ARIZONA BALD EAGLE MANAGEMENT PROGRAM
2008 SUMMARY REPORT

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ARIZONA BALD EAGLE MANAGEMENT PROGRAM 2008 SUMMARY REPORT

Kyle M. McCarty and Kenneth V. Jacobson

INTRODUCTION

In 1978, the U.S. Fish and Wildlife Service (USFWS) listed the bald eagle (*Haliaeetus leucocephalus*) as endangered under the Endangered Species Act (ESA) as amended (1973) in 43 states (including Arizona), and threatened in 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 is warranted, and if so then to decide if listing the DPS as threatened or endangered under the ESA is warranted (USFWS 2008). The deadline for the status review was December 5, 2008, but was extended to October 12, 2009. Consequently, although bald eagles were delisted nationally, bald eagles in central Arizona are currently protected as threatened under the ESA in all of Gila, Graham, Pinal, Maricopa, and Yavapai Counties, and parts of Mohave, La Paz, and Yuma Counties (USFWS 2008). The bald eagle remains protected in the state under Arizona Revised Statute Title 17 and nationally under the Airborne Hunting Act, Bald and Golden Eagle Protection Act, Lacey Act, Migratory Bird Treaty Act, 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, Fort McDowell Yavapai Nation, Geo-Marine (U.S. Air Combat Command), The Hopi Tribe, Maricopa County Parks and Recreation Department (MCPRD), Navajo Nation Fish and Wildlife, Phelps Dodge, 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.

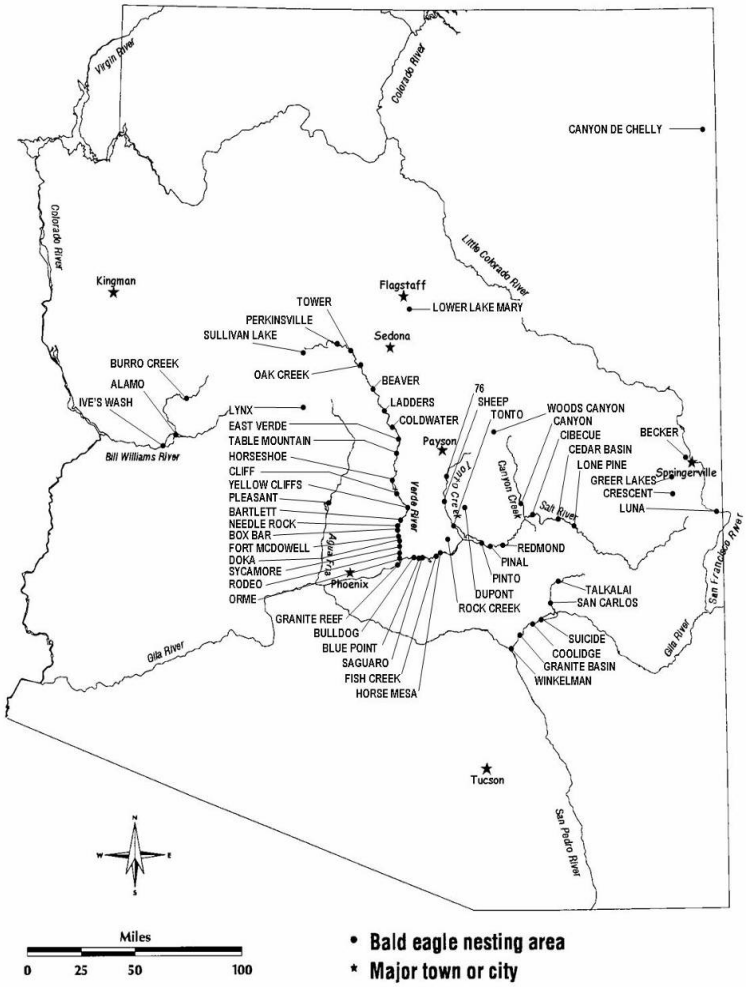

Figure 1. Location of known bald eagle BAs in Arizona, 2008.

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 (*Cercidium floridium*), mesquite (*Prosopis* spp.), ironwood (*Olneya tesota*), saguaro (*Carnegiea gigantea*), teddy bear cholla (*Opuntia bigelovii*), juniper (*Juniperus* spp.), and pinyon pine (*Pinus edulis*).

Eleven BAs are located outside of or do not include Sonoran Riparian Scrubland areas (Brown 1994). The Becker and Sullivan Lake BAs are within the Plains and Great Basin Grassland biome where the nests are in isolated stands of Fremont cottonwoods. Canyon De Chelly, Crescent, Dupont, Greer Lakes, Lower Lake Mary, Luna, Lynx, Rock Creek, 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). Dupont and Rock Creek are located in patches of 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*).

With the exception of the Dupont and Rock Creek BAs, bald eagles in Arizona nested within a mile of water. BAs were located along: Burro, Canyon, Cibecue, Oak, Pinal, 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, Little Colorado, Gila, Salt, San Carlos, San Francisco, San Pedro, 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 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, 2004).

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 U.S. Army Corps of Engineers (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. Jacobson et al. 2007). 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 will be 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 2008 Arizona bald eagle 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, 2008, 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 30.5-61 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 for terrestrial and aquatic surveys from cooperating agencies and volunteers from private groups. We supplied survey forms from the USGS/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 (*Aguila 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 2008 Arizona bald eagle winter count tallied 185 bald eagles (Table 1). We documented 152 adults (82.2%), 29 subadults (15.7%), and 4 unknown eagles (2.1%) (Table 2). The highest number of bald eagles observed during land-based surveys occurred in Coconino County (n=35),

Table 1. Summary of the Arizona bald eagle winter count 2008.

County	Routes surveyed	Minutes	Adult	Subadult	Unknown[1]	Total	Total/ Minute	Total/ Hour
Apache	13	478	12	1	2	15	0.031	1.9
Cochise	2	315	1	1	0	2	0.006	0.4
Coconino	31	4,107	29	5	1	35	0.009	0.5
Graham	Not surveyed.							
Mohave	1	51	2	0	0	2	0.039	2.4
Navajo	16	1,119	14	4	1	19	0.017	1.0
Santa Cruz	1	90	0	0	0	0	0	0
Yavapai	6	2,017	10	2	0	12	0.006	0.4
Yuma and La Paz	1	240	0	1	0	1	0.004	0.3
Verde River drainage	3	243	42	11	0	53	0.218	13.1
Gila River drainage	7	204	13	4	0	17	0.083	8.2
Salt River drainage	10	459	28	0	0	28	0.061	3.7
Various helicopter	5	39	1	0	0	1	0.026	1.5
Totals	96	9,362	152	29	4	185	0.020	1.2

[1] Unknown age bald eagles and unidentified eagles.

Table 2. Summary of Arizona bald eagle winter counts 1981-1985, 1992-2008.

Year	Survey Time	Surveys completed	Birds/minute	Adults	Subadults	Unknown[5]	Total
1981	--[1]	n/a	--	103 (63%)	60 (36%)	2 (1%)	165
1982	--	n/a	--	135 (64%)	72 (34%)	3 (2%)	210
1983	--	n/a	--	104 (66%)	53 (33%)	3 (2%)	158
1984	--	n/a	--	159 (71%)	63 (28%)	3 (1%)	225
1985	--	n/a	--	78 (66%)	40 (34%)	--	118
1992	9,801	n/a	0.023	145 (65%)	70 (31%)	10 (4%)	225
1993	9,938	n/a	0.018	133 (71%)	46 (25%)	7 (4%)	186
1994	7,949	n/a	0.045	263 (72%)	96 (26%)	4 (1%)	363
1995[2]	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[3]	93	0.041	183 (63%)	103 (36%)	4 (1%)	290
1999	8,378[3]	105	0.050	248 (62%)	144 (36%)	11 (3%)	403
2000	9,402[3]	110	0.034	202 (62%)	115 (35%)	8 (2%)	325
2001	8,726[3]	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[3]	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[4]	10,074	104	0.031	239 (74%)	77 (24%)	7 (2%)	323
2007	11,632[3]	100	0.024	192 (68%)	81 (29%)	8 (3%)	281
2008	9,362	96	0.020	152 (82%)	29 (16%)	4 (2%)	185
Average	9,150	103	0.036	179 (66%)	86 (32%)	8 (3%)	272

[1]The effort for the 1981-1984 counts was described in miles flown.
[2]Beginning of 115 standardized routes derived from the 1992-1994 surveys.
[3]Some survey times not recorded. Times averaged from reported times of previous counts.
[4]Beginning of 104 standardized routes derived from the analysis of 1995-2005 surveys.
[5]Unknown age bald eagles and unidentified eagles.

many of which were on the Bellemont survey route (n=10)(Appendix A). Also, a large number of bald eagles were observed by helicopter along the Verde River route (n=45, or 24.3% of the total count). An additional 8 bald eagles were counted on non-standardized routes.

Arizona surveyed 96 of the 102 standardized routes (94%)(Table 2). Survey effort was modestly above average, with a total of 9,362 minutes (156 hours). Coconino County had the most number of routes and therefore had the most effort with 4,107 minutes (68.5 hours). Deep snow and muddy roads caused several areas to be inaccessible, including the 6 routes that were not completed. Poor road conditions also limited access to 11 other routes that were only partially surveyed as a result.

Despite some challenging conditions, weather during the survey overall did not seem to be unusual. Surveyors are asked each year to rate the weather during the count compared to previous years as being either very mild, mild, normal, harsh, or very harsh. Most responded that this year's weather was normal (58% of responses, n=50) or mild (33%, n=28), and a few responded harsh (9%, n=8). There were no responses for either very harsh or very mild weather. Similarly, ice cover was rated as being normal (67%, n=52), more than normal (23%, n=18), much more than normal (5%, n=4), less than normal (4%, n=3), and much less than normal (<2%, n=1).

The total of 185 bald eagles counted in 2008 was much lower than the average of 319 birds counted annually during the period of standardized counts, 1995-2007, and represents the lowest total during this period. When including this year's count, the average since 1995 drops to 309 birds. Some bald eagles were certainly missed this year due to uncompleted and partially surveyed routes, but this situation typically occurs each year. Dropping the Lake Mead and Lake Mohave routes also accounted for some reduction. These two routes contributed a combined average of 7.1 bald eagles per year (1995-2002, 2004, 2006-2007) and could have increased this year's count; however the total number of bald eagles still would have represented the lowest count in the period. On 42 (44%) of the 96 routes, no bald eagles were counted.

The age composition of the 2008 bald eagle winter count was 82% adults, 16% subadults, and 2% unknown. This was the highest ratio of adults to subadults seen in Arizona's winter counts, which have averaged 65% adults, 32% subadults, and 3% unknown (1981-1985, 1992-2007) (Table 2).

An assessment in 2007 of the national midwinter bald eagle survey showed an overall increase in counts of 1.7% per year (n=746 routes) in the contiguous U.S. from 1986-2005 (USGS unpublished data). The analysis showed that counts increased annually by 6.0%, 1.2%, and 1.0% in the Northeast, Northwest, and Southeast parts of the country, respectively, as defined relative to longitude 100°W and latitude 40°N. However, over the same period the Southwest experienced a 1.2% decrease in counts annually, and within the Southwest Recovery Region (USFWS 1982) a similar decreasing trend of 1.1% per year was detected. In Arizona, the assessment detected a decline of 1.3% per year in 65 survey routes from 1992 to 2005. Further analyses of these Arizona surveys incorporated biome and elevation, and indicated that counts significantly decreased by nearly 4% at lower-elevation routes (<1100m; n=15), particularly within the Sonoran desertscrub biome, whereas counts showed little or no change at middle to

higher elevations (>1100m; n=50). Routes in the Rocky Mountain Montane Conifer Forest biome showed an increase of 0.7% per year (n=22).

The overall decreasing trends in the Southwest could possibly result from fewer northern migrants wintering as far south as they once did, perhaps because of increasingly warmer winters reducing the duration and extent of frozen water (Steenhof et al. 2002). This explanation coincides with the increasing trend in the Northwest. Alternatively, high human population growth and development in western states may have precluded eagles from wintering in areas that were once favorable. Steenhof et al. (2002) found a higher rate of increase of adults than immatures in winter counts, proposing that the recovery of bald eagle populations involved increased recruitment. In part, this may help to explain why adults have outnumbered immatures more than average in two of Arizona's last three winter surveys.

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, 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. Jacobson et al. 2007). The AGFD administered and performed the 2008 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 2007 (e.g. Jacobson et al. 2007). We also investigated reports of bald eagles and nests by other agencies, biologists, and the public. A 2 to 3 person team conducted surveys between January and June 2008. Winter count flights (January), monthly Occupancy and Reproductive Assessment (ORA) flights (February to June), 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).

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), and nest map atlases from Hunt et al. (1992) and SRP (2003) 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 in previous Arizona bald eagle nest survey reports (e.g. Jacobson et al. 2007).

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", "large" and "small" in this section to describe heights of cliffs, and 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. 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 bald eagles.

RESULTS

We examined all known BAs (n=56) for breeding activity (Fig. 1). Of 48 occupied BAs, 44 pairs attempted to breed, and 30 pairs successfully produced 53 fledglings (Table 3; Appendix C). Significant findings of the 2008 nest survey include 3 new bald eagle BAs, 3 new alternate bald eagle nests, 6 fallen nests within BAs, and 6 potential nest sites.

Table 3. Summary of Arizona bald eagle productivity 2008.

Number of BAs	56	Number of Active BAs	44
Number of Occupied BAs	48	Number of Failed Breeding Attempts	14
Number of Eggs	71	Number of Successful Breeding Attempts	30
Nest Success = 30/48	0.63	Number of Young Hatched	65
Mean Brood Size = 53/30	1.77	Number of Young Fledged	53
		Productivity = 0.63*1.77	1.11

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)

Burro Mesa. – On April 21, above the Devil's Post historic breeding area on Burro Creek, we found a golden eagle incubating in a new cliff nest #1, with a new alternate nest #2 nearby.

Dogtown Lake. – We received several reports of adult bald eagles at Dogtown Lake this year. No eagles were seen during a helicopter flight on April 14. On July 27, a new large snag nest #1 was discovered near the lake. One adult bald eagle was seen perched in the area of the nest and at the lake, however there was no indication of any nesting activity. The adult wore a blue Visual Identification (VID) band on its left leg ("15/V"; 2003 Tower nestling). We will continue to monitor this area, along with nearby White Horse Lake, for breeding activity.

Greer Lakes. – On March 20 we received a report and photographs from the USFS in Springerville of a bald eagle nest at Greer Lakes. On March 24 we confirmed a new breeding area with a pair of adults incubating eggs in a new snag nest #1. The snag nest was reported to have been built and previously used by ospreys. The adult male of the pair wore a blue VID band ("15/S"; 2003 Luna nestling). The female eagle was not banded: however it had a faint gray "mask" around the eyes and faint remnants of an eye line, as well as some gray marks on the bill possibly indicating a young adult. The nest failed during incubation.

Table 4. 2008 Arizona bald eagle nest survey summary, new locations.

Location	Date	Survey Method	Results
Ashurst Lake	5/7	Helicopter	No new nests or bald eagles.
Bear Canyon Lake	5/7	Helicopter	No new nests or bald eagles.
Black Canyon Lake	5/7	Helicopter	No new nests or bald eagles.
Burro Mesa	4/21	Helicopter	Golden eagle incubating in new cliff nest #1. New alternate nest #2 nearby.
Canyon Creek (upper)	5/7	Helicopter	No new nests or bald eagles.
City Reservoir	4/14	Helicopter	No new nests or bald eagles.
Colorado River (Parker Dam to Topock Marsh)	4/14	Helicopter	No new nests or bald eagles.
Dogtown Lake	4/14, 7/27	Helicopter Ground	7/27-New snag nest #1 empty. One adult bald eagle in area.
East Clear Creek (Hamilton Crossing to Blue Ridge Reservoir)	5/7	Helicopter	No new nests or bald eagles.
Gleason Flat	1/29	Helicopter	No new nests or bald eagles.
Greer Lakes	3/24, 4/22	Ground Helicopter	3/24 & 4/22-New BA with adult incubating in new snag nest #1. Second adult in area.
Kinnikinick Lake	5/7	Helicopter	No new nests or bald eagles.
LF Ranch	1/14	Helicopter	No new nests or bald eagles.

Table 4. continued.			
Location	Date	Survey Method	Results
Long Lake	5/7	Helicopter	No new nests or bald eagles.
Marshall Lake	5/7	Helicopter	No new nests. Two adults in area.
Rogers Lake	5/7	Helicopter	No new nests or bald eagles.
Santa Fe Reservoir	4/14	Helicopter	No new nests or bald eagles.
Scholz Lake	4/14	Helicopter	No new nests or bald eagles.
Sycamore Canyon	4/14	Helicopter	No new nests or bald eagles.
Topock Marsh	4/14	Helicopter	No new nests or bald eagles.
Vail Lake/Prime Lake	5/7	Helicopter	No new nests or bald eagles.

Historical Breeding Areas (Table 5)
Devil's Post. – On April 21, a new large cliff nest #8 was found in fair condition, which may be the remnants or a rebuild of an eagle-sized nest discovered in 1992.

Hell Point. – On March 20 we found a golden eagle incubating in nest #2. By April 21 the nesting attempt had failed.

Upper Lake Mary. – On May 7, a new large snag nest #5 was documented along the southeast side of the lake. Ospreys were incubating in nests #1, 2, and 3.

Table 5. 2008 Arizona bald eagle nest survey summary, historical breeding areas.			
Location	Date	Survey Method	Results
Ash	4/22	Helicopter	No new nests or bald eagles.
Camp Verde	1/28	Helicopter	No new nests or bald eagles.
Devil's Post	3/20, 4/21	Helicopter	4/21-New cliff nest #8 found. All other known nests empty. No bald eagles.
Hell Point	1/10, 1/28, 3/20, 4/21	Helicopter	3/20-One adult golden eagle incubating in nest #2. 4/21-Golden eagle nest failed.
Mule Hoof	1/10, 1/29, 3/19, 4/22	Helicopter	All known nests empty. No bald eagles.
Upper Lake Mary	5/7	Helicopter	Ospreys incubating in nests #1, 2, and 3. Nest #4 empty. New snag nest #5 empty.

Survey Sites with Existing Large Nests (Table 6)
Blue Ridge Reservoir. – On May 7, a new large snag nest #5 was documented. No bald eagles were seen, but an osprey was incubating in nest #2.

Chevelon Canyon. – On the May 7 helicopter survey, a pair of ospreys was seen flying near new snag nest #2 on the west side of Chevelon Canyon Lake. Due to windy conditions a close inspection was not possible, however the nest appeared to contain at least one nestling. No bald eagles were seen.

Granite. – On March 20 we found a golden eagle incubating in nest #3, and a 2-week old nestling on April 21 .

Muldoon. – On January 14, two adult bald eagles were seen in the area, but not on subsequent ORA flights. We will continue to monitor the area for further activity.

Tremaine/Soldier Annex/ Soldier/Long Lakes. – On May 7, nest #1 was found to have fallen. No bald eagles were seen.

West Clear Creek. – On January 14, an adult bald eagle was seen in the area of a small nest discovered last year, and a second adult was upstream. No evidence of nesting was observed. We will continue to monitor the area for further activity.

White Horse Lake. – We continue to receive reports of bald eagles at this lake and in the area, including sightings of an adult as late as August. We saw no eagles during a May 14 flight, but an osprey was observed standing in nest #2, and another was incubating in nest #3.

Woods Canyon Lake. – On May 7, we documented a new BA at Woods Canyon Lake when an adult bald eagle was found incubating in snag nest #3. This nest was originally built and used by ospreys, and has been monitored annually since its discovery in 2003. On May 28 the nest failed following an intense snow storm on May 22-24.

Table 6. 2008 Arizona bald eagle nest survey summary, nest sites.

