

ARIZONA BALD EAGLE WINTER COUNT: 1997-1998

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ARIZONA BALD EAGLE WINTER COUNT: 1997-1998

Gregory L. Beatty and James T. Driscoll

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 high bald eagle concentrations (sites with more than 15 eagles observed in 2 or more years) be surveyed. Subsequently, due to Arizona's lack of "concentrations," the state 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 (U.S. Fish and Wildlife Service 1990) and Nankoweap Creek (Brown et. al 1989; Brown and Stevens 1992). Annual statewide counts were resumed in 1992 (Beatty 1993; Beatty and Driscoll 1994, 1996; Beatty et al. 1995a, 1995b), using a combination of ground visits (foot, automobile, boat, snowmobile) and helicopters. 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 U.S. Geological Survey Biological Resources Division, Snake River Field Station (USGS-BRD-SRFS, 970 Lusk Street, Boise, Idaho 83706).

Because the bald eagle is gregarious in winter, national surveys can determine the species' success throughout its range (Stalmaster 1987). In addition, determining the bald eagles winter use of Arizona lands increases our knowledge of management needs for wintering areas. Identifying winter distribution in Arizona was a goal in the 1982 Southwest Bald Eagle Recovery Plan (U.S. Fish and Wildlife Service 1982).

Now that the U.S. Fish and Wildlife Service (USFWS) has reclassified the bald eagle to threatened status (USFWS 1995), and is considering delisting the species, the national winter count retains its importance. Through the consistent efforts of each state, the winter count will provide valuable information for possible delisting or returning the bald eagle to the endangered species list.

METHODS

We continued to use the 115 standardized survey sites for the 1997 and 1998 Arizona winter counts. Our objective was to complete all of the 115 standardized sites. Any additional routes completed are included for management purposes only and are not recorded in the final tallies.

The 1997 and 1998 winter counts were scheduled for January 7 to 11, 1997, and January 7 to 12, 1998. This allowed 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 in a narrow time frame with minimal effort; a variety of methods was needed to adequately survey the state. The best way to survey the rugged terrain and deep canyons of the Salt, Verde, and Gila river drainages, including their the associated lakes and tributaries, is by helicopter. U.S. Bureau of Reclamation

(USBR) and Salt River Project (SRP) contributed four days of helicopter time to survey these areas. 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 watershed. Level of flight and speed were dependent upon 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 observing bald eagles.

Volunteer surveyors from agencies and private groups were solicited through the mail, given tally forms (supplied by the USGS-BRD-SRFS), and instructed on procedures. Most volunteers surveyed from their vehicle. Boats, foot travel, helicopters, snowmobiles and planes were used less frequently.

Bald eagle sightings were classified into adult and subadult age classes. Adult bald eagles have a distinct all white head and tail, brown wings and body. Subadult (or immature) plumaged birds have brown in the tail and head, and white mottling on the body (Clark and Wheeler 1987). Volunteers were asked to be aware of mistaking near-adult bald eagles for full-adult birds. Golden eagles also were recorded during the survey, but they are not reported in this document.

Data were broken down in two sections: the volunteer survey by county, and the helicopter survey (Tables 1-10, 13-22). The separation between volunteer and helicopter surveys represents the differences in methods so that future comparisons can be accurate.

RESULTS

The Arizona winter counts totaled 343 bald eagles in 1997 (Tables 1-10, 12), and 290 in 1998 (Tables 13-22, 24). We documented 193 adults (56%), 134 subadults (39%), and 16 unknown age bald eagles (5%) in 1997. In 1998, 183 adults (63%), 103 subadults (36%), and 4 unknown age bald eagles (1%) were recorded. Highest numbers of bald eagles, in both years, occurred on the Verde River (n=40 and n=32) and San Carlos Reservoir (n=33 and n=28). An additional 23 and 9 bald eagles were counted on routes not a part of the standardized count (Table 11, 23).

