Conservation Assessment And Strategy For The Bald Eagle In Arizona

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Nongame and Endangered Wildlife Program
Arizona Game and Fish Department
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Photo by B. Taubert

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MEMORANDUM OF UNDERSTANDING

for

CONSERVATION OF THE BALD EAGLE IN ARIZONA

This Memorandum of Understanding (hereafter MOU) is made and entered into by and among the Arizona Game and Fish Department, Arizona Public Service, Bureau of Land Management (Arizona), Bureau of Reclamation (Lower Colorado Region), 56th Fighter Wing at Luke Air Force Base (Department of Defense), Maricopa County, National Park Service, Salt River Project, U.S. Army Corps of Engineers (South Pacific Division), U.S. Fish and Wildlife Service (Southwest Region), U.S. Forest Service (Southwestern Region), and various other agencies for the Conservation of the Bald Eagle in Arizona. Collectively, the parties to this MOU will be referred to as the Cooperators. All references in this MOU to the bald eagle are to the wintering and breeding populations of the bald eagle in Arizona (*Haliaeetus leucocephalus*).

AUTHORITIES

Arizona Game and Fish Department is authorized pursuant to A.R.S. 17-231.B.7 to enter into this MOU. The State of Arizona Required Provisions (Appendix A) is hereby made part of this agreement.

PURPOSE

The purpose of this MOU is to establish a conservation partnership that maintains, and where feasible and appropriate, enhances the breeding bald eagle population in Arizona after delisting. The baseline for measuring the adequacy of this conservation effort shall be the bald eagle's status in Arizona in the year they are removed from Federal Listing under the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.).

OBJECTIVES

This MOU has the following objectives:

1. Implement the "Conservation Assessment and Strategy for the Bald Eagle in Arizona" (hereafter CAS, see Appendix B).
2. Continue long-standing relationships and participation among the Cooperators as equal partners committed to conservation of the breeding bald eagle population in Arizona.
3. Maintain the Southwestern Bald Eagle Management Committee (SWBEMC), composed of signatories to this MOU, as the primary forum in which this conservation effort will be administered and monitored.
4. Implement any monitoring program required by Section 4(g) of the Endangered Species Act, in the event the bald eagle in Arizona is federally delisted.

WITNESSETH:

WHEREAS, (a) the bald eagles of the lower 48 states are now a Threatened Species (60 FR 3599, July 12, 1995); (b) nearly all breeding bald eagles in the American Southwest occur in Arizona; (c) the breeding population in Arizona now exceeds established recovery goals, yet remains vulnerable

due to factors described in the CAS; and (d) an aggressive management program carried out by land and wildlife management agencies, and their public and private partners, is one reason for bald eagle recovery in Arizona, and remains an effective means of continuing to conserve the breeding population in Arizona;

WHEREAS, the Arizona Game and Fish Department, a State wildlife management agency, has determined that support and implementation of the CAS is consistent with its responsibilities under Arizona Revised Statutes Title 17;

WHEREAS, Arizona Public Service has determined that support and implementation of the CAS is consistent with its efforts to help conserve wildlife resources in the State of Arizona. Arizona Public Service's participation in this MOU shall be administered by its Forestry& Special Programs Department;

WHEREAS, the Bureau of Land Management, a Federal land management agency, has the authority under the Federal Land Policy and Management Act of 1976, 43 U.S.C. 1701 et. seq.; the Sikes Act, 16 U.S.C. 670a et seq.; and has found that conservation of the Bald Eagle would be consistent with its special status species policies and land use plans, and under obligations under Section 7(a)(1) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.);

WHEREAS, the Bureau of Reclamation, a Federal agency, has determined that support and implementation of the Conservation Assessment and Strategy is consistent with its obligations under Section 7(a)(1) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.), to use its authorities in furtherance of the purposes of the Act by carrying out programs for conservation of threatened and endangered species;

WHEREAS, the 56th Fighter Wing at Luke Air Force Base, a component within the Department of Defense, a Federal agency, has determined that support and implementation of the CAS is consistent with its obligations under Section 7(a)(l) of the Endangered Species Act of 1973, as amended (16 U.S.C 1531 et seq.), to use its authorities in furtherance of the purposes of the Act by carrying out programs for conservation of threatened and endangered species;

WHEREAS, Maricopa County is authorized, pursuant to A.R.S. §11-933 and A.R.S. §11-952, to enter into this Memorandum of Understanding (hereafter MOU), entitled *MEMORANDUM OF UNDERSTANDING for CONSERVATION OF THE BALD EAGLE IN ARIZONA*, by and among the Arizona Game and Fish Department and various other agencies for the Conservation of the Bald Eagle in Arizona. Maricopa County's participation in this MOU shall be administered by its Parks and Recreation Department.

WHEREAS, the National Park Service, a Federal land management agency, has the responsibility to manage lands and resources for the benefit of current and future generations of visitors to lands it owns and/or manages and administers, and has determined that implementation of the CAS is consistent with its obligations under Section 7 (a)(1) of the Endangered Species Act;

WHEREAS, Salt River Project has determined that support and implementation of the CAS is consistent with its efforts to help conserve wildlife resources in the State of Arizona;

WHEREAS, the U.S. Army Corps of Engineer, a Federal agency, has found that the conservation of Federally and State-listed threatened and endangered species on existing Corps project lands is consistent with environmental stewardship and natural resource management guidance for Corps of Engineers Civil Works water resource projects; and has found that conservation of the Bald Eagle and implementation of the BECAS would be consistent with Section 2 of the Conservation of Forest Land Act of 1960 and Section 7(a)(1) of the Endangered Species Act of 1973, as amended.

WHEREAS, the U.S. Forest Service, a Federal land management agency, has the responsibility to conserve fish, wildlife, and plants, and manage habitats and activities for the conservation of sensitive species of wildlife to promote maintenance of viable populations and biological diversity on the National Forests, and has determined that support and implementation of the CAS is consistent with its obligations under the National Forest Management Act (36 CFR 219.26 and 219.19).

NOW THEREFORE, in consideration of the above premises, the cooperators enter into this MOU as full and equal partners to accomplish its purpose and objectives.

ALL COOPERATORS AGREE TO:

1. Further develop and implement the objectives, strategies, tasks, and recommendations identified in the CAS.
2. Based upon availability of resources and funding, provide bald eagle conservation program personnel with facilities, equipment, logistical support, and access to lands under their control.
3. Designate a representative to the SWBEMC.
4. Participate regularly in SWBEMC meetings to enhance communication and cooperation, and to help develop and implement management guidelines and procedures consistent with those identified in the CAS.
5. Contribute to the development and distribution of public information and educational materials relating to the CAS and the programs and management practices identified therein.
6. Provide ongoing review and feedback on all activities proposed, planned, or executed pursuant to this MOU.
7. Keep local governments, municipalities, the conservation community, citizens, and other interested and affected parties informed on the status of the bald eagle conservation program, and solicit their input on issues and actions of concern or interest to them.
8. Develop voluntary opportunities and incentives for local communities and private landowners to participate in bald eagle conservation activities, including ways that might provide local economic benefits.

FURTHER, THE ARIZONA GAME AND FISH DEPARTMENT AGREES TO:

1. Implement, on a daily basis, the administrative and field actions necessary to support this conservation effort.
2. Chair the SWBEMC and provide to its members the information, reports, and recommendations necessary for them to cooperatively determine and implement the best management practices for the conservation of breeding bald eagles in Arizona.

IT IS MUTUALLY AGREED AND UNDERSTOOD BY AND AMONG THE COOPERATORS THAT:

1. Sufficiency of Resources. The terms of this Agreement are contingent upon sufficient resources being available to the Signatories for the performance of this Agreement. The Lead Agencies will agree to a work plan each year, develop budgets, and, as funding is available from all sources, assess priorities and apply the available funding to those priorities. The decision as to whether sufficient resources are available to each Signatory shall be determined by each Signatory, shall be accepted by all other Signatories, and shall be final.

2. Non-Fund Obligating Document. Nothing in this Agreement shall obligate the Signatories to obligate or transfer any funds, expend appropriations, or to enter into any contract or other obligations. Specific work projects or activities that involve transfer of funds, services, or property among the Signatories may require execution of separate agreements or contracts and be contingent upon the availability of appropriated or other funds. Appropriate statutory authority must independently authorize such activities; this Agreement does not provide such authority. Negotiation, execution, and administration of each such agreement must comply with all applicable statutes and regulations.

3. Establishment of Responsibility. This Agreement is non-binding and establishes no duty or obligation on any party; this Agreement is not intended to, and does not create or establish, any substantive or procedural right, benefit, trust responsibility, claim, cause of action enforceable at law, or equity in any administrative or judicial proceeding by a party or non-party against any party or against any employee, officer, agent, or representative of any party.

4. Responsibilities of Parties. The Signatories to this Agreement and their respective agencies and offices will handle their own activities and use their own resources, including the expenditure of their own funds, in pursuing the objectives of this Agreement. Each party will carry out its separate activities in a coordinated and mutually beneficial manner. Employee assignment to the Project is subject to approval by the employing agency.

5. Freedom of Information Act (FOIA). Any information provided to the Federal Agencies under this instrument may be subject to release under the Freedom of Information Act (5 U.S.C. 552). However, nothing in this Agreement shall be construed to affect the applicability of the exemptions set forth in 5 U.S.C. Section 552 (b).

6. Participation in Similar Activities. This instrument in no way restricts the Signatories from participating in similar activities with other public or private agencies, organizations, and individuals. This Agreement does not modify or supersede other existing agreements between or among any of the Signatories.

7. Commencement/Expiration/Withdrawal. This Agreement takes effect upon the date of the last signature of approval and shall remain in effect for no more than five years from the date of execution, unless renewed, extended, or canceled. This Agreement may be renewed, extended, or amended upon written request by any Signatory, and subsequent written concurrence of the other Signatories. All such actions shall be discussed in a meeting of the SWBEMC. Any Signatory may withdraw from this Agreement with a 60-day written notice to the other Signatories, through the SWBEMC Chair. Withdrawal by one party shall not affect the continued cooperation of the remaining parties under this Agreement. Further, in

accordance with the laws of the State of Arizona, all parties are hereby put on notice that State of Arizona participation this Agreement is subject to cancellation pursuant to A.R.S. § 38-511.

8. Additional Signatories. This Agreement may be amended at any time to include additional Signatories. An entity requesting inclusion as a Signatory shall submit its request to the SWBEMC Chair in the form of a document defining its proposed responsibilities pursuant to this Agreement. Inclusion of additional Cooperators shall be approved by majority voice concurrence of the current signatories present in a SWBEMC meeting. On approval, the new Cooperator must comply with all aspects of the Agreement as it was structured at the time of approval of its request for Cooperator status.

9. Conflict Resolution. Conflicts between or among the Signatories concerning this Agreement that cannot be resolved at the lowest possible level shall be referred to the next higher level in the respective cooperator's organization, et seq., as necessary, for resolution.

IN WITNESS WHEREOF:

The cooperators hereto have executed this MOU as of the last written date below:

Michael D. Snyder
Regional Director, Intermountain Region 12/14/06

Paul Atwell
Director of Operations and Maintenance
Arizona Public Service 1/12/07

Carol Lynn Erwin, Area Manager
Phoenix Area Office
Bureau of Reclamation, Lower Colorado Region 09/15/06

John R. McMahon
Colonel, U. S. Army
Commanding 09/21/06

Elaine Y. Zielinski 8-29-06
Elaine Y. Zielinski Date
Bureau Land Management, Arizona

for HARV FORSGREN
Regional Forester
10/04/06

Richard Hayslip
09/12/06

Dr. Benjamin Tuggle
Regional Director, Southwest Region
U.S. Fish and Wildlife Service 01/22/07

Noel T. Jones
Brigadier General, USAF
Commander, 56th Fighter Wing
Luke Air Force Base, Arizona 01/05/07

Duane L. Shroufe, Director
Arizona Game and Fish Department 1/24/07

Maricopa County Board of Supervisors

Chairman MAR 0 9 2007 Date

Attest:

Clerk of the Board 022107 MAR 0 9 2007 Date

Approved as to Form:

Maricopa County Attorney 2/5/07 Date

APPENDIX A: STATE OF ARIZONA REQUIRED PROVISIONS

1. Civil Rights and Non-discrimination. In carrying out the terms of this Agreement, the Parties agree to comply with Chapter 9, Title 41, Arizona Revised Statutes, Arizona Executive Order 99-4 prohibiting discrimination in employment, the provisions of which are incorporated herein by reference.

2. Audit. Pursuant to A.R.S. § 35-214, 35-215, and 41-2548 all books, accounts, reports, files, electronic data, and other records relating to this Agreement shall be subject at all reasonable times to inspection and audit by the State of Arizona for five (5) years after completion of this Agreement.

3. Arbitration. The parties agree to engage in any alternative dispute resolution procedures authorized by their statutes, regulations and court rules, including, but not limited to, 5 U.S.C. § 575 and A.R.S. § 12-1518(B) and 12-133.

4. Termination for Conflict of Interest. This Agreement is subject to termination pursuant to A.R.S. § 38-511.

5. Termination for Non-Availability of Funds. Every obligation of the Parties under this Agreement is conditioned upon the availability of funds appropriated or allocated for the payment of such obligation. If funds for the continuance of this Agreement are not allocated or are not available, this Agreement shall terminate automatically on the date of expiration of funding. In the event of such termination, the Parties shall incur no further obligation or liability under this Agreement other than for payment of services rendered prior to the expiration of funding.

6. Illegal Immigration. The Parties agree to comply with Executive Order 2005-30, "Ensuring Compliance with Federal Immigration Laws by State Employers and Contractors," the provisions of which are hereby incorporated by reference.

Recommended Citation

Driscoll, J.T., K.V. Jacobson, G.L. Beatty, J.S. Canaca, and J.G. Koloszar. 2006. Conservation assessment and strategy for the bald eagle in Arizona. Nongame and Endangered Wildlife Program Technical Report 173. Arizona Game and Fish Department, Phoenix, Arizona.

Acknowledgments

We thank the following agencies and many individuals for assistance in completing this document: Arizona Public Service, Arizona State Parks, Fort McDowell Yavapai Nation, Luke Air Force Base, Maricopa County Parks and Recreation Department, National Park Service, Salt River Pima-Maricopa Indian Community, Salt River Project, San Carlos Apache Tribe, U.S. Air Combat Command (GeoMarine Incorporated), U.S. Army Corps of Engineers, U.S. Bureau of Indian Affairs, U.S. Bureau of Land Management (Arizona), U.S. Bureau of Reclamation (Lower Colorado Region), U.S. Forest Service (Southwestern Region), U.S. Fish and Wildlife Service (Region 2), and the White Mountain Apache Tribe. Finally, we appreciate all the comments and suggestions we received in the drafting; they helped make a more complete and comprehensive document.

Project Funding

Funding for this project was provided by: voluntary contributions to Arizona's Nongame Wildlife Checkoff Fund; the Arizona Game and Fish Department's Heritage Fund; Project W95, under State Trust Fund Grants for Wildlife Restoration (Pittman-Robertson Act); Arizona Public Service; Fort McDowell Yavapai Nation; Luke Air Force Base; Salt River Project; San Carlos Apache Tribe; U.S. Air Combat Command (GeoMarine Incorporated); U.S. Army Corps of Engineers; U.S. Bureau of Indian Affairs; U.S. Bureau of Land Management (Arizona); U.S. Bureau of Reclamation (Lower Colorado Region); U.S. Forest Service (Southwestern Region); and the U.S. Fish and Wildlife Service (Region 2) under Section 6, Safe Harbor Grants, and State Wildlife Grants.

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Kenneth V. Jacobson, Arizona Game and Fish Department
Gregory L. Beatty, U.S. Fish and Wildlife Service
Jorge S. Canaca, Biologist
John G. Koloszar, Biologist

INTRODUCTION

The U.S. Fish and Wildlife Service (USFWS) classified the bald eagle (*Haliaeetus leucocephalus*) in 1978 as endangered in 43 states (including Arizona), threatened in 5 others, and it was not listed in Alaska and Hawaii. The Southwestern Region's Recovery Plan guided bald eagle management in Arizona until recovery goals were met (USFWS 1982).

The impetus for creating this Conservation Assessment and Strategy is to describe the current threats facing bald eagles in Arizona and identify the management necessary to maintain their distribution and abundance post-delisting. Herein, we detail the history of, and outline the foundation for, future bald eagle management in Arizona by emphasizing demographics, habitat, recreation, and funding. We also enlist the support of the Southwestern Bald Eagle Management Committee (SWBEMC), who will ensure the awareness, attention, and common sense of land and wildlife managers remains focused on bald eagles (Fig. 1). The key to the past success of bald eagle management in Arizona has been cooperation among agencies and broad public support. This will remain through SWBEMC oversight and incorporation of these guidelines into their respective agency, tribe, or group's management plans.

Figure 1. The Southwestern Bald Eagle Management Committee. (Photo by unknown photographer)

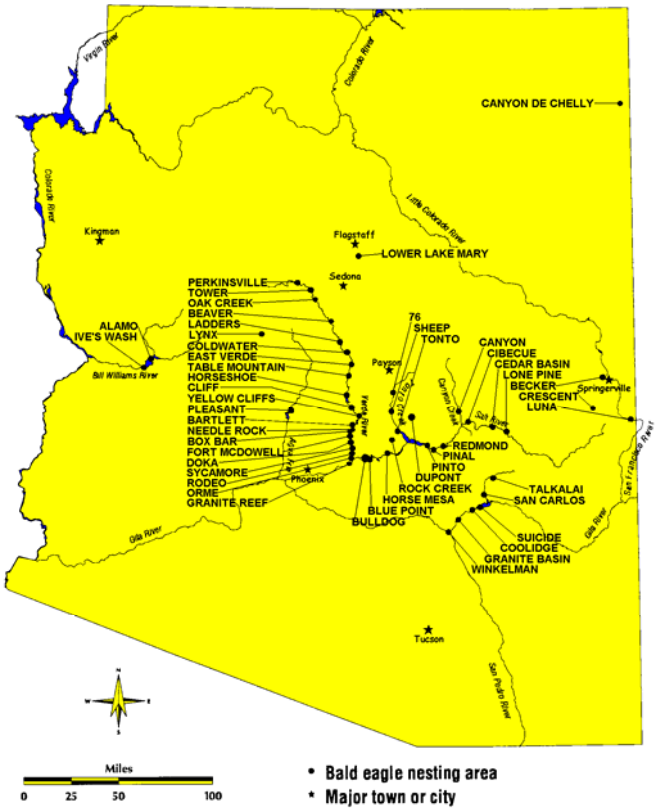
Funding to implement all of the described management strategies will be an obstacle post-delisting. For 28 years, the Endangered Species Act (ESA) dictated that federal and state agency processes intervene for the species' best interest. The subsequent funding of projects through ESA section 7 consultations, agreements, and donations of interested parties have provided the means to study and manage the bald eagle in Arizona. Once delisted, management will move forward adaptively and concentrate on those strategies with the greatest influence over the species.

Federal, state, county, and Native American ownership is another part of the solution. Bald eagles nest on public and Native American land; therefore, federal, state, county agencies, and Native American Tribes are in the best position to implement this Assessment and Strategy. Presently (2006), Arizona has 50 bald eagle breeding areas (BAs) (Fig. 2). Most are in central Arizona, along the Gila, Salt, and Verde rivers. BAs under single agency jurisdiction are the U.S. Forest Service (USFS) (n=28), Fort McDowell Yavapai Nation (FMYN) (n=4), San Carlos Apache Tribe (SCAT) (n=3), Bureau of Land Management (BLM) (n=2), Arizona Game and Fish Department (AGFD) (n=1), Maricopa County Parks and Recreation Department (MCPRD) (n=1), White Mountain Apache Tribe (WMAT) (n=1), and private landowners (n=2). At the Cedar Basin and Lone Pine (SCAT/WMAT), Coolidge and Granite Basin (SCAT/BLM), Cibecue (WMAT/USFS), Orme and Granite Reef (Salt River Pima-Maricopa Indian Community

[SRPMIC]/USFS), and Canyon de Chelly BAs (Navajo Nation/National Park Service[NPS]), management responsibility is shared. While these agencies have land management responsibility for specific BAs, other land and wildlife agencies of the SWBEMC (Arizona Public Service, Arizona State Parks, Bureau of Indian Affairs, The Hopi Tribe. Luke Air Force Base [LAFB], Salt River Project [SRP], Tonto Apache Tribe, U.S. Army Corps of Engineers, U.S. Air Combat Command [GeoMarine Inc.], USFWS) are responsible for the bald eagle in Arizona and the habitat it occupies.

The USFWS acknowledged the need to continue the Arizona Bald Eagle Nestwatch Program (ABENWP) through this Conservation Agreement in the proposed delisting rule (USFWS 1999). In addition to the ABENWP, other management programs/projects that aided the recovery of the bald eagle in Arizona include: Arizona Bald Eagle Nest Survey, Banding and Visual Identification Project, seasonal BA closures, Occupancy and Reproduction Assessment flights, and Organochlorine and Heavy Metal Analysis.

Through these projects we have identified existing and potential breeding habitat, and the challenges they face. Some strategies we mention in this document will continue after delisting to address persistent threats. These threats include: increasing recreation pressures, changes in habitat quality and prey base, and development in or near the best habitat. These and other factors combined with natural mortality agents such as competition, heat stress (affecting nestlings), parasites, and predation warrant continued attention.



The intent of this Conservation Assessment and Strategy is to guide management of the bald eagle in Arizona. The descriptive conservation assessment addresses past, present, and future management issues. The conservation strategy provides guidance and outlines management to reduce immediate threats, identify and protect habitat, and to carry out other conservation actions. Together, with a Memorandum of Understanding among the members of the SWBEMC, they form a Conservation Agreement that, when implemented, will sustain a thriving bald eagle population in Arizona.

Figure 2. Bald eagle BAs in Arizona in 2006.

CONSERVATION ASSESSMENT

DESCRIPTION

Stalmaster (1987), Palmer (1988), Johnsgard (1990), and Wheeler and Clark (1996) offer the best description of bald eagles. They are birds of prey, members of the Order Falconiformes, and Family Accipitridae. Almost exclusively a North American species, they are most similar to Stellar's sea (*H. pelagicus*) and white-tailed (*H. albicilla*) eagles found on the Aleutian Islands.

Adults exhibit morphological characteristics of reverse sexual dimorphism (females larger than males) and Bergmann's Rule (animal size decreases with decreasing latitude). Their length varies from 28 to 38 inches, wingspread from 66 to 96 inches, and weight from 6.5 to 14 pounds. Hunt et al. (1992) found adult males and females in Arizona were significantly smaller (81%, n=21; 61%, n=14 respectively) than bald eagles from Alaska, California, and Wyoming (typical Bergmann's Rule).

