ARIZONA BALD EAGLE NESTWATCH PROGRAM: 2003 SUMMARY REPORT

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ARIZONA BALD EAGLE NESTWATCH PROGRAM: 2003 SUMMARY REPORT

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INTRODUCTION

In 1978, the U.S. Fish and Wildlife Service (USFWS) listed the bald eagle (*Haliaeetus leucocephalus*) as endangered under the Endangered Species Act (ESA) as amended (1973) in 43 states (including Arizona), and threatened in 5 others (USFWS 1982). In Alaska, the USFWS did not list the species and it does not occur in Hawaii. The USFWS downlisted the bald eagle to threatened in 1995 (USFWS 1995), and has proposed to delist in the future (USFWS 1999). Until delisting, the bald eagle remains protected under the ESA. Thereafter, the Airborne Hunting Act, the Bald and Golden Eagle Protection Act, the Lacey Act, the Migratory Bird Treaty Act, and Arizona Revised Statute Title 17 will protect the species.

Due to an increase in metropolitan Phoenix's human population, many Arizona bald eagle breeding areas (BAs) are located near high recreation areas. As land and wildlife management agencies became more informed on the affects of human recreation to bald eagles in these areas, the demand for protective management also increased. In 1978, U.S. Forest Service (USFS) biologists and 2 Maricopa Audubon Society volunteers began to monitor bald eagles near Bartlett Reservoir. This monitoring effort eventually expanded to other BAs, and developed into the Arizona Bald Eagle Nestwatch Program (ABENWP).

To adequately address the needs for Arizona's breeding bald eagles, the ABENWP operates under 3 goals: conservation, data collection, and education. Due to high recreation pressures along some of Arizona's lakes and rivers, land management agencies enact seasonal closures to protect the bald eagles during the breeding cycle. Nestwatchers interact with members of the public, educate them on bald eagles, distribute brochures, and/or direct them out of the closures. To help the land and wildlife management agencies make better decisions, nestwatchers collect basic demographic information and behavioral response 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 for biologists to intervene in those situations, and eliminate/reduce the threat.

As new BAs were discovered, interagency coordination became more important. To enhance coordination, increase communication, and provide oversight for Arizona bald eagle management, the land and wildlife management agencies formed the Southwestern Bald Eagle Management Committee (SWBEMC) in 1984. The SWBEMC is comprised of various federal, state, and county land and wildlife management agencies, Native American Tribes, and private organizations interested in bald eagle conservation. In 1986, the USFWS assumed coordination of the ABENWP on behalf of the SWBEMC, and expanded its scope. In 1991, as a result of the passage of the Heritage Initiative, the USFWS transferred the lead to the Arizona Game and Fish Department (AGFD).

This report summarizes significant discoveries at each monitored BA in 2003. Detailed reports of each monitored BA are centralized at AGFD, and distributed to the appropriate land and wildlife management agencies.

STUDY AREA

Nestwatchers monitored BAs along creeks, lakes, reservoirs, and rivers throughout Arizona (Fig. 1). All monitored BAs (except the Luna BA) were in the central part of the state. We monitored BAs as far north as Tower, near Clarkdale; south to Orme, on the lower Verde/Salt rivers; east to Luna Lake, near Alpine; and west to Lynx Lake, near Prescott. Elevations of the monitored BAs ranged from Luna at 2438 m (8000 ft) to Orme at 439 m (1440 ft).

Most bald eagles breed in central Arizona at elevations between 329 m (1080 ft) and 1719 m (5640 ft). Vegetation commonly associated within this area is comprised of the Upper and Lower Sonoran Life Zones, which include riparian habitats and transition areas of both zones (Brown 1994). Representative vegetation includes Arizona sycamore (*Platanus wrightii*), blue palo verde (*Cercidium floridum*), Fremont cottonwood (*Populus fremontii*), Goodding willow (*Salix gooddingii*), mesquite (*Prosopis* spp.), saguaro (*Carnegiea gigantea*), and tamarisk (*Tamarix s*pp.). Pinyon pine (*Pinus* spp.) and juniper (*Juniperus* spp.) are found in the transition areas.

The Luna BA is 1 of 5 known Arizona bald eagle BAs found at high elevations. Vegetation commonly associated within this area is typical of the Montane-Conifer Forest zone and includes ponderosa pine (*Pinus ponderosa*), white fir (*Abies concolor*), Douglas fir (*Pseudotsuga menziesii*), and quaking aspen (*Populus tremuloides*) (Brown 1994).

METHODS

We selected the monitored BAs by weighing the levels of recreation activity and necessary management needs. These included BAs with seasonal closures (Bartlett, Box Bar, Ladders, Luna, Lynx, Pleasant, and Tower), those without (Fort McDowell, Orme, Suicide, Sycamore, and Tonto), and as opportunistic information (Bull Dog, Doka, Granite Reef, and Rodeo). In the fall of 2002, we advertised the ABENWP contract positions through the American Ornithologists Union Newsletter, American Birding Associations Job Listing, AGFD Internet site, SWBEMC internet site, Society for Conservation Biology web page, and at university and college job placement services nationwide. Presentations, brochures, and word-of-mouth also contributed to the pool of applicants.

We held 2 orientation meetings, and several question and answer sessions for the selected ABENWP contractors. The first 2 meetings offered an introduction to the program, background and the ABENWP's role in bald eagle management, and an explanation of data forms and emergency protocols. After the orientation meetings, the contractors chose a partner and BA, and were taken into the field. The question and answer sessions occurred after the first 10-day work period, and before every other 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 7, 2003, and continued until nestlings fledged. Teams of 2 nestwatchers maintained a 10 day on/4 day off schedule. During each 10-day 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 8 hours with emphasis on identifying territory boundaries, home range, and overall habitat use of the breeding pair.

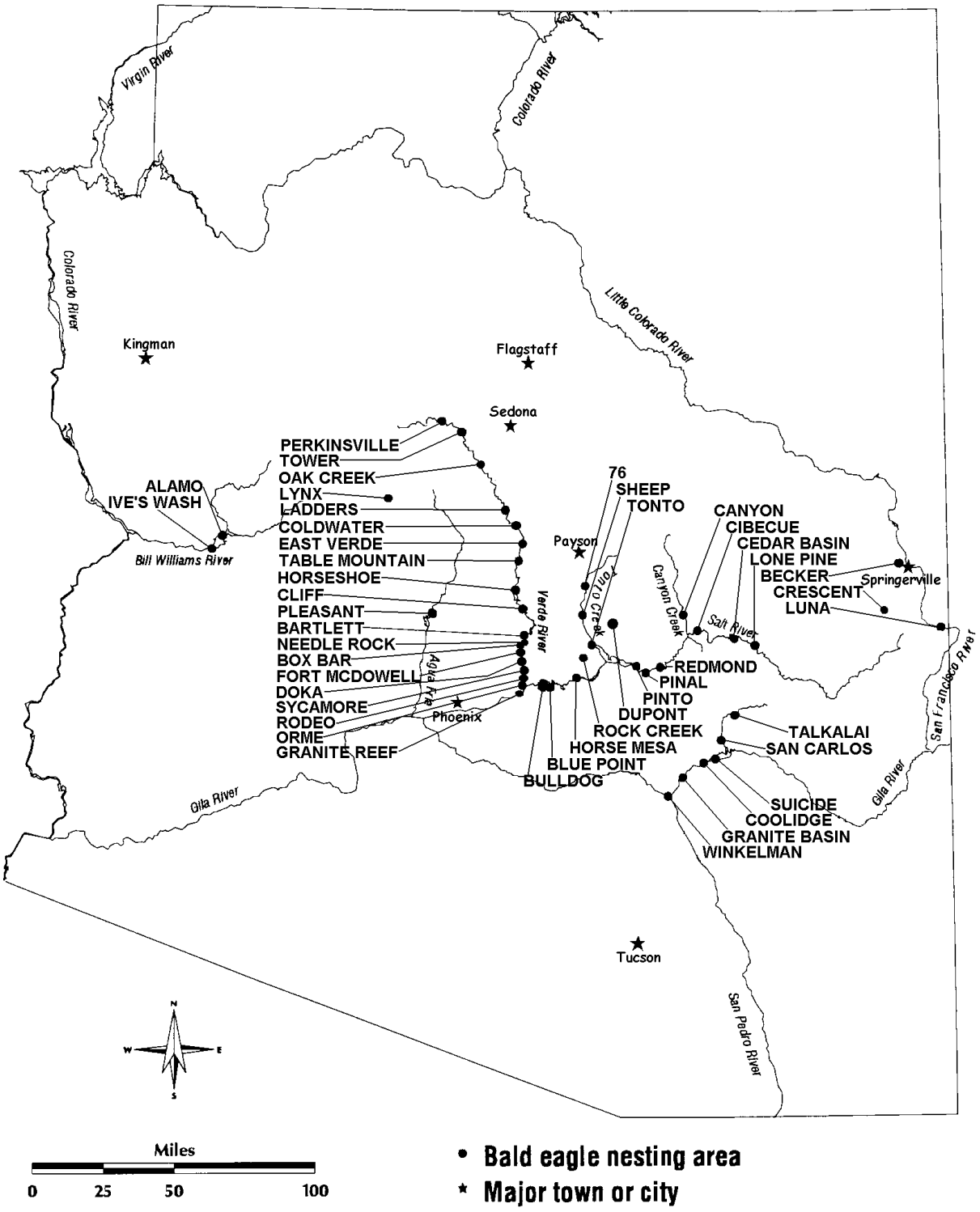

Figure 1. Location of known bald eagle BAs in Arizona, 2003.

Nestwatchers recorded bald eagle behavior and recreation use data from assigned observation points (OPs) within the BA. We selected observation points to provide optimal viewing while minimizing the impact to the breeding bald eagles. Alternate OPs were identified when the breeding pair utilized areas out of the primary OP's view. Nestwatchers were provided spotting scopes, Motorola radios, cellular telephones, and/or USFS radios for viewing and communication needs. They recorded all bald eagle behavioral data on supplied field forms. We supplied BA maps with river kilometer designations, and a guide to commonly taken fish species. Nestwatchers provided their own transportation, gas, supplies, binoculars, and housing on days off.

Within an arbitrary 1.0 km (3300 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 8 categories: none, watched, restless, flushed, left area, bird not in area, other, 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 of the human activity and flew away. Nestwatchers recorded a "not in area" if a bald eagle was not present at the time of the activity, an "unknown" response if the bald eagle could not be observed, and an "other" response if the associated behavior did not fit into one of the above categories. To accurately describe activities that caused bald eagle behavior change, a "restless", "flushed", "left area", and various "other" responses, are considered significant responses.

At the Pleasant, Box Bar, and Luna BAs, nestwatchers recorded human activity different than described above. They recorded compliance with the Pleasant BA closure by documenting the number of boats and jet skis approaching the buoy line and those that entered. If the watercraft entered the closure and proceeded past the nestwatchers, they were documented as "inside the closure." Conversely, they recorded those who complied with the closure or those who were contacted by the nestwatchers as "at the closure." Due to the high level of recreation activity at the Box Bar BA 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. Due to the high amount of shoreline used by the Luna eagles, nestwatchers documented shoreline use by the resident pair in addition to the above ground perch locations. Shoreline use and perch locations are presented separately.

Nestwatchers documented all aspects of bald eagle behavior at their BA. They documented interactions with other wildlife; habitat use; forage events; frequency, type, and prey species delivered 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.

Contrary to years before 2002, the nestwatchers focused data collection on habitat use of the breeding pair. This focus will help land and wildlife managers assess impacts of projects occurring within breeding area boundaries. Due to this shift in focus, some information collected historically has been de-emphasized. These include: inter-specific interaction, low flying aircraft reporting, prey delivered to nest, and other wildlife observed. In addition, nestwatchers were instructed to use the weekdays to document the locations and types of habitat use within the breeding pair's home range.

This prohibited them from consistently monitoring the breeding pair's behaviors at the nest. Therefore, comparisons to reports prior to 2002 may not be appropriate. Data collection on weekends remained the same with dawn to dusk monitoring of the breeding pair's behaviors at the nest.

Management recommendations included in this report are taken directly from the individual BA reports and therefore are not the 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 future SWBEMC meetings.

RESULTS AND DISCUSSION

PRODUCTIVITY OVERVIEW

The 2003 Arizona bald eagle breeding season produced an average number of young (Appendix A). Out of 31 breeding attempts, 18 pairs successfully fledged 25 young.

PROGRAM

The ABENWP monitored 17 BAs in 2003. Those BAs monitored include: Bartlett, Box Bar, Bulldog, Doka, Fort McDowell, Granite Reef, Ladders, Luna, Lynx, Needle Rock, Orme, Pleasant, Rodeo, Suicide, Sycamore, Tonto, and Tower. The final status of monitored BAs was 6 failed, 11 successful, and 17 young fledged.

Some BAs were not monitored the entire season due to breeding attempt failures (Fort McDowell, Lynx, Tonto), subsequent moving of contractors to new sites (Ladders, Needle Rock, Bulldog), and supplemental monitoring (Doka, Granite Reef, Rodeo). Therefore observation days vary, and all collected data reflects only those instances observed during the documented time frame. The Bulldog, Doka, Granite Reef, and Rodeo BAs were opportunistically monitored, the Fort McDowell and Lynx BAs failed early in the ABEWNP field season, and we received no report for Needle Rock; therefore data summaries for these BAs are not included in this report. However, management recommendations for all sites are included.