Location	Date	Survey Method	Results
Blue Ridge Reservoir	5/7	Helicopter	Osprey incubating in nest #2. Nests #1, 3, and 4 not found. New snag nest #5 empty.
Chevelon Canyon (Slim Jim Canyon to Chevelon campground)	5/7	Helicopter	Two ospreys in area of new tree nest #2. Possibly one nestling in nest. No bald eagles.
Eagle (Eagle Creek)	1/11	Helicopter	No new nests or bald eagles.
Gene Wash	4/14	Helicopter	All known nests empty. Nest #1 poor. No bald eagles.
Granite (Verde River)	1/14, 1/28, 3/20, 4/21	Helicopter	3/20-One adult golden eagle incubating in nest #3. 4/21-One 2-week old golden eagle nestling.
Knoll Lake	5/7	Helicopter	Osprey flew from nest #3. Nest #1 empty. Nest #2 not found. No bald eagles.
Mormon Pocket (Verde River)	1/28, 3/20, 4/21	Helicopter	All known nests empty. No bald eagles.
Muldoon (Verde River)	1/14, 1/28, 3/20	Helicopter	1/14-Two adults in area. No new nests.
Sullivan (Verde River)	1/28, 3/20, 4/21	Helicopter	All known nests empty. No bald eagles.
Tremaine/Soldier Annex/ Soldier/Long Lakes	5/7	Helicopter	Nest #1 fallen. No new nests or bald eagles.
Watson Lake	3/20	Helicopter	All known nests empty. No bald eagles.
West Clear Creek	1/14	Helicopter	1/14-Two adults in area. No new nests.
White Horse Lake	4/14	Helicopter	One osprey standing in nest #2. One osprey incubating in nest #3. Nest #1 empty. No bald eagles.
Willow (Willow Creek)	1/11	Helicopter	No new nests or bald eagles.

Table 6. continued.

Location	Date	Survey Method	Results
Willow Springs Lake	5/7	Helicopter	Osprey incubating in nest #1. No bald eagles.
Woods Canyon Lake	5/7, 5/28	Helicopter	5/7-New breeding area. One adult incubating in snag nest #3. 5/28-Failed. Nest empty.

Breeding Areas (Table 7)

Alamo. – Despite extensive searching during the January 28 helicopter flight, nest #7 was not located. The nest tree, which stood in the floodplain of the Bill Williams River, was presumed to have fallen or was wiped out in floods. The breeding pair was found incubating in nest #4.

Blue Point. – On January 29 we discovered an adult in a new cliff nest just upstream of the old Blue Point #8 nest. Over the last few years we had seen a pair of bald eagles around Bagley Flat and suspected a new breeding area. On May 6 we confirmed this as a new BA (Saguaro Lake, nest #1) when the Blue Point pair was discovered using a new alternate nest #11 on a cliff in a small drainage near Willow Springs Canyon. The Saguaro adult female had no bands, and the male had a blue band on the left leg but was not identified. Both Blue Point adults had blue VID bands on their left legs, but were not identified. On June 3, the Blue Point eaglet was found dead on the ground in the area of nest #11.

Burro Creek. – On March 4, nest #1 was found to have fallen and no bald eagles were seen in the area. On March 20, an adult and a near-adult bald eagle were seen perching and flying near 4 large, empty nests on cliffs downstream of the Highway 93 bridge. Two nests lower on the cliffs were in poor shape, while the two higher nests were in better condition.

Cedar Basin. – On January 29, we found that nest #2 had fallen. No bald eagles were observed.

Cliff. – On January 28, nest #2 was not seen and was presumed fallen. The breeding pair was found incubating in nest #6.

Coolidge. – On January 29, 1 immature bald eagle was seen perched in the cottonwood grove near nest #2. All known nests were empty and no nesting was observed.

East Verde. – On March 20, 1 adult bald eagle was seen perched upstream of nest #6. All known nests were empty and no nesting was observed.

Lower Lake Mary. – On March 6, two unbanded adult bald eagles were seen feeding on a mammal carcass about ¼ mile away from nest #2. One adult was observed to fly to the nest and perched beside it while the second adult perched within 200m of the nest, which looked to be in good condition. On the May 7 helicopter flight, 2 adults were seen flying close over empty nest #2. No new nests were found and no nesting was observed.

San Carlos. – On the January 9 winter count we observed nest #4 had fallen. On January 29 we found an adult bald eagle incubating in a new large nest #5 in a live cottonwood tree on the south side of San Carlos Reservoir. This nest was discovered by San Carlos Apache Tribe wildlife

biologists in 2005 and was previously described as the Cottonwood Wash nest site. It has been monitored as a potential alternate nest site for the San Carlos pair. Since there was no nesting activity in the pair's traditional areas on the San Carlos River this year, we concluded that the pair moved to the new nest location. Both of the adults wore bands but we were unable to identify them.

Table Mountain. – On January 14, we observed 1 adult bald eagle perched above nest #4. On March 20, 2 adults were seen flying and perching in the area of the nest, which was in poor condition. On April 21, 2 adults were again seen flying in the nest area, then 1 perched above the nest while the second perched by the nest, which was in poor to fair condition. No new nests were found and no nesting was observed this year.

Tonto. – On April 17, a windstorm broke off the nest branch holding nest #4, killing both 6-week old nestlings. Nest #2 was still present on the April 21 helicopter flight.

Winkelman. – During three searches (January 9 and 29, March 19) we saw no new nests or bald eagles, making 2008 the tenth consecutive year that this BA has been unoccupied. Winkelman will now be designated as a historical BA. We will continue to monitor the area for bald eagle breeding activity because good nesting substrate still exists (many large cottonwoods) on the San Pedro River.

Yellow Cliffs. – On March 20 an adult was found incubating an egg in a new snag nest #3, upstream from nest #2.

Table 7. 2008 Arizona bald eagle nest survey summary, breeding areas.

Location	Date	Survey Method	Results
Alamo	1/15, 1/28, 3/20, 4/21, 5/12	Helicopter Ground	1/28-Nest #7 fallen. One adult incubating in nest #4.
Becker	3/24	Ground	All known nests empty. No bald eagles.
Blue Point	1/9, 1/28-1/29, 3/11, 3/19, 4/22, 5/5-5/7, 5/28, 6/3	Helicopter Ground	1/29-One adult in a new cliff nest in a new BA (Saguaro #1). 5/6-One 7-week old nestling in new Blue Point cliff nest #11. 6/3-Blue Point nesting attempt failed.
Burro Creek	3/4, 3/20, 4/21	Helicopter Ground	3/4-Nest #1 fallen. 3/20-One adult and 1 near-adult in area of 4 empty nests.
Canyon	1/9, 1/29, 3/19	Helicopter	All known nests empty. No bald eagles.
Cedar Basin	1/10, 1/29, 3/19, 4/22	Helicopter	1/29-Nest #2 gone. All other known nests empty. No bald eagles.
Cliff	1/14, 1/28, 2/21, 3/20, 4/21, 5/7, 5/28, 5/30	Helicopter Ground	1/28-Nest #2 gone.
Coolidge	1/9, 1/29, 3/19, 4/22	Helicopter	All known nests empty. 1/29-One immature bald eagle perched in area.
Dupont	1/29, 3/19	Helicopter	All known nests empty. No bald eagles.
East Verde	1/14, 1/28, 3/20	Helicopter	3/20-One adult in area.
Fish Creek	1/9, 2/12, 3/19, 4/22, 5/7	Helicopter Ground	All known nests empty. No bald eagles.

Table 7. continued.

Location	Date	Survey Method	Results
Lower Lake Mary	2/23, 3/6, 5/7	Helicopter Ground	3/6-One adult stood in nest #2. Second adult in area. 5/7-Two adults in area of nest #2.
San Carlos	1/9, 1/29, 2/6, 2/7, 3/19, 4/22	Helicopter Ground	1/9-Nest #4 fallen. 1/29-One adult incubating in new cottonwood tree nest #5.
Table Mountain	1/14, 1/28, 3/20	Helicopter	1/14-One adult perched above nest #4. 3/20-Two adults in area. 4/21-Two adults in area.
Tonto	1/9, 1/29, 2/28, 3/19, 4/22	Helicopter Ground	4/21-Nest #4 gone (branch broken off in windstorm on 4/17).
Winkelman	1/9, 1/29, 3/19	Helicopter	No new nests or bald eagles.
Yellow Cliffs	1/14, 1/28, 3/17, 3/20, 4/21, 6/4, 6/20	Helicopter Ground	3/20-One adult incubating 1 egg in new snag nest #3.

Overview

Significant findings of the 2008 nest survey include: 3 new bald eagle BAs, 3 new alternate bald eagle nests within BAs, 6 fallen nests within BAs, and 6 new potential nest sites. In 2008, we documented a record number of BAs, occupied BAs (tied with 2007), successful BAs, and young fledged (Table 3).

For the third year in a row, 3 new bald eagle BAs were discovered. These 9 newest BAs have been found across the state at 3 lakes, 2 rivers, and 1 creek, and range in elevation from 1700 to 8260 feet. Finding bald eagles nesting at Woods Canyon Lake this year came after many seasons of searching the Mogollon Rim and plateau. Another new BA, at Greer Lakes, continues the expansion of bald eagles in the White Mountains. For these two new high-elevation BAs, winter and spring storms could be detrimental to success as was evidenced by the failure of Woods Canyon in late May. The third new BA in 2008, at Saguaro Lake, was formed by a pair of bald eagles that moved into the territory of an established pair. The proximity of the Saguaro Lake, Blue Point, and Bulldog nests (spanning 3.5 miles) could influence the success of each of these three pairs through density dependent factors such as increased competition. However, food abundance plays an important role in densities of bald eagles (Dzus and Gerrard 1993) and perhaps a large supply of food has allowed for this concentration of breeders to develop at Saguaro Lake.

Overall, numerous factors could have contributed to the trend of recent yearly increases in the number of bald eagle BAs, and there are strong indications that the potential exists to continue this trend. Since 2004, 217 young have fledged in Arizona, with average productivity at 1.0 young fledged per occupied BA. By comparison, 144 young fledged in the previous 5-year period (1999-2003) when the average productivity was 0.75. The recent increases in fledglings will help drive population increases in future.

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 historical BAs, potential BAs, and large nests reported in previous nest survey reports. These documents are useful tools for identifying occupancy trends, locating new BAs, and monitoring population expansion.
2. Bald eagles banded in Arizona have been observed near or on El Novillo Reservoir, Sonora, Temecula Lake, California, and southwestern New Mexico. This suggests that the current distribution may extend into Sonora, 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.
3. Determine the identification of the breeding pair at Copper Basin, CA and yearly band the nestlings.
4. Surveyors should continue to use the nest survey, Occupancy and Reproductive Assessment (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. Follow-up ground surveys thoroughly investigate an area.
5. 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, 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, Casadore Springs, Chevelon Canyon, Cholla, Doney Park, Dry, George's Basin, Knoll, Lyman, Nash Creek, Phillips Park Tank, Paucity Lake, Point of Pines, Rogers, Tonto, White Horse, and Willow Springs.
   - Colorado River drainage – Lake Mead (Grand Wash), Nankoweep 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 – Gun/Tonto Creek confluence, Mormon Flat Dam, Redmond BA to Canyon BA, Cibecue BA to Cedar Basin BA, Tanks Canyon.
   - Verde River drainage – East Verde River, West Clear Creek.
   - White Mountain Lakes – Carnero, Christmas Tree, Horseshoe Cienaga, Hawley, Lee Valley Reservoir, Nelson Reservoir, Nutrioso, Pacheta, Reservation, Sierra Blanca.
   - White River – Whiteriver to confluence with Black and Salt rivers.

ARIZONA BALD EAGLE NESTWATCH PROGRAM

INTRODUCTION

In 1978, the USFS and 2 Maricopa Audubon Society volunteers monitored bald eagles breeding near Bartlett Reservoir to understand the effects of recreation on nesting behavior and success. This monitoring effort eventually expanded to other BAs, and developed into the ABENWP. In 1986, the USFWS assumed coordination of the ABENWP on behalf of the SWBEMC, and expanded its scope. In 1991, after passage of the Heritage Initiative, the USFWS transferred the lead to the AGFD.

To address the increasing needs of 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 to protect the 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 2008. 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 (Box Bar, Cliff, Crescent, Luna, Needle Rock, Pinto, Pleasant, Tonto, Tower, and Woods Canyon), those without (Orme, Saguaro), and those monitored opportunistically for information (Granite Reef). In the fall of 2007, 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 and the ABENWP's role in bald eagle management, and an explanation of data forms and emergency protocols. After the orientation meetings, the contactors 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 then after every second 10-day work period thereafter. 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 1, 2008 and continued until nestlings fledged. 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's) within the BA. We selected OP's to provide optimal viewing while minimizing the impact to the breeding bald eagles. Alternate OP's were identified when the breeding pair utilized areas out of the primary OP's 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 field 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. They 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 a "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 Box Bar and Needle Rock BAs, nestwatchers recorded human activity differently than described above. Due to the high level of recreation activity at the Box Bar and Needle Rock BAs within 1.0 km of the active nest, nestwatchers only recorded the human activities and the bald eagle's associated behavior that occurred on the east side of the river, which is closed. In addition to recording human activity as described above, nestwatchers at the Pinto BAs were able to document non-compliance with water closures by observing the number of watercraft that entered the closure. Nestwatchers at the Pleasant BA typically record compliance with the Pleasant BA closure by documenting the number of watercraft approaching the buoy line and those that entered. However this year the location of the nest and OP were out of view of the buoy line and nestwatchers were unable to consistently gather data on compliance.

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 discuss human activity, foraging attempts, prey deliveries, habitat use, and site-specific management recommendations.

RESULTS AND DISCUSSION

The ABENWP monitored 13 breeding areas in 2008 including Box Bar, Cliff, Crescent, Granite Reef, Luna, Needle Rock, Orme, Pinto, Pleasant, Saguaro, Tonto, Tower, and Woods Canyon. The final status of the monitored BAs was 4 failed, 9 successful, and 20 young fledged (Appendix C).

The Granite Reef and Crescent BAs were monitored opportunistically by nestwatchers at nearby BAs. Therefore, data for these two BAs is not included in the following section of this report.

Box Bar Breeding Area (Appendix E)
Observation Period. – February 16 to May 18. Total monitoring 69 days/584 hours.

Bald Eagle Identification. – The male was blue Visual Identification (VID) banded "5/G" on his left leg, USFWS banded on the right leg, and in adult plumage (1994 Pleasant nestling). The female was blue VID banded "5/H" on her left leg, USFWS banded on the right leg, and in adult plumage (1994 Pleasant nestling). The male and female are siblings.

Figure 2. Box Bar breeding area. Maricopa County, Arizona Photo by J. Driscoll.

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The owners of Rio Verde Ranch allowed ABENWP contractors to camp and monitor from their lawn. 3) ABENWP contractors were active in educating the public visiting the Rio Verde Ranch and the campground at the end of USFS road 161. 4) On March 26, 1 male nestling was blue VID banded "21/X", and 2 female nestlings were banded "21/Y" and "21/Z" at 5-6 weeks of age.

Interventions. – On May 7, 2008, nestwatchers at the Box Bar BA reported 2 of 3 nestlings out of the nest on the ground. We captured the nestlings and placed them back in the nest tree for their safety. They flew immediately, and 1 was re-captured and put back in the nest tree. Both were subsequently seen flying.

Human Activity. – Nestwatchers recorded 74 human activities within the closure. Aircraft activity (helicopters, small and large planes, and motorized parachutes) represented 74.3% (n=55), terrestrial activity of 5 types represented 21.6%, and water pursuits (canoe, tuber) represented 4.1%. Four activities elicited 7 significant responses from the breeding pair. The bald eagles were restless in response to 1 gunshot, flushed from 1 motorized parachute, small

plane, and helicopter each, left the area in response to 1 motorized parachute and gunshot each, and flew from a perch to attend the nest in response to 1 motorized parachute.

Food Habits. – Nestwatchers observed 7 forage events, however they were not able to determine the outcome of 4 of these events. In known outcomes, the male was successful in 100% (n=1), and the female and an unknown adult in 0% (n=2) of forage events. Fish accounted for 100% of these events. The breeding pair was observed delivering 100 prey items to the nest, of which the male delivered 57.0%, the female 31.0%, and an unidentified adult 12.0%. Fish comprised 59.0% (n=59) of the deliveries, mammals 4.0% (n=4), reptiles 2.0% (n=2), and unknown prey types 35.0% (n=35). Of the 7 prey items further identified, 85.7% (n=6) were tilapia (*Tilapia spp.*) and 14.3% (n=1) rattlesnake (*Crotalus spp.*).

Habitat Use. – The Box Bar nestwatchers identified 9 separate perch locations that spanned a 2.7 km stretch of the Verde River ranging from rk 22.7 to 25.4. The bald eagle pair was observed spending 62.0% of their time at rk 23.4, 19.3% at rk 23.8, 14.2% at rk 25.1, and 4.5% at the remaining 6 perch locations.

Cliff Breeding Area (Appendix F)
Observation Period. – February 1 to April 23. Total monitoring 63 days/556 hours.

Bald Eagle Identification. – The male was unbanded and in adult plumage (unknown origin). The female was blue VID banded "12/C" on her left leg, USFWS banded on the right leg, and in adult plumage (2001 Box Bar nestling).

Management Activities. – 1) The USFS placed "Sensitive species area" signs around the nest area. 2) The USFS placed markers, posts, and natural barriers to prevent off-road traffic and keep people on existing roads.

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

Interventions. – During an ORA flight on May 28, we landed a helicopter near the nest in order to rescue a group of people whose vehicle had gotten stuck in the sand and had been stranded overnight within a few hundred feet of the nest. One nestling remained in the nest throughout the ordeal, while the second one was not found in the nest or on the ground. Both eaglets were seen and confirmed to have fledged by May 30.

Human Activity. – Nestwatchers recorded 86 human activities during the monitoring period. Aircraft (helicopters, small planes, and jets) accounted for 51.1%, terrestrial activities of 6 different types for 47.5%, and watercraft (jet ski) 1.2%. Five activities elicited 6 significant responses from the breeding pair. The bald eagles were restless in response to 1 small plane and

gunshot each, and flushed in response to 2 off-highway vehicles (OHVs) and 1 helicopter and fisherman each.

Food Habits. – Nestwatchers observed 5 forage events. The male was unsuccessful in 1 forage event, and an unknown adult was unsuccessful in 4 other events. Birds accounted for 20.0% (n=1) and unknown prey for 80.0% (n=4) of these events. The breeding pair was observed delivering 21 prey items to the nest, of which the male delivered 52.4%, the female 4.8%, and an unidentified adult 42.9%. Fish comprised 76.2% (n=16) of the deliveries, carrion 14.3% (n=3), and unknown prey types 9.5% (n=2). No prey items were identified to species.

Habitat Use. – The Cliff nestwatchers identified 18 separate perch locations along the Verde River. The pair was observed spending 46.0% of their time at rk 66.7, 17.7% at rk 66.6, 10.7% at rk 66.8, 8.9% at rk 67.6, 5.0% at rk 69.0, 4.4% at rk 72.2, and 7.3% at the remaining 12 perch locations.

Luna Breeding Area (Appendix G)
Observation Period. – February 1 to June 1. Total monitoring 97 days/846 hours.

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

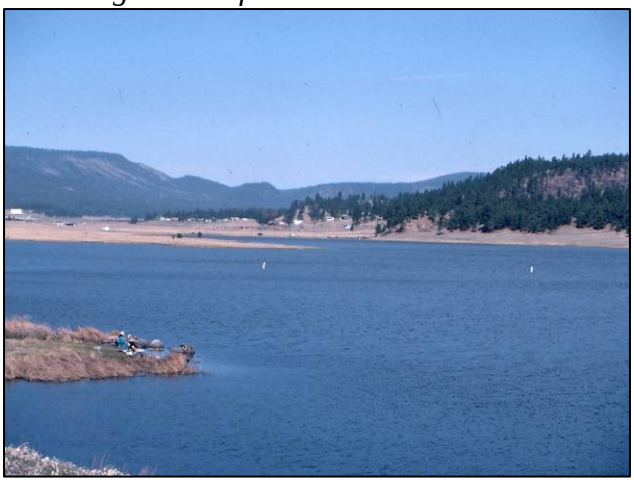

Figure 4. Luna breeding area. Apache County, Arizona. Photo by J. Driscoll.