A bald eagle's plumage is quite variable. A juvenile's flight feathers are black, while the outer-wing coverts, breast, leg, and head feathers tend to be brown. Under-wing coverts, secondary flight feathers, wing pits, and tail are brown and mottled with white. After the first molt, belly feathers lighten and can appear completely white. In the third year, the brown eye and gray beak turn to cream and yellow, respectively. The crown of the head lightens, giving the bird a dark eye stripe (Fig. 3). In a near-adult plumage, the eye stripe is retained, but the rest of the head turns white, the eye cream, beak yellow, and the tail white except for brown mottling near the base and tip. The wings, breast, and belly become brown. The definitive adult plumage is well known with a completely white head and tail, cream eye, and yellow beak. The body is brown, talons black, and feet and legs a featherless yellow. Bald eagles achieve their definitive plumage at age 5; however, we have documented some 7-year-old bald eagles retaining remnants of the eye stripe and brown mottling on the crown of the head and tail (Allison et al. in prep.).

Figure 3. Subadult bald eagle (Photo by D. Driscoll).

LIFE HISTORY

Grubb (1986a), USFWS (1982), Hunt et al. (1992), Hunt (1998), Palmer (1988), and Stalmaster (1987) all describe the bald eagle's natural history. The most comprehensive are *The Ecology of Bald Eagles in Arizona* (Hunt et al. 1992), and *The Bald Eagle* (Stalmaster 1987).

Bald eagles typically nest within 1 mile of water along coasts, inland lakes, and rivers. The largest breeding populations occur in Alaska and Canada with approximately 48,000 individuals (Palmer 1988). In the lower 48 states, 791 pairs in 1974 have increased to more than 7,066 pairs in 2005 (USFWS 1999, 2006).

Mearns (1890) recorded Arizona's first breeding bald eagles at Stoneman Lake, and construction crews building Stewart Mountain and Bartlett dams in the 1930s reported the first desert breeding bald eagles (Phillips et al. 1964). Since, reports of breeding remained sparse until the 1970s when the species' declining status spurred surveys to document their range (e.g. Jacobson et al. 2005).

The majority of bald eagle BAs are in central Arizona between elevations of 329 m (1080 ft) and below 1341 m (4400 ft) within the riparian areas of the Sonoran Riparian Scrubland and Sonoran Interior Strands as described in Brown (1994) (Fig. 4). Representative riparian vegetation includes Fremont cottonwood (*Populus fremontii*), Goodding willow (*Salix gooddingii*), Arizona sycamore (*Platanus wrightii*), and introduced 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 (*Prosopsis* spp.), ironwood (*Olyneya tesota*), saguaro (*Carnegia gigantea*), teddy bear cholla (*Opuntia bigelovii*), juniper (*Juniperus* spp.), and pinyon pine (*Pinus edulis*).

Figure 4. Bald eagle BA on the lower Salt River, Maricopa County, Arizona (Photo by K. Jacobson).

Seven BAs are located outside of Sonoran Riparian Scrubland areas (Brown 1994). The Becker BA is within the Plains and Great Basin Grassland biome where they nest in an isolated patch of Fremont cottonwoods. Crescent, Dupont, Lower Lake Mary, Luna, Lynx, and Rock Creek 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 and Madrean Montane Conifer Forest surrounded by Interior Chaparral, consisting mainly of pinyon–juniper woodland, shrub live oak (*Quercus turbinalla*), and pointed (*Arctostaphylos pungens*) and pringle manzanita (*A. pringlei*).

Except in 2 BAs (Dupont and Rock Creek BAs), bald eagles in Arizona nest within 1 mile of water. BAs are located along: Canyon, Cibecue, Oak, Pinal, Tangle, Tonto, Tsaile, and Walnut creeks; Alamo, Apache, Bartlett, Becker, Crescent, Horseshoe, Lower Lake Mary, Luna, Lynx, Pleasant, Roosevelt, Saguaro, San Carlos, and Talkalai 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 common on cliff ledges, rock pinnacles, and in cottonwood trees, however they have been found in junipers, pinyon and ponderosa pines, sycamores, willows, snags, and 1 artificial structure (Horseshoe BA 1980) (Grubb 1980).

Breeding behavior begins early in Arizona (November) compared to northern counterparts but similar to other states of this latitude. Whether this adjustment is to avoid the extreme heat of summer, or timed with fish spawns is of speculation. One to 3 eggs, laid from December to March, take 35 days to hatch. Both adults care for the young until the nestlings fledge at approximately 12 weeks in May and June. The fledglings are almost completely dependent upon

the adults for food until they migrate north about 45 days after fledging (Hunt et al. 1992, K. Jacobson and H. Messing unpublished data).

Many factors can influence productivity rates. Recent Arizona productivity is 0.78 young/occupied BA, which is within the range of many other states and literature (Stalmaster 1980). This difference between productivity in Arizona from 1975-1985 and 1987-2005 could be attributed to a difference in monitoring protocols (See Current Management Efforts, Occupancy and Reproductive Assessment Flights) or an increasing density of breeding pairs (Hansen 1987). From 1975 to 1984 with fewer than known 20 BAs, average productivity was 0.95 young/occupied BA (SD=0.29); from 1987 to 2005, the average has been 0.78 (SD=0.18) (Table 1, Fig. 5). The time separation denotes the difference of before and after the use of helicopters for surveys (Appendix A).

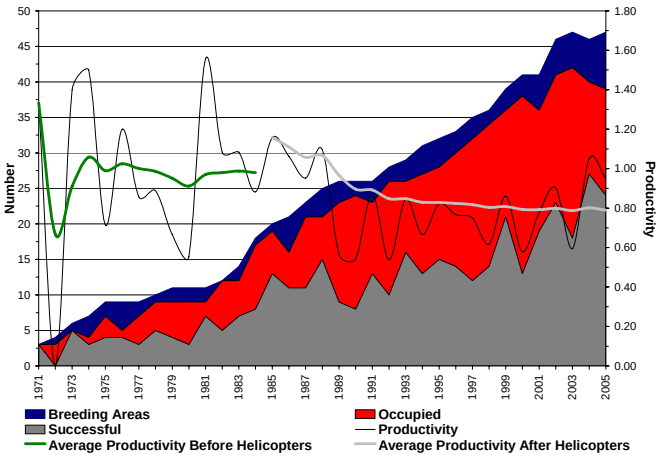


Figure 5. Bald eagle productivity in Arizona, 1971 to 2005.

Table 1. Bald eagle productivity estimates across North America.

Study area	Average # BAs Monitored/year	Productivity (Fledged/occupied BA)	Years	Study
Aleutian Is., AK	23/island	0.67-1.24[1]	1993-1994	Anthony et al. 1999
Minnesota	22.3	0.68	1973-1993	Grim and Kallemeyn 1995
British Columbia	26.0	0.70	1992-1996	Elliot et al. 1998
Interior Alaska	231	0.77	1989-1994	Steidl et al. 1997
Arizona	34	0.78	1987-2005	Hunt et al. 1992, Mesta et al. 1992 Allison et al. in prep. Jacobson et al. 2005
Washington	173	0.85	1981-1985	McAllister 1986
Nationwide		0.92	Pre-1986	Stalmaster 1987[2]
Arizona	11	0.95	1975-1985	Grubb et al. 1983, 1986a
Chesapeake	145	1.18	1981-1990	Buehler et al. 1991
Colorado/Wyoming	9.4	1.21	1981-1989	Kralovec et al. 1992
Florida	40	1.21	1985-1988	Wood and Collopy 1993
Wisconsin	254	1.28	1983-1988	Kozie and Anderson 1991

[1] Per active BA.

[2] Stalmaster (1987) summarized completed studies in the early 1980's.

Juveniles migrate north to exploit food resources (Hunt et al. 1992, K. Jacobson and H. Messing unpublished data). We believe most 2 and 3 year-old subadults also migrate, leaving Arizona in April and May and returning in September and October (Hunt et al. 1992, K. Jacobson and H. Messing unpublished data). We are unsure if non-breeding 4 year-old and floating adult bald eagles follow this migration schedule or remain in Arizona. Breeding adults stay near their BAs year-round but have traveled to higher elevations for short periods (Hunt et al. 1992, AGFD unpublished data).

Bald eagles are opportunistic feeders. Their diet is mostly fish, but they will eat birds, amphibians, reptiles, small mammals, and carrion (Hunt et al. 1992). Common Arizona fish prey

items are: Sonora (*Catostomus insignis*) and desert suckers (*C. clarki*) (Fig. 6); channel (*Ictalurus punctatus*) and flathead (*Pilodictis olivaris*) catfish; common carp (*Cyprinus carpio*); largemouth (*Micropterus salmoides*), smallmouth (*M. d. dolomieui*), yellow (*Morone mississippiensis*) and white (*M. chrysops*) bass; rainbow trout (*Oncorhyncus mykiss*); and black crappie (*Pomoxis nigromaculatus*). Less common fish prey items are roundtail chub (*Gila robusta*), green sunfish (*Lepomis cyanellus*), bluegill (*L. macrochirus*), red shiner (*Cyprinella lutrensis*), shad (*Petenense* spp.), and tilapia (*Oreochromis* spp.).

Figure 6. Sonoran sucker from the lower Salt River, Maricopa County, Arizona (Photo by J. Voeltz).

A multitude of factors affect the size of a breeding pair's home range. The availability of nest sites (cliffs, pinnacles, trees), density of breeding pairs, prey availability, and the morphology of the water system (regulated/unregulated river or impounded lake) are among a few. The highest density of breeding pairs is on the regulated Verde River below Bartlett Dam (39.2 river km) (n=8, 1 BA/4.9 river km). Lower densities exist on the unregulated Verde River above Horseshoe Dam (183 river km) (n=9 pairs, 1 pair/20.3 river km), but this is similar to the unregulated Salt River above Roosevelt Lake (160 km) (n=7 pairs, 1 pair/22.9 river km). The regulated Salt River below Stewart Mountain Dam (21.9 river km) is less populated (n=3, 1 pair/7.3 river km) than the regulated Verde River below Bartlett Dam (SRP 2003).

Breeding bald eagles in Arizona have a high level of genetic heterozygosity compared to other states (Hunt et al. 1992). However, Hunt et al. (1992) cautioned against definitive conclusions based on this study due to a low sample size and low number of loci examined. Hunt et al. (1992) stated this level of variation may indicate: 1) Arizona's bald eagle population is open and some immigration and emigration has occurred, 2) DDT did not reduce the population to levels at which alleles would drift to fixation, 3) there have not been enough generations since the occurrence of population bottlenecks for genes to drift to fixation, or 4) chance events have maintained heterozygosity among the relative few loci examined.

The documented incidence of immigration and emigration of breeding adults is low in Arizona. From banding nestlings (since 1987) and subsequently identifying adults (since 1991), 1 case of emigration has been reported and 1 case of immigration has been documented (southern California and southeast Texas, respectfully) (R. Jurek, pers. com., Mabie et al. 1994, Hunt et al. 1992, Mesta et al. 1992, Allison et al. in prep., AGFD unpublished data). Without immigration, the chance of inbreeding is increased. Newton (1979) stated incest was rare, but when it occurs it can contribute to lowered productivity. As of 2005, there has been 7 documented pairs in incestuous relationships: mother-son (Alamo), grandfather-granddaughter (Pleasant), 2 cases of 1st cousins (Pinto and San Carlos), and 3 cases of brother-sister (Box Bar, Oak Creek, and Sheep) (Allison et al. in prep., AGFD unpublished data). Similar to Newton (1979), the productivity of our incestuous pairs is lower (0.68 young/occupied BA [n=34]), but within the range of non-incestuous bald eagle pairs.

MANAGEMENT STATUS

Federal status

In 1995 the bald eagle was downlisted to threatened status, and in 1999 and 2006 the USFWS has proposed to delist the species (USFWS 1995, 1999, 2006). Currently, in addition to the ESA, 5 federal laws protect the bald eagle: the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, Lacey Act, Airborne Hunting Act, and the Convention on International Trade in Endangered Species of Wild Flora and Fauna. These laws prohibit, except under certain conditions, taking, possessing or dealing in commerce of bald eagles, any parts thereof (including feathers), their nests, and their eggs. "Take" includes pursuing, shooting, shooting at, poisoning, wounding, killing, capturing, trapping, collecting, molesting, or disturbing. When removed from the ESA, a minimum five-year post-delisting monitoring period is required.

State status

All of Arizona's native wildlife, including threatened and endangered species are protected under the general provisions of Arizona Revised Statutes, Title 17. AGFD includes the bald eagle on its list of *Wildlife of Special Concern in Arizona* (1996). The list provides policy guidance on management priorities only, not legal or regulatory protection.

The 1982 Southwestern Bald Eagle Recovery Plan

After listing, the USFWS divided the nation's bald eagle population into recovery regions for planning and management purposes. The Southwestern Recovery Region included Arizona, California (along Colorado River where it borders Arizona), New Mexico, and Oklahoma and Texas (west of the 100th meridian).

The 1982 Southwestern Bald Eagle Recovery Plan's goals were to: 1) establish breeding birds in 1 or more river drainages in addition to those of the Salt and Verde rivers, 2) have 10 to 12 young produced annually for a five-year period, and 3) identify important winter habitat (USFWS 1982). Since Arizona contained 80% (n=15) of the BAs in the Southwest Region when the plan was written, management to increase the southwest population was focused in Arizona. Due to these concentrated efforts, Arizona has separately achieved these goals as: 1) bald eagles have occupied BAs on the Agua Fria, Bill Williams, Little Colorado, Gila, Salt, San Carlos, San Francisco, San Pedro, and Verde rivers, 2) annual productivity averages 27.4 young, and 3) annual winter counts have identified most of the wintering habitats (e.g. Jacobson et al. 2005).

The Southwestern Bald Eagle Recovery Plan was written with the information available at the time. As studies to monitor the breeding population began, it became clear that the Southwestern Region, in particular Arizona, would attain these goals quickly. When the plan was written: productivity and mortality rates; the affects of human disturbance; entanglement in fishing line; parasites; and habitat capability, preferences, and requirements were largely unknown. The authors of the Recovery Plan acknowledged these gaps, and called for revision as new information emerged. However this was never accomplished. Regardless, the bald eagle in Arizona: 1) averages national productivity rates, 2) is distributed across most major watersheds, and 3) has management in place to reduce the effects of those earlier unknown threats.

Southwestern Bald Eagle Management Committee

In 1984, the SWBEMC was formed to coordinate bald eagle conservation efforts in Arizona across diversely managed lands of different agencies and Native American Tribes (Strategy

Section I). Meeting twice a year, the SWBEMC provides the forum for communication, oversight, and information sharing among representative agencies. While the USFWS and AGFD are jointly responsible for the regulation and management of threatened, endangered, and migratory species in Arizona, the other members have significant roles in implementing policies and management for the protection and restoration of the bald eagle.

CURRENT MANAGEMENT EFFORTS

Seasonal closures

During certain breeding stages (incubation, young nestlings, and nestlings near fledging), human activity near a bald eagle nest can cause abandonment and/or failure (Anthony et al. 1994, Grubb et al. 1991, 2002). Established BA closures reduce losses by managing these activities (Fig. 7 and 8). In conjunction with the ABENWP, seasonal closures protect BAs on lands managed by AGFD, BLM, FMYN, MCPR, SCAT, SRPMIC, USFS, and WMAT.

Figure 7. Land Closure at Lake Pleasant Regional Park, Maricopa County, Arizona (Photo by J. Driscoll).

Figure 8. Water Closure at Alamo Lake State Park, La Paz County, Arizona (Photo by G. Beatty).

Rather than establish arbitrary distances and restrict all activities, closures boundaries and limitations vary based on their effectiveness and enforceability (Strategy Section II.A). Some closures restrict all entry into the BA, others only around certain nests, and several only certain types of activities. Seasonal closures restricting all entry include: Cliff, Ladders, Lower Lake Mary, Luna, Lynx, Needle Rock (which includes the Bartlett, Box Bar, and Needle Rock BAs), Oak Creek (being established in 2006), Pleasant, 76, and Tower BAs. Closures in effect when the breeding pair occupies certain nests include: Alamo, Becker, Bulldog (Blue Point Closure), Cibecue, Granite Reef (being established in 2006), Pinto, San Carlos, Tonto, and Talkalai BAs. Closures only prohibiting watercraft from stopping are: Coldwater (being established in 2006), East Verde (being established in 2006), Redmond, and Table Mountain BAs.

In the absence of closures, agencies have found other means to protect breeding pairs. While not specifically for bald eagles, both FMYN and SRPMIC have closed the lower Verde River and portions of the lower Salt River to non-tribal members. Human activity near the BAs has since decreased (Beatty et al. 1998) and bald eagle pairs have pioneered 3 new BAs (Jacobson et al. 2005). Additionally, the BLM has protected the Coolidge and Granite Basin BAs by not issuing boating permits during the breeding season.

Development within closures rarely occurs due in part to the management of public access for a portion of the year. The defined Buffer Zone Strategy (Strategy Section III.C.) and the continued

establishment of necessary closures (Strategy Section II.A) will help protect bald eagle habitat, breeding attempts, and ensure the appropriate management of recreation and habitat.

Bald eagle winter count

To determine population trends nationwide, the National Wildlife Federation initiated an annual bald eagle winter count in 1979. Each year the states are responsible for the completion of standardized survey routes, which are now compiled by a national coordinator at the U.S. Geological Survey (Strategy Section II.B).

After participating from 1981 to 1985 (e.g. Todd 1984b), AGFD resurrected the winter count in 1992, standardized 115 routes statewide in 1995, and amended the routes to 105 in 2006 (e.g. Beatty and Driscoll 1996a, AGFD in prep.). AGFD annually solicits the assistance of Federal and State agencies, Native American Tribes, and private groups to conduct the survey during a one-week period in January. The most common survey tool is a vehicle, but an adequate survey of the central and east-central river systems requires a helicopter. To accommodate this effort, the January Occupancy and Reproduction Assessment (ORA) helicopter flights were expanded to complete routes on the Black, Gila, Salt, Verde, and White rivers and their tributaries.

The winter count yields information on bald eagle age classes, numbers, and habitats. Arizona averages 322 wintering migrants, composed of 64% adults and 33% subadults from 1995 to 2005 (Jacobson et al. 2005). Bald eagles rarely concentrate in Arizona as on other wintering grounds, but occasionally there can be a 30 or more in one area. Nomadic in winter, bald eagles occupy a variety of habitats but are most common at the lakes and rivers along the Mogollon Rim and the White Mountains (e.g. Jacobson et al. 2005). Because of this diversity, developing management guidelines for wintering habitat is difficult. Dargan (1991) described the characteristics of bald eagle roost trees in the Coconino National Forest as: large (mean of 28.3 inches dbh and 93 feet tall), in loose groups (5 to 40 acre stand-size, old growth clumps of 5 to 10 trees/acre), on a slope (10 to 35%), with a canopy closure of 50 to 80%, and near a food source. Thus, identification, maintenance, protection, and recruitment for these characteristic stands are of the greatest need (Strategy Section VIII).

Occupancy and reproductive assessment helicopter flights

Seasonal monthly ORA helicopter flights (January to June) help determine statewide productivity (Strategy Section II.C). Biologists visit all BAs in 1 or 2 days to determine occupancy, stage of the breeding cycle, and the result of the breeding attempt. This method differs from standard monitoring protocols of two annual surveys (Postupalsky 1974). However, it helps Arizona biologists by: reducing errors in productivity estimation, identifying the exact stage of the breeding cycle to assist with the planning of projects, the scheduling of banding events (Strategy Sections III.C, II.F, and II.G), discovering new BAs to implement protective management, and identifying prolonged incubation to collect addled eggs for contaminant analysis (Strategy Sections II.F.1.b. and II.H).

Bald eagle nest survey

Due to rugged terrain and steep canyons, access to Arizona's riparian areas limited bald eagle nest surveys before 1985 (Fig. 9). Since the use of helicopters, examination of new areas, historical and known BAs, and nest sites of other species has contributed to a more complete breeding population assessment (e.g. Jacobson et al. 2005) (Strategy Section II.D). The discovery of new BAs and alternate nests, coupled with the knowledge of current and historical BAs,

allows for an accurate description of the distribution, status, and annual productivity of the bald eagle in Arizona. In addition, timely discovery of new BAs facilitates addressing and implementing management to ensure adequate protection (Strategy Section III).

Figure 9. Bald eagle BA on the upper Salt River, Gila County, Arizona (Photo by J. Driscoll).

From 1987 to 1991, cooperators theorized that breeding bald eagles in Arizona might be reaching carrying capacity, as the number of BAs did not increase dramatically. However, beginning in 1992 and due to an intensive management effort to maximize productivity (i.e. ABENWP, rescues, etc.); adults began pioneering new and reoccupying historical habitats. From 1992 to 2006, 20 new BAs have been discovered and 8 historical BAs reoccupied (Fig. 2) (e.g. Jacobson et al. 2005, AGFD in prep.). Clearly, the bald eagle in Arizona has not reached its carrying capacity as the potential to occupy the 12 remaining historical BAs, and other suitable unoccupied habitat exist (i.e. Black, Colorado, Gila, White rivers, etc).

Arizona Bald Eagle Nestwatch Program

Many land and wildlife agencies recognize the conflicts between increasing metropolitan populations, recreation, and breeding bald eagles. In Arizona, the most productive BAs are located near urban and high recreation areas, thus increasing the need for protective management. In 1978, these concerns led to the creation of the ABENWP (Forbis et al. 1985). Beginning as a weekend volunteer effort by the USFS and Maricopa Audubon Society, the ABENWP has expanded into contracting 20 biologists annually and daily monitoring during the breeding season (22 days each month) (e.g. Jacobson et al. 2005) (Strategy Section II.E). The goals of the program are public education, data collection, and conservation of the species.

Beginning in February, nestwatchers are stationed at 10 to 15 BAs with the highest recreation pressures. They interact with members of the public, educate them on breeding bald eagles, distribute brochures, and direct them away from the breeding attempt. Nestwatchers collect data on breeding behavior, human activities, and habitat use to help agencies make better management decisions. Determining when bald eagles are in a life threatening situation is possibly the most tangible benefit of this monitoring. This recognition enables biologists to intervene and eliminate/reduce the threat, thereby increasing productivity. From 1983 to 2005, the ABENWP has helped rescue and return to the wild 49 nestlings and eggs, representing 9.4% of all young fledged in Arizona (Fig. 10) (e.g. Jacobson et al. 2005).

Demography studies

To assess the health of the bald eagle in Arizona, biologist started placing USFWS bands on nestlings in the late 1970s and early 1980s (Haywood and Ohmart 1982, Grubb 1986a). Later, this practice continued to document replacements, natal origin, age of first breeding, mortality, and tenure with the use of color visual identification (VID) bands and identifying breeding adults

(Hunt et al. 1992). AGFD and the USFWS have continued these efforts since 1991 (Mesta et al. 1992, Allison et al. in prep., AGFD unpublished data).

