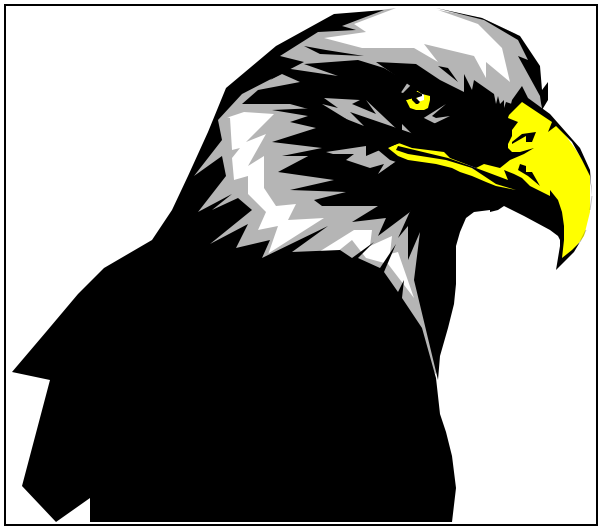
ARIZONA BALD EAGLE WINTER COUNT: 1996

Gregory L. Beatty, Bald Eagle Management Coordinator
James T. Driscoll, Nongame Biologist
Nongame Branch, Wildlife Management Division



Technical Report 103
Nongame and Endangered Wildlife Program
Program Chief: Terry B. Johnson
Arizona Game and Fish Department
2221 West Greenway Road
Phoenix, Arizona 85023-4312

June 1996

RECOMMENDED CITATION

Beatty, G.L. and J.T. Driscoll. 1996. Arizona bald eagle winter count: 1996. Nongame and Endangered Wildlife Program Technical Report 103. Arizona Game and Fish Department, Phoenix, Arizona.

ACKNOWLEDGMENTS

We thank the following agencies and private groups for their contributions to Arizona's 1996 bald eagle winter count: Bureau of Reclamation (USBR), Salt River Project (SRP), U.S. Forest Service (USFS), U.S. Fish and Wildlife Service (USFWS), White Mountain (WMAT) and San Carlos Apache (SCAT) Tribes, National Audubon Society (Arizona chapters), and the Flagstaff Birding Club. A special thanks goes out to John Koloszar, Nongame Biologist who participated in the helicopter flights, and all the volunteers for their hard work and dedication to the count.

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PROJECT FUNDING

Funding for this project was provided by: the Arizona Game and Fish Department's Heritage Fund; voluntary contributions to Arizona's Nongame Wildlife Checkoff; Project W-95-M, under the Federal Aid in Wildlife Restoration Act (Pittman-Robertson Act); and voluntary contributions of helicopter time by the U.S. Bureau of Reclamation and Salt River Project.

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INTRODUCTION

Arizona's wintering bald eagle (*Haliaeetus leucocephalus*) population was examined in the 1970s and early 1980s through comprehensive winter counts (Todd 1977, 1981, 1984a, 1984b; Hall 1985). In 1986, the National Wildlife Federation (NWF), coordinator of the nationwide survey, asked that only areas of eagle concentration (sites with more than 15 eagles observed in 2 or more years) be surveyed. Subsequently, due to Arizona's lack of eagle "concentrations," the state only contributed minimal information in 1986 and 1987 (Hastings 1988). From 1989 through 1991, winter counts in Arizona were localized in specific management areas, such as Roosevelt Lake (USFWS 1990) and Nankoweap Creek (Brown et. al 1989, Brown and Stevens 1991). Annual statewide counts were resumed in Arizona in 1992 (Beatty 1993, Beatty and Driscoll 1994, Beatty et al. 1995a, 1995b), using a combination of ground visits (foot, automobile, boat, snowmobile) and helicopters. Beginning in 1995, 115 standardized routes were established for the winter count. The national bald eagle winter survey, which was initiated and organized by the NWF from 1979-1991, is now coordinated by the Raptor Research Technical Assistance Center (RRTAC -National Biological Service, 970 Lusk Street, Boise, Idaho 83706).

Standardized survey forms for the 1996 Arizona winter count were sent to the RRTAC after they were collected by AGFD. Additionally, Nongame Branch staff developed a bald eagle winter count database for all standardized routes completed between 1992 and 1996.