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) Nestwatchers were stationed at the boat ramp to talk to fisherman launching boats. 3) Two female nestlings were VID banded "22/R" and "22/S" at 5.5 weeks of age on April 10.

Human Activity. – The nestwatchers recorded 778 human activities. Terrestrial activity of 13 different types accounted for 78.7%, watercraft (boats, float tubers, canoes/kayaks) 20.7%, and aircraft (military jets, small planes, and helicopters) 0.6%. Six activities elicited 9 significant responses from the breeding pair. The bald eagles were restless in response to 3 agency workers, 2 military jets, 1 gunshot and 1 helicopter, and they left the area in response to 1 boater (hiked into the nest area) and 1 hiker.

Food Habits. – The nestwatchers observed 125 forage events. The male was successful in 92.8% (n=69) and the female in 91.1% (n=56) of forage events. Birds accounted for 60.8% (n=76), fish 28% (n=35), carrion 8.8% (n=11), and mammals 2.4% (n=3) of these events. The breeding pair was observed delivering 115 prey items to the nest, of which the male delivered 56.5% (n=65) and the female 43.5% (n=50). Birds comprised 59.1% (n=68) of the deliveries, fish 28.7%

(n=33), carrion 9.6% (n=11), and mammals 2.6% (n=3). Of the 102 prey items further identified, 62.7% (n=64) were American coots (*Fulica americana*), 32.4% (n=33) were rainbow trout (*Oncorhynchus mykiss*), 2.9% (n=3) were grebes (*Podilymbus podiceps* or *Aechmophorus spp.*), 1% (n=1) common merganser (*Mergus merganser*), and 1% (n=1) Abert's squirrel (*Sciurus aberti*).

Habitat Use. – The Luna nestwatchers identified 17 separate perch locations around the lake. Perches spanned 4.8 km ranging from lk 0.3 to 5.1. The breeding pair spent 57.6% of the observed time at lk 2.4, 9.6% at lk 2.7, 6.9% at lk 2.1, 6.0% at lk 2.3, and 19.9% at the remaining 13 perch locations.

Needle Rock Breeding Area (Appendix H)
Observation Period. – February 1 to May 11. Total monitoring 73 days/534 hours.

Bald Eagle Identification. – The male was blue VID banded "9/T" on his left leg, USFWS banded on the right leg, and in adult plumage (1998 Orme nestling). The female was USFWS banded on her right leg, and was in adult plumage (unknown origin).

Figure 5. Needle Rock breeding area. Maricopa County, Arizona. Photo by J. Driscoll.

Management Activities. – 1) The USFS enacted the seasonal BA closure. 2) The owners of Rio Verde Ranch allowed ABENWP contractors to camp on their lawn. 3) ABENWP contractors were active in educating the public visiting the Needle Rock Recreation Area. 4) One female and 1 male nestling were blue VID banded "22/W" and "22/X" at 6 weeks of age on April 15.

Human Activity. – Nestwatchers recorded 60 human activities. Aircraft (helicopters, small planes, motorized parachutes) accounted for 66.7%, terrestrial activities of 7 types 23.3%, and watercraft (rafters, canoes/kayaks, boaters) 10.0%. Eight activities elicited 13 significant responses from the breeding pair. The pair flew to the nest in response to 1 helicopter, flushed in response to 1 small plane and OHV each, and left the area in response to 3 horseback riders, 2 small planes, and 1 helicopter, canoe/kayak, picnicker, boater, and photographer each.

Food Habits. – Nestwatchers observed 20 forage events. The male was successful in 50.0% (n=8), the female in 75.0% (n=4), and an unknown adult in 50.0% (n=8) of forage events. Fish accounted for 45.0% (n=9), mammals 5.0% (n=1), and unknown prey types 50.0% (n=10) of these events. The breeding pair was observed delivering 15 prey items to the nest, of which the male delivered 33.3%, the female 40.0%, and an unidentified adult 26.7%. Fish comprised 46.7% (n=7) of the deliveries, mammals 6.7% (n=1), and unknown prey types 46.7% (n=7). No prey items were identified to species.

Habitat Use. – The Needle Rock nestwatchers identified 26 separate perch locations along the Verde River. River perches spanned a total of 4.6 km ranging from rk 25.7 to 30.3. The pair spent 26.1% of the observed time at rk 26.0, 11.3% at rk 28.1, 11.2% at rk 27.8, 10.7% at rk 27.5, 10.2% at rk 26.5, 8.5% at rk 29.4, and 22.0% at the remaining 20 perch locations.

Orme Breeding Area (Appendix I)
Observation Period. – February 1 to May 31. Total monitoring 90 days/786 hours.

Bald Eagle Identification. – 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 visited the ABENWP contractors on a daily basis and patrolled the nesting area during times of elevated recreation use. 3) On April 8, two female and one male nestlings were blue VID banded "22/H", "20/K" and "20/M" at 5.5, 4.5, and 5.5 weeks of age, respectively.

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

Human Activity – Nestwatchers recorded 716 human activities. Aircraft of 5 different types represented 75.8%, terrestrial activities of 14 different types 21.2%, and watercraft (kayaks and rafters) 2.9%. Thirteen activities elicited 33 significant responses by the breeding pair. The bald eagles were restless to 4 Apache helicopters, 3 drivers, 2 helicopters, gunshots, and picnickers each, and 1 small plane, rafter, and camper each. The breeding pair flushed in response to 3 drivers, 2 helicopters, Apache helicopters, hikers, fishermen, and AGFD biologist each, and 1 gunshot, law enforcement officer, researcher and camper each.

Food Habits. – Nestwatchers observed 21 forage events. The male was successful in 80.0% (n=10) and the female in 90.9% (n=11). Fish accounted for 71.4%, and mammals and birds each 14.3% of these events. The breeding pair was observed delivering 53 prey items to the nest, of which the male delivered 52.8% and the female 47.2%. Fish comprised 81.1% (n=43) of these deliveries, mammals and birds 5.6% (n=3) each, and unknown prey types 7.5% (n=4). No prey items were identified to species.

Habitat Use. – The Orme nestwatchers identified 39 separate perch locations along the Verde and Salt Rivers. River perches spanned a total of 10.2 km ranging from rk 0.2 to 0.85 on the Verde River and rk 4.6 to 14.1 on the Salt River. The pair was seen spending 62.3% of their time at rk 0.4 (Verde River), 12.1% at rk 11.1 (Salt River), and 25.7% at the remaining 37 perch locations.

Pinto Breeding Area (Appendix J)
Observation Period. – February 2 to May 2. Total monitoring 62 days/560 hours.

Bald Eagle Identification. – The male was blue VID banded "5/D" on his left leg, USFWS banded on the right leg, and in adult plumage (1994 Blue Point nestling). The female was blue VID banded "2/H" on her left leg, USFWS banded on the right leg, and in adult plumage (1991 Alamo nestling).

Management Activities. – 1) The USFS enacted the 1000 ft bald eagle closure. 2) The Southwestern Willow Flycatcher Closure limited recreational activities on the west side of the Salt River. 3) Nestwatchers were supplied a boat by AGFD and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 782 human activities. Watercraft (boaters, jet skis, canoes/kayaks) represented 80.1%, terrestrial activities of 6 different types represented 18.5%, and aircraft (helicopters and small planes) represented 1.4%. Six activities elicited 18 significant responses from the breeding pair. The bald eagles were restless in response to 2 boaters and photographers each, and 1 fisherman and birder each. The pair flushed in response to 4 boaters, 2 photographers, and 1 fisherman, helicopter, and shooter each. The bald eagles left the area in response to 2 boaters and 1 birder. Of 20 observed closures violations, the bald eagles flushed in response to 2 photographers and 1 fisherman, and were restless in response to 1 boater.

Figure 7. Pinto breeding area. Gila County, Arizona. Photo by K. McCarty.

Food Habits. – The nestwatchers observed 56 forage events. The male was successful in 36.1% (n=36), the female in 70.6% (n=17), and an unknown adult in 100% (n=3) of forage events. Fish accounted for 91.1% (n=51) and unknown prey types 8.9% (n=5) of these events. The breeding pair was observed delivering 102 prey items to the nest, of which the male delivered 58.8%, the female 39.2%, and an unknown adult 2.0%. Fish comprised 61.8% (n=63) and unknown prey types 38.2% (n=39) of the deliveries. Of the 3 prey items further identified, 66.7% (n=2) were black crappie (*Pomoxis nigromaculatus*) and 33.3% (n=1) were catfish (flathead catfish *Pylodictis olivaris,* or channel catfish *Ictalurus punctatus*).

Habitat Use. – The Pinto nestwatchers identified 56 separate perch locations along the Salt River. Perches spanned 6.8 km ranging from rk 101.5 to 108.3. The breeding pair spent 74.8% of the observed time at rk 104.3, 15.8% at rk 104.4, and 9.4% at the remaining 54 perch locations.

Pleasant Breeding Area (Appendix K)
Observation Period. – February 1 to May 4. Total monitoring 70 days/647 hours.

Bald Eagle Identification. – The male was blue VID banded "W" on his left leg, USFWS band on the right leg, and in adult plumage (1987 Horse Mesa nestling). The female was unbanded and in adult plumage (unknown origin).

Management Activities. – 1) MCPRD enacted the seasonal closure around the active nest. 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. 4) Two male nestlings were banded with blue VID bands "21/V" and "21/W" at 4.5 weeks old on March 13.

Figure 8. Pleasant breeding area. Maricopa County, Arizona. Photo by J. Driscoll.

Human Activity. – Nestwatchers recorded 469 human activities. Aircraft of 5 different types represented 82.3%, watercraft (boats and water skiers) 13.4%, and terrestrial activity of 5 different types 4.3%. One activity elicited 3 significant responses by the breeding pair. The bald eagles flushed twice in response to a small plane, and once diverted a flight path to avoid a plane. Due to the location of the nest this year, the nestwatchers were out of view of the buoy line and were unable to gather data on compliance with the closure.

Food Habits. – Nestwatchers observed 6 forage events. The male was successful in 100% (n=1), the female in 50.0% (n=2), and an unknown adult in 66.7% (n=3) of forage events. Fish accounted for 100% of these events. The breeding pair was observed delivering 34 prey items to the nest, of which the male delivered 73.5% and the female 26.5%. Fish comprised 67.6% (n=23) of the deliveries, birds 14.7% (n=5), mammals 2.9% (n=1), and unknown prey types 14.7% (n=5). Of the 13 prey items further identified, 23.1% (n=3) were largemouth bass (*Micropterus salmoides*) and American coots each, 15.4% (n=2) common carp (*Cyprinus carpio*), and 7.7% (n=1) channel catfish, black crappie, white bass (*Morone chrysops*), common raven (*Corvus corax*), and ground squirrels (*Spermophilus* or *Ammospermophilus* spp.) each.

Habitat Use. – The Pleasant nestwatchers identified 23 separate perch locations along the Agua Fria arm of Lake Pleasant. Perches spanned a total of 3.2 km ranging from rk 72.0 to 75.2. The breeding pair was seen spending 73.3% of the time at rk 73.2, 11.9% at rk 73.4, 10.3% at rk 73.3, and 4.5% at the remaining 20 perch locations.

Saguaro Breeding Area (Appendix L)
Observation Period. – February 15 to May 9. Total monitoring 67 days/585 hours.

Bald Eagle Identification. – The male was blue VID banded on his left leg, USFWS banded on the right leg, and in adult plumage (unknown origin). The female was unbanded and in adult plumage (unknown origin).

Management Activities. – 1) Nestwatchers were supplied a boat by AGFD and educated recreationists on the bald eagles. 2) On May 18, one grounded male fledgling was rescued and banded with blue VID band "23/C" and was released in good condition.

Interventions. – On May 18, Maricopa County Sheriff's Office deputies at Saguaro Lake contacted AGFD with a report that on May 17 a nestling had fallen into the water below the nest and then climbed into a dead-end alcove a few feet above the water. We captured the 11-week old eagle, found it to be uninjured, banded it, and released it. The fledgling was later seen flying that day and on June 3.

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

Human Activity. – Nestwatchers recorded 8,495 human activities. Watercraft (boats, jet skies, canoe/kayaks) accounted for 99.0%, aircraft (helicopters, small planes) 0.9%, and terrestrial activities (swimmers, gunshots) 0.1%. Three activities elicited 104 significant responses from the breeding pair. The bald eagles were restless in response to 100 boats and 2 helicopters and small planes each.

Food Habits. – The nestwatchers observed 34 forage events. The male was successful in 31.6% (n=19), the female in 55.6% (n=9), an unknown adult in 60.0% (n=5), and they were unsuccessful when hunting in tandem (n=1). Fish accounted for 91.2% (n=31) and birds 8.8% (n=3) of these forage events. The breeding pair was observed delivering 79 prey items to the nest, of which the male delivered 65.8%, the female 26.6%, and an unidentified adult 7.6%. Fish comprised 86.1% (n=68) of the deliveries, birds and mammals 2.5% (n=2) each, and unknown prey types 8.9% (n=7). Of the 8 prey items further identified, 25.0% (n=2) were black crappie and smallmouth bass (*Micropterus dolomieu*) each and 12.5% (n=1) were largemouth bass, flathead catfish, channel catfish, and American coots each.

Habitat use. – The Saguaro nestwatchers identified 62 separate perch locations along Saguaro Lake. Lake perches spanned 14.3 km ranging from rk 18.0 to 32.3. The breeding pair spent 21.7% of the observed time at rk 31.9, 18.0% at rk 31.3, 13.8% at rk 31.4, 9.5% at rk 31.2, 8.4% at rk 30.9, and 28.6% at the 57 remaining perch locations.

Tonto Breeding Area (Appendix M)
Observation Period. – February 1 to April 17. Total monitoring 57 days/510 hours.

Bald Eagle Identification. – The male was blue VID banded "14/E" on his left leg, USFWS banded on the right leg, and in adult plumage (2002 Talkalai nestling). The female was blue VID banded "G" on her left leg, USFWS banded on the right leg, and in adult plumage (1987 Horseshoe nestling).

Figure 10. Tonto breeding area. Gila County, Arizona. Photo by J. Driscoll.

Management Activities. – 1) The Indian Point campground remained closed throughout the breeding season. 2) The Southwestern Willow Flycatcher Closure limited recreational activities in the area. 3) The USFS enacted the seasonal bald eagle closure. 4) Nestwatchers were supplied a boat by AGFD and educated recreationists about the closure and bald eagles.

Human Activity. – Nestwatchers recorded 655 human activities. Watercraft (boats, canoes/kayaks, jet skis) accounted for 97.2%, aircraft (helicopters, small planes, motorized parachutes) 2.0%, and terrestrial activities of 4 different types 0.8%. One activity elicited 5 significant responses from the breeding pair. The bald eagles were restless in response to 2 boats and flushed in response to 3 boats.

Food Habits. – The nestwatchers observed 19 forage events. The male was successful in 70.0% (n=10), the female in 80.0% (n=5), and an unknown adult in 50.0% (n=4) of events. Fish accounted for 68.4% (n=13), birds 5.3% (n=1), and unknown prey types 26.3% (n=5). The breeding pair was observed delivering 52 prey items to the nest, of which the male delivered 51.9%, the female 46.2%, and an unidentified adult 1.9%. Fish comprised 67.3% (n=35) of delivered items, mammals 11.5% (n=6), birds 1.9% (n=1), and unknown prey 19.2% (n=10). Of the 19 prey items further identified, 68.4% (n=13) were black crappie, 10.5% (n=2) largemouth bass, and 5.3% (n=1) catfish, smallmouth bass, black-tailed jackrabbit (*Lepus californicus*), and desert cottontails (*Sylvilagus audubonii*) each.

Habitat use. – The Tonto nestwatchers identified 17 separate perch locations along Tonto Creek. River perches spanned 7.5 km ranging from rk 10.0 to 17.5. The breeding pair spent 72.2% of the observed time at rk 16.9, 17.7% at rk 17.0, and 10.1% at the remaining 15 perch locations.

Tower Breeding Area (Appendix N)

Observation Period. – February 1 to February 29. Total monitoring 21 days/184 hours. Observations ended on February 29 after the nesting attempt failed.

Bald Eagle Identification. – Both resident eagles were in adult plumage. Band status and bird origin were not known.

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

Human Activity. – Nestwatchers recorded 73 human activities. Terrestrial activities of 7 different types accounted for 84.9%, aircraft (small planes and helicopters) 7.3%, and watercraft (canoes/kayaks) 1.6%. One activity elicited 1 significant response from the breeding pair. The bald eagles flushed in response to 1 train.

Food Habits. – The breeding pair was observed delivering 2 prey items to the nest, of which the male brought 100%. Fish and unknown prey types comprised 50.0% each. No prey items were identified to species.

Figure 11. Tower breeding area. Yavapai County, Arizona. Photo by J. Driscoll.

Habitat Use. – The Tower nestwatchers identified 27 separate perch locations along the Verde River. River perches spanned a total of 1.4 km ranging from 247.1 to 248.5. The pair spent 35.8% of the observed time at rk 248.1, 22.1% at rk 248.0, 18.2% at rk 247.2, 7.6% at rk 247.1, and 16.3% at the remaining 23 perch locations.

Woods Canyon Breeding Area (Appendix O)
Observation Period. – May 23 to June 1. Total monitoring 10 days/49 hours. Observations ended on June 1 after the nesting attempt failed May 25 due to a snow storm.

Bald Eagle Identification. – Both resident eagles were in adult plumage and unbanded.

Management Activities. – 1) The Black Mesa Ranger District established an emergency closure around the nest area and placed closure signs. 2) AGFD established a water closure around the nest site. 3) Nestwatchers were supplied a canoe by AGFD and educated recreationists about the closure and bald eagles.

Figure 12. Woods Canyon breeding area. Coconino County, Arizona. Photo by K. McCarty.

Habitat Use. – The Woods Canyon nestwatchers identified 19 separate perch locations around the lake. Perches spanned a total of 4.8 km ranging from 0.1 to 4.9. The pair spent 25.2% of the

observed time at lk 4.7, 19.9% at lk 2.2, 19.7% at lk 3.3, 15.2% at lk 4.8, 5.5% at lk 1.7, and 14.5% at the remaining 14 perch locations.

MANAGEMENT CONSIDERATIONS

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

Box Bar Breeding Area

1. Conduct an interdisciplinary environmental assessment of the Verde River from Bartlett Dam to the Ft. McDowell Reservation boundary, with the goal toward more proactive management of the riparian corridor. For example, nestwatchers observed inadequate management of recreation and were concerned over OHV use and destruction of vegetation.
2. Establish a trail system between Needle Rock and Box Bar utilizing the existing two-track road that follows the river, with one main trail for OHVs and another for hikers, bikers, and horseback riders. Close off all other OHV trails to allow re-growth of vegetation.
3. Confine most camping to developed fee areas off the floodplain instead of dispersed camping in order to reduce recreational impacts.
4. Develop some fee-based "environmental" sites that are hike in only and have picnic tables, fire rings, pack in/pack out trash, and instruction on proper waste burial.
5. The area known as the Airstrip, just south of Rio Verde ranch, should be closed to motorized vehicles to preserve vegetation and archaeological sites, and limit target shooting, vandalism of fences and locked gates, and access for motorized parachutes.
6. Establish a non-motorized trail in the Airstrip area and restore it with native plantings.
7. Place more "No target shooting" bilingual signs in the Airstrip area.
8. Place closure signs along the Ft. McDowell Reservation boundary.
9. Install a gate at the top of the hill leading to the floodplain on FR 160 to reduce confusion about the closure.
10. Provide more law enforcement in the area on weekends and implement a zero tolerance policy.
11. Inform dispatchers in the greater Phoenix area (e.g. Mesa) about the location of the Needle Rock recreation area and tell them which ordinances are in effect there.