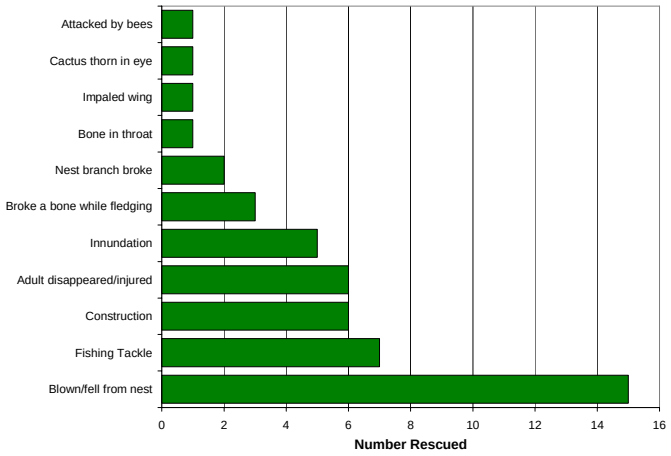


Figure 10. Bald eagles rescued through ABENWP monitoring and intervention, 1983 to 2005.

Demographic information helps biologists identify factors affecting population viability. Five tasks are necessary to assess population demographics: 1) nestlings must be banded and their sex determined; 2) breeding adults must be identified; 3) statewide productivity data must be collected; 4) identification of the mortality sources in each age class; and, 5) an assessment of catastrophic events (Strategy Sections II.C, II.D, and II.F. through II.I). While it is ideal to accomplish the above tasks yearly with 100% success, often logistics and time constraints impede the efforts.

Access to BAs and nests helps eliminate data gaps and reduce the standard error of survivorship through banding. However, entering some nests is not possible (unsafe substrate for climbers, or inaccessible nest location) and time constraints hinder travel to remote locations. Certain BAs reside in designated wilderness areas or on Native American land closed to helicopters and the public, thereby reducing the quality and quantity of data collected.

Entering nests can also benefit the species in other ways (Fig. 11). It provides the opportunity to collect and remove potentially lethal fishing line and tackle (Strategy Section II.F.1.d), addled eggs, eggshells (Strategy Section II.F.1.b), prey remains (Strategy Section II.F.1.c), to retrieve dead nestlings to determine the cause of mortality (Strategy Section II.F.2), to rescue individuals (Strategy Section II.F.3), and to repair or reconstruct nests if they are falling apart (Strategy Sections II.F.1.f). These efforts have been an essential component of Arizona Bald Eagle Management and are particularly beneficial in BAs without ABENWP monitoring.

Figure 11. A biologist banding nestlings on the lower Verde River, Maricopa County, Arizona (Photo by J. Koloszar).

Collecting as much information as possible during 1 banding visit minimizes the disturbance to the breeding pair, however it may be necessary to enter a nest more than once. Fishing line may entangle a nestling, or they may fall out of the nest before being able to fly. In these instances, the most prudent measure is to rescue the nestling and return it to the nest. If done during specific windows of time, climbing nests has no affect on the current or subsequent breeding attempt (Grier 1969).

THREAT ANALYSIS

This section addresses 4 of the 5 factors required by Section 4(a)(1) of the Endangered Species Act (59 FR 7968) to assess real and/or potential threats facing bald eagles in Arizona. The only factor not addressed here relates to over-utilization for commercial, recreational, scientific, or educational purposes, which has not been a concern for Arizona. In addition to the 4 factors, this section also addresses other threats to the bald eagle.

Present or threatened destruction, modification, or curtailment of its habitat or range

Breeding bald eagle distribution in Arizona follows the major watersheds, with the best productivity occurring along the lower Salt and Verde rivers. These riparian systems have provided the resources necessary for the population to expand. However, they are also closest to the metropolitan areas and have the highest demand for recreation, development, and water. As human populations, water demands, and recreation pressures increase, so will the pressure for land managers to develop into this habitat.

With flexibility and planning, most projects, especially smaller ones, could continue to occur around bald eagle BAs. While a single project, land exchange, or development may not have an affect on the species persistence, multiple projects statewide and over time, designed without consideration for bald eagles have the potential to reduce suitable habitat. To counter these effects, the buffer zone system adapted and modified from *Bald Eagles in the Chesapeake, a Management Guide for Landowners* (Cline 1990) is a practical method for Arizona (Strategy Section III.C). Consistent with this guide, 3 zones will guide acceptable activities within a BA.

In addition to the nest area, consideration must also occur for a bald eagle's foraging habitat. Stalmaster (1987) stated a foraging area is the most essential component of the habitat used by bald eagles. Foraging areas must provide an adequate amount of food in a relatively consistent fashion. Without consideration for important foraging areas, development, water use, and recreation may limit the adult's ability to acquire food and thus affect productivity (Strategy Section VII).

No single agency will oversee the potential affects projects have on bald eagle habitat in the absence of the ESA. However through the SWBEMC, the species can be successfully managed through the awareness, collaboration, flexibility, planning, and willingness of all wildlife, land, and recreation managers.

Riparian habitat. Riparian trees and cliff substrates provide bald eagles with places to nest, roost, loaf, preen, and/or hunt. Since cliff substrates are abundant in many Arizona BAs, land and wildlife managers have been fortunate that the health of riparian forests has not been a central issue for recovery. However in the absence of cliff substrates, riparian trees are a vital habitat component. Bald eagles at 13 BAs (Becker, Box Bar, Doka, Fort McDowell, Granite Reef, Needle Rock, Pinto, Rodeo, 76, Sheep, Sycamore, Tonto, and Winkelman) rely solely on riparian trees as no other substrate exists (Fig. 12). Within some of these BAs, existing trees have become over-mature, are dying, and are not being replaced. Regeneration of key riparian habitat has not occurred in many areas of the Southwest due to many factors (Stromberg 1993).

Figure 12. Riparian habitat of the lower Verde River, Maricopa County, Arizona (Photo by J. Driscoll).

These 13 BAs have collectively contributed 24% (n=606) of all recorded fledglings from 1971 to 2005 (Appendix A) (Grubb et al. 1983, 1986a, Hunt et al. 1992, Mesta et al. 1992, e.g. Jacobson et al. 2005). The Fort McDowell BA surpasses all other BAs with 43 young fledged, with the second most productive BA being Blue Point (n=40) on the Salt River. Additionally, 4 of these 13 BAs have been in existence for at least 16 years (17, 23, 24, and 35 years) demonstrating the bald eagle's fidelity to this habitat type.

Many land uses affect riparian habitat including: agriculture, housing and recreational development, water diversions, grazing, off-road vehicles, poorly timed water releases (Stromberg et al. 1991), scouring, and woodcutting. Doka, Fort McDowell, Granite Reef, Rodeo, 76, and Sheep BAs currently nest in over-mature live trees or snags with few available replacements, and regenerating cottonwood trees have not yet matured to a point where they could support a bald eagle nest. Fort McDowell has lost 2 nest trees to flood waters (1995 and 2005) (e.g. Jacobson et al. 2005). The riparian trees of the Pinto and Tonto BAs are threatened by the increased storage capacity of Roosevelt Lake. Nest trees in both BAs will die from inundation and the snags will fall over time (similar to Alamo nest #3) (Driscoll et al. 1998). Few alternate trees exist for Pinto, and most available to Tonto are threatened with housing community developments and water table reductions.

To address these and related issues on the lower Salt and Verde rivers, managing agencies have found the means to minimize the factors impairing riparian regeneration. The FMYN and SRPMIC have proactively submitted proposals to the Arizona Water Protection Fund and Wetlands Protection Fund to plant riparian trees. The USBR and SRP have mitigated for the impacts of the increased water operations of Roosevelt Lake through a Habitat Conservation Plan. This mitigation includes: 1) the USBR is analyzing ground water levels in the Pinto BA for possible cottonwood pole plantings, 2) in cooperation with the USFS, the USBR has helped implement the restoration strategies of the Tonto Creek Riparian Unit, 3) SRP has examined cooperative agreements with FMYN and SRPMIC to regenerate riparian areas of the lower Verde River, and 4) SRP has purchased property for riparian enhancements on Roosevelt Lake.

Long-term commitment and in depth planning is required for successful riparian restoration. In addition, improvement of riparian habitat will not only benefit bald eagles, but all riparian dependent species. Consideration of grazing and other land-uses, proximity to the floodplain and channel, soil salinity, water table, and the control of destructive agents (beavers, vehicles, and water releases) will need to occur (Strategy Section V).

Development. Over time, the cumulative effects of previous, current, or future recreation, housing, and agricultural developments may affect current BAs, foraging areas, and potential bald eagle habitat. Clearly, accommodating human populations around one of the fastest growing metropolitan areas in the nation will not cease. However, the effects of encroachment escalate when the best bald eagle habitat, foraging areas, and the highest densities are at stake. As above,

the species can be successfully managed through the awareness, collaboration, flexibility, planning, and willingness of all wildlife, land, and recreation managers.

Examples of proposed and ongoing developments are occurring at the Bulldog, Crescent, Pleasant, Sheep, and Tonto BAs and their foraging areas (Fig. 13). A proposed turnaround for river-tubers near Bulldog Cliffs is within the Bulldog BA foraging area. A developed recreation site and road paving is planned for the Crescent BA (AESO 02-21-97-F-0229, AESO 02-21-04-F-0107). Near the Pleasant BA, the City of Peoria annexed the north shore of Lake Pleasant to develop lakeside resorts. In addition, continued housing, road, and business developments continue to occur along lower Tonto Creek, near the Sheep and Tonto BAs.

Figure 13. Recreation and development on the upper Verde River, Yavapai and Coconino counties, Arizona (Photo by Jim Cooper).

Completed developments that may affect bald eagles have occurred at the Bartlett, Bulldog, Orme, Rodeo, and Tonto BAs. A four-lane boat launch and 1000 person/day recreation area were constructed on Bartlett Lake across from the BAs foraging area (AESO/SE 2-21-99-I-065). A new day use area and an emergency boat launch were constructed on the lower Salt River in the Bulldog and Orme BAs foraging areas (AESO/SE 2-21-00-F-27). A new RV Park was constructed within 1300 ft of the Rodeo nest tree. Finally, a 100-unit campground with a boat ramp was constructed within 2.0 miles of the Tonto nest tree; and the dirt road leading to the campground was paved 1300 ft from the nest bringing more recreation into the area (AESO/SE 2-21-92-F-285).

To address these concerns, AGFD's Projects Evaluation Program is available for federal agencies or companies with a federal nexus to evaluate the impacts planned or future projects in areas where there may be a species of concern. The goal of the program is to facilitate the inclusion of fish and wildlife resource needs statewide, in proposed land and water development projects and to identify possible impacts to the AGFD's wildlife management authorities and State Trust responsibilities. Through this program, we can ensure that bald eagles and their habitat are considered and evaluated for possible effects from the projects.

In addition, habitat management or monitoring of breeding pairs on private land presents further difficulties. Private property falls under different federal guidelines, and the landowners can restrict access for wildlife management activities. Currently (2006), only 2 BA's nest is on private property (Beaver, Sheep), but 9 more pairs have private landownership within their home ranges (Box Bar, Lower Lake Mary, Lynx, Oak Creek, Perkinsville, 76, Tower, Tonto, and Winkelman BAs) (e.g. Jacobson et al. 2005). To address this issue, the USFWS has implemented the Safe Harbor Program that gives private landowners the option of taking action to benefit listed species on their property, while receiving assurances that the measures will not lead to future land use restrictions as long as their actions benefit the species.

River alterations. Creation of burms, dams, and diversions has benefited some breeding pairs (Alamo, Crescent, Ive's Wash, Lower Lake Mary, Luna, Lynx, and Pleasant BAs) by making prey species more available, but these activities in addition to water table pumping on rivers and

creeks with erratic and/or small flows (Agua Fria River, Bill Williams River, Black River, San Francisco River, Tonto Creek, Verde River, and Walnut Creek) could be impeding others by reducing their foraging areas (Coldwater, East Verde, Horseshoe, Ladders, Oak Creek, Perkinsville, Sheep, Table Mountain, Tonto, and Towers).

Resident pairs would not successfully reproduce without the constant food supply provided by Alamo Lake, Crescent Lake, Lower Lake Mary, Luna Lake, Lynx Lake, and Lake Pleasant. For example, the Pleasant BA from 1979 to 1992 unsuccessfully attempted to breed on 3 occasions. Not coincidentally, the pair has produced 16 young in the 13 years since completion of the New Waddell Dam in 1993 (e.g. Jacobson et al. 2005).

However, the timing of water releases from many dams has also impeded riparian regeneration, destroyed riparian habitat and riverbanks, and can influence the abundance, distribution, and diversity of fish species (Stromberg et al. 1991, Poff et al. 1997) (Fig. 14). The diversion of the Gila and Salt rivers has diminished flows throughout their corridor to the Colorado River. Hoover and Glen Canyon dams have altered the Colorado River and its surrounding habitat. While it is clear dams have helped some breeding bald eagles in recent times, our lack of knowledge on bald eagles in Arizona before dam construction leads to speculation regarding whether dams hinder or promote the species expansion or productivity.

Figure 14. Ashurst-Hayden Diversion Dam, Pinal County, Arizona (Photo by USBR).

Water pumping and diversions threaten riparian vegetation and bald eagle prey populations statewide. However, the affect of these activities are escalated in BAs on unregulated systems. The City of Prescott is trying to obtain water rights for groundwater pumping in the Chino Valley. While this action is still pending (2006), the loss of water on the upper Verde River may affect fish populations, and consequently, productivity in 9 BAs (Beaver, Coldwater, East Verde, Horseshoe, Ladders, Oak Creek, Perkinsville, Table Mountain, and Tower). Dams and bank stabilizing diversions on Tonto Creek have ceased flows on the lower portion during the summer and low rainfall years. These losses are affecting foraging areas at the Sheep and Tonto BAs and therefore affecting productivity.

As with development, AGFD's Projects Evaluation Program will help evaluate the impacts planned or future river alterations and water pumping in areas where there may be a concern for bald eagles.

Disease or predation

Recorded disease outbreaks in bald eagles such as aspergillosis, avian pox, avian vacuolar mylinopathy, and West Nile Virus can have unpredictable consequences to local populations. As an example, 62 bald eagles died in Arkansas and South Carolina in the 1990s from avian vacuolar mylinopathy (USGS 2001). This occurrence has increased our awareness of the impact an outbreak may have on the bald eagle in Arizona. Although a disease outbreak has never been recorded in the breeding population of Arizona, there has been 1 case of avian pox (Hunt et al.

1992), 1 case of West Nile Virus (Jacobson et al. 2005), and 1 nestling contracted cataracts (unknown cause) (Dr. K. Orr pers. comm.).

Bald eagles have been killed by a variety of animals. Fledglings have been killed by Africanized bees (*Apis mellifera*), canines (suspected coyotes [*Canis latrans*]), great horned owls (*Bubo virginianus*), interactions with red-tailed hawks (*Buteo jamaicensis*), and an adult was killed by a peregrine falcon (*Falco peregrinus*) (Hunt et al. 1992, e.g. Jacobson et al. 2005). In addition, intra-specific competition for BAs has killed members of breeding pairs (Hunt et al. 1992, Beatty and Driscoll 1996b).

Because of the size, distribution, and the degree of immigration and emigration of the breeding bald eagle in Arizona, continued to monitoring will need to occur for these threats (Strategy Section II.B, II.C, and II.E through II.I).

The inadequacy of existing regulatory mechanisms

While the regulations listed above (see Management Status, Federal Status and State Status) provide specific protection from such acts as shooting and trapping, they do not protect habitat. However, bald eagles and their habitat are protected on Federal lands through the National Environmental Policy Act, the National Forest Management Act, and the enabling regulations of federal agency policies.

The USFWS reexamined the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act due to nationwide concern for habitat protection (USFWS 2000). Specific amendments, guidance, and protocol are being considered, but have not been finalized (2006).

Other natural or manmade factors affecting its continued existence

Recreation. Most of the bald eagle BAs in Arizona are located in the Gila, Salt, and Verde drainages near Maricopa County. Over the last decade, the county's human population was the fastest growing in the state increasing to more than 3 million (U.S. Census Bureau 2000). Likewise, the demand for limited water-based recreation opportunities of the desert has increased respectively. The ABENWP recorded a 3-fold increase in the average number of human activities within 1 km of all monitored bald eagle BAs in the last 16 years (Fig. 15) (e.g. Jacobson et al. 2005).

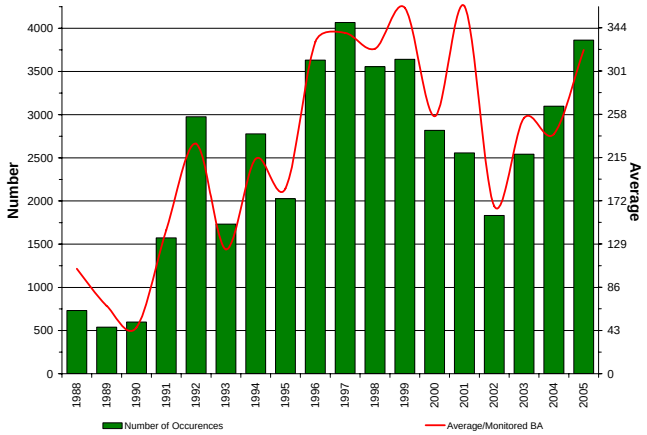


Figure 15. Number of human activities recorded in monitored bald eagle BAs, 1988 to 2005.

The combined management of the ABENWP and seasonal closures are successful in deterring this increase in recreation and the potential impact on breeding bald eagles. Even with an increasing human population and the corresponding recreation pressures, the population has grown 78% in the last 16 years. For example, closure violations decreased at Lake Pleasant with consistent monitoring by the ABENWP and increased outreach efforts (brochures, media coverage, maps, signs, etc.). From 1993-1997, non-compliance with the closure's southern

boundary averaged 6%/year (n=12,445) (Fig. 16) (e.g. Jacobson et al. 2005). In 1997, it increased to 12% (n=3,928), but has since averaged 4% (n=41,838), and in 2002 as low as 2% (n=4,100).

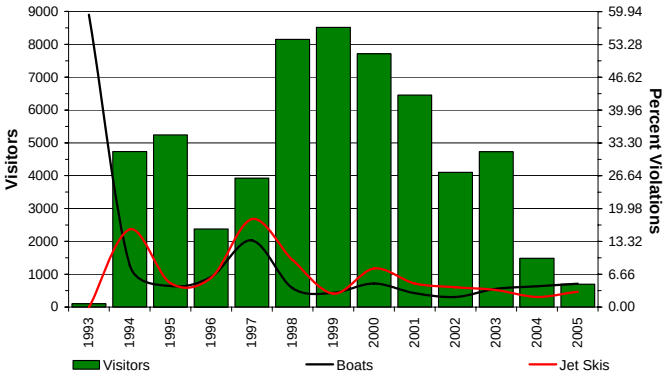


Figure 16. Compliance with the southern closure boundary at Lake Pleasant, 1993 to 2005.

Even more successful are the outreach efforts. In 2000, a survey of public attitudes at Lake Pleasant found 21.6% of the recreating public agreed with the bald eagle closure, and 66.8% stated it had not affected their recreation experience (n=352) (Driscoll 2000). However, signs, the threat of fines, or law enforcement do not hinder the determined closure violator, and monitoring by the ABENWP is necessary to protect breeding attempts. Hunt et al. (1992) stated bald eagles at BAs such as Bartlett, Cliff, and 76 would rarely produce young without the aid of nestwatchers.

Bald eagles are expected to encounter increasing recreation pressures on the lower Gila and San Carlos rivers, the Salt and Verde rivers, Tonto Creek, and the lakes of Alamo, Crescent, Lower Lake Mary, Luna, Lynx, and Pleasant (e.g. Jacobson et al. 2005). These include the Suicide BA on the Gila River; Blue Point, Bulldog, Cibecue, Granite Reef, Horse Mesa, Orme, Pinal, Pinto, and Redmond BAs on the Salt River; San Carlos and Talkalai BAs on the San Carlos River; Bartlett, Box Bar, Cliff, Coldwater, East Verde, Ladders, Needle Rock, Rodeo, Table Mountain, and Tower BAs on the Verde River; 76, Sheep, and Tonto BAs on Tonto Creek; and the BAs of Alamo, Crescent, Lower Lake Mary, Luna, Lynx, and Pleasant. If recreation continues to increase, so will the need to continue protective bald eagle management.

Recreation affects bald eagle foraging as well (Brown et al. 1997, Knight et al. 1984). Breeding adults need foraging areas without constant human activity to capture prey successfully. Defining these areas is difficult as their use changes with prey availability. Often recreation occurs outside of the nest area where the presumed effects to breeding are minimal. However, constant activity near foraging areas may limit foraging opportunities and affect adult, nestling, and juvenile survivorship, and egg production.

Fishing Line. Fishing line and tackle are a common threat to bald eagles in Arizona. Most encounters derive from bald eagles catching dead fish with fishing material attached or collecting it for nest material (Hunt et al. 1992, Beatty et al. 1998) (Fig. 17). However there are other ways: an adult became entangled while perched on the shoreline, another swallowed fishing line (and possibly a hook) while feeding on a dead fish, and an angler cast a lure directly into a nest (Beatty et al. 1998, AGFD unpublished data).

Figure 17. Fishing line and tackle entangle a nestling bald eagle on the Salt River, Maricopa County, Arizona (Photo by D. Driscoll).

From 1986 to 2005, biologists have encountered fishing line and/or tackle either entangling individuals or in nests on 85 instances of 28 BAs (Hunt et al. 1992, Mesta et al. 1992, Beatty 1992, Beatty et al. 1995c, Beatty et al. 1998, AGFD unpublished data). The most frequent locations of occurrence is on the lower Verde River at 19%, the upper Salt River 17%, and Luna and Alamo lakes 14% each. Active efforts to remove the litter during banding, and early detection by the ABENWP contractors has limited mortalities to 2 nestlings (Mesta et al. 1992).

Biologists remove the material during nest climbs to band young (Strategy Section II.F.1.d). In addition, in 2002 AGFD launched a Monofilament Recovery Program to reduce discarded fishing line in the environment (Strategy Section IV.H). The program concentrates on recreation areas near bald eagle habitat; however, land managers have found this program to be a successful means for cleaning all water-based recreation areas. Currently (2006), 8.5% (n=200) of the fishable waters in Arizona have the program (AGFD unpublished data).