Of the 115 standardized routes, 96 were completed in 1997 and 93 in 1998. A total of 7718 minutes (128.6 hours) was spent searching for eagles in 1997, and 7190 minutes (119.8 hours) in 1998 (for four sites not recorded in 1998, survey times were averaged from previous years). In 1997 and 1998, the greatest survey effort was in Coconino County, where volunteers searched for 3164 minutes (52.7 hours) and 2677 minutes (44.6 hours), respectively (Table 12, 22).

The most efficient method of counting eagles was by helicopter. In 1997, 178 eagles were counted in 786 minutes (13.1 hours), 147 eagles were counted in 868 minutes (14.5 hours) in 1998. This represented 0.22 eagles and 0.17 bald eagles observed per minute, respectively. The most efficient volunteer ground effort (in counties with more than one survey site) occurred in Navajo County in 1997, and in Apache County in 1998, where 0.07 and 0.05 bald eagles were observed per minute

(Table 12, 22).

DISCUSSION

The total numbers of bald eagles counted in Arizona during the 1997 and 1998 winter counts were 343 and 290, respectively. These are above the statewide mean of 277 (range=186 to 363) since 1992.

The percentage of adults and subadults counted in Arizona have matched the NWF national winter surveys for 1986-1988 (Hastings 1988). Statewide counts from 1981 to 1985 and 1992 to 1998 averaged 65 percent adults (n=1892), 33 percent subadults (n=940), and 2 percent unknown (n=60) (Table 25). In 1997 and 1998, the percentage of subadult bald eagles counted (39% and 36%) was just above the national average.

Winter weather conditions in 1997 and 1998 did not affect access to sites or visibility of bald eagles. In January 1997, a large storm entered the state and dropped the largest amount of precipitation in two years, but it occurred after the suggested survey period (Arizona State University 1997). The following year, a scattered storm left less than one half inch of precipitation in most areas on January 10th and 11th (Arizona State University 1998). Temperatures for Arizona during the month of January were average in 1997 and above average in 1998. In January 1998, Phoenix, Tucson, and Flagstaff reported average temperatures 3.0, 1.9, and 2.7 degrees above the long term mean.

Lower lake levels and higher concentrations of waterfowl may have been factors influencing the presence of bald eagles on San Carlos Reservoir (SCR). From 1994 to 1996, SCR ranged from 39 to 46 percent full in January. During those years, 7, 12, and 10 bald eagles were observed, respectively. In January 1997 and 1998, when SCR dropped to 15 and 9 percent full, we observed 33 and 28 bald eagles. The number of bald eagles using SCR in 1997 was likely higher; we counted an additional 21 bald eagles in a cottonwood grove just below Coolidge Dam. Over the last two years, we noted an abundance of waterfowl on the reservoir. Waterfowl were present in such high concentrations, the helicopter pilot had to pull away from the reservoir for safety concerns.

In 1997 and 1998, 83 (n=28) and 96 (n=27) percent of the bald eagles counted at SCR were in subadult plumage. These comprised 21 and 26 percent of all the subadult eagles counted statewide. The concentration of subadults seems odd considering state and national counts found only a third of all bald eagles counted were subadults. In contrast, at the FH3 lakes (Marshall Lake, Upper and Lower Lake Mary, Mormon Lake and Prime Lake) where 114 eagles have been counted since 1993, 44 percent of all eagles were in subadult plumage. We are unsure why SCR has specifically attracted subadult eagles over the last two years.

RECOMMENDATIONS

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

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

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

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

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APPENDIX A: 1997 WINTER COUNT

Table 1. Results of the 1997 bald eagle winter count, January 9 and 10, Apache County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
1	Becker Lake	10	Ordonez-USFS	2	0	0	0
2	Little Colorado River (LCR)	40	Ordonez-USFS	3	2	0	0
3	S. Fork LCR – Campground	20	Ordonez-USFS	0	0	0	0
4	Casa Malapais - LCR	10	Ordonez-USFS	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	90	Davidson-USFS	2	0	0	0
6	Sponseller Lake	55	Klien-USFS	0	0	0	0
7	Mexican Hay Lake	60	Vahle-AGFD	0	0	0	0
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	70	Crawford-AGFD	3	2	0	0
9	The Ranch Lake	10	Cagle-AGFD	0	0	0	0
10	Ortega Lake	20	Cagle-AGFD	0	0	0	0
11	Concho Lake	20	Cagle-AGFD	1	0	0	0
12	Luna Lake	35	Copeland-USFS	2	0	0	0
13	Nelson Reservoir	30	Copeland-USFS	1	0	0	0
14	Nutriosio Reservoir	Not surveyed					
15	Tenney Pond	10	Copeland-USFS	0	0	0	0
16	San Francisco River (Alpine RD to New Mexico)	300	Slaughter-USFS	0	0	0	0
17	Campbell Blue Creek	Not surveyed					