Because the bald eagle is sometimes gregarious in winter, national surveys can determine the species' success throughout its range and distribution (Stalmaster 1987). In addition, determining bald eagle winter use in Arizona contributes to management efforts on the bird's wintering grounds. Identifying the bird's winter distribution in Arizona was a goal defined in the 1982 Southwest Bald Eagle Recovery Plan (USFWS 1982).

Now that the bald eagle has been reclassified by the USFWS to threatened status (USFWS 1995), the national winter count is even more important. Through the consistent efforts of each state, the count will provide critical information on the species' status. Continuing an annual nationwide count will add important information for possibly de-listing the bird or returning it to the endangered list.

METHODS

We continued to use the 115 standardized survey sites (established in 1995) for the 1996 Arizona winter count. These sites were developed after examining all routes completed between 1992 and 1994. Our objective for the 1996 count was to complete all of the 115 standardized sites. Any additional routes completed are included in this report solely for management purposes and are not included in final count tallies.

The 1996 winter count was scheduled for 8-14 January, 1996 to allow weekday use of agency helicopters and a weekend for volunteers. Due to the diverse habitat in Arizona, and our desire to maximize (but not duplicate) the count of bald eagles in a narrow time frame with minimal effort, a variety of methods were needed to adequately survey the state. The Salt, Verde, and Gila river drainages and their associated lakes and tributaries are the main water bodies in central Arizona where fish and carrion eating bald eagles might occur. The best way to survey the rugged terrain, and deep canyons of these river drainages is by helicopter. USBR and SRP contributed four days of helicopter time to survey the Verde, Salt, and Gila drainages and their main tributaries. Other areas in Arizona more accessible by boat, vehicle, and foot were left to volunteer surveyors.

Low-level helicopter surveys were conducted with three biologists and a pilot flying directly above the drainage. The observer in front had the best overall view and was able to spot the most eagles. Observers in back watched for birds out the side windows, and were most useful observing eagles along cliffs and birds that flushed and flew to the side of the helicopter. Level of flight and speed were dependent on terrain, height and density of tension wires, and wind speed. However, a flying height of 100 to 200 feet above ground level was best for all observers when conditions were favorable.

Volunteer surveyors from agencies and private groups were solicited through the mail, given tally forms (supplied by the RRTAC), and instructed on procedures. Most volunteers surveyed from their vehicle. Foot travel, boats, and helicopters were used less frequently.

Adult plumaged bald eagles are birds at least five years old, with a distinct all white head and tail, brown wings and body. Subadult (or immature) plumaged birds are 1 to 4 years old with brown in the tail and head and white mottling on the body (Clark and Wheeler 1987). Volunteers were asked beware of mistaking four-year old near-adult bald eagles for full-adult plumaged birds. Golden eagles observed also were recorded during the survey, but they are not reported in this document.

Data were broken down in two sections: the helicopter survey and the volunteer survey, by county (Tables 1-10). The separation between helicopter and volunteer surveys represents the differences in methodology so that comparisons of future

seasons can be consistent with regard to effort and results.

RESULTS

The standardized statewide 1996 Arizona winter count totaled 361 bald eagles (Tables 1-10, 12). We recorded 232 adults (64%), 127 subadults (35%), and 2 unknown age bald eagles (1%). The most concentrated location of eagles was at Lake Mary / Mormon Lake, where 69 birds were observed. An additional 37 eagles were counted on routes that were not part of the standardized count (Table 11).

A total of 102 of the 115 statewide routes were completed during which 7255 minutes (121 hours) were spent searching for eagles. The greatest effort was in Coconino County, where volunteers spent 3041 minutes (51 hours) (Table 12).

The most efficient method of counting eagles was by helicopter. The 167 eagles counted in 971 minutes (16 hours) from the helicopter represented 0.17 eagles seen per minute. The most efficient volunteer ground effort (in counties with more than one survey site) occurred in Navajo County, where 0.05 eagles were seen for every minute spent searching (Table 12).

DISCUSSION

Methods of searching for bald eagles changed during the 1992-1996 winter counts (Beatty et al. 1995) from those of earlier statewide surveys (Todd 1981). We used terrestrial volunteers to survey all areas with the exception of the central river drainages. The helicopter was used exclusively to survey the central rivers and lakes surrounding the breeding bald eagle population. In contrast, early statewide counts used only a fixed wing aircraft to search for eagles.