Low-flying private aircraft. Small planes and helicopters are the most common human activities in bald eagle BAs of Arizona. From 1998 to 2005, low-flying private aircraft accounted for 37.1% (n=23,905) of all human activities, and 25.3% (n=1,273) of the significant responses by the breeding pair (restless, flushed, and left the area) (e.g. Jacobson et al. 2005). Small planes are 3 times more common than helicopters within monitored BAs, but helicopters caused a higher frequency of significant responses (Table 2).

Table 2. Low flying aircraft reported within 1.0 km of a bald eagle BA in Arizona, 1998 to 2005.

Year	Average Rank of Occurrence		Number of Occurrences							Number of Significant Bald Eagle Responses						
	Small Plane	Helicopter	Small Plane	% Small Planes	Helicopter	% Helicopters	Low Flying Aircraft Total	Human Activity Total	LFA % of all Human Activity	Small Plane	% Small Planes	Helicopter	% Helicopters	Low Flying Aircraft Total	Significant Response Total	LFA % of all Significant Responses
1998	2	3	1,278	83.2	258	16.8	1,536	3,555	43.2	14	56.0	11	44.0	25	105	23.8
1999	1	3	1,760	76.2	550	23.8	2,310	3,639	63.5	57	66.3	29	33.7	86	243	35.4
2000	2	3	915	75.4	228	18.8	1143	2,817	43.1	7	46.7	8	53.3	15	77	19.5
2001	2	4	824	82.4	176	17.6	1,000	2,558	39.1	11	78.6	3	21.4	14	91	15.4
2002	3	4	176	54.3	148	45.7	324	1,833	17.7	10	41.7	14	58.3	24	227	10.6
2003	4	3	928	72.3	355	27.7	1,283	2,542	50.5	87	75.0	29	25.0	116	263	44.1
2004	4	4	425	61.1	270	38.8	695	3,099	22.4	5	31.3	11	68.8	16	138	11.6
2005	3	5	237	41.0	341	59.0	578	3,862	15.0	6	22.2	21	77.8	27	129	20.9
Total			6,543	73.8	2,326	26.2	8,869	23,905	37.1	196	60.9	126	39.1	322	1,273	25.3

The effect this activity has on bald eagle productivity is unknown, but the bald eagle's reaction is of concern (Ellis et al. 1991, Grubb et al. 1997). While no direct link of a nest failure to low-flying private aircraft has occurred, they can flush an incubating adult causing the eggs to break or cause the young to prematurely fledge (Fig. 18). We anticipate this activity will increase with the demand for tourism flights, especially in remote BAs.

Many Arizona BAs are under military training routes (MTR), testing grounds, and routes for Emergency aircraft. Arizona contains a maze of MTR's for the U.S. Air Force's low-level jets. Although their high speed may not disturb bald eagles if it occurs at an appropriate distance, the resulting noise and sonic booms can cause a reaction (Ellis et al. 1991, Grubb et al. 1997).

Helicopters from Boeing, Maricopa County's Sheriff Department, and Emergency AirEvac are slower, and have been reported within 150 feet from active nests causing the adults to vocalize, flush from the nest, and/or mantle the nestlings (e.g. Jacobson et al. 2005).

Figure 18. Small plane flying 50ft above the riparian corridor of the lower Verde River, Maricopa County, Arizona (Photo by unknown photographer).

Similar to other state's management guidelines for bald eagles, AGFD has worked with the Federal Aviation Administration and the Arizona Department of Transportation to establish a 2000-ft above ground level (AGL) advisory along the Salt and Verde drainages, and to develop pilot brochures (Strategy Section IV.B). The SWBEMC has also worked with Luke A.F.B. and Boeing to modify their MTR's and flight paths to their test areas to avoid BAs.

Fish Diversity. Prey availability strongly influences bald eagle productivity (Newton 1979, Hansen 1987). The availability of prey during in the months preceding egg laying affects the female's egg production, during the nestling stage it affects the survivorship of nestlings and post-fledging juveniles. Thus, any factor that affects the adults' ability to acquire food can influence productivity and survivorship (Newton 1979).

For example, the introduction of predatory flathead catfish in the late 1970s has decreased fish diversity and abundance on the upper Salt River by nearly extirpating all other fish species available to bald eagles (AGFD unpublished data). Flathead catfish, while available as bald eagle prey when smaller, grow to large sizes (up to 50 lbs.) making them unavailable as prey (Fig. 19). AGFD surveys show their populations have increased on the upper Salt River, while populations of other fish species have decreased (Fig. 20) (AGFD unpublished data). In turn, productivity of four bald eagle BAs on the upper Salt River has decreased from 1.12 in the 1980s to 0.29 in the 1990s (Fig. 21) (e.g. Jacobson et al. 2005).

Figure 19. Flathead catfish captured on the upper Salt River, Gila County, Arizona (Photo by J. Warnecke).

Figure 20. Relative fish abundances available to bald eagles as prey on the upper Salt River, 1988 to 1997.

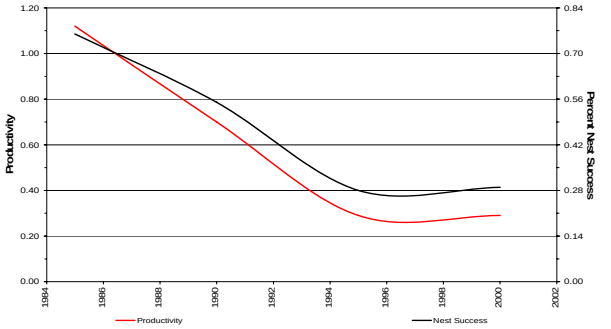


Figure 21. Bald eagle productivity on the upper Salt River, 1983 to 2002.

Non-native fish have out-competed, preyed upon, and subsequently replaced native fish populations in many central Arizona rivers (Rinne and Minckley 1991). Hunt et al. (1992) cited fish diversity as a crucial feature of a suitable breeding location, and native suckers as an important prey item in riverine systems. Maintaining this diversity will help improve bald eagle productivity and enhance survivorship (Strategy Section VI.A).

Lead Poisoning. Lead poisoning in bald eagles has been linked to ingestion of spent lead gunshot (Pain et al. 1994, Ma 1996), consumption of lead sinkers (Sears 1988), and secondary consumption of lead contaminated prey (DeMent et al. 1986, Frenzel and Anthony 1989). Lead poisoning in other birds and mammals has been linked to mining and smelting activities (Beyer et al. 1997, Henny et al. 2000), and firearm training facilities (Lewis et al. 2001).

Even with 25 years of study on bald eagles in Arizona, mortality agents remain a mystery. One reason for this lack of knowledge is missed opportunities. Bald eagle carcasses in the late 1980s through the 1990s were only necropsied if the bird died of un-natural causes (e.g. those requiring a law enforcement investigation). Most lead poisoning mortalities occur during winter when starvation is common. Reichel (1984) described 88% (n=17) of lead poisoned bald eagles as emaciated. Additionally, Pattee et al. (1981), discovered (under a controlled experiment) that when fed doses of lead, healthy bald eagles ceased eating several days before succumbing to lead poisoning. Thus by diagnosing starvation without a necropsy, the opportunities to document lead poisoning were missed.

Pattee et al. (1981) reported the toxic liver lead level for bald eagles as 10.0 parts/million (ppm). However, some researchers indicate this may be lower between 6.0 to 8.0 ppm (K. Converse, U.S. Geological Survey, pers. comm.). Blood lead levels diagnostic of lead poisoning is greater than 60 µg/dl. From 1998 to 2004, 22 bald eagles (39% of all documented mortalities) had liver lead levels averaging 32.9 ppm (excluding femur and blood values), ranging from 0 to 9 times the toxic threshold, and all were emaciated (Table 3) (AGFD unpublished data). Only 1 of the confirmed lead poisoned bald eagles hatched in Arizona.

Table 3. Known lead poisoning mortalities and lead concentrations in bald eagles recovered in Arizona, 1998 to 2004.

Bald Eagle Location	Recovered	Liver Lead Levels (ppm)	Bald Eagle Location	Recovered	Liver Lead Levels (ppm)
Saguaro Lake	January 1998	94.0	Horseshoe Dam	January 2003	30.05
Scholz Lake	Fall 1998	43.0	Whiteriver[2]	January 2003	60.0[3]
Pintail Lake	March 1999	49.56	Show Low	February 2003	36.04
Young	Fall 1999	23.05[1]	Stoneman Lake	March 2003	13.52
Camp Verde	Fall 1999	15.66[1]	Long Lake	March 2003	13.3
Kaibab Lake	March 2000	38.28	Wilcox	February 2004	23.43
East Clear Creek	April 2000	33.47	K.A. Ranch	March 2004	30.0
Fools Hollow Lake	March 2001	42.77	River Reservoir	March 2004	7.53[4]
Cosnino	January 2002	41.5	White Horse Lake	March 2004	13.11
Lake Elaine	March 2002	48.52	Young	March 2004	11.30
Upper Lake Mary	March 2002	48.17	Clifton	April 2004	8.15
Average			32.9		

[1]Femur lead levels (ppm dry weight).
[2]Arizona hatched bald eagle.
[3]Blood lead levels before chelatin treatment (µg/dL).
[4]Liver lead levels after 1 chelatin treatment.

Bald eagles can travel large distances quickly (Hunt et al. 1992, K. Jacobson and H. Messing unpublished data); and they follow migrating waterfowl in the winter. Therefore, the ingestion of lead could occur in any area along their migration. Pattee et al. (1981) discovered 60% (n=5) of birds in his experiment died within 12 to 20 days of ingesting lead pellets. However, it is also common for migrating bald eagles to remain near a suitable food supply (Dargan 1991). Thus, we are uncertain of the lead's source, i.e. local or regional.

To address this issue, AGFD and the USFWS initiated a protocol in 2003 for identifying, documenting, and processing all bald eagle carcasses found in Arizona. This procedure allows for the monitoring of mortality factors to facilitate implementing reactive management (Strategy Section II.G.7). In addition, a long-term dispersal study could appropriately document the frequency of lead poisoning mortalities during migration (Strategy Section II.G).

Mercury. Bald eagles encounter mercury through prey and water; and it accumulates in the body until released through feathers (Wood et al. 1996, Newton 1979) and eggs. Heavy metal analyses on bald eagle eggs in Arizona from 1977 to 1985 revealed mercury concentrations above those reported for other states (Grubb et al. 1990), and concentrations in white-tailed sea eagle eggs above 2 ppm (dry weight) impaired hatching (Newton 1979) (Fig. 22). King et al. (1991) found mercury levels ranging from 0.06 to 0.97 ppm in fish collected from BAs at Alamo Lake, Lake Pleasant, Salt River, Tonto Creek, and Verde River.

Figure 22. Addled bald eagle eggs on the upper Verde River, Yavapai County, Arizona (Photo by J. Driscoll).

From 1994 to 2004, analysis of 27 addled bald eagle eggs in Arizona showed mercury levels at an average 2.14 ppm (range 0.55 to 8.02 ppm) (Table 4) (AGFD unpublished data). Ten eggs from the Box Bar, Needle Rock, Pinal, 76, Tower, and Winkelman BAs were toxic (>2.0 ppm) (range 2.11 to 8.02 ppm). Elevated levels of mercury (1.5 to 2.0 ppm) were found in 11 eggs from the Bartlett, East Verde, Horseshoe, Lone Pine, Rodeo, Tonto, and Tower BAs. Lesser concentrations (1.0 to 1.5 ppm) were found in 4 eggs from the Box Bar, Fort McDowell, Horseshoe, and Sycamore BAs.

We remain uncertain of mercury's effects on bald eagle productivity in Arizona or the frequency of its occurrence. Collection of addled eggs occurs opportunistically during banding, and time constraints limit entering failed nests. AGFD repeated King et al. (1991) fish contamination study in 1996, although the analysis is not complete (2006). However, the presence of toxic mercury levels in 35% of the collected eggs warrants continued monitoring (Strategy Section II.H).

DDE. The most significant factor in the decline of the North American bald eagle population was the post World War II use of DDT, and the effects of its metabolite DDE (USFWS 1999). DDE accumulates in the fatty tissues of adult bald eagles and impairs the calcium release for normal eggshell production. Wiemeyer et al. (1984) noted depressed productivity occurring in bald eagle eggs with DDE values between 3 and 5 ppm (wet weight). Hunt et al. (1992) noted bald eagles in

Arizona did not display a significant drop in productivity with egg DDE levels ranging from 2.3 to 9.5 ppm. They estimated bald eagle eggs in Arizona might have a threshold level near 8 ppm.

DDE levels from the contents of 27 bald eagle eggs in Arizona from 1994 to 2004 averaged 2.01 ppm (range 0.23 to 7.0 ppm) (Table 4)(AGFD unpublished data). All but 4 had DDE levels below 3 ppm (Tower 1994 3.2 ppm; Sycamore 1997 7.0 ppm; Tonto 2001 4.17 ppm; and Rodeo 2002 4.23 ppm). Because all of the analyzed eggs were addled and the exact cause of the egg mortality is unknown, we caution against the use of acceptable DDE thresholds.

Table 4. Organochlorine and mercury levels in bald eagle eggs of Arizona, 1994 to 2004.

Drainage	Year	Breeding Area	DDE Levels (ppm wet weight)	Mercury Levels (ppm dry weight)
Gila River	1996	Winkelman	1.40	4.14
	1996	Winkelman	1.40	3.46
Salt River	1995	Pinal	1.60	2.11
	2004	Lone Pine	2.61	1.8
San Francisco River	1998	Luna	1.31	0.55
Tonto Creek	1995	76	0.87	8.02
	1999	76	0.23	2.29
	2000	Tonto	2.96	1.80
	2000	Tonto	1.30	1.87
	2001	Tonto	4.17	1.79
Verde River	1994	Tower	2.20	2.24
	1994	Tower	3.20	2.39
	1994	Fort McDowell	1.90	1.25
	1995	Tower	1.50	1.76
	1995	Tower	1.90	2.61
	1996	Horseshoe	1.90	1.49
	1996	Horseshoe	1.80	1.73
	1997	Box Bar	1.80	1.03
	1997	Sycamore	7.00	1.01
	1998	East Verde	0.38	1.62
	1998	East Verde	0.96	1.77
	2000	Bartlett	0.71	1.81
	2000	Bartlett	1.52	1.58
	2001	Tower	0.91	0.91
	2002	Rodeo	4.23	1.6
	2002	Needle Rock	2.97	2.9
	2003	Box Bar	1.57	2.3
Average			2.01	2.14

King et al. (1991) collected fish in bald eagle BAs of Arizona and found DDE levels averaged 0.07 ppm. They stated this level of occurrence should not have a significant impact on eggshell thinning. AGFD conducted a follow up study in 1996, although the analysis is not complete (2006).

Wiemeyer et al. (1984) related moderate eggshell thinning greater than 10% to difficulties in bald eagle reproduction. Anderson and Hickey (1972) stated a population would experience reproductive problems when eggshell thinning has become severe (15 to 20%) for a period of years.

Eggshell fragments from 38 bald eagle BAs in Arizona (n=349 sets) were collected, measured, and averaged by nest in 4 different studies from 1977 to 2004 (Grubb et al. 1990, Hunt et al. 1992, Mesta et al. 1992, AGFD unpublished data). To calculate percent thinning, these means were compared with measurements from Baja California (0.591 mm), the closest known bald eagle population to Arizona with pre-DDT eggshell measurements. From 1977 to 1985, Grubb et al. (1990) collected 32 eggshell sets from 14 BAs with a mean eggshell thickness of 0.539 mm (range 0.470 to 0.597 mm, SE 0.030) or 8.8% thinning (Fig. 23). Hunt et al. (1992) collected 71 sets from 23 BAs from 1987 to 1990, and found a mean thickness of 0.562 mm (range 0.455 to 0.651 mm, SE 0.042) or 4.9% thinning. Mesta et al. (1992) collected 27 sets from 18 BAs in 1991 and 1992, and measured a mean of 0.552 mm (range 0.508 to 0.634 mm) or 6.6% thinning. More recently, AGFD collected 169 sets from 34 BAs from 1993 to 2004, and measured a mean of 0.533 mm (range 0.395 to 0.648 mm, SE 0.034) or 9.8% thinning.

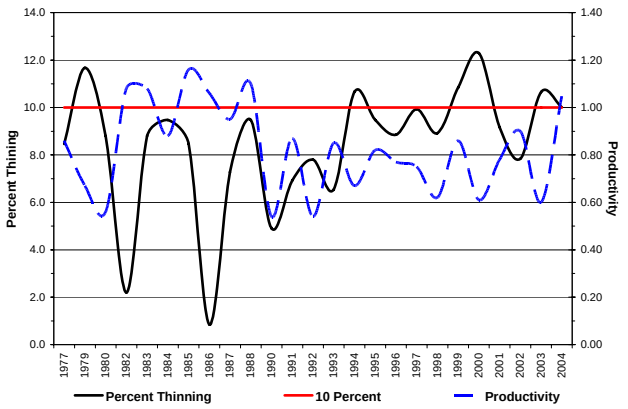


Figure 23. Mean thickness and percent thinning of bald eagle eggshells recovered in Arizona, 1977 to 2004.

From 1993 to 2004, 10% thinning was reached or exceeded on 5 occasions (1994, 1999, 2000, 2003, and 2004). In these years, thinning was higher with a mean of 0.528 mm/10.7% (n=28, SD 0.029) in 1994, 0.527 mm/10.8% (n=17, SD 0.026) in 1999, 0.517 mm/12.3% (n=14, SD 0.043) in 2000, 0.528 mm/10.7% (n=13, SD 0.053) in 2003, and 0.532 mm/10.0% (n=20, SD 0.025) in 2004 (AGFD unpublished data).

Since the ban in 1973, other factors may have a greater influence on productivity than DDT (e.g. storms during hatching, heat stress, prey availability, etc.). However, to ensure that DDT or some other organochlorine does affect productivity, we will continue to collect eggs and measures eggshells (Strategy Section II.H).

Parasites. Known parasites of the bald eagle in Arizona include the Mexican chicken bug (*Haematosiphon indorus*) (Grubb 1986a) and 2 ticks (*Argas cooleyi*, and a new tick species being classified) (Hunt et al. 1992, Dr. J. Phillips pers. comm.).

The Mexican chicken bug is a blood-sucking ectoparasite from the Cimicidae or "bed-bug" family (Platt 1975, Grubb 1986b, Hunt et al. 1992) (Fig. 24). Only found in specific cliff nests, they have caused or contributed to the death of at least 12 nestlings from 1987 to 2005 (Hunt et al. 1992, e.g. Jacobson et al. 2004). Phillips (1990) reported, "sometimes these parasites do cause death or can pave the way for lethal secondary infections. Sick or injured individuals are more vulnerable to parasites, and arthropod populations on these individuals are likely to reach levels where they do serious damage." Hunt et al. (1992) documented 39% of Arizona cliff nests with Mexican Chicken Bugs.

Figure 24. Mexican chicken bug (Haematosiphon indorus) (Photo by J. Driscoll).

By themselves, parasites (specifically the Mexican chicken bug) have a minimal affect on productivity. Infestations keep adults away from the nest, thus attracting competitors, predators, and exposing nestlings to extreme weather (causing mortality through dehydration and exposure). Nestlings have also fallen from the nest and died while trying to escape the infestation. However, the effects may be more significant should bald eagle numbers or productivity reach low levels.

While mortalities linked to parasites are minimal, detecting infestations is influenced by management practices. Nests are rarely entered if the breeding attempt fails, and otherwise only during banding when parasite loads may be low. Therefore, monitoring should continue to assess their frequency and affect on nestling survivorship (Strategy Section I).

Mortality. Examining bald eagle mortality helps determine population trends, health, and to detect environmental problems. However, determining acceptable mortality rates for stability is difficult. In bald eagles of Arizona, 2 studies reported an average 16% mortality from 1987 to 1990 (5.25 breeding adults annually) (Hunt et al. 1992), and 12% mortality from 1991 to 2003 (Allison et al. in prep.) (Table 5). Comparatively, adult bald eagles in Arizona have a mortality rate that is higher, but within the range of, other populations. Similar to other studies, Allison et al. (in prep.) found adult mortality in Arizona has a strong influence on population trends.

Table 5. Age-specific survivorship estimates for bald eagles across their range.

Study Area	Mortality Rates	Years	Study
Northern California	0.05	1983-1991	Jenkins (1992)
Saskatchewan	0.06-0.08	1968-1981	Gerrard et al. (1992)
Maine	0.09	1981-1985	McCollough (1986; pre-feeding)
Coastal Alaska	0.12	1989-1992	Bowman et al. (1995)
Arizona	0.12	1991-2003	Allison et al. (in prep.)
Arizona	0.16	1987-1990	Hunt et al. (1992)
Chesapeake Bay	0.17	1981-1990	Buehler and others (1991)

Arizona recorded 281 bald eagle deaths from 1987 to 2005 (Hunt et al. 1992, Mesta et al. 1992, Allison et al. in prep., AGFD unpublished data) (Table 6). Of these, 91 deaths were adults, 33 were subadults, and 157 were nestlings. Some breeding adult deaths are based on the assumption that a breeder is dead once replaced. This assumption is still valid as in 18 years of identifying adults in Arizona, only on 2 occasions did an adult reappear in a pair after being replaced (Allison et al. in prep, AGFD unpublished data).

Finding a bald eagle carcass before predators or scavengers is rare (Hunt et al. 1992) and contributes to 95 (34%) of our reported bald eagle deaths being undetermined. To address this issue, AGFD and the USFWS initiated a protocol in 2003 for identifying, documenting, and processing all bald eagle carcasses found in Arizona. This procedure allows for the monitoring of mortality factors to facilitate implementing reactive management (Strategy Section II.G.7).

Table 6. Probable causes of bald eagle mortality in Arizona, 1987 to 2005.

Mortality factor for bald eagles in Arizona[1]	Adults[2]	Subadult	Nestlings	Adults	Subadult	Total
Unknown	3	1	78	8	5	95
Replacement/Intruding Adult	52	4	8	--	--	64
Lead Poisoning	1	--	--	16	5	22
Starvation	1	2	11	2	--	16
Predations	1	--	14	--	--	15
Heat stress	--	--	10	--	--	10
Mexican chicken bugs	--	--	12	--	--	12
Shot	2	4	--	1	1	8
Fell from nest	--	--	6	--	--	6
Impact injury	--	2	2	1	1	6
Electrocution	--	3	1	--	1	5
Drowned	--	1	2	--	1	4
Poisoning	1	2	--	--	--	3
Bacterial infection	1	--	2	--	--	3
Fishing line	1	--	2	--	--	3
Siblicide	--	--	3	--	--	3
Abandonment	--	--	2	--	--	2
Physiological problems	--	--	2	--	--	2
Bee stings	--	--	1	--	--	1
Frostbite	--	--	1	--	--	1
Total	63	19	157	28	14	281

[1]Includes results reported in Hunt et al. (1992) and Mesta et al. (1992). [2]Shaded areas = bald eagles hatched or breeding in Arizona.