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

Table 2. Results of the 1997 bald eagle winter count, January 4 and 9, Cochise County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
18	Parker Canyon Lake	80	Millican-AGFD	1	0	0	0
19	Willcox Playa	270	Pruss-AGFD	2	1	0	0
20	Sulphur Springs Valley – Whitewater Draw	210	Fulk-AGFD	0	1	0	0

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

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Table 3. Results of the 1997 bald eagle winter count, January 9-11, Coconino County, Arizona.

#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
21	Long Lake Complex	230	Taylor-USFS	3	1	0	0
22	Stoneman Lake	268	Whitney-USFS	10	4	0	7
23	FH3	48	Whitney-USFS	0	0	0	0
24	I-17, Sedona to Flagstaff	115	Schaal-USFS	1	2	0	0
25	Bellemont	135	Crisp-USFS	0	0	0	0
26	Townsend/Winona A/B	530	Beard-USFS	1	1	0	0
27	HWY 89 North/Sunset Crater - Wupatki	360	Dargan-USFS	1	1	0	0
28	FH3 Lakes (Mary, Mormon, Marshall, Prime)	415	Green-USFS	3	1	0	1
29	Continental Country Club Lakes	135	Fields	2	1	0	0
30	Chevelon Canyon Lake	21	Clay-AGFD	0	0	0	0
31	Holden Lake	21	Nelson-USFS	0	0	0	0
32	Spring Valley Wash	240	Muldoon-USFS	3	0	0	0
33	Red Lake Valley	60	Holmes-USFS	0	0	0	0
34	Kaibab Lake	15	Nelson-USFS	0	0	0	0
35	Pittman Valley	60	Holmes -USFS	0	0	0	0
36	Davenport Lake	2	Menasco-USFS	1	0	0	0
37	Scholz Lake	20	Weintaub-USFS	0	0	0	0
38	Cataract Lake	19	Nelson-USFS	0	0	0	0
39	Willow Springs Lake	30	Carrothers-USFS	0	0	0	0
40	West Chevelon Canyon	120	Dykstra-USFS	2	4	0	0
41	Willow Creek	65	Dykstra-USFS	1	0	2	0
42	White Horse Lake - Pomeroy Tanks	75	Menasco-USFS	4	3	0	0
43	JD Dam Lake	20	Weintaub-USFS	0	0	0	0
44	Barney Flat Wetland	5	Weintaub-USFS	0	0	0	0
45	Steel/Stone Road	45	Nelson-USFS	1	0	0	0
46	Pine Flat	75	Menasco-USFS	0	0	0	0
47	Boggy Tank	Not surveyed					
48	Blue Stem Wash-Babbitt property	Not surveyed					

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

Table 3. (continued)

#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
49	Glen Canyon Nat'l Rec Area (Lee's Ferry)	35	Russel-NPS	1	2	0	0
50	Colorado River, Lee's Ferry to Little Colorado River	Not surveyed					

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

Table 4. Results of the 1997 bald eagle winter count, January 12, Graham, Greenlee, and Maricopa counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
51	Point of Pines Lake Area	Not surveyed					
52	Greys Peak	Not surveyed					
53	Painted Rock Reservoir	60	Corman-AGFD	0	0	0	0

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

Table 5. Results of the 1997 bald eagle winter count, January 7 and 12, Mohave County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
54	Lake Mohave	450	Hahn-NPS	3	1	0	1
55	Havasu National Wildlife Refuge, Topock Marsh	Not surveyed					
56	Lake Mead, Temple Bar	255	Burt-NPS	8	2	0	2
57	Alamo Lake	215	Driscoll-AGFD	3	1	0	0

