations were conducted from dawn-to-dusk to cover times of high recreation use and document the resulting habitat use of the breeding pair. Monday through Thursday observations were a minimum of eight hours with emphasis on identifying territory boundaries, home range, and overall habitat use of the breeding pair.

Nestwatchers recorded bald eagle behavior and recreation use 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 the primary OP view. Nestwatchers were provided spotting scopes, Motorola® radios, cellular telephones, and/or USFS radios for viewing and communication needs. We supplied BA maps with river and/or lake kilometer (rk/lk) designations, and a guide to commonly taken fish species. They recorded all bald eagle data on supplied forms. Nestwatchers provided their own transportation, gas, field supplies, binoculars, and housing on days off.

Within an arbitrary 1.0 km (3,300 ft) radius of a bald eagle or active nest, nestwatchers recorded all human activity and the associated bald eagle behavior. Aircraft flying below the 2000 foot

FAA advisory over bald eagle breeding areas were also recorded. Nestwatchers classified bald eagle behavior in response to human activity into 7 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 away. Nestwatchers recorded "bird not in area" if a bald eagle was not present, and an "unknown" response if the bald eagle 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 Orme, Show Low, and Woods Canyon BAs, nestwatchers recorded human activity differently than described above. At Orme, activities at the USFS Phon D. Sutton Recreation Area were not recorded unless the activity continued across the river onto the SRPMIC land. At the Woods Canyon BA, due to the high volume of recreationists at the lake nestwatchers only recorded eagle behavioral responses to violations of the nest area closure. At Show Low, the limited view of the area meant nestwatchers were only able to record activities in the nest area within the available viewshed of the lake and shoreline.

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

RESULTS AND DISCUSSION

The ABENWP monitored 19 breeding areas in 2013 including Bachelor Cove, Bartlett, Campaign Bay, Cliff, Crescent, Doka, Fort McDowell, Goldfield-Kerr, Granite Reef, Ladders, Luna, Orme, Pinto, Pleasant, Rodeo, Show Low Lake, Sycamore, Whiskey Spring, and Woods Canyon. The final status of the monitored BAs was 7 failed, 11 successful, 1 occupied, and 18 young fledged (Appendix C).

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

Bachelor Cove Breeding Area (Appendix E)

Observation Period. – February 8 to May 9. Total monitoring 70 days/438 hours.

Bald Eagle Identification. – The male was reported by nestwatchers as having a blue VID band on his left leg, USFWS band on the right leg, and in adult plumage (unknown origin, but blue

band indicative of an Arizona nestling). The female was reported as unbanded and in adult plumage (unknown origin).

Management Activities. – 1) The USFS placed "No Entry" signs within the BA.

Human Activity. – Nestwatchers recorded 398 human activities. Terrestrial activity of 9 types represented 99.0%, aircraft activity represented 0.5%, and watercraft 0.5%. Two types of activities elicited 4 significant responses from the breeding pair. The bald eagles were restless in response to 2 boaters and 1 nestwatcher, and flushed in response to 1 nestwatcher.

Food Habits. – Nestwatchers observed 1 forage event. The male was successful in 100% (n=1) of events. The breeding pair was observed delivering 58 prey items to the nest, of which the male delivered 51.7%, the female 44.8%, and an unknown adult 3.4%. Fish comprised 84.4% (n=49) of the deliveries and unknown prey types 15.6% (n=9). Of the 12 prey items further identified, there were 7 largemouth bass (*Micropterus salmoides*), 3 black crappie (*Pomoxis nigromaculatus*), 1 common carp (*Cyprinus carpio*), and 1 channel catfish (*Ictalurus punctatus*).

Habitat Use. – The Bachelor Cove nestwatchers identified 17 separate perch locations, spanning 7.5 km of the Roosevelt Lake shoreline ranging from lake kilometer (lk) 8.6 to 16.1. The bald eagle pair spent 72.5% of the observed time at lk 9.7, 24.6% at lk 8.6, and 2.9% at the remaining locations.

Bartlett Breeding Area (Appendix F)
Observation Period. – March 22 to May 9. Total monitoring 41 days/411 hours.

Bald Eagle Identification. – The male was unbanded and in adult plumage (unknown origin). The female had a blue VID band partially identified as "?/U" on her left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona-born nestling).

Management Activities. – 1) The USFS enacted the seasonal BA closure.

Human Activity. – Nestwatchers recorded 23 human activities during the monitoring period. Watercraft (canoes, kayaks, and rafts) accounted for 52.2% and aircraft (helicopters and small planes) for 47.8%. One type of activitiy elicited 1 significant response from the breeding pair. The bald eagles left the area in response to 1 military helicopter.

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

Food Habits. – Nestwatchers were unable to observe any forage events. The breeding pair was observed delivering 49 prey items to the nest, of which the male delivered 57.1%, the female 36.8%, and an unidentified adult 6.1%. Fish comprised 95.9% (n=47) of the deliveries, and mammals and birds each for 2.0% (n=1). Of the 21 prey items further identified, 33.3% were suckers (n=7) (unidentified species), 28.6% common carp (n=6), 9.5% black crappie (n=2), 9.5% smallmouth bass (n=2) (*Micropterus dolomieu*), and 4.8% (n=1) each were largemouth bass, catfish (unidentified species), American coot (*Fulica americana*), and bass (unidentified species).

Habitat Use. – The Bartlett nestwatchers identified 26 separate habitat use areas, spanning a 1.5 km stretch of the Verde River ranging from river kilometer (rk) 34.6 to 36.1. The bald eagle pair spent 44.2% of the observed time at rk 35.0, 19.9% at rk 34.7, 15.6% at rk 34.8, 10.0% at rk 34.6, 5.8% at rk 34.9, 4.3% at rk 35.1, and 0.1% at the remaining locations.

Campaign Bay Breeding Area (Appendix G)
Observation Period. – February 8 to June 27. Total monitoring 16 days/108 hours.

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

Management Activities. – 1) The USFS maintained "Closed Area" signs and posts around the nest area.

Human Activity. – Nestwatchers recorded 30 human activities during the monitoring period. Aircraft (helicopters, small planes, and military) accounted for 63.3%, terrestrial activities of 5 different types for 30.0%, and watercraft (kayaks) for 6.7%. No significant responses to these activities from the breeding pair were detected.

Food Habits. – Nestwatchers observed 1 forage event. The female was successful in foraging a fish. Due to the early failure of the nest attempt, no prey deliveries were observed.

Figure 4. Campaign Bay breeding area. Gila County, Arizona. Photo by K. McCarty.

Habitat Use. – The Campaign Bay nestwatchers identified 10 separate habitat use areas, spanning a 1.3 km stretch of the Salt River ranging from rk 98.6 to 99.9. The bald eagle pair spent 28.2% of the observed time at rk 99.8, 25.3% at rk 99.2, 21.2% at rk 98.6, 18.6% at rk 98.8, 4.3% at rk 99.7, and 2.3% at the remaining locations.

Cliff Breeding Area (Appendix H)
Observation Period. – February 8 to May 26. Total monitoring 80 days/683 hours.

Bald Eagle Identification. – The male was unbanded and in adult plumage (unknown origin). The female had a blue VID band "19/R" on her left leg, USFWS band on the right leg, and was in adult plumage (2006 Granite Reef nestling).

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

Human Activity. – Nestwatchers recorded 29 human activities during the monitoring period. Aircraft (helicopters, small planes, and jets) accounted for 62.1% and terrestrial activities of 5 different types for 37.9%. Five types of activities elicited 8 significant responses from the breeding pair. The bald eagles were restless in response to 2 Apache helicopters, and flushed in response to 2 helicopters, 2 nestwatchers or AGFD personnel, 1 hiker and 1 hunter.

Food Habits. – Nestwatchers observed 8 forage events. The male was successful in 80.0% (n=5), and the female in 66.7% (n=3) of events. Fish accounted for 75.0% (n=6) and birds for 25.0% (n=2) of these events. The breeding pair was observed delivering 68 prey items to the nest, of which the male delivered 70.6% and the female 29.4%. Fish comprised 76.5% (n=52) of the deliveries, mammals and birds each for 5.9% (n=4), and unknown prey types 11.8% (n=8). Of the 3 prey items further identified, 33.3% (n=1) each were common carp, channel catfish, and great blue heron (*Ardea herodias*).

Habitat Use. – The Cliff nestwatchers identified 12 separate habitat use areas, spanning a 6.3 km stretch of the Verde River ranging from river kilometer (rk) 66.5 to 72.8. The bald eagle pair spent 64.4% of the observed time at rk 66.6, 9.7% at rk 66.5, 8.7% at rk 67.7, 7.0% at rk 69.2, and 10.2% at the remaining locations.

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

Crescent Breeding Area (Appendix I)
Observation Period. – April 19 to August 4. Total monitoring 84 days/839 hours.

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

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

Human Activity. – Nestwatchers recorded 1,972 human activities during the monitoring period. Terrestrial activity of 8 different types represented 77.4%, water pursuits (boaters, float tubers, and kayaks/canoes) 21.9%, and aircraft (small planes and helicopters) 0.7%. Three types of activities elicited 6 significant responses from the breeding pair. The bald eagles were restless in response to 2 small planes, 1 hiker, and 1 gunshot. They flushed in response to 1 small plane and 1 hiker.

Food Habits. – The nestwatchers observed 131 forage events. The male was successful in 97.5% (n=79) and the female in 98.1% (n=52). Of these forage attempts, 95.4% were for fish, 3.1% birds, and 1.5% mammals. The breeding pair was observed delivering 126 prey items to the nest, of which the male delivered 59.5% and the female 40.5%. Fish comprised 95.2% (n=120) of these deliveries, birds for 3.2% (n=4), and mammals 1.6% (n=2). Of the 125 prey items further identified, 89.6% were rainbow trout (n=112) (*Oncorhynchus mykiss*), 6.4% cut throat trout (n=8) (*Oncorhynchus clarkii*), 3.2% American coots (n=4), and 0.8% rabbit species (n=1) (unidentified species).

Habitat Use. – The Crescent nestwatchers identified 11 perch locations around Crescent Lake. The bald eagle pair spent 41.9% of the observed time at lake kilometer (lk) 2.25, 25.8% at lk 2.15, 12.8% at lk 2.3, 6.4% at lk 2.35, 5.9% at lk 2.1, and 7.1% at the remaining locations.

Figure 6. Crescent breeding area. Apache County, Arizona. Photo by K. McCarty.

Goldfield-Kerr Breeding Area (Appendix J)
Observation Period. – February 8 to May 5. Total monitoring 63 days/424 hours.

Bald Eagle Identification. – The female had no bands and was in adult plumage (unknown origin). The male had a blue VID band "19/D" on his left leg, USFWS band on the right leg, and was in adult plumage (2006 Needle Rock nestling).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The USFS closed off vehicle access to the nest area. 3) The USFS posted wildlife breeding area signs along the river prohibiting entry. 4) One female nestling and one male nestling were VID banded "28/U" and "28/V" at 5.5 weeks of age on March 19.

Human Activity. – Nestwatchers recorded 364 human activities during the observation period. Terrestrial activity of 6 different types represented 48.6%, aircraft (helicopters, small planes, jets,

motorized parachute) 30.2%, and watercraft 21.2%. Seven types of activities elicited 17 significant responses from the breeding pair. The bald eagles were restless in response to 3 helicopters, and flushed in response to 5 helicopters, 2 nestwatchers, 2 horseback riders, 2 hikers, and once each to small plane, photographer, and motorized parachute.

Food Habits. – Nestwatchers observed 3 forage events. The male was successful in 100% (n=2) and the female in 100% (n=1). Fish accounted for 33.3% and unknown prey types 66.7% of these events. The breeding pair was observed delivering 31 prey items to the nest, of which the male delivered 48.4%, the female 38.7%, and an unidentified adult 12.9%. Fish comprised 19.4% (n=6) of these deliveries, mammals and birds each 3.2% (n=1), and unknown prey types 74.2% (n=23). No prey items were further identified.

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

Habitat Use. – The Goldfield-Kerr nestwatchers identified 12 perch locations, spanning a 3.0 km stretch of the Salt River ranging from river kilometer (rk) 9.4 to 12.4. The bald eagle pair spent 83.3% of the observed time at rk 10.2, 13.5% at rk 10.1, and 3.1% at the remaining locations.

Ladders Breeding Area (Appendix K)
Observation Period. – February 8 to March 15. Total monitoring 27 days/206 hours.

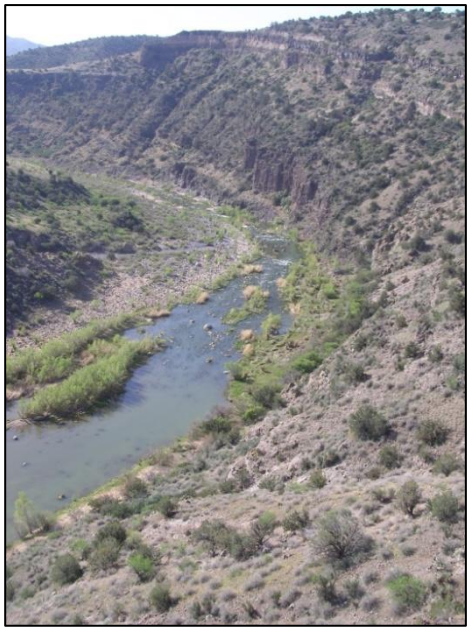
Bald Eagle Identification. – Nestwatchers reported the male had a blue VID band on his left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling). The female had no bands and was in adult plumage (unknown origin).

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The USFS posted closure signs at the upstream and downstream access points to the Verde River.

Interventions. – On March 15, nestwatchers observed an intruding immature golden eagle attack the nestling in the nest, knocking it to the slope below. AGFD rescued the nestling and transferred it to Liberty Wildlife for treatment of extensive injuries.

Human Activity. – The nestwatchers recorded 63 human activities. Water-based activities (canoes/kayaks and rafts) accounted for 84.1%, aircraft (helicopters and small planes) for 12.7%, and terrestrial activities 3.2%. No significant responses to these activities from the breeding pair were detected.

Food Habits. – Nestwatchers observed 2 forage events, both by the male who was successful on one occasion. Fish accounted for 50.0% of these events, and unknown prey types 50%. The breeding pair was observed delivering 37 prey items to the nest, of which the male delivered 94.6%, and the female 5.4%. Mammals comprised 18.9% (n=7) of the deliveries, fish 10.8% (n=4), birds 2.7% (n=1), and unknown prey types 67.6% (n=25). Of the 12 prey items further identified, 16.7% (n=2) each were sucker, catfish, and mouse (all unidentified species), and 8.3% (n=1) each were woodrat, rabbit, cow placenta, and waterfowl (all unidentified species), rock squirrel (*Spermophilus variegatus*), and mountain cottontail (*Sylvilagus nuttallii*).

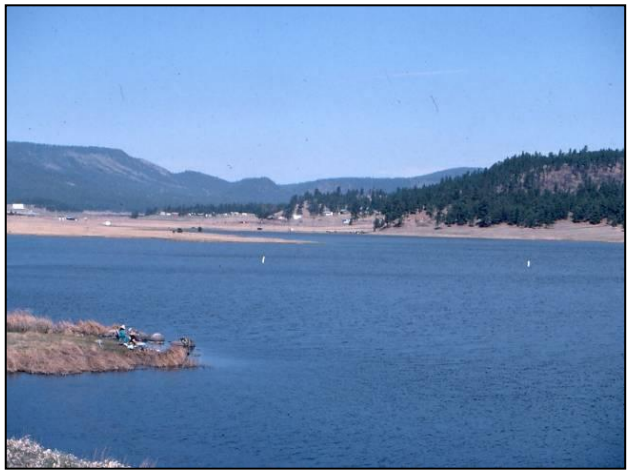


Habitat Use. – The Ladders nestwatchers identified 51 separate habitat use areas, spanning a 2.2 km stretch of the Verde River ranging from rk 161.2 to 163.4. The bald eagle pair spent 32.9% of the observed time at rk 162.9, 32.2% at rk 162.8, 15.8% at rk 161.9, 4.7% at rk 163.0 and 14.5% at the remaining locations.

Figure 8. Ladders breeding area. Yavapai County, Arizona. Photo by K. McCarty.

Luna Breeding Area (Appendix L)
Observation Period. – February 8 to April 14. Total monitoring 50 days/472hours.

Bald Eagle Identification – Nestwatchers reported the male had a black VID band "Δ/A" on his right leg, USFWS band on the left leg, and was in adult plumage (1988 Texas nestling), and the female had a black VID band "Δ/B" on her right leg, USFWS band on the left leg, and was in adult plumage (unknown origin; trapped as an unbanded adult at Luna Lake in 1994).



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

Figure 9. Luna breeding area. Apache County, Arizona. Photo by J. Driscoll.

Human Activity. – The nestwatchers recorded 167 human activities. Terrestrial activity of 9 different types accounted for 94.0%, water pursuits (fishing boats, kayaks, float tubers) for 4.2%, and aircraft (small planes) 1.8%. One type of activity elicited 1 significant response from the breeding pair. The bald eagles flushed in response to 1 hiker.