Subadult breeding bald eagles. Literature describes only a few instances, and offers minimal explanations, for subadults breeding. Bent (1937) described subadult breeding bald eagles as rare. Nye (1983) and Mulhern et al. (1994) attributed breeding subadults to reintroductions into extirpated habitat of New York and Kansas. Palmer (1988) also described subadults breeding in Florida and the Aleutian Islands. Hunt et al. (1992) surveyed 14 bald eagle biologists throughout North America and found the known incidence of breeding subadults was 0.02%. In addition, Gerrard et al. (1992) determined population stability in Saskatchewan was "maintained as a result of the bald eagles deferring first breeding to age six." Hunt et al. (1992) believed there were 2 possible explanations for subadults breeding (assuming no emigration or immigration): 1) Arizona's floating adults could be creating territories at such an accelerated rate that only near-adults are left to fill the gaps left by mortalities in known pairs, or 2) high mortality in Arizona breeders is draining itinerant adults, leaving only near-adults to breed.

Figure 25. Breeding subadult bald eagle on the lower Verde River, Maricopa County, Arizona (Photo by J. Driscoll).

Subadults are common members of bald eagle pairs in Arizona, and have accounted for 26.0% of the recruitments from 1987 to 2004 (n=149) (Hunt et al. 1992, Allison et al. in prep., AGFD unpublished data) (Fig. 25). From 1987 to 1990, Hunt et al. (1992) identified 52.2% (n=22) subadult plumage recruitments and Allison et al.

(in prep.) identified 22% (n=127) from 1991 to 2003. Different than Hunt's study, but because of their banding efforts, Allison et al. (in prep.) could differentiate between 4 year old near adults, and those birds retaining the near adult plumage to a later age (up to 7 years old). This factor may have inflated Hunt's numbers.

We examined the occurrence of subadults entering breeding pairs and the influence it may have on productivity from 1983 to 2005 (Hunt et al. 1992, Allison et al. in prep., Jacobson et al. 2005). Of the known age bald eagles (not based on plumage), subadults had a first year productivity of 0.93 young/occupied nest (n=16), and adults 0.82 (n=38). Even though our sample size was low, it does not appear that the occurrence of subadults in breeding pairs is negatively affecting productivity.

Because the floating population is a demographic difficult to observe, our current understanding of its ecology remains limited. Allison et al. (in prep.) estimated there are about one fifth as many floaters as breeders in Arizona. It is safe to assume the floating population fluctuates in size and age distribution annually as: 1) some vacancies in breeding pairs remain unfilled due to the time of the mortality and suitability of the habitat, 2) the annual variability of productivity and survivorship adds less floaters in some years and more in others, and 3) not all adults enter the breeding pairs the first year they are physically able to breed (Allison et al. in prep.). These behaviors may account for some subadults entering breeding pairs.

Further examination into the occurrence of subadults breeding, floating populations, and their relationship to adult mortality can occur through the continuation of ORA flights, nest surveys, banding nestlings, and identifying adults (Strategy Sections II.C, II.D, II.F, and II.G).

Natal origin of breeding adults. Determining natal origin helps identify the level of breeding adult exchange between neighboring populations. In a survey of biologists studying 9 bald eagle populations, Hunt et al. (1992) found only 2 breeding adults outside of their natal area (330 km and 418 km). Studies in Texas and the Greater Yellowstone Ecosystem also found that bald eagles tend to breed near their natal area (Mabie et al. 1994, Harmata and Montopoli 1998).

To determine if the same held true for breeding bald eagles in Arizona, biologists placed bands on nestlings starting in 1977. The early banding efforts (before 1985) were opportunistic, the bands were difficult to read without capturing the bird, and attempts to increase the visibility of these bands failed. Since 1987, biologists made a concerted effort to band all nestlings, and use color visual identification bands that can be identified with a spotting scope. In all, 71.4% (n=539) of fledglings in Arizona were banded from 1977 to 2004, and 73.2% (n=884) of breeding adults in Arizona were identified from 1991 to 2004 (Hildebrandt and Ohmart 1978; Haywood and Ohmart 1980, 1981, 1982, 1983; Grubb 1986a; Hunt et al. 1992, Mesta et al. 1992, Allison et al. in prep., AGFD unpublished data).

Of all breeding adults in Arizona from 1987 to 2005 whose natal origins were known, 97% (n=64) bred within 300 kms of their natal area (Fig. 26). Allison et al. (in prep.) found adult females in Arizona traveled an average 121.3 km from the natal area to breed, and males 44.4 km. Resighting bands also showed 41.8% of the bald eagles hatched in Arizona, 18.8% likely hatched in Arizona before 1985 (single banded, assuming no immigration or emigration), 0.6% are from another state, and 38.8% are from an unknown origin (unbanded) (n=160), (Hunt et al. 1992, Mesta et al. 1992, Allison et al. in prep., AGFD unpublished data) (Fig. 27). One adult

breeding in Arizona originated from another state (southeast Texas), and 1 reported fledgling from Arizona bred elsewhere (Temecula, California) (R. Jurek pers comm., Mabie et al. 1994).

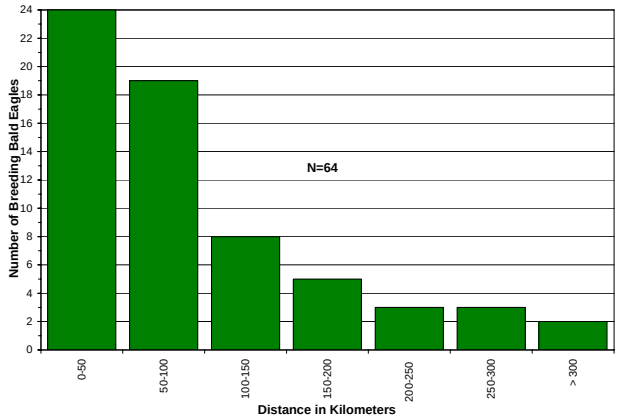


Figure 26. Dispersal distance of breeding bald eagles in Arizona, 1987 to 2005.

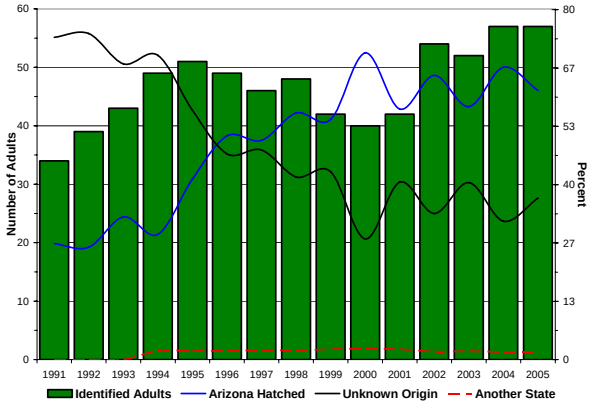


Figure 27. Natal origin of identified breeding bald eagles in Arizona, 1991 to 2005.

Habitat suitability determines breeding density, distribution, and abundance. Bald eagle BAs in the Southwest are more widespread and fewer in number compared to other regions with abundant prey and nesting substrate (e.g. the Great Lakes, Pacific Northwest, and Southeast). Arizona has 50 bald eagle BAs, southern California 4, Colorado 42, Nevada 4, New Mexico 5, and Utah 4. The small number of BAs and large distances between adjacent population centers limit emigration and immigration between them. This will be the case until the Southwest or neighboring populations expand their distribution to occupy, and/or surveys are conducted to identify the new or existing BAs within, these distribution gaps.

Continued management of the breeding population in the Southwest will ensure the species persistence until these gaps are bridged and/or the new or existing BAs are discovered. Documenting this integration is accomplished through the nest survey, ORA flights, banding nestlings and identifying adults (Strategy Sections II.C, II.D, II.F, and II.G).

Other assessment factors

Identification of possible breeding locations. The historical distribution and abundance of the breeding bald eagle in Arizona is not well known. Also unknown is: 1) the amount suitable bald eagle habitat depleted by diversion dams, channelization, grazing, recreation, 2) the effects of dams, and 3) the effects of the loss of fish diversity along the lower Colorado, Gila, Salt and Verde rivers. Regardless, the restoration of riparian habitat and prey populations in Arizona will aid the bald eagle's continued expansion.

While we can expect the establishment of BAs in more unusual locations (e.g. Becker, Dupont, Granite Basin, and Rock Creek BAs), we do not anticipate BA densities on other Arizona waterways to be similar to the lower Verde River. Historically, Arizona's documented breeding range is: Canyon de Chelly to the north; Winkelman, Gila River to the south; Luna Lake, San Francisco River to the east; and Topock Marsh, Colorado River to the west. This diversity in breeding habitat can make predicting expansion difficult, however using their current distribution, nest surveys, and atlases as a guide, land managers can identify potential habitat and make improvements to similar habitats for expansion to occur (e.g. Jacobson et al. 2005) (Strategy Section II.D).

Habitat designations and advisories. Some bald eagle BAs occur on lands protected by The National Wild and Scenic Rivers Act of 1968, The Wilderness Act of 1964, and a Federal Aviation Administration (FAA) advisory. These acts control the type of transportation and activities within their boundaries, therefore management to control the amount of human activity within these bald eagle BAs is not necessary. Maintaining these designations and advisories, with support through proper public education and outreach, will reduce management needs for the bald eagles breeding within the boundaries.

The Wild and Scenic Rivers Act of 1968 (P.L. 90-542) serves to protect "selected rivers of the Nation which, with their immediate environments, possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values." It preserves rivers and their immediate environments for the benefit and enjoyment of present and future generations. The Verde River from Childs Power plant to Red Creek is designated as a "Wild River," and is free of impoundments and the floodplain inaccessible except by trail, with primitive watersheds or shorelines, and unpolluted waters. The Verde River from Beasley Flat to Childs Power Plant is designated as a "Scenic River," and is free of impoundments with largely undeveloped shorelines and largely primitive watersheds, but accessible in places by roads. Four bald eagle BAs exist within these designations. The Ladders and Coldwater BAs are located between Beasley Flat and Childs Power Plant, and the East Verde and Table Mountain BAs are found between the Childs Power Plant and Red Creek.

The Wilderness Act of 1964 (16 U.S.C. 1131-1136) designates primitive land "for the American people of present and future generations the benefits of an enduring wilderness. Wilderness areas will be administered for the use and enjoyment of the American people in such a manner as will leave them unimpaired for future use and enjoyment as wilderness, and so as to provide for the protection of these areas, and their wilderness character (sic)." Six bald eagle BAs exist within this designation. The Pinal, Redmond, and Canyon BAs are located in the Salt River Canyon Wilderness (Gleason Flat to Highway 288 Bridge), the Horse Mesa and Rock Creek BAs are found in the Four Peaks Wilderness (surrounding the Four Peaks Mountains), and the Ive's Wash BA is in the Rawhide Mountain Wilderness (downstream of Alamo Lake). All of these BAs, with the exception of Canyon, nest within the wilderness boundaries. The Canyon pair nests on WMAT land, but their suspected foraging area is within the boundaries.

AGFD, ADOT, and the FAA worked together to apply a 2000 ft AGL ceiling to the airspace above bald eagle BAs on the Alamo Lake, Lake Pleasant, and the Salt and Verde rivers. Although providing special status, it is only an advisory as defined by Federal Aviation Regulations Part 73.

OVERVIEW

This document provides a threat analysis of the bald eagle in Arizona, and outlines a coordinated strategy to counteract them (see below). In addition, we have outlined the specific management issues and needs for each of the 50 BAs (Appendix B). Collectively, the suggested management actions provide guidance for land and wildlife agencies to manage the bald eagle in Arizona in the future.

As mentioned in the introduction, the key to successfully implementing these guidelines in an environment absent the ESA is the continuation of funding. Because of the different state and federal agencies, Native American Tribes, and private groups with responsibilities and/or interest

in bald eagles in Arizona, a variety of funding opportunities exist. Therefore, funding responsibility can be distributed equitably (Appendix C). The funding levels provide for the coordination, monitoring, surveys, and management activities described. Additional items such as closure signs, educational materials, lab analysis, etc. will be funded separately when the need exists (Strategy Section X).

In addition to funding, involving the public is also critical to successful implementation of these guidelines (Strategy Section IV). Public education and investment into bald eagle management is necessary due to increasing human populations and the subsequent increase in recreational demands in and around bald eagle habitat. We must continue to gain the public's support statewide, locally, and within BAs through personal contact and the media. Hunt et al. (1992) emphasized this notion:

> "Ultimately, the fate of Arizona's small population of bald eagles will depend upon whether people value it sufficiently. Our experience in the field clearly suggests most people do regard the bald eagle with admiration, respect, and interest…there can be little doubt television specials, newspapers, and magazines directly benefit the bald eagles, not only by invoking our appreciation, but also producing pleasing images in our minds of the lives and habitats of the wild bald eagle, thus educating us to the realities of their ecological needs."

CONSERVATION STRATEGY

The outline below: 1) details the past projects and programs used to understand the ecology of the bald eagle in Arizona and their challenges, 2) describes new methods to manage for the species in the future, 3) gives guidance to implement adaptive management for continued conservation, and 4) promotes cooperation, communication, and the sharing of information with all agencies and the general public.

As previously mentioned, funding all of these strategies will be difficult in a post-delisting scenario. To plan effectively, we have developed an Implementation Priorities Matrix to identify the projects, and the level of management, necessary for the continued conservation of the bald eagle in Arizona post-delisting (Strategy Section XI). We will use the defined strategies, through the Implementation Priorities Matrix, to guide future Arizona Bald Eagle Management.

I. MAINTAIN THE SWBEMC

A. The SWBEMC contains a representative from each federal, state, and local agency, Native American Tribe, and private organization responsible for bald eagle management. Other interested parties, such as private groups and landowners will be encouraged to cooperate with the committee.

B. The SWBEMC will coordinate, assist, and implement through the AGFD, management activities outlined in the conservation strategy, and as prioritized in the Implementation Priorities Matrix. We will meet twice each year (January and July) to review information provided by the interested and affected parties, outline management guidelines and research needs, identify future projects affecting the species, discuss solutions and define management issues, identify funding needs and sources, and implement strategies to

counteract the threats. SWBEMC may meet more frequently as deemed appropriate and explore other areas of bald eagle management as necessary (e.g. public relations).

C. The SWBEMC has been chaired since its inception by AGFD. As the state wildlife agency conducting and coordinating most management-based activities, AGFD will continue to chair the SWBEMC.

II. MANAGEMENT EFFORTS

A. Maintain Existing and Implement Planned Seasonal BA Closures.
   1. Closures will remain in place for the duration of the post-delisting monitoring period. Unless evaluated and agreed upon by the SWBEMC, these closures shall be maintained as they currently exist with the same boundaries.
      a. Arizona Game and Fish Department.
         1) Closures restricting terrestrial and watercraft entry.
            i) Region I.
               a) Becker BA – February 1 to June 30.
         2) Closures restricting watercraft entry.
            i) Region III.
               a) Lynx BA – December 1 to June 30.
            ii) Region IV.
               a) Alamo BA – January 1 to June 30.
            iii) Region VI.
               a) Tonto BA – December 1 to June 30.
               b) Pinto BA – December 1 to June 30.
      b. Bureau of Land Management.
         1) Closures restricting watercraft entry.
            i) Phoenix Resource Area.
               a) Coolidge BA.
      c. Maricopa County Parks and Recreation.
         1) Closures restricting terrestrial and watercraft entry.
            i) Lake Pleasant BA – December 15 to June 15.
      d. San Carlos Apache Tribe.
         1) Closures restricting watercraft entry.
            i) Talkalai BA – December 1 to June 30.
         2) Closures restricting terrestrial entry.
            i) San Carlos BA – December 1 to June 30.
      e. U.S. Forest Service.
         1) Closures restricting terrestrial entry and allow watercraft to float through, but boaters cannot disembark or stop in the river.
            i) Prescott/Coconino National Forests.
               a) Ladders BA – December 1 to June 30.
            ii) Tonto National Forest.
               a) Needle Rock (which includes the Bartlett, Box Bar, and Needle Rock BAs) – December 1 to June 30.
               b) Cliff BA – December 1 to June 30.

2) Closures restricting terrestrial and watercraft entry.
   i) Tonto National Forest,
      a) Pinto BA – December 1 to June 30.
      b) 76 BA – December 1 to June 30.
      c) Tonto BA – December 1 to June 30.
3) Closures allowing watercraft to float through, but boaters cannot disembark or stop in the river.
   i) Tonto National Forest.
      a) Redmond BA – December 1 to June 30.
      b) Table Mountain BA – December 1 to June 30.
4) Closures restricting land access.
   i) Apache-Sitgreaves National Forest.
      a) Luna BA – January 1 to June 30.
   ii) Coconino National Forest.
      a) Lower Lake Mary BA – January 1 to August 31.
      b) Tower BA – December 1 to June 30.
   iii) Prescott National Forest.
      a) Lynx BA – December 1 to June 30.
   iv) Tonto National Forest.
      a) Blue Point BA – December 1 to June 30.

f. White Mountain Apache Tribe.
   1) Closures restricting land access.
      i) Cibecue BA – December 1 to June 30.

2. The boundaries for 5 closures are pending and have not yet been established (2006).
   a. U.S. Forest Service.
      1) Closures allowing watercraft to float through, but boaters cannot disembark or stop in the river.
         i) Coconino National Forest.
            a) Coldwater BA.
            b) East Verde BA.
      2) Closures restricting terrestrial and watercraft entry.
         i) Coconino National Forest.
            a) Oak Creek BA.
      3) Closures restricting terrestrial entry.
         i) Apache-Sitgreaves National Forest
            a) Crescent BA.
         ii) Tonto National Forest.
            a) Granite Reef BA.
3. No adverse changes to the landscape or increased access will occur within the boundaries of any existing or currently planned closure. Beneficial or restorative landscape changes may occur outside of the closure dates or when it has been determined the breeding pair will not lay eggs or attempt to double clutch.
4. If by March 31, the breeding pair is not occupying the BA or the specific nest a closure protects, or the pair in an occupied BA does not lay eggs in a nest within a closure, then the closure can be lifted and the area opened to the public.
5. If the pair lays eggs but the breeding attempt fails, the closure can be opened to the public if the pair does not double clutch within 45 days after the failure.
6. If closure boundaries do not adequately protect the breeding attempt from human activity then AGFD and the land manager will discuss ways to improve the closure.

7. The boundaries of the closure will be marked. The land management agency responsible for the closure will provide signs. Signs are to be in place and/or replaced annually by the land manager before the start date (for those vandalized or missing) to adequately mark the closure's boundaries.
8. If a new BA or new nest in a known BA is discovered (not in the current closure), AGFD and the land manager will discuss the need to develop a new closure or adjust the current boundaries (Section III).

B. Bald Eagle Winter Count
   1. Continue to coordinate and conduct a winter count in January for as long as there is a National Winter Count effort according to the protocol and routes established (1995) and amended (2006) (Beatty et al. 1995b, AGFD in prep.).
   2. Four days of helicopter flights are required to survey 24 routes (primarily the Black, Gila, Salt, Verde, and White rivers).
      a. Only people essential to the mission participate (three seats are available). To maintain consistency and accuracy in winter counts, a representative of AGFD will be present on the flights. When flying over Apache Tribal lands, a representative of the SCAT and WMAT will be present as available.
   3. An annual report will be provided to the SWBEMC describing results of the winter count.

C. Monitor Productivity through Monthly ORA Helicopter Flights.
   1. Continue to conduct monthly ORA flights from January to June for the duration of the post-delisting monitoring period.
      a. Only people essential to the mission participate (three seats are available). To maintain consistency and accuracy in ORA flights, a representative of AGFD will be present on the flights. When flying over Apache Tribal lands, a representative of the SCAT and WMAT will be present as available.
   2. An annual report will be provided to the SWBEMC describing results of the ORA flights.

D. Determine current species distribution with an annual Nest Survey.
   1. Conduct an annual nest survey for new BAs, alternate nests in known BAs, and breeding activity/occupancy at historical BAs for the duration of the post-delisting monitoring period.
   2. Use ground visits in concert with ORA flights to investigate new areas, and historical and current BAs.
   3. Site-specific information will be entered into AGFD's Heritage Database Management System.
   4. Continue to update and produce a "working" and "historical" nest map atlas for agency use.
      a. The "working" nest map atlas will describe only those BAs and nests which currently exist. The "historical" nest map atlas will describe all known BAs and nests, past and present. The "historical" atlas (Hunt et al. 1992) was most recently revised by USBR in 1995, and the "working" atlas by SRP in 2004.
      b. The necessity of updating the atlases will be determined by the SWBEMC and based upon the amount of new information accrued.

c. Atlases are distributed only to the SWBEMC. The site-specific locations are considered sensitive information, used only for official purposes, and are not distributed to parties outside of the agencies.

5. An annual report will be provided to the SWBEMC describing results of the survey.

E. Arizona Bald Eagle Nestwatch Program.
1. Identify the specific BAs requiring monitoring.
2. Monitoring at the primary BAs will remain funded for at least the duration of the post-delisting monitoring period. After this period, the SWBEMC will evaluate the need to continue monitoring these BAs on an annual basis. The level of human activity, access to the nest, and productivity potential distinguishes primary and secondary BAs.
   a. Primary BAs the ABENWP should monitor.
      1) Box Bar, Needle Rock, Pleasant, Tower, and Tonto and Pinto (when boats can access the nest trees).
   b. Secondary BAs the ABENWP should monitor if a primary BA fails or if additional funding exists.
      1) Bartlett, Ladders, Lower Lake Mary, Luna, Orme, and San Carlos.
3. Conduct ABENWP (methodology, scheduling, etc.) per Jacobson et al. (2005).
4. If a new BA or nest in a known BA is discovered, or if the human activity of a BA changes, the SWBEMC will assess the need for monitoring (Section III).
5. An annual report will be provided to the SWBEMC describing the results of the ABENWP monitoring.

F. Enter Nests to Manage Bald Eagles.
1. Continue entering nests to mark nestlings with USFWS and color visual identification bands, and collect supplemental information as available until there is sufficient data to determine items in Sections II.G.1. to II.G.3. Where allowable and appropriate to other management objectives, gain helicopter access to nests in designated wilderness and other closed areas.
   a. Band, measure, and determine sex of nestlings between 5 and 7 weeks-old per Hunt et al. (1992).
   b. Collect eggshell fragments and/or addled eggs.
   c. Collect prey remains.
   d. Collect any foreign material (e.g. fishing line).
   e. Check nest and nestlings for the presence of parasites or other arthropods. If found, collect and identify.
   f. If necessary, repair/rebuild a deteriorating nest.
2. If a nest fails, attempt to enter the nest to determine cause of failure, complete items II.F.1.b.through II.F.1.f. as necessary.
3. If a nest is entered to return or rescue a nestling, complete items II.F.1.c. through II.F.1.f. as necessary.