BREEDING AREA SUMMARIES

Bartlett Breeding Area
Observation Period. – February 7 to June 3.
Total monitoring days/hours.....83 days/900 hours.

Eagle Identification.
Male – Blue VID band "6/H" left leg, USFWS band right leg, adult plumage (Tonto 1995 nestling).
Female – Unbanded, adult plumage.

Management Activities.
- The USFS reinstated the seasonal BA closure.
- The male nestling was VID banded "15/Y" at 6 weeks of age.

Human Activity. – Nestwatchers recorded 715 human activities (Appendix B, Table 3). Aircraft (small planes and helicopters) represented 87.3% of reported activity, watercraft 6.4% (canoe/kayak, rafter, and tuber), and terrestrial activity 6.3% of 11 different types.

Eight activities elicited 26 significant responses from the breeding pair. The bald eagles were restless to 5 canoes/kayaks, 5 helicopters, 3 drivers, 2 small planes, and 1 OHV. The breeding pair flushed in response to 4 ultra-lights, 2 agency workers, 1 hiker, driver, canoe/kayak, and helicopter, each.

Food Habits. – Nestwatchers observed 72 forage attempts (Appendix B, Table 4). The male was successful in 48.6% (n= 35), the female in 79.4% (n= 34), and an unknown adult in 100% (n= 3). Eighty-seven percent of the attempts were for fish, 5.5% birds, 4.2% unknown items, and 2.7% mammals.

The breeding pair delivered 83 items to the nest (Appendix B, Table 5). The male delivered 37.3%, the female 54.2%, and an unknown adult 8.4%. The most common prey type was fish (n=70), although mammals (n=2), birds (n=1), and unknown prey (n=10) were taken.

Of the 47 items that could be identified to species, 38.3% were sucker species, 34.0% were common carp (*Cyprinus carpio*), 6.4% were black crappie (*Pomoxis nigromaculatus*), largemouth bass (*Micropterus salmoides*), and minnow sized fish each, 4.3% were channel catfish (*Ictalurus punctatus*) and bass species each (Appendix B, Table 6).

The Bartlett nestwatchers identified 98 perch locations along the Verde River and 6 perch locations on Bartlett Lake. River perches spanned 7.9 km ranging from river kilometer (rk) 29.3 to 37.2 (Appendix B, Table 7).

Ninety-five percent of the pair's time was spent within the immediate nesting area between rk 34.2 and 34.8. No boat was available to follow, locate, and document the pair's use of Bartlett Lake, therefore information on lake habitat use is limited (Appendix B, Table 8).

Box Bar Breeding Area

Observation Period. – February 7 to May 9.

Total monitoring days/hours.....71 days/749 hours.

Eagle Identification.

Male – Blue VID band "5/G" left leg, USFWS band right leg, adult plumage (Pleasant 1994 nestling).

Female – Blue VID band "5/H" left leg, USFWS band right leg, adult plumage (Pleasant 1994 nestling).

Management Activities.

- The USFS reinstated the seasonal BA closure.
- The owners of Rio Verde Ranch allowed ABENWP to camp and monitor from their lawn.
- ABENWP contractors were active in educating the public visiting the Rio Verde Ranch and the campground at the end of USFS road 161.
- The female nestling was VID banded "15/M" at 6 weeks of age and fitted with a solar powered satellite transmitter at 9 weeks of age.

Human Activity. – Nestwatchers recorded 174 human activities within the closure (Appendix C, Table 9). Aircraft activity (helicopters and small planes) represented 51.1%, terrestrial activity represented 39.1% of 9 different types, and watercraft 9.8%.

Ten activities elicited 31 significant responses from the breeding pair. The bald eagles were restless to 7 airplanes, 6 helicopters, 2 shooters, and 1 agency worker, horseback rider, OHV, and loud camper each. The breeding pair flushed in response to 2 agency workers, shooters, and hikers each, and 1 vehicle and fisherman each. The birds left the area in response to 1 airplane, hiker, horseback rider, and OHV each.

Food Habits. – Nestwatchers observed 12 forage attempts (Appendix C, Table 10). The male was successful in 37.5% (n=8), and the female in 25.0% (n=4). Forage attempts for fish comprised 83.3%, and 8.3% for birds and unknown prey each.

The breeding pair delivered 75 items to the nest (Appendix C, Table 11). The male delivered 52.0%, the female 36.0%, and an unknown adult 12.0%. The common prey types were fish (n=24), birds (n=2), reptiles (n=1), mammals (n=1), and unknown (n=47). No items were identified to species.

The Box Bar nestwatchers identified 11 habitat use areas that spanned a 4.0 km stretch of the Verde River ranging from rk 22.0 to 26.0. Percentage of time spent in these habitat use areas was not reported (Appendix C, Table 12).

Ladders Breeding Area

Observation Period. – February 21 to June 22.
Total monitoring days/hours.....71 days/619 hours.

Eagle Identification.
Male – Blue VID band "9/W" left leg, USFWS band right leg, adult plumage ("76" 1998 nestling).
Female – Unbanded, adult plumage.

ABENWP contractors were assigned to the Ladders BA after the failure of the Tonto BA. Therefore, observation dates and times vary.

Management Activities.
- The USFS reinstated the seasonal BA closure.
- The USFS provided contractors with a camping trailer.
- The two male nestlings were VID banded "17/A" and "17/B" at 5 weeks of age.

Human Activity. – Nestwatchers recorded 245 human activities during 71 days of observation (Appendix D, Table 13). Watercraft (boats) accounted for 53.9%, aircraft (small planes and helicopters) accounted for 40.0%, and terrestrial activity 6.1% of 5 different types.

Five activities elicited 17 significant responses from the breeding pair. The birds were restless in response to 1 boater and plane each. The bald eagles flushed in response to 6 boats, 2 helicopters, and 1 hiker. The birds left the area in response to 3 boats, and 1 small plane, helicopter, and OHV, each.

Food Habits. – Nestwatchers observed 27 forage attempts (Appendix D, Table 14). The male was successful in 90.9% (n=11), the female in 42.8% (n=14), and an unknown adult in 100% (n=2). Fish

accounted for 70.4% of the forage attempts, mammals 11.1%, and birds and unknown prey 7.4% each.

The breeding pair delivered 68 prey items to the nest (Appendix D, Table 15). The male delivered 54.4%, the female 39.7%, and an unknown adult 5.8%. Of these items, 75.0% percent were fish, 8.8% mammals, 4.4% birds, 1.5% amphibians, and 10.3% unknown.

Of the 34 items that could be identified to species, 26.5% were bass, 23.5% suckers, 17.6% common carp, 11.8% catfish, and 2.9% flathead catfish (*Pylodictis olivaris*), common merganser (*Mergus merganser*), raven (*Corus corvax*), American kestral (*Falco sparverius*), ringtail cat (*Bassariscus astutus*), squirrel (*Sciurus spp.*), and bullfrog (*Rana catesbeiana*) each (Appendix D, Table 16).

The Ladders nestwatchers identified 60 separate perch locations along the Verde River. Perches spanned a total of 4.0 km ranging from rk 161.2 to 165.2 (Appendix G, Table 17).

The pair used 6 habitat use areas closely associated with the nest 86.8% of the time, and 13.2% of the pairs time was spent at the remaining 15 habitat use areas (Appendix G, Table 18).

Luna Breeding Area

Observation Period. – February 8 to June 8.
Total monitoring days/hours.....90 days/1,090 hours.

Eagle Identification.

Male – Black VID band "Δ/A" right leg, USFWS band left leg, adult plumage (1988 Texas nestling).

Female – Black VID band "Δ/B" right leg, USFWS band left leg, adult plumage (Unknown origin).

Management Activities

- The USFS reinstated the seasonal BA closure.
- Nestwatchers were stationed at the boat ramp to talk to fisherman launching boats.
- The USFS housed the nestwatchers in a trailer.
- The male nestling was VID banded "15/S" at 5.5 weeks of age.

Human Activity. – Nestwatchers recorded 285 human activities (Appendix E, Table 19). Terrestrial activities represented 56.1% of 5 different types, watercraft (boats, canoe/kayaks, and float tube) 40.4%, and aircraft (jets and planes) 3.5%.

Four activities elicited 12 significant responses from the breeding pair. The bald eagles were restless in response to 2 vehicles and 1 cargo plane. The breeding pair flushed in response to 2 picnickers and 1 jet (military). The bald eagles left the area in response to 3 boats, 2 picnickers, and 1 jet (military).

Food Habits. – Nestwatchers observed 117 forage attempts (Appendix E, Table 20). The male was successful in 65.3% (n=75) forage attempts, the female in 75.0% (n=28), and an unknown adult in 64.3% (n=14). Of these attempts, 44.4% were for birds, 30.8% fish, and 24.8% unknown.

The breeding pair delivered 58 prey items to the nest (Appendix E, Table 21). The male delivered 65.5%, the female 25.9%, and an unknown adult 8.6%. Fish accounted for 37.9%, birds 34.5%, unknown 24.1%, and carrion 3.4% of prey items.

Of the 42 items that could be identified to species, 52.4% were rainbow trout (*Oncorhynchus mykiss*), 45.2% American coots (*Fulica americana*), and 2.4% ruddy duck (*Oxyura jamaicensis*) (Appendix E, Table 22).

The Luna nestwatchers identified 15 separate perch locations around the lake. Perches spanned a total of 4.4 km ranging from lake kilometer (lk) 0.7 to 5.1 (Appendix E, Table 23).

Fifty-one percent of the time was spent at the nest, 21.7% at lk 2.5, and 27.3% spent at the remaining 13 perch locations (Appendix E, Table 24).

The Luna pair spent 1.9% (n=1,403 minutes [23.4 hours]) of their time on the shoreline between lk 1.1 and 5.1 for 6 different uses (Appendix E, Table 25).

Orme Breeding Area

Observation Period. – February 9 to May 25.
Total monitoring days/hours.....70 days/824 hours.

Eagle Identification.
Male – Unbanded, adult plumage.
Female – Unbanded, adult plumage.

The Orme male was in a polygynous relationship with the female from the Rodeo BA. The male was observed incubating at both nests, but spent more time at the Rodeo nest due to the disappearance and replacement of the Rodeo female by an intruding adult female. After the Rodeo nest failed, the Orme male resumed full attendance to the Orme BA.

Management Activities.

- The Salt River Pima-Maricopa Indian Community (SRPMIC) continues to restrict non-tribal member use of the river area.
- The SRPMIC Police visited the ABENWP contractors on a daily basis and patrolled the nesting area during times of elevated recreation use.
- The ABENWP contractors provided supplemental food to the Orme female while the male was defending the Rodeo BA.
- The male nestling was banded "15/X" at 6 weeks of age and was fitted with a solar-powered satellite transmitter at 9 weeks of age.

Human Activity. – Nestwatchers recorded 241 human activities (Appendix G, Table 26). Aircraft (planes, jets, and helicopters) represented 61.8%, terrestrial activity 24.1% of 14 different types, and watercraft (rafters, and canoe/kayaks) 14.1%.

Six activities elicited 13 significant responses by the breeding pair. The bald eagles were restless to 3 helicopters and 1 vehicle. The breeding pair flushed in response to 3 helicopters, 2 vehicles, 1 hiker, woodcutter, and the banding and transmitter visits each.

Food Habits. – Nestwatchers observed 22 forage attempts (Appendix G, Table 27). The male was successful in 55.6% (n=9) attempts, and the female in 38.5% (n=13). The most common forage item was fish (90.9%), although birds (9.1%) were also taken.

The breeding pair delivered 17 prey items to the nest (Appendix G, Table 28). The male delivered 47.1%, and the female 52.9%. Fish composed 94.1% of those items, and 5.9% birds.

Of the 5 prey items that could be identified to species, 60.0% were sucker spp., and 40.0% rainbow trout.

The Orme nestwatchers identified 15 separate perch locations along the Verde and Salt Rivers. River perches spanned a total of 8.6 km ranging from rk 0.3 to 2.2 on the Verde River and rk 1.0 to 11.5 on the Salt River (Appendix G, Table 29).

Ninety-four percent of the pair's time was spent within the immediate nesting area between rk 0.3 and 0.4 (Verde River) and 6.0% spent at the remaining 12 perch locations on both rivers (Appendix G, Table 30).

Pleasant Breeding Area

Observation Period. – February 9 to May 25.

Total monitoring days/hours.....72 days/828 hours.

Eagle Identification.

Male – Blue VID band "??" left leg, USFWS band right leg, adult plumage (likely the 1987 Horse Mesa nestling which occupied the BA in previous years).

Female – Unbanded, adult plumage.

Management Activities.

- Maricopa County Parks and Recreation Department (MCPRD) reinstated the seasonal closure around the active nest.
- MCPRD marked closure boundaries with buoys and signs.
- Nestwatchers were stationed at the southern closure boundary to educate recreationists on the closure and bald eagles.
- The female nestling was VID banded "15/U" at 6 weeks of age.