Cliff Breeding Area

1. Add more "Sensitive Species" stop signs, which have proven to be effective, along the western edge of the closure (especially along FR 161) to hinder OHV and foot traffic from entering the closure.
2. Restrict shooting around the closure area, especially upstream towards Horseshoe Dam, to allow the eagles to perch and forage along the river banks, as well as to provide safety to nestwatchers in the area.
3. Encourage the Salt River Project to manage the outflow from dams in a pattern more closely resembling natural flows in order to benefit eagles by improving foraging conditions during the breeding season, and support the growth of cottonwoods along the river in order to provide future nest locations and perches for bald eagles.

4. Advise the Sheriff's helicopter not to fly so low over the breeding area.
5. Make Arizona Bald Eagle Nestwatch pamphlets available for the public at the closure signs and at the USFS Cave Creek Ranger Station.

Luna Breeding Area

1. Continue the nestwatch program at the Luna BA.
2. Maintain closure boundaries, including Group Campsite A, as they currently exist.
3. Establish islands by cutting off ends of peninsulas to benefit breeding waterfowl.
4. Complete the repainting or replacing of weather-worn signage for the waterfowl closure.
5. Encourage the new concessionaire and clients at the Luna Lake marina to support the bald eagle management plan.

Needle Rock Breeding Area

1. Increase the law enforcement presence and increase outreach to those people typically using the Tonto Forest in order to reduce the likelihood of property destruction, shooting in the area, trash piles, and waste.
2. Inform emergency operators regarding the Needle Rock Recreation Area location.
3. Simplify closure signage to read in large, bilingual print "Area across river closed December 1 to June 30" with a reference to a number or address for more information, and place more signs.

Orme Breeding Area

1. Continue to keep SRPMIC closed to non-tribal members.
2. Plant and fence off riparian cottonwoods for future bald eagle habitat.
3. Investigate the excessive shooting between the Bush Highway and ½ mile of the Phon D Sutton Recreation Area from Thursday through Sunday, which has been reported for the previous three years.

Pinto Breeding Area

1. Place the "Sensitive Species" stop signs on the closure buoys, or similar signs detailing the need for the closure and that it is being monitored and enforced.
2. Use closure buoys that are distinct from others on Roosevelt Lake.
3. Install an informational display at the Schoolhouse boat launch.
4. Continue to provide nestwatchers with a boat.
5. Maintain the closure buoy line to prevent it from drifting.
6. Enlarge the breeding area closure. Extend the closure by 100 meters up and down river, and 20 meters out towards the center of the river from its current position. Furthermore, designate that section of the river as a "no stopping" area, restricted to through traffic only.

Pleasant Breeding Area

1. Keep nestwatchers informed about the rules and regulations of the Agua Fria Conservation area closure if it is in effect next year, so they know what to tell the public and are better able to discern and report violations.
2. Mark the northern boundary of the eagle closure at river km 74.0 with buoys from the beginning of the closure period.

3. The addition of a third buoy line at river km 71.4, visible from the nestwatch observation point, could reduce boater intrusions into the critical nest area.
4. Continue to place a buoy line near the observation point in a small cove of the Agua Fria River, to end confusion fishermen were having with the boundaries of the eagle closure and aid the Sheriff's ability to cite offenders.

Saguaro Breeding Area

1. Close off the area from boats beyond the current "No Wake Zone" to insure a foraging area for the bald eagles and allow an area for the nest watchers to camp without being observed by the public.
2. Inform the local sheriff of the nest site to avoid helicopter flyovers.
3. Place informational signs regarding the bald eagles either near the no wake buoys or on the nest watchers' boat, for example, that might encourage the public to slow down, not litter, and be quieter in the no wake zone.

Tonto Breeding Area

1. Post informational signs at the Indian Point boat ramp and other motorized parachute launch sites explaining about the nest site and restrictions.
2. Place more buoys, closer together and in straighter lines, to more clearly mark the closure area.
3. Create a no fly zone for small aircraft, encompassing the area bounded by A Cross road on the north, Orange Peel and Indian Point on the south, Highway 188 on the west, and east to the A Cross Road to Indian Point.
4. Provide information at boat launches through brochures and/or signs regarding closure areas, maintaining distance from eagles, and that the area is monitored by AZBENWP, USFS, and county sheriff, and violators will be ticketed.

Tower Breeding Area

No new recommendations.

Woods Canyon Breeding Area

1. Extend the closure fence at the Rocky Point trailhead all the way up to the Forest Service access road being used as the alternate trail around the lake. The alternate trail needs to be more clearly marked and cleared of debris throughout its length.
2. Place buoys at slightly closer intervals, and place closure signs behind them along the shore.
3. Install monofilament collection bins at all lakes in the area to reduce the amount of fishing line along the lakes and to prevent wildlife entanglements.

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APPENDIX A: 2008 ARIZONA BALD EAGLE WINTER COUNT RESULTS

Table 8. 2008 Arizona bald eagle winter count volunteer survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Apache County						
1	Becker Lake	15	2	0	0	0
2	Little Colorado River (LCR)	15	0	0	0	0
3	S. Fork LCR – Campground	15	0	0	0	0
4	Casa Malapais – LCR	5	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	45	0	0	0	0
6	Sponseller Lake	20	0	0	0	0
7	Mexican Hay Lake	Not surveyed.				
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	60	4	1	0	0
9	The Ranch Lake	20	1	0	1	0
10	Ortega Lake	20	0	0	0	0
11	Concho Lake	25	0	0	0	0
12	Luna Lake	82	2	0	0	0
13	Nelson Reservoir	66	2	0	0	0
14	Nutrioso Reservoir	90	1	0	0	1
16	San Francisco River (Luna Lake to New Mexico line)	Not surveyed.				
Total		**527**	**12**	**1**	**1**	**1**
Cochise County						
18	Parker Canyon Lake	90	1	0	0	0
19	Willcox Playa	225	0	1	0	0
Total		**315**	**1**	**1**	**0**	**0**
Coconino County						
21	Long Lake Complex	300	1	0	0	0
22	Stoneman Lake	141	2	1	0	0
23	FH-3	156	1	1	0	1
24	I-17, Section to Flagstaff	195	1	0	0	0
25	Bellemont	360	9	1	0	0
26	Townsend/Winona A/B	255	1	0	0	0
27	HWY 89 North /Sunset Crater – Wupatki	385	3	0	0	0
28	FH-3 Lakes (Mary, Mormon, Marshall, Prime, etc.)	472	5	1	0	0
29	Continental Country Club Lakes	120	2	0	0	0
30	Chevelon Canyon Lakes	Not surveyed.				
32	Spring Valley Wash	120	0	1	0	0
33	Red Lake Valley	15	0	0	0	0
34	Kaibab Lake	102	0	0	0	0
35	Pittman Valley	52	0	0	0	0
36	Davenport Lake	35	0	0	0	0
37	Scholz Lake	100	0	0	0	0
38	Cataract Lake	110	0	0	0	0
39	Willow Springs Lake	145	1	0	0	0
40	West Chevelon Canyon	50	1	0	0	0
41	Willow Creek	65	0	0	0	0

Table 8. continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
42	White Horse Lake – Pomeroy Tanks	45	0	0	0	0
43	JD Dam Lake	Not surveyed.				
45	Steel/Stone Road	30	0	0	0	0
48	Blue Stem Wash-Babbit property	1	0	0	0	0
49	Glen Canyon Nat'l Rec. Area (Lake Powell to Lee's Ferry)	80	0	0	0	0
118	Bill Williams Loop Road	120	0	0	0	0
119	Johnson Canyon	50	0	0	0	0
120	Highway 64 east	20	1	0	0	0
121	Highway 64	13	0	0	0	0
122	Camp Navajo	Not surveyed.				
123	Partridge Creek	300	0	0	0	0
124	Odell Lake	60	0	0	0	0
125	Highway 87 north	60	1	0	0	0
126	Highway 180	150	0	0	0	0
Total		**4,107**	**29**	**5**	**0**	**1**
Graham County						
51	Point of Pines Lake area	Not surveyed.				
Mohave County						
54	Lake Mohave	Dropped[1]				
56	Lake Mead, Temple Bar	Dropped[1]				
57	Alamo Lake	51	2	0	0	0
Total		**51**	**2**	**0**	**0**	**0**
Navajo County						
58	Lake of the Woods	30	0	0	0	0
59	Rainbow Lake	30	2	0	0	0
61	Whipple Lake	30	1	0	0	0
62	Long Lake	120	1	0	0	0
63	Lone Pine Dam	60	0	0	0	0
64	Schoens Reservoir	45	0	0	0	0
65	White Mountain Lake	70	3	0	0	0
67	Jacques Marsh	60	2	2	0	0
68	Scott's Reservoir	50	0	0	0	0
69	Show Low Lake	30	2	0	0	0
70	Pintail Lake	33	1	0	0	0
71	Telephone Lake	25	1	0	0	0
72	Fool Hollow Lake	240	0	1	0	0
75	Cottonwood Wash/ Clay Springs	45	0	0	0	0
76	White Lake	11	0	0	0	0
127	Mortenson Wash	240	1	1	0	1
Total		**1,119**	**14**	**4**	**0**	**1**
Santa Cruz County						
82	Pena Blanca Lake	90	0	0	0	0
Yavapai County						
83	Wet Beaver Creek	540	2	1	0	0
84	Oak Creek	510	2	0	0	0

[1]Lake Mead and Lake Mohave winter count surveys were dropped from Arizona's standardized routes in order to eliminate double-reporting to the national winter count coordinator. These routes will be reported only by Nevada.

Table 8. continued.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
85	Willow Lake	240	0	0	0	0
86	Lynx Lake	240	2	0	0	0
87	Watson Lake	247	1	1	0	0
88	Goldwater Lake	240	3	0	0	0
Total		**2,017**	**10**	**2**	**0**	**0**
Yuma and La Paz Counties						
89	Imperial N.W.R. Cibola/Martinez Lake – Colorado River	240	0	1	0	0

Table 9. 2008 Arizona bald eagle winter count helicopter survey results.

Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
90	Verde River	211	39	6	0	0
91	Lower East Verde River	14	1	0	0	0
92	Lower West Clear Creek	18	2	0	0	0
93	Lower Salt River	130	10	5	0	0
94	Upper Salt River	94	2	0	0	0
95	Lower Tonto Creek	29	6	0	0	0
97	Lower Canyon Creek	18	0	0	0	0
98	Lower Cibecue Creek	11	0	0	0	0
100	White River	15	2	0	0	0
101	North Fork White River	42	3	0	0	0
102	Lower Black River	57	5	0	0	0
103	Big and Little Bonito Creeks	37	0	0	0	0
104	San Carlos River–Talkalai Lake	23	2	0	0	0
105	San Carlos Reservoir	21	4	3	0	0
106	Upper and Lower Gila River	60	1	1	0	0
107	Eagle Creek	42	3	0	0	0
108	Bonita Creek	15	0	0	0	0
109	Lower San Francisco River	33	3	0	0	0
110	Blue River	10	0	0	0	0
111	Sunrise Lake	3	0	0	0	0
112	Big Lake	4	0	0	0	0
114	Crescent Lake	5	0	0	0	0
115	Lake Pleasant	26	1	0	0	0
116	Del Rio Ponds	1	0	0	0	0
117	Tres Rios	26	0	0	0	0
Total		**945**	**84**	**15**	**0**	**0**

Table 10. 2008 Arizona bald eagle winter count non-standardized survey route results.

Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
Boggy Tank (047)	Coconino	62	1	0	0	0
Camp Verde (993)	Yavapai	95	0	0	0	0
Hwy. 87 South (991)	Coconino	90	3	0	0	0
Kachina Wetlands (986)	Coconino	47	0	0	0	0
Coconino National Forest	Yavapai	155	4	0	0	0
Total		**449**	**8**	**0**	**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 occupied 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 occupied 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: 2008 ARIZONA BALD EAGLE PRODUCTIVITY

Table 11. Arizona bald eagle breeding area productivity summary, 2008.

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Alamo	S	4	<1/28	1+	1/28-3/20	1	1	>5/12
Bartlett	S	2	2/2	1+	2/20-3/20	1	1	5/21-5/28
Beaver	S	1	<1/14	2+	1/28-3/20	2	2	5/7-5/28
Becker	U							
Blue Point	F	11	<5/6	1+	<5/6	1	Failed 5/7-5/28	
	Eaglet found dead on ground in nest area on 6/3.							
Box Bar*	S	3	<1/14	3	2/20-2/27	3	3	5/5-5/16
Bulldog	F	1	1/9-1/29	2+	1/29-3/12	2	Failed 4/22-5/7.	
	Nestlings last seen in nest on 4/22 at 8.5-9 weeks old.							
Burro	O							
Canyon	U							
Canyon de Chelly	S	1	3/4	2+	4/7	2	2	6/29, 6/30-7/8
Cedar Basin	U							
Cibecue	F	2	1/29-3/19	1+	Failed 3/19-4/22.			
Cliff*	S	6	1/28-2/2	2+	3/5-3/6	2	2	5/21-5/30
Coldwater	S	3	1/28-3/20	1+	3/20-4/21	1	1	>6/12
Coolidge	U							
Crescent*	F	2	<3/19	1+	4/22-5/6	1	Failed 5/6-5/28.	
Doka	S	3	<1/14	2+	1/28-3/20	2	2	5/7-5/28
Dupont	U							
East Verde	O							
Fish Creek	U							
Fort McDowell	S	17	1/28-3/20	1+	1/28-3/20	1	1	>5/28
Granite Basin	U							
Granite Reef*	S	2	1/14-1/28	2+	1/28-3/19	2	2	6/1
Greer Lakes	F	1	<3/20	1+	Failed 4/22-5/12.			
Horse Mesa	S	4	<1/9	2+	1/29-3/19	2	1	5/7-5/28
	One nestling disappeared from nest 4/22-5/7 at 8-10 wks old.							
Horseshoe	S	11	1/28-3/20	1+	3/20-4/7	1	1	>5/28
Ive's Wash	S	3	1/15-1/28	2+	1/28-3/20	2	2	>5/12
Ladders	F	3	1/28-3/4	1+	¾-3/20	1	Failed 4/19.	
	Non-resident, subadult bald eagle entered nest and took nestling.							
Lone Pine	S	5	1/29-3/19	1+	3/19-4/22	1	1	>5/28
Lower Lake Mary	O							
Luna*	S	1	<2/2	2+	2/29	2	2	5/25
Lynx	S	2	1/27-2/1	2+	3/5	2	2	5/21-6/1
Needle Rock*	S	2	1/14-1/28	2+	2/25-2/28	2	2	5/11-5/28
Oak Creek	S	4	1/14-1/28	2+	1/28-3/4	2	2	5/7-5/22
Orme*	S	6	1/14-1/28	3	3/1-3/9	3	3	5/17-5/28
	One fledgling was found dead under nest on 6/16.							
Perkinsville	S	4	1/14-1/28	1+	3/20-4/21	1	1	>5/28
Pinal	S	3	<3/19	2+	<3/19	2	2	5/7-5/28
Pinto*	S	6	<1/9	2+	2/11-2/15	2	2	5/2-5/14

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

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

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 11. continued.

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Pleasant*	S	3	<1/14	2+	2/9	2	2	4/30, >5/13
Redmond	F	5	1/29-3/19	1+	Failed 3/19-4/22.			
Rock Creek	F	2	<1/29	1+	Failed 3/19-4/22.			
Rodeo	S	3	1/14-1/28	2+	1/28-3/20	2	2	5/7-5/28
San Carlos	F	5	<1/29	1+	Failed before 3/19.			
Saguaro*	S	1	<1/29	2+	3/2	2	2	5/15-5/17
76	S	4	1/29-3/19	1+	3/19-3/24	1	1	>6/12
Sheep	S	4	1/9-1/29	2+	1/29-3/19	2	2	>5/28
Suicide	S	2	1/9-1/29	2+	1/29-3/19	2	2	4/22-5/20
Sullivan Lake	F	2	1/28-3/3	2+	3/3-4/1	2	Failed	
	One nestling gone 4/11-4/21 before 3 weeks old. Second died in nest at 4-5 weeks old.							
Sycamore	S	4	1/14-1/28	2+	1/28-3/20	2	2	5/7-5/28
Table Mountain	O							
Talkalai	S	7	1/9-1/29	2+	1/29-3/19	2	2	4/22-5/20
Tonto*	F	4	1/9-1/29	2+	¾	2	Failed 4/17.	
	Wind storm broke nest branch; 6-week old nestlings died in water below nest tree.							
Tower*	F	8	1/14-1/23	1+	2/23	1	Failed 2/29.	
	Nest left unattended; possible difficulty finding food (high river flow and muddy water).							
Winkelman	U							
Woods Canyon*	F	3	<5/7	1+	Failed 5/25.			
	Intense late spring snow storm occurred a few days before confirmed failure.							
Yellow Cliffs	F	3	<3/20	1	3/20-4/21	1	Failed 6/4-6/20.	
	Nestling found dead on ground below nest at 8-10 weeks old.							

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

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

* Nests monitored by the Arizona Bald Eagle Nestwatch Program.

APPENDIX D: NEST SURVEY RESULTS

Table 12. Results of the 2008 winter count, ORA, and Nest Survey Flights.

Location	Time	Comments
January 9, 2008		
Granite Reef	0744	Two adults perched in area.
Bulldog	0754	Two adults standing in nest #1.
Blue Point	0800	All known nests empty. No bald eagles.
Fish Creek	0819	All known nests empty. No bald eagles.
Horse Mesa	0836	One adult incubating in nest #4.
Tonto	0848	Two adults standing in nest #4.
Sheep	0852	Two adults perched near nest #4.
76	0910	One adult standing in nest #4.
Pinto	1135	One adult incubating in nest #6. Second adult perched in area.
Pinal	1141	All known nests empty. No bald eagles.
Redmond	1155	All known nests empty. No bald eagles.
Canyon	1243	All known nests empty. No bald eagles.
Talkalai	1422	Two adults flushed from nest #7.
San Carlos	1437	Nest #4 fallen. All known nests empty. No bald eagles.
Suicide	1501	Two adults standing in nest #2.
Coolidge	1506	All known nests empty. No bald eagles.
Granite Basin	1542	All known nests empty. No bald eagles.
Winkelman	1557	All known nests empty. No bald eagles.
January 10, 2008		
Cibecue	0945	All known nests empty. No bald eagles.
Mule Hoof historical BA	0959	All known nests empty. No bald eagles.
Cedar Basin	1018	All known nests empty. No bald eagles.
Lone Pine	1030	All known nests empty. One adult in area.
Crescent	1140	All known nests empty. No bald eagles.
January 11, 2008		
Willow nest site	0940	No new nests or bald eagles.
Eagle nest site	1004	No new nests or bald eagles.
January 14, 2008		
Granite Reef	0739	All known nests empty. No bald eagles.
Orme	0740	One adult perched in area of nest #6.
Rodeo	0744	All known nests empty. No bald eagles.
Sycamore	0748	Two adults perched in area of nest #4.
Doka	0750	One adult incubating in nest #3.
Fort McDowell	0753	One adult standing in nest #17. Second adult in area.
Box Bar	0757	One adult incubating in nest #3.
Needle Rock	0758	Two adults standing in nest #2.
Bartlett	0805	One adult standing in nest #1, flushed.
Yellow Cliffs	0814	All known nests empty. One adult in area.
Cliff	0833	All known nests empty. No bald eagles.
Horseshoe	0855	All known nests empty. No bald eagles.
Table Mountain	0906	One adult perched above nest #4. Second adult in area.
LF Ranch	0932	No new nests or bald eagles.
East Verde	0941	All known nests empty. No bald eagles.
Coldwater	0950	All known nests empty. No bald eagles.
Ladders	0957	One adult perched in area of nest #3. Second adult in area.
West Clear Creek nest site	1006	One adult in area of small nest. Second adult in area.
Beaver	1212	One adult incubating in nest #1. Second adult in area.