Food Habits. – The nestwatchers observed 31 forage events. The male was successful in 91.7% (n=12) and the female was successful in 94.7% (n=19) of forage events. Birds accounted for 93.5% (n=29) and unknown prey 6.5% (n=2) of these events. The breeding pair was observed delivering 20 prey items to the nest, of which the male delivered 45.0% (n=9) and the female 55.0% (n=11). Birds comprised 100% (n=20) of the deliveries. Of the 19 prey items further identified, 73.7% were American coots (n=14), 21.1% were eared grebes (n=4) (*Podiceps nigricollis*), and 5.3% were gadwall (n=1) (*Anas strepera*).

Habitat Use. – The Luna nestwatchers identified 22 separate habitat use areas around Luna Lake. The bald eagle pair spent 62.8% of the observed time at lk 2.4, 6.5% at lk 2.3, 5.8% at lk 2.7, 3.8% at lk 2.2, 3.6% at lk 2.8, 3.5% at lk 5.2, and 14.1% at the remaining locations.

Orme Breeding Area (Appendix M)
Observation Period. – February 8 to March 17. Total monitoring 30 days/268 hours.

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

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

Human Activity – Nestwatchers recorded 168 human activities. Aircraft (helicopters and small planes) represented 53.6%, and terrestrial activities of 12 different types 46.4%. Six types of activities elicited 11 significant responses by the breeding pair. The bald eagles flushed in response to 6 hikers, 1 helicopter, 1 photographer, 1 gunshot, and 1 hunter, and left the area in response to 1 driver/vehicle.

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

Food Habits. – Due to the early failure of the nest, nestwatchers did not observe any forage events or prey deliveries.

Habitat Use. – The Orme nestwatchers identified 29 habitat use locations along the Verde and Salt Rivers, spanning a total of 4.7 km ranging from river kilometer (rk) 0.3 to 1.3 on the Verde River and rk 6.2 to 9.9 on the Salt River. The bald eagle pair spent 44.9% of the observed time at rk 0.7 (Verde River), 37.4% at rk 0.6 (Verde River), 5.8% at rk 0.3 (Verde River), 5.6% at rk 6.2 (Salt River), and 6.4% at the remaining locations.

Pinto Breeding Area (Appendix N)
Observation Period. – February 28 to May 26. Total monitoring 60 days/444 hours.

Bald Eagle Identification. – Nestwatchers reported the male was unbanded and in adult plumage (unknown origin), and the female had a blue VID band on the left leg, USFWS band on the right leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling). Last year, AGFD believed the male was the banded bird and the female to be unbanded, so the identity of the adults is currently unclear.

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

Human Activity. – Nestwatchers recorded 62 human activities. Terrestrial activities of 5 types represented 46.8%, aircraft (helicopters, small planes, and military) 43.5%, and watercraft (kayak) 9.7%. Two types of activities elicited 3 significant responses from the breeding pair. The bald eagles were restless in response to 2 anglers and 1 military jet.

Figure 11. Pinto breeding area. Gila County, Arizona. Photo by K. McCarty.

Food Habits. – The nestwatchers observed 8 forage events by the breeding pair, with the male and female each successful in 25.0% (n=4). Fish accounted for 12.5% (n=1), birds 12.5% (n=1), and unknown prey 75.0% (n=6) of these events. The breeding pair was observed delivering 30 prey items to the nest, of which the male delivered 50.0%, the female 40.0%, and an unidenitfied adult 10.0%. Fish comprised 83.3% (n=25) and unknown prey types 16.7% (n=5) of the deliveries. Of the 25 prey items further identified, 64.0% were common carp (n=16), and 36.0% were suckers (n=9) (unknown species).

Habitat Use. – The Pinto nestwatchers identified 21 separate habitat use areas along the Salt River, spanning 3.8 km and ranging from river kilometer (rk) 101.9 to 105.7. The bald eagle pair spent 35.6% of the observed time at rk 104.2, 33.1% at rk 102.2, 13.3% at rk 104.4, 4.3% at rk 104.3, 4.1% at rk 101.9, and 9.8% at the remaining locations.

Pleasant & Whiskey Spring Breeding Areas (Appendix O)
Observation Period. – February 8 to March 17. Total monitoring 30 days/232 hours.

Bald Eagle Identification. – At the Pleasant BA, nestwatchers reported the female had no bands and was in adult plumage (unknown origin). The band status of the male was undetermined. At the Whiskey Spring BA, the male had a blue VID band on his left leg, USFWS band on the right

leg, and was in adult plumage (unknown origin, but blue band indicative of an Arizona nestling). The female was in adult plumage and appeared to be unbanded (unknown origin), but band status was not confirmed.

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

Human Activity. – Nestwatchers recorded 84 human activities. Aircraft (small planes, jets, and helicopters) accounted for 67.9%, watercraft (boats) for 20.2%, and terrestrial activities of 3 types for 9.5%. Three types of activities elicited 3 significant responses from the breeding pairs. The bald eagles were restless in response to 1 military jet and 1 gunshot, and flushed from a perch in response to 1 nestwatcher.

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

Food Habits. – No forage events were observed. Due to the early failure of both breeding attempts, no prey deliveries were observed.

Habitat use. – At the Pleasant BA, nestwatchers identified 9 separate habitat use areas along the Agua Fria River arm of the lake, spanning a total of 1.6 km and ranging from river kilometer (rk) 72.2 to 73.8. The Pleasant bald eagle pair spent 72.2% of the observed time at rk 73.2, 18.7% at rk 72.2, and 9.1% at the remaining locations. At the Whiskey Spring BA, nestwatchers identified 5 separate habitat use areas spanning a total of 0.4 km and ranging from rk 68.7 to 69.1. The Pleasant bald eagle pair spent 81.9% of the observed time at rk 73.2 and 18.1% at the remaining locations.

Show Low Lake Breeding Area (Appendix P)
Observation Period. – April 19 to May June 25. Total monitoring 53 days/520 hours.

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

Management Activities. – 1) AGFD and USFS established water and land closures around the nest site. 2) Nestwatchers were supplied a kayak by AGFD and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 1,545 human activities. Water activities of 6 types represented 56.1%, terrestrial activities of 5 types 41.6%, and aircraft (helicopters and jets) 2.3%.

Four types of activity elicited 7 significant responses from the breeding pair. The bald eagles were restless in response to 2 canoes/kayaks, 2 helicopters, and 1 dog, and flushed in response to 1 angler and 1 canoe/kayak.

Food Habits. – The nestwatchers observed 6 forage events. The male was successful in 80.0% (n=5) and the female was successful in 100% (n=1) of forage events. Fish accounted for all of these events. The breeding pair was observed delivering 70 prey items to the nest, of which the male delivered 55.7% (n=39) and the female 44.3% (n=31). Fish comprised 95.7% (n=67) of these deliveries and unknown prey types 4.3% (n=3).

Habitat use. – The Show Low Lake nestwatchers identified 64 separate habitat use areas around the lake. The bald eagle pair spent 76.4% of the observed time at lake kilometer (lk) 2.3, 10.7% at lk 3.9, 7.0% at lk 2.2, and 5.9% at the remaining locations.

Figure 13. Show Low Lake breeding area. Navajo County, Arizona. Photo by K. McCarty.

Sycamore Breeding Area (Appendix Q)
Observation Period. – February 8 to May 17. Total monitoring 72 days/671 hours.

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

Management Activities. – 1) The FMYN restricts non-tribal member use of the river area. 2) Nestwatchers, Fort McDowell Adventures, Green Zebra Tomcar tours, and community members worked collaboratively to ensure protection of eagles and promote outreach opportunities. 3) One female nestling was banded "29/D" at 10 weeks old on April 30 after it had fledged to the ground.

Figure 14. Sycamore breeding area. Maricopa County, Arizona. Photo by Arizona Game & Fish Department.

Interventions. – On April 25, nestwatchers observed one of the branching nestlings had fallen to a low perch under the nest. The next morning, we hand-captured the juvenile and placed it higher

up in the nest tree. On April 30, we again captured this bird after it ended up on the ground and took it to Liberty Wildlife. The juvenile was placed back to the nest tree on May 6 and later fledged.

Human Activity. – Nestwatchers recorded 237 human activities. Terrestrial activities of 7 types represented 78.9%, aircraft (helicopters, small planes, and ultralights) 20.3%, and water activities (raft) 0.4%. Six types of activities elicited 11 significant responses from the breeding pair. The bald eagles were restless in response to 1 small plane, and flushed in response to 4 drivers, 2 OHVs, 2 AGFD researchers, 1 hiker, and 1 gunshot.

Food Habits. – Nestwatchers observed 4 forage events. The male (n=1) and female (n=3) each were 100% successful. Fish accounted for 50% and unknown prey 50% of these events. The breeding pair was observed delivering 75 prey items to the nest, of which the male delivered 44.0%, and the female 56.0%. Fish comprised 56.0% (n=42) of these deliveries, mammals and birds each 5.3% (n=4), and unknown prey types 33.4% (n=25). Of the 21 prey items further identified, 38.1% (n=8) were common carp, 28.5% (n=6) were suckers (unidentified species), 23.8% were rainbow trout, and 4.8% each were American coots and waterfowl (unidentified species).

Habitat use. – The Sycamore nestwatchers identified 20 separate habitat use areas, spanning a total of 3.1 km along the Verde River ranging from river kilometer (rk) 9.3 to 12.4, and 0.3 km along Sycamore Creek ranging from rk 0.4 to 0.7. The bald eagle pair spent 74.2% of the observed time at rk 10.4 (Verde River), 9.7% at rk 9.5 (Verde River), 7.9% at rk 10.1, and 8.2% at the remaining locations.

Woods Canyon Lake Breeding Area (Appendix R)
Observation Period. – April 20 to August 3. Total monitoring 90 days/641 hours.

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

Management Activities. – 1) The Black Mesa Ranger District established a closure around the nest area, including re-routing the lake trail, and placed closure signs. 2) AGFD established a water closure around the nest site. 3) Nestwatchers were supplied a boat by AGFD and educated recreationists about the closure and bald eagles.

Figure 15. Woods Canyon breeding area. Coconino County, Arizona. Photo by K. McCarty. .

Human Activity. – Nestwatchers recorded 31 human activities within or at the closure. Terrestrial activities (hiker, anglers, and dogs) and aircraft (helicopters and small planes) accounted for

38.7% each, and watercraft (boats, kayaks) for 22.6%. One type of activity elicited 1 significant response from the breeding pair. The bald eagles were restless in response to 1 helicopter.

Food Habits. – The nestwatchers observed 13 forage events. The male (n=8), female (n=4), and an unknown adult (n=1) were successful in 100% of events, which were all for fish. The breeding pair was observed delivering 76 prey items to the nest, of which the male delivered 54.1%, the female 45.9%., and an unknown adult 6.6%. Fish comprised all of the delivered items, and of 67 prey further identified, all were rainbow trout.

Habitat Use. – The Woods Canyon nestwatchers identified 47 separate habitat use areas around the lake. The bald eagle pair spent 16.4% of the observed time at lake kilometer (lk) 4.9, 15.7% at lk 3.5, 9.8% at lk 4.5, 9.1% at lk 5.0, 7.0% at lk 3.4, 6.7% at lk 1.1, 6.5 at lk 4.7, 6.2% at lk 4.8, 4.0% at lk 2.2 and 18.6% 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 AGFD. We have included them as informational material for land and wildlife management agencies reviewing this report, and for further discussion at SWBEMC meetings.

Bartlett Breeding Area

1. Post an informative closure sign at the locked Forest Service gate facing the road. Some people entered the closure area apparently oblivious to the sign that stands opposite the gate in a pullout near the river.
2. Post a replacement sign along the Verde River facing boat traffic upstream of the Bartlett nest. Nestwatchers located a destroyed and shot-through sign laying on the ground in an arroyo about 50m from the river.

Cliff Breeding Area

1. More public interaction and presence on the river road by Nestwatchers may help keep OHV traffic down. The OHV riders we saw inside the closure area usually drove out quickly as soon as they realized we were watching them. More signs probably will not help.
2. Post a few more signs along the main road (Horseshoe Dam Road) to help with informing horseback and OHV riders about the closure area. Some entered the area from the main road and not from the trail that leads to the river, where Nestwatch signs are plentiful.

Crescent

1. Implement a conscientious supplementation of food for this pair through the tough times of February and March. With the already high use and projected major increase in human activity in the area, this could become a wildlife viewing destination with eagle viewing added as a highlight if we can aid their breeding attempts.
2. Enforce speed limits in recreation areas and off road vehicle use.

3. The handicapped docks need to be maintained and fixed where they are usable even if the lake is low. There were people in wheelchairs being carried to the rocky shoreline, while able bodied people were using the dock.

Goldfield

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

Ladders

None.

Luna

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

Orme

1. The closure area needs to be clearly defined and signed to make enforcement more effective. A relatively inexpensive perimeter could be provided by means of simple T-posts, spaced at regular intervals along the closure perimeter. Inexpensive laminated signs could be attached to the T-posts, providing a well-signed boundary.
2. Adding land area maps at Phon D. Sutton informational kiosks (in addition to the three SRPMIC no trespassing signs at the river confluence opposite the recreation area) would provide ample warning to any approaching trespasser, and give law enforcement grounds to proceed effectively against offenders.
3. Nestwatchers should be permitted to speak with closure violators and any person/s stopped along the closure boundary. This would prevent many human activities from escalating into bald eagle disturbances and would strengthen the relationship between the Community and the Arizona Bald Eagle Nestwatch Program.
4. Close Pole 4 road seasonally; add a locking gate at the intersection of Pole 4 Road and North Fort McDowell Road to prevent vehicle traffic and discourage foot traffic from locations that disturb the eagles, while allowing key holders (e.g. Law enforcement and Natural Resources) on official business. The addition of immovable, cement barriers was an improvement from the traffic barricades used in 2012, but trespassers and Community Members alike proceeded down the Pole 4 Road to park at the barrier or parked at Pole 4 itself, occasionally exiting their vehicles to read the signs and view the eagles.

5. During the bald eagle nesting season, efforts should be made to allow Community Members access to the river confluence via the track east of the water plant, which is currently barred by a locked gate.
6. The nestwatchers had good communication by cell phone with the Salt River Rangers, but no method of communication with the Salt River Patrol Police except through Dispatch. This made communication in the field difficult. To avoid confusion, the SRPMIC Police Officers and Dispatch should be provided nestwatcher's cell phone numbers, a map that includes the locations of Orme and GR nests, the nestwatchers' primary OP, and numbered poles.
7. Develop a Standard Operating Procedure (SOP) for the Wildlife Closure Area, which includes a simple set of procedures developed by law enforcement, natural resources, and SWBEMC Bald Eagle experts [see the Orme Nestwatch Report for more details].
8. In conjunction with the above recommendation, develop a short seminar about the SOP and brief the police about the basics of bald eagle biology and management.
9. Consider locking the South gate to the Red Mountain Preserve at the beginning of the breeding season and close (but do not lock) the North gate to the Red Mountain Preserve. Much of the vehicular traffic is confused tourists looking for the Casino; a closed gate would stop them from entering the Red Mountain Preserve while still enabling access to community members.
10. Inform Unity Run attendees that they should not enter the Wildlife Closure Area.
11. Install monofilament recycling bins at recreation areas contiguous with the Orme Breeding Area.
12. The Tonto Forest Service passes allowing nestwatchers to park at the Phon D. Sutton and Granite Reef recreation areas should also include Coon Bluff as this is within the eagles' territory. The passes should cover the whole nestwatch period from the beginning of February to the end of May.
13. The SRPMIC special use permit provided to the nestwatchers should allow for nestwatcher habitat investigations on foot within the river corridor (approximately 300 meters on each side of the Salt and Verde Rivers).
14. We recommend that anyone wishing to observe the eagles at the immediate closure boundary stay inside their vehicle, which would be less of a disturbance than getting out to look, and prolonged periods near the closure should be avoided. Groups are welcome to view the eagles from the nestwatchers' observation point.

Pinto

1. Provide nestwatchers with a boat and/or kayaks.
2. In the future take blood samples from nestlings/fledglings and or recover eggs (if the BA fails) and test them for mercury and other environmental contaminants.

Show Low

1. Continue to monitor the site with two nestwatchers.
2. Continue to post signs at land closure areas and place closure buoys on the lake.
3. Place additional buoys at the north side of nest since most violations occurred in this area.

4. Provide fishing line disposal bins at the north end of the lake near the trash cans, and provide information regarding proper fish cleaning to prevent guts being discarded into the water.
5. Provide an information or educational board at the dock area informing the public of the closure and of proper wildlife viewing etiquette.
6. Distribute information at the campground.
7. Provide a kayak for nestwatchers.