Human Activity. – Nestwatchers recorded 174 human activities (Appendix H, Table 31). Watercraft (boats and canoes) represented 92.0%, aircraft (planes, helicopters, and jets) 4.6%, and terrestrial activities (OHV) 3.4%. No activity elicited significant responses by the breeding pair.

Of the 4810 watercraft that approached the southern buoy line, only 168 (3.6%) did not comply (agency boats omitted) (Appendix H, Table 32). Boats represented 85.7% of those non-complying, and 14.3% jet skis. However within the type of watercraft, only 3.6% of the boats and 3.3% of the jet skis did not comply with the closure.

Food Habits. – Nestwatchers observed 8 forage attempts (Appendix H, Table 33). The male and an unknown adult were successful in 100% (n= 3) each. Both adults foraged together for birds with a 50.0% (n= 2) success rate. Seventy-five percent of the attempts were for fish, and 25.0% birds.

The breeding pair delivered 45 prey items to the nest (Appendix H, Table 34). The male delivered 37.8%, the female 11.1%, and an unknown adult 51.1%. Prey items were comprised of 42.2% fish, 11.1% birds and mammals each, and 35.6% unknown.

Of the 6 prey items that could be identified to species, 33.3% were sucker spp. and channel catfish each, 16.7% were largemouth bass and a grebe spp. each (Appendix H, Table 35).

The Pleasant nestwatchers identified 35 separate perch locations on the Agua Fria arm of Lake Pleasant. Perches spanned a total of 5.0 km ranging from rk 68.5 to 73.5 (Appendix H, Table 36).

Fifty-seven percent of the time was spent at the nest, 26.3% at rk 69.1a, and 16.7% spent at the remaining 33 perch locations (Appendix H, Table 37).

Suicide Breeding Area

Observation Period. – Observation dates .....February 7 to May 21.
Total monitoring days/hours .....79 days/667 hours.

Eagle Identification.

Male – Blue VID band "4/M" left leg, USFWS band right leg, adult plumage (1993 Blue Point nestling).

Female – Blue VID band "3/S" left leg, USFWS band right leg, adult plumage (1992 East Verde nestling).

Management Activities.

- ABENWP contractors were introduced to the San Carlos Apache (SCA) police in an orientation session held on their first day in the field.
- The SCA Police visited the ABENWP contractors on a daily basis.
- The 3 nestlings were VID banded "15/N", "15/P", and "15/R" at 5.5 weeks of age.

Human Activity. – Nestwatchers recorded 179 human activities (Appendix I, Table 38). Terrestrial activity accounted for 85.5% of 10 different types, aircraft (airplanes, jets, and helicopters) 11.7%, and watercraft 2.8%.

Seven activities elicited 18 significant responses from the breeding pair. The bald eagles were restless to 7 people below nest, 2 gunshots, and 1 jet, sonic boom, and hiker each. The breeding pair left the area in response to 2 boats, people below the nest, and moving cars each.

Food Habits. – Nestwatchers observed 79 forage attempts (Appendix I, Table 39). The male was successful in 84.4% (n= 32), and the female in 89.4% (n= 47). Fish composed 89.9% of the attempts, unknown 6.3%, and carrion 3.8%.

The breeding pair delivered 125 prey items to the nest (Appendix I, Table 40). The male delivered 45.6%, and the female 54.4%. Of those items, 73.6% were fish, 2.4% carrion, 1.6% mammals, and 22.4% unknown items. No prey items were identified to species.

The Suicide nestwatchers identified 18 habitat use areas around San Carlos Lake. Habitat use area spanned a total of 16 km ranging between lk 0.0 to 5.0 and lk 23.0 to 34.0 (Appendix I, Table 41).

The bald eagle pair spent 94.0% of the time in the nest area, and 6.0% spent at the remaining 11 habitat use areas (Appendix I, Table 42).

Sycamore Breeding Area

Observation Period. – Observation dates ..... February 7 to April 20.
Total monitoring days/hours .....53 days/416 hours.

Eagle Identification.
Male – Blue VID band "3/G" left leg, USFWS band right leg, adult plumage (1992 Orme nestling).
Female – Unbanded, adult plumage.

Management Activities.

- The Fort McDowell Yavapai Nation (FMYN) continues to restrict non-tribal member use of the river area.
- ABENWP contractors were introduced to the FMYN police in an orientation session held on their first day in the field.
- The FMYN Police visited the ABENWP contractors on a daily basis.
- The nestlings were VID banded "15/E" and "15/H" at 6 weeks of age.

Human Activity. – Nestwatchers recorded 181 human activities (Appendix J, Table 43). Aircraft (small planes, and helicopters) accounted for 85.1%, and terrestrial activity 14.9% of 4 different types.

Four activities elicited 15 significant responses from the breeding pair. The bald eagles were restless to 1 vehicle. The breeding pair flushed in response to 7 drivers, 2 small planes, and 1 OHV and horseback rider each. The breeding adults left the area in response to 1 small plane, vehicle, and agency worker each.

Food Habits. – Nestwatchers observed 24 forage attempts (Appendix J, Table 44). The male was successful in 40.0% (n= 10), and the female in 64.3% (n= 14). Successful foraging attempts consisted of 37.5% unknown items, 33.3% fish, 25.0% birds, and 4.2% mammals.

The breeding pair delivered 64 prey items to the nest (Appendix J, Table 45). The male delivered 46.9%, the female 50.0%, and an unknown adult 3.1%. Fifty percent of those items were fish, 1.6% mammals, 23.4% birds, and 25.0% unknown. No prey items were identified to species.

The Sycamore nestwatchers identified 23 separate perch locations along the Verde River. River perches spanned a total of 5.3 km ranging from rk 7.5 to 12.8 (Appendix J, Table 46).

Fifty-two percent of the time was spent at the nest, 11.5% at rk 10.3, 8.3% at rk 10.2, and 28.2% at the remaining 20 perch locations (Appendix J, Table 47).

Tonto Breeding Area

Observation Period. – Observation dates ..... February 9 to March 11.
Total monitoring days/hours .....25 days/216 hours.

ABENWP contractors were assigned to the Tonto BA after the failure of the Lynx BA. The Tonto breeding attempt failed on March 10, 2003. The adults abandoned the nest and ravens scavenged the

nestling remains. The cause of failure and subsequent abandonment is unknown, although it is unlikely that the nestlings were alive when the ravens entered the nest.

Eagle Identification.
Male – Blue VID band "G" left leg, USFWS band right leg, adult plumage (1987 Pinal nestling).
Female – Blue VID band "Backwards 3" left leg, USFWS band right leg, adult plumage (1987 Horseshoe nestling).

Management Activities.
- The Indian Point campground remained closed throughout the breeding season.
- The Southwestern Willow Flycatcher Closure limited recreational activities in the area.

Human Activity. – In 25 days of observation, nestwatchers recorded 49 human activities (Appendix K, Table 48). Terrestrial activities represented 85.7% of 4 different types, and aircraft (small planes and helicopters) represented 14.3%. Five activities each elicited 1 restless response from a gunshot, OHV, helicopter, small plane, and siren.

Food Habits. – Although no forage attempts were observed by the nestwatchers, they did observe the adults returning from the vicinity of Roosevelt Lake with prey items.

The breeding adults delivered 3 prey items to the nest. The male delivered 66.6%, and the female 33.3%. Of these items, 66.6% were fish, and 33.3% birds.

One prey item was identified as a sucker spp..

The Tonto nestwatchers identified 4 separate perch locations along the Tonto River. River perches spanned 1.1 km ranging from rk 16.9 to 18.0 (Appendix K, Table 49). Due to the BA failure and limited monitoring time, a bias must be considered. Fifty-eight percent of the time was spent within the nest tree, 40.4% out of view, and 1.3% spent at the remaining 3 perch locations (Appendix K, Table 50).

<u>Tower Breeding Area</u>
Observation Period. – February 7 to May 31.
Total monitoring hours.....830 hours.

Eagle Identification.
Male – Purple VID band "Diamond 8" left leg, USFWS band right leg, adult plumage (1988 Ladders nestling).
Female – Unbanded, adult plumage.

On May 24, one nestling died mid-morning. The remaining nestling appeared healthy and fledged on May 27. On the following day, we entered the nest and discovered a Mexican chicken bug (MCB) infestation. Samples of the MCBs were collected and the nestling removed. Dehydration from MCB parasitism is the likely cause of death.

Management Activities.
- The USFS reinstated a seasonal breeding area closure surrounding the nest area.
- The USFS posted closure signs at the upstream and downstream access points to the Verde River.

- The USFS provided contractors with a camping trailer.
- The nestlings were VID banded "15/V" and "15/W" at 6 weeks of age.

Human Activity. – Nestwatchers recorded 299 human activities (Appendix L, Table 51). Aircraft (small planes, helicopters, jets, and ultralights) represented 55.9%, and terrestrial activities 44.1% of 10 different types.

Thirteen activities elicited 126 significant responses from the breeding pair. The bald eagles were restless to 2 maintenance crews, and 1 helicopter, fisherman, and OHV each. The breeding pair flushed in response to 2 small planes, trains, and vehicles each. One hundred fifteen various significant responses were additionally recorded for 11 activities.

Food Habits. – Nestwatchers observed 14 forage attempts (Appendix L, Table 52). The male was successful in 83.3% (n=6), and the female in 87.5% (n=8). Fish accounted for 78.6% of the attempts, carrion 14.3%, and mammals 7.1%.

The breeding pair delivered 61 prey items to the nest (Appendix L, Table 53). The male delivered 42.6%, the female 50.8%, and an unknown adult 6.6%. Fish comprised 65.6% of those items, 23.0% mammals, 1.6% birds, and 9.8% unknown.

Of the 21 prey items that could be identified, 33.3% were sucker spp., 28.6% rabbit species, 23.8% channel catfish, 9.5% common carp, and 4.8% small-mouth bass (Appendix L, Table 54).

The Tower nestwatchers identified 69 perch locations along the Verde River. River perches spanned a total of 22.4 km ranging from rk 234.0 to 256.4 (Appendix J, Table 55). The pair spent 68.5% of the observed time between rk 248.2 and 248.4, 31.5% at the remaining 50 perch locations.

OTHER INTERVENTIONS

Coolidge Breeding Area

On June 10, Nathan Pamplin, San Carlos Recreation and Wildlife Department, reported 1 nestling on the ground below nest #4. AGFD biologists arrived the next morning to find both nestlings on the ground. After re-hydrating and banding both nestlings, we placed them back in the nest. On June 20, we received another call reporting that both nestlings were no longer in the nest. We arrived that same afternoon to find 1 nestling near the river, and the second dead below the nest. The healthy nestling was placed back in the nest and we recovered the second nestling's remains. On June 23, the remaining nestling was once again on the ground. We recovered the nestling and placed it in alternate nest #3 with better shade. The nestling successfully fledged 2 days later on June 25.

MANAGEMENT RECOMMENDATIONS

Bartlett Breeding Area

1. Replace sign and/or gate on FR 393.
2. Place signs on road above nest cliff that designate closure boundaries.
3. Increase law enforcement presence between Bartlett and Needle Rock.
4. Remove old fiber optic wire leading to the nest site.
5. Make new Forest Service maps that include closure information.

Box Bar Breeding Area

1. Address the large amount of closure and firearm violations through intensified law enforcement activity.
2. If law enforcement presence is not available, close the Box Bar and Needle Rock areas to entry.

Bull Dog Breeding Area

1. Close Blue Point and Sheep Crossing recreation areas during the breeding season.
2. Postpone development of the Sheep Crossing recreation area until further data can be collected on bald eagle habitat use.
3. Place garbage cans by the river and under all ramadas.
4. Post signs about littering and subsequent penalties.
5. Enforce litter violations.

Granite Reef Breeding Area

1. Place informative signs around the Phon D. Sutton loop trail.

Ladders Breeding Area

1. Update closure signs to include the new June 30 date.
2. Large readable signs should be added within the closure at the river bend after the falls.
3. Foliage should be cleared from signs.
4. Add signs depicting closure information and brochure boxes to Chasm canyon trailhead #164, White Bridge, Beasley Flat, and Clear Creek.
5. Close Forest Service road 500 on both sides during bald eagle breeding season.
6. Install a mandatory sign-in for all boats where river-guides and bald eagle closure information are provided.
7. Limit number of boaters on river per day.

Luna Breeding Area

1. Extend fence along the eastern closure boundary to the shoreline.
2. Keep Group Site A closed until the fledgling leaves the area.
3. Implement the Monofilament Recovery Program (MRP) at Luna Lake.

Orme Breeding Area

1. During the breeding season, limit firewood cutting within the nest area.
2. Maintain the berms blocking access to the breeding area.

Pleasant Breeding Area

1. Mark closure buoys in some way different from the other buoys on the lake (e.g. Flags on top).
2. Make an effort to inform boaters at the park entrance and website about the closure.
3. Coordination between law enforcement agents to stagger patrols into the closure.
4. Notify local airport at Jct. 74 and Lake Pleasant Road of the FAA flight advisory.