G. Monitor and Assess Population Dynamics.
1. Model demographics on data collected since 1987 to determine reproduction, mortality, and survivorship rates for bald eagles in Arizona.
2. Produce a document summarizing results of the demographic analysis.
3. Use data collected from demography analyses to determine objectives for the bald eagle in Arizona and re-evaluate management priorities for the species.

4. Identify breeding adults when visiting BAs per Beatty and Driscoll (1996b) until sufficient data are collected to complete items in Sections II.G.1. to II.G.3.
5. Color band and determine the sex of nestlings per Hunt et al. (1992) (Section II.F).
6. Trap breeding adults marked with USFWS bands only and/or other markers (not placed by SWBEMC members) to determine natal origin as needed for items in Sections II.G.1. to II.G.3.
7. Process all mortalities through the AGFD and USFWS according to the protocol established in 2003. The AGFD will maintain a mortality database.

H. Monitor Environmental Contamination in the Breeding Population.
   1. Collect eggshell fragments opportunistically when entering nests to band nestlings (Sections II.F.1.b and II.F.2).
      a. Measure eggshell fragment thickness per Grubb et al. (1990).
      b. Archive eggshell fragments at the Western Foundation of Vertebrate Zoology in Camarillo, California.
      c. Produce a document summarizing results of the eggshell thickness analysis.
   2. Collect addled eggs for analysis of organochlorines and heavy metals (Sections II.F.1.b and II.F.2).
      a. Use Sections II.C, II.D, and II.E to aid in the estimation of egg laying and nestling hatch dates.
      b. Analyze contents of addled eggs through the USFWS Patuxent facility for organochlorines and heavy metals to retain consistency and high quality control.
      c. Section II.H.1. applies.
   3. Monitor the presence of organochlorine and heavy metals in fish.
      a. Complete a statewide analysis in 2006 of fish in bald eagle BAs per King et al. (1991) and 1996 (AGFD unpublished data).
      b. Produce a document summarizing results of the contaminant analysis.

I. Maintain Awareness of Disease, Parasites, and Predation
   1. Continue to monitor the occurrence of parasites and diseases in breeding bald eagles and wintering migrants.
      a. Instruct ABENWP contractors of common behavioral changes indicating possible parasite infestation and/or disease.
      b. Section II.F.1.e. applies.
      c. Although not expected, Mexican chicken bugs could occur at levels that affect productivity. The SWBEMC should discuss the risks associated with using natural pesticides on infested nests, and implement a program to control the parasite.
      d. Section II.G.7. applies.
      e. When possible, potentially diseased bald eagles should be examined by a veterinarian experienced in birds of prey.
      f. SWBEMC should discuss the presence of any disease outbreaks and implement a program to counteract its affects.

III. Guidelines For Initiating Management For New Nests Or BAs

A. Notify the land manager and advise SWBEMC of the discovery.
   1. Investigate the BA on the ground to examine potential conflicts.
   2. Monitor the BA through Sections II.C, II.D, II.F, and II.G.

3. Discuss land use and potential threats to breeding/foraging habitat, etc.
4. Apply Section III.C.

B. If there are concerns with ongoing recreation/human activity, monitor the BA with Section II.E.
   1. If human activity is not found to be a threat to the success of the breeding attempt then monitor the BA through Sections II.C, II.D, II.F, and II.G.
   2. If human activity is found to be a minimal threat to the success of the breeding attempt, then maintain Section II.E.
   3. If existing human activity is found to be a persistent threat to the success of the breeding attempt, develop closure boundaries similar to those in Section II.A.1.
   4. If the type or frequency of human activity changes, the BA will need to be re-evaluated to determine the level of monitoring.

C. Protect BAs from Adverse Affects.
   1. Buffer Zone 1.
      a. Zone 1 is a 500 ft radius around a nest on land, and a 300 ft radius around a nest surrounded by water. In this area, breeding eagles are most sensitive to human activity and the greatest degree of protection is needed.
      b. Breeding Season - December 1 to June 30.
         1) From December 1 until eggs are laid, no activity occurs around all known nests.
         2) Once a nest is chosen and eggs are laid, activity restrictions around unused alternate nests in Zone 1 become dependent upon their proximity to the active nest.
         3) If the pair lays eggs but the breeding attempt fails, all buffer zone restrictions will remain in place to ensure protection in case the pair double clutches within 45 days after the failure.
      c. Non-breeding Season - July 1 to November 30.
         1) No activity will adversely change the landscape, including but not limited to residential, industrial, or commercial development, construction, timber cutting, etc.
         2) Limited activity or projects requiring a short duration of time, such as fence building, cattle roundups, etc. are acceptable.
      d. The SWBEMC will discuss any planned human activity or projects deviating from these guidelines.
   2. Buffer Zone 2.
      a. Zone 2 is a 500 to 1000 ft radius around a nest on land, and a 300 to 1000 ft radius around a nest surrounded by water. In this area, human activity is limited, but not restricted during the breeding season. Bald eagles remain sensitive to activity, but to a lesser extent than Zone 1.
      b. Breeding Season - December 1 to June 30.
         1) From December 1 until eggs are laid, only brief activities can occur. Acceptable activities are those occurring for a short period, such as passing by in a vehicle, walking through, and/or monitoring a gauging station.
         2) Once a nest is chosen and eggs are laid, activity restrictions surrounding unused alternate nests in Zone 2 become dependent upon their proximity to the active nest.

3) If the pair lays eggs but the breeding attempt fails, all buffer zone restrictions will remain in place to ensure protection in case the pair double clutches within 45 days after the failure.

c. Non-breeding Season - July 1 to August 15.
   1) No activity will adversely change the landscape, including but not limited to residential, industrial, or commercial development, construction projects, timber cutting, etc.
   2) Limited activity or projects requiring a short duration of time, such as fence building, cattle roundups, etc. are acceptable.
   3) Maintenance activities such as selective thinning of timber stands to improve habitat, and upkeep of existing buildings and roads are acceptable.

d. The SWBEMC should discuss any planned human activity or projects deviating from these guidelines.

3. Buffer Zone 3.
   a. Zone 3 is a 1000 to 2500 ft radius around a nest. In this area, more flexibility exists and limited activity can occur year-round.
   b. Breeding Season - December 1 to June 30.
      1) No activity will adversely change the landscape, including but not limited to residential, industrial, or commercial development, construction projects, timber cutting, etc.
      2) Limited activity or projects requiring a short amount of time, such as passing by in a vehicle, walking through, and/or monitoring a gauging station, fence building, cattle roundups, etc. are acceptable.
   c. Non-breeding Season - July 1 to November 30.
      1) No activity will adversely change the landscape, including but not limited to residential, industrial, or commercial development, construction projects, timber cutting, etc.
      2) Most activities within this area are possible outside of the breeding season. However, perches, roosts, and foraging areas must be considered in the implementation of any project.
      3) Maintenance activities such as selective thinning of timber stands to improve habitat, and upkeep of existing buildings and roads can occur.
   d. The SWBEMC should discuss any planned human activity or projects deviating from these guidelines.
4. Any activity will be stopped if a negative impact to breeding pair becomes apparent. AGFD and the land manager will immediately establish more appropriate guidelines for the project/activity so it can be resumed without impact.
5. If a nest fails and there is no second clutch of eggs laid, then all management will turn to regulations designed for the non-breeding season.
6. When BAs are near existing recreation centers, roads, occupied buildings, etc. within the protection zones, then the SWBEMC will develop a strategy to best manage the area.

IV. PUBLIC EDUCATION

A. As needed, update, produce, and distribute brochures describing bald eagle life history, management strategies, and threats.
   1. Brochures will be given to the public when contacted by the ABENWP in the field.

2. Brochures will be provided to the public at various agencies regional locations, such as AGFD, USFS, and BLM state and district offices.
3. Brochures will be made available in Spanish and English.

B. As needed, update, produce, and help distribute the "Bald Eagles Need Your Help" brochure. The brochure provides pilots with information about the FAA recommended 2000 ft above ground level ceiling over bald eagle BAs.
   1. Distribute to all pilots when renewing their licenses.
   2. Provided to the public at local airports within the bald eagle's breeding range.
   3. Increase awareness for the advisory by displaying posters in pilot's lounges with delineated advisory areas.
   4. Seek out opportunities to speak with pilot clubs, Boeing, AirEvac, Sheriff's Office, and the Air Force to educate them on the potential impacts of low-flying aircraft on the breeding cycle.

C. Signs should mark closure boundaries (Section II.A.7).
   1. Land managers will place additional interpretive signs at closure boundaries.
   2. Signs will be in Spanish and English.

D. A five-panel, color photograph display (housed at AGFD) is available for use at workshops, seminars, and fairs, etc.

E. Use agency public information officers to issue press releases and articles about bald eagles.

F. Provide opportunities to local and national television media to produce shows/news segments, etc. on bald eagles.

G. The SWBEMC's Public Relations subcommittee will continue to develop creative ways to educate the public. Examples of innovative approaches and possible products:
   1. A live telecast of an active nest on local cable access television from a solar powered video camera.
   2. Bald eagle's in Arizona posters with biological information for schools and agencies.
   3. Public service announcements on local radio channels (and at low-frequency site specific stations at recreation centers like Lake Pleasant).
   4. A poster for airports to hang informing pilots of advisories.
   5. All items should be in Spanish and English.

H. Address negative effects of fishing line and tackle through increased public education and the Monofilament Recovery Program.
   1. Produce press releases to mass media.
   2. Provide information to television stations.
   3. Provide information/articles to angling public.
   4. Provide information in AGFD fishing regulations.
   5. Provide information to angling magazines.
   6. Contact fishing equipment manufacturers to discuss ways to promote recycling of fishing line.
   7. Develop a display for AGFD's Wildlife Building.

8. Develop and distribute a brochure specific to fishing line and tackle's effects on wildlife.
9. All items should be in Spanish and English.

V. RIPARIAN HABITAT

A. Discuss and implement appropriate measures to stabilize and improve riparian habitat along the Gila, Salt, and Verde rivers, and Tonto Creek.
   1. Cottonwood pole or seedling plantings, fencing of riparian areas to exclude livestock, more timely (natural) water releases from dams, and maintenance of newly planted trees are some methods of restoration.
   2. Continue to conduct member agency reviews of the management programs and recovery plans for other species which focus on improving riparian habitats in regulated and unregulated rivers.
   3. Consult experts as necessary.

B. In locations where rehabilitation of the habitat cannot occur, discuss constructing artificial nesting structures.
   1. Any artificial nesting structure must be placed in an area where it does not increase management, monitoring, or restriction needs. For example, an artificial nest should not be placed along a lake's shoreline, below maximum water level, in high use recreation areas, or next to a well-traveled trail/road.
   2. Artificial nest structures will appear as natural as possible to maintain the bald eagle's use of the area. Factors such as perches and protection from the sun should be incorporated.

VI. FISH POPULATIONS

A. Discuss and implement ways to restore fish diversity to the lower Gila, and the upper Salt and Verde rivers.

B. Consider impacts to bald eagles in fish stocking proposals.

C. Continue to monitor the diversity of fish along the unregulated and regulated Gila, Salt, and Verde rivers.

D. Continue to address sport fish stocking’s effects on bald eagles in impoundments where they are dependent on the stocked fish (e.g. Becker, Crescent, Lower Lake Mary, Luna, and Lynx).

VII. FORAGING AREAS

A. Continue to identify foraging areas through Section II.E. to manage for recreation and development.

B. Maintain fish populations and diversity through Section VI.

C. Maintain and improve riparian habitat through Section V.

D. Manage human activity in foraging areas appropriately.
   1. Discourage new developments within known foraging areas.
   2. Recommend existing recreation sites within foraging areas to be day-use only.

VIII. WINTER ROOSTS

A. Continue to identify roost locations through Section II.B. and record those locations similar to Section II.D.3.

B. Protect existing, newly discovered, and identified communal roost sites.
   1. Restrict human activity within 500 ft of a communal roost.
   2. Establish a 300 ft radius no-cut zone similar to those described in the Coconino National Forest's Land Management Plan.
   3. Avoid road development near communal roosts.
   4. If important roost sites are becoming less suitable due to loss of trees/snags, then thinning to promote growth of large roost trees within communal roost can occur.

C. Projects and activities causing disturbance to communal roosting bald eagles should be avoided from October 15 to April 15.

D. Prescribed fires to improve and protect communal roost areas should be used with extreme caution. Evaluate specific communal roost sites for stand condition, nearby roosts, and importance before application.

E. Roost stands exhibit old-growth characteristics, thus continued management for old-growth forests will provide replacement and additional roosts.

IX. KNOWN BA MANAGEMENT CONCERNS

A. The history of known BAs, their management concerns, most significant challenges, and needs are described in Appendix B.

X. FUNDING

A. Arizona Game and Fish Department's Bald Eagle Management Program Personnel (Appendix C).
   1. Wildlife Specialist II – Bald Eagle Management Coordinator.
   2. Wildlife Specialist I – Bald Eagle Field Projects Coordinator.
   3. Wildlife Specialist I – Bald Eagle Biologist.

B. Arizona Bald Eagle Nestwatch Program Personnel.
   1. 12 Contractors to Monitor 6 BAs.

C. Helicopter Flights.
   1. Winter Count – 2 eight-hour flights.
   2. Occupancy and Reproductive Assessment Flights – 10 eight-hour flights (2 in conjunction with the Winter Count Flights).
   3. Nest Survey – 1 eight-hour flight (conducted mostly during Occupancy and Reproductive Assessment Flights.

XI. IMPLEMENTATION PRIORITY

A. In order to manage the bald eagle in Arizona post-delisting, an Implementation Priorities Matrix will be used to identify the Conservation Strategies with the most influence on the species (Appendix D). Each action is assigned a priority, with a description of the strategy, the commitment, responsible agencies, and an estimate the cost of implementation to assist in planning.

B. The SWBEMC will use adaptive management to determine if priorities need changed based upon the species need.

C. Priority assignments are based on the following:

No. 1 Ranking:	Strategies necessary to document the status and maintain the current abundance and distribution by protecting the breeding areas/attempts.
No. 2 Ranking:	Strategies necessary to determine population viability and increase distribution.
No. 3 Ranking:	Strategies necessary to monitor the effects of natural and human caused threats.
No. 4 Ranking:	Strategies necessary to maintain public awareness.

D. Time and expenditure estimates are based on a minimum 5 year post-delisting monitoring effort since, as of 2006, no time frame has been established. Some strategies are estimated beyond this period, as they require more time for implementation and completion. Others will be reviewed by the SWBEMC to determine if they should continue past the post-delisting monitoring period (TBD). Funding estimates are approximate values for implementing the strategy and could vary accordingly.

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APPENDIX A: PRODUCTIVITY

Table 7. Productivity Summary of Bald Eagles in Arizona 1971- 2005.

Breeding Area	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Alamo																		S1	S1	S2	S2	S2	FS-1 S1	S1	S2	F	F	F	F	S1	F	S1	O	F	F
Ash														S1	S2	U	U	U	U	U	U	U	U	U	U										
Bartlett	S1	F	S2	F	S1	F	S2	S1	S1	S1	S2	S1	F	F	S1	S1	F	S2	S2	F	F	S1	S1	S1	S2	S2	F	S2	S1	F	F	F	S1	S2	F
Becker																													F	O	O	O	U	U	U
Blue Point	S2	F	U	U	U	U	U	U	O	O	S3	S3	S3	S2	S1	U	S3	S2	F	O	S2	S2	S2	S2	S2	S2	S3	F	S1	F	S1	S2	F	S2	S3
Box Bar																										F	FS-1	S2	F	S2	S2	S1	S1	S2	S1
Bull Dog																																	S2	S2	S2
Camp Verde																						F	O	U	U	U	U	U	U	U	U	U	U	U	
Canyon																S1	S1	S1	S1	S2	F	S1	S1	F	O	O	O	O	O	O	U	U	U	U	U
Cedar Basin								S2	F	U	O	O	U	F	F	F	F	F	F	F	O	F	F	F	O	F	F	F	O	O	O	O	U	O	U
Chino															S2	FS+2	F	U	U	U	U	U		U	U	U	U									
Cibecue			S1	?	S1	U	F	S2	F	F	U	F	F	S3	S1	S1	F	O	S1	F	S2	F	F	S1	S1	O	O	O	S1	O	O	F	F	F	F
Cliff														F	S2	F	O	S2	F	O	O	F	O	F	O	O	O	O	O	O	O	O	O	U	U
Coldwater																												F	F	F	F	S2	S1	S1	S2
Coolidge															F	S1	S2	S2	O	O	S1	S1	S2	F	S2	F	S2	F	F	F	F	F	S1	F	O
Crescent																																	F	S1	F
Doka																												S1	S2	S2	S2	S2	S1	S2	S2
Dupont																											F	S1	O	F	O	U	F	U	U
East Verde			S2	S3	S1	S2	S2	F	U	S2	S2	S2	F	S1	S2	S2	S1	S2	S2	F	F	S1	S1	F	S1	S1	F	F	S2	O	F	F	O	S1	O
Fort McDowell	S1	U	S1	S1	S2	S1	S2	S2	S2	F	S2	S2	S3	S3	S3	S2	S1	F	S2	F	S1	F	S2	F	F	O	S2	F	S1	S2	S2	S2	F	S1	F
Granite Basin																													F	O	F	O	O	U	U
Granite Reef																																S2	F	FS-1	S1
Horse Mesa													F	F	F	S2	S2	S1	F	S2	S3	F	S1	F	S1	S2	S1	F	S1	S1	S1	S1	S2	F	S1

U = Unoccupied, O = Occupied, S = Successful (n=eagles fledged), F = Failed, FS = Fostered, (n=+X, -X are eaglets fostered or taken)
Yellow shaded BAs – Designated Historical

Table 7. continued.

Breeding Area	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Horseshoe					F	S2	F	F	F	F	O	FS-2	S1	S2	S2	FS-2	S3	S1	F	S2	F	F	O	F	F	S1	S2	F	S2	S2	S2	S2	S1	S1 FS+1	F
Ives Wash																	S1	S1	S1	F	S2	S2	S1 FS+1	S1	S1	F	F	O	O	O	O	O	O	S3	S1
Ladders		F	S1	U	U	U	F	O	F	S2	S2	FS+2	S2	F	S2	S2	F	S2	S2	F	S2	S2	F	S2	O	S1	F	S3	S2	O	S1	S2	S2	S1	S1
Lone Pine														F	F	S1	F	S2	O	F	S1	F	F	F	O	F	F	O	S2	F	S1	F	O	S1	S1
Luna																								S1	S1	S2	S3	S1	S1	S1	F	S2	S1	S2	S2
Lynx																																F	F	S1	S1
Mule Hoof				S2	F	U	U	F	U	U	U	O	U	U	U	U	U	U	U	O	O	O	U	U	U	U	U	U	U	U	U	U			
Needle Rock																																S1	S1	S1	F
Oak Creek																																S2	S1	F	F
Orme																	S2	S1	O	S1	S1	S1	S1	S2	F	F	S2	S1	F S1	O	S1	S2	S1	S2	S2
Perkinsville																														S1	S1	F	S2	F	S1
Pinal									S2	F	S1	FS+1	S1	S1	S1	U	S2	F	S1	S2	S1	F	S1	S1	F	F	F	O	O	S1	U	S1	F	S1	S2
Pinto																			F	O	F	F	S1	F	S2	S3	F	O	S2	O	S2	F	O	S2	S2
Pleasant														F	F	U	O	U	O	O	O	F	S1	S2	S2	F	S2	S1	S1	S2	S2	S1	S1	S1	F
Redmond					F	S1	O	S1	S1	F	S2	S2	S2	F	S2	S1	S2	S1	F	S1	F	O	O	F	S1	F	F	S1	F	S1	S1	F	O	S1	O
Rock Creek																																S1	F	F	S1
Rodeo																														F	F	S1	F	S1	F
San Carlos																									S2	S1	FS+1	S2	O	F	O	F	O	S1	S1
76												FS-1	S1	S2	S1	S1	F	S2	O	S1	S1	S1	F	S2	F	S1	S2	S2	S1	S2	S2	O	O	F	U
Sheep													F	O	O	F	F	F	O	O	U	O	O	F	O	S2	O	O	S1	F	F	S2	F	F	S2
Suicide																													S2	S3	S2	F	S3	S3	S3
Sycamore																											F	S1	S2	F	S2	S1	S2	S2	S2
Table Mountain																		F	F	F	S1	F	S2	S1	S2	S1	S1	F	S1	F	F	O	F	F	F
Talkalai																								F	F	F	O	O	F	F	S1	S2	O	S1	S1

U = Unoccupied, O = Occupied, S = Successful (n=eagles fledged), F = Failed, FS = Fostered, (n=+X, -X are eaglets fostered or taken)
Yellow shaded BAs – Designated Historical

Table 7. continued.

Breeding Area	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Tonto																						F	S2	S1	S1	S2	S2	S1	S2	F	S1	S2	F	S2	S1
Tower																							S1	F	F	S2	S1	S2	S2	S2	S1	S2	S1	F	S1
Winkelman																										F	F	O	U	U	U	U	U	U	U
Total Fledglings	4	0	7	6	5	6	6	8	6	5	14	13	13	15	22	17	20	23	13	13	20	14	22	18	23	23	24	21	31	23	28	37	25	42	38

U = Unoccupied, O = Occupied, S = Successful (n=eagles fledged), F = Failed

APPENDIX B: BREEDING AREA MANAGEMENT NEEDS

Table 8. Management challenges and needs at bald eagle BAs in Arizona.