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

Table 6. Results of the 1997 bald eagle winter count, January 9 and 10, Navajo County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
58	Lake of the Woods	20	Klein-USFS	0	0	1	0
59	Rainbow Lake	27	Sorenson-USFS	5	4	0	0
60	Little Mormon Lake	6	Groebner-AGFD	1	0	0	0
61	Whipple Lake	10	Groebner-AGFD	0	1	0	0
62	Long Lake	35	Groebner-AGFD	1	2	0	0
63	Lone Pine Lake	25	L. Holland-AGFD	1	0	0	0
64	Schoens Reservoir	27	L. Holland-AGFD	1	0	0	0
65	White Mountain Lake	20	L. Holland-AGFD	2	1	0	0
66	Dry Lake	174	Chapin-AGFD	0	0	0	0
67	Jacques Marsh	26	Puschel-USFS	2	0	0	0
68	Scott's Reservoir	42	Puschel-USFS	1	3	0	0
69	Showlow Lake	20	Kay-USFS	0	3	1	0
70	Pintail Lake	35	Groebner-AGFD	2	0	0	0
71	Telephone Lake	14	Groebner-AGFD	3	0	0	0
72	Fool Hollow Lake	60	Kay-USFS	2	2	0	0
73	Fred's Lake	5	Sorenson-USFS	0	0	0	0
74	Edeler's Lake	5	Sorenson-USFS	0	0	0	0
75	Cottonwood Wash/Clay Springs	30	Carrothers-USFS	0	0	0	0
76	White Lake	7	Groebner-AGFD	0	0	0	0

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

Table 7. Results of the 1997 bald eagle winter count, January 9 and 10, Pima, Pinal, and Santa Cruz counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
77	Arivaca Lake	Not surveyed					
78	Picacho Reservoir	90	Pruss_AGFD	0	0	0	0
79	Bog Hole	30	Millican-AGFD	0	0	0	0
80	Patagonia Lake	Not surveyed					
81	San Raphael Valley	55	Millican-AGFD	0	0	0	0
82	Pena Blanca Lake	Not surveyed					

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

Table 8. Results of the 1997 bald eagle winter count, January 9 and 11, Yavapai County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
83	Wet Beaver Creek	300	Bradley-USFS	2	0	0	0
84	Oak Creek	330	Van Cleve-N.Az. Aud.	3	1	1	0
85	Willow Lake	Not surveyed					
86	Lynx Lake	Not surveyed					
87	Watson Lake	Not surveyed					
88	Goldwater Lake	Not surveyed					

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

Table 9. Results of the 1997 bald eagle winter count, January 10, Yuma/La Paz counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
89	Imperial National Wildlife Refuge Cibola/Martinez Lake - Colorado River	55	Kennedy-USFWS	4	7	0	0

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

Table 10. Results of the 1997 bald eagle winter count, helicopter survey, January 7, 9, 15, and 17, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
90	Verde River	205	AGFD, SRP, USBR	30	10	0	0
91	Lower East Verde River	10	AGFD, SRP, USBR	1	0	0	0
92	Lower West Clear Creek	17	AGFD, SRP, USBR	1	0	0	0
93	Lower Salt River	93	AGFD, SRP, USBR	8	5	0	0
94	Upper Salt River	78	AGFD, SRP, USBR	3	1	0	0
95	Lower Tonto Creek	30	AGFD, SRP, USBR	1	1	0	0
96	Lower Cherry Creek	7	AGFD, SRP, USBR	0	0	0	0
97	Lower Canyon Creek	7	AGFD, SRP, USBR	0	0	0	0
98	Lower Cibecue Creek	10	AGFD, SRP, USBR	0	0	0	0
99	Lower Carrizo Creek	5	AGFD, SRP, USBR	0	0	0	0
100	White River	14	AGFD, SRP, USBR	2	2	0	0
101	North Fork White River	33	AGFD, SRP, USBR	5	1	0	0
102	Lower Black River	41	AGFD, SRP, USBR	4	2	0	0
103	Big and Little Bonito Creeks	Not surveyed					
104	San Carlos River (Talkalai Lake)	29	AGFD, SRP, USBR	3	0	0	0
105	San Carlos Reservoir	19	AGFD, SRP, USBR	5	28	0	0
106	Upper and Lower Gila River	69	AGFD, SRP, USBR	5	19	0	0
107	Eagle Creek	36	AGFD, SRP, USBR	17	10	0	0
108	Bonita Creek	17	AGFD, SRP, USBR	5	1	0	0
109	Lower San Francisco River	39	AGFD, SRP, USBR	4	0	0	0
110	Blue River	13	AGFD, SRP, USBR	3	0	0	0
111	Sunrise Lake	2	AGFD, SRP, USBR	0	0	0	0
112	Big Lake	Not surveyed					
113	Lee Valley Reservoir	Not surveyed					
114	Crescent Lake	Not surveyed					
115	Lake Pleasant	12	AGFD, SRP, USBR	1	0	0	0