Suicide Breeding Area

1. Start a bald eagle education program for the San Carlos Apache Tribe.
2. Place signs at the boat ramps educating recreationists on bald eagle presence and possible fines for harassment.
3. Place nestwatchers at the San Carlos nest if active.

Sycamore Breeding Area

1. Pursue bald eagle education opportunities with the Fort McDowell Indian Community.
2. Re-sign and fence the entryway from Sycamore Creek.
3. Post a sign containing a map of boundary lines at the Sugarloaf trailhead.

Tonto Breeding Area

1. Post signs delineating closure boundaries.

Tower Breeding Area

1. Replace old closure signs similar to brown sign at FR 9507 and 9508.
2. Place closure sign at end of FR 9505.
3. Participate in the Verde Valley Bird and Nature Festival.
4. Advertise MRP at local businesses in the City of Cottonwood.

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APPENDIX A: 2003 BALD EAGLE REPRODUCTION SUMMARY

Table 1. Arizona bald eagle breeding area productivity summary, 2003

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Alamo	O							
Bartlett*	S	1	2/3-5	1+	3/13	1	1	5/26-30
Becker	U							
Blue Point	F	10	<1/13	1	Failed 3/14- 21			
Box Bar*	S	3	1/6-2/3	1+	2/14	1	1	5/6
Bulldog*	S	1	1/13-2/4	2+	2/18-3/10	2	2	5/20, 5/23
Camp Verde	U							
Canyon	O							
Cedar Basin	U							
Cibecue	F	2	2/4-3/14	1+	Failed 3/14-4/10			
Cliff	O							
Coldwater	S	3	2/3-3/13	2+	3/13-4/17	2	1	5/16-6/13
	One young died between 4/25-5/16 at 4-7 weeks of age.							
Coolidge	S	4	3/13-6/10	2+	3/13-6/10	2	1	6/25
	One young died below nest on 6/20 at 8 weeks of age from dehydration.							
Crescent	F	1	<4/30	1+	Failed 5/20-6/6.			
Doka*	S	2	12/20-1/6	1+	1/6-2/3	1	1	3/13-4/17
Dupont	F	2	1/13-2/4	1+	Failed 3/14			
East Verde	O							
Fort McDowell*	F	16	1/6-2/3	1+	Failed 3/7			
Granite Basin	O							
Granite Reef*	F	3	2/4-2/7	2+	3/18-3/21	2	Failed 3/31-4/4	
	Two nestlings died at 2 weeks of age.							
Horse Mesa	S	4	1/14-2/4	2+	2/4-3/14	2	2	5/16-6/13
Horseshoe	S	11	1/6-2/3	1+	3/13-4/2	1	1	5/22-6/13
Ive's Wash	O							
Ladders*	S	4	2/3-21	2+	3/26	2	2	6/16, 6/20
Lone Pine	O							
Luna*	S	1	<2/8	1+	3/4-6	1	1	5/30
Lynx*	F	1	12/9-1/6	1+	Failed 2/3-7			
Needle Rock*	S	2	<1/16	1+	2/16	1	1	5/4
Oak Creek	S	3	2/3-3/5	1+	3/13-25	1	1	5/16-6/13
Orme*	S	6	1/13-2/3	1+	3/4-9	1	1	5/24
Perkinsville	S	4	1/6-2/3	2+	3/13-25	2	2	4/25-6/13
Pinal	F	7	2/4-3/14	1+	Failed 3/14-25			
Pinto	O							
Pleasant*	S	2	1/6-29	1	3/2	1	1	5/20
Redmond	O							
Rock Creek	F	2	2/4-3/14	1+	3/14-4/10	1	Failed 5/16-6/13	
	Nestling last observed at 6 weeks old.							
Rodeo*	F	2	1/6-2/3	2+	3/7	2	Failed 3/15	
	Nestlings killed by intruding female at 1 week of age.							
San Carlos	O							
76	O							

[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 others 1992; Driscoll and Beatty 1994; Driscoll and others 1995a, 1995b, 1997, 1998, 1999; Koloszar and Driscoll 2001a, 2001b.

*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 1 (continued).

Breeding Area	Status[1]	Nest[2]	Incubation Date	Eggs	Hatch Date	Young	Fledged	Fledge Date
Sheep	F	1	1/13-2/4	1+	2/24-3/5	1	Failed 3/14	
	Nestling died in nest at 2 weeks of age.							
Suicide*	S	1	1/13-2/4	3	2/26	3	3	5/20, 5/22
Sycamore*	S	4	12/20-1/6	2	1/6-2/3	2	2	4/5, 4/20
Table Mountain	F	4	2/3-3/13	2	Failed 4/17			
Talkalai	O							
Tonto*	F	2	1/13-2/4	2	2/26-27	1+	Failed 3/9	
	One nestling died at < 1 week, other died while pipping.							
Tower*	S	8	1/6-2/3	2	2/28	2	1	5/27
	One nestling died on 5/28 at 12 weeks of age from Mexican Chicken Bug Infestation.							
Winkelman	U							

[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 others 1992; Driscoll and Beatty 1994; Driscoll and others 1995a, 1995b, 1997, 1998, 1999, 2001; Koloszar and Driscoll 2002.
*Nests monitored by the Arizona Bald Eagle Nestwatch Program.

Table 2. Arizona bald eagle productivity summary, 2003.

Number of BAs	47	Number of Active BAs	31
Number of Occupied BAs	43	Number of Failed Breeding Attempts	13
Number of Eggs	45+	Number of Successful Breeding Attempts	18
Nest Success = 18/43	0.42	Number of Young Hatched	35
Mean Brood Size = 25/18	1.39	Number of Young Fledged	25
		Productivity = 0.42 x 1.39	0.58

APPENDIX B: BARTLETT BREEDING AREA SUMMARY

Table 3. Observed human activity and bald eagle behavior, Bartlett BA, Arizona, 2003.						
Human Activity	N[1]	W	R	F	Total	Percent
Small plane	461	16	2	--	479	67.0
Helicopter	103	26	5	1	135	18.9
Canoe/kayak	24	9	5	1	39	5.5
OHV	6	3	1	--	10	1.4
Driver	2	1	3	1	7	1.0
Gunshot	6	--	--	--	6	0.8
Hiker	3	2	--	1	6	0.8
Rafter	6	--	--	--	6	0.8
Jet	2	4	--	--	6	0.8
Ultra-light	--	--	--	4	4	0.6
Power Co.	4	--	--	--	4	0.6
Agency worker	--	1	--	2	3	0.4
Shooter	2	--	--	--	2	0.3
Cycler	2	--	--	--	2	0.3
Fisherman	2	--	--	--	2	0.3
Birder	2	--	--	--	2	0.3
Tuber	--	1	--	--	1	0.1
Picnicker	--	1	--	--	1	0.1
Total	625	64	16	10	715	

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

Table 4. Observed forage event and success, Bartlett BA, Arizona, 2003.										
Sex	Fish		Birds		Mammals		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	30	14-16	2	0-2	2	2-0	1	1-0	35	17-18
Female	30	25-5	2	0-2	--	--	2	2-0	34	27-7
Unknown	3	3-0	--	--	--	--	--	--	3	3-0
Total	63	42-21	4	0-4	2	2-0	3	3-0	72	47-25

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

Table 5. Observed prey types delivered to the nest, Bartlett BA, Arizona, 2003.						
Sex	Fish	Mammal	Bird	Unknown	Total	Percent
Male	24	2	--	5	31	37.3
Female	41	--	1	3	45	54.2
Unknown	5	--	--	2	7	8.4
Total	70	2	1	10	83	
Percent	84.3	2.4	1.2	12.0		

Table 6. Observed prey items delivered to the nest, Bartlett BA, Arizona, 2003.									
Sex	Fish							Total	Percent
	BC[1]	CP	CS	LB	SU	UB	MI		
Male	1	7	--	1	4	2	3	18	38.3
Female	2	8	2	2	13	--	--	27	57.4
Unknown	--	1	--	--	1	--	--	2	4.3
Total	3	16	2	3	18	2	3	47	

[1]BC=black crappie, CP=carp, CS=catfish spp., LB=largemouth bass, SU=sucker, UB=unknown bass, MI=minnow.

Table 7. Bald Eagle Habitat Analysis at the Bartlett BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
29.3	SR	Right	No	2	RI	UP
30.1	BO	Left	No	1	RI	TA
30.8a	BO	Left	Yes	1	RB	TA
30.8b	CT	Left	No	1	RB	TA
30.9a	BO	Left	No	4	RB	TA
30.9b	CF	Left	No	8	RI	TA
32.1	BO	Right	No	1	RI	--
32.5	SS	Left	No	1	RU	UP
33.1	BO	Left	No	8	RB	TA
33.2a	BO	Left	No	8	RI	TA
33.2b	CT	Left	No	1	RU	--
33.3	SS	Left	Yes	1	RI	--
33.5	SS	Left	Yes	1	PO	--
33.6	HS	Right	No	1	RI	--
33.7	CT	Left	Yes	2	RU	--
33.8	HS	Right	No	1	RI	GB
34.0a	DM	Left	Yes	1	RB	--
34.0b	DS	Right	No	1	BW	WT
34.0c	SB	Left	Yes	1	PO	--
34.0d	SS	Left	No	1	RI	--
34.1a	CF	Left	Yes	1	RU	--
34.1b	SB	Left	Yes	1	RB	--
34.1c	SO	Left	No	1	RU	--
34.1d	SR	Left	No	1	RI	--
34.2a	CF	Right	Yes	1	RI	--
34.2b	DM	Left	No	1	RI	WT
34.2c	DS	Left	Yes	1	RI	WT
34.2d	SB	Channel	No	1	RU	--
34.2e	SO	Right	Yes	1	RI	WT
34.2f	SR	Left	No	1	BW	WT
34.2g	SS	Left	Yes	1	RU	--
34.3a	BO	Left	Yes	1	RU	--
34.3b	BO	Right	Yes	1	RI	TA
34.3c	CF	Left	Yes	1	RU	--
34.3d	GB	Right	No	1	RU	GB
34.3e	PV	Right	No	1	PO	--
34.3f	SB	Right	Yes	1	RI	--
34.3g	SO	Right	Yes	1	RI	--
34.3h	SR	Left	Yes	1	RI	WT
34.3i	SS	Right	Yes	1	RI	--
34.3j	SW	Right	Yes	1	RI	--
34.4a	BO	Right	No	1	RU	TA
34.4b	BO	Left	No	1	RU	--
34.4c	CF	Right	Yes	1	RB	--
34.4d	GB	Right	No	1	BW	GB
34.4e	PV	Right	No	2	RU	UP

[1]River/lake kilometers (Hunt and others 1992).

[2]SR=snag scrub, BO=boulder, CT=cliff top, CF=cliff face, SS=soft snag, HS=snag hard, DM=deciduous tree medium/20-40ft., CM=cottonwood medium/30-60ft., DS=deciduous small/0-20ft., PT=pinnacle top, GB=gravel bar, SB=sandbar, SO=shore.

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

[4]PO=pool, RI=riffle, RU=run, PW=pocket water, BW=backwater, RB=river bend, RS=reservoir, RC=reservoir cove.

[5]MB=mesquite bosque, WT=willow thicket, UP=desert upland, TA=talus.

Table 7 (continued).

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
34.4f	SO	Channel	Yes	1	BW	MB
34.4g	SR	Left	No	2	PW	MB
34.4h	SS	Left	No	1	BW	MB
34.4i	SW	Left	No	1	BW	WT
34.5a	BO	Channel	Yes	1	RU	--
34.5b	CF	Right	Yes	1	PO	--
34.5c	CT	Right	No	1	RU	--
34.5d	GB	Left	No	1	RI	--
34.5e	SB	Left	Yes	1	RI	--
34.6a	BO	Left	No	1	RI	--
34.6b	CF	Right	No	1	RI	--
34.6c	CT	Right	Yes	1	RI	--
34.6d	GB	Left	Yes	1	RI	--
34.6e	HS	Right	Yes	1	RI	--
34.6f	SB	Left	Yes	1	RB	--
34.6g	SO	Left	Yes	1	RI	--
34.6h	SR	Left	No	1	BW	MB
34.6i	SW	Channel	No	1	RI	--
34.7a	BO	Right	No	1	RI	TA
34.7b	CF	Right	Yes	1	RI	--
34.7c	CT	Right	Yes	1	RU	--
34.7d	DM	Right	No	1	RB	--
34.7e	GB	Left	No	2	RI	GB
34.7f	PT	Right	Yes	1	RI	--
34.7g	PV	Right	No	2	RU	--
34.7h	SB	Left	No	1	RU	--
34.7i	SW	Left	Yes	1	RI	--
34.8a	CF	Right	Yes	1	BW	--
34.8b	CT	Right	No	1	RU	--
34.8c	PV	Right	No	3	RI	UP
34.8d	SR	Right	No	3	RU	UP
34.9a	CF	Right	Yes	1	RU	--
34.9b	CT	Right	Yes	1	RB	--
34.9c	PV	Right	No	2	RU	UP
34.9d	SR	Right	No	2	RI	UP
35.0a	CF	Right	Yes	1	RI	--
35.0b	PT	Right	No	1	RI	--
35.0c	PV	Right	No	3	RU	UP
35.0d	SR	Right	No	3	RI	--
35.1	PT	Right	Yes	1	RI	--
35.3	SR	Right	No	1	BW	--
35.5	SS	Right	No	1	RU	--
35.9	SR	Left	Yes	2	PW	--
36.1a	BO	Left	Yes	1	RI	--
36.1b	CF	Right	Yes	1	RU	--
36.5a	CF	Left	No	1	RU	--

[1]River/lake kilometers (Hunt and others 1992).