Because our methods were different from Todd's, we were unable to standardize our winter count locations until 1995 (Beatty et al. 1995). We selected 115 standard sites from the routes that were consistently completed, accessible, and productive between 1992 and 1994. We deleted long terrestrially oriented routes that were difficult to duplicate and those that did not produce any eagles. Some sites in southern Arizona, where eagles have not regularly been spotted, were kept to adequately represent the entire state.

The total number of bald eagles counted in Arizona during the 1996 winter count was 361. This fell just shy of the record 363 eagles counted in 1994. Yet, since routes were not standardized in 1994 (124 routes were completed vs. 102 in 1996), this year's count is proportionally the most successful to date when considering eagles found per minute searching (0.05 eagles per minute) and routes completed (3.5 eagles / route) (Table 13).

The age structure of the 361 bald eagles observed was 64 percent (n=232) adults, 35 percent (n=127) subadults, and 1 percent (n=2) unknown. Stalmaster (1987) discussed the factors that can influence winter age ratios, such as status of the population, stage of migration, and geographic location. He stated, "roughly a third of all eagles in any concentration are juveniles and sub-adults." The NWF national winter surveys (Hastings 1988) for 1986-1988 averaged 33 percent subadult eagles. Arizona's statewide counts from 1981-1985 and 1992-1996 averaged 31 percent subadult bald eagles (Table 13).

Temperatures for Arizona during the survey period were characterized as "unseasonably warm" (NOAA 1996). Record highs were tied in Flagstaff (62EF), surpassed in Phoenix (80EF) and Willcox (76EF), and nearly tied in Tucson and Yuma. The month of January had the least precipitation since 1972.

Because of the dry weather conditions during the survey period, many eagles were found along our clear and calm central and eastern Arizona rivers. Over the last five years, it has become almost predictable whether the presence of birds along rivers such as the Verde River will be high or low. During dry Januarys in 1992, 1994, and 1996 we counted 36, 31, and 32 eagles along the Verde River, respectively. During wetter Januarys in 1993 and 1995, only 13 and 20 eagles were found along the muddy and turbid Verde River.

RECOMMENDATIONS

1.Continue to conduct the annual winter count with the 115 standardized routes.

2.Continue updating the Nongame Branch bald eagle winter count database with core information from the standardized survey forms.

3.Develop statewide maps documenting the location and abundance of wintering eagles for distribution to managing agencies.

4.Begin to document the location of wintering bald eagle mortalities in Arizona and follow up with appropriate management.

5.Work with the Coconino National Forest and Rocky Mountain Forest and Range Experiment Station to determine what conditions at Lake Mary and Mormon Lake cause large concentrations of eagles.

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APPENDIX

Table 1. Results of standardized 1996 Arizona bald eagle winter count, 9 & 12 January, Apache County, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
1	Becker Lake	14	V. Ordonez - USFS	2	1	0	0
2	Little Colorado River (LCR)	20	"	0	1	0	0
3	S. Fork LCR - Campground	24	"	2	1	0	0
4	Casa Malapais - LCR	6	"	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	90	T. Davidson - USFS	2	0	0	0
6	Sponseller Lake	38	D. Groebner - AGFD	2	1	0	0
7	Mexican Hay Lake	30	B. Vahle - AGFD	0	0	0	0
8	White Mt. Hereford Rch. (Trinity, Glen Livet, McKay Res)	80	R. Winstead - AGFD	0	0	0	0
9	The Ranch Lake	20	D. Cagle - AGFD	1	0	0	0
10	Ortega Lake	35	"	1	0	0	0
11	Concho Lake	40	"	0	0	0	0
12	Luna Lake	Not surveyed					
13	Nelson Reservoir	Not surveyed					
14	Nutriosa Reservoir	Not surveyed					
15	Tenney Pond	Not surveyed					
16	San Francisco River (Alpine RD to New Mexico)	Not surveyed					
17	Campbell Blue Creek	Not surveyed					

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 2. Results of standardized 1996 Arizona bald eagle winter count, 10 & 13 January, Cochise County, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
18	Parker Canyon Lake	60	J. Millican - AGFD	0	0	0	0
19	Willcox Playa	240	B. Fulk - AGFD	0	0	0	0
20	Sulphur Springs Valley - Whitewater Draw						