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

Date	County	Site	Surveyor	Ad	Sub	Ube	Uea
1/9	Coconino	Bar Cross Tank	Davis - USFS	2	2	0	0
1/9	Coconino	Coleman Lake	Davis - USFS	0	1	0	0
1/9	Coconino	Red Lake Valley	Matza - USFS	0	0	0	0
1/9	Coconino	Sunflower Flat	Weintraub - USFS	0	0	0	0
1/9	Coconino	Hwy 87	Benoit - USFS	0	0	0	0
1/9	Coconino	Woodland Lake	Sorenson - USFS	0	0	0	0
1/9	Navajo	Ned's Lake	Groeber - AGFD	0	0	0	0
1/9	Navajo	Redhead Marsh	Groeber - AGFD	2	2	0	0

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

County	Sites	Minutes	Total/minute	Subadult	Adult	Unknown	Total
Verde River drainage	3	232	0.18	10	32	0	42
Salt River drainage	10	318	0.11	12	23	0	35
Gila River drainage	7	222	0.45	58	42	0	100
Various helicopter	2	14	0.7	0	1	0	1
Apache	15	780	0.02	4	14	0	18
Cochise	3	560	0.009	2	3	0	5
Coconino	27	3164	0.02	20	34	10	64
Maricopa	1	60	0	0	0	0	0
Mohave	3	920	0.02	4	14	3	21
Navajo	19	588	0.07	16	21	2	39
Pinal	1	90	0	0	0	0	0
Santa Cruz	2	85	0	0	0	0	0
Yavapai	2	630	0.01	1	5	1	7
Yuma	1	55	0.2	7	4	0	11
Totals	96	7718	0.04	134	193	16	343

APPENDIX B: 1998 WINTER COUNT

Table 13. Results of the 1998 bald eagle winter count, January 12 and 14, Apache County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
1	Becker Lake	15	Ordonez-USFS	2	0	0	0
2	Little Colorado River (LCR)	20	Ordonez-USFS	0	0	0	0
3	S. Fork LCR - Campground	15	Ordonez-USFS	0	0	0	0
4	Casa Malapais - LCR	10	Ordonez-USFS	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	60	Davidson -USFS	3	0	0	0
6	Sponseller Lake	25	Puscel-USFS	0	0	0	0
7	Mexican Hay Lake	20	Groebner-AGFD	0	0	0	0
8	White Mt. Hereford Rch. (Trinity, Glen Livet, McKay Res)	90	Crawford-AGFD	3	0	0	0
9	The Ranch Lake	15	Cagle-AGFD	4	1	0	0
10	Ortega Lake	50	Cagle-AGFD	1	3	0	0
11	Concho Lake	20	Cagle-AGFD	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					

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

Table 14. Results of the 1998 bald eagle winter count, January 5 and 10, Cochise County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
18	Parker Canyon Lake	120	Millican-AGFD	2	2	0	0
19	Willcox Playa	420	Paz-AGFD	1	1	0	0
20	Sulphur Springs Valley - Whitewater Draw	Not surveyed					

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

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Table 15. Results of the 1998 bald eagle winter count, January 7-12, Coconino County, Arizona.