[2]SR=snag scrub, BO=boulder, CT=cliff top, CF=cliff face, SS=soft snag, HS=snag hard, DM=deciduous tree medium/20-40ft., CM=cottonwood medium/30-60ft., DS=deciduous small/0-20ft., PT=pinnacle top, GB=gravel bar, SB=sandbar, SO=shore.

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

[4]PO=pool, RI=riffle, RU=run, PW=pocket water, BW=backwater, RB=river bend, RS=reservoir, RC=reservoir cove.

[5]MB=mesquite bosque, WT=willow thicket, UP=desert upland, TA=talus.

Table 7 (continued).

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
36.5b	CM	Left	No	1	BW	CF
36.5c	CT	Left	No	2	RI	--
36.5d	HS	Left	No	1	RI	--
36.7	CM	Left	No	1	RB	--
36.8	CF	Left	Yes	1	RI	--
37.2	CM	Left	No	1	BW	--
L1	CF	Left	No	1	RC	CL
L13.8	CF	Left	No	1	RC	--
L39.8	CT	Right	No	8	RS	TA
L39.9	CF	Right	Yes	2	RC	--
L40.2	CT	Right	No	2	RS	TA
L6	BO	Left	Yes	1	RC	--

[1]River/lake kilometers (Hunt and others 1992).
[2]SR=snag scrub, BO=boulder, CT=cliff top, CF=cliff face, SS=soft snag, HS=snag hard, DM=deciduous tree medium/20-40ft., CM=cottonwood medium/30-60ft., DS=deciduous small/0-20ft., PT=pinnacle top, GB=gravel bar, SB=sandbar, SO=shore.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]PO=pool, RI=riffle, RU=run, PW=pocket water, BW=backwater, RB=river bend, RS=reservoir, RC=reservoir cove.
[5]MB=mesquite bosque, WT=willow thicket, UP=desert upland, TA=talus.

Table 8. Bald Eagle Habitat Use at the Bartlett BA, Arizona, 2003.

River km	PP[1]	PH	PR	PW	ES	CL	SS	DW	PK	Total	Percent
30.1	--	--	--	65	--	--	--	--	--	65	0.2
30.8	--	65	49	145	--	26	--	--	--	285	0.7
30.9	--	15	12	--	--	--	--	--	--	27	0.1
33.6	--	--	--	75	--	--	--	--	--	75	0.2
33.7	--	24	--	--	--	--	--	--	--	24	0.1
33.8	--	--	--	43	--	--	--	--	--	43	0.1
34.0	19	22	--	79	--	--	2	--	--	122	0.3
34.1	6	38	--	--	--	--	9	4	--	57	0.1
34.2	194	477	255	778	12	2	64	--	1	1,783	4.5
34.3	81	12	171	574	12	--	70	25	6	951	2.4
34.4	1,022	1,237	5,062	7,065	27	449	121	7	3	14,993	38.0
34.5	188	403	1,119	4,101	--	--	18	28	6	5,863	14.9
34.6	91	240	3,397	2,901	64	197	121	21	142	7,174	18.2
34.7	138	3	686	968	--	192	10	--	--	1,997	5.1
34.8	99	219	2,715	1,714	--	96	--	--	--	4,843	12.3
34.9	130	3	161	199	--	--	--	--	--	493	1.3
35.0	9	29	--	231	--	--	--	--	--	269	0.7
35.1	--	--	21	--	--	--	--	--	--	21	0.1
36.1	--	--	--	72	--	--	--	--	--	72	0.2
36.5	6	2	--	59	--	--	--	--	--	67	0.2
37.2	--	--	--	25	--	--	--	--	--	25	0.1
37.7	--	--	--	78	--	--	--	--	--	78	0.2
L40.2	--	51	--	--	--	--	--	--	--	51	0.1
L6	--	--	--	60	--	--	--	--	--	60	0.2
Total	1,983	2,840	13,648	19,232	115	962	415	85	158	39,559	
Percent	5.0	7.2	34.6	48.8	0.3	2.4	1.1	0.2	0.4		

[1]PP=perched preening, PH=perched hunting, PR=perched roosting, ES=eating on shore, CL=perched close to mate, SS=standing on shore, DW=drinking water, PK=perched with prey.

APPENDIX C: BOX BAR BREEDING AREA SUMMARY

Table 9. Observed human activity and bald eagle behavior, Box Bar BA, Arizona, 2003.

Human Activity	N[1]	W	R	F	L	U	Total	Percent
Airplane	5	23	7	--	1	15	51	29.3
Helicopter	2	12	6	--	--	18	38	21.8
Hiker	1	1	--	2	1	19	24	13.8
River Traffic	2	1	--	--	--	14	17	9.8
Fisherman	2	--	--	1	--	6	9	5.2
Gunfire	--	--	--	--	--	8	8	4.6
OHV	1	2	1	--	1	2	7	4.0
Horseback	--	2	1	--	1	2	6	3.4
Shooter	--	--	2	2	--	2	6	3.4
Vehicle	--	--	--	1	--	2	3	1.7
Agency Worker	--	--	1	2	--	--	3	1.7
Campground noise	--	--	1	--	--	1	2	1.1
Total	13	41	19	8	4	89	174	

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

Table 10. Observed forage event and success, Box Bar BA, Arizona, 2003.

Sex	Fish		Birds		Unknown		Total	
	E[1]	S[2]-U	E	S-U	E	S-U	E	S-U
Male	7	2-5	--	--	1	1-0	8	3-5
Female	3	1-2	1	0-1	--	--	4	1-3
Total	10	3-7	1	0-1	1	1-0	12	4-8

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

Table 11. Observed prey types delivered to the nest, Box Bar BA, Arizona, 2003.

Sex	Fish	Birds	Reptiles	Mammals	Unknown	Total	Percent
Male	15	1	--	--	23	39	52.0
Female	8	--	1	--	18	27	36.0
Unknown	1	1	--	1	6	9	12.0
Total	24	2	1	1	47	75	
Percent	32.0	2.7	1.3	1.3	62.7		

Table 12. Bald eagle habitat analysis at the Box Bar BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]
23.5	PV	Left	No	5	NA
24	CT	Left	No	1	RI,RB
24.5	SM,MS,BA	Right	Partial	1	RI,RB
24.8	CM	Both	Partial	1	RI,RB
24.9 (nest)	CL	Left	Partial	6	NA
25	ST	Left	No	6	NA
25.4	ST	Left	No	5	NA
26	CL	Right	Partial	4	RI
22-24	NA	NA	NA	NA	NA
24.7-25.2	GR	Left	Yes	1	BW
24.5-25.5	SM,MS,SP	Left	Partial	1	BW

[1]River Kilometer (Hunt and others 1992).
[2]CL=Cottonwood large/60-90+ft, ST=Snag top, SM=Snag mesquite, MS=Mesquite, BA=Cut bank, CT=Cliff top, GR=Ground, SP=Stump, CM=Cottonwood medium/30-60ft, PV=Palo verde, NA=Not applicable.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]RI=Riffle, BW=Backwater, RB=Riverbend, NA=Not applicable.

APPENDIX D: LADDERS BREEDING AREA SUMMARY

Table 13. Observed human activity and bald eagle behavior, Ladders BA, Arizona, 2003									
Human Activity	N[1]	W	R	F	L	B	U	Total	Percent
Boater	27	88	1	6	3	4	3	132	53.9
Plane	20	48	1	--	1	3	2	75	30.6
Helicopter	4	13	--	2	1	3	--	23	9.4
OHV	3	2	--	--	1	--	--	6	2.5
Hiker	1	2	--	1	--	--	1	5	2.0
Gunshot	2	--	--	--	--	--	--	2	0.8
Agency Worker	--	--	--	--	--	--	1	1	0.4
Fisherman	--	--	--	--	--	--	1	1	0.4
Total	57	153	2	9	6	10	8	245	

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

Table 14. Observed forage event and success, Ladders BA, Arizona, 2003												
Sex	Fish		Birds		Mammals		Amphibians		Unknown		Total	
	E[1]	S[2]-U	E	S-U	E	S-U	E	S-U	E	S-U	E	S-U
Male	8	8-0	1	0-1	--	--	1	1-0	1	1-0	11	10-1
Female	10	3-7	1	0-1	3	3-0	--	--	--	--	14	6-8
Unknown	1	1-0	--	--	--	--	--	--	1	1-0	2	2-0
Total	19	12-7	2	0-2	3	3-0	1	1-0	2	2-0	27	18-9

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

Table 15. Observed prey types delivered to the nest, Ladders BA, Arizona, 2003							
Sex	Fish	Birds	Mammals	Amphibians	Unknown	Total	Percent
Male	29	2	1	1	4	37	54.4
Female	20	1	4	--	2	27	39.7
Unknown	2	--	1	--	1	4	5.8
Total	51	3	6	1	7	68	
Percent	75.0	4.4	8.8	1.5	10.3		

Table 16. Observed prey items delivered to the nest, Ladders BA, Arizona, 2003													
Sex	Fish					Birds			Mammals		Herps	Total	Percent
	CP[1]	SU	CS	BS	FC	CM	RV	KS	RC	RS	BF		
Male	2	4	1	5	--	--	1	--	--	--	1	14	41.2
Female	3	4	3	4	1	1	--	--	--	1	--	17	50.0
Unknown	1	--	--	--	--	--	--	1	1	--	--	3	8.8
Total	6	8	4	9	1	1	1	1	1	1	1	34	

[1]CP=carp, SU=sucker, CS=catfish species, BS=bass, FC=flathead catfish, CM=common merganser, RV=raven, KS=kestrel, RC=ringtail cat, RS=rock squirrel, BF=bullfrog.

Table 17. Bald eagle habitat analysis at the Ladders BA, Arizona, 2003

Perch Location[1]	Perch Type[2]	Side	Distance to H_2O[3]	H_2O Type[4]
161.2	CF	Right	3	PO
161.3a	JN	Right	4	RI
161.3b	PT	Right	4	RI
161.4	CF	Left	3	RU
161.7	JN	Right	5	U
161.8a	BO	Right	1	RI
161.8b	BO	Right	1	RI
162.4a	CF	Left	3	RI
162.4b	CF	Right	4	RI
162.4c	SJ	Left	4	U
162.4d	SJ	Right	5	U
162.5	JN	Right	2	RI
162.6	?	Right	?	U
162.9	CF	Left	4	U
163.1	CT	Left	4	U
163.3a	CT	Right	4	U
163.3b	CT	Left	3	PO
163.4a	CT	Right	4	PO
163.4b	CT	Left	4	PO
163.5	CT	Left	5	U
163.6	CT	Left	2	RU
163.7a	SS	Left	5	U
163.7b	CF	Left	4	RU
163.7c	CF	Left	2	RU
163.7d	CF	Left	4	PO
163.7e	CF	Left	4	U
163.8a	CF	Left	4	RU
163.8b	CT	Left	4	U
163.8c	CF	Left	4	U
163.9a	CF	Left	4	RU
163.9b	CF	Left	3	RU
163.9c	CF	Left	3	RU
163.9d	CF	Left	3	RU
163.9e	CF	Left	4	U
163.9f	CF	Left	3	U
164.0a	CT	Left	4	U
164.0b	SO	Left	1	U
164.0c	CF	Left	3	RU
164.0d	BO	Left	1	RU
164.0e	CF	Left	4	U
164.0f	SB	Right	1	PO
164.0g	JN	Left	4	U
164.0h	CT	Left	4	U
164.0i	SO	Left	1	U
164.1a	SO	Left	1	U
164.1b	CT	Right	2	U
164.1c	PT	Left	4	U
164.1d	BO	Left	1	RU

[1]River kilometer (Hunt and others 1992).
[2]CF=Cliff, CT=Cliff Top, PT=Pinnacle Top, CL=Large Cottonwood, SJ=Juniper Snag, SH=Hard Snag, SS=Soft Snag, SM=Mesquite Snag, GR=Ground, MS=Mesquite, JN=Juniper, BO=Boulder, SO=Shore, SB=Sand Bar.
[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, RI=Riffle, RU=Run, U=Unknown.

Table 17 (continued).

Perch Location[1]	Perch Type[2]	Side	Distance to H_2O[3]	H_2O Type[4]
164.1e	BO	Left	1	RU
164.2a	SH	Right	2	U
164.2b	CT	Left	5	U
164.2c	SS	Right	4	RI
164.2d	CF	Left	4	PO
164.2e	CF	Right	4	RU
164.2f	SJ	Right	4	RI
164.2g	MS	Left	2	PO
164.2h	DW	Left	1	PO
164.2i	CT	Right	2	U
164.2j	CF	Left	4	U
165.2	CF	Right	3	RU

[1]River kilometer (Hunt and others 1992).
[2]CF=Cliff, CT=Cliff Top, PT=Pinnacle Top, CL=Large Cottonwood, SJ=Juniper Snag, SH=Hard Snag, SS=Soft Snag, SM=Mesquite Snag, GR=Ground, MS=Mesquite, JN=Juniper, BO=Boulder, SO=Shore, SB=Sand Bar.
[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, RI=Riffle, RU=Run, U=Unknown.