Table 3. Results of standardized 1996 Arizona bald eagle winter count, 10-14 & 19 January, Coconino County, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
21	Long Lake Complex	210	C. Taylor - USFS	2	1	0	0
22	Stoneman Lake	130	D. Moniak - USFS	0	0	0	0
23	FH3	35	"	0	0	0	0
24	I-17, Sedona to Flagstaff	116	Green, Goodwin - USFS	8	1	0	0
25	Bellemont	148	Martinez - USFS	0	1	0	0
26	Townsend / Winona A & B	660	Phillips, Beard -USFS	1	0	0	0
27	HWY 89 North / Sunset Crater - Wupatki	315	C. Dargan - USFS	2	0	0	0
28	FH3 Lakes (Mary, Mormon, Marshall, Prime)	425	S. MacVean - AGFD	30	37	2	0
29	Continental Country Club Lakes	120	G. Fields - USFS	1	0	0	0
30	Chevelon Canyon Lake	15	K. Clay - AGFD	4	2	0	0
31	Holden Lake	15	C. Nelson - USFS	0	0	0	0
32	Spring Valley Wash	30	S Muldoon - USFS	0	0	0	0

33	Red Lake Valley	60	J. Holmes - USFS	0	0	0	0
34	Kaibab Lake	35	C. Nelson - USFS	2	1	0	0
35	Pittman Valley	40	J. Holmes - USFS	0	0	0	0
36	Davenport Lake	5	J. Hanson - USFS	0	0	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 3. Continued.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
37	Scholz Lake	45	R. Tissaw - USFS	1	0	0	0
38	Cataract Lake	15	C. Nelson - USFS	1	0	0	0
39	Willow Springs Lake	Not surveyed					
40	West Chevelon Canyon	100	B. Dykstra - USFS	0	0	0	0
41	Willow Creek	130	"	0	0	0	0
42	White Horse Lake - Pomeroy Tanks	30	K. Menasco - USFS	2	0	0	0
43	JD Dam Lake	35	R. Tissaw - USFS	1	0	0	0
44	Barney Flat Wetland	20	"	0	0	0	0
45	Steel / Stone Road	85	T. McGann - USFS	1	0	0	0
46	Pine Flat	15	R. Tissaw - USFS	0	0	0	0
47	Boggy Tank	60	R.V. Ward - USFS	0	0	0	0
48	Blue Stem Wash-Babbitt property	90	"	1	0	0	0
49	Glen Canyon Nat'l Rec Area (Lee's Ferry)	57	C. Connella - NPS	3	0	0	0
50	Colorado River, Lee's Ferry to Little Colorado River	Not surveyed					

Table 4. Results of standardized 1996 Arizona bald eagle winter count, 9, 11 & 15 January, Graham,

Greenlee, and Maricopa counties, Arizona.							
Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
51	Point of Pines Lake Area	51	A. Moors - SCAT	9	7	0	0
52	Greys Peak	30	R. Csargo - USFS	0	0	0	0
53	Painted Rock Reservoir	45	T. Corman - AGFD	1	1	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 5. Results of standardized 1996 Arizona bald eagle winter count, 9 & 15 January, Mohave County, Arizona.							
Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
54	Lake Mohave	300	C. Hahn - NPS	4	4	0	0
55	Havasu National Wildlife Refuge, Topock Marsh	Not surveyed					
56	Lake Mead, Temple Bar	360	Klein and Stafford - NPS	7	4	0	0
57	Alamo Lake	10	AGFD	3	1	0	0

Table 6. Results of standardized 1996 Arizona bald eagle winter count, 8-10 January, Navajo County, Arizona.							
Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
58	Lake of the Woods	11	M. Ingraldi - AGFD	0	0	0	0
59	Rainbow Lake	25	"	2	1	0	0
60	Little Mormon Lake	9	"	0	0	0	0
61	Whipple Lake	9	"	0	0	0	0
62	Long Lake	38	"	2	2	0	0
63	Lone Pine Lake	15	L. Holland - AGFD	0	0	0	0
64	Schoens Reservoir	38	"	0	0	0	0