#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
21	Long Lake Complex	215	Taylor-USFS	0	2	0	0
22	Stoneman Lake	179	Paul-USFS	2	0	0	0
23	FH3	43	Paul-USFS	0	0	0	0
24	I-17, Sedona to Flagstaff	220	Green-USFS	11	2	0	2
25	Bellemont	255	Dargan-USFS	4	1	0	0
26	Townsend/Winona A/B	240	Phillips-USFS	4	0	0	0
27	HWY 89 North/Sunset Crater - Wupatki	340	Dargan-USFS	5	1	0	1
28	FH3 Lakes (Mary, Mormon, Marshall,	270	Schaal-USFS	3	0	0	0
29	Continental Country Club Lakes	150	Blows-N.Az. Aud.	1	0	0	0
30	Chevelon Canyon Lake	15	Clay-AGFD	2	0	0	0
31	Holden Lake	15	Nelson-USFS	0	0	0	0
32	Spring Valley Wash	180	Nelson-USFS	3	1	0	0
33	Red Lake Valley	10	Herron-USFS	0	0	0	0
34	Kaibab Lake	40	Nelson-USFS	1	0	0	0
35	Pittman Valley	60	Herron-USFS	0	0	0	0
36	Davenport Lake	10	Herron-USFS	0	0	0	0
37	Scholz Lake	45	Tissaw-USFS	2	0	0	0
38	Cataract Lake	15	Nelson-USFS	1	0	0	0
39	Willow Springs Lake	Not surveyed					
40	West Chevelon Canyon	80	Dykstra -USFS	6	0	0	0
41	Willow Creek	105	Dykstra -USFS	2	5	0	0
42	White Horse Lake - Pomeroy Tanks	45	Tissaw-USFS	2	0	0	0
43	JD Dam Lake	20	Tissaw-USFS	0	0	0	0
44	Barney Flat Wetland	20	Tissaw-USFS	0	0	0	0
45	Steel/Stone Road	90	Herron-USFS	1	0	0	0
46	Pine Flat	15	Tissaw-USFS	0	0	0	0
47	Boggy Tank	Not surveyed					
48	Blue Stem Wash-Babbitt property	Not surveyed					

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

Table 15. (continued)

#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
49	Glen Canyon Nat'l Rec Area (Lee's Ferry)	Not surveyed					
50	Colorado River, Lee's Ferry to Little Colorado River	Not surveyed					

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

Table 16. Results of the 1998 bald eagle winter count, January 16, Graham, Greenlee, and Maricopa counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
51	Point of Pines Lake Area	Not surveyed					
52	Greys Peak	Not surveyed					
53	Painted Rock Reservoir	45	Piest-AGFD	0	0	0	0

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

Table 17. Results of the 1998 bald eagle winter count, January 9-11, Mohave County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
54	Lake Mohave	480	Hahn-NPS	10	1	0	0
55	Havasu National Wildlife Refuge, Topock Marsh	Not surveyed					
56	Lake Mead, Temple Bar	360	Burt-NPS	5	1	0	0
57	Alamo Lake	30	Driscoll-AGFD	4	0	0	0

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

Table 18. Results of the 1998 bald eagle winter count, January 12 and 17, Navajo County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
58	Lake of the Woods	10	Collins-USFS	0	0	0	0
59	Rainbow Lake	15	Collins-USFS	3	0	0	0
60	Little Mormon Lake	8	Rinker-AGFD	0	0	0	0
61	Whipple Lake	20	Rinker-AGFD	1	0	0	0
62	Long Lake	68	Rinker-AGFD	1	1	0	0
63	Lone Pine Lake	10	Groebner-AGFD	0	0	0	0
64	Schoens Reservoir	20	Groebner-AGFD	0	0	0	0
65	White Mountain Lake	45	Groebner-AGFD	1	0	0	0
66	Dry Lake	107	Chapin-AGFD	1	1	1	0
67	Jacques Marsh	60	Ringelburg-USFS	3	5	0	0
68	Scott's Reservoir	20	Ringelburg-USFS	1	0	0	0
69	Showlow Lake	45	Christian	2	0	0	0
70	Pintail Lake	60	Sitko-AGFD	0	0	0	0
71	Telephone Lake	45	Sitko-AGFD	2	0	0	0
72	Fool Hollow Lake	75	Christian-USFS	1	3	0	0
73	Fred's Lake	10	Ringelburg-USFS	0	0	0	0
74	Edeler's Lake	15	Christian-USFS	0	1	0	0
75	Cottonwood Wash/Clay Springs	25	Carrothers-USFS	0	0	0	0
76	White Lake	5	Groebner-AGFD	0	0	0	0