Table 18. Bald eagle habitat use at the Ladders BA, Arizona, 2003.

River km	PR[1]	PP	PH	PV	PE	PU	SS	DW	Total	Percent
161.2	--	--	77	--	--	14	--	--	91	0.7
161.3	--	3	107	9	--	72	--	--	191	1.4
161.4	--	--	18	--	--	1	--	--	19	0.1
161.7	14	--	--	--	--	--	--	--	14	0.1
161.8	66	--	--	--	71	--	--	--	137	1.0
162.4	213	--	107	--	--	223	--	--	543	4.0
162.5	52	20	108	--	--	166	--	--	346	2.5
162.6	--	--	--	--	--	83	--	--	83	0.6
162.9	61	--	--	1	--	--	--	--	62	0.5
163.1	30	--	--	--	--	--	--	--	30	0.2
163.3	45	--	12	5	--	--	--	--	62	0.5
163.4	36	--	26	--	--	--	--	--	62	0.5
163.5	1	5	--	--	--	6	--	--	12	0.1
163.6	--	--	80	--	--	--	--	--	80	0.6
163.7	92	22	259	2	--	--	--	--	375	2.7
163.8	386	89	37	--	--	--	3	--	515	3.8
163.9	1,464	79	1,495	--	--	115	--	--	3,153	23.0
164.0	3,117	667	2,416	36	22	211	35	38	6,542	47.7
164.1	341	20	13	1	3	--	15	37	430	3.1
164.2	275	41	211	--	--	370	--	--	897	6.5
165.2	--	--	--	--	--	58	--	--	58	0.4
Total	6,193	946	4,969	54	96	1,319	53	82	13,702	
Percent	45.2	6.9	36.3	0.4	0.7	9.6	0.4	0.6		

[1]PR=Perched Roosting, PP=Perched Preening, PH=Perched Hunting, PV=Perched Vocalizing, PE=Perched Eating, PU=Perched Unspecified, SS=Standing on Shore, DW=Drinking Water.

APPENDIX E: LUNA BREEDING AREA SUMMARY

Table 19. Observed human activity and bald eagle behavior, Luna BA, Arizona, 2003.

Human Activity	N[1]	W	R	F	L	Total	Percent
Fisherman	105	18	--	--	--	123	43.2
Boat	51	44	--	--	3	98	34.4
Picnicker	7	3	--	2	2	14	4.9
Vehicle	--	12	2	--	--	14	4.9
Canoe/Kayak	2	12	--	--	--	14	4.9
Jet (Military)	2	3	--	1	1	7	2.5
Gunshot	3	2	--	--	--	5	1.8
Agency Worker	--	4	--	--	--	4	1.4
Float Tube	1	2	--	--	--	3	1.1
Small Plane	--	2	--	--	--	2	0.7
Cargo Plane	--	--	1	--	--	1	0.4
Total	171	102	3	3	6	285	

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

Table 20. Observed forage event and success, Luna BA, Arizona, 2003.

Sex	Fish		Birds		Unknown		Total	
	E[1]	S[2]-U	E	S-U	E	S-U	E	S-U
Male	19	15-4	37	15-22	19	19-0	75	49-26
Female	12	11-1	12	7-5	4	3-1	28	21-7
Unknown	5	3-2	3	1-2	6	5-1	14	9-5
Total	36	29-7	52	23-29	29	27-2	117	79-38

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

Table 21. Observed prey types delivered to the nest, Luna BA, Arizona, 2003.

Sex	Fish	Birds	Carrion	Unknown	Total	Percent
Male	13	13	1	11	38	65.5
Female	7	7	0	1	15	25.9
Unknown	2	--	1	2	5	8.6
Total	22	20	2	14	58	
Percent	37.9	34.5	3.4	24.1		

Table 22. Observed prey items delivered to the nest, Luna BA, Arizona, 2003.

Sex	Fish	Birds		Total	Percent
	RT[1]	AC	RD		
Male	13	13	--	26	61.9
Female	7	6	1	14	33.3
Unknown	2	--	--	2	4.8
Total	22	19	1	42	

[1]RT=rainbow trout, AC=American Coot, RD=Ruddy Duck.

Table 23. Bald eagle habitat analysis at the Luna BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Shade	Distance to H_20[3]	H_2O Type[4]
0.7	SH	No	2	RC
0.8	SH	No	1	RC
0.9	SH	No	1	RS
1.7	PS	No	1	RC
1.8	PS	No	1	RC
2.0	PO	Yes	8	CF
2.2	ST	No	6	CF
2.3 (nest)	NE	Yes	8	CF
2.4 (post)	FP	No	1	RS
2.5	SH	No	5	CF
2.7a	ST	No	5	CF
2.7b	PS	No	2	RS
3.4	SH	No	3	RS/CF
4.9	PO	Yes	8	CF
5.1 (post)	FP	No	1	RS

[1]Lake kilometer.
[2]SH=hard snag (only main branches), PS=small pine/0-70 ft, PO=Old-growth pine/70-100ft, NE=nest, FP=fencepost, ST=Snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]RC=reservoir cove, RS=reservoir main body, CF=coniferous forest.

Table 24. Bald eagle habitat use at the Luna BA, Arizona, 2003.

Lake km	PR[12]	PH	PP	PV	NP	PC	NX	EN	Total	Percent
0.7	325	1,571	357	2	--	--	--	--	2,255	3.1
0.8	90	--	--	--	--	--	--	--	90	0.1
0.9	54	127	34	2	--	--	--	--	217	0.3
1.7	119	335	25	2	--	--	--	--	481	0.7
1.8	125	--	--	--	--	--	--	--	125	0.2
2.0	871	1,410	131	--	--	--	--	--	2,412	3.3
2.2	20	723	135	--	--	--	--	--	878	1.2
2.3 (nest)	730	1,368	330	55	392	42	33,500	862	37,279	51.3
2.4 (sign)	--	646	--	--	--	--	--	--	646	0.9
2.5	5,819	8,108	1,664	15	--	119	--	--	15,725	21.7
2.7	985	3,928	635	--	--	--	--	--	4,028	7.6
3.4	902	1,880	108	--	--	--	--	--	2,890	4.0
4.9	--	2,320	83	--	--	--	--	--	2,403	3.3
Other[3]	112	1,515	51	--	--	--	--	--	1,678	2.3
Total	10,152	23,931	3,553	76	392	161	33,500	862	72,628	
Percent	14.0	33.3	4.9	0.1	0.5	0.2	46.	1.2		

[1]Observation Time (minutes).
[2]PR=perched roosting, PH=perched hunting/watching, PP=perched preening, PV=perched vocalizing, NP=time perched at nest (in addition to nest duties), PC=perched close to mate, NX=nest duties/attendance, EN=eating in nest.
[3]Other=secondary perches.

Table 25. Bald eagle shoreline use at the Luna BA, Arizona, 2003.

Lake km	PH[1,2]	SS	ES	BA	DW	SI	Total	Percent
1.1	--	22	--	--	--	--	22	1.6
2.1	--	12	18	--	8	--	38	2.7
2.2	42	--	17	6	--	--	65	4.6
2.3	106	7	--	--	7	--	120	8.6
2.5	150	33	54	7	4	--	248	17.7
2.8	129	--	--	5	1	--	135	9.6
3.0	2	49	2	23	--	--	76	5.4
3.2	--	37	9	2	8	--	56	4.0
4.6	59	137	11	--	--	--	207	14.8
4.7	204	--	--	--	--	--	204	14.5
4.8	32	37	--	--	--	--	69	4.9
5.1	60	2	11	39	--	--	112	8.0
999.9[3]	--	--	---	--	--	51	51	3.6
Total	784	336	122	82	28	51	1,403	
Percent	55.9	23.9	8.7	5.8	2.0	3.6		

[1]Observation Time (minutes).
[2]PH=perched hunting/watching, SS=standing on shore, ES=eating on shore, BA=bathing, DW=drinking water, SI=standing on ice.
[3]999.9=no specific location.

APPENDIX F: ORME BREEDING AREA SUMMARY

Table 26. Observed human activity and bald eagle behavior, Orme BA, Arizona, 2003.							
Human Activity	N[1]	W	F	R	B	Total	Percent
Helicopter	38	56	3	3	13	113	46.9
Small Plane	9	21	--	--	1	31	12.9
Vehicle	7	13	1	2	2	24	10.4
Rafter	14	--	--	--	8	22	9.1
Canoe/Kayak	8	--	--	--	4	12	5.0
Hiker	2	2	--	1	2	7	2.9
Alarm	7	--	--	--	1	8	3.3
Jet	4	1	--	--	--	5	2.1
Construction	--	3	--	--	--	3	1.2
Researcher	--	3	--	--	--	3	1.2
Agency Worker	--	2	--	--	--	2	0.8
Camper	1	1	--	--	--	2	0.8
Photographer	--	1	--	--	1	2	0.8
Banding event	--	--	--	1	--	1	0.4
Birder	--	--	--	--	1	1	0.4
Picnicker	--	1	--	--	--	1	0.4
Rancher	--	1	--	--	--	1	0.4
Transmitter	--	--	--	1	--	1	0.4
Woodcutter	--	--	--	1	--	1	0.4
Total	90	105	4	9	33	241	

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

Table 27. Observed forage event and success, Orme BA, Arizona, 2003.						
Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	9	5-4	--	--	9	5-4
Female	11	4-7	2	1-1	13	5-8
Total	20	9-11	2	1-1	22	10-12

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

Table 28. Observed prey types delivered to the nest, Orme BA, Arizona, 2003.				
Sex	Fish	Birds	Total	Percent
Male	8	--	8	47.1
Female	8	1	9	52.9
Total	16	1	17	
Percent	94.1	5.9		

Table 29. Bald eagle habitat analysis at the Orme BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]
0.3v[5] nest	CL	Right	Yes	4	RU
0.4v	ST	Right	No	4	RU
0.4v	CM	Left	Partial	1	RU
0.8v	CM	Left	Yes	1	RU
0.9v	MS	Left	No	1	RI/RU
1.0v	MS	Left	No	1	RI/RU
1.1v	CF	Right	Yes	8	RI/RU
2.2v	ST	Left	No	1	RU
4.8s	MS	Left	No	1	RI
5.0s	CM	Right	No	2	RI/RU
5.1s	CM	Right	No	1	RU
5.3s	ST	Right	No	1	RI/RU
6.1s	CF	Left	No	1	RI/PO
7.8s	CM	Right	No	2	RU
11.5s	CF	Right	No	1	PO/RI

[1]River kilometer (Hunt and others 1992).
[2]CL=cottonwood large/60-90ft, CM=cottonwood medium/30-60ft, ST=snag tree, MS=mesquite, CF=cliff ledge, ST=Snag top.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]RU=run, RI=riffle, PO=pool.
[5]v=Verde River, s=Salt River.

Table 30. Bald eagle habitat use at the Orme BA, Arizona, 2003.

River km	PR[1]	PH	PV	PK	PP	ET	CL	NX	Total	Percent
0.3v[2] nest	649	--	--	--	--	115	67	15,831	16,662	38.6
0.4v	12,305	1,279	44	11	969	33	818	--	15,459	35.9
0.4v	5,679	2,709	--	--	--	--	--	--	8,388	19.5
0.8v	15	--	48	--	--	--	--	--	63	0.1
0.9v	--	--	--	--	--	16	--	--	16	0.0
1.0v	--	109	--	--	--	--	--	--	109	0.3
1.1v	120	--	--	--	--	--	591	--	711	1.6
2.2v	--	--	--	--	--	9	--	--	9	0.0
4.8s	--	104	--	--	--	23	--	--	127	0.3
5.0s	69	999	--	--	--	--	--	--	1,068	2.5
5.1s	--	294	--	--	--	--	--	--	294	0.7
5.3s	--	5	--	--	--	--	--	--	5	0.0
6.1s	4	138	--	--	--	--	--	--	142	0.3
7.8s	--	23	--	--	--	--	--	--	23	0.1
11.5s	--	34	--	--	--	--	--	--	34	0.1
Total	18,841	5,694	92	11	969	196	1,476	15,831	43,110	
Percent	43.7	13.2	0.2	0.0	2.2	0.5	3.4	36.7		

[1]PR=perched roosting, PH=perched hunting, PV=perched vocalizing, PK=perched with prey, PP=perched preening, ET=eating in tree, CL=perched very close to mate, NX=nest duties.
[2]v=Verde River, s=Salt River.

APPENDIX G: PLEASANT BREEDING AREA SUMMARY

Table 31. Observed human activity and bald eagle behavior, Pleasant BA, Arizona, 2003.

Human Activity	N[1]	W	B	U	Total	Percent
Boat	125	27	7	--	159	91.4
ATV	6	--	--	--	6	3.4
Helicopter	4	--	--	--	4	2.3
Plane	1	1	--	1	3	1.7
Jet	1	--	--	--	1	0.6
Canoe	1	--	--	--	1	0.6
Total	138	28	7	1	174	

[1]Bald eagle behavior, N=none, W=watched, B= not in area, U= unknown.