65	White Mountain Lake	35	"	1	0	0	0
66	Dry Lake	Not surveyed					
67	Jacques Marsh	65	D. Groebner - AGFD	0	1	0	0
68	Scott's Reservoir	28	"	2	0	0	0
69	Showlow Lake	18	M. Ingraldi - AGFD	2	1	0	0
70	Pintail Lake	15	S. Trachy - AGFD	2	1	0	0
71	Telephone Lake	51	D. Groebner - AGFD	2	2	0	0
72	Fool Hollow Lake	28	M. Ingraldi - AGFD	0	0	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 6. Continued.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
73	Fred's Lake	20	D. Groebner - AGFD	0	0	0	0
74	Edeler's Lake	10	"	0	0	0	0
75	Cottonwood Wash / Clay Springs	Not surveyed					
76	White Lake	5	D. Groebner - AGFD	0	0	0	0

Table 7. Results of standardized 1996 Arizona bald eagle winter count, 10, 12 & 14 January, Pima, Pinal, and Santa Cruz counties, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
77	Arivaca Lake	55	T. Newman - USFS	0	0	0	0
78	Picacho Reservoir	150	M. Pruss - AGFD	0	0	0	0
79	Bog Hole	25	J. Millican - AGFD	0	0	0	0
80	Patagonia Lake	0	R. Gagnon - State Parks	0	0	0	0
81	San Raphael Valley	45	J. Millican - AGFD	0	0	0	0

82	Pena Blanca Lake	55	T. Newman - USFS	0	0	0	0

Table 8. Results of standardized 1996 Arizona bald eagle winter count, 9-12 & 14 January, Yavapai County, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
83	Wet Beaver Creek	330	J. Agyagos - USFS	1	0	0	0
84	Oak Creek	420	C. Van Cleve	1	1	0	0
85	Willow Lake	15	N. Fletcher - USFS	1	0	0	0
86	Lynx Lake	40	"	1	1	0	0
87	Watson Lake	40	"	0	0	0	0
88	Goldwater Lake	35	"	2	0	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 9. Results of standardized 1996 Arizona bald eagle winter count, 16 January, Yuma/La Paz counties, Arizona.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
89	Imperial National Wildlife Refuge Cibola/Martinez Lake - Colorado River	120	C. Kennedy - USFWS	1	4	0	0

Table 10. Results of standardized 1996 Arizona bald eagle winter count, helicopter survey, 9-11 & 17 January, Arizona. Surveyors: AGFD - Driscoll, Koloszar, SRP - Nobel, USBR - Messing.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
90	Verde River	388	AGFD, SRP, USBR	25	7	0	0
91	Lower East Verde River	11	"	0	1	0	0
92	Lower West Clear Creek	23	"	3	5	0	0
93	Lower Salt River	33	"	2	0	0	0

94	Upper Salt River	110	"	10	2	0	0
95	Lower Tonto Creek	21	"	2	0	0	0
96	Lower Cherry Creek	2	"	0	0	0	0
97	Lower Canyon Creek	9	"	0	0	0	0
98	Lower Cibecue Creek	13	"	1	0	0	0
99	Lower Carrizo Creek	3	"	0	0	0	0
100	White River	17	"	1	1	0	0
101	North Fork White River	39	"	9	3	0	0
102	Lower Black River	48	"	18	8	0	0
103	Big & Little Bonito Creeks	30	"	3	0	0	0
104	San Carlos River (Talkalai Lake)	28	"	5	0	0	0
105	San Carlos Reservoir	27	"	4	6	0	0
106	Upper and Lower Gila River	55	"	4	11	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 10. Continued.

Site #	Site	Minutes	Surveyor	Ad[1]	Sub	Ube	Uea
107	Eagle Creek	36	AGFD, SRP, USBR	14	2	0	0
108	Bonita Creek	14	"	4	1	0	0
109	Lower San Francisco River	33	"	7	1	0	0
110	Blue River	12	"	3	0	0	0
111	Sunrise Lake	2	"	2	1	0	0
112	Big Lake	Not surveyed					
113	Lee Valley Reservoir	2	"	0	0	0	0
114	Crescent Lake	Not surveyed					

115	Lake Pleasant	15	"	1	0	0	0

[1]Ad=adult, Sub=subadult, Ube=unknown age of bald eagle, Uea=unknown type of eagle.

Table 11. 1996 winter count sites not included in standardized survey, Arizona.