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

Table 19. Results of the 1998 bald eagle winter count, January 10 and 12, Pima, Pinal, and Santa Cruz counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
77	Arivaca Lake	165	Newman-USFS	0	0	0	0
78	Picacho Reservoir	Not surveyed					
79	Bog Hole	30	Millican-AGFD	0	0	0	0
80	Patagonia Lake	Not surveyed					
81	San Raphael Valley	60	Millican-AGFD	0	0	0	0
82	Pena Blanca Lake	72	Newman-USFS	0	0	0	0

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

Table 20. Results of the 1998 bald eagle winter count, January 6, 9, and 11, Yavapai County, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
83	Wet Beaver Creek	330	Agyagos-USFS	0	0	0	0
84	Oak Creek	330	Van Cleve-N.Az. Aud.	0	0	0	0
85	Willow Lake	Not surveyed					
86	Lynx Lake	20	Fletcher-USFS	2	0	0	0
87	Watson Lake	Not surveyed					
88	Goldwater Lake	60	Thurman-Prescott Parks	1	2	0	0

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

Table 21. Results of the 1998 bald eagle winter count, January 7, Yuma/La Paz counties, Arizona.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
89	Imperial National Wildlife Refuge Cibola/Martinez Lake - Colorado River	120	Kennedy-USFWS	1	0	0	0

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

Table 22. Results of the 1998 Arizona bald eagle winter count, helicopter survey, January 5-7, and 16.							
#	Site	Min.	Surveyor	Ad	Sub	Ube	Uea
90	Verde River	190	AGFD, SRP, USBR	20	12	0	0
91	Lower East Verde River	11	AGFD, SRP, USBR	1	0	0	0
92	Lower West Clear Creek	22	AGFD, SRP, USBR	2	0	0	0
93	Lower Salt River	103	AGFD, SRP, USBR	6	10	0	0
94	Upper Salt River	55	USBR, WMAGFD	4	5	0	0
95	Lower Tonto Creek	34	AGFD, SRP, USBR	2	1	0	0
96	Lower Cherry Creek	7	AGFD, SRP, USBR	0	0	0	0
97	Lower Canyon Creek	25	USBR, WMAGFD	2	0	0	0
98	Lower Cibecue Creek	11 ²	USBR, WMAGFD	1	0	0	0
99	Lower Carrizo Creek	7 ²	USBR, WMAGFD	0	0	0	0
100	White River	14 ²	USBR, WMAGFD	0	0	0	0
101	North Fork White River	38 ²	USBR, WMAGFD	4	2	0	0
102	Lower Black River	58	USBR, WMAGFD	14	9	0	0
103	Big and Little Bonito Creeks	27	USBR, WMAGFD	1	0	0	0
104	San Carlos River (Talkalai Lake)	37	AGFD, SRP, USBR	2	0	0	0
105	San Carlos Reservoir	24	AGFD, SRP, USBR	1	27	0	0
106	Upper and Lower Gila River	66	AGFD, SRP, USBR	6	3	0	0
107	Eagle Creek	41	AGFD, SRP, USBR	10	0	0	0
108	Bonita Creek	16	AGFD, SRP, USBR	0	0	0	0
109	Lower San Francisco River	48	AGFD, SRP, USBR	0	0	0	0
110	Blue River	6	AGFD, SRP, USBR	0	0	0	0
111	Sunrise Lake	5	USBR, WMAGFD	0	0	0	0
112	Big Lake	Not surveyed					
113	Lee Valley Reservoir	Not surveyed					
114	Crescent Lake	Not surveyed					
115	Lake Pleasant	23	AGFD, SRP, USBR	2	0	0	0

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

²Survey times not recorded. Times estimated from reported times in 1994-1997.