Table 32. Watercraft compliance at the southern closure boundary, Pleasant BA, Arizona, 2003.

Date	Time of Week	Boats at Closure	Boats in Closure	Jet Skis at Closure	Jet Skies in Closure	Agency Boats in Closure	Total
2/22-23	Weekend	72	4	6	--	2	84
2/24-27	Weekday	13	1	2	--	0	16
2/28-3/02	Weekend	19	0	--	--	2	21
3/07-09	Weekend	185	10	15	--	4	214
3/10-13	Weekday	91	4	5	2	5	107
3/14-16	Weekend	118	4	7	--	2	131
3/21-23	Weekend	295	10	18	1	5	329
3/24-27	Weekday	57	5	5	--	6	73
3/28-30	Weekend	150	6	3	2	2	163
4/04-06	Weekend	91	5	4	--	5	105
4/07-10	Weekday	75	7	6	1	4	93
4/11-13	Weekend	203	6	25	--	6	240
4/18-20	Weekend	170	6	41	2	5	224
4/21-24	Weekday	72	4	8	--	4	88
4/25-27	Weekend	295	19	58	--	1	373
5/02-04	Weekend	446	16	84	--	7	553
5/05-08	Weekday	121	4	15	--	5	145
5/09-11	Weekend	357	6	77	2	3	445
5/12-15	Weekday	178	5	65	8	2	258
5/17-18	Weekend	295	4	80	2	1	382
5/19-22	Weekday	164	8	61	1	4	238
5/23-25	Weekend	400	10	110	3	5	528
Total	Weekend	3,096	106	528	12	50	3,792
	Weekday	771	38	167	12	30	1,018
	Total	3,867	144	144	24	80	4,810
	Percent	80.4	3.0	3.0	0.5	1.7	

Table 33. Observed forage event and success, Pleasant BA, Arizona, 2003.

Sex	Fish		Birds		Total	
	E[1]	S-U[2]	E	S-U	E	S-U
Male	3	3-0	--	--	3	3-0
Unknown	3	3-0	--	--	3	3-0
Both	--	--	2	1-1	2	1-1
Total	6	6	2	1-1	8	7-1

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

Table 34. Observed prey types delivered to the nest, Pleasant BA, Arizona, 2003.

Sex	Fish	Birds	Mammal	Unknown	Total	Percent
Male	8	3	2	4	17	37.8
Female	3	--	1	1	5	11.1
Unknown	8	2	2	11	23	51.1
Total	19	5	5	16	45	
Percent	42.2	11.1	11.1	35.6		

Table 35. Observed prey items delivered to the nest, Pleasant BA, Arizona, 2003.

Sex	Fish		Bird		Total	Percent
	SP[1]	LB	CC	GR		
Male	--	1	1	1	3	50.0
Female	1	--	--	--	1	16.7
Unknown	1	--	1	--	2	33.3
Total	2	1	2	1	6	

[1]SP=sucker spp., LB=largemouth bass, CC=channel catfish, GR=grebe spp.

Table 36. Bald eagle habitat analysis at the Pleasant BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side	Relative Height
68.5a	BO	Right	--
68.5b	SO	Right	--
68.6	SO	Left	--
68.7a	BO	Left	--
68.7b	CF	Left	Low
68.7c	SO	Left	--
68.7d	BO	Right	--
68.8a	CF	Left	High
68.8b	CF	Left	Medium
68.9a	CF	Left	High
68.9b	CF	Left	Low
68.9c	CF	Left	Medium
68.9d	SO	Left	--
69.0a	CF	Left	High
69.0b	CF	Left	Medium
69.0c	SO	Left	--
69.0d	SO	Right	--
69.1a	CF	Left	High
69.1b	CF	Left	Medium
69.1c	CF	Left	Low
69.1d	SO	Left	--
69.2a	CF	Left	Medium

[1]River kilometer (Hunt and others 1992).
[2]CF=cliff, BO=boulder, SO=shore, SH=hard snag, SP=fallen tree, JN=juniper.

Table 36 (continued).

Perch Location[1]	Perch Type[2]	Side	Relative Height
69.2b	JN	Left	--
69.3a	SO	Left	--
69.3b	BO	Left	--
69.4a	SH	Left	--
69.4b	SO	Left	--
69.4c	SP	Left	--
69.4d	BO	Left	--
69.5	SO	Left	--
69.6	SO	Left	--
69.8	CF	Left	--
69.9	CF	Left	--
72.3	BO	Left	--
73.5	CF	Left	--

[1]River kilometer (Hunt and others 1992).
[2]CF=cliff, BO=boulder, SO=shore, SH=hard snag, SP=fallen tree, JN=juniper.

Table 37. Bald eagle habitat use at the Pleasant BA, Arizona, 2003.

River km	PP[1]	PH	EC	PV	DW	PK	Total	Percent
68.5	--	--	--	--	15	--	15	0.0
68.6	--	--	--	--	--	3	3	0.0
68.7	101	17	--	--	179	8	305	0.9
68.8	1,590	810	41	72	--	10	2,523	7.4
68.9	8,648	10,627	27	95	--	59	19,456	57.0
69.0	298	914	53	54	--	40	1,359	4.0
69.1	3,434	5,471	63	--	--	--	8,968	26.3
69.2	382	562	--	--	--	1	945	2.8
69.3	78	--	--	--	55	--	133	0.4
69.4	34	42	--	--	26	--	102	0.3
69.5	--	--	--	--	3	--	3	0.0
69.6	--	--	--	5	--	--	5	0.0
69.8	--	222	--	--	--	--	222	0.7
69.9	7	--	--	--	--	--	7	0.0
72.3	--	81	--	--	--	--	81	0.2
73.5	19	--	--	--	--	--	19	0.1
Total	14,591	18,746	184	226	278	121	34,146	
Percent	42.7	54.9	0.5	0.7	0.8	0.4		

[1]PP=perched preening, PH=perched hunting, EC=eating on cliff, PV=perched vocalizing, DW=drinking water, PK=perched with prey.

APPENDIX H: SUICIDE BREEDING AREA SUMMARY

Table 38. Observed human activity and bald eagle behavior, Suicide BA, Arizona, 2003.

Human Activity	N[1]	W	R	L	Total	Percent
Loud music	44	1	--	--	45	25.1
People below nest	27	9	7	2	45	25.1
People on dam	23	9	--	--	32	17.9
Car horn	13	4	--	--	17	9.5
Jet (military)	9	6	1	--	16	8.9
Boat	1	2	--	2	5	2.8
Sirens	--	4	--	--	4	2.2
Helicopter	--	3	--	--	3	1.7
Gunshots	1	--	2	--	3	1.7
Fisherman	3	--	--	--	3	1.7
Airplane	--	2	--	--	2	1.1
Moving car	--	--	--	2	2	1.1
Hiker	--	--	1	--	1	0.6
Sonic boom	--	--	1	--	1	0.6
Total	121	40	12	6	179	

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

Table 39. Observed forage event and success, Suicide BA, Arizona, 2003.

Sex	Fish		Carrion		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	31	26-5	1	1-0	--	--	32	27-5
Female	40	35-5	2	2-0	5	5-0	47	42-5
Total	71	61-10	3	3-0	5	5-0	79	69-10

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

Table 40. Observed prey types delivered to the nest, Suicide BA, Arizona, 2003.

Sex	Fish	Mammals	Carrion	Unknown	Total	Percent
Male	41	1	1	14	57	45.6
Female	51	1	2	14	68	54.4
Total	92	2	3	28	125	
Percent	73.6	1.6	2.4	22.4		

Table 41. Bald eagle habitat analysis at the Suicide BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side[3]	Shade	Vertical distance to H_2O[4]	Horizontal distance to H_2O
1.1-1.8	SO, SS, BO, CF	Left	No	1	0-100
1.8-3.0	SO, SH, SS, BO	Left	No	1	0-400
3.0-5.0	SO, SS, SH, PV, BO	Left	No	1	0-400
23.0-30.0	SO, SS, SH, PV	Right	No	1	0-400
30.0-31.0	SO, SS, SH, PV	Right	No	1	0-500
31.0-33.0	SO	Right	No	1	0-1,000
33.0-34.0	CF, SS	Right	No	1,2	0-400
1.5 (Island 4)	SO	Left	No	1	0
29.9 (Island 2)	SO	Right	No	1	0
30.0 (Island 3)	SO	Right	No	1	0
33.0 (Island 1)	SO	Right	No	1	0
0.0-0.6 (Region 3)	CF, CT, SJ, CC	Left	Partial	3, 4, 5	75-175
0.0-0.7 (Region 4)	CF	Left	No	1, 2	0-75
.04-.08 (Region 2)	CF, CT, SJ, CC	Left	Yes – PM	5, 6	200-300
.06-.08 (Region 1)	CF, PF, PT, SJ	Left	Partial	4, 5	100-250
.07-1.0 (Region 5)	CF, CT, SJ	Left	Partial	1, 2, 3	0-125
0.8-1.1 (Region 6)	CF, SH	Left	No	3, 4	100-300
1.1-1.6 (Region 7)	CF, SJ, CC	Left	No	3, 4, 5, 6	100-350

[1]River/Lake kilometers (Hunt and others 1992).
[2]SO=shore, SS=soft snag, SH=hard snag, SJ=juniper snag, PV=palo verde, BO=boulder, CF=cliff ledge, CT=cliff top, CC=cactus/agave, PF=pinnacle ledge, PT=pinnacle top.
[3]For islands, side refers to visually right or left of middle from the OP.
[4]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.

Table 42. Bald eagle habitat use at the Suicide BA, Arizona, 2003.

River km	PP[1,2]	PH/PW	PR	PK	ES	EC	DW	Total	Percent
1.1-1.8	15	215	60	12	42	--	19	363	1.7
1.8-3.0	--	63	--	3	--	--	--	66	0.3
3.0-5.0	15	139	--	1	7	--	3	165	0.8
23.0-30.0	--	8	--	1	--	--	--	9	0.0
30.0-31.0	125	183	138	7	88	--	26	567	2.6
31.0-33.0	--	8	--	19	--	--	--	27	0.1
33.0-34.0	--	12	--	2	--	--	--	14	0.1
Island 1	--	--	--	--	15	--	14	29	0.1
Island 2	--	18	--	--	--	--	7	25	0.1
Island 3	--	59	--	--	3	--	4	66	0.3
Island 4	--	--	--	--	--	--	4	4	0.0
Region 1	1,304	4,296	1,405	43	--	2	--	7,050	32.1
Region 2	1,156	6,093	2,422	--	--	--	--	9,671	44.1
Region 3	389	980	159	14	--	20	--	1,562	7.1
Region 4	--	64	--	4	--	14	--	82	0.4
Region 7	--	189	--	--	--	--	--	189	0.9
Region 6	154	201	2	9	--	--	--	366	1.7
Region 5	64	1,405	66	109	--	46	--	1,690	7.7
Total	3,222	13,933	4,252	224	155	82	77	21,945	
Percent	14.7	63.5	19.4	1.0	0.7	0.0	0.4		

[1]Observation Time (minutes)
[2]PP=perched preening, PH/PW=perched hunting/watching, PR=perched roosting, PK=perched with prey, ES=eating on shore, EC=eating on cliff, DW=drinking water.

APPENDIX I: SYCAMORE BREEDING AREA SUMMARY

Table 43. Observed human activity and bald eagle behavior, Sycamore BA, Arizona, 2003.

Human Activity	N[1]	W	R	F	L	Total	Percent
Small plane	110	14	--	2	1	127	70.2
Helicopter	15	12	--	--	--	27	14.9
OHV	9	3	--	1	--	13	7.2
Vehicle	3	--	1	7	1	12	6.6
Agency worker	--	--	--	--	1	1	0.6
Horseback	--	1	--	1	--	1	0.6
Total	137	30	1	11	3	181	

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

Table 44. Observed forage event and success, Sycamore BA, Arizona, 2003.

Sex	Fish		Mammals		Birds		Unknown		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U	E	S-U
Male	--	--	1	1-0	5	2-3	4	1-3	10	4-10
Female	8	8-0	--	--	1	1-0	5	0-5	14	9-14
Total	8	8-0	1	1-0	6	3-3	9	1-8	24	13-24

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

Table 45. Observed prey types delivered to the nest, Sycamore BA, Arizona, 2003.