Table 12. continued.

Location	Time	Comments
Oak Creek	1223	Two adults in area.
Tower	1245	One adult perched near nest #9. Second adult in area.
Perkinsville	1257	All known nests empty. No bald eagles.
Hell Point historical BA	1313	All known nests empty. No bald eagles.
Muldoon nest site	1322	All known nests empty. No bald eagles.
Granite nest site	1325	All known nests empty. No bald eagles.
Sullivan Lake	1335	All known nests empty. No bald eagles.
Pleasant	1434	One adult incubating in nest #3.
January 28, 2008		
Granite Reef	0748	One adult incubating in nest #2.
Orme	0749	One adult incubating in nest #6.
Rodeo	0751	One adult incubating in nest #3.
Sycamore	0753	One adult incubating in nest #4. Second adult in area.
Doka	0754	One adult incubating in nest. Second adult in area.
Fort McDowell	0755	One adult standing in nest #17, flushed. Second adult in area.
Box Bar	0800	One adult incubating in nest.
Needle Rock	0800	One adult incubating in nest #2.
Bartlett	0805	Two adults in area. Nest #1 partially fallen.
Yellow Cliffs	0810	All known nests empty. No bald eagles.
Cliff	0825	One adult perched by nest #6. Nest #2 gone.
Horseshoe	0832	One adult standing in nest #11.
Table Mountain	0847	All known nests empty. No bald eagles.
East Verde	0853	All known nests empty. No bald eagles.
Coldwater	0902	All known nests empty. No bald eagles.
Ladders	0910	One adult standing in nest #3.
Camp Verde historical BA	0920	No new nests or bald eagles.
Beaver	0922	One adult incubating in nest.
Oak Creek	0932	One adult incubating in nest #4.
Tower	0950	One adult incubating in nest #8.
Mormon Pocket	1045	All known nests empty. No bald eagles.
Perkinsville	1047	One adult incubating in nest #4. Second adult standing in nest.
Hell Point historical BA	1100	All known nests empty. No bald eagles.
Muldoon nest site	1108	All known nests empty. No bald eagles.
Granite nest site	1110	All known nests empty. No bald eagles.
Sullivan nest site	1115	All known nests empty. No bald eagles.
Sullivan Lake	1120	All known nests empty. No bald eagles.
Alamo	1345	One adult incubating in nest #4. Nest #7 gone.
Ive's Wash	1358	One adult incubating in nest #3. Second adult in area.
Pleasant	1443	One adult incubating in nest.
January 29, 2008		
Bulldog	0935	One adult incubating in nest #1.
Blue Point	0939	All known nests empty. No bald eagles.
Saguaro	0946	New breeding area with 1 adult in new cliff nest #1. Second adult flew to nest.
Fish Creek	0954	All known nests empty. No bald eagles.
Horse Mesa	0956	One adult incubating in nest #4.
Rock Creek	1000	One adult incubating in nest #2.
Tonto	1007	One adult incubating in nest #4.
Sheep	1012	One adult incubating in nest #4. Second adult in area.
76	1024	One adult standing in nest #4.
Dupont	1035	No new nests or bald eagles.

Table 12. continued.

Location	Time	Comments
Pinto	1049	One adult incubating in nest #6.
Pinal	1055	All known nests empty. No bald eagles.
Redmond	1101	One adult standing in nest #5.
Gleason Flat	1110	No new nests or bald eagles.
Canyon	1120	All known nests empty. No bald eagles.
Cibecue	1245	All known nests empty. No bald eagles.
Mule Hoof historical BA	1255	All known nests empty. No bald eagles.
Cedar Basin	1305	All known nests empty. No bald eagles.
Lone Pine	1310	One adult perched in area.
Talkalai	1459	One adult incubating in nest #7.
San Carlos	1510	One adult incubating in new cottonwood tree nest #5.
Suicide	1527	One adult incubating in nest #2.
Coolidge	1530	All known nests empty. One immature bald eagle perched in area.
Granite Basin	1559	All known nests empty. No bald eagles.
Winkelman	1612	No new nests or bald eagles.
March 19, 2008		
Granite Reef	0747	One 1-week old nestling. One adult in area.
Orme	0748	Two 3-week old nestlings. One adult in nest, second adult in area.
Bulldog	0752	Two 3.5-week old nestlings.
Blue Point	0754	All known nests empty. No bald eagles.
Saguaro	0756	One 2.5-week old nestling. Two adults in nest.
Fish Creek	0810	All known nests empty. No bald eagles.
Horse Mesa	0814	Two 3-week old nestlings. One adult flushed from nest.
Rock Creek	0820	One adult incubating in nest.
Tonto	0837	Two 1.5-week old nestlings. One adult in nest.
Sheep	0841	Two 2-week old nestlings. One adult in nest.
76	0849	One adult incubating/brooding in nest #4.
Dupont	0905	All known nests empty. No bald eagles.
Pinto	0919	Two 4.5-week old nestlings. One adult in nest. Second adult in area.
Pinal	0925	Two 4.5-week old nestlings in nest #3. One adult in nest.
Redmond	0929	One adult incubating in nest #5.
Canyon	0945	All known nests empty. No bald eagles.
Cibecue	1105	One adult incubating in nest #2. Second adult in area.
Mule Hoof historical BA	1110	All known nests empty. No bald eagles.
Cedar Basin	1115	All known nests empty. No bald eagles.
Lone Pine	1124	One adult incubating in nest #5.
Crescent	1200	One adult incubating in nest #2. Second adult in area.
Talkalai	1337	Two 3.5-week old nestlings. One adult in nest.
San Carlos	1403	Failed. Nest #5 empty. Pair of adults seen in area of fallen nest #4.
Suicide	1407	Two 3-week old nestlings. One adult in nest. Second adult in area.
Coolidge	1410	All known nests empty. No bald eagles.
Granite Basin	1419	All known nests empty. No bald eagles.
Winkelman	1430	No new nests or bald eagles.
March 20, 2008		
Rodeo	0758	One 3-week old nestling. One adult in nest. Second adult in area.
Sycamore	0802	Two 3.5-week old nestlings. One adult in nest. Second adult in area.
Doka	0805	Two 3-week old nestlings. One adult in area.
Fort McDowell	0807	One 1-week old nestling. One adult flushed from nest.
Box Bar	0812	Three 4.5-week old nestlings. One adult perched by nest.
Needle Rock	0813	Two 2.5-week old nestlings. One adult in nest.

Table 12. continued.

Location	Time	Comments
Bartlett	0814	One 1-week old nestling in nest #2. One adult brooding. Second adult in area.
Yellow Cliffs	0823	One adult incubating 1 egg in new snag nest #3, flushed.
Cliff	0827	One 1-week old nestling in nest #6. Two adults in nest.
Horseshoe	0833	One adult incubating/brooding in nest #11.
Table Mountain	0842	Two adults in area.
East Verde	0849	All known nests empty. One adult in area.
Coldwater	0855	One adult incubating in nest #4.
Ladders	0900	Possibly one 1-week old nestling in nest #3. One adult flushed from nest. Second adult flew to nest.
Beaver	0905	Two 4.5-week old nestlings in nest. One adult in area.
Oak Creek	0913	Two 3-week old nestlings. One adult in nest brooding.
Tower	0920	Failed. All known nests empty. No bald eagles.
Mormon Pocket	0925	All known nests empty. No bald eagles.
Perkinsville	0926	One adult incubating/brooding in nest #4.
Hell Point historical BA	0932	One adult golden eagle incubating in nest #2.
Muldoon nest site	0935	All known nests empty. No bald eagles.
Granite nest site	0937	One adult golden eagle incubating in nest #3.
Sullivan nest site	0940	All known nests empty. No bald eagles.
Sullivan Lake	0944	One adult incubating in nest #2.
Watson Lake	1107	All known nests empty. No bald eagles.
Lynx	1111	Two 1-week old nestlings. One adult in nest. Second adult in area.
Devil's Post historical BA	1145	All known nests empty. No bald eagles.
Burro Creek	1219	Nest #1 fallen. One adult and one near-adult in area of 4 empty nests downstream.
Alamo	1233	One 4.5-week old nestling. One adult in nest shading.
Ive's Wash	1237	Two 2.5-week old nestlings. Two adults in area.
April 14, 2008		
Ive's Wash	0830	Two 5.5-week old nestlings. One adult flew from nest.
Gene Wash nest site	1110	No new nests or bald eagles. Nest #1 poor.
Colorado River (Parker Dam to Topock Marsh)	1110-1125	No new nests or bald eagles.
Topock Marsh	1125	No new nests or bald eagles.
Santa Fe Reservoir	1320	No new nests or bald eagles.
City Reservoir	1320	No new nests or bald eagles.
Dogtown Lake	1327	No new nests or bald eagles.
Scholz Lake	1333	No new nests or bald eagles.
White Horse Lake	1338	One osprey standing in nest #2. One osprey incubating in nest #3. No bald eagles. Nest #1 empty.
Sycamore Canyon	1347	No new nests or bald eagles.
Tower	1410	All known nests empty. No bald eagles.
Ladders	1546	One nestling. One adult flushed from nest. One subadult bald eagle in area.
Coldwater	1551	One adult in nest shading. Second adult in area.
April 21, 2008		
Orme	0717	Three 8-week old nestlings.
Rodeo	0719	Two 8-week old nestlings. One adult in area.
Sycamore	0722	Two 8-week old nestlings.
Doka	0723	Two 8-week old nestlings.
Fort McDowell	0725	One 5-week old nestling. One adult perched by nest.
Box Bar	0729	Three 9-week old nestlings.

Table 12. continued.

Location	Time	Comments
Needle Rock	0730	Two 7-week old nestlings.
Bartlett	0732	One 5-week old nestling. One adult in area.
Yellow Cliffs	0740	One 2-week old nestling. One adult flushed from nest.
Cliff	0745	Two 6-week old nestlings. One adult flew to nest.
Horseshoe	0751	One 5-week old nestling. One adult flushed from nest.
Table Mountain	0756	Two adults in area.
East Verde	0805	All known nests empty. No bald eagles.
Coldwater	0812	One 3-week old nestling. One adult in nest. Second adult in area.
Ladders	0821	Failed. Nest empty. One adult flew from nest.
Beaver	0830	Two 9-week old nestlings. One adult in nest.
Oak Creek	0834	Two 8-week old nestlings.
Tower	0917	All known nests empty. No bald eagles.
Mormon Pocket	0923	All known nests empty. No bald eagles.
Perkinsville	0926	One 4.5-week old nestling.
Hell Point historical BA	0932	Failed golden eagle attempt. All known nests empty. No bald eagles.
Granite nest site	0942	One 2-week old golden eagle nestling.
Sullivan nest site	0946	All known nests empty. No bald eagles.
Sullivan Lake	0950	One 3-week old nestling. One adult flushed from perch.
Lynx	1003	Two 6-week old nestlings. One adult flushed from perch at nest.
Burro Mesa nest site	1140	One golden eagle incubating in new cliff nest #1. New alternate nest #2 nearby.
Devil's Post historical BA	1150	New cliff nest #8 found. All other known nests empty. No bald eagles.
Burro Creek	1158	All known nests empty. No bald eagles.
Alamo	1213	One 9-week old nestling.
Ive's Wash	1217	Two 6-week old nestlings. Two adults in area.
April 22, 2008		
Granite Reef	0658	Two 5.5-week old nestlings. One adult in nest. Second adult in area.
Bulldog	0706	Two 8-week old nestlings.
Blue Point	0709	All known nests empty. No bald eagles.
Saguaro	0711	Two 7-week old nestlings.
Fish Creek	0720	All known nests empty. No bald eagles.
Horse Mesa	0723	Two 8-week old nestlings.
Rock Creek	0728	Failed. Nest empty and no bald eagles. One osprey perched near nest.
Tonto	0732	Failed. Nest #4 branch broke. No bald eagles.
Sheep	0736	Two 6-week old nestlings. One adult flew to nest.
76	0745	One 4.5-week old nestling.
Pinto	0803	Two 9-week old nestlings. One adult in area.
Pinal	0807	Two 9-week old nestlings.
Redmond	0811	Failed. Nest empty. One adult standing on nest.
Cibecue	1026	Failed. All known nests empty. No bald eagles.
Mule Hoof historical BA	1032	All known nests empty. No bald eagles.
Cedar Basin	1040	All known nests empty. No bald eagles.
Lone Pine	1049	One 3.5-week old nestling. One adult in nest shading.
Crescent	1113	One adult incubating/brooding in nest. Second adult in area.
Greer Lakes	1118	New breeding area with one adult incubating in new snag nest #1. Second adult in area.
Ash historical BA	1243	No new nests or bald eagles.
Talkalai	1317	Two 9-week old nestlings. One adult in nest tree. Second adult in area.
San Carlos	1325	All known nests empty. No bald eagles.
Suicide	1332	Two 9-week old nestlings. Two adults in area.

Coolidge	1335	All known nests empty. No bald eagles.

Table 12. continued.

Location	Time	Comments
Granite Basin	1401	All known nests empty. No bald eagles.
		May 7, 2008
Granite Reef	0652	Two 8-week old nestlings.
Bulldog	0700	Failed. Nest empty and no bald eagles.
Blue Point	0710	One 7-week old nestling in new cliff nest #11.
Fish Creek	0725	All known nests empty. No bald eagles.
Horse Mesa	0733	One 10-week old nestling. Second nestling not found.
Pinto	0741	One fledgling in area and one 11-week old nestling branching from nest.
Pinal	0745	Two 11-week old nestlings.
Sheep	0800	Two 8-week old nestlings. One adult in nest tree.
76	0813	One 6-week old nestling.
Upper Canyon Creek	0855	No new nests or bald eagles.
Black Canyon Lake	0910	No new nests or bald eagles.
Willow Springs Lake	0921	Osprey incubating in nest #1. No bald eagles.
Woods Canyon Lake	0930	New breeding area with adult incubating in nest #3.
Bear Canyon Lake	0940	No new nests or bald eagles.
Knoll Lake	0946	Osprey flushed from nest #3, fresh nest material inside. Nest #1 empty. Nest #2 not found.
Chevelon Canyon (Slim Jim Canyon to Chevelon Canyon campground)	0957	Two ospreys in area of new large tree nest #2 at lake. Possibly one nestling in nest.
East Clear Creek (Hamilton Crossing to Blue Ridge Reservoir)	1024	No new nests or bald eagles.
Blue Ridge Reservoir	1041	Osprey incubating in nest #2. Nests #1, 3, and 4 not found. New snag nest #5 empty.
Tremaine/Soldier Annex/Long Lakes	1105	Nest #1 fallen. No new nests or bald eagles.
Kinnickinick Lake	1125	No new nests or bald eagles.
Long Lake	1130	No new nests or bald eagles.
Ashurst Lake	1135	No new nests or bald eagles.
Lower Lake Mary	1325	Two adults in area of nest #2. Nest was empty.
Upper Lake Mary	1342	Ospreys incubating in nests #1, 2, and 3. Nest #4 empty. New snag nest #5 empty.
Veil Lake/Prime Lake	1343	No new nests or bald eagles.
Marshall Lake	1351	No new nests. Two adults in area.
Rogers Lake	1405	No new nests or bald eagles.
Perkinsville	1424	One 6-week old nestling.
Oak Creek	1436	Two 10-week old nestlings.
Beaver	1442	Two 11-week old nestlings, one branching from nest.
Coldwater	1452	One adult in nest shading nestling. Second adult in area.
Cliff	1508	Two 8-week old nestlings. One adult in area.
Bartlett	1517	One 7-week old nestling.
Needle Rock	1523	Two 9-week old nestlings.
Box Bar	1525	One fledgling perched below nest. One 11-week old nestling in nest. Third nestling fledged but not found.
Fort McDowell	1528	One 7-week old nestling. One adult in area.
Doka	1529	Two 10-week old nestlings branching from nest.
Sycamore	1531	Two 10-week old nestlings.
Rodeo	1534	Two 10-week old nestlings. One adult in area.

Orme	1535	Three 10-week old nestlings.

Table 12. continued.

Location	Time	Comments
May 28, 2008		
Granite Reef	0653	Two 11-week old nestlings, one branching from nest. Two adults in area.
Orme	0654	Two fledglings in area, third not found. Two adults in area.
Bulldog	0705	All known nests empty. No bald eagles.
Blue Point	0710	Failed. Nest empty and no bald eagles.
Saguaro	0719	One fledging in area. Second eaglet not seen.
Horse Mesa	0730	One fledging in area. Second eaglet not seen.
Pinal	0750	One fledging in area. Second eaglet not seen.
Pinto	0800	One fledging in area. Second eaglet not seen.
Sheep	0817	Two 11-week old nestlings, one branching from nest.
76	0825	One 9.5-week old nestling. One adult in area.
Lone Pine	0948	One 8-week old nestling.
Woods Canyon Lake	1055	Failed. Nest empty and no bald eagles.
Beaver	1125	One fledging in area. Second eaglet not seen. Two adults in area.
Oak Creek	1132	Two fledglings and one adult in area.
Perkinsville	1141	One 9.5-week old nestling.
Sullivan	1157	Failed. One dead nestling in nest. One adult flushed from nest tree.
Coldwater	1300	One 8.5-week old nestling. One adult in nest shading eaglet. Second adult in area.
Horseshoe	1315	One 10-week old nestling branching from nest. One adult flushed from nest tree.
Cliff	1320	One 11-week old nestling branching from nest. Second eaglet not found. Two adults in area.
Bartlett	1502	Nest empty, nestling not seen. Two adults in area. No time spent searching.
Needle Rock	1507	One fledgling in area, second eaglet not seen. No time spent searching.
Box Bar	1507	Two fledglings in nest tree, third eaglet not seen. No time spent searching.
Ft. McDowell	1510	One 10-week old nestling.
Doka	1511	One fledgling in area, second eaglet not seen. One adult in area. No time spent searching.
Sycamore	1513	Nest empty, eaglets not seen. One adult in area. No time spent searching.
Rodeo	1516	Nest empty, eaglets not seen. No time spent searching.

APPENDIX E: BOX BAR BREEDING AREA SUMMARY

Table 13. Observed human activity and bald eagle behavior, Box Bar BA, Arizona, 2008.

Human Activity	N[1]	W	R	F	L	X	B	U	Total	Percent
Helicopter	11	9	--	1	--	--	6	3	30	40.5
Small plane	5	6	--	1	--	--	3	2	17	23.0
Gunshot	--	4	1	--	1	--	2	1	9	12.2
Motorized parachute	--	3	--	1	1	1	1	--	7	9.5
OHV/dirt bike	1	1	--	--	--	--	1	--	3	4.0
Hiker	--	1	--	--	--	--	1	--	2	2.7
Tuber	2	--	--	-	--	--	--	--	2	2.7
Rancher	--	--	--	--	--	--	1	--	1	1.3
Canoe	--	--	--	--	--	--	1	--	1	1.3
Shooter	--	1	--	--	--	--	--	--	1	1.3
Large plane	1	--	--	--	--	--	--	--	1	1.3
Total	20	25	1	3	2	1	16	6	74	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, L=left area, X=bird flew from perch to attend nest, B=bird not in area, U=unknown.

Table 14. Observed forage events and success, Box Bar BA, Arizona, 2008.

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

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

Table 15. Observed prey types delivered to the nest, Box Bar BA, Arizona, 2008.

Sex	Fish	Mammals	Reptiles	Unknown	Total	Percent
Male	40	1	1	15	57	57.0
Female	14	2	--	15	31	31.0
Unknown	5	1	1	5	12	12.0
Total	59	4	2	35	100	
Percent	59.0	4.0	2.0	35.0		

Table 16. Observed prey species delivered to the nest, Box Bar BA, Arizona 2008.