Breeding Area	Land Manager	Challenge	Needs
Alamo	AGFD BLM	Human activity, fishing line and tackle, riparian degeneration, nest inundation.	ABENWP, closure if nesting in snags in lake, MRP, riparian restoration, Emergency Protocol.
Bartlett	USFS	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, closure, MRP, riparian restoration.
Beaver	Private USFS	Human activity, fishing line and tackle, riparian degeneration.	MRP, riparian restoration.
Becker	AGFD	Human activity, fishing line and tackle, riparian degeneration, decreased occupancy.	ABENWP, water & land closure if breeding, MRP, riparian restoration, assessment of foraging areas.
Blue Point	USFS	Human activity, fishing line and tackle.	Assessment of human activity in relation to foraging areas, MRP
Box Bar	USFS	Human activity, fishing line and tackle, riparian degeneration, development.	ABENWP, closure, MRP, riparian restoration.
Bulldog	USFS	Human activity, fishing line and tackle, riparian degeneration, development.	Closure, MRP, riparian restoration, restrict development below Stewart Mt. Dam.
Canyon	WMAT	Decreased occupancy and productivity.	Restore fish diversity.
Canyon de Chelly	Navajo NPS	Human activity, fishing line and tackle.	Area restrictions, MRP.
Cedar Basin	WMAT SCAT	Decreased productivity.	Investigate prey/eggs for metals or organochlorines, fish surveys.
Cibecue	WMAT	Human activity, Mexican chicken bugs, decreased occupancy and productivity.	ABENWP, closure if in nests 2 or 3, restore fish diversity.
Cliff	USFS	Human activity, fishing line and tackle, riparian degeneration, decreased productivity.	ABENWP, closure, MRP, riparian restoration, fish surveys.
Coldwater	USFS	Human activity, prey availability.	Boating restrictions, restore fish diversity.
Coolidge	SCAT BLM	Human activity, riparian degeneration, loss of foraging areas.	Boating restrictions, riparian restoration, restore fish diversity, assessment of foraging areas.
Crescent	USFS	Human activity, fishing line and tackle, development.	ABENWP, closure, MRP, assessment of foraging areas.
Doka	FMYN	Human activity, riparian degeneration.	ABENWP, riparian restoration.
Dupont	USFS	Fishing line and tackle, decrease occupancy and productivity.	MRP, assessment of foraging areas.
East Verde	USFS	Human activity, prey availability.	Boating restrictions, restore fish diversity.

Table 8. continued.

Breeding area	Land Manager	Challenge	Needs
Fort McDowell	FMYN	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, MRP, riparian restoration.
Granite Basin	SCAT BLM	Human activity, riparian degeneration.	Boating restrictions, riparian restoration, restore fish diversity.
Granite Reef	USFS SRPMIC	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, closure, MRP, riparian restoration.
Horse Mesa	USFS	Fishing line and tackle, access.	MRP, gain helicopter access to Wilderness Area.
Horseshoe	USFS	Human activity, riparian degeneration, decreased productivity.	ABENWP, riparian restoration, assessment of foraging areas, restore fish diversity.
Ive's Wash	BLM	Human activity, fishing line and tackle, decreased occupancy and productivity.	Limit access below dam, MRP, assessment of foraging areas.
Ladders	USFS	Human activity, fishing line and tackle, Mexican chicken bugs, prey availability.	ABENWP, closure, MRP, parasite control, restore fish diversity.
Lone Pine	WMAT	Decreased productivity.	Fish surveys.
Lower Lake Mary	USFS	Human activity, fishing line and tackle.	ABENWP, closure, MRP.
Luna	USFS	Human activity, fishing line and tackle.	ABENWP, closure, MRP.
Lynx	USFS	Human activity, fishing line and tackle.	ABENWP, closure, MRP.
Needle Rock	USFS	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, closure, increase law enforcement, MRP, riparian restoration.
Oak Creek	USFS	Human activity, riparian degeneration, prey availability.	ABENWP, closure, riparian restoration, restore fish diversity.
Orme	SRPMIC	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, MRP, riparian restoration.
Perkinsville	USFS	Riparian degeneration, prey availability.	Riparian restoration, restore fish diversity.
Pinal	USFS	Fishing line and tackle, riparian degeneration, decreased occupancy and productivity.	MRP, riparian restoration, restore fish diversity.
Pinto	USFS	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, closure, MRP, riparian restoration.
Pleasant	MCPRD AGFD	Human activity, fishing line and tackle, development.	ABENWP, closure, MRP, restrict development from occurring near active nest.
Redmond	USFS	Human activity, fishing line and tackle, decreased occupancy and productivity, Mexican chicken bugs.	Closure, MRP, restore fish diversity, parasite control.
Rock Creek	USFS	Fishing line and tackle, access.	MRP, gain helicopter access to Wilderness Area.
Rodeo	SRPMIC	Human activity, development.	ABENWP, restrict development in BA.

Table 8. continued.

Breeding area	Land Manager	Challenge	Needs
San Carlos	SCAT	Human activity, fishing line and tackle, decreased occupancy and productivity.	Closure, MRP, establish minimum pool to maintain fish populations.
76	USFS	Human activity, riparian degeneration, decreased occupancy and productivity.	ABENWP, closure, boating restrictions, riparian restoration, analyze water table usage, restore fish diversity.
Sheep	USFS Private	Human activity, riparian degeneration, decreased occupancy and productivity, prey availability.	ABENWP, riparian restoration, analyze water table usage, access to private property, restore fish diversity.
Suicide	SCAT	Human activity, fishing line and tackle.	Pullout restrictions, MRP, establish minimum pool to maintain fish populations.
Sycamore	FMYN	Human activity, riparian degeneration.	ABENWP, riparian restoration.
Table Mountain	USFS	Human activity, riparian degeneration, prey availability.	Boating restrictions, riparian restoration, restore fish diversity.
Talkalai	SCAT	Human activity, fishing line and tackle.	Closure, MRP.
Tonto	USFS	Human activity, fishing line and tackle, riparian degeneration.	ABENWP, closure, MRP, riparian restoration.
Tower	USFS	Human activity, fishing line and tackle, riparian degeneration, prey availability.	ABENWP, closure, MRP, riparian restoration, restore fish diversity.
Winkelman	Private	Human activity, decreased occupancy and productivity	Private land owner cooperation, fish surveys, restore fish diversity.
Yellow Cliffs	USFS	Fishing line and tackle, riparian degeneration.	MRP, riparian restoration.

APPENDIX C: FUNDING REQUIREMENTS

Table 9. Arizona Bald Eagle Management Program annual budget.		
Personnel	1 Wildlife Specialist II – 26 pay periods @ ~$3,173/pay period (PS/ERE + $3,000 PIPP)	$82,499
	1 Wildlife Specialist I – 26 pay periods @ ~$2,070/pay period (PS/ERE +$3,000 PIPP)	$53,816
	1 Wildlife Specialist I – 26 pay periods @ ~$1,825pay period (PS/ERE + $3,000 PIPP)	$47,438
	12 ABENWP Contractors - ~92 days @ $85/day = ~$7,820/nestwatcher	$93,840
	Subtotal	**$187,593**
Travel	1 Wildlife Specialist II – Per Diem	$500
	1 Wildlife Specialist I – Per Diem	$1,300
	1 Wildlife Specialist I – Per Diem	$1,300
	Mileage for 2 4x4's - ~29,600 miles @ $0.50/mile	$14,800
	Subtotal	**$17,900**
Other Expenses	Helicopter time – 14 flights (108 hours @ ~ $530/hour)	$57,200
	Maintenance for 4 boats, 4 motors, 4 trailers	$1,000
	Printing – Reports, Brochures, Outreach Materials, etc.	$5,000
	Other operating/administrative expenses – Supplies and Equipment	$30,000
	Subtotal	**$93,200**
TOTAL		**$298,693**

Table 10. Projected annual expenditures per agency for bald eagle management based upon land and wildlife management jurisdictions and actions within bald eagle BAs[1].

Agency	Funds	Helicopter	Total
Arizona Game and Fish Department	$5,000		$5,000
Arizona Public Service	$1,000	$9,200	$10,200
Army Corps of Engineers	$2,000		$2,000
Bureau of Indian Affairs	$3,000		$3,000
Bureau of Land Management	$6,000		$6,000
Fort McDowell Yavapai Nation	$20,000		$20,000
Holloman A.F.B	$1,000		$1,000
Hopi Tribe	$1,000		$1,000
Luke A.F.B	$11,000		$11,000
Maricopa County Parks and Recreation Department	$3,000		$3,000
National Park Service	$1,500		$1,500
Navajo Nation	$1,500		$1,500
San Carlos Apache Tribe	$15,000		$15,000
Salt River Pima Maricopa Indian Community	$15,000		$15,000
Salt River Project	$15,000	$19,200	$34,200
Tonto Apache Tribe	$1,000		$1,000
U.S. Bureau of Reclamation	$7,000	$28,800	$35,800
U.S. Fish and Wildlife Service	$50,000		$50,000
USFS, Apache-Sitgreaves National Forest	$6,000		$6,000
USFS, Coconino National Forest	$12,000		$12,000
USFS, Prescott National Forest	$10,500		$10,500
USFS, Tonto National Forest	$61,500		$61,500
White Mountain Apache Tribe	$7,500		$7,500
Total	$256,500	$57,200	$313,700

[1]Some bald eagle BAs share jurisdiction boundaries therefore funding allocation is shared.

Table 11. Example budget allocations of the Arizona Bald Eagle Management Program from fiscal year 2005-2006.

Agency	Funds	Helicopter[2]	Total
Arizona Game and Fish Department [3]	$59,532	--	$59,532
Donations	$68,192	--	$68,192
Arizona Public Service	$1,000	$9,200	$10,200
Salt River Project	$15,000	$9,600	$24,600
Verde Canyon Railroad	$5,000	--	$5,000
San Carlos Apache Tribe	$32,711	--	$32,711
GeoMarine Incorporated	$18,180	--	$18,180
Federal Highways	$16,550	--	$16,550
U.S. Bureau of Land Management	$18,192	--	$18,192
U.S. Bureau of Reclamation	$37,783	$28,800	$66,583
U.S. Department of Defense (Luke Air Force Base)	$49,802	--	$49,802
U.S. Fish and Wildlife Service – State Wildlife Grant	$96,371	--	$96,371
U.S. Forest Service, Prescott N.F.	$6,481	--	$6,481
Total	$424,794	$47,600	$472,394

APPENDIX D. IMPLEMENTATION PRIORITIES MATRIX

Table 12. Implementation priorities matrix of the conservation strategies for the bald eagle in Arizona.

Priority	Section	Description	Commitment	Agency	Total Estimated Costs ($1000s)	Estimated Costs ($1000s)								
						Post-delisting Year 1	2	3	4	5	5-10	10-20	20-40	40+
1	I	SWBEMC	Meet twice each year, oversee CA implementation.	All	$412.5+	82.5	82.5	82.5	82.5	82.5	TBD	TBD	TBD	TBD
1	II.A	Seasonal BA Closures.	Enactment of existing closures annually, creation, and maintenance of signs.	AGFD Land Managers	$7.5+	1.5	1.5	1.5	1.5	1.5	TBD	TBD	TBD	TBD
1	II.C	ORA Helicopter Flights	11 helicopter flights annually.	SRP USBR	$292.5+	58.5	58.5	58.5	58.5	58.5	TBD	TBD	TBD	TBD
1	II.D	Nest Surveys	Annually examine known BAs, historical BAs, nest sites, and new areas. Conducted monthly in conjunction with ORA flights plus one additional helicopter flight.	AGFD APS SRP USBR	$28+	5.6	5.6	5.6	5.6	5.6	TBD	TBD	TBD	TBD
1	II.E	Arizona Bald Eagle Nestwatch Program	Coordination and a minimum of 12 contractors (6 teams) annually to monitor primary BAs.	All	$450+	90	90	90	90	90	TBD	TBD	TBD	TBD
1	III.C	Protect BAs	Annually implement the Buffer Zone Strategy around nests without seasonal closures.	AGFD Land Managers	$20+	0.5	0.5	0.5	0.5	0.5	2.5	5	10	TBD
1 or 3[1]	II.B	Winter Count	Two helicopter flights in January to complete 25 routes, coordination of ground surveys.	AGFD SRP USBR	$67.5+	13.5	13.5	13.5	13.5	13.5	TBD	TBD	TBD	TBD

[1]Priority 1 based on requirement within the Post Delisting Monitoring Protocol.

Table 12. continued.

Priority	Section	Description	Commitment	Agency	Total Estimated Costs ($1000s)	Estimated Costs ($1000s)								
						Post-delisting Year 1	2	3	4	5	5-10	10-20	20-40	40+
2	II.F	Entering Nests	Annually, one month to band nestlings, collect eggshell fragments, addled eggs, prey remains, foreign material, parasites, rescue nestlings.	AGFD	$39+	7.8	7.8	7.8	7.8	7.8	TBD	TBD	TBD	TBD
2	II.G.1.	Model Population Dynamics	Model the bald eagle in Arizona to determine survivorship, transmitter juveniles and subadults.	AGFD	$378.9+	80	112	66.3	70.8	49.8	TBD	TBD	TBD	TBD
2	II.G.4-6	Monitoring Population Dynamics	Identify adults, trap single banded adults.	AGFD	$390+	39	39	39	39	39	195	TBD	TBD	TBD
2	V	Regeneration of riparian habitat	Develop and implement a plan to regenerate riparian vegetation.	All	$375+	5	5	5	5	5	50	100	200	TBD
2	VI	Restoration of fish populations	Develop and implement a plan to restore fish diversity throughout the Gila, Salt, and Verde rivers.	All	$375+	5	5	5	5	5	50	100	200	TBD
2	VII	Protection of foraging areas	Identify and manage recreation and development within foraging areas.	All	$20+	0.5	0.5	0.5	0.5	0.5	2.5	5	10	TBD
2	IX	Known BA Concerns	Land and wildlife managers implementing the BA needs.	AGFD Land Managers	Variable									
3	II.H	Monitor environmental contaminants	Measure eggshell fragments, analyze addled eggs, prey base contamination study.	AGFD USFWS	$52+	22.4	22.4	2.4	2.4	2.4	TBD	TBD	TBD	TBD

Table 12. continued.

Priority	Section	Description	Commitment	Agency	Total Estimated Costs ($1000s)	Estimated Costs ($1000s)								
						Post-delisting Year 1	2	3	4	5	5-10	10-20	20-40	40+
3	II.I	Monitor disease, parasites, and predation	Assess mortality agents of breeding and wintering adults, and nestlings, conducted in conjunction with entering nests.	AGFD USFWS	$0									
3	VIII	Protection of winter roosts	Identify and develop a plan to protect winter roosts.	All	$25	5	5	5	5	5				
4	IV	Public Education	Produce, update, and distribute brochures; five panel display board; media releases and events, internet updates.	All	$25+	5	5	5	5	5	TBD	TBD	TBD	TBD

APPENDIX E: PUBLIC COMMENTS AND RESPONSE

The comments below are reproduced exactly as stated in the correspondence received during review periods for various drafts of this document. They are organized by content in relation to the most appropriate section of this document.

GENERAL COMMENTS

1. **Comment from:** Robert Johnson, Regional Director, USBR. The draft assessment and strategy provides an excellent guideline for management of the bald eagle in the state. However, we do not believe the level of management identified is necessary to maintain a viable population of bald eagle in the state. Clearly, priorities will need to be established and management efforts redirected. At a minimum, the Occupancy and Reproductive Assessment flights should continue after delisting so the population can be adequately monitored. This data could then be used by the USFWS to determine whether re-listing or some other action would be appropriate for bald eagles breeding in the state. **Response:** We disagree that the level of management described within the Conservation Assessment and Strategy (CAS) is unnecessary. However, due to concerns about funding, we have inserted an implementation Priorities Matrix to ensure that the projects with the most influence on the species are retained post-delisting.

2. **Comment from:** Sue Clemenz, private citizen. Please continue to manage bald eagles within Arizona as if they were Federally listed as endangered. With no more than 30 nesting pairs in the state, 1 disease could wipe them out. Please continue to close down access during nesting and continue the Nestwatch funding. Perhaps have a goal to reconsider when there are 75 or more nesting pairs. **Response:** We intend to continue bald eagle management as described in the CAS, but we do not intend to have a population goal. The SWBEMC will evaluate the progress of the bald eagle in Arizona annually to determine what levels of management are necessary.

3. **Comment from:** Al Anderson, private citizen. I have read the Conservation Assessment and Strategy for the Bald Eagle in Arizona. This document excels in explaining the status and threats to eagles. Unfortunately, that is where the factual and constructive part of the document ends and the fantasy begins. The “innovative approaches to problems affecting” the eagle in this conservation assessment will do nothing but expedite the eagles demise. The Arizona Game and Fish Department should cease receiving Heritage Fund money and be eliminated if this is the best management plan the Department can come up with. The Conservation Assessment is a disgrace and shows the Department has no intention or interest in conserving endangered, non-game species but only in placating Arizona's water and development interest. The Desert Nesting Bald Eagle should not be delisted. The Conservation Assessment should be redone to adequately protect Arizona's Eagles. **Response:** We disagree with your assessment, and believe the proposed management program is appropriate to protect breeding bald eagles in Arizona. Heritage Funding has been a mainstay of support for this program, and will remain so indefinitely. Concerns regarding delisting should be addressed to the USFWS.

4. **Comment from:** Jack Fraser, private citizen. I am particularly appalled by a notice I just received by the Arizona Game and Fish Department which appears to outline a program to be

followed if delisting of the Arizona bald eagle proceeds. It appears to be a program of study, collaboration, discussion, and agreement to take no specific measures or actions to protect the species. It proposes "innovative approaches" to problems affecting the species in Arizona. I challenge those who use the term "innovative approaches" to identify what they mean in terms of meaningful actions to protect a species from the very real and known dangers affecting its survival. I have come to view the words as pure spin-doctoring for a program of ineffective action. If this is the program to follow de-listing of the Arizona-nesting bald eagle population then I submit that the proposal is tantamount to removing whatever protection is now afforded the species and I forecast a resultant extinction of this unique isolated Arizona population. I am dismayed and alarmed by what I must view as a defection from responsible action to protect a public trust resource. The proposal as outlined by the Arizona Game and Fish Department, which I assume will be adopted by the USFWS as the post-delisting program for Arizona bald eagle management, is a politically expedient means of appearing to be doing something while, in reality, doing little more than generating discussion, meetings and suggestions for so-called "innovative proposals" until the Arizona population is extirpated. I can only view this process as irresponsible. **Response:** We disagree with your assessment. The breeding bald eagle in Arizona has improved their abundance and distribution with the same management techniques that are outlined in the CAS. Seasonal closures, buffer zones, consideration of habitat, and the assessment of other factors are included to protect the nesting population. "Innovative approaches" accurately describes the Arizona program. The ABENWP and seasonal closures are nationally recognized as effective. Similar efforts are now being implemented in other states across the Nation. In conjunction with seasonal closures, the Buffer Zones technique is derived from a successful program in the Chesapeake Bay area. The Banding and Visual Identification Program, Winter Count, ORA Flights, and the Organochlorine and Heavy Metal Analysis Studies all provide information to ongoing status assessments.

5. **Comment from:** Gerry Nealon, private citizen. On reading the document I noticed that there was no mention of bald eagles in the Colorado River corridor including the Nankoweap area. I'm just curious if this region is covered in the surveys mentioned in the document or if the AGFD leaves that area to the Grand Canyon Monitoring and Research Center (GCMRC). I've seen records as recent as 1999 of bald eagles in the canyon that came from the GCMRC. I'm curious how data for this region from different agencies will be gathered and included. **Response:** The CAS covers the entire state, including the Colorado River corridor, with a focus on breeding birds. The areas you mentioned have winter migrants, sometimes in significant numbers. In those outlying areas, we rely on cooperating agencies and the public to alert us to promising sightings and/or breeding activity. This has proven successful, and reduces the funding needed to provide a sound statewide monitoring program.

6. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. The Conservation Assessment and Agreement 1999 shortcomings include: 1. no mandatory protection for habitat, 2. no mandatory participation of parties adversely affecting bald eagles or their habitat, 3. no mandatory funding, and 4. no citizens suit provisions, 5. no single agency mandated to oversee the potential affects of all projects or development of habitat. Nothing has changed in 2000. **Response:** The CAS is not a regulatory action, and it was not designed to mandate habitat restrictions, participation, or funding. It is based on the successful management programs and practices of the past, and to meet bald eagle needs in the future.

7. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. The shortcomings of the each law (*protecting the bald eagle after delisting*) were addressed at the September 23, 1999 public hearing and in the Center for Biological Diversities October 4, 1999 delisting comments. Again, AGFD has chosen to ignore conservation community concerns. **Response:** All comments received were very carefully considered at all stages of developing the CAS and incorporated where appropriate. Concerns regarding the shortcomings of any federal law protecting the species should be directed to the USFWS.

8. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. Three recent developments highlight the shortcomings of the Conservation Assessment and Agreement 2000. One of the recent developments explains AGFD's continuing refusal to respect conservation community concerns. The other 2 developments highlight the necessity to maintain Federal protection for the Southwestern Desert Nesting Bald Eagle, and in order to protect habitat necessary for its long term survival. These are: 1) Governor Jane Hull's recent appointment of ranching advocate, Sue Chilton, to the Arizona Game and Fish Commission, 2) Increasing consensus of experts regarding entry into a prolonged drought cycle, 3) Prescott's plans to pump groundwater from the headwaters of the Verde River. **Response:** 1) This comment is not relevant to the CAS. 2 and 3) The effects of drought and groundwater pumping are among the many factors considered when managing bald eagles, and countless other obligate and facultative riparian-dwelling species. The CAS outlines management practices by which we can address such landscape-scale problems as they emerge.

9. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. A population with a total of only 36 active breeding sites of biologically, behaviorally, and ecologically isolated Southwestern Desert Nesting Bald Eagles, a population with essentially no chance of further expansion, a population facing increasing threats of recreational impacts and habitat demise, is nothing short of "threatened." The Southwestern Desert Nesting Bald Eagle has not "recovered" by any objective standard based upon acceptable principles of population biology or conservation biology. Nevertheless, on September 23, 1999, in the public hearing on the USFWS's proposal to remove the ESA protection for the Southwestern Desert Nesting Bald Eagle, AGFD chose to continue promote removal of federal protection…Prior to, and at the September 23, 1999, public hearing, the conservation community has been united in opposition to delisting of the Southwestern Desert Nesting Bald Eagle…AGFD's refusal to respect the conservation community concerns and refusal to reexamine its position supporting delisting represents the culmination of the influence of former governor, Fife Symington and of current governor, Jane Hull. Both governors display impressive ignorance concerning our wildlife heritage. **Response:** We disagree with your assessment. The bald eagle in Arizona has now expanded to 50 BAs and (under the current and proposed management program) has the potential to increase even more. We agree that the breeding bald eagle requires ongoing intensive management, thus the impetus for the CAS. However, we disagree that Federal listing is necessary for appropriate management actions to be continued by the cooperating agencies. Further, AGFD's position on delisting the bald eagle is not a subject of this document, as it may not be the position of the other agencies involved. Any comments related to an agency's position on bald eagle delisting, recovered or not, should be addressed to the respective agency.

10. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. Drought conditions will dramatically prolong or exacerbate the effects of abusive cattle grazing and

will make it much more difficult to recover riparian habitat, especially in areas where nesting trees are aging and lacking replacements. The Conservation Assessment and Agreement 2000 offers no solution to this problem. Continued ESA protection of the Southwestern Desert Nesting Bald Eagle mandates such habitat protection and allows citizen suits if land managers or dewatering groundwater pumpers are recalcitrant...As we enter a prolonged drought cycle, protecting habitat from dewatering and other abuses will becoming increasingly difficult. Conservation Assessment and Agreement 2000 offers nothing to prevent Prescott or other groundwater pumping entities from destroying Bald Eagle Habitat. **Response:** The CAS provides a framework in which land management agencies are responsible for ensuring that bald eagle habitat issues are addressed on a statewide basis.

11. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. The proposal to remove of ESA protection for the Southwestern Desert Nesting Bald Eagle is nothing more than another example of the USFWS capitulation to political expediency. The Southwestern Desert Nesting Bald Eagle is highly likely to become an endangered species again in the foreseeable future. It is not unreasonable to imagine that given the facts presented here that this population will shrink once again to the brink of extinction. To propose removal of ESA protection for the Southwestern Desert Nesting Bald Eagle ignores science and reality. The proposal is not only inappropriate, it is arbitrary and capricious. The Southwestern Desert Nesting Bald Eagle is unique: 1) The Southwestern Desert Nesting Bald Eagle is smaller than other bald eagles, 2) The Southwestern Desert Nesting Bald Eagle is reproductively isolated, 3) The current understanding of genetics remains inconclusive. **Response:** We disagree with your assessment. Concerns regarding delisting should be addressed to the USFWS.

12. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. The threats to the continued existence of the Southwestern Desert Nesting Bald Eagle are increasing: 1) The Southwestern Desert Nesting Bald Eagle population is extremely small without prospects for significant expansion, 2) Subadults occupy and excessively high presence in breeding pairs, 3) Mortality rates for fledglings is excessive, 4) Reproductive rates are low, 5) The most prolific Southwestern Desert Nesting Bald Eagle breeding areas are showing productivity declines, 6) Breeding areas along the free-flowing rivers are showing productivity declines, 7) Three Southwestern Desert Nesting Bald Eagle nests on private property are not producing young and destined to fail, 8) Habitat faces imminent and accelerating loss of increasing amounts of habitat vital for long term survival, 9) Toxic substances remain a problem, 10) DDT is found in Arizona, 11) Mercury contamination of the Southwestern Desert Nesting Bald Eagle is worrisome, 12) Pyrroles may become the next DDT, 13) Low flying aircraft continue and will increasingly continue adversely affecting the Southwestern Desert Nesting Bald Eagle, flight advisories are not mandatory and are ignored, 14) Monofilament and tackle are found in half of Southwestern Desert Nesting Bald Eagle nests, increasing deaths are expected, 15) Eggshell thinning remains a potential problem for the Southwestern Desert Nesting Bald Eagle, 16) Global warming will increase the challenge for Southwestern Desert Nesting Bald Eagle of living in an already hostile environment, 17) Habitual violation of law and lack of agency resolve increasingly threatens protection of the Southwestern Desert Nesting Bald Eagle, 18) USFWS, itself, continues to warn of increasing dangers to the survival of the Southwestern Desert Nesting Bald Eagle. **Response:** The Conservation Assessment Section of the CAS was drafted to describe threats to the bald eagle in Arizona; therefore, most of the 18 concerns listed are explained within. We will address those that may not be adequately covered in the CAS: 1) We agree -- the CAS affirms the bald eagle

abundance in Arizona is small, thus the need for continued management. As noted above, the bald eagle in Arizona continues to expand under the same management program as the CAS proposes. 4) Bald eagle productivity in Arizona is within the range of other populations and values reported in literature. 12) The CAS outlines the procedures in place to document pyrrole's occurrence in the bald eagles of Arizona. 16) Global warming is beyond the scope of the CAS. 17) The strength of ESA has long been adaptive management, to provide a mechanism for modifying proposed projects to eliminate or reduce impacts on listed species. A large portion of what is known about bald eagles has been a result of ESA section 7 consultations. The management needed to maintain the breeding bald eagle population in Arizona is well known, and is outlined in the CAS. 18) We recognize the variety of threats to the bald eagle in Arizona, and the CAS is responsive to all of those that can be addressed.

13. **Comment from:** Robin Silver, Southwest Center for Biological Diversity. Inadequacies of the USFWS proposal to remove the Southwestern Desert Nesting Bald Eagle from the List of Threatened and Endangered Species are many: 1) Accomplishment of the 1982 Recovery Plan goals does not justify removal of protection in 1999, 2) ESA mandated funding for direct, human protective intervention continues responsible for Southwestern Desert Nesting Bald Eagle survival, 3) USFWS population policy and practice does not preclude continued protection for the Southwestern Desert Nesting Bald Eagle. **Response:** Concerns regarding delisting should be addressed to the USFWS.

14. **Comment from:** Eleanor S. Towns, U.S. Forest Service Regional Forester. 1) There seems to be a discrepancy between the interpretation as stated in the CAS, that existing laws and regulations are insufficient to protect the species, and therefore a CAS is needed, and the USFWS reliance on these same laws and regulations in the delisting process…2) Further evidence for this apparent discrepancy lies in the fact that nowhere in the document is there an acknowledgement that the current population of bald eagles in Arizona is sufficient enough to support delisting. It is our understanding that the position of the Department is that the current population is more than adequate to support delisting. These discrepancies could be easily fixed with the addition of some clarifying language. **Response:** 1) The CAS has been revised to more clearly acknowledge the roles of the National Environmental Policy Act, National Forest Management Act, and other Federal laws, rules, and policies governing habitat in relation to bald eagles. 2) The CAS is intended to describe future management actions. Issues pertaining to delisting are outside the scope of the document.

15. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester. At this time, we are providing our review of the final draft document focused on our 4 major concerns: 1) The USFS cannot commit to post-delisting activities beyond 5 years, 2) The USFS cannot commit to fixed levels of funding beyond 1-year annual work planning, 3) Allow for beneficial landscape changes within breeding areas and encourage mitigation for unavoidable adverse landscape changes, 4) there is a lack of acknowledgement for past and future USFS roles and responsibilities regarding management of bald eagles. **Response**: 1) Understood. 2) Understood. 3) We have revised Section III.C to address these issues. 4) We have added clarifying text to more clearly identify Federal agency responsibilities with regard to bald eagle management.

16. **Comment from:** David Harlow, Field Supervisor, USFWS**.** It may be helpful to develop more discussion about management of aircraft (small planes, helicopters, and military

aircraft) in the strategy section. The Federal Aviation Administration and Arizona Department of Transportation (ADOT) have worked with the USFWS and the AGFD on instituting a 2000 ft above ground level advisory ceiling. Also, relationships with LAFB, Boeing, the Army, and private aircraft clubs have been developed by AGFD toward maintaining this advisory. We believe it would be useful to engage in conversation with some of these agencies, particularly LAFB, Boeing, and ADOT, to maintain the 2000 ft ceiling and avoidance of sensitive nest areas by having them as a cooperator on this strategy. We could only find mention of this advisory in the educational section of the strategy where discussing brochures. **Response:** We have addressed the concern in the section Threat Analysis, Other Natural or Manmade Factors Affecting its Continued Existence, Low Flying Aircraft, and inserted various sentences and bullets throughout the document.

INTRODUCTION

17. **Comment from:** Bill Burger, AGFD Region 6. **Referring to subsection:** Introduction. You need to add an additional paragraph in the Introduction on the 1982 Recovery Plan. **Response:** The 1982 Recovery Plan is briefly mentioned in the Introduction, and discussed in detail in the Management Status Section.

CONSERVATION ASSESSMENT SECTION

18. **Comment from:** Henry Messing, USBR**. Referring to subsection:** Life History. Have productivity rates also decreased in other populations as density increased? The present comparison seems to imply that productivity has declined in Arizona and not in other populations. The comparison needs to be made between equivalent time frames. **Response:** The CAS shows lower productivity in Arizona since the reaching 20 known occupied BAs. Regardless, we used 20 BAs as a pivot point for comparison because the Arizona Bald Eagle Nest Survey began in 1985 at 20 BAs. Before that date, statewide surveys were not completed in the same manner that we currently employ (helicopter flights with follow-up ground surveys). Therefore, the two data sets are not comparable. See the response to comment #9 regarding productivity.

19. **Comment from:** David Harlow, Field Supervisor, USFWS**. Referring to subsection:** Current Management Efforts, Arizona Bald Eagle Nestwatch Program. On page 9 there is a discussion about the importance of bald eagle nestwatchers identifying when eagles are in life threatening situations and how these rescue operations have contributed to maintaining productivity (16% of all fledglings). There is no doubt this is an important aspect of bald eagle management and that, by itself, solely demonstrates the importance of the program. However, in other documents written by the AGFD, there have been descriptions about how education, contact, and protection provided by the program likely elevate annual productivity even higher than 16%. We believe these aspects of the program are an important part of eagle management and should be included in the strategy. **Response:** We agree and provide this guidance through Strategy Section II.E.3, under "Conduct Nestwatch (methodology, scheduling, etc.) per Jacobson et al. (2005)." We also modified Strategy Section IV to ensure that it appropriately emphasizes public outreach by the ABENWP.

20. **Comment from:** Daniel Driscoll, private citizen**. Referring to subsection:** Threat Analysis, Present or Threatened destruction, modification, or curtailment of its habitat or range. The

Arizona bald eagle population has almost doubled and now occupy several new drainages since 1985. Why would it not likely increase substantially? **Response:** It may increase further, and have reworded the text to reflect this statement.

21. **Comment from:** Daniel Driscoll, private citizen**. Referring to subsection:** Threat Analysis, Present or Threatened destruction, modification, or curtailment of its habitat or range. The buffer zone management technique used in the Chesapeake Bay may not work in Arizona as they have different "view sheds." View sheds are what the eagle can see from its nest. The Chesapeake Bay is surround by forests and therefore can be protected by the "buffer zone" technique, smaller view shed. Arizona is open desert habitat. **Response:** While drafting our proposed Buffer Zone technique based on Cline (1990), we took into consideration the difference between bald eagle nesting habitat in the Chesapeake Bay area and Arizona. Our proposed method was enlarged to encompass the bigger "view shed" of bald eagle nests in Arizona. Zone 1 was increased 270 ft; Zone 2 by 440 ft, and Zone 3 by 1180 ft. In addition, we extended the breeding season dates to 15 days earlier, to adjust to the early breeding schedule in Arizona, and 15 days later for juvenile dispersal.

22. **Comment from:** Daniel Driscoll, private citizen**. Referring to subsection:** Threat Analysis, Present or Threatened destruction, modification, or curtailment of its habitat or range, Riparian Habitat. You mention, "managing agencies must minimize the factors impairing regeneration of riparian trees to maintain the current distribution and abundance of breeding pairs on the lower Verde River, Tonto Creek, and Roosevelt Lake." What about the invasion of salt cedar with fluctuating reservoir levels as observed at Alamo and Roosevelt Lakes? **Response:** With discovery of multiple endangered southwestern willow flycatcher populations within salt cedar habitats at these lakes, the issue has become more complex. The challenge is to enhance bald eagle riparian habitat (emergent trees/snags) without negatively affecting the shorter-stature trees that willow flycatchers use. We are working to restore cottonwoods in the lower Verde drainage, and substantial willow regeneration is occurring naturally on the upstream portions of Alamo Lake. Management efforts along the Tonto Creek Riparian Unit have also showed promise in restoring natural vegetation along the riparian corridor.

23. **Comment from:** Daniel Driscoll, private citizen**. Referring to subsection:** Threat Analysis, Present or Threatened destruction, modification, or curtailment of its habitat or range, River Alterations. The statement of "Dams on large rivers have also provided benefits to the species, but their negative affects are largely unknown," is not accurate. Dams flooded large riparian forest suitable for bald eagle nesting, and favored the expansion of exotic fish species. **Response:** We have reworded this statement. Without question, dams have flooded riparian forests, and the impoundments behind them and the flow regimes below them have favored exotic fishes over native fishes. What is arguable is: (a) whether bald eagles actually used those historical riparian forests as nesting sites, and, (b) whether the exotic fishes have simply replaced native fishes as an adequate prey base for bald eagles. There is virtually no information on pre-1900 breeding bald eagles in Arizona, and certainly not enough on which to formulate a data-based abundance estimate. What we currently know has been derived from post-dam construction studies (1970s et seq.), thus any assessment of positive or negative impacts of dams will be conjectural.

24. **Comment from:** Bill Burger, AGFD Region 6. **Referring to subsection:** Threat Analysis, Other natural or manmade factors affecting its continued existence, Mortality. Your assumption of "once a breeder no longer exists in a mated pair, it is dead," is not a fair assumption. The bird may be lost as a breeder, but is it really dead? Is part of this just normal replacement of older birds in a breeding area by younger ones which must happen at some rate? **Response:** Your argument is logical, and may be correct. However, we know of only 2 cases in which a breeding pair was not mated for life. In all others, once a member of a pair was replaced, the replaced bird did not re-enter in the breeding segment. After replacement, the adult may become a part of the floating population. As mentioned in the CAS, we are unsure of the identity, age structure, or numbers of the floating adult population. Since they do not concentrate in a particular area, nor are their migration patterns documented, it is difficult to assess these factors. For these reasons, we believe our assumption is appropriate as a generalization for management purposes.

25. **Comment from:** David Harlow, Field Supervisor, USFWS**. Referring to subsection:** Threat Analysis, Other natural or manmade factors affecting its continued existence, Mortality. We believe there is more to learn about mortalities of bald eagles in Arizona. Clearly, these birds have been barometers of environmental health. Our law enforcement agents in Mesa have discovered a few instances of wintering eagles dying due to toxic chemicals in recent years. We believe the AGFD would be the appropriate place for reporting eagle mortalities statewide and a simple database on location and cause of death could be developed. It may be prudent to develop a strategy in Section F (contamination) or Section K (disease) for annually informing State and Federal wildlife and land management agencies on the importance of reporting mortalities and routing carcasses through the AGFD and the USFWS. **Response:** Since the initial drafts of this document, we have instituted a Dead or Injured Bald Eagle Handling Protocol with your office and have developed and maintained a mortality database for tracking mortalities and their causes. Items have also been included in the Strategy Section II.G.1.d. and II.G.7.

26. **Comment from:** David Harlow, Field Supervisor, USFWS**. Referring to subsection:** Threat Analysis, Other assessment factors, Identification of possible breeding locations. Under "Other assessment factors," the historical distribution of bald eagles is discussed. In general, the paragraph describes how little is known, so it is difficult to determine if the current number of breeding pairs is smaller or larger than the past. We believe it would be prudent to expand this discussion (here or someplace else in the document) to other nearby locations in the southwest portion of the country to provide a regional perspective. Please check Chuck Henny's paper in Raptor Research (1994) about the historical and current distribution of bald eagles in Baja, California. Also, compare and contrast the numbers from neighboring states. Much of this information can be found in the Biosystems Analysis Arizona eagle ecology report (1992) and the recent information distributed by the USFWS in the delisting proposal. In addition, we suggest contacting Robert Mesta in our Ventura Office {now with the BLM in Tucson} for information regarding the occupancy of bald eagle breeding areas in Sonora, Mexico, and the historical and current distribution of eagles in Southern California. **Response:** The literature mentioned has been considered in developing the strategies outlined in the CAS, however we do not believe it would add additional strength to the CAS.

CONSERVATION STRATEGY SECTION

27. **Comment from:** Eleanor S. Towns, U.S. Forest Service Regional Forester**. Referring to subsection:** I. Maintain SWBEMC as the Arizona Bald Eagle Conservation Team. The lack of acknowledgement that by law, all federal agencies play a role in the management, conservation, and recovery of threatened and endangered species is troubling. Clearly the recovery of the bald eagle has been a national effort by a large number of both state and federal agencies and should be recognized as such. For our part, section 7 of the Endangered Species Act, 1973, as amended, requires that we manage for listed species. This omission could be easily corrected. **Response:** We have revised the text to address your concerns, and added sentences throughout the document. See also the response to comments #14 and #15 regarding the roles of federal agencies in bald eagle management.

28. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester**. Referring to subsection:** I. Maintain SWBEMC as the Arizona Bald Eagle Conservation Team. In order to more equitably represent the roles and responsibilities of land management agencies in past and future conservation endeavors, we urge revision of the paragraph under I.A. **Response:** We agree. See the response to comment #14 and #15 regarding the roles of federal agencies in bald eagle management.

29. **Comment from:** Henry Messing, USBR**. Referring to subsection:** II.A. Seasonal Closures. The USFWS is tasked with monitoring the status of a delisted species for a 5-year period. If the SWBEMC will coordinate and assist management activities outlined in the conservation strategy, will they also be responsible for preparing a report to the USFWS containing breeding season data or will this data continue to be consolidated and disseminated by AGFD? We recommend the subject of data collections, reports, and monitoring of the strategy be discussed and the AGFD be clearly designated as the lead in this effort. **Response:** Yes, and we agree. As mentioned in Strategy Section I.C, the AGFD would continue to chair the SWBEMC and be the lead in coordinating most management-based activities.

30. **Comment from:** Eleanor S. Towns, U.S. Forest Service Regional Forester**. Referring to subsection:** II.A. Maintain existing and implement planned seasonal BA closures, and II.E. Arizona Bald Eagle Nestwatch Program. The statement that the intent is for this plan to be in effect for 10 years seems contrary to the standard post-delisting monitoring period of 5 years. Federal partners will have a hard time investing in monitoring past the required delisting monitoring period. I suggest we modify the length to 5 years with a re-evaluation at the end of 5 years to determine if another 5 years is needed. **Response:** Agreed. We have changed the document to demonstrate that these guidelines will be in place throughout the post-delisting monitoring period.

31. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester**. Referring to subsection:** II.D. Determine current species distribution with an annual nest survey. Realistically, it seems that the "primary cooperators" would be conducting annual nest surveys in cooperation with the AGFD and the USFWS. We urge rephrasing in order to leave room for annual adjustments in each agencies specific contribution. Annual work plans would provide the specifics rather than this long term strategy. **Response**: It is understood

that budgeting is an annual process, and work plans must be adjusted as necessary to reflect changes in fund availability.

32. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester**. Referring to subsection:** III.C. Protect BAs from the adverse affects of projects and developments. It is not clear how the exceptional projects will be "discussed" and by whom. Presumably, the intent is to have the action agencies (that is primary cooperators) bring their projects before the SWBEMC for discussion and possible modification. **Response**: The guideline was not intended to define a new process, but to facilitate communication between the responsible agencies to address bald eagle concerns. The SWBEMC, in this sense, defers to those agencies and representatives with jurisdiction over bald eagles and their habitat within the project area. However, the SWBEMC does discuss how to best avoid impacts to the breeding pair for all projects within bald eagle BAs. Representatives are responsible for relaying those concerns, if any, to their agency.

33. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester**. Referring to subsection:** III.C. Protect BAs from the adverse affects of projects and developments. As for H.3.c, revise to clarify that notification would be to SWBEMC as a whole, and not just the primary cooperators. Also, confusion and misinterpretations of roles and responsibilities could be minimized by not using "primary cooperators" label to separate out other agencies. It would be more conducive to a more coherent team atmosphere to switch to the label of SWBEMC wherever appropriate within this document and subsequent enabling agreements. If differentiation needs to be made between AGFD and USFWS versus the other agencies, that might be done using the labels of "regulatory" versus "land management" agencies. All agencies signatory to the Strategy and Agreement(s) would thus be "primary cooperators." **Response**: In earlier drafts, we define the "primary cooperators" as all agencies represented in the SWBEMC for the purpose of implementation of this CA. We have removed the term and inserted the SWBEMC to avoid this confusion.

34. **Comment from:** David Harlow, Field Supervisor, USFWS**. Referring to subsection:** V. Riparian Habitat. We support the AGFD in including a section in the strategy about enhancing riparian habitat for bald eagles. While riparian habitat may not have been a central concern for eagles over the past 20 years, the USFWS believes it is a serious current concern and will also be in the future. For a significant portion of the population, maintaining riparian habitat for nesting and stream health for fish is crucial for success. We encourage the SWBEMC members, particularly the USFS, FMYN, USBR, and SRP to develop creative solutions to improving the health of our central Arizona streams. **Response:** We agree.

35. **Comment from:** James Gladen, U.S. Forest Service Deputy Regional Forester**. Referring to subsection:** VI. Fish Populations. Insert "Arizona Game and Fish Department and" at the beginning of statement in order to clarify that the AGFD is the principle agency with responsibility for fish stocking and not the land management agencies. **Response**: The purpose of this section is to facilitate discussion and a frame of reference within the SWBEMC. As a member of the SWBEMC, the representative from AGFD will take recommendations from the SWBEMC to their agency.

36. **Comment from:** Eleanor S. Towns, U.S. Forest Service Regional Forester**. Referring to subsection:** Population Objectives. The proposed development of relisting criteria seems

contrary to the intent of managing a fully recovered bald eagle population. **Response:** We have removed this section as the USFWS will develop both a post-delisting monitoring protocol and the re-listing criteria for the species nationwide.

37. **Comment from:** Henry Messing, USBR**. Referring to subsection:** Population Objectives. Some members of the SWBEMC may not be qualified to make the decisions on relisting criteria. We would recommend an independent eagle biologist be included in this process. **Response:** See the response to comment #36 regarding the re-listing criteria.

38. **Comment from:** Henry Messing, USBR**. Referring to subsection: X**. Funding. Whether we like it or not, the issue of funding will be crucial to the success of this strategy. Yet, the narrative does not clearly spell out the fact the agencies are being asked to commit the funding identified in Appendix C, nor does the document identify a time period for how long this funding may be needed for. Because this issue is so critical, we recommend funding be addressed up front in the Introduction. **Response:** We have inserted a paragraph in the Introduction, a separate Strategy Section XI, and an Implementation Priorities Matrix to address the concerns about funding.

39. **Comment from:** Bryan Arroyo, Acting Regional Director, USFWS**. Referring to subsection: X**. Funding. Table 10 in the Conservation Strategy contains projected annual funding for each prospective signatory to the CAS. The table lists the USFWS's share as $47,000/year. As a Federal Agency we cannot assure such funding, as our funding comes through Congressional appropriation and thus cannot be predicted from year to year. In addition, there are a number of threatened, endangered, and candidate species throughout Region 2 among which our limited endangered species budget must be shared. As you are aware, section 6 of the Endangered Species Act authorizes allocation of funding to the States. Each year the USFWS and State fish and wildlife agencies identify and prioritize projects to be funded with section 6 monies. It is through this process, we will determine how much funding, if any, should be provided to the bald eagle conservation effort. **Response:** We understand. No agency can commit to expenditures above and beyond what is in their approved budgets. See the response to comment #6 regarding funding.

40. **Comment from:** Eleanor S. Towns, U.S. Forest Service Regional Forester**. Referring to subsection: X**. Funding. There appears to be a discrepancy between the proposed supporting MOU and the CAS regarding the commitment of funding from each signatory agency as it is proposed in the CAS. **Response:** See the response to comment #6 regarding funding.