Sycamore

1. Place FMYN no trespassing signs on the road just beyond the Fort McDowell Adventures stables and at other sites determined by tribal council and law enforcement.
2. Obtain and place AGFD Sensitive Wildlife Area signs in locations determined by FMYN Environmental Department, in addition to and alongside FMYN no trespassing signs. Additional signage would convey that not only is someone on tribal land, but it is a protected wildlife area.
3. We suggest placing these signs in Sycamore Creek where OHVs enter the BA (near the jeep road that crosses Sycamore Creek at km 1.3), and along the Verde River near the area of the nest tree (at the confluence of Sycamore Creek and the Verde River).
4. Increase FMYN Police patrol of these signed areas, particularly along Sycamore Creek where it enters the Verde River. OHV use of the river is most active late in the afternoon on Fridays and Saturdays and during the morning on Sundays.
5. Continue collaboration with FMYN youth council and H'man 'Shawa school, as well as with Raphael Bear, Karen Ray and the FMYN Cultural Department.
6. Band the Doka nestlings at approximately five weeks of age if the current nest is used again.

Woods Canyon

1. Modifications should be made to the fishing line disposal containers to help reduce the amount of trash that can be deposited in them. Container holes small enough to make it difficult to deposit aluminum cans and plastic bottles would greatly reduce the amount of trash going into the fishing line disposal containers.
2. Create a presentation for public display at Woods Canyon with photos from Liberty Wildlife depicting the harm to wildlife caused by improper disposal of fishing line, hooks and lead sinkers. This may help educate fishermen on the consequences of improper disposal of fishing tackle.
3. The closure buoys should be placed as close to shore as possible to limit public confusion. The AGFD employees that set up the closure buoys this season did an excellent job placing them.

LITERATURE CITED

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Steenhof, K., L. Bond, K.K. Bates, and L.L. Leppert. 2002. Trends in midwinter counts of bald eagles in the contiguous United States, 1986-2000. Bird Populations 6:21-32. Available online at http://ocid.nacse.org/nbii/eagles/ (accessed October 13, 2009).

Steenhof, K., L. Bond, and L. L. Dunn. 2008. The midwinter bald eagle survey results and analysis 1986-2005. U.S. Geological Survey, National Biological Information

Infrastructure, and Northwest Alliance for Computational Science and Engineering. Available online at http://www.nacse.org/nbii/eagles (accessed October 13, 2009).

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

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

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

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

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

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

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

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

APPENDIX A: 2013 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 9. 2013 Arizona bald eagle winter count volunteer survey results (continued next page).

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Apache County						
1	Becker Lake	20	3	1	0	0
2	Little Colorado River (LCR)	20	0	0	0	0
3	S. Fork LCR – Campground	30	0	0	0	0
4	Casa Malapais – LCR	5	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	60	1	0	0	0
6	Sponseller Lake	30	0	0	0	0
7	Mexican Hay Lake	28	0	0	0	0
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	80	3	0	0	4
9	The Ranch Lake	70	1	1	0	0
10	Ortega Lake	45	0	0	0	0
11	Concho Lake	75	1	1	0	0
12	Luna Lake	210	1	1	0	0
13	Nelson Reservoir	37	2	1	0	0
14	Nutrioso Reservoir	60	1	1	0	0
16	San Francisco River (Luna Lake to New Mexico line)	180	0	0	0	0
Total		**950**	**13**	**6**	**0**	**4**
Cochise County						
18	Parker Canyon Lake[1]	Not surveyed within winter count dates.				
19	Willcox Playa	150	2	0	0	0
Total		**150**	**2**	**0**	**0**	**0**
Coconino County						
21	Long Lake Complex	185	1	0	0	0
22	Stoneman Lake	120	0	0	0	0
23	FH-3	65	0	0	0	0
24	I-17, Section to Flagstaff	69	2	1	0	0
25	Bellemont	275	3	1	0	0
26	Townsend/Winona A/B	358	4	0	0	0
27	HWY 89 North /Sunset Crater – Wupatki	348	1	0	0	1
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	387	0	0	0	0
29	Continental Country Club Lakes	100	2	0	0	0
30	Chevelon Canyon Lake	225	0	0	0	0
32	Spring Valley Wash	110	2	0	0	1
33	Red Lake Valley	35	0	0	0	0
34	Kaibab Lake	60	1	0	0	0
35	Pittman Valley	55	0	1	0	0
36	Davenport Lake	55	0	0	0	0
37	Scholz Lake	120	3	0	0	0
38	Cataract Lake	60	0	0	0	0
39	Willow Springs Lake	300	0	0	0	0

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
40	West Chevelon Canyon	45	0	0	0	0
41	Willow Creek	30	0	0	0	0
42	White Horse Lake – Pomeroy Tanks	180	0	2	0	0
43	JD Dam Lake	60	0	0	0	0
45	Steel/Stone Road	240	1	1	0	0
48	Blue Stem Wash-Babbit property	150	1	0	0	0
49	Glen Canyon Nat'l Rec. Area (Lake Powell to Lee's Ferry)	90	3	0	0	3
118	Bill Williams Loop Road	45	0	0	0	0
119	Johnson Canyon	70	0	0	0	0
120	Highway 64 east	65	1	1	0	0
121	Highway 64	50	0	0	0	0
122	Camp Navajo	180	0	0	0	0
123	Partridge Creek[1]	228	0	0	0	0
124	Odell Lake	30	0	0	0	0
125	Highway 87 north	90	0	0	0	0
126	Highway 180	180	1	0	0	0
Total		**4,660**	**26**	**7**	**0**	**5**
Graham County						
51	Point of Pines Lake area	Not surveyed.				
Mohave County						
57	Alamo Lake	120	2	5	0	0
Total		**120**	**2**	**5**	**0**	**0**
Navajo County						
58	Lake of the Woods	15	1	0	0	0
59	Rainbow Lake	45	0	0	0	0
61	Whipple Lake	15	0	0	0	0
62	Long Lake	30	0	0	0	0
63	Lone Pine Dam	45	1	0	0	0
64	Schoens Reservoir	30	0	0	0	0
65	White Mountain Lake	100	0	0	0	0
67	Jacques Marsh	45	2	1	0	0
68	Scott's Reservoir	65	0	0	0	0
69	Show Low Lake	120	2	0	0	0
70	Pintail Lake	20	0	0	0	0
71	Telephone Lake	15	2	0	0	0
72	Fool Hollow Lake	180	1	2	0	0
75	Cottonwood Wash/ Clay Springs	30	0	0	0	0
76	White Lake	7	0	0	0	0
127	Mortenson Wash	75	0	0	0	0
Total		**837**	**9**	**3**	**0**	**0**
Santa Cruz County						
82	Pena Blanca Lake	120	0	0	0	0
Total		**120**	**0**	**0**	**0**	**0**
Yavapai County						
83	Wet Beaver Creek	480	0	0	0	0

[1]Time was averaged from previous years (2004-2012).

Table 9 continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
84	Oak Creek	500	2	0	0	0
85	Willow Lake	240	2	1	1	0
86	Lynx Lake	240	2	1	0	0
87	Watson Lake	240	1	4	0	0
88	Goldwater Lake	240	3	2	0	0
Total		**1,940**	**10**	**8**	**1**	**0**
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	300	2	1	0	0
Total		**300**	**2**	**1**	**0**	**0**

Table 10. 2013 Arizona bald eagle winter count helicopter survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
90	Verde River	179	26	8	0	0
91	Lower East Verde River	7	0	0	0	0
92	Lower West Clear Creek	16	1	0	0	0
93	Lower Salt River	111	33	14	0	0
94	Upper Salt River	69	9	1	0	0
95	Lower Tonto Creek	20	2	0	0	0
97	Lower Canyon Creek	9	0	0	0	0
98	Lower Cibecue Creek	10	0	0	0	0
100	White River	21	1	1	0	0
101	North Fork White River	41	2	1	0	0
102	Lower Black River	60	16	3	0	0
103	Big and Little Bonito Creeks	32	0	0	0	0
104	San Carlos River–Talkalai Lake	15	3	3	0	0
105	San Carlos Reservoir	17	2	9	0	0
106	Upper and Lower Gila River	53	3	4	0	0
107	Eagle Creek	57	3	2	0	0
108	Bonita Creek	14	0	0	0	0
109	Lower San Francisco River	33	1	0	0	0
110	Blue River	10	0	0	0	0
111	Sunrise Lake	1	0	0	0	0
112	Big Lake	Not surveyed.				
114	Crescent Lake	Not surveyed.				
115	Lake Pleasant	23	1	0	0	0
116	Del Rio Ponds	1	1	0	0	0
117	Tres Rios	26	1	0	0	0
Total		**825**	**105**	**46**	**0**	**0**

Table 11. 2013 Arizona bald eagle winter count non-standardized survey route results.						
Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Highway 260 and F.R. 618 (976)	Yavapai	235	1	1	0	0
Blue Ridge Reservoir (977)	Coconino	75	0	0	0	0
Kachina Sewage Treatment (986)	Coconino	30	0	0	0	0
Clint's Well (991)	Coconino, Yavapai	145	1	0	0	0
Total		**485**	**2**	**1**	**0**	**0**

APPENDIX B: RAPTOR REPRODUCTIVE STATUS CRITERIA

Breeding Area (BA): An area containing 1 or more nests within the range of 1 mated pair of birds. Operationally, once a BA is established, we consider it a BA whether it is occupied by bald eagles in a given year or not, until or unless it is designated historical.

Occupied BA/Nest: An occupied BA must have an occupied nest, which is any nest, where at least 1 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 the nest, presumably incubating.
d. Two adults present on or near the nest.
e. One adult and 1 bird in immature plumage at or near a nest, if mating behavior was observed (display flight, nest repair, coition).
f. A recently repaired nest with fresh sticks, or fresh boughs on top, and/or droppings and/or molted feathers on its rim or underneath.

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 alternate nests at which none of the activity patterns diagnostic of an occupied nest 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 1 young fledged during the breeding season under consideration. Nests were successful if at least 1 young was raised past 8 weeks of development.

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

Historical BA: A BA that has remained unoccupied for 10 consecutive years. This term also applies to BAs identified before the 1970s and have been unoccupied since the beginning of annual monitoring.

Reoccupied Historical BA: A Historical BA, which shows signs indicative of being active.

Pioneer Effort: The occupancy of a new nest, 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.

Existing Status: A 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: 2013 ARIZONA BALD EAGLE PRODUCTIVITY

Table 12. Arizona bald eagle breeding area productivity summary, 2013 (continued next page).

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs[3]	Hatch Date	Young	Fledged	Fledge Date
Alamo	S	4	1/15-2/4	1	2/4-3/14	1	1	>5/15
Bachelor Cove*	S	1	<2/5	1	<2/9	1	1	4/24
Bagley	S	2	<1/10	2	2/5-3/15	2	2	>4/25
Bartlett	S	2	<1/10	2	2/4-2/13	2	1	4/21
Beaver	S	1	<1/7	2	2/4-3/14	2	2	>4/19
Bill Williams Refuge	U							
Blue Point	U							
Box Bar	S	4	<1/7	2	2/4-3/14	2	2	>5/8
Bulldog	S	2	<1/10	2	2/5-2/15	2	2	>4/15
Burro Creek	U							
Campaign Bay*	F	1	1/16-1/18	1	Failed 2/27 near hatch date.			
Canyon de Chelly	S	2	2/23-2/24	1	2/24-4/11	1	1	6/23
Cedar Basin	U							
Cibecue	F	2	2/5-3/15	1	Failed by 4/15.			
Cliff*	S	6	1/7-2/4	2	2/4-3/14	2	1	>5/26
Coldwater	O							
Coolidge	U							
Crescent*	S	1	<4/19	1	5/8	1	1	8/2
Doka*	S	7	<1/7	2	2/4-2/14	2	2	4/22-5/3
Dupont	U							
East Verde	S	6	1/7-2/4	1	3/14-4/19	1	1	>5/8
Fish Creek	S	1	1/10-2/5	1	2/5-3/15	1	1	>5/8
Fort McDowell*	O							
Gilbert	U							
Goldfield-Kerr*	S	2	12/30-1/10	2	1/10-2/8	2	2	4/30
Granite Basin	U							
Granite Reef*	F	5	1/7-2/4	2	2/4-2/28	2	Failed by 3/20.	
Greer Lakes	S	5	<6/5	1	<6/5	1	1	7/2-7/8
Horse Mesa	F	4	<1/10	2	2/5-3/15	2	Failed by 4/15.	
Horseshoe	U							
Ive's Wash	S	4	1/15-2/4	1	2/4-3/14	1	1	>5/15
Ladders*	F	3	<1/7	1	1/7-2/8	1	Failed 3/15	
		Failed when nestling was attacked by a golden eagle. Nestling in rehabilitation.						
Lone Pine	F	2	1/8-2/5	2	2/5-3/15	2	Failed by 4/15	
Lower Lake Mary	S	3	<5/8	1	<5/8	1	1	>7/3
Luna*	F	1	2/14	1	3/28	1	Failed 4/15	
Lynx	S	3	<2/4	1	3/14-/4/19	1	1	<5/21
Mohave	U	2/28: One adult perched at nest.						

[1]Breeding area status codes (Postupalsky 1974): U=unoccupied, O=occupied, S=successful, F=failed, FOS=Fostered (n= +X or –X are number of nestlings fostered or taken).

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997, 1998, 1999; Jacobson and others 2004, 2005, 2006, 2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008, 2009, 2010, 2011, 2012.

[3]Represents minimum number of eggs laid.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 12 continued.

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs[3]	Hatch Date	Young	Fledged	Fledge Date
Needle Rock*	U	2/4: One adult in area.						
Oak Creek	S	4	1/7-2/4	2	2/4-2/26	2	2	>4/19
Orme*	F	7	1/7-2/4	1	Failed by 3/17			
Pee Posh Wetlands	S	4	<1/7	2	1/7-2/1	2	2	4/19-4/21
Perkinsville	O							
Pinal	S	3	<1/10	2	2/5-3/15	2	2	>4/15
Pinto*	S	8	1/10-2/5	2	3/1	2	2	6/2-6/4
Pleasant*	F	3	1/18-2/1	1	Failed by 3/17			
Redmond	O							
Riverside	S	1	<1/7	2	2/4-2/15	2	2	>4/19
Rock Creek	U							
Rodeo*	S	4	<1/7	2	2/10-2/14	2	2	5/7-5/17
Saguaro	S	1	1/10-2/5	3	2/5-3/15	3	3	>5/8
San Carlos	S	6	1/10-2/5	2	2/5-3/15	2	2	>5/15
76	U							
Sheep	F	6	2/5-3/15	1	Failed by 4/29.			
Show Low Lake*	S	1	2/22-2/27	2	3/5-4/1	2	2	6/22-6/24
Silver Creek	S	2	1/25-2/26	3	2/26-4/2	3	1	6/6
Suicide	S	1	1/10-2/5	3	2/5-3/15	3	3	>5/15
Sullivan Lake	S	2	<1/7	2	1/7-2/8	2	2	>4/19
Sycamore*	S	5	1/7-2/4	2	2/14	2	2	5/6-5/10
Table Mountain	F	4	1/7-2/4	1	2/4-3/14	1	Failed by 4/15	
Talkalai	S	8	<1/10	1	2/5-3/15	1	1	>5/15
Tapco	F	2	1/7-2/4	1	Failed by 4/19			
Tonto	O							
Tortilla Creek	S	1	<1/10	2	2/5-3/15	2	2	4/15-5/8, >5/8
Tower	U							
Whiskey Spring	F	1	1/18-2/1	1	Failed 2/13			
White Horse Lake	F	4	2/4-3/7	1	Failed by 4/1			
Woods Canyon*	S	3	<4/3	2	4/3-4/20	2	2	7/7
Yellow Cliffs	S	1	1/7-2/4	2	2/4-3/14	2	2	>5/8
Black Canyon[4]	A	1	<2/25	2	2/25-3/25	2	Final status unknown.	

[1]Breeding area status codes (Postupalsky 1974): U=unoccupied, O=occupied, S=successful, F=failed, FOS=Fostered (n= +X or –X are number of nestlings fostered or taken).

[2]Nest numbers are from Hunt and others 1992; Driscoll and Beatty 1994; Driscoll and others 1992, 1995a, 1995b, 1997, 1998, 1999; Jacobson and others 2004, 2005, 2006, 2007; Koloszar and Driscoll 2001a, 2001b; Koloszar and others 2002; Canaca and others 2004; McCarty and Jacobson 2008, 2009, 2010, 2011, 2012.

[3]Represents minimum number of eggs laid.

[4]Black Canyon is outside of Arizona state boundaries and is monitored opportunistically. It is not included in productivity calculations.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

APPENDIX D: NEST SURVEY RESULTS

Table 13. Results of the 2013 winter count, ORA, and nest survey flights (continued next page).