Sex	Fish	Reptiles	Total	Percent
	Tilapia	Rattlesnake		
Male	6	--	6	85.7
Unknown	--	1	1	14.3
Total	6	1	7	
Percent	85.7	14.3		

Table 17. Bald eagle habitat analysis at the Box Bar BA, Arizona, 2008.					
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]
22.7	SS	Right	No	1	RI
23.4	SS	Left	Partial	2	RU
23.8	CT	Left	Partial	1	RU
23.9	HS	Right	No	1	RB
24.0	LG	Left	No	1	RB
24.3	CM	Left	Partial	1	RU
24.5	CS	Left	No	1	BW
25.1	ST	Left	No	7	RU
25.4	CL	Right	Partial	1	RU

[1]River kilometer (Hunt et. al. 1992).
[2]SG=soft snag (dead but branches still intact), CT=cliff top, HS=hard snag (main branches only), LG=log, CM=cottonwood medium (10-20m), CS=cottonwood small (0-10m), ST=snag top, CL=cottonwood large (20-30m).
[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]RI=riffle, RU=run, RB=river bend, BW=backwater.

Table 18. Bald eagle habitat use at the Box Bar BA, Arizona, 2008.										
River km[1]	PW[2,3]	PU	PH	PD	PP	PK	PE	PI	Total	Percent
22.7	3	--	--	11	--	--	--	--	14	0.3
23.4	1,852	1,488	10	--	--	--	9	--	3,359	62.0
23.8	172	35	837	--	--	1	--	1	1,046	19.3
23.9	25	2	139	10	--	--	--	--	176	3.2
24.0	--	--	--	--	--	26	--	--	26	0.5
24.3	4	--	--	--	--	--	--	--	4	0.1
24.5	8	--	--	--	--	--	--	--	8	0.1
25.1	397	50	9	178	128	5	1	--	768	14.2
25.4	--	--	--	--	18	--	--	--	18	0.3
Total	2,461	1,575	990	199	146	32	10	1	5,414	
Percent	45.4	29.1	18.4	3.7	2.7	0.6	0.2	0.1		

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

APPENDIX F: CLIFF BREEDING AREA SUMMARY

Table 19. Observed human activity and bald eagle behavior, Cliff BA, AZ, 2008.

Human Activity	N[1]	W	R	F	U	Total	Percent
Helicopter	1	16	--	1	1	19	22.1
Small plane	1	16	1	--	--	18	20.9
Gunshot	6	11	1	--	--	18	20.9
Driver	2	5	--	--	--	7	8.1
Jet	--	2	--	--	5	7	8.1
OHV	--	5	--	2	--	7	8.1
Fisherman	1	3	--	1	--	5	5.8
Hunter	--	2	--	--	--	2	2.3
Hiker	--	2	--	--	--	2	2.3
Jet ski	--	1	--	--	--	1	1.2
Total	11	63	2	4	6	86	

[1]Bald eagle response: N=none, W=watched, R=restless, F=flushed, U=unknown.

Table 20. Observed forage events and success, Cliff BA, AZ, 2008.

Sex	Bird		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	1	0-1	--	--	1	0-1
Unknown	--	--	4	0-4	4	0-4
Total	1	0-1	4	0-4	5	0-5

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

Table 21. Observed prey types delivered to the nest, Cliff BA, AZ, 2008.

Sex	Fish	Carrion	Unknown	Total	Percent
Male	7	3	1	11	52.4
Female	1	--	--	1	4.8
Unknown	8	--	1	9	42.9
Total	16	3	2	21	
Percent	76.2	14.3	9.5		

Table 22. Bald eagle habitat analysis at the Cliff BA, AZ, 2008.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Distance to H_2O[4]	H_2O Type[5]	Land Type[6]
66.4a	CF	Left	No	1	RU	CL
66.4b	CF	Left	Yes	1	RU	CL
66.4c	SH	Right	No	3	--	MB
66.5	HS	Right	No	3	--	MB
66.6a	HS	Right	No	3	--	MB
66.6b	SH	Right	No	1	RU	MB
66.6c	HS	Right	No	2	RU	MB
66.6d	SG	Right	No	3	--	MB
66.7a	HS	Right	No	1	RI	MB
66.7b	SH	Right	No	2	RI	--
66.8	HS	Right	No	1	RI	MB
67.6a	HS	Right	No	1	RU	MB
67.6b	CF	Left	Partial	1	RU	CL
69.0	HS	Left	No	1	RU	--
69.8	PT	Right	No	2	PO	CL
71.5	SG	Right	No	1	RI	MB
72.1	HS	Right	No	1	PO	MB
72.2	SM	Left	No	1	PO	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, SH=shrub, HS=hard snag (only main branches), PT=Pinnacle top, SG=soft snag, SM=snag, mesquite.
[3]Facing downstream.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[5]RU=run, RI=riffle, PO=pool.
[6]CL=cliffs, MB=mesquite bosque.

Table 23. Bald eagle habitat use at the Cliff BA, AZ, 2008.														
River Km[1]	PH[2,3]	PW	PP	ET	EN	PD	PK	PR	FH	FC	SS	OT	Total	Percent
65.5	--	--	--	--	--	--	--	--	--	3	--	--	3	0.1
66.4	35	--	1	--	--	--	--	--	3	--	--	--	39	0.8
66.5	4	51	23	7	--	--	9	--	--	--	--	3	97	2.0
66.6	132	553	13	--	88	--	7	41	1	6	20	4	865	17.7
66.7	1,472	359	226	103	--	30	16	--	27	--	--	12	2,245	46.0
66.8	421	--	48	--	--	40	--	--	--	--	4	8	521	10.7
66.9	--	--	--	--	--	--	--	--	--	--	--	7	7	0.1
67.0	--	--	--	--	--	--	--	--	--	4	--	--	4	0.1
67.5	--	--	--	--	--	--	--	--	--	7	--	2	9	0.2
67.6	357	52	--	10	--	--	15	--	--	--	--	--	434	8.9
69.0	240	--	--	--	--	--	--	--	--	6	--	--	246	5.0
69.5	--	--	--	--	--	--	--	--	--	--	--	1	1	0.1
69.8	15	--	--	--	--	--	--	--	--	--	--	--	15	0.2
70.2	--	--	--	--	--	--	--	--	1	--	--	--	1	0.1
70.7	--	--	--	--	--	--	--	--	--	--	--	3	3	0.2
71.5	11	--	--	--	--	--	--	--	--	--	--	--	11	0.2
72.1	136	--	--	--	--	--	--	--	1	3	--	27	167	3.4
72.2	103	108	--	--	--	--	--	--	3	--	--	--	214	4.4
73.0	--	--	--	--	--	--	--	--	--	3	--	--	3	0.1
Total	2,926	1,123	311	120	88	70	47	41	36	32	24	67	4,885	
Percent	59.9	23.0	6.4	2.5	1.8	1.4	1.0	0.8	0.7	0.7	0.5	1.4		

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

[2]Observation Time (minutes). Does not include all nest activity.

[3]PH=perched hunting, PW=perched watching, PP=perched preening, ET=eating in tree, EN=eating in nest, PD=perched drying, PK=perched with prey, PR=perched roosting, FH=flying, hunting, FC=flying, chasing, SS=standing on shore, OT=other behaviors.

APPENDIX G: LUNA BREEDING AREA SUMMARY

Table 24. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2008.

Human Activity	N[1]	W	R	L	Total	Percent
Driver/vehicle	257	--	--	--	257	33.0
Fisherman	224	--	--	--	224	28.8
Boater	142	--	--	1	143	18.4
Picnicker	56	--	--	--	56	7.2
Birder	44	--	--	--	44	5.7
Float tuber	15	--	--	--	15	1.9
Hiker	13	--	--	1	14	1.8
OHVs	5	--	--	--	5	0.6
Bicycler	3	--	--	--	3	0.4
Canoe/kayak	3	--	--	--	3	0.4
Agency worker	--	--	3	--	3	0.4
Photographer	2	--	--	--	2	0.3
Helicopter	1	--	1	--	2	0.3
Jet	--	--	2	--	2	0.3
Snow sledding	--	1	--	--	1	0.1
Camper	1	--	--	--	1	0.1
Gunshot	--	--	1	--	1	0.1
Small plane	1	--	--	--	1	0.1
Elk shed hunter	--	1	--	--	1	0.1
Total	767	2	7	2	778	

[1]Bald eagle behavior, N=none, W=watched, R=restless, L=left area.

Table 25. Observed forage event and success, Luna BA, Arizona, 2008.

Sex	Birds		Fish		Mammals		Carrion		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	42	39-3	20	18-2	1	1-0	6	6-0	69	64-5
Female	34	29-5	15	15-0	2	2-0	5	5-0	56	51-5
Total	76	68-8	35	33-2	3	3-0	11	11-0	125	115-10

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

Table 26. Observed prey types delivered to the nest, Luna BA, Arizona, 2008.

Sex	Birds	Fish	Mammals	Carrion	Total	Percent
Male	40	18	1	6	65	56.5
Female	28	15	2	5	50	43.5
Total	68	33	3	11	115	
Percent	59.1	28.7	2.6	9.6		

Table 27. Observed prey species delivered to the nest, Luna BA, Arizona 2008.

Sex	Birds			Fish	Mammals	Total	Percent
	AC[1]	GR	CM	RT	AS		
Male	38	2	--	18	1	59	57.8
Female	26	1	1	15	--	43	42.2
Total	64	3	1	33	1	102	
Percent	62.7	2.9	1	32.4	1		

[1]AC=American coot, GR=grebe, CM=common merganser, RT=rainbow trout, AS=Abert's squirrel.

Table 28. Bald eagle habitat analysis at the Luna BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Shade	Distance to H_2O (m)[3]	Land Type[4]
0.3	PS	No	1	RS
0.9	HS	No	2	RC
1.1	PS	Yes	1	RC
1.7	PS	Yes	1	RC
1.8	PS	Yes	1	RC
2.0	HS	Yes	8	CF
2.1	PO	No	7	CF
2.2	HS	No	7	CF
2.3	PO	Partial	7	CF
2.4	HS	No	7	CF
2.5	PS	No	2	CF
2.6	WF	No	1	RS
2.7	PS	No	2	RS
2.8	HS	Yes	7	CF
3.0	PS	Yes	2	CF
3.5	ST	No	2	RC
5.1	FP	No	1	RC

[1]Lake kilometer (counterclockwise from boat ramp).
[2]PS=pine/conifer 2nd growth (10-20m), HS= hard snag (only main branches), PO= pine/conifer old growth (20-30+m), WF=waterfowl closure sign, ST=snag top, FP=fence post.
[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, RC=reservoir cove, CF=coniferous forest.

Table 29. Bald eagle habitat use at the Luna BA, Arizona, 2008.

Lake km[1]	PW[2,3]	PR	PH	PP	PU	PK	ET	OT	Total	Percent
0.3	--	--	19	--	--	--	--	--	19	0.1
0.9	--	--	35	--	--	--	--	--	35	0.1
1.1	77	--	16	--	--	--	--	--	93	0.2
1.7	--	--	43	--	--	--	--	--	43	0.1
1.8	421	--	334	13	--	2	--	12	782	1.8
2.0	552	--	--	--	--	--	--	--	552	1.3
2.1	1,727	1,017	155	--	--	2	--	--	2,901	6.9
2.2	1,721	71	--	41	--	--	--	--	1,833	4.3
2.3	918	1,593	--	22	--	--	--	--	2,533	6.0
2.4	19,633	3,880	--	702	130	--	--	8	24,353	57.6
2.5	158	39	68	--	--	--	--	--	265	0.6
2.6	1,012	184	456	14	--	36	22	--	1,724	4.1
2.7	1,222	--	2,839	12	--	--	--	--	4,073	9.6
2.8	523	180	44	--	--	--	--	--	747	1.8
3.0	107	--	343	--	--	--	--	--	450	1.1
3.5	499	190	338	7	--	3	--	--	1,037	2.5
5.1	69	--	--	--	--	--	--	--	69	0.2
Other[4]	--	778	--	--	--	--	--	--	778	1.8
Total	28,639	7,932	4,690	811	130	43	22	20	42,287	
Percent	67.7	18.8	11.1	1.9	0.3	0.1	0.1	0.1		

[1]Lake kilometer (counterclockwise from boat ramp).
[2]Observation Time (minutes).
[3]PW=perched watching, PR=perched roosting, PH=perched hunting, PP=perched preening, PU=perched unknown, PK=perched with prey, ET=eating in tree, OT=other behavior (includes perched vocalizing and perched close to mate).
[4]South of highway 180.

APPENDIX H: NEEDLE ROCK BREEDING AREA SUMMARY

Table 30. Observed human activity and bald eagle behavior, Needle Rock BA, Arizona, 2008.

Human Activity	N[1]	W	F	L	X	U	Total	Percent
Helicopter	23	1	--	1	1	--	26	43.3
Small plane	6	1	1	2	--	1	11	18.3
Horseback rider	1	--	--	3	--	--	4	6.7
OHV	1	1	1	--	--	--	3	5.0
Rafters	3	--	--	--	--	--	3	5.0
Motorized parachute	2	--	--	--	--	1	3	5.0
Drivers	2	--	--	--	--	--	2	3.3
Hikers	2	--	--	--	--	--	2	3.3
Canoe/Kayak	1	--	--	1	--	--	2	3.3
Fisherman	1	--	--	--	--	--	1	1.7
Picnicker	--	--	--	1	--	--	1	1.7
Boater	--	--	--	1	--	--	1	1.7
Photographer	--	--	--	1	--	--	1	1.7
Total	42	3	2	10	1	2	60	

[1]Bald eagle behavior, N=none, W=watched, F=flushed, L=Left area, X=bird flew from perch to attend nest, U=unknown.

Table 31. Observed forage events and success, Needle Rock BA, Arizona, 2008.

Sex	Fish		Mammal		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	4	1-3	--	--	4	3-1	8	4-4
Female	1	0-1	--	--	3	3-0	4	3-1
Unknown	4	2-2	1	1-0	3	1-2	8	4-4
Total	9	3-6	1	1-0	10	7-3	20	11-9

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

Table 32. Observed prey types delivered to the nest, Needle Rock BA, Arizona, 2008.

Sex	Fish	Mammals	Unknown	Total	Percent
Male	3	--	2	5	33.3
Female	3	--	3	6	40
Unknown	1	1	2	4	26.7
Total	7	1	7	15	
Percent	46.7	6.7	46.7		

Table 33. Bald eagle habitat analysis at the Needle Rock BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
25.7	SM	Left	No	5	RU/RI	MB
25.8	SM	Left	No	4	RU/RI	MB
26.0a	CM	Left	Yes	2	RU	CW
26.0b	SM	Left	No	1	RU	WT
26.0c	SM	Left	No	4	RU	MB
26.0d	SM	Left	No	8	--	MB
26.0e	Nest	Left	Yes	8	--	MB
26.4a	WO	Right	Partial	1	RU/RI	WT
26.4b	WO	Left	Partial	1	RU/RI	WT
26.5	CM	Left	Yes	1	RU/RI	MB
26.6	WO	Right	Partial	1	PW/BW	WT
26.9a	WO	Left	Partial	1	RU/RI	WT
26.9b	WO	Right	Partial	1	RU/RI	WT
27.0a	WO	Left	Partial	1	RU/RI	WT
27.0b	WO	Right	Partial	1	RU/RI	WT
27.5a	ST	Right	No	1	RU/RI	WT
27.5b	SO	Right	No	1	RI	--
27.8a	WO	Left	Partial	1	PW	WT
27.8b	WO	Right	No	1	PW	WT
28.1a	WO	Left	Partial	1	PW	WT
28.1b	SS	Left	No	1	PW	WT
28.1c	HS	Left	No	1	RU/PW	WT
28.2	WO	Left	Partial	1	PW	WT
29.0	HS	Left	No	1	RU	WT
29.4	PT/PF	Right	No	1	PW	WT
30.3	CF	Right	No	1	PW/RI	UP

[1]River kilometer (Hunt et. al. 1992).
[2]SM=snag, mesquite; CM=cottonwood medium (10-20m); WO=willow; ST=snag top; SO=shore; SS=shrub snag; HS=hard snag (only main branches); PT/PF=pinnacle top/ledge; CF=cliff ledge.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RU=run, RI=riffle, PW=pocket water, BW=back water.
[5]MB=mesquite bosque, CW=cottonwood grove, WT=willow thicket, UP=desert upland.

Table 34. Bald eagle habitat use at the Needle Rock BA, Arizona, 2008.

River km[1]	PH[2,3]	PW	PR	PP	PD	PU	SS	ES	ET	PK	OT	Total	Percent
25.7	--	449	--	--	--	--	--	--	--	--	--	449	4.0
25.8	275	218	--	59	--	--	--	--	--	--	--	552	4.9
25.9	9	--	--	--	--	--	--	--	--	--	--	9	0.1
26.0	538	1,208	597	426	35	94	--	--	--	--	14	2,912	26.1
26.3	18	--	--	--	--	--	--	--	--	--	--	18	0.2
26.4	107	231	--	19	--	--	--	--	--	--	--	357	3.2
26.5	656	186	114	95	53	--	--	--	22	17	--	1,143	10.2
26.6	43	38	79	--	--	--	--	--	--	--	--	160	1.4
26.8	13	--	--	--	--	--	--	--	--	--	--	13	0.1
26.9	170	9	--	--	--	--	--	--	--	--	--	179	1.6
27.0	10	23	--	--	--	1	--	--	--	--	3	37	0.3
27.5	822	31	--	146	128	--	2	61	--	--	2	1,192	10.7
27.6	20	72	--	--	--	--	--	--	--	--	--	92	0.8
27.8	1,058	136	--	5	50	--	--	--	--	--	--	1,249	11.2
28.1	1,209	--	--	--	--	--	55	--	--	--	--	1,264	11.3
28.2	368	103	--	--	--	59	7	--	--	--	--	537	4.8
28.3	1	11	--	--	--	--	37	--	--	--	1	50	0.4
28.5	--	--	12	--	--	--	--	--	--	--	--	12	0.1
29.4	899	51	--	--	--	--	--	--	--	--	--	950	8.5
Total	6,216	2,766	802	750	266	154	101	61	22	17	20	11,175	
Percent	55.6	24.8	7.2	6.7	2.4	1.4	0.9	0.5	0.2	0.2	0.2		

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

[2]Observation Time (minutes).

[3]PH=perched hunting, PW=perched watching, PR=perched roosting, PP=perched preening, PD=perched drying, PU=perched unknown, SS=standing on shore, ES=eating on shore, ET=eating in tree, PK=perched with prey, OT=other behaviors (perched vocalizing, gathering nest materials).

APPENDIX I: ORME BREEDING AREA SUMMARY

Table 35. Observed human activity and bald eagle behavior, Orme BA, Arizona 2008.

Human Activity	N[1]	W	R	F	U	Total	Percent
Small plane	162	134	1	--	36	333	46.8
Helicopter	8	132	2	2	14	158	22.2
Boeing Apache	1	29	4	2	--	36	5.1
Hiker	--	29	--	2	--	31	4.4
Gunshot	16	4	2	1	--	23	3.2
Driver	2	12	3	3	2	22	3.1
Fisherman	--	19	--	2	--	21	2.9
Law enforcement	--	13	--	1	--	14	2.0
Jet	5	9	--	--	--	14	2.0
Kayak	--	13	--	--	--	13	1.8
Rafter	--	7	1	--	--	8	1.1
Water plant alarm	--	8	--	--	--	8	1.1
Researcher	--	5	--	1	--	6	0.8
Maintenance	--	6	--	--	--	6	0.8
Swimmer	--	6	--	--	--	6	0.8
Picnicker	--	3	2	--	--	5	0.7
Photographer	--	4	--	--	--	4	0.6
Camper	--	--	1	1	--	2	0.3
Birder	--	2	--	--	--	2	0.3
Ultralight	--	2	--	--	--	2	0.3
AZGFD biologist	--	--	--	2	--	2	0.3
Total	194	433	16	17	52	712	

[1]Bald eagle behavior, N=none, W=watched, R=restless, F=flushed, U=unknown.