Date	County	Site	Drainage	Surveyor	Ad	Sub	?
1/9/96	Apache	Little Ortega Lake	Little Ortega Lake	D. Cagle - AGFD	0	4	0
1/13/96	Cochise	Spitler Land and Cattle	Sulphur Springs Valley	A. Moorhouse	1	1	1
1/13/96	Cochise	Sunset Loop	Bonita Creek	M. Pruss - AGFD	2	1	0
1/12/96	Coconino	Hwy 87	None	Moniak - USFS	0	1	0
1/12/96	Coconino	Hwy 87 North	None	May - USFS	5	0	0
1/12/96	Coconino	Hwy 260	None	Moniak - USFS	0	0	0
1/12/96	Coconino	FS Road 751 to Blue Ridge Res.	None	May - USFS	0	0	0
1/11/96	Coconino	Sunflower Flat	None	Menasco - USFS	2	0	3
1/11/96	Coconino	Coleman Lake	Coleman Lake	Davis - USFS	1	1	0
1/11/96	Coconino	Bar Cross Tank	None	"	1	0	0
1/11/96	Coconino	Saginaw Tank	None	"	1	0	0
1/11/96	Coconino	McClellan Res.	McClellan Res.	McGann - USFS	0	0	0
1/11/96	Coconino	Webster Tank	None	Matza - USFS	0	0	0
1/11/96	Coconino	Smoot Lake	Smoot Lake	Muldoon - USFS	2	0	0
1/11/96	Coconino	Dutch Kid Tank	None	Nelson - USFS	1	1	0
1/12/96	Navajo	Corduroy Creek	Corduroy Creek	Jojola - WMAT	2	0	0
1/11/9	Navajo	Little Bear Lake	Little Bear Lake	"	1	0	0

6							
1/11/96	Navajo	Hawley Lake	Hawley Lake	"	2	0	0
1/11/96	Navajo	Horseshoe-Cienega Lake	Horseshoe-Cienega Lake	"	1	0	0
1/12/96	Navajo	Amos Ranch	None	"	2	0	0
1/10/96	Navajo	Woodland Lake	Woodland Lake	Groebner - AGFD	0	0	0

Table 12. Summary of 1996 Arizona bald eagle winter count.

County	Sites	Minutes	Total/minute	Subadult	Adult	Unknown	Total
Verde River drainage	3	422	0.10	13	28	0	41
Salt River drainage	11	325	0.18	14	46	0	60
Gila River drainage	7	205	0.30	21	41	0	62
Various helicopter	3	19	0.21	1	3	0	4
Apache	11	397	0.04	4	10	0	14
Cochise	3	300	0	0	0	0	0
Coconino	28	3041	0.03	43	60	2	105
Graham	1	51	0.31	7	9	0	16
Greenlee	1	30	0	0	0	0	0
Maricopa	1	45	0.04	1	1	0	2
Mohave	3	670	0.03	9	14	0	23
Navajo	17	420	0.05	8	13	0	21
Pima/Pinal	2	205	0	0	0	0	0
Santa Cruz	4	125	0	0	0	0	0
Yavapai	6	880	0.009	2	6	0	8
Yuma	1	120	0.04	4	1	0	5
Totals	102	7255	0.05	127	232	2	361

Table 13. Summary of statewide Arizona bald eagle winter counts, 1981-1985, 1992-1996.

Year	Survey time minutes	Total birds per minute	# Subadult bald eagles	# Adult bald eagles	# Unknown bald eagles	Total # bald eagles
1981	-[1]	-	60 (36%)	103 (63%)	2 (1%)	165
1982	-	-	72 (34%)	135 (64%)	3 (2%)	210
1983	-	-	53 (33%)	104 (66%)	1 (1%)	158
1984	-	-	63 (28%)	159 (71%)	3 (1%)	225
1985	-	-	40 (34%)	78 (66%)	0	118
1992	9801	0.0230	70 (31%)	145 (65%)	10 (4%)	225
1993	9938	0.0187	46 (25%)	133 (71%)	7 (4%)	186
1994	7949	0.0457	96 (26%)	263 (72%)	4 (1%)	363
1995[2]	9563	0.0259	76 (31%)	164 (66%)	8 (3%)	248
1996	7255	0.0498	127 (35%)	232 (64%)	2 (1%)	361
Totals	44,506[3]	0.0311[3]	703 (31%)	1516 (67%)	40 (2%)	2259 (100%)

[1]The effort for the 1981-1984 counts was described in miles flown.
[2]Beginning of use of 115 standardized routes from the 1992-1994 surveys.
[3]Represents only counts from 1992-1996.