Location	Time	Comments
January 7, 2013		
Riverside BA	0753	Adult incubating in nest #1.
Granite Reef BA	0759	One adult standing in nest #5. Second adult perched by nest #2.
Orme BA	0802	All known nests empty. One adult in area.
Rodeo BA	0808	Adult incubating in nest #4. Second adult in area.
Sycamore BA	0810	All known nests empty. One adult in area.
Doka BA	0818	Adult incubating in nest #6.
Fort McDowell BA	0820	One adult perched by nest #15. Second adult perched near nest #18.
Box Bar BA	0823	Adult incubating in nest #4. Second adult standing in nest.
Needle Rock BA	0824	No new nests. One immature bald eagle in area.
Bartlett BA	0831	Adult incubating in nest #2.
Yellow Cliffs BA	0842	All known nests empty. One adult in area.
Cliff BA	0858	One adult standing in nest #6.
Sheep Creek	0855	One adult in area. No new nests.
Horseshoe BA	0915	All known nests empty. No bald eagles.
Table Mountain BA	0923	One adult standing in nest #4.
East Verde River	0931	No new nests and no eagles.
East Verde BA	0945	All known nests empty. No bald eagles.
Coldwater BA	0948	All known nests empty. No bald eagles.
Ladders BA	1000	Adult incubating in nest #3.
West Clear Creek	1006	All known nests empty. One adult in area.
Beaver BA	1138	Adult incubating in nest #1.
Oak Creek BA	1147	All known nests empty. One adult in area.
Tapco BA	1200	All known nests empty. No bald eagles. Nest #1 fallen.
Tower BA	1207	All known nests empty. No bald eagles.
Mormon Pocket nest site	1215	All known nests empty. No bald eagles.
Perkinsville BA	1218	All known nests empty. No bald eagles.
Hell Point historic BA	1227	All known nests empty. No bald eagles.
Granite nest site	1236	All known nests empty. No bald eagles.
Sullivan Lake BA	1242	Adult incubating in nest #2.
Watson Lake nest site	1254	All known nests empty. No bald eagles.
Pleasant BA	1450	All known nests empty. No bald eagles.
Pee Posh Wetlands BA	1552	Adult incubating in new snag nest #4.
January 8, 2013		
Cibecue BA	1017	All known nests empty. One adult in area.
Mule Hoof historic BA	1031	All known nests empty. No bald eagles.
Cedar Basin BA	1051	All known nests empty. No bald eagles.
Lone Pine BA	1102	One adult standing in nest #2, flushed. Second adult in area.
George's Basin nest site	1400	All known nests empty. No bald eagles.
January 9, 2013		
Willow nest site	--	No new nests or bald eagles.
Eagle nest site	--	No new nests or bald eagles.
January 10, 2013		
Granite Reef BA	0810	All known nests empty. One adult in area.
Goldfield-Kerr BA	0815	One adult in nest #2, appeared to be incubating. Second adult flew to nest.
Bulldog BA	0822	Adult incubating in nest #2.

Table 13 continued.

Location	Time	Comments
Bagley & Blue Point BAs	0824	Adult incubating in Bagley nest #2 (Blue Point #10). One adult standing in Bagley #1.
Saguaro BA	0834	Two adults standing in nest #2.
Tortilla BA	0839	Adult incubating in nest #1.
Fish Creek BA	0849	All known nests empty. No bald eagles.
Horse Mesa BA	0859	Adult incubating in nest #4.
Campaign Bay BA	0910	On adult standing in new nest #1.
Pinto BA	0915	Two adults at nest #8.
Pinal BA	0919	Adult incubating in nest #3.
Redmond BA	0921	All known nests empty. No bald eagles.
Hess Creek nest site	0938	All known nests empty. No bald eagles.
Canyon historic BA	0944	All known nests empty. No bald eagles.
Tonto BA	1137	One adult perched by nest.
Sheep BA	1142	All known nests empty. No bald eagles.
76 BA	1151	Nest #4 fallen. No new nests and no bald eagles.
Talkalai BA	1411	Adult incubating in nest #8. Second adult in area.
San Carlos BA	1420	All known nests empty. No bald eagles.
Suicide BA	1438	All known nests empty. No bald eagles.
Coolidge BA	1448	All known nests empty. One immature bald eagle in area.
Granite Basin BA	1521	One adult standing in nest #2.
February 4, 2013		
Riverside BA	0733	Adult incubating.
Granite Reef BA	0740	Adult incubating in nest #5.
Orme BA	0743	Adult incubating in nest #7.
Rodeo BA	0745	Adult incubating. Second adult in area.
Sycamore BA	0749	Adult incubating in nest #5.
Doka BA	0751	Adult incubating #6. Second adult in area.
Fort McDowell BA	0752	Two adults in area of nest #18.
Box Bar BA	0800	Adult incubating.
Needle Rock BA	0802	One adult in area. No new nests.
Bartlett BA	0805	Adult incubating.
Yellow Cliffs BA	0811	Adult incubating in nest #1.
Sheep Creek	0816	Two adults in area. No new nests.
Cliff BA	0825	Adult incubating in nest #6.
Horseshoe BA	0836	All known nests empty. No bald eagles.
Table Mountain BA	0847	Adult incubating in nest #4.
East Verde BA	0853	Adult incubating in nest #6.
Coldwater BA	0901	One adult standing in nest #3, flushed. Second adult in area.
Ladders BA	0906	Adult incubating.
Beaver BA	0915	Adult incubating.
Oak Creek BA	0923	Adult incubating in nest #4.
Oak Creek	0945	Searched Oak Creek up to Sedona. One adult in area.
Tapco BA	1047	Adult incubating in nest #2. Second adult in area.
Tower BA	1054	All known nests empty. No bald eagles.
Mormon Pocket nest site	1100	All known nests empty. Two adult bald eagles in area.
Perkinsville BA	1104	All known nests empty. No bald eagles.
Hell Point historic BA	1115	All known nests empty. No bald eagles.
Granite nest site	1125	Adult golden eagle incubating in nest #2. Second adult in area.
Sullivan Lake BA	1131	Adult incubating.

Table 13 continued.

Location	Time	Comments
Lynx BA	1144	Adult incubating in nest #3.
Watson Lake nest site	1149	All known nests empty. One adult bald eagle perched by lake.
Alamo BA	1345	Adult incubating in nest #4.
Ive's Wash BA	1353	Adult incubating in nest #4.
Pee Posh Wetlands BA	1450	Adult standing in nest as if brooding young.
February 5, 2013		
Goldfield-Kerr BA	0813	Adult incubating or brooding.
Bulldog BA	0819	Adult incubating or brooding.
Bagley BA	0822	Adult incubating . All other known nests empty.
Saguaro BA	0828	Adult incubating in nest #1.
Tortilla Creek BA	0832	Adult incubating in nest #1.
Fish Creek BA	0842	Adult incubating in nest #1.
Horse Mesa BA	0846	Adult incubating.
Rock Creek BA	0851	All known nests empty. No bald eagles.
Tonto BA	0900	All known nests empty. Two adults in area.
Sheep BA	0906	One adult standing in nest #6.
76 BA	0915	No new nests and no bald eagles.
Campaign Bay BA	0938	Adult incubating in nest #1.
Pinto BA	0940	Adult incubating in nest #8.
Pinal BA	0947	Adult incubating.
Redmond BA	0958	All known nests empty. No bald eagles.
Hess Creek nest site	1010	Nest not found. One adult bald eagle in area.
Cibecue BA	1150	All known nests empty. One adult in area.
Mule Hoof historic BA	1203	All known nests empty. No bald eagles.
Cedar Basin BA	1215	All known nests empty. No bald eagles.
Lone Pine BA	1230	Adult incubating in nest #2.
Crescent BA	1254	All known nests empty. No bald eagles.
Greer BA	1300	All known nests empty. No bald eagles.
Show Low Lake BA	1320	Two adults perched by nest #1.
Talkalai BA	1457	Adult incubating.
San Carlos BA	1504	Adult incubating in nest #6.
Suicide BA	1512	Adult incubating in nest #1.
Coolidge BA	1515	All known nests empty. No bald eagles.
Granite Basin BA	1522	All known nests empty. No bald eagles.
February 25, 2013		
Black Canyon BA (NV)	1635	Adult incubating or brooding in nest #1. Second adult flew to nest.
February 28, 2013		
Mohave BA	1126	One adult flew from nest #1. Nest empty.
Bill Williams BA	1200	All known nests empty. No bald eagles.
March 14, 2013		
Riverside BA	0724	Two nestlings, 5.5 weeks old. One adult in area.
Granite Reef BA	0730	One nestling, 3.5 weeks old. One adult perched above nest.
Orme BA	0738	Adult incubating.
Rodeo BA	0740	Two nestlings, 4 weeks old
Sycamore BA	0742	Two adults at nest. Two nestlings, 4 weeks old.
Doka BA	0745	Two nestlings, 4 weeks old, with one adult.
Fort McDowell BA	0747	Two adults perched in area of nest #18.
Box Bar BA	0750	Two nestlings, 3 weeks old. One adult in tree.
Needle Rock BA	0753	All known nests empty. One adult and two immature bald eagles in area.

Table 13 continued.

Location	Time	Comments
Bartlett BA	0755	Two nestlings, 4.5 weeks old. One adult flew to nest.
Yellow Cliffs BA	0801	Adult brooding at least one small nestling. Second adult in nest.
Cliff BA	0805	Adult brooding at least one small nestling. Second adult in nest.
Horseshoe BA	0818	All known nests empty. No bald eagles.
Table Mountain BA	0825	One nestling, 3 weeks old. Two adults at nest, both flsuhed.
East Verde BA	0831	Adult brooding at least one small nestling.
Deadman Mesa nest site	0836	Adult golden eagle incubating in nest #1.
Coldwater BA	0840	All known nests empty. Two adults in area. New cliff nest #9 empty.
Ladders BA	0850	One nestling, 4 weeks old. One adult flew to nest, flushed and went back.
Beaver BA	0858	Two nestlings, 5 weeks old.
Oak Creek BA	0904	Two nestlings, 4 weeks old. One adult in area.
Oak Creek	0910	Searched Oak Creek up to Sedona. New cliff nest #1 empty, potentially large enough for use by eagles.
Tapco BA	0925	Adult incubating or brooding.
Tower BA	0932	All known nests empty. No bald eagles.
Mormon Pocket nest site	0938	Adult golden eagle incubating in nest #2.
Perkinsville BA	0951	All known nests empty. Two adults bald eagles in area.
Hell Point historic BA	1135	Adult golden eagle incubating in nest #4.
Granite nest site	1146	Golden eagle incubating .
Sullivan Lake BA	1153	Two nestlings, 4.5 weeks old. Adult in nest.
Watson Lake nest site	1205	All known nests empty. One golden eagle perched in area.
Lynx BA	1211	Adult incubating.
Devil's Post historic BA	1236	All known nests empty. No bald eagles.
Burro Creek BA	1248	No new nests or bald eagles.
Alamo BA	1304	One nestling, 3 weeks old. Two adults standing in nest.
Ive's Wash BA	1310	One nestling shaded by adult (nestling approximatley 2.5 weeks old).
Pleasant BA	1408	Adult incubating in nest #3.
Pee Posh Wetlands BA	1426	Two nestlings, 6 weeks old. One adult in nest.
March 15, 2013		
Goldfield BA	0756	Two nestlings, 5 weeks old. One adult in nest.
Bulldog BA	0801	Two nestlings, 5 weeks old.
Bagley & Blue Point BAs	0804	Two nestlings, 4 weeks old (Bagley). One adult in nest.
Saguaro BA	0808	At least two nestlings, 3.5 weeks old. One adult in nest.
Tortilla Creek BA	0814	Two nestlings, 4 weeks old. One adult flew to nest.
Fish Creek BA	0820	One nestling, 2 weeks old, brooded by adult.
Horse Mesa BA	0826	Two nestlings, 4 weeks old. One adult in area.
Roosevelt Lake	0833	New large cliff nests #1, 2, and 3 found near dam. One golden eagle perched in area.
Bachelor Cove BA	0840	One nestling, 6 weeks old in new tree nest #1. One adult in nest.
Tonto BA	0845	One adult perched in nest tree. Second adult flew to nest.
Sheep BA	0851	Adult incubating in nest #5.
76 BA	0900	No new nests or eagles.
Dupont BA	0918	All known nests empty. No bald eagles.
Pinto BA	0930	At least one nestling, 3 weeks old, shaded by adult.
Pinal BA	0935	Two nestlings, 4.5 weeks old. One adult by nest.
Redmond BA	0940	All known nests empty. No eagles.
Hess Creek nest site	0950	All known nests empty. No eagles.
Canyon historic BA	1117	All known nests empty. No eagles.
Cibecue BA	1126	Adult incubating in nest #2.

Table 13 continued.

Location	Time	Comments
Mule Hoof historic BA	1128	All known nests empty. No eagles.
Cedar Basin BA	1140	All known nests empty. No bald eagles.
Lone Pine BA	1150	Two nestlings, 2.5 weeks old.
Crescent BA	1215	All known nests empty. One adult in area.
Greer Lakes BA	1220	All known nests empty. No bald eagles.
Show Low Lake BA	1249	Adult incubating in nest #1.
Rainbow Lake	1254	Searched. One medium and one medium-large nest found. No eagles.
Talkalai BA	1430	One nestling, 3 weeks old, shaded by adult.
San Carlos BA	1440	One nestling, 2.5 weeks old, shaded by adult. Second adult in area.
Suicide BA	1450	Adult in nest possibly brooding.
Coolidge BA	1455	All known nests empty. One adult and two immature bald eagles in area.
Granite Basin BA	1502	All known nests empty. No bald eagles.
March 25, 2013		
Black Canyon BA (NV)	1657	Two nestlings, 3 weeks old. One adult in area.
March 28, 2013		
Mohave BA	1039	All known nests empty. No bald eagles.
Bill Williams BA	1110	All known nests empty. No bald eagles.
April 15, 2013		
Goldfield BA	0705	Two nestlings, 9-10 weeks old. One adult in area.
Bulldog BA	0710	Two nestlings, 9-10 weeks old.
Bagley BA	0715	Two nestlings, 8-9-weeks old. One adult in area.
Saguaro BA	0717	Three nestlings, 7-8 weeks old..
Tortilla Creek BA	0720	Two nestlings, 8-9 weeks old.
Fish Creek BA	0724	One nestling, 6-7 weeks old, being fed by adult.
Horse Mesa BA	0728	Failed. Nest empty and no eagles.
Roosevelt Lake	0741	Three large nests, empty. Two adult bald eagles standing in one of them.
Bachelor Cove BA	0745	One nestling, 10 weeks old.
Tonto BA	0748	All known nests empty. No bald eagles.
Sheep BA	0753	Adult incubating.
Pinto BA	0811	Two nestlings, 5 weeks old, shaded by adult.
Pinal BA	0812	Two nestlings, 8-9 weeks old.
Redmond BA	0815	All known nests empty. Pair of adults perched and flying in area.
Cibecue BA	0838	Failed. Nest empty. No eagles.
Show Low Lake BA	0941	Adult incubating or brooding.
Lone Pine BA	1033	Failed. Nest empty and no eagles.
Talkalai BA	1105	One nestling, 7 weeks old. Adult in nest.
San Carlos BA	1115	Two nestlings, 6.5-7 weeks old. Adult in nest.
Suicide BA	1124	At least two nestlings, 3-4 weeks old, shaded by adult.
Coolidge BA	1125	Nest #4 fallen. No eagles.
Granite Basin BA	1135	All known nests empty. No bald eagles.
April 19, 2013		
Pee Posh BA	0736	Two nestlings, 11 weeks old. One was branching above nest.
Riverside BA	0748	One nestling, 10-11 weeks old. One fledgling perched in tree below nest.
Granite Reef BA	0757	Failed. Nest empty and no eagles.
Orme BA	0758	All known nests empty. No bald eagles.
Rodeo BA	0759	Two nestlings, 9-9.5 weeks old. One adult perched in area.
Sycamore BA	0801	Two nestlings, 9-9.5 weeks old.
Doka BA	0803	Two nestlings, 9-9.5 weeks old.
Fort McDowell BA	0805	All known nests empty. No bald eagles.

Table 13 continued.