Table 36. Observed forage events and success, Orme BA, Arizona, 2008.

Sex	Fish		Birds		Mammals		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	7	6-1	1	0-1	2	2-0	10	8-2
Female	8	8-0	2	1-1	1	1-0	11	10-1
Total	15	14-1	3	1-2	3	3-0	21	18-3

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

Table 37. Observed prey types delivered to the nest, Orme BA, Arizona, 2008.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	23	2	1	2	28	52.8
Female	20	1	2	2	25	47.2
Total	43	3	3	4	53	
Percent	81.1	5.6	5.6	7.5		

Table 38. Bald eagle habitat analysis at the Orme BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.20 V	SM	L	N	1	RU	MB
0.40 V	HS	R	N	6	--	CG
0.41 V	CM	R	N	4	BW	CG
0.44 V	CM	R	Y	1	RU	CG
0.46 V	SM	L	N	1	RU	MB
0.50 V	SM	L	N	1	RU	MB
0.55 V	CL	R	N	3	BW	CG
0.58 V	SM	L	Y	1	RU	MB
0.60 V	CL	R	N	1	RU	CG
0.63 V	SP	M	N	0	RU	IS
0.64 V	SM	L	N	1	RU	MB
0.65 V	CL	R	N	1	RU	CG
0.66 V	CM	R	N	1	RU	CG
0.67 V	WO	L	Y	1	RU	WT
0.80 V	SM	L	N	1	RU	MB
0.85 V	SM	L	N	1	RI	MB
4.6 S	HS	L	N	1	RU	CG
4.9 S	MS	L	N	1	RU	MB
5.0 S	SM	L	N	1	RI	MB
5.2 S	CM	R	Y	2	RU	CG
5.4 S	CM	R	N	8	--	CG
5.7 S	SM	R	N	1	RU	MB
6.6 S	CT	L	N	3	RU	UP
8.1 S	CL	L	N	2	RI	CG
8.3 S	CL	R	N	2	RU	CG
8.5 S	CL	R	Y	3	RU	CG
8.6 S	CL	R	N	U	--	CG
8.7 S	CL	R	N	2	RU	CG
8.8 S	CL	R	N	1	RU	CG
9.0 S	MM	R	N	1	RU	--
10.0 S	CM	R	N	4	RI	CG
11.0 S	CM	R	N	2	RI	MB
11.1 S	CM	R	N	3	RI	MB
11.5 S	SM	L	N	2	RU	CG
12.0 S	HS	R	N	2	BW	MB
13.0 S	CL	R	N	3	RU	CG
13.1 S	SM	R	N	--	--	MB
14.0 S	CG	R	N	--	--	CG
14.1 S	CL	L	N	--	--	CG

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

[2]SM=snag mesquite, HS=hard snag (main branches only), CM=cottonwood medium (10-20m), CL=cottonwood large (20-30+m), SP=stump/fallen tree, WO=willow, MS=mesquite, CT=cliff top, MM=medium mesquite, CG=cottonwood snag.

[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

[4]RU=run, BW=backwater, PO=pool, RI=riffle.

[5]MB=mesquite bosque, CG=cottonwood grove, IS=island, UP=desert upland, WT=willow thicket.

Table 39. Bald eagle habitat use at the Orme BA, Arizona, 2008.

River km[1]	PW[2,3]	PH	PP	PD	ET	PK	SW	SS	DW	Total	Percent
0.20 V	--	389	34	--	--	5	--	--	--	428	1.8
0.40 V	14,216	302	206	141	57	76	39	17	3	15,057	62.0
0.41 V	--	254	--	--	--	38	--	--	--	292	1.2
0.44 V	--	8	25	--	--	--	--	--	--	33	0.1
0.46 V	--	74	8	--	--	--	--	--	--	82	0.3
0.50 V	--	451	--	9	--	--	--	--	--	460	1.9
0.55 V	--	67	--	--	--	--	--	--	--	67	0.3
0.58 V	--	82	--	--	--	--	--	--	--	82	0.3
0.60 V	--	318	155	72	--	--	--	--	--	545	2.2
0.63 V	--	16	--	--	--	--	--	--	--	16	0.1
0.64 V	--	82	--	--	--	--	--	--	--	82	0.3
0.65 V	--	597	203	60	--	--	--	--	--	860	3.5
0.66 V	--	22	11	--	--	--	--	--	--	33	0.1
0.67 V	--	10	--	--	--	--	--	--	--	10	0.1
0.80 V	--	14	7	--	--	--	--	--	--	21	0.1
0.85 S	--	6	18	--	--	--	--	--	--	24	0.1
4.6 S	--	187	--	--	24	4	--	--	--	215	0.9
4.7 S	--	432	21	--	--	--	--	--	--	453	1.9
5.0 S	--	145	--	7	29	--	--	--	--	181	0.7
5.2 S	79	179	--	--	--	--	--	--	--	258	1.1
5.4 S	82	321	37	--	--	--	--	--	--	440	1.8
5.7 S	--	25	--	--	--	--	--	--	--	25	0.1
6.6 S	--	12	--	--	--	--	--	--	--	12	0.1
8.1 S	--	98	--	--	--	--	--	--	--	98	0.4
8.3 S	--	39	--	--	31	--	--	--	--	70	0.3
8.5 S	--	47	--	--	--	--	--	--	--	47	0.2
8.6 S	--	83	--	--	--	--	--	--	--	83	0.3
8.7 S	--	466	--	--	--	--	--	--	--	466	1.9
8.8 S	--	38	--	--	--	--	--	--	--	38	0.2
9.0 S	--	190	--	--	--	--	--	--	--	190	0.8
10.0 S	--	578	64	--	--	--	--	--	--	642	2.6
11.0 S	--	2,814	89	--	--	--	--	--	--	2,903	11.9
11.1 S	--	15	--	--	--	--	--	--	--	15	0.1
11.5 S	--	7	--	--	--	--	--	--	--	7	0.1
12.0 S	--	10	--	--	--	--	--	--	--	10	0.1
13.0 S	--	4	--	--	--	--	--	--	--	4	0.1
13.1 S	--	9	--	--	--	--	--	--	--	9	0.1
14.0 S	--	34	--	--	--	--	--	--	--	34	0.1
14.1 S	--	4	--	--	--	--	--	--	--	4	0.1
Total	14,377	8,429	878	289	141	123	39	17	3	24,296	
Percent	59.2	34.7	3.6	1.2	0.6	0.5	0.2	0.1	0.1		

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

[2]Observation Time (minutes).

[3]PW=perched watching, PH=perched hunting; PP=perched preening, PD=perched drying, ET=eating in tree, PK=perched with prey, SS=standing on shore, SW=soaring over water, DW=drinking water.

APPENDIX J: PINTO BREEDING AREA SUMMARY

Table 40. Observed human activity and bald eagle behavior, Pinto BA, Arizona, 2008.

Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Boater	119	408	2	4	2	71	6	612	78.3
Fisherman	35	43	1	1	--	9	--	89	11.4
Photographer	--	19	2	2	--	1	--	24	3.1
Birder	1	15	1	--	1	2	--	20	2.6
Jet Ski	2	7	--	--	--	3	--	12	1.5
Agency Worker	3	5	--	--	--	--	--	8	1.0
Helicopter	1	4	--	1	--	--	--	6	0.8
Small Plane	1	4	--	--	--	--	--	5	0.6
Shooter	1	1	--	1	--	--	--	3	0.4
Kayak/Canoe	1	--	--	--	--	1	--	2	0.3
Researcher	--	1	--	--	--	--	--	1	0.1
Total	164	507	6	9	3	87	6	782	

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

Table 41. Observed closure violations and bald eagle behavior, Pinto BA, Arizona, 2008.

Human Activity	W	R	F	Total	Percent
Boater	4	1	--	5	25.0
Fisherman	7	--	1	8	40.0
Photographer	1	--	2	3	15.0
Birder	3	--	--	3	15.0
Jet Ski	1	--	--	1	5.0
Total	16	1	3	20	

Table 42. Observed forage events and success, Pinto BA, Arizona, 2008.

Sex	Fish		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	36	13-23	--	--	36	13-23
Female	15	11-4	2	1-1	17	12-5
Unknown	--	--	3	3-0	3	3-0
Total	51	24-27	5	4-1	56	28-28

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

Table 43. Observed prey types delivered to the nest, Pinto BA, Arizona, 2008.

Sex	Fish	Unknown	Total	Percent
Male	37	23	60	58.8
Female	25	15	40	39.2
Unknown	1	1	2	2.0
Total	63	39	102	
Percent	61.8	38.2		

Table 44. Observed prey species delivered to the nest, Pinto BA, Arizona 2008.				
Sex	Fish		Total	Percent
	Black crappie	Channel catfish		
Male	1	1	2	66.7
Female	1	--	1	33.3
Total	2	1	3	
Percent	66.7	33.3		

Table 45. Bald eagle habitat analysis at the Pinto BA, Arizona, 2008.						
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
101.5	CL	Left	No	1	PO	TX
102.2a	HS	Left	Yes	1	PO	TX
102.2b	CF	Right	Yes	1	PO	UP
102.3a	CT	Right	No	1	PO	UP
102.3b	CF	Right	Yes	1	PO	UP
102.5a	CT	Right	No	1	PO	TX
102.5b	HS	Left	No	1	PW	TX
102.6a	CT	Right	No	1	PO	UP
102.6b	CF	Right	Partial	1	PO	UP
102.7	CF	Right	Yes	1	PO	UP
102.9a	CT	Right	Yes	1	PO	UP
102.9b	CF	Right	Yes	1	PO	UP
102.9c	SP	Left	Partial	1	PO	TX
103.0a	CT	Right	Yes	1	PO	UP
103.0b	CF	Right	Yes	2	PO	UP
103.1a	CT	Right	Yes	1	PO	UP
103.1b	CF	Right	Yes	1	PO	UP
103.2a	CF	Right	Partial	1	PO	UP
103.2b	CT	Right	Yes	1	PO	UP
103.2c	CF	Right	Yes	1	PO	UP
103.3a	CF	Right	Partial	1	PO	UP
103.3b	CT	Right	Partial	1	PO	UP
103.4	CT	Right	Yes	1	PO	UP
103.5	CT	Right	No	1	PO	UP
103.7a	DW	Island	No	1	RU	TX
103.7b	HS	Left	No	1	PO	TX
104.0	SG	Right	No	1	PO	CW
104.1a	CF	Right	No	3	RU	TX
104.1b	CM	Right	Yes	1	PO	CW
104.2a	HS	Right	No	2	RU	TX
104.2b	HS	Right	No	1	PO	TX
104.2c	SG	Right	Yes	1	PO	TX
104.2d	CL	Right	No	2	PO	TX
104.2e	SG	Right	No	1	PO	TX
104.3a	SG	Right	Partial	1	PO	TX

[1]River kilometer (Hunt et. al. 1992).
[2]CL=cottonwood large (20-30+ m), HS=hard snag (only main branches), CF=cliff ledge, CT=cliff top, SP=stump, DW=driftwood, SG=soft snag, CM=cottonwood medium (10-20m), 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=>401m.
[4] PO=pool, PW=pocket water, RU=run.
[5]TX=tamarisk thicket, UP=desert upland, CW=cottonwood grove.

Table 45 continued.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
104.3b	HS	Right	Partial	1	PO	TX
104.3c	SO	Right	Partial	1	PW	TX
104.3d	SP	Right	Partial	1	PO	TX
104.3e	HS	Right	Partial	1	PO	TX
104.3f	SS	Right	Yes	1	PO	TX
104.4a	HS	Right	Partial	1	PO	TX
104.4b	SG	Right	No	1	PO	TX
104.4c	DW	Left	No	1	PO	UP
104.4d	DW	Right	No	1	PO	TX
104.5a	DW	Island	No	1	RU	TX
104.5b	LG	Left	No	1	PO	TX
104.5c	SG	Right	No	1	PO	TX
105.5	CT	Left	No	1	PO	TX
106.5a	CM	Right	No	1	PO	TX
106.5b	CS	Right	No	2	RU	TX
106.6	CT	Left	No	1	RU	UP
106.9	SB	Island	No	1	RB	TX
107.7	SS	Left	No	1	PO	TX
108.3a	HS	Right	No	4	RU	TX
108.3b	CM	Right	No	3	RU	TX

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

[2]LG=log, CT=Cliff top, CM=cottonwood medium/10-20m, CS=cottonwood small (0-10 m), SB=sand bar, SS=shrub snag, HS=hard snag (only main branches).

[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.

[4]RU=run, RB=river bend, PO=pool, PW=pocket water

[5]TX=tamarisk thicket, UP=desert upland.

Table 46. Bald eagle habitat use at the Pinto BA, Arizona, 2008.

River km[1]	PW[2,3]	PH	PP	PD	PU	PV	PK	Total	Percent
101.5	1	--	--	--	--	--	--	1	0.0
102.2	27	178	--	--	--	--	--	205	0.9
102.3	98	120	--	--	--	--	--	218	1.0
102.4	--	90	--	--	--	--	--	90	0.4
102.5	92	46	--	--	--	--	8	146	0.7
102.6	--	44	--	--	--	--	--	44	0.2
102.7	--	5	--	--	--	--	--	5	0.0
102.9	10	85	--	--	--	--	--	95	0.4
103.0	--	15	--	--	--	--	--	15	0.1
103	5	--	--	--	--	--	--	5	0.0
103.1	--	62	--	--	--	--	--	62	0.3
103.2	86	244	--	--	--	--	--	330	1.5
103.3	87	71	--	--	--	--	--	158	0.7
103.4	6	--	--	--	--	--	--	6	0.0
103.5	26	--	--	--	--	--	--	26	0.1
103.7	30	--	--	--	--	--	--	30	0.1

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

[2]Observation Time (minutes).

[3]PW=perched watching, PH=perched hunting, PP=perched preening, PD=perched drying, PU=perched unknown, PV=perched vocalizing, OT=other behaviors (includes perched with prey and eating in tree).

Table 46. continued.

River km[1]	PW[2,3]	PH	PP	PD	PU	PV	PK	Total	Percent
104.0	--	2	--	--	--	--	--	2	0.0
104.1	76	--	--	--	--	--	--	76	0.4
104.2	64	76	--	--	--	--	--	140	0.6
104.3	15,627	330	205	11	--	12	2	16,187	74.8
104.4	2,748	317	164	181	4	5	--	3,419	15.8
104.5	16	17	--	--	--	--	--	33	0.2
104.7	--	--	--	--	--	--	8	8	0.0
105.5	13	10	--	--	--	--	--	23	0.1
106.5	179	24	--	--	--	--	--	203	0.9
106.6	38	--	--	--	--	--	--	38	0.2
108.3	1	16	--	--	45	--	--	62	0.3
Total	19,230	1,752	369	192	49	17	18	21,627	
Percent	88.9	8.1	1.7	0.9	0.2	0.1	0.1		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation Time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, PD=perched drying, PU=perched unknown, PV=perched vocalizing, OT=other behaviors (includes perched with prey and eating in tree).

APPENDIX K: PLEASANT BREEDING AREA SUMMARY

Table 47. Observed human activity and bald eagle behavior, Lake Pleasant BA, Arizona, 2008.

Human Activity	N[1]	W	F	X	B	U	Total	Percent
Small plane	202	25	1	2	11	73	314	67.0
Boat	22	3	--	--	28	9	62	13.2
Helicopter	19	11	--	--	3	14	47	10.0
Jet	8	9	--	--	1	4	22	4.7
Agency worker	6	2	--	--	2	1	11	2.3
Camper	1	--	--	--	--	2	3	0.6
Gunshot	2	--	--	--	--	1	3	0.6
Driver	1	--	--	--	--	1	2	0.4
Large plane	2	--	--	--	--	--	2	0.4
Ultra-light	1	--	--	--	--	--	1	0.2
OHV	1	--	--	--	--	--	1	0.2
Water skier	1	--	--	--	--	--	1	0.2
Total	266	50	1	2	45	105	469	

[1]Bald eagle behavior, N=none, W=watched, F=flushed, X=other (diverted flight path to avoid plane; flushed temporarily from next but not likely caused by plane), B=birds not in area, U=unknown.

Table 48. Observed forage events and success, Lake Pleasant BA, Arizona, 2008.

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

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

Table 49. Observed prey types delivered to the nest, Lake Pleasant BA, Arizona, 2008.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	17	5	--	3	25	73.5
Female	6	--	1	2	9	26.5
Total	23	5	1	5	34	
Percent	67.6	14.7	2.9	14.7		

Table 50. Observed prey species delivered to the nest, Lake Pleasant BA, Arizona 2008.

Sex	Fish					Birds		Mammals	Total	Percent
	LB[1]	CP	CC	BC	WB	AC	CR	GS		
Male	3	1	1	--	1	3	1	--	10	76.9
Female	--	1	--	1	--	--	--	1	3	23.1
Total	3	2	1	1	1	3	1	1	13	
Percent	23.1	15.4	7.7	7.7	7.7	23.1	7.7	7.7		

[1]LB=largemouth bass, CP=carp, CC=channel catfish, BC=black crappie, WB=white bass, AC=American coot, CR=common raven, GS=ground squirrel.

Table 51. Bald eagle habitat analysis at the Lake Pleasant BA, Arizona, 2008.					
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]
72.0	CT	Left	No	7	RB
72.5	SO	Left	No	1	RB
72.7	SO	Left	No	1	RB
73.1	SO	Left	Yes	1	RB
73.2a	CF	Left	Yes	3	RB
73.2b	BO	Left	No	4	RB
73.2c	SO	Left	No	1	RB
73.3a	SO	Left	No	1	RB
73.3b	CT	Left	No	3	RB
73.3c	CF	Left	Partial	3	RB
73.3d	CF	Left	Partial	2	RB
73.3e	BO	Right	No	4	RB
73.4a	CT	Left	No	4	RB
73.4b	CF	Left	Partial	5	RB
73.4c	SO	Left	No	1	RB
73.5a	CF	Left	Yes	6	RB
73.5b	CF	Left	No	2	RB
73.5c	CT	Left	No	2	RB
73.5d	CF	Left	Partial	5	RB
73.5e	CT	Left	Partial	4	RB
73.8	CF	Right	Partial	2	RB
74.9	CT	Right	No	1	RB
75.2	LG	Left	No	1	RB

[1]River kilometer (Hunt et. al. 1992).
[2]CT=cliff top, SO=shore, CF=cliff face, BO=boulder, LG=log.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RB=river bend.

Table 52. Bald eagle habitat use at the Pleasant BA, Arizona, 2008.									
River km[1]	PW[2,3]	PP	DW	SS	PK	BA	OT	Total	Percent
72.0	37	--	--	--	--	--	--	37	0.5
72.5	9	--	--	--	--	--	3	12	0.2
72.7	9	--	--	--	--	--	--	9	0.1
73.1	3	--	15	1	--	--	--	19	0.3
73.2	5,059	119	11	19	26	--	--	5,234	73.3
73.3	639	17	41	21	--	11	8	737	10.3
73.4	782	31	13	15	--	6	3	850	11.9
73.5	209	--	--	--	--	--	--	209	2.9
73.8	10	--	--	--	--	--	--	10	0.1
74.9	15	--	--	--	--	--	--	15	0.2
75.2	2	--	--	--	--	--	8	10	0.1
Total	6,774	167	80	56	26	17	22	7,142	
Percent	94.8	2.3	1.1	0.9	0.2	0.2	0.3		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation Time (minutes).
[3]PW=perched watching, PP=perched preening, DW=drinking water, SS=standing on shore, PK=perched with prey, BA=bathing, OT=other behaviors (includes perched drying, eating on shore, and perched hunting).