Table 23. 1998 Arizona winter count sites not included in standardized survey.							
Date	County	Site	Surveyor	Ad	Sub	Ube	Uea
1/5	Cochise, Graham	Wilcox - Bonita	Bacorn - AGFD	0	0	0	0
1/7	Coconino	Jackass Flat	McLaughlin - USFS	1	3	0	0
1/7	Coconino	Hat Ranch	VanNote - USFS	0	1	0	0
1/7	Coconino	Mud Ketch Tank	Mutz - USFS	2	2	0	0
1/9	Coconino	Clints Well	Benoit - USFS	0	0	0	0
1/10	Coconino	Hwy 87	Benoit - USFS	0	0	0	0
1/10	Coconino, Yavapai	Hwy 87 South	Dargan - USFS	1	0	0	0
1/13	Mohave	Topock Marsh	Connolly - USFWS	1	0	0	0
1/10	Mohave	Lake Mead N.R.A	Olson - NPS	1	0	0	0
1/10	Mohave	Katherine's Landing	Lopez - NPS	0	0	0	0
1/9	Mohave	Boulder Basin	Sabatini - NPS	1	0	0	0
1/10	Mohave	Overton Arm	Hendricks - NPS	9	1	0	0
1/12	Navajo	Woodland Lake	Ringelberg - USFS	0	0	0	0

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

Table 24. Summary of 1998 Arizona bald eagle winter count.							
County	Sites	Minutes	Total/minute	Adult	Subadult	Unknown	Total
Verde River drainage	3	223	0.16	23	12	0	35
Salt River drainage	11	379 ¹	0.16 ¹	34	27	0	61
Gila River drainage	7	238	0.21	19	30	0	49
Various helicopter	2	28	0.07	2	0	0	2
Apache	11	340	0.05	13	4	0	17
Cochise	2	540	0.01	3	3	0	6
Coconino	25	2677	0.02	50	12	3	65
Maricopa	1	45	0	0	0	0	0
Mohave	3	870	0.02	19	2	0	21
Navajo	19	663	0.04	16	11	1	28
Pima	1	165	0	0	0	0	0
Santa Cruz	3	162	0	0	0	0	0
Yavapai	4	740	0.007	3	2	0	5
Yuma	1	120	0.008	1	0	0	1
Totals	93	7190 ¹	0.04 ¹	183	103	4	290

¹ Four survey times not recorded. Times estimated from reported times in 1994-1997.

Table 25. Summary of statewide Arizona bald eagle winter counts, 1981-1985, 1992-1998.						
Year	Survey Time	Birds/minute	Adults	Subadults	Unknown	Total
1981	- ¹	-	103 (63%)	60 (36%)	2 (1%)	165
1982	-	-	135 (64%)	72 (34%)	3 (2%)	210
1983	-	-	104 (66%)	53 (33%)	1 (1%)	158
1984	-	-	159 (71%)	63 (28%)	3 (1%)	225
1985	-	-	78 (66%)	40 (34%)	0	118
1992	9801	0.0230	145 (65%)	70 (31%)	10 (4%)	225
1993	9938	0.0187	133 (71%)	46 (25%)	7 (4%)	186
1994	7949	0.0457	263 (72%)	96 (26%)	4 (1%)	363
1995 ²	9563	0.0259	164 (66%)	76 (31%)	8 (3%)	248
1996	7255	0.0498	232 (64%)	127 (35%)	2 (1%)	361
1997	7718	0.0444	193(56%)	134(39%)	16(5%)	343
1998	7190 ³	0.0416 ³	183(63%)	103(36%)	4(1%)	290
Totals	59414 ⁴	0.0339 ⁴	1892 (65%)	940 (33%)	60 (2%)	2892 (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 Four survey times not recorded. Times estimated from reported times in 1994-1997.

⁴ Represents only counts from 1992-1998.