Location	Time	Comments
Box Bar BA	0807	Two nestlings, 8 weeks old.
Bartlett BA	0808	One nestling, 9 weeks old.
Yellow Cliffs BA	0814	Two nestlings, 5 weeks old.
Cliff BA	0822	Two nestlings, 5-6 weeks old. One adult in nest.
Horseshoe BA	0833	All known nests empty. No bald eagles.
Table Mountain BA	0844	Failed. Nest empty. Two adults in area.
East Verde BA	0853	One nestling, 6-7 weeks old. One adult in area.
Deadman Mesa nest site	0901	Failed golden eagle attempt. Nest empty.
Coldwater BA	0907	All known nests empty. No bald eagles.
Beaver BA	0916	Two nestlings, 10-10.5 weeks old. Two adults in area.
Oak Creek BA	0921	Two nestlings, 8.5 weeks old.
Oak Creek	0925	Searched Oak Creek up to Sedona. All known nests empty. No bald eagles.
Tapco BA	1021	Failed. Nest #2 fallen. No eagles.
Mormon Pocket nest site	1030	Failed golden eagle attempt. Nest empty and no eagles.
Perkinsville BA	1032	All known nests empty. No bald eagles.
Hell Point historic BA	1043	Adult golden eagle incubating or brooding.
Granite nest site	1049	Failed golden eagle attempt. Nest empty and no eagles.
Sullivan Lake BA	1051	Two nestlings, 9.5 weeks old.
Lynx BA	1103	One nestling, 4-4.5 weeks old. Two adults at nest.
Goldwater Lake	1107	No new nests and no eagles.
May 8, 2013		
Saguaro BA	0632	Three nestlings, 10-11 weeks old.
Tortilla Creek BA	0636	One nestling, 11 weeks old. Presume second nestling fledged.
Fish Creek BA	0640	One nestling, 9-10 weeks old.
Rock Creek BA	0650	All known nests empty. No eagles.
Knoll Lake nest site	0715	Nests #1-4 not seen. No eagles.
Bear Canyon Lake nest site	0730	Osprey incubating in nest #1. Nest #2 empty.
Woods Canyon Lake BA	0735	Two nestlings, 2-3 weeks old. Two adults at nest.
Woods Canyon	0736	Ospreys incubating at new snag nests #4 and 7. Pair of ospreys perched by new snag nest #5. New snag nest #6 empty.
Willow Springs Lake nest site	0740	Ospreys incubating in nests # 1-2, 4-6 and new nest #7. Nest #3 not seen.
Chevelon Canyon lake nest site	0802	Nest #2 mosty fallen. Nest #3 not seen. One adult bald eagle perched at south end of lake.
Blue Ridge Reservoir nest site	0919	Osprey incubating in nest #2. Nest #5 not seen.
Tremaine/Soldier Annex/Long Lakes	0952	New large nest #2 in snag. Two adult and one immature bald eagles in area.
Kinnikinick Lake	1010	No new nests and no eagles.
Ashurst Lake	1020	No new nests. One immature bald eagle in area.
Upper Lake Mary nest site	1030	Ospreys active in nests #1-4 and new snag nests #7-10. Nests #5-6 not seen.
Lower Lake Mary BA	1035	One nestling, 3.5-4 weeks old, in new tree nest #3. One adult perched by nest, flushed. Second adult in area.
White Horse Lake nest site	1225	Ospreys active at nests #1, 2, 5, and new snag nest #6. Nest #3 not seen.
White Horse Lake BA	1226	Nest #4 empty. No bald eagles.
Sunflower Flat nest site	1230	Osprey incubating in nest #1. Nest #2 not seen.
Dogtown Lake nest site	1240	New large nest #2 empty. No eagles.

Table 13 continued.

Location	Time	Comments
Kaibab Lake	1245	Ospreys active at new nests #1-4. Ospreys perched by new nests #5-6. Two adult bald eagles flying in area.
JD Dam Lake nest site	1305	Osprey incubating in nest # 2.
Lynx Lake BA	1330	One nestling, 7 weeks old. One adult perched by nest.
East Verde BA	1355	One nestling, 9 weeks old. One adult in area.
Yellow Cliffs BA	1411	Teo nestlings, 8 weeks old. One adult in nest.
Box Bar BA	1418	Two nestlings, 11 weeks old. One adult in area.

APPENDIX E: BACHELOR COVE BREEDING AREA SUMMARY

Table 14. Observed human activity and bald eagle behavior, Bachelor Cove BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Drivers	87	81	--	--	--	58	68	294	73.9
OHVs	6	20	--	--	--	1	19	46	11.6
Birders	13	15	--	--	--	6	2	36	9.1
Hikers	--	4	--	--	--	2	--	6	1.5
Nestwatcher	2	2	1	1	--	--	--	6	1.5
Gold Miners	--	--	--	--	--	--	3	3	0.8
Boater	--	--	2	--	--	--	--	2	0.5
AZGFD Helicopter	--	--	--	--	--	--	1	1	0.3
Cyclists	1	--	--	--	--	--	--	1	0.3
Low Aircraft	--	1	--	--	--	--	--	1	0.3
Campers	--	1	--	--	--	--	--	1	0.3
Picnicker	--	1	--	--	--	--	--	1	0.3
Total	109	125	3	1	--	67	93	398	

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

Table 15. Observed prey types delivered to the nest, Bachelor Cove BA, Arizona, 2013.

Sex	Fish	Unknown	Total	Percent
Male	25	5	30	51.7%
Female	22	4	26	44.8%
Unknown	2	0	2	3.4%
Total	49	9	58	
Percent	84.4%	15.6%		

Table 16. Observed prey species delivered to the nest, Bachelor Cove BA, Arizona 2013.

Sex	Fish				Total	Percent
	LB[1]	BC	CP	CC		
Male	2	--	1	--	3	25.0
Female	5	2	--	--	7	58.3
Unknown	--	1	--	1	2	16.7
Total	7	3	1	1	12	
Percent	58.3	25.0	8.3	8.3		

[1]LB=largemouth bass, BC=black crappie, CP=carp, CC=channel catfish.

Table 17. Bald eagle habitat analysis at the Bachelor Cove BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
8.6	PT	Right	No	4	RS	UP
8.8	SG	Right	No	2	RS	UP
9.5	SG	Right	No	6	RS	UP
9.6	SG	Right	No	7	RS	UP
9.7a	NT	Right	Partial	8	RS	UP
9.7b	HL, CF, BO	Right	Partial	8	RS	UP
9.7c	RO	Right	No	8	RS	UP
9.7d	SP	Right	Partial	8	RS	UP
9.7e	CM	Right	Partial	8	RS	UP
9.7f	SG	Right	Partial	7	RS	UP
9.9	SG	Right	No	5	RS	UP
10.0	HL, CF, BO	Right	No	2	RS	UP
10.1	HL, CF, BO	Right	No	2	RS	UP
10.2	SO	Right	No	1	RS	SO
11.2	SO	Right	No	1	RS	SO
11.4	SG	Right	No	1	RS	SO
16.1	SO	Right	No	1	RS	SO

[1]Lake kilometer.
[2]PT = Pinnacle Top, SG=snag, NT=nest tree, HL = Hillside, CF = Cliff Ledge, BO = Boulder, RO = Roadside, SP = Stump, CM=Cottonwood Medium/10-20m, SO = Shore.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8= >400m.
[5]RS=reservoir main body.
[6]UP=desert upland, SO=shore.

Table 18. Bald eagle habitat use at the Bachelor Cove BA, Arizona, 2013.

River km[1]	PW[2,3]	PX	PP	PE	PK	PV	Total	Percent
8.6	4,153	--	17	--	--	--	4,170	24.6
8.8	106	--	--	--	--	--	106	0.6
9.5	7	--	--	--	--	--	7	<0.1
9.6	12	--	--	--	--	--	12	0.1
9.7	10,316	940	426	415	136	79	12,312	72.5
9.9	50	--	--	--	--	1	51	0.3
10.0	32	94	--	24	30	--	180	1.1
10.1	4	--	--	--	--	--	4	<0.1
10.2	8	--	--	--	--	--	8	<0.1
11.2	--	7	--	--	--	--	7	<0.1
11.4	75	--	--	--	--	--	75	0.4
16.1	57	--	--	--	--	--	57	0.3
Total	14,820	1,041	443	439	166	80	16,989	
Percent	87.2	6.1	2.6	2.6	1.0	0.5		

[1]Lake kilometer .
[2]Observation time (minutes).
[3]PW=perched watching, PX = Perched various and Perched interaction, PP = Perched preening, PE = Perched eating, PK = Perched with prey, PV = Perched vocalizing.

APPENDIX F: BARTLETT BREEDING AREA SUMMARY

Table 19. Observed human activity and bald eagle behavior, Bartlett BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Kayaker/Canoe	5	6	--	--	--	--	--	11	47.9
Helicopter	3	3	--	--	--	1	1	8	34.8
Military Helicopter	1	--	--	--	1	--	--	2	8.7
Raft	1	--	--	--	--	--	--	1	4.3
Small Plane	1	--	--	--	--	--	--	1	4.3
Total	11	9	--	--	1	1	1	23	

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

Table 20. Observed prey types delivered to the nest, Bartlett BA, Arizona, 2013.

Sex	Fish	Bird	Mammals	Total	Percent
Male	26	1	1	28	57.1
Female	18	--	--	18	36.8
Unknown	3	--	--	3	6.1
Total	47	1	1	49	
Percent	95.9	2.0	2.0		

Table 21. Observed prey species delivered to the nest, Bartlett BA, Arizona 2013.

Sex	Birds	Fish							Total	Percent
	AC[1]	SU	CP	BC	SB	LB	CS	UB		
Male	1	5	3	2	1	--	1	--	13	61.9
Female	--	2	3	--	1	1	--	1	8	38.1
Total	1	7	6	2	2	1	1	1	21	
Percent	4.8	33.3	28.6	9.5	9.5	4.8	4.8	4.8		

[1]AC=American coot, SU=sucker species, CP=common carp, BC=black crappie, SB=smallmouth bass, LB=largemouth bass, CS=catfish species, UB=bass species.

Table 22. Bald eagle habitat analysis at the Bartlett BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
34.6a	CF	Right	Yes	1	PO	CL
34.6b	CT	Right	No	1	PO	CL
34.7a	CF	Right	No	1	PO	CL
34.7b	CF	Right	Yes	1	PO	CL
34.7c	CF	Right	Yes	1	RI	CL
34.7d	RI	Right	No	2	PO	UP
34.8a	CF	Right	No	1	RI	CL
34.8b	CF	Right	Yes	1	RI	CL
34.8c	CT	Right	No	1	PO	CL
34.8d	CT	Right	Yes	1	PO	CL
34.8e	CT	Right	No	2	PO	CL
34.8f	CT	Right	Yes	2	PO	CL
34.9a	CF	Right	No	1	RI	CL
34.9b	CF	Right	Yes	1	RI	CL
34.9c	CF	Right	Yes	1	PO	CL
35.0a	CF	Right	Yes	1	PO	CL
35.0b	CF	Right	Yes	1	RI	CL
35.0c	CT	Right	No	1	PO	CL
35.0d	CT	Right	Yes	1	PO	CL
35.0e	PF	Right	No	1	PO	CL
35.0f	PT	Right	No	1	PO	CL
35.0g	PT	Right	Yes	1	PO	CL
35.1a	CT	Right	No	3	PO	CL
35.1b	CT	Right	Yes	3	PO	CL
36.1a	BO	Left	No	5	PO	UP
36.1b	SS	Left	No	5	PO	UP

[1]River kilometer (Hunt et al. 1992).
[2]BO=boulder, CF=cliff ledge, CT=cliff top, PF=pinnacle ledge, PT=pinnacle top, RI=ridge, SS=snag shrub.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8= >400m.
[5]PO= =pool, RI=riffle.
[6]CL=cliff, UP=desert upland.

Table 23. Bald eagle habitat use at the Bartlett BA, Arizona, 2013.

River km[1]	PW[2,3]	CL	PH	PF	PP	PE	Total	Percent
34.6	558	--	38	--	5	--	601	10.0
34.7	1,157	--	--	32	--	5	1,194	19.9
34.8	412	354	--	110	9	47	932	15.6
34.9	349	--	--	--	--	--	349	5.8
35.0	2,463	--	141	--	38	2	2,644	44.2
35.1	260	--	--	--	--	--	260	4.3
36.1	4	--	--	--	3	--	7	0.1
Total	5,203	354	179	142	55	54	5,987	
Percent	86.9	5.9	3.0	2.3	0.9	0.9		

[1]River kilometer (Hunt et al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, CL=perched close to young, PH=perched hunting, PF=perched feeding young, PP=perched preening, PE = perched eating.

APPENDIX G: CAMPAIGN BAY BREEDING AREA SUMMARY

Table 24. Observed human activity and bald eagle behavior, Campaign Bay BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small plane	3	10	--	--	--	--	--	13	43.3
Helicopter	1	3	--	--	--	--	--	4	13.3
Gunshots	2	1	--	--	--	--	--	3	9.9
Fishermen	--	2	--	--	--	--	--	2	6.6
Kayaker	--	2	--	--	--	--	--	2	6.6
Hikers	--	2	--	--	--	--	--	2	6.6
C130 plane	--	1	--	--	--	--	--	1	3.3
Military jet	--	1	--	--	--	--	--	1	3.3
OHV	1	--	--	--	--	--	--	1	3.3
Agency worker	--	1	--	--	--	--	--	1	3.3
Total	7	23	--	--	--	--	--	30	

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

Table 25. Observed forage events and success, Campaign Bay BA, Arizona, 2013.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
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 26. Bald eagle habitat analysis at the Campaign Bay BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
98.6	HS	Left	No	1	IN/RB	DB
98.7	HS	Right	No	1	IN	DB
98.8	HS	Right	No	1	IN/RB	DB
99.2	HS	Left	No	5	RE	DB
99.7	HS	Left	No	1	RU	WT/TX
99.8a	HS	Left	No	5	RU	DB
99.8b	HS	Left	No	4	RU	DB
99.8c	SG	Left	No	5	RB	DB
99.8d	NT	Right	No	6	RU	DB
99.9	HS	Left	No	6	RU	DB

[1]River kilometer (Hunt et. al. 1992).
[2]HS=hard snag (main branches only), SG=soft snag, NT=nest 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=>400m.
[5]IN=inflow to reservoir, RB=river bend, RE=reservoir, RU=run.
[6]DB=dead bosque, TX=tamarisk, WT=willow thicket.

Table 27. Bald eagle habitat use at the Campaign Bay BA, Arizona, 2013.									
River km[1]	PH[2,3]	PW	PP	PE	PK	PV	PD	Total	Percent
98.6	325	43	6	23	--	--	--	397	21.2
98.7	35	--	--	--	--	--	--	35	1.9
98.8	348	--	--	--	--	--	--	348	18.6
99.2	415	30	29	--	--	--	--	474	25.3
99.7	74	--	--	--	--	7	--	81	4.3
99.8	--	333	110	17	36	11	20	527	28.2
99.9	--	8	--	--	--	--	--	8	0.4
Total	1,197	414	145	59	20	18	17	1,870	
Percent	64.0	22.1	7.8	3.2	1.1	1.0	0.9		

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

APPENDIX H: CLIFF BREEDING AREA SUMMARY

Table 28. Observed human activity and bald eagle behavior, Cliff BA, Arizona, 2013.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
OHV/ATV	4	2	--	--	--	--	--	6	20.7
Helicopter	1	2	--	2	--	--	--	5	17.0
Small plane	--	5	--	--	--	--	--	5	17.0
Apache Helicopter	1	2	2	--	--	--	--	5	17.0
Military Jet	2	1	--	--	--	--	--	3	10.3
Nestwatcher/AGFD	--	--	--	2	--	--	--	2	6.9
Horse Riders	1	--	--	--	--	--	--	1	3.4
Hiker	--	--	--	1	--	--	--	1	3.4
Hunter	--	--	--	1	--	--	--	1	3.4
Total	9	12	2	6	--	--	--	29	

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

Table 29. Observed forage events and success, Cliff BA, Arizona, 2013.						
Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	5	4-1	--	--	5	4-1
Female	1	1-0	2	1-1	3	2-1
Total	6	5-1	2	1-1	8	6-2

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

Table 30. Observed prey types delivered to the nest, Cliff BA, Arizona, 2013.						
Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	38	3	1	6	48	70.6
Female	14	1	3	2	20	29.4
Total	52	4	4	8	68	
Percent	76.5	5.9	5.9	11.8		

Table 31. Observed prey species delivered to the nest, Cliff BA, Arizona 2013.					
Sex	Fish		Birds	Total	Percent
	CP[1]	CC	BH		
Male	1	1	--	2	66.7
Female	--	--	1	1	33.3
Total	1	1	1	3	
Percent	33.3	33.3	33.3		

[1]CP=common carp, CC=channel catfish, BH=great blue heron.

Table 32. Bald eagle habitat analysis at the Cliff BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type	Land Type[5]
66.5	SG	Right	No	4	--	MB
66.6	SG	Right	No	4	--	MB
66.7a	CF	Left	Partial	1	--	CL
66.7b	HS	Right	No	4	--	MB
66.7c	SG	Right	No	4	--	MB
66.8	ST	Right	No	4	--	MB
67.0	HS	Right	No	2	--	MB
67.1	CL	Right	No	2	--	MB
67.3	ST	Right	No	2	--	MB
67.5	CL	Right	Partial	1	--	CW
67.7	CF	Left	Partial	1	--	CL
72.8	CF	Left	Partial	1	--	CL

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

Table 33. Bald eagle habitat use at the Cliff BA, Arizona, 2013.