APPENDIX L: SAGUARO BREEDING AREA SUMMARY

Table 53. Observed human activity and bald eagle behavior, Saguaro BA, Arizona, 2008.

Human Activity	N[1]	W	R	B	Total	Percent
Boat	2,200	3,309	100	2,465	8,074	95.0
Jet ski	81	106	--	133	320	3.8
Helicopter	13	15	2	8	38	0.4
Small plane	14	21	2	1	38	0.4
Canoe/kayak	6	3	--	5	14	0.2
Swimmer	4	2	--	3	9	0.1
Gunshot	2	--	--	--	2	0.1
Total	2,320	3,456	104	2,615	8,495	

[1]Bald eagle behavior, N=none, W=watched, R=restless, B=bird not in area.

Table 54. Observed forage events and success, Saguaro BA, Arizona, 2008.

Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	19	6-13	--	--	19	6-13
Female	7	5-2	2	0-2	9	5-4
Tandem	--	--	1	0-1	1	0-1
Unknown	5	3-2	--	--	5	3-2
Total	31	14-17	3	0-3	34	14-20

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

Table 55. Observed prey types delivered to the nest, Saguaro BA, Arizona, 2008.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	44	1	2	5	52	65.8
Female	18	1	--	2	21	26.6
Unknown	6	--	--	--	6	7.6
Total	68	2	2	7	79	
Percent	86.1	2.5	2.5	8.9		

Table 56. Observed prey species delivered to the nest, Saguaro BA, Arizona, 2008.

Sex	Fish					Birds	Total	Percent
	BC[1]	SB	LB	FC	CS	AC		
Male	1	2	1	--	--	--	4	50.0
Female	--	--	--	1	1	1	3	37.5
Unknown	1	--	--	--	--	--	1	12.5
Total	2	2	1	1	1	1	8	
Percent	25	25	12.5	12.5	12.5	12.5		

[1]BC=black crappie, SB=smallmouth bass, LB=Largemouth bass, FC=flathead catfish, CS=catfish species, AC=American coot.

Table 57. Bald eagle habitat analysis at the Saguaro BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
18.0a	CF	Right	Yes	1	RS	CL
19.0a	CT	Right	No	1	RU	CL
19.2a	CT	Right	No	1	RU	CL
19.6a	PT	Right	No	1	RU	CL
20.0a	CF	Right	Yes	1	RU	CL
22.6a	HS	Left	No	1	RS	--
23.0a	CF	Left	No	1	RS	CL
23.5a	CT	Left	No	1	RS	CL
23.5b	CF	Left	No	1	RS	CL
26.1a	CF	Right	Partial	1	RC	CL
27.7a	CF	Left	Partial	1	RS	CL
30.0a	CT	Left	No	1	RS	CL
30.8a	PT	Right	No	1	RU	CL
30.8b	CT	Right	No	1	RU	CL
30.8c	CF	Right	Yes	1	RU	CL
30.9a	CT	Right	No	1	RU	CL
30.9b	CT	Right	No	1	RU	CL
30.9c	CT	Right	No	1	RU	CL
30.9d	RW	Right	Partial	1	RU	--
31.0a	CF	Right	Partial	1	RU	CL
31.1a	CF	Right	Partial	1	RU	CL
31.1b	CF	Right	Partial	1	RU	CL
31.1c	CF	Right	Partial	1	RU	CL
31.2a	CT	Right	Partial	1	RU	CL
31.2b	CF	Right	Partial	1	RU	CL
31.2c	CT	Right	Partial	1	RU	CL
31.2d	HS	Right	Partial	2	RU	CL
31.2e	CT	Right	Partial	1	RU	CL
31.2f	BO	Left	Partial	1	RU	CL
31.3a	CF	Right	Partial	1	RU	CL
31.3b	CF	Right	Partial	1	RU	CL
31.3c	CF	Right	Partial	1	RU	CL
31.3d	CF	Right	Partial	1	RU	CL
31.3e	SH	Right	Partial	1	RU	CL
31.4a	CF	Right	Partial	1	RU	CL
31.4b	CF	Right	Partial	1	RU	CL
31.4c	CF	Right	Partial	1	RU	CL
31.4d	SM	Right	Partial	1	RU	CL
31.4e	CF	Right	Partial	1	RU	CL
31.5 (nest)	NE	Right	Partial	1	RU	CL
31.5a	HS	Right	Partial	1	RU	--
31.5b	CT	Right	Partial	1	RU	CL
31.6a	CF	Right	Partial	1	RU	CL
31.6b	CT	Right	Partial	1	RU	CL

[1]River kilometer (Hunt et. al. 1992).
[2]CF=cliff ledge, CT=cliff top, PT=pinnacle top, RW=rock in water, HS=hard snag (only main branches), BO=boulder, SH=shrub, SM=snag, mesquite, NE=nest.
[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, RU=run, RC=reservoir cove.
[5]CL=cliffs.

Table 57. continued.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
31.6c	CF	Right	Partial	1	RU	CL
31.6d	HS	Right	Partial	1	RU	CL
31.7a	CT	Right	Partial	1	RU	CL
31.7b	HS	Right	Partial	1	RU	CL
31.7c	CF	Right	Partial	1	RU	CL
31.8a	CF	Right	Partial	1	RU	CL
31.8b	CF	Right	Partial	1	RU	CL
31.8c	CF	Right	Partial	1	RU	CL
31.8d	CF	Right	Partial	1	RU	CL
31.8e	CF	Right	Partial	1	RU	CL
31.8f	CF	Right	Partial	1	RU	CL
31.9a	SH	Right	Partial	1	RU	CL
31.9b	CT	Right	Partial	1	RU	CL
32.0a	CF	Right	Partial	1	RU	CL
32.0b	CT	Right	Partial	1	RU	CL
32.2a	CF	Right	Partial	1	RU	CL
32.2b	CF	Right	Partial	1	RU	CL
32.3a	CF	Right	Partial	1	RU	CL

[1]River kilometer (Hunt et. al. 1992).
[2]HS=hard snag (only main branches), CF=cliff ledge, SH=shrub, CT=cliff 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]RU=run.
[5]CL=cliffs.

Table 58. Bald eagle habitat use at the Saguaro BA, Arizona, 2008.

River km[1]	PW[2,3]	PH	PP	EC	GN	PV	PK	DW	Total	Percent
18.0	1	1	--	--	--	--	--	--	2	0.1
19.0	38	--	--	--	--	--	--	--	38	0.5
19.2	16	--	--	30	--	--	--	--	46	0.6
19.6	29	--	--	--	--	--	--	--	29	0.4
20.0	136	25	--	--	--	--	--	--	161	2.2
22.6	--	2	5	--	--	--	--	--	7	0.1
23.0	3	--	--	--	--	--	--	--	3	0.1
23.5	106	160	4	--	--	--	--	--	270	3.6
26.1	4	--	--	--	--	--	--	--	4	0.1
27.7	--	--	--	--	--	3	--	--	3	0.1
30.0	4	--	--	--	--	--	--	--	4	0.1
30.8	343	--	--	--	1	2	--	--	346	4.6
30.9	617	--	2	--	--	6	--	4	629	8.4
31.0	14	--	--	--	--	--	--	--	14	0.2
31.1	96	--	--	--	3	2	--	--	101	1.4
31.2	664	2	35	--	2	4	3	--	710	9.5
31.3	1,297	--	22	22	1	--	--	--	1,342	18.0
31.4	1,016	--	13	--	4	--	--	--	1,033	13.8
31.5	148	3	--	--	--	--	--	--	151	2.0
31.6	333	--	7	22	4	6	--	--	372	5.0
31.7	148	1	--	--	12	--	--	--	161	2.2
31.8	191	15	--	10	7	--	4	--	227	3.0
31.9	1,608	--	4	--	8	3	--	--	1,623	21.7
32.0	106	8	--	--	--	3	--	--	117	1.6
32.2	81	--	--	--	--	--	--	--	81	1.1
32.3	--	--	--	--	--	1	--	--	1	0.1
Total	6,999	217	92	84	42	30	7	4	7,475	
Percent	93.6	2.9	1.2	1.1	0.6	0.4	0.1	0.1		

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

[2]Observation Time (minutes).

[3]PW=perched watching; PH=perched hunting; PP=perched preening; EC=eating on cliff; GN=gathering nest material; PV=perched vocalizing; PK=perched with prey; DW=drinking water.

APPENDIX M: TONTO BREEDING AREA SUMMARY

Table 59. Observed human activity and bald eagle behavior, Tonto BA, Arizona, 2008.

Human Activity	N[1]	W	R	F	U	Total	Percent
Boat	36	581	2	3	1	623	95.1
Canoe/kayak	3	9	--	--	--	12	1.8
Helicopter	3	4	--	--	2	9	1.4
Small plane	--	3	--	--	--	3	0.5
Birdwatcher	1	1	--	--	--	2	0.3
Motorized parachute	1	1	--	--	--	2	0.3
Hiker	1	--	--	--	--	1	0.2
Agency worker	1	--	--	--	--	1	0.2
Gunshot	1	--	--	--	--	1	0.2
Jet ski	--	1	--	--	--	1	0.2
Total	47	600	2	3	3	655	

[1]Bald eagle behavior, N=none, W=watched, R=restless, F=flushed, U=unknown.

Table 60. Observed forage events and success, Tonto BA, Arizona, 2008.

Sex	Fish		Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	9	2-2	1	0-1	--	--	10	7-3
Female	3	3-0	--	--	2	1-1	5	4-1
Unknown	1	1-0	--	--	3	1-2	4	2-2
Total	13	6-2	1	0-1	5	2-3	19	13-6

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

Table 61. Observed prey types delivered to the nest, Tonto BA, Arizona, 2008.

Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	22	2	1	2	27	51.9
Female	13	4	--	7	24	46.2
Unknown	--	--	--	1	1	1.9
Total	35	6	1	10	52	
Percent	67.3	11.5	1.9	19.2		

Table 62. Observed prey species delivered to the nest, Tonto BA, Arizona 2008.

Sex	Fish				Mammals		Total	Percent
	BC[1]	LB	CS	SB	JK	DC		
Male	10	1	1	1	--	--	13	68.4
Female	3	1	--	--	1	1	6	31.6
Total	13	2	1	1	1	1	19	
Percent	68.4	10.5	5.3	5.3	5.3	5.3		

[1]BC=black crappie, LB=largemouth bass, CS=catfish species, SB=smallmouth bass, JK=black-tailed jackrabbit, DC=desert cottontail.

Table 63. Bald eagle habitat analysis at the Tonto BA, Arizona, 2008.						
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
10.0	PT	Left	No	1	RC	--
16.4	HS	Right	No	1	RS	--
16.5a	HS	Right	No	1	RS	--
16.5b	LG	Right	No	1	RS	--
16.5c	SG	Right	No	1	RS	--
16.6	HS	Right	No	1	RS	-
16.8	SO	Left	No	1	RS	--
16.9a	SG	Left	No	1	RS	--
16.9b	HS	Left	No	1	RS	--
16.9c	SG	Left	Partial	1	RS	--
17.0	WO	Left	Yes	1	RS	--
17.1	CM	Left	No	1	RS	--
17.2	HS	Left	No	1	RU	CW
17.3a	YL	Right	No	1	RU	CW
17.3b	SO	Left	No	1	BW	CW
17.4	CM	Left	No	1	RU	CW
17.5	CM	Left	No	1	RU	CW

[1]River kilometer (Hunt et. al. 1992).
[2]PT=pinnacle top, HS=hard snag (only main branches), LG=log, SG=soft snag, SO=shore, WO=willow, CM=cottonwood medium (10-20m), YL=sycamore, large.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]RC=reservoir cove, RS=reservoir main body, RU=run, BW=backwater.
[5]CW=cottonwood grove.

Table 64. Bald eagle habitat use at the Tonto BA, Arizona, 2008.										
River km[1]	PW[2,3]	PP	PH	PV	DW	ET	BA	PD	Total	Percent
10.0	--	--	40	--	--	--	--	--	40	1.3
16.4	--	--	25	--	--	--	--	--	25	0.8
16.5	--	--	51	--	--	--	--	--	51	1.6
16.8	47	31	--	--	22	--	--	14	114	3.6
16.9	1,542	641	19	36	--	20	20	--	2,278	72.2
17.0	512	42	4	--	--	--	--	--	558	17.7
17.1	32	--	25	--	--	--	--	--	57	1.8
17.2	--	--	5	--	--	--	--	--	5	0.2
17.3	--	--	5	--	10	--	--	--	15	0.5
17.4	--	-	10	--	--	--	--	--	10	0.3
17.5	--	--	3	--	--	--	--	--	3	0.1
Total	2,133	714	187	36	32	20	20	14	3,156	
Percent	67.6	22.6	5.9	1.1	1.0	0.6	0.6	0.4		

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

APPENDIX N: TOWER BREEDING AREA SUMMARY

Table 65. Observed human activity and bald eagle behavior, Tower BA, Arizona, 2008.

Human Activity	N[1]	W	F	U	Total	Percent
Passenger train	4	17	1	5	27	37.0
Road-rail vehicle	4	5	--	8	17	23.3
Freight train	2	7	--	2	11	15.1
Small plane	1	5	--	--	6	8.2
Helicopter	--	4	--	--	4	5.5
Photographer	3	--	--	--	3	4.1
OHV	1	1	--	--	2	2.7
Shooter	--	--	--	1	1	1.4
Hunter	1	--	--	--	1	1.4
Kayak	--	--	--	1	1	1.4
Total	16	39	1	17	73	

[1]Bald eagle behavior, N=none, W=watched, F=flushed, U=unknown.

Table 66. Bald eagle habitat use at the Tower BA, Arizona, 2008.

River km[1]	PW[2,3]	PH	PP	PD	PV	EC	PI	Total	Percent
247.1	175	--	--	--	--	--	--	175	7.6
247.2	81	315	--	20	1	--	--	417	18.2
247.3	55	30	--	--	--	--	--	85	3.7
247.9	--	10	--	--	--	--	--	10	0.4
248.0	275	110	7	101	5	8	--	506	22.1
248.1	617	44	138	8	14	--	1	822	35.8
248.2	63	--	12	--	15	4	8	102	4.4
248.3	44	--	--	--	--	--	--	44	1.9
248.4	83	--	--	--	--	--	--	83	3.6
248.5	33	--	-	15	2	--	--	33	2.2
Total	1,426	509	157	144	37	12	9	2,294	
Percent	62.2	22.2	6.8	6.3	1.6	0.5	0.4		

[1]River kilometer (Hunt et. al. 1992).
[2]Observation Time (minutes).
[3]PW=perched watching, PH=perched hunting, PP=perched preening, PD=perched drying, PV=perched vocalizing, EC=eating on cliff, PI=perched interaction.

Table 67. Bald eagle habitat analysis at the Tower BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
247.1	EP	Left	No	3	PO	CL
247.2a	CF	Left	Yes	2	PO	CL
247.2b	CF	Right	Partial	3	RU	CL
247.2c	CT	Right	Yes	3	PO	CL
247.2d	SS	Right	Partial	3	PO	CL
247.3a	CT	Left	Yes	3	PO	CL
247.3b	SJ	Right	Yes	3	PO	CL
247.9	CT	Left	No	3	RU	CL
248.0a	BO	Right	Yes	2	RU	TA
248.0b	CF	Right	Yes	3	RU	CL
248.0c	CM	Right	Yes	1	RU	CW
248.0d	CT	Right	Yes	3	RU	CL
248.0e	SJ	Right	Partial	3	RU	CL
248.1a	CF	Left	Yes	3	RI	CL
248.1b	CM	Right	Yes	1	RU	CW
248.1c	CT	Left	Partial	3	RU	CL
248.1d	JN	Right	Partial	3	RI	CL
248.1e	SS	Right	No	3	RI	CL
248.1f	ST	Right	Partial	3	RI	CL
248.2a	CF	Right	Yes	2	RU	CL
248.2b	CT	Right	No	2	RI	CL
248.2c	SP	Right	Partial	3	RU	CL
248.3a	FP	Right	No	4	RU	UP
248.3b	JN	Right	Yes	3	RU	CL
248.4	CF	Right	Yes	2	RI	CL
248.5a	CF	Right	No	2	RI	CL
248.5b	CT	Right	Partial	2	RI	CL

[1]River kilometer (Hunt et. al. 1992).
[2]EP=electric power line pole, CF=cliff ledge, CT=cliff top, SS=snag, shrub, SJ=snag, juniper, BO=boulder, CM=cottonwood, medium (10-20m), JN=juniper (live), ST=snag top, SP=stump or fallen tree, FP=fence post.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>401m.
[4]PO=pool, RU=run, RI=riffle.
[5]CL=cliffs, TA=talus, CW=cottonwood grove, UP=desert upland.

APPENDIX O: WOODS CANYON BREEDING AREA SUMMARY

Table 68. Bald eagle habitat analysis at the Woods Canyon BA, Arizona, 2008.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
0.1	SS	Left	No	1	RS	CF
0.4	PS	Left	Yes	1	RS	CF
0.9	PS	Left	No	1	RS	CF
1.7a	PS	Left	Yes	1	RS	CF
1.7b	PS	Left	No	1	RC	CF
2.0	PS	Left	Partial	1	RS	CF
2.2	HS	Left	No	1	RS	CF
2.5	PS	Right	Yes	1	RC	CF
3.3	SS	Right	Partial	1	RC	CF
3.4	PS	Right	Partial	1	RC	CF
3.5	HS	Right	No	2	RS	CF
3.6	HS	Right	No	1	RS	CF
3.7	SS	Right	No	1	RS	CF
3.8	SS	Right	Yes	1	RS	CF
4.1	PO	Right	Partial	1	RS	CF
4.7	HS	Right	No	1	RC	CF
4.8	SS	Right	No	1	RS	CF
4.9a	HS	Right	No	1	RS	CF
4.9b	PS	Right	Yes	1	RS	CF

[1]Lake kilometer (counterclockwise from middle of dam).
[2]SS=soft snag, PS=pine 2nd growth (10-20m), HS=Hard snag (main branches only), PO=pine, old growth (20-30m+).
[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, RC=reservoir cove.
[5]CF=conifer forest.

Table 69. Bald eagle habitat use at the Woods Canyon BA, Arizona, 2008.											
Lake km[1]	PW[2,3]	PH	PU	PD	PI	PP	ET	PV	PK	Total	Percent
0.1	9	--	--	--	--	--	--	--	--	9	1.4
0.4	4	--	--	--	--	--	--	--	--	4	0.6
0.9	4	--	--	--	--	--	4	--	1	9	1.4
1.7	25	--	--	10	--	--	--	--	--	35	5.5
2.0	2	--	--	--	--	--	--	--	--	2	0.3
2.2	61	61	--	--	--	5	--	--	--	127	19.9
2.5	2	--	--	--	--	--	--	--	--	2	0.3
3.3	35	91	--	--	--	--	--	--	--	126	19.7
3.4	9	--	--	--	--	--	--	--	--	9	1.4
3.5	12	--	--	--	--	--	--	--	--	12	1.9
3.6	3	--	--	--	--	--	--	--	--	3	0.5
3.7	--	--	--	--	9	--	--	--	--	9	1.4
3.8	7	2	--	--	--	--	--	--	--	9	1.4
4.1	8	--	--	--	--	--	--	--	--	8	1.3
4.7	--	--	161	--	--	--	--	--	--	161	25.2
4.8	77	13	4	--	1	--	--	2	--	97	15.2
4.9	17	--	--	--	--	--	--	--	--	17	2.7
Total	275	167	165	10	10	5	4	2	1	639	
Percent	43.0	26.1	25.8	1.6	1.6	0.8	0.6	0.3	0.2		

[1]Lake kilometer (counterclockwise from middle of dam).
[2]Observation Time (minutes).
[3]PW=perched watching, PH=perched hunting, PU=perched unknown, PD=perched drying, PI=perched interaction, PP=perched preening, ET=eating in tree, PV=perched vocalizing, PK= perched with prey.