Sex	Fish	Birds	Mammals	Unknown	Total	Percent
Male	8	12	1	9	30	46.9
Female	24	2	--	6	32	50.0
Unknown	--	1	--	1	2	3.1
Total	32	15	1	16	64	
Percent	50.0	23.4	1.6	25.0		

Table 46. Bald eagle habitat analysis at the Sycamore BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
7.5	SS	Right	No	1	RI/RB	TX
8.4	SM	Left	No	1	RI	MB
8.5	YM	Right	No	2	RI	MB
9.1	ST	Right	Partial	3	RU	MB
9.2	SM	Left	Partial	1	RU	CL
9.3	SM	Left	Partial	1	RU	CL
9.4	SR	Left	Partial	1	RU	CL
9.7	SH	Left	No	2	RB	MB
9.9a	SH	Left	No	3	RB	MB
9.9b	SH	Left	No	6	RB	MB
10 (nest)	CL	Left	No	7	RU	MB
10.1	ST	Left	No	7	RU	MB
10.2	SH	Left	No	7	RU	MB
10.4	FL	Right	No	3	RU	FL
10.5	YL	Left	No	7	RI	MB

[1]River kilometer (Hunt and others 1992).
[2]SS=snag soft, SM=snag mesquite, YM=sycamore medium/20-40ft, ST=snag top, SR=snag shrub, SH=snag hard, CL=cottonwood large/60-90ft, FL=farm land, YL=sycamore large/40-60ft+.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]RI=riffle, RB=river bend, RU=run, U=unknown.
[5]MB=mesquite bosque, CL=Cliff, FL=farmland, TX=tamarisk thicket.

Table 46 (continued).

Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]	Land Type[5]
10.6	SH	Right	No	1	RI	MB
11.0	YL	Left	Partial	8	RB	MB
12.2a	ST	Right	No	1	RU	FL
12.2b	SH	Right	No	1	RU	FL
12.4a	ST	Right	Partial	1	RU	MB
12.4b	SH	Right	No	1	RU	MB
12.8	SH	Unknown	No	U	U	TX

[1]River kilometer (Hunt and others 1992).
[2]SS=snag soft, SM=snag mesquite, YM=sycamore medium/20-40ft, ST=snag top, SR=snag shrub, SH=snag hard, CL=cottonwood large/60-90ft, FL=farm land, YL=sycamore large/40-60ft+.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]RI=riffle, RB=river bend, RU=run, U=unknown.
[5]MB=mesquite bosque, CL=Cliff, FL=farmland, TX=tamarisk thicket.

Table 47. Bald eagle habitat use at the Sycamore BA, Arizona, 2003.

River km	PR[1]	PP	PH	ET	CL	PV	PK	CO	Total	Percent
7.5	86	--	--	--	--	--	--	--	86	0.5
8.4	44	--	37	--	24	--	--	--	105	0.6
8.5	20	--	--	--	--	--	--	--	20	0.1
9.1	286	16	1	--	--	--	--	--	303	1.6
9.2	90	2	--	--	--	--	--	--	92	0.5
9.3	233	9	103	--	--	--	7	--	352	1.9
9.4	2	--	--	--	--	33	--	--	35	0.2
9.7	71	--	--	--	--	--	4	--	75	0.4
9.9	414	--	12	--	--	7	33	--	466	2.5
10.0 (nest)	9,634	55	22	--	102	26	--	--	9,839	52.1
10.1	347	17	--	--	--	14	--	--	378	2.0
10.2	1,189	109	--	107	30	38	98	2	1,573	8.3
10.3	2,132	8	30	--	--	--	--	--	2,170	11.5
10.4	42	--	--	--	--	--	--	--	42	0.2
10.5	54	--	--	--	--	--	--	--	54	0.3
10.6	110	5	90	--	--	--	--	--	205	1.1
11.0	292	--	119	--	--	--	--	--	411	2.2
12.2	1,280	--	133	--	--	--	--	--	1,413	7.5
12.4	1,201	--	28	--	43	3	--	--	1,275	6.7
12.8	3	--	--	--	-	--	--	--	3	0.0
Total	17,530	221	575	107	199	121	142	2	18,897	
Percent	92.8	1.2	3.0	0.6	1.1	0.6	0.8	0.0		

[1]PR=perched roosting, PP=perched preening, PH=perched hunting/watching, ET=eating on tree, CL=perched close to mate, PV=perched vocalizing, PK=perched with prey, CO=copulation.

APPENDIX J: TONTO BREEDING AREA SUMMARY

Table 48. Observed human activity and bald eagle behavior, Tonto BA, Arizona, 2003.					
Human Activity	N[1]	W	R	Total	Percent
Gunshots	12	16	1	29	59.2
Sonic Boom	--	6	--	6	12.2
OHV	--	4	1	5	10.2
Helicopter	--	3	1	4	8.2
Small Plane	--	2	1	3	6.1
Sirens	--	1	1	2	4.1
Total	12	32	5	49	
Percent	24.5	65.3	10.2		

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

Table 49. Bald eagle habitat analysis at the Tonto BA, Arizona, 2003.					
Perch Location[1]	Perch Type[2]	Side	Shade	Distance to H_2O[3]	H_2O Type[4]
16.9	NE	Left	No	8	DR
16.7	CM	Right	No	4	DR
16.6	SH	Right	No	3	RB
18	CL	Left	No	4	RB

[1]River kilometer (Hunt and others 1992).
[2]NE=nest, NT=nest tree, CM=cottonwood medium/30-60ft, SH=snag hard, CL=cottonwood large/60ft+.
[3]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[4]DR=dry riverbed, RB=river bend.

Table 50. Bald eagle habitat use at the Tonto BA, Arizona, 2003.									
River km	NI/NB[1]	CL	PV	OV	PR	PH	PP	Total	Percent
16.9	12,310	12	45	--	238	661	394	13,660	58.3
16.7	--	--	--	--	--	7	112	119	0.5
16.6	--	--	--	--	--	124	6	130	0.6
18	--	58	--	--	--	--	--	58	0.2
OV	--	--	--	9,464	--	--	--	9,464	40.4
Total	12,310	70	45	9,464	238	792	512	23,431	
Percent	52.5	0.3	0.2	40.4	1.0	3.4	2.2		

[1]NI/NB=nest incubating/brooding, CL=perched close to mate, PV=perched vocalization, OV=out of view, PR=perched restless, PH=perched hunting, PP=perched preening.

APPENDIX K: TOWER BREEDING AREA SUMMARY

Table 51. Observed human activity and bald eagle behavior, Tower BA, Arizona, 2003.							
Human Activity	N[1]	W	R	F	X	Total	Percent
Small Plane	33	51	--	2	69	155	51.8
Train	13	31	--	2	14	60	20.1
Train Maint.	14	15	2[2]	--	6	37	12.4
Sightseer	1	--	--	--	10	11	3.7
Helicopter	--	1	1	--	6	8	2.7
Hiker	5	--	--	--	--	5	1.7
Vehicle	1	--	--	2	2	5	1.7
Fisherman	2	2	1	--	--	5	1.7
Gunshots	--	--	--	--	3	3	1.0
Agency Worker	2	--	--	--	1	3	1.0
Ultralight	--	1	--	--	1	2	0.7
Jet	--	--	--	--	2	2	0.7
Cycle	--	--	--	--	1	1	0.3
Camper	--	1	--	--	--	1	0.3
OHV	--	--	1	--	--	1	0.3
Total	71	102	5	6	115	299	

[1]Bald eagle behavior, N=none, W=watched, R=restless, F=flushed, X=various reasons.

Table 52. Observed forage event and success, Tower BA, Arizona, 2003								
Sex	Fish		Mammals		Carrion		Total	
	E[1]	S-U[2]	E	S-U	E	S-U	E	S-U
Male	4	3-1	1	1-0	1	1-0	6	5-1
Female	7	6-1	--	--	1	1-0	8	7-1
Total	11	9-2	1	1-0	2	2-0	14	12-2

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

Table 53. Observed prey types delivered to the nest, Tower BA, Arizona, 2003.						
Sex	Fish	Mammals	Birds	Unknown	Total	Percent
Male	20	4	--	2	26	42.6
Female	17	10	--	4	31	50.8
Unknown	3	--	1	--	4	6.6
Total	40	14	1	6	61	
Percent	65.6	23.0	1.6	9.8		

Table 54. Observed prey items delivered to the nest, Tower BA, Arizona, 2003							
Sex	Fish				Mammals	Total	Percent
	SS[1]	CC	SB	C	RS		
Male	4	2	1	1	3	11	52.4
Female	3	3	--	--	3	9	42.9
Unknown	--	--	--	1	--	1	4.8
Total	7	5	1	2	6	21	

[1]SS=sucker spp., CC=channel catfish, SB=smallmouth bass, C= common carp, RS=rabbit species.

Table 55. Bald eagle habitat analysis at the Tower BA, Arizona, 2003.

Perch Location[1]	Perch Type[2]	Side[3]	Shade[4]	Distance to H_2O[5]	H_2O Type[6]	Time[7]	Percent
234.0	RR	R	U	3	RI	--	--
235.7	U	R	U	3	U	--	--
240.2	JS	R	N	4	RU	36	0.3
242.0	BO	R	Y	1	RU	10	0.1
242.2	JS	R	U	2	RI	--	--
247.0	JS	R	Y	2	RU	301	2.4
247.0	BO	R	U	2	RI	128	1.0
247.0	BO	L	U	3	RI	35	0.3
247.1	PP	L	N	3	RU	114	0.9
247.1	JS	R	P	3	RI	78	0.6
247.1	CL	L	P	2	RU	69	0.6
247.2	JS	R	P	2	RU	13	0.1
247.4	CL	R	P	2	RU	10	0.1
247.5	JN	R	N	2	RU	38	0.3
247.8	JS	R	P	2	RU	4	0.0
247.8	CL	R	P	2	RU	10	0.1
247.9	CL	R	Y	3	RI	109	0.9
248.0	BO	R	P	2	RU	8	0.1
248.0	CL	R	Y	2	RU	239	1.9
248.0	JN	R	Y	2	RU	90	0.7
248.0	JS	R	N	2	RU	145	1.2
248.1	JS	R	N	1	PO	26	0.2
248.1	CL	R	Y	2	RU	94	0.8
248.1	JN	R	N	6	RU	783	6.3
248.1	JS	R	N	1	RU	35	0.3
248.1	SO	R	P	1	RU	24	0.2
248.1	CL	L	N	2	RU	20	0.2
248.2	CL	L	Y	2	RU	91	0.7
248.2	JN	R	P	2	RU	377	3.0
248.2	SO	R	Y	1	RU	43	0.3
248.2	CL	R	N	2	RU	331	2.7
248.2	JS	R	N	2	RU	1,933	15.6
248.3	BO	R	N	1	RU	16	0.1
248.3	JN	R	Y	3	RU	2,983	24.1
248.3	SO	R	N	1	RU	47	0.4
248.3	JS	R	N	3	RU	1,232	10.0
248.3	CL	L	P	2	RU	135	1.1
248.3	SO	L	P	1	RU	12	0.1
248.3	BO	L	N	1	RU	155	1.3
248.3	CL	R	N	3	RU	381	3.1
248.3	CL	R	N	2	RU	162	1.3
248.4	CL	R	N	2	RU	213	1.7
248.4	BO	L	P	2	RU	50	0.4
248.4	JS	R	N	3	RU	35	0.3
248.4	JN	R	N	2	RU	261	2.1
248.4	PP	R	N	3	RU	23	0.2

[1]River kilometer (Hunt and others 1992).
[2]PP=power pole, JN=juniper tree, CT=cliff top, JS=Juniper snag, SO=shore, CL-cliff ledge, SY=sycamore tree.
[3]R=right, L=left, U=unknown.
[4]Y=yes, N=No, P=partial, U=unknown.
[5]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[6]RI=riffle, RU=Run, PO=Pool.
[7]Time in minutes.

Table 55 (continued).

Perch Location[1]	Perch Type[2]	Side[3]	Shade[4]	Distance to H_2O[5]	H_2O Type[6]	Time[7]	Percent
248.5	CL	L	Y	2	RU	2	0.0
248.5	BO	R	Y	2	RU	26	0.2
248.5	SO	U	P	1	RU	65	0.5
248.5	JS	R	N	2	RU	3	0.0
248.5	CL	R	N	2	RU	136	1.1
248.6	JS	R	N	2	RU	156	1.3
248.6	CT	R	P	2	RU	450	3.6
248.6	BO	R	P	2	RU	4	0.0
248.6	JN	R	P	2	RU	10	0.1
248.7	CL	R	P	1	RU	10	0.1
248.8	SY	R	P	1	RU	39	0.3
249.0	JS	R	N	3	RU	15	0.1
249.7	BO	R	N	8	RU	5	0.0
250.0	BO	R	N	8	RU	216	1.7
250.0	CL	L	P	2	RU	72	0.6
250.5	BO	L	N	6	RU	40	0.3
250.5	CT	R	N	3	RU	45	0.4
250.5	CT	L	N	6	RU	117	0.9
250.6	JN	L	U	U	U	67	0.5
252.3	SY	L	U	U	U	--	--
255.7	SY	R	U	U	U	--	--
256.4	SY	U	U	U	U	--	--
270.8	BO	R	U	U	U	--	--
					Total	12377	

[1]River kilometer.
[2]PP=power pole, JN=juniper tree, CT=cliff top, JS=Juniper snag, SO=shore, CL-cliff ledge, SY=sycamore tree.
[3]R=right, L=left, U=unknown.
[4]Y=yes, N=No, P=partial, U=unknown.
[5]1=0-25m, 2=26-50m, 3=51-75m, 4=76-100m, 5=101-200m, 6=201-300m, 7=301-400m, 8=>400.
[6]RI=riffle, RU=Run, PO=Pool.
[7]Time observed in minutes.