River km[1]	PW[2,3]	PP	PH	PV	PE	Total	Percent
66.5	643	41	--	--	--	684	9.7
66.6	4,436	99	--	3	--	4,538	64.4
66.7	247	--	--	--	--	247	3.5
66.8	123	--	--	--	--	123	1.7
67.0	113	--	--	--	--	113	1.6
67.1	193	--	--	--	--	193	2.7
67.3	13	--	5	1	5	24	0.3
67.5	--	--	8	--	--	8	0.1
67.7	495	--	115	1	--	611	8.7
69.2	495	--	--	--	--	495	7.0
72.8	--	--	12	--	--	12	0.2
Total	6,758	140	140	5	5	7,048	
Percent	95.9	2.0	2.0	0.1	0.1		

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

APPENDIX I: CRESCENT BREEDING AREA SUMMARY

Table 34. Observed human activity and bald eagle behavior, Crescent BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	Total	Percent
Anglers	1,435	--	--	--	--	--	1,435	72.8
Boater - fishing	259	--	--	--	--	--	259	13.1
Float tubers	138	--	--	--	--	--	138	7.0
Picnickers	40	--	--	--	--	--	40	2.0
Canoe - kayak	34	--	--	--	--	--	34	1.7
Birder	16	--	--	--	--	--	16	0.8
Agency workers	15	--	--	--	--	--	15	0.8
Drivers	11	--	--	--	--	--	11	0.6
Small Plane	8	--	2	1	--	--	11	0.6
Hikers	6	--	1	1	--	--	8	0.4
Helicopter	2	--	--	--	--	--	2	0.1
Bikes	1	--	--	--	--	--	1	0.1
Gunshot	--	--	1	--	--	--	1	0.1
Military Helicopter	1	--	--	--	--	--	1	0.1
Total	1,966	--	4	2	--	--	1,972	

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

Table 35. Observed forage events and success, Crescent BA, Arizona, 2013.

Sex	Fish		Birds		Mammals		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	77	75-2	2	2-0	--	--	79	77-2
Female	48	47-1	2	2-0	2	2-0	52	51-1
Total	125	122-3	4	4-0	2	2-0	131	128-3

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

Table 36. Observed prey types delivered to the nest, Crescent BA, Arizona, 2013.

Sex	Fish	Birds	Mammals	Total	Percent
Male	73	2	--	75	59.5
Female	47	2	2	51	40.5
Total	120	4	2	126	
Percent	95.2	3.2	1.6		

Table 37. Observed prey species delivered to the nest, Crescent BA, Arizona 2013.

Sex	Fish		Birds	Mammals	Total	Percent
	RT[1]	CT	AC	RS		
Male	70	3	2	--	75	60.0
Female	42	5	2	1	50	40.0
Total	112	8	4	1	125	
Percent	89.6	6.4	3.2	0.8		

[1]RT= rainbow trout, CT=cut throat trout, AC=American coot, RS=rabbit species, U=unknown.

Table 38. Bald eagle habitat analysis at the Crescent BA, Arizona, 2013.						
Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type	Land Type[5]
2.0	PS	West	Yes	6	--	CF
2.1	SC	West	Yes	8	--	CF
2.15	PO	West	Yes	7	--	CF
2.2	PO	West	Yes	8	--	CF
2.25	HS	West	No	8	--	CF
2.3	PO	West	No	7	--	CF
2.35	PO	West	Yes	8	--	CF
2.36	PO	West	Yes	4	--	CF
2.4	SC	West	No	8	--	CF
2.5	PO	West	No	6	---	CF
2.6	PO	West	No	3	--	CF

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

Table 39. Bald eagle habitat use at the Crescent BA, Arizona, 2013.								
Lake km[1]	PW[2,3]	PP	PR	PH	PV	PK	Total	Percent
2.0	436	--	--	--	--	--	436	1.0
2.1	2,702	--	--	--	--	1	2,703	5.9
2.15	11,512	90	121	74	2	--	11,799	25.8
2.2	282	--	53	--	5	--	340	0.7
2.25	18,875	243	--	--	26	--	19,144	41.9
2.3	5,813	14	--	--	10	14	5,851	12.8
2.35	2,928	14	--	--	--	--	2,942	6.4
2.36	385	8	--	42	--	--	435	1.0
2.4	601	20	--	--	--	--	621	1.4
2.5	368	--	--	--	4	--	372	0.8
2.6	1,059	--	--	--	5	--	1,064	2.3
Total	44,961	389	174	116	52	15	45,707	
Percent	98.4	0.9	0.4	0.3	0.1	<0.1		

[1]Lake kilometer (clockwise from north boat ramp).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PR=perched roosting, PH=perched hunting, PV=perched vocalizing, PK=perched with prey.

APPENDIX J: GOLDFIELD BREEDING AREA SUMMARY

Table 40. Observed human activity and bald eagle behavior, Goldfield BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Horseback rider	125	2	--	2	--	--	--	129	35.4
Kayak/canoe/raft*	67	10	--	--	--	--	--	77	21.1
Helicopters	14	17	--	2	--	--	12	45	12.4
Hiker	34	6	--	2	--	--	--	42	11.5
Apache helicopter	9	9	3	1	--	--	8	30	8.2
Small Plane	11	5	--	1	--	3	1	21	5.8
Ultralight helicopter	3	2	--	2	--	--	--	7	1.9
Jet, military	--	3	--	--	--	--	--	3	0.8
Military helicopter	--	2	--	--	--	--	--	2	0.6
Nestwatcher	--	--	--	2	--	--	--	2	0.6
Photographer	1	--	--	1	--	--	--	2	0.6
Driver	1	--	--	--	--	--	--	1	0.3
Fisherman	1	--	--	--	--	--	--	1	0.3
Sherriff Helicopter	--	--	--	--	--	--	1	1	0.3
Motorized parachute	--	--	--	1	--	--	--	1	0.3
Total	266	56	3	14	--	3	22	364	

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

Table 41. Observed forage events and success, Goldfield BA, Arizona, 2013.

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

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

Table 42. Observed prey types delivered to the nest, Goldfield BA, Arizona, 2013.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	4	1	1	9	15	48.4
Female	1	--	--	11	12	38.7
Unknown	1	--	--	3	4	12.9
Total	6	1	1	23	31	
Percent	19.4	3.2	3.2	74.2		

Table 43. Bald eagle habitat analysis at the Goldfield BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
9.4	CL	Right	No	1	RU	MB
9.5	CL	Right	No	3	--	MB
9.8	CL	Right	No	3	RU	MB
9.9	CS	Right	No	3	RU	MB
10.0	ST	Left	No	1	RU	MB
10.1a	ST	Right	No	1	RU	MB
10.1b	SG	Right	No	2	RU	WT
10.1c	CL	Left	Partial	2	RU	MB
10.2	CL	Right	No	1	BW	WT
10.4	HS	Right	No	3	--	MB
10.6	CM	Left	Yes	1	RI	SO
12.4	HS	Left	No	3	--	MB

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood large (20-30+m), CM=cottonwood medium (10-20+m), CS=cottonwood small/0-10 m, HS=hard snag (main branches only), SG=soft snag (dead but branches still intact), ST=snag top.
[3]Side of river facing downstream.
[4]1=0-25m, 2 =26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]BW=backwater, RI=riffle, RU=run.
[6]MB=mesquite bosque, SO=shore, WT=willow thicket.

Table 44. Bald eagle habitat use at the Goldfield BA, Arizona, 2013.

River km[1]	PW[2,3]	CL	PD	PV	PP	ET	PH	CO	GN	PK	Total	Percent
9.4	190	5	0	11	0	0	13	0	4	0	223	1.4
9.8	9	--	--	--	--	--	--	--	--	--	9	0.1
9.9	61	--	--	--	--	--	--	--	--	--	61	0.4
10.0	6	--	--	--	--	--	--	--	--	--	6	<0.1
10.1	1,982	45	123	32	10	28	0	2	0	0	2,222	13.5
10.2	13,322	228	--	78	57	14	--	2	--	1	13,702	83.3
10.4	20	--	--	--	--	--	--	--	--	--	20	0.1
10.6	176	--	--	--	--	--	9	--	--	--	185	1.1
12.4	13	--	--	--	--	--	--	--	--	--	13	0.1
Total	15,779	278	123	121	67	42	22	4	4	1	16,441	
Percent	96.0	1.7	0.7	0.7	0.4	0.3	0.1	<0.1	<0.1	<0.1		

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

APPENDIX K: LADDERS BREEDING AREA SUMMARY

Table 45. Observed human activity and bald eagle behavior, Ladders BA, Arizona, 2013.									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Kayaker/Canoe	16	34	--	--	--	1	--	51	81.0
Helicopter	--	4	--	--	--	--	--	4	6.3
Small Plane	2	2	--	--	--	--	--	4	6.3
Raft	--	1	--	--	--	1	--	2	3.2
Driver	--	1	--	--	--	--	--	1	1.6
Cattle Ranchers	1	--	--	--	--	--	--	1	1.6
Total	19	42	--	--	--	2	--	63	

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

Table 46. Observed forage events and success, Ladders BA, Arizona, 2013.						
Sex	Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	1	0-1	1	1-0	2	1-1
Total	1	0-1	1	1-0	2	1-1

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

Table 47. Observed prey types delivered to the nest, Ladders BA, Arizona, 2013.						
Sex	Mammals	Fish	Birds	Unknown	Total	Percent
Male	7	4	--	24	35	94.6
Female	--	--	1	1	2	5.4
Total	7	4	1	25	37	
Percent	18.9	10.8	2.7	67.6		

Table 48. Observed prey species delivered to the nest, Ladders BA, Arizona 2013.											
Sex	Fish		Birds	Mammals						Total	Percent
	SU[1]	CS	WS	MO	WR	GS	MC	RS	CO		
Male	2	2	--	2	1	1	1	1	1	11	91.7
Female	--	--	1	--	--	--	--	--	--	1	8.3
Total	2	2	1	2	1	1	1	1	1	12	
Percent	16.7	16.7	8.3	16.7	8.3	8.3	8.3	8.3	8.3		

[1]SU=sucker, CS=catfish species, WS=waterfowl species, GS=rock squirrel, WR=woodrat, MO=mouse MC=mountain cottontail, RS=rabbit species, CO=cow placenta.

Table 49. Bald eagle habitat analysis at the Ladders BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
161.2	CF	Right	Yes	1	PO	CL
161.8a	HS	Right	Yes	2	RI	CL
161.8b	JN	Right	No	2	RI	CL
161.9a	SC	Right	Partial	2	RI	CL
161.9b	HS	Right	Yes	3	RI	CL
161.9c	JN	Right	Yes	2	RI	CL
162.0	HS	Right	No	3	RI	UP
162.1	CF	Right	No	2	RI	CL
162.2	JN	Right	No	3	RI	UP
162.4	JN	Right	Yes	2	RI	UP
162.6a	JN	Right	Partial	4	RI	UP
162.6b	SJ	Left	No	6	PO	CL
162.6c	ID	Left	No	1	PO	SO
162.7	BO	Right	Yes	2	PO	UP
162.8a	CT	Left	No	2	PO	CL
162.8b	CF	Left	Partial	2	PO	CL
162.8c	CF	Left	Yes	2	PO	CL
162.8d	CT	Left	Yes	2	PO	CL
162.8e	JN	Left	No	2	PO	CL
162.8f	JN	Left	Yes	1	PO	CL
162.8g	SO	Left	No	1	PO	SO
162.8h	SO	Right	No	1	PO	SO
162.8i	SO	Right	Yes	1	PO	SO
162.9a	WO	Left	Yes	1	PO	CL
162.9b	BO	Left	Yes	1	PO	CL
162.9c	CF	Left	No	1	PO	CL
162.9d	CF	Left	No	2	PO	CL
162.9e	CF	Right	Yes	1	PO	CL
162.9f	CF	Left	Yes	2	PO	CL
162.9g	CF	Left	No	2	PO	CL
162.9h	CT	Left	No	2	PO	CL
162.9i	CT	Left	Yes	1	PO	CL
162.9j	CT	Left	Yes	2	PO	CL
162.9k	CT	Right	No	2	PO	CL
162.9l	CT	Right	Yes	2	PO	CL
162.9m	HL	Left	No	2	PO	CL
162.9n	ID	Left	Yes	1	PO	CL
162.9o	RW	Left	No	1	PO	PO
162.9p	SO	Left	No	1	PO	SO
162.9q	SO	Left	Yes	1	PO	CL
162.9r	SO	Left	Yes	1	PO	SO
163.0a	CF	Left	Yes	2	PO	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, HS=hard snag, JN=juniper, SC=conifer snag, SJ= juniper snag, BO=boulder, CT=cliff top, SO=shore, WO=willow, HL=hillside, ID=island, RW=rock in water.
[3]Side of river facing downstream.
[4]1=0-25m, 2 =26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=pool, RI=riffle.
[6]CL=Cliff, UP=upland desert, SO=Shore, PO=River pool.

Table 49 continued.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
163.0b	CT	Left	Partial	2	PO	CL
163.0c	CT	Left	Yes	2	PO	CL
163.0d	SO	Left	No	1	PO	CL
163.1a	CF	Left	Yes	1	PO	CL
163.1b	CF	Right	Yes	2	RI	CL
163.1c	JN	Right	No	6	PO	UP
163.3	CF	Right	Yes	2	RI	CL
163.4a	CF	Right	No	2	RI	CL
163.4b	CT	Right	No	2	RI	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, HS=hard snag, JN=juniper, SC=conifer snag, SJ= juniper snag, BO=boulder, CT=cliff top, SO=shore, WO=willow, HL=hillside, ID=island, RW=rock in water.
[3]Side of river facing downstream.
[4]1=0-25m, 2 =26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=pool, RI=riffle.
[6]CL=Cliff, UP=upland desert, SO=Shore, PO=River pool.

Table 50. Bald eagle habitat use at the Ladders BA, Arizona, 2013.

River km[1]	PW[2,3]	PH	PV	PG	PD	PP	BA	DW	Total	Percent
161.2	--	32	--	--	--	--	--	--	32	2.5
161.8	21	--	--	--	--	--	--	--	21	1.6
161.9	85	118	--	--	--	--	--	--	203	15.8
162.0	12	--	--	--	--	--	--	--	12	0.9
162.1	5	6	--	--	--	--	--	--	11	0.9
162.2	1	--	--	--	--	--	--	--	1	0.1
162.4	11	--	--	--	--	--	--	--	11	0.9
162.6	15	--	--	2	--	--	--	--	17	1.3
162.7	22	--	--	--	--	--	--	--	22	1.7
162.8	370	--	--	29		11	--	4	414	32.2
162.9	291	11	50	26	32	--	10	3	423	32.9
163.0	35	--	19	7	--	--	--	--	61	4.7
163.1	2	15	--	--	--	--	--	--	17	1.3
163.3	--	6	--	--	--	--	--	--	6	0.5
163.4	--	36	--	--	--	--	--	--	36	2.8
Total	870	224	69	64	32	11	10	7	1,287	
Percent	67.6	17.4	5.3	5.0	2.5	0.9	0.8	0.5		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PH=perched hunting, PV=perched vocalizing, PG=perched on the ground, PD=perched drying, PP=perched preening, BA=bathing, DW=drinking water.

APPENDIX L: LUNA BREEDING AREA SUMMARY

Table 51. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Birders	35	--	--	--	--	--	--	35	21.0
Drivers	34	--	--	--	--	--	--	34	20.4
Hikers	33	--	--	1	--	--	--	34	20.4
Picnickers	18	--	--	--	--	--	--	18	10.8
Agency Workers	18	--	--	--	--	--	--	18	10.8
Fisherman	10	--	--	--	--	--	--	10	6.0
Campers	6	--	--	--	--	--	--	6	3.6
Boaters (fishing)	3	--	--	--	--	--	--	3	1.8
Small Planes	3	--	--	--	--	--	--	3	1.8
Float Tubers	2	--	--	--	--	--	--	2	1.2
Kayaks	2	--	--	--	--	--	--	2	1.2
ATVs	1	--	--	--	--	--	--	1	0.6
Gunshots	1	--	--	--	--	--	--	1	0.6
Total	167	166	--	1	--	--	--	167	

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

Table 52. Observed forage events and success, Luna BA, Arizona, 2013.

Sex	Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	10	9-1	2	2-0	12	11-1
Female	19	18-1	--	--	19	18-1
Total	29	27-2	2	2-0	31	29-2

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

Table 53. Observed prey types delivered to the nest, Luna BA, Arizona, 2013.

Sex	Birds	Total	Percent
Male	9	9	45.0
Female	11	11	55.0
Total	20	20	
Percent	100.0		

Table 54. Observed prey species delivered to the nest, Luna BA, Arizona 2013.

Sex	Birds			Total	Percent
	AC[1]	EG	GA		
Male	6	2	--	8	42.1
Female	8	2	1	11	57.9
Total	14	4	1	19	
Percent	73.7	21.1	5.3		

[1]AC=American coot, EG=eared grebe, GA=gadwall.

Table 55. Bald eagle habitat analysis at the Luna BA, Arizona, 2013.

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

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

Table 56. Bald eagle habitat use at the Luna BA, Arizona, 2013.

River km[1]	PW[2,3]	PH	PR	PP	PD	CL	CO	Total	Percent
0.1	150	1	--	--	--	--	--	151	0.9
0.9	254	--	--	--	--	--	--	254	1.5
1.4	--	28	--	--	--	--	--	28	0.2
1.6	18	--	--	--	--	--	--	18	0.1
1.7	--	17	--	--	--	--	--	17	0.1
1.8	--	31	--	--	--	--	--	31	0.2
1.9	50	--	--	--	--	--	--	50	0.3
2.0	224	104	--	--	--	--	--	328	1.9
2.1	270	--	--	6	--	--	--	276	1.6
2.2	493	--	105	63	--	--	--	661	3.8
2.3	535	--	42	546	--	--	--	1,123	6.5
2.4	10,175	--	727	--	--	6	6	10,914	62.8
2.6	84	63	--	--	64	--	--	211	1.2
2.7	751	249	--	--	--	--	--	1,000	5.8
2.8	329	295	--	--	--	--	--	624	3.6
3.0	33	--	--	--	--	--	--	33	0.2
3.4	38	--	--	--	--	--	--	38	0.2
3.5	249	83	--	--	--	--	--	332	1.9
4.4	37	63	--	--	--	--	--	100	0.6
4.9	--	80	--	--	--	--	--	80	0.5
5.1	472	31	--	--	--	--	--	503	2.9
5.2	571	37	--	--	--	--	--	608	3.5
Total	14,733	1,082	874	615	64	6	6	17,380	
Percent	84.8	6.2	5.0	3.5	0.4	<0.1	<0.1		

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

APPENDIX M: ORME BREEDING AREA SUMMARY

Table 57. Observed human activity and bald eagle behavior, Orme BA, Arizona 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Helicopter (Apache)	1	37	--	1	--	5	13	57	33.9
Driver/vehicle	4	14	--	--	1	2	8	29	17.3
Helicopter (Civilian)	--	8	--	--	--	5	14	27	16.1
Hiker	--	2	--	6	--	--	3	11	6.5
Cyclist	2	4	--	--	--	--	5	11	6.5
Runner	--	9	--	--	--	--	1	10	6.0
Agency Worker	--	4	--	--	--	--	2	6	3.6
Small Plane	1	1	--	--	--	--	1	3	1.8
Construction	--	3	--	--	--	--	--	3	1.8
Photographer	--	1	--	1	--	--	--	2	1.2
Helicopter (Sheriff)	--	2	--	--	--	--	--	2	1.2
AGFD Researcher	--	2	--	--	--	--	--	2	1.2
Gunshot	--	--	--	1	--	--	--	1	0.6
Fisherman	--	--	--	--	--	--	1	1	0.6
Picnicker	--	1	--	--	--	--	--	1	0.6
Hunter	--	--	--	1	--	--	--	1	0.6
Helicopter (Other military)	--	--	--	--	--	--	1	1	0.6
Total	8	88	--	10	1	12	49	168	

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

Table 58. Bald eagle habitat analysis at the Orme BA, Arizona, 2013 (continued next page).

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
V 0.3a	CL	Right	No	5	--	CW
V 0.3b	CL	Right	No	4	--	CW
V 0.3c	CL	Left	No	5	--	CW
V 0.4a	HS	Left	Partial	2	RU	MB
V 0.4b	HS	Left	Partial	1	--	MB
V 0.6a	SM	Left	Partial	1	PO	MB
V 0.6b	SM	Left	No	1	RU	MB
V 0.6c	CS	Right	Partial	4	--	CW
V 0.6d	BA	Left	Yes	2	--	MB
V 0.6e	HS	Left	No	4	--	TX
V 0.6f	CS	Right	No	5	--	CW
V 0.7	SG	Right	Partial	5	--	TX
V 1.1	SM	Left	Yes	1	SO	UP
V 1.3	HS	Left	No	1	--	UP

[1]River kilometer (Hunt et. al. 1992). V=Verde River.
[2]BA=cut bank, CL=cottonwood large (>20m), CS=cottonwood small (0-10m), HS=hard snag (main branches only), SG=soft snag (dead but branches still intact), SM=snag, mesquite.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=river pool, RU=run, SO=shore.
[6]CW=cottonwood grove, MB=mesquite bosque, TX=tamarisk thicket, UP=desert upland.

Table 58 continued.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
S 6.2a	SG	Left	No	3	RI	MB
S 6.2b	HS	Right	No	2	RI	TX
S 6.5a	BO	Left	Partial	1	PO	UP
S 6.5b	BO	Left	Yes	1	PO	UP
S 6.5c	BO	Left	Yes	5	-	UP
S 6.5d	CF	Left	No	1	PO	CL
S 6.5e	BO	Left	Partial	3	PO	UP
S 6.5f	CT	Left	No	1	PO	UP
S 6.5g	CF	Left	Partial	1	PO	UP
S 6.7	BO	Left	Partial	4	RB	UP
S 6.8	BO	Left	Partial	5	RI	UP
S 7.9	CL	Right	Partial	--	--	CW
S 9.6	CL	--	No	--	--	CW
S 9.9	CL	--	Yes	--	--	CW
999.9	BA	--	Yes	8	--	UP

[1]River kilometer (Hunt et. al. 1992). S=Salt River

[2]BA=cut bank, BO=boulder, CF=cliff ledge, CL=cottonwood large (>20m), CT=cliff top, HS=hard snag (main branches only), SG=soft snag (dead but branches still intact).

[3]Side of river facing downstream.

[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.

[5]PO=river pool, RB=river bend, RI=riffle.

[6]CW=cottonwood grove, MB=mesquite bosque, TX=tamarisk thicket, UP=desert upland.

Table 59. Bald eagle habitat use at the Orme BA, Arizona, 2013.

River km[1]	PW[2,3]	PP	PX	PH	PV	PE	PD	PU	PI	OT	Total	Percent
V 0.3	157	--	6	--	--	4	--	--	--	1	168	5.8
V 0.4	--	--	--	30	--	1	--	--	--	--	31	1.1
V 0.6	819	168	60	--	17	--	17	--	--	2	1,083	37.4
V 0.7	764	351	119	--	37	--	18	1	2	7	1,299	44.9
V 0.8	--	--	--	--	--	--	--	--	--	1	1	<0.1
V 0.9	4	--	--	--	--	--	--	--	--	4	8	0.3
V 1.0	--	--	--	1	--	--	--	--	--	--	1	<0.1
S 6.2	41	4	--	110	6	--	--	--	--	--	161	5.6
S 6.5	49	--	--	6	3	--	--	--	7	--	65	2.2
S 6.7	--	--	--	--	--	--	--	1	--	--	1	<0.1
S 7.4	--	--	--	--	--	33	--	2	--	--	35	1.2
S 7.5	--	--	--	--	--	--	--	1	--	--	1	<0.1
S 9.6	23	--	--	--	--	--	--	18	--	--	41	1.4
Total	1,857	523	185	147	63	38	35	23	9	15	2,895	
Percent	64.1	18.1	6.4	5.1	2.2	1.3	1.2	0.8	0.3	0.5		

[1]River kilometer (Hunt et al. 1992). V=Verde River, S=Salt River.

[2]Observation time (minutes).

[3]PW=perched watching, PP=perched preening, PX=perched, various, PH=perched hunting, PV=perched vocalizing, PE=perched eating, PD=perched drying, PU=perched unknown, PI=perched interaction, OT=other (includes perched close to mate, perched with prey, gathering nest materials, and drinking water).

APPENDIX N: PINTO BREEDING AREA SUMMARY

Table 60. Observed human activity and bald eagle behavior, Pinto BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Fishermen	6	7	2	--	--	--	--	15	24.2
Helicopter	2	10	--	--	--	--	--	12	19.4
Small plane	3	6	--	--	--	--	--	9	14.5
Gunshots	2	4	--	--	--	--	--	6	9.7
Kayaker	1	5	--	--	--	--	--	6	9.7
Campers	3	1	--	--	--	--	--	4	6.5
Military jet	--	2	1	--	--	--	--	3	4.8
C130 plane	--	3	--	--	--	--	--	3	4.8
OHV	1	2	--	--	--	--	--	3	4.8
Agency worker	--	1	--	--	--	--	--	1	1.6
Total	18	41	3	--	--	--	--	62	

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

Table 61. Observed forage events and success, Pinto BA, Arizona, 2013.

Sex	Birds		Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	1	0-1	1	0-1	2	1-1	4	1-3
Female	--	--	--	--	4	1-3	4	1-3
Total	1	0-1	1	0-1	6	2-4	8	2-6

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

Table 62. Observed prey types delivered to the nest, Pinto BA, Arizona, 2013.

Sex	Fish	Unknown	Total	Percent
Male	13	2	15	50.0
Female	10	2	12	40.0
Unknown	2	1	3	10.0
Total	25	5	30	
Percent	83.3	16.7		

Table 63. Observed prey species delivered to the nest, Pinto BA, Arizona 2013.

Sex	Fish		Total	Percent
	CP[1]	SU		
Male	8	5	13	52.0
Female	7	3	10	40.0
Total	16	9	25	
Percent	64.0	36.0		

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

Table 64. Bald eagle habitat analysis at the Pinto BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
101.9	CT	Right	No	1	RU	UP
102.0	HS	Left	No	1	RU	MB
102.2	CF	Right	Yes	1	RU	UP
103.5	CT	Right	No	1	RU	UP
103.6a	SG	Right	No	1	RU	TX
103.6b	RO	Right	No	3	RI	UP
103.6c	CB	Right	No	1	RI	TX
104.0	HS	Right	No	1	RU	DB
104.1a	SG	Right	No	1	RB	DB
104.1b	SG	Right	No	1	RU	DB
104.2a	HS	Right	No	2	RU	DB
104.2b	SG	Right	No	1	RI	DB
104.3a	SG	Right	No	1	RU	DB
104.3b	HS	Right	No	5	RU	DB
104.4a	HS	Right	No	5	RU	DB
104.4b	HS	Left	No	1	RI	DB
104.4c	HS	Right	No	5	RU	DB
104.5a	HS	Right	No	4	RU	DB
104.5b	SG	Left	No	1	RU	DB
105.6	CT	Left	No	2	RU	UP
105.7	MM	Right	No	1	RI	MB

[1]River kilometer (Hunt et. al. 1992).
[2]CB=cobble bar, CF=cliff face, CT=cliff top, HS=hard snag (main branches only), MM=medium mesquite, RO=rock outcrop, SG=soft snag (dead but branches still intact).
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PO=pool, RB=river bend, RI=riffle, RU=run.
[6]CL=cliff , DB=dead bosque, MB=dead mesquite bosque, UP=upland desert.

Table 65. Bald eagle habitat use at the Pinto BA, Arizona, 2013.

River km[1]	PH[2,3]	PW	PP	PD	PE	PV	Total	Percent
101.9	480	--	--	--	--	14	494	4.1
102.0	52	--	--	--	--	--	52	0.4
102.2	3,993	--	--	--	--	--	3,993	33.1
103.5	75	--	--	--	--	--	75	0.6
103.6	207	--	--	--	43	--	250	2.1
104.0	61	--	--	--	--	--	61	0.5
104.1	62	--	--	--	--	--	62	0.5
104.2	992	2,918	292	61	27	3	4,293	35.6
104.3	30	458	25	--	--	--	513	4.3
104.4	109	1,322	109	21	3	36	1,600	13.3
104.5	126	245	--	--	--	--	371	3.1
105.6	300	--	--	--	--	--	300	2.5
105.7	6	--	--	--	--	--	6	<0.1
Total	6,493	4,943	426	82	73	53	12,070	
Percent	53.8	41.0	3.5	0.7	0.6	0.4		

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

APPENDIX O: PLEASANT & WHISKEY SPRING BREEDING AREA SUMMARY

Table 66. Observed human activity and bald eagle behavior, Pleasant & Whiskey Spring BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Small planes	30	9	--	--	--	1	8	48	57.1
Boats	6	--	--	--	--	7	4	17	20.2
Military Jets	1	2	1	--	--	--	--	4	4.7
Helicopters	2	--	--	--	--	1	--	3	3.6
Nestwatcher	1	--	--	1	--	--	1	3	3.6
Gun Shots	2	--	1	--	--	--	--	3	3.6
Agency Worker	2	--	--	--	--	--	--	2	2.4
C130 Cargo Plane	--	--	--	--	--	--	1	1	1.2
Ultralight Plane	1	--	--	--	--	--	--	1	1.2
Total	45	13	2	1	--	9	14	84	

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

Table 67. Bald eagle habitat analysis at the Pleasant BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
72.2	CF	Right	No	2	RB	CL
72.9	SO	Left	No	1	RB	SO
73.1	SO	Left	No	1	RB	SO
73.2	CT	Left	No	3	RB	CL
73.2	DW	Left	Partial	1	RB	SO
73.4	BO	Left	No	1	RB	TA
73.5	BO	Left	No	2	RB	TA
73.7	SS	Left	No	1	RB	SO
73.8	SS	Left	No	1	RB	SO

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, BO=boulder, CT=cliff top, DW=drift wood, SO=shore, SS=snag shrub.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[4]RB=river bend.
[5]CL=cliff ledge, SO=shore, TA=talus.

Table 68. Bald eagle habitat use at the Pleasant BA, Arizona, 2013.

River km[1]	PW[2,3]	PP	DW	PH	Total	Percent
72.2	60	--	--	--	60	18.7
72.7	--	--	5	--	5	1.6
73.1	5	--	--	--	5	1.6
73.2	183	29	19	--	231	72.2
73.4	7	--	--	--	7	2.2
73.5	6	--	--	--	6	1.9
73.7	--	--	--	2	2	0.6
73.8	--	--	--	4	4	1.2
Total	261	29	24	6	320	
Percent	81.5	9.1	7.5	1.9		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, DW=drinking water, PH=perched hunting.

Table 69. Bald eagle habitat analysis at the Whiskey Spring BA, Arizona, 2013.						
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
68.7	RI	Left	No	1	RB	SO
68.8	CT	Left	No	1	RB	CL
68.9	CT	Left	No	1	RB	CL
69.0	CT	Left	No	1	RB	CL
69.1	CT	Left	No	1	RB	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CT=cliff top, RI=ridge.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[4]RB=river bend.
[5]CL=cliff ledge, SO=shore.

Table 70. Bald eagle habitat use at the Whiskey Spring BA, Arizona, 2013.				
River km[1]	PW[2,3]	PP	Total	Percent
68.7	5	--	5	2.0
68.8	12	--	12	4.7
68.9	191	17	208	81.9
69.0	17	--	17	6.7
69.1	12	--	12	4.7
Total	237	17	254	
Percent	93.3	6.7		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening.

APPENDIX P: SHOW LOW LAKE BREEDING AREA SUMMARY

Table 71. Observed human activity and bald eagle behavior, Show Low Lake BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Fishing by Boat	595	--	--	--	--	--	--	595	38.5
Anglers	567	--	--	1	--	--	--	568	36.8
Swimmer	141	2	--	--	--	--	--	143	9.3
Canoes/Kayaks	86	2	2	1	--	--	--	91	5.9
Partier	48	3	--	--	--	--	--	51	3.3
Small Planes	21	5	--	--	--	--	--	26	1.7
Boater	19	--	--	--	--	--	--	19	1.2
Hikers	17	1	--	--	--	--	--	18	1.2
Paddleboard	15	--	--	--	--	--	--	15	0.9
Rafter	3	--	--	--	--	--	--	3	0.2
Commercial Jet	3	--	--	--	--	--	--	3	0.2
Agency Worker	3	--	--	--	--	--	--	3	0.2
Helicopter	3	2	2	--	--	--	--	7	0.4
Dogs/Barking	--	2	1	--	--	--	--	3	0.2
Total	1,521	17	5	2	--	--	--	1,545	

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

Table 72. Observed forage events and success, Show Low Lake BA, Arizona, 2013.

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

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

Table 73. Observed prey types delivered to the nest, Show Low Lake BA, Arizona, 2013.

Sex	Fish	Unknown	Total	Percent
Male	37	2	39	55.7
Female	30	1	31	44.3
Total	67	3	70	
Percent	95.7	4.3		

Table 74. Bald eagle habitat analysis at the Show Low Lake BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
2.0a	PO	Right	Yes	1	RS	CF
2.0b	PO	Right	Yes	2	RS	CF
2.0c	ST	Right	No	2	RS	CF
2.0d	ST	Right	No	1	RS	CF
2.0e	ST	Right	Partial	2	RS	CF
2.1a	HS	Right	Yes	1	RS	CF
2.1b	PS	Right	Partial	2	RS	CF
2.1c	SG	Right	Yes	1	RS	CF
2.1d	ST	Right	No	2	RS	CF
2.2a	BO	Right	Yes	1	RS	CF
2.2b	HS	Right	No	1	RS	CF
2.2c	HS	Right	No	2	RS	CF
2.2d	HS	Right	No	3	RS	CF
2.2e	LG	Center	No	1	RS	CF
2.2f	PO	Right	No	2	RS	CF
2.2g	PO	Right	Yes	1	RS	CF
2.2h	PS	Right	No	1	RS	CF
2.2i	PS	Right	No	2	RS	CF
2.2j	PS	Right	Yes	1	RS	CF
2.2k	SC	Right	Partial	1	RS	CF
2.2l	SC	Right	No	1	RS	CF
2.2m	SG	Right	Partial	1	RS	CF
2.2n	SG	Right	No	1	RS	CF
2.2o	SO	Right	Yes	1	RS	CF
2.2 p	ST	Right	No	2	RS	CF
2.25 (nest)	SG	Right	No	2	RS	CF
2.3a	HS	Right	N	1	RS	CF
2.3b	HS	Right	No	2	RS	CF
2.3c	HS	Right	Partial	1	RS	CF
2.3d	LG	Right	Y	1	RS	CF
2.3e	LG	Right	No	1	RS	CF
2.3f	PO	Right	Partial	1	RS	CF
2.3g	PO	Right	No	1	RS	CF
2.3h	PS	Right	No	1	RS	CF
2.3i	PS	Right	No	2	RS	CF
2.3j	PS	Right	Yes	1	RS	CF
2.3k	PS	Right	Yes	2	RS	CF
2.3 l	SC	Right	Partial	1	RS	CF
2.3m	SC	Right	No	1	RS	CF
2.3n	SG	Right	Yes	1	RS	CF
2.3o	SO	Right	No	1	RS	CF
2.3p	SO	Right	Partial	1	RS	CF
2.3q	ST	Right	No	1	RS	CF

[1]Lake kilometer (clockwise from middle of dam).
[2]BO=boulder, HS=hard snag (main branches only), LG=log, PO=pine/conifer, old growth/20-30+ m., PS=pine/second growth 10-20m, SC=snag, conifer, SG=soft snag (dead but branches still intact), SO=shore, ST=snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=conifer forest.

Table 74 continued.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
2.4a	HS	Right	No	2	RS	CF
2.4b	HS	Right	Yes	2	RS	CF
2.4c	HS	Right	Partial	1	RS	CF
2.4d	LG	Right	No	1	RS	CF
2.4 e	PO	Right	Partial	1	RS	CF
2.4f	PS	Right	No	1	RS	CF
2.4g	PS	Right	Yes	1	RS	CF
2.4h	SC	Right	No	1	RS	CF
2.4i	SO	Right	No	1	RS	CF
2.4j	ST	Right	No	2	RS	CF
2.4k	ST	Right	No	1	RS	CF
2.4l	ST	Right	Yes	2	RS	CF
2.4m	ST	Right	No	1	RS	CF
3.7	PS	Left	Yes	1	RS	CF
3.9a	PO	Left	Partial	1	RS	CF
3.9b	PS	Left	No	1	RS	CF
3.9c	PS	Left	No	1	RS	CF
3.9d	PS	Left	Partial	1	RS	CF
3.9e	PS	Left	Partial	2	RS	CF
3.9f	SG	Left	No	1	RS	CF
3.9g	SO	Left	No	1	RS	CF

[1]Lake kilometer (clockwise from middle of dam).
[2]BO=boulder, HS=hard snag (main branches only), LG=log, PO=pine/conifer, old growth/20-30+ m., PS=pine/second growth 10-20m, SC=snag, conifer, SG=soft snag (dead but branches still intact), SO=shore, ST=snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=conifer forest.

Table 75. Bald eagle habitat use at the Show Low Lake BA, Arizona, 2013.

Lake km[1]	PW[2,3]	PP	PH	DW	PV	PI	BA	ET	PD	GN	Total	Percent
2.0	131	--	--	--	--	--	--	--	--	--	131	1.4
2.1	157	--	--	--	--	--	--	--	--	--	157	1.7
2.2	612	7	--	--	2	12	--	7	8	--	648	7.0
2.3	6,816	115	44	32	21	14	14	4	2	10	7,072	76.4
2.4	229	9	--	7	7	--	--	--	--	--	252	2.7
3.7	10	--	--	--	--	--	--	--	--	--	10	0.1
3.9	985	4	--	--	2	--	--	--	--	--	991	10.7
Total	8,940	135	44	39	32	26	14	11	10	10	9,261	
Percent	96.5	1.5	0.5	0.4	0.4	0.3	0.1	0.1	0.1	0.1		

[1]Lake kilometer (clockwise from middle of dam).
[2]Observation time (minutes).
[3]PW=perched watching, PP=perched preening, PH=perched hunting, DW=drinking water, PV=perched vocalizing, PI=perched interaction, BA=bathing, ET=eating in tree, PD=perched drying, GN=gathering nest materials.

APPENDIX Q: SYCAMORE BREEDING AREA SUMMARY

Table 76. Observed human activity and bald eagle behavior, Sycamore BA, Arizona, 2013.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Horseback riding groups	76	3	--	--	--	2	--	81	34.3
OHV	40	7	--	2	--	6	1	56	23.6
Driver	22	4	--	4	--	5	--	35	14.8
Small plane	11	3	1	--	--	1	--	16	6.8
Helicopter	9	2	--	--	--	4	--	15	6.3
Apache helicopter	7	1	--	--	--	2	--	10	4.2
Military helicopter	3	2	--	--	--	1	--	6	2.5
Hiker	1	1	--	1	--	2	--	5	2.1
Gunshots	2	1	--	1	--	1	--	5	2.1
Rancher	2	--	--	--	--	1	--	3	1.3
AGFD Researcher	--	--	--	2	--	--	--	2	0.8
MCSO Helicopter	1	--	--	--	--	--	--	1	0.4
Raft	--	--	--	--	--	1	--	1	0.4
Ultralight	--	1	--	--	--	--	--	1	0.4
Total	174	25	1	10	--	26	1	237	

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

Table 77. Observed forage events and success, Sycamore BA, Arizona, 2013.

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

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

Table 78. Observed prey types delivered to the nest, Sycamore BA, Arizona, 2013.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	12	--	3	18	33	44.0
Female	30	4	1	7	42	56.0
Total	42	4	4	25	75	
Percent	56.0	5.3	5.3	33.4		

Table 79. Observed prey species delivered to the nest, Sycamore BA, Arizona 2013.

Sex	Fish			Birds		Total	Percent
	CP[1]	SU	RT	AC	WS		
Male	1	1	2	1	1	6	28.6
Female	7	5	3	--	--	15	71.4
Total	8	6	5	1	1	21	
Percent	38.1	28.5	23.8	4.8	4.8		

[1]CP=common carp, SU=sucker species, RT=rainbow trout, AC=American coot, WS= waterfowl species.

Table 80. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2013.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
V 9.3	GR	Right	No	8	--	FL
V 9.5	SM	Left	No	1	RI	MB
V 9.6	CM	Right	Yes	1	RI	CW
V 10.0	ST	Left	No	4	RU	MB
V 10.1a	MS	Right	Yes	1	RU	MB
V 10.1b	SP	Left	No	7	RU	MB
V 10.2	SM	Right	No	1	RU	MB
V 10.3	SB	Center	No	1	RI	--
V 10.4 a	SG	Left	No	6	RI	MB
V 10.4b	TX	Left	No	4	RI	GB
V 10.4c	SM	Left	No	6	RI	MB
V 10.8	SG	Right	No	3	RU	MB
V 11.5	SG	Right	No	4	RU	TX
V 11.7	SG	Right	No	4	RU	FL
V 11.8	ST	Right	No	2	RI	MB
V 12.2	CM	Left	Yes	2	RU	CW
V 12.4	CL	Left	Yes	3	RU	CW
S 0.4	CL	Left	Yes	8	--	CW
S 0.5	SM	Left	No	8	--	MB
S 0.7	YM	Left	Partial	8	--	MB

[1]River kilometer (Hunt et. al. 1992). V=Verde River, S=Sycamore Creek.
[2]CL=cottonwood large/20-30+ m, CM=cottonwood medium/10-20m, GR=ground, MS = Mesquite, SB=sand bar, SG=soft snag (dead but branches still intact), SM=snag, mesquite, SP=stump or fallen tree, ST=snag top, TX=tamarisk, YM=sycamore medium/5-10m.
[3]Side of river facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400m.
[5]PN=pond, RI=riffle, RU=run.
[6]CW=cottonwood grove, FL=farmland, GB=gravel bar, MB=mesquite bosque, TX=tamarisk thicket.

Table 81. Bald eagle habitat use at the Sycamore BA, Arizona, 2013.

River km[1]	PW[2,3]	PH	PP	CL	ET	PD	PK	SS	PV	OT	Total	Percent
V 9.3	--	--	--	--	--	--	--	--	--	9	9	<0.1
V 9.5	445	1,835	33	--	--	29	6	--	--	--	2,348	9.7
V 9.6	175	345	--	27	--	--	--	--	--	--	547	2.3
V 10.0	10	--	--	--	--	--	--	--	--	--	10	<0.1
V 10.1	382	1,397	8	--	79	--	30	--	5	--	1,901	7.9
V 10.2	27	244	--	--	--	--	5	--	--	--	276	1.1
V 10.3	--	30	--	--	--	--	--	80	--	57	167	0.7
V 10.4	17,011	93	440	169	31	80	21	23	24	--	17,892	74.2
V 10.8	15	--	--	--	--	--	--	--	--	--	15	0.1
V 11.5	12	--	--	--	--	--	--	--	--	--	12	0.1
V 11.7	79	73	--	--	--	--	--	--	--	--	152	0.7
V 11.8	194	263	43	--	--	--	--	--	--	--	500	2.1

[1]River kilometer (Hunt et. al. 1992). V=Verde River.
[2]Observation time (minutes).
[3]PW = Perched watching, PH = Perched hunting, CL = Perched close to mate, PP = perched preening, ET = Eating in tree, PD = Perched drying, PK = Perched with prey, PV = Perched vocalizing, GN = Gathering nest material.

Table 81 continued.

River km[1]	PW[2,3]	PH	PP	CL	ET	PD	PK	SS	PV	OT	Total	Percent
V 12.2	10	--	--	--	--	--	--	--	--	--	10	<0.1
V 12.4	25	--	--	--	--	--	--	--	--	--	25	0.1
S 0.4	7	--	--	--	--	--	--	--	--	--	7	<0.1
S 0.5	169	--	--	--	--	--	44	--	25	--	238	1.0
S 0.7	--	--	--	--	--	--	--	--	7	--	7	<0.1
Total	18,561	4,280	524	196	110	109	106	103	61	66	24,116	
Percent	77.0	17.8	2.2	0.8	0.5	0.5	0.4	0.4	0.2	0.3		

[1]River kilometer (Hunt et. al. 1992). V=Verde River, S=Sycamore Creek.
[2]Observation time (minutes).
[3]PW = Perched watching, PH = Perched hunting, PP = perched preening, CL = Perched close to mate, ET = Eating in tree, PD = Perched drying, PK = Perched with prey, SS=standing on shore, PV = Perched vocalizing, OT=other (includes drinking water, bathing, eating on shore, perched on ground, and standing in water).

APPENDIX R: WOODS CANYON BREEDING AREA SUMMARY

Table 82. Observed human activity and bald eagle behavior, Woods Canyon BA, Arizona, 2013.

Human Activity[1]	N[2]	W	R	F	L	B	U	Total	Percent
Hiker	8	--	--	--	--	--	1	9	29.0
Helicopters	1	4	1	--	--	--	1	7	22.6
Boats	5	--	--	--	--	1	--	6	19.4
Small Planes	4	--	--	--	--	--	1	5	16.1
Fisherman	1	--	--	--	--	--	1	2	6.5
Kayak	1	--	--	--	--	--	--	1	3.2
Dog	1	--	--	--	--	--	--	1	3.2
Total	21	4	1	--	--	1	4	31	

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

Table 83. Observed forage events and success, Woods Canyon BA, Arizona, 2013.

Sex	Fish		Total	
	E[1]	S-U[2]	E	S-U
Male	8	8-0	8	8-0
Female	4	4-0	4	4-0
Unknown	1	1-0	1	1-0
Total	13	13-0	13	13-0

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

Table 84. Observed prey types delivered to the nest, Woods Canyon BA, Arizona, 2013.

Sex	Fish	Total	Percent
Male	41	41	54.1
Female	30	30	45.9
Unknown	5	5	6.6
Total	76	76	
Percent	100		

Table 85. Observed prey species delivered to the nest, Sycamore BA, Arizona 2013.

Sex	Fish	Total	Percent
	Rainbow Trout		
Male	39	39	58.2
Female	26	26	38.8
Unknown	2	2	3.0
Total	67	67	
Percent	100		

Table 86. Bald eagle habitat analysis at the Woods Canyon BA, Arizona, 2013 (continued next page).

Perch Location[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.2a	PS	Partial	2	RS	CF
0.2b	SO	No	1	RS	CF
0.9	ST	No	1	RS	CF
1.1	ST	No	1	RS	CF
1.2	PS	Yes	1	RS	CF
1.3a	HS	Partial	1	RS	CF
1.3b	SP	Yes	1	RS	CF
1.3c	PS	Partial	1	RS	CF
1.3d	SG	No	1	RS	CF
1.4a	HS	No	1	RS	CF
1.4b	HS	No	4	RS	CF
1.4c	PS	No	1	RS	CF
1.7a	PS	Yes	1	RS	CF
1.7b	PS	Partial	2	RS	CF
2.2	HS	No	1	RS	CF
2.3a	SG	No	1	RS	CF
2.3b	HS	No	2	RS	CF
2.3c	HS	No	3	RS	CF
2.4a	SG	Yes	1	RS	CF
2.4b	SO	No	1	RS	CF
2.4c	ST	No	1	RS	CF
2.5	PS	Yes	1	RS	CF
2.9	PS	Partial	1	RS	CF
3.4a	SG	Partial	1	RS	CF
3.4b	PS	Partial	1	RS	CF
3.5a	SG	Partial	1	RS	CF
3.5b	PS	No	1	RS	CF
3.5c	HS	No	1	RS	CF
3.5d	HS	No	3	RS	CF
3.6	HS	No	3	RS	CF
3.7	SG	No	1	RS	CF
3.8	HS	No	1	RS	CF
4.0	PS	Yes	1	RS	CF
4.2	PS	Yes	1	RS	CF
4.5a	PS	Yes	1	RS	CF
4.5b	PS	Partial	2	RS	CF
4.6	PS	Yes	1	RS	CF
4.7a	PS	Yes	1	RS	CF
4.7b	HS	No	1	RS	CF
4.8a	PS	Partial	1	RS	CF
4.8 b	SS	No	1	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]HS=hard snag (main branches only), PS=pine/conifer, 2nd growth/10-20+ m, SG=soft snag (dead but branches still intact), SO=shore, SP=stump or fallen tree, SS=snag shrub, ST=snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=conifer forest.

Table 86 continued.

Perch Location[1]	Perch Type[2]	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
4.9a	PS	Partial	1	RS	CF
4.9b	SG	No	1	RS	CF
5.0a	PS	Partial	1	RS	CF
5.0b	PS	Partial	2	RS	CF
5.1a	PS	Partial	1	RS	CF
5.1b	PS	Partial	2	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]PS=pine/conifer, 2nd growth/10-20+ m, SG=soft snag (dead but branches still intact).
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RS=reservoir main body.
[5]CF=conifer forest.

Table 87. Bald eagle habitat use at the Woods Canyon BA, Arizona, 2013.

Lake km[1]	PW[2,3]	PH	CL	PI	SS	PE	PP	PV	PK	Total	Percent
0.2	--	9	--	--	10	--	--	--	--	19	0.6
0.9	--	47	--	--	--	--	--	--	--	47	1.6
1.1	20	173	--	--	--	--	5	--	--	198	6.7
1.2	23	--	--	--	--	--	--	--	--	23	0.8
1.3	--	37	--	--	--	3	--	--	--	40	1.4
1.4	21	31	--	--	--	3	--	--	--	55	1.9
1.7	--	50	--	--	--	--	--	--	--	50	1.7
2.2	117	--	--	--	--	--	--	--	--	117	4.0
2.3	50	10	--	--	--	--	--	--	--	60	2.0
2.4	6	6	--	--	1	--	--	--	--	13	0.4
2.5	--	32	--	--	--	--	--	--	--	32	1.1
2.9	--	5	--	--	--	--	--	--	--	5	0.2
3.4	195	--	--	11	--	--	--	2	--	208	7.0
3.5	398	65	--	--	--	--	--	--	1	464	15.7
3.6	7	--	--	--	--	--	--	--	--	7	0.2
3.7	19	--	--	--	--	--	--	--	--	19	0.6
3.8	--	6	--	--	--	--	--	--	--	6	0.2
4.0	--	56	--	--	--	--	--	--	--	56	1.9
4.2	--	28	--	--	--	--	--	--	--	28	1.0
4.5	256	32	3	--	--	--	--	--	--	291	9.8
4.6	19	--	--	--	--	--	--	--	--	19	0.6
4.7	--	192	--	--	--	--	--	--	--	192	6.5
4.8	47	73	63	--	--	--	--	--	--	183	6.2
4.9	449	37	--	--	--	--	--	--	--	486	16.4
5.0	199	10	60	--	--	--	--	--	--	269	9.1
5.1	50	20	--	--	--	--	--	--	--	70	2.4
Total	1,876	919	126	11	11	6	5	2	1	2,957	
Percent	63.4	31.1	4.26	0.4	0.4	0.2	0.2	<0.1	<0.1		

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