

# ARIZONA BALD EAGLE WINTER COUNT: 2002

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James T. Driscoll, J.G. Koloszar, K.V. Jacobson, and J.S. Canaca

### INTRODUCTION

The National Wildlife Federation (NWF) initiated and organized the national bald eagle (*Haliaeetus leucocephalus*) winter count from 1979-1991. Arizona contributed statewide information in the 1970s to the early 1980s (Todd 1977, 1981, 1984a, 1984b; Hall 1985). However in 1986, a NWF protocol change asked the states to survey only areas of high bald eagle concentrations (routes with more than 15 bald eagles observed in two or more years). Due to Arizona's lack of "concentrations," we contributed minimal information in 1986 and 1987, and surveyed only specific management areas such as Roosevelt Lake, and Nankoweap Creek from 1989 to 1991 (Brown and others 1989; Brown and Stevens 1992; Hastings 1988; U.S. Fish and Wildlife Service 1990).

Arizona's statewide annual winter counts resumed in 1992, using a combination of ground visits (foot, automobile, boat, snowmobile) and helicopters (Beatty 1993; Beatty and Driscoll 1994, 1996, 1998; Beatty and others 1995a, 1995b; Driscoll and others 2000, 2001). By 1995, the Arizona Game and Fish Department, in coordination with the NWF, established 115 standardized routes for Arizona's bald eagle winter count. The U.S. Geological Survey Biological Resources Division, Snake River Field Station (USGS-BRD-SRFS), now coordinates the national winter count.

Since bald eagles are gregarious in winter, national surveys are a valuable tool to determine the species' success throughout its range (Stalmaster 1987). In addition, determining wintering bald eagle habitat use in Arizona 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). Although the U.S. Fish and Wildlife Service (USFWS) has reclassified the bald eagle to threatened status, and has proposed to delist the species, the national winter count is still important (USFWS 1995, 1999). Through the consistent efforts of each state, the winter count will provide information on nationwide population fluctuations post-delisting.

### METHODS

In 2002, we continued to use the established 115 standardized survey routes in Arizona. Our objective was to complete all of the standardized routes. Any additional routes completed were included for management purposes only, and were not included in the results.

We scheduled the Arizona bald eagle winter count for January 7 to 13, 2002. This scheduling allowed for the weekday use of agency helicopters, and weekends for volunteers. Due to the diverse habitat in Arizona, and our desire to maximize (but not duplicate) statewide coverage in a narrow period with minimal effort, we needed a variety of methods to perform an adequate survey. The best way to survey the rugged terrain and deep canyons of the Salt, Verde, and Gila River watersheds, is by helicopter. The U.S. Bureau of Reclamation (USBR) and Salt River Project (SRP) contributed

four days of helicopter time, while volunteers surveyed the other areas more accessible by boat, vehicle, and foot.

The low-level helicopter flights contained two to three biologists and a pilot flying directly above the watershed. While the level of flight and speed were dependent upon terrain, height and density of power lines, and wind speed; a height of 30.5 to 61 m (100 to 200 ft) above ground level and 55 to 65 knots (48 to 57 mph) was optimum for observing bald eagles.

We solicited volunteers from agencies and private groups through the mail, supplied survey forms (from the USGS-BRD-SRFS), and instructed them on the protocol. Most volunteers surveyed from their vehicle, although they also used boats, foot travel, snowmobiles, and planes.

We classified the bald eagle sightings into adult, subadult, and unknown age classes. We advised the volunteers to be aware of the various near-adult plumages as they may be easily mistaken for full-adult bald eagles. We also recorded the occurrence of golden eagles during the survey, but did not report them in this document.

We broke the data into two sections: 1) the volunteer survey by county (Tables 1-9), and 2) the helicopter survey (Table 10). The separation between volunteer and helicopter surveys represents the difference in methods for future comparisons.

## RESULTS

The 2002 Arizona bald eagle winter count totaled 402 bald eagles (Tables 1-11). We documented 236 adults (58.7%), 147 subadults (36.6%), and 19 unknown age bald eagles (4.7%). The highest number of bald eagles occurred on the lower Black River (n=105). An additional 13 bald eagles were counted on non-established routes (Table 12).

Of the 115 standardized routes, Arizona completed 109 (94.8%). Surveyors spent a total of 9,032 minutes (150.5 hours) searching. The greatest survey effort was in Coconino County, where volunteers searched for 3,996 minutes (66.6 hours) (Table 3).

The most efficient method of counting was by helicopter. We counted 228 bald eagles in 857 minutes (14.3 hours). This represented 0.266 bald eagles observed per minute. The most efficient volunteer ground effort (in counties with more than one survey route) occurred in Navajo County where they observed 0.033 bald eagles per minute (Table 11).

## DISCUSSION

The total number of bald eagles counted in the 2002 Arizona winter count was 402. This is the second highest number of bald eagles counted since the survey routes were standardized in 1995. The record setting 1999 winter count totaled 403. In 2002, we completed 109 (94.8%) of the 115 standardized routes. The most routes historically completed is 110 (95.7%) in 2000.

The percentage of adult and subadult bald eagles counted in Arizona match the NWF national winter surveys for 1986-1988 (Hastings 1988). Statewide winter counts from 1981 to 1985 and 1992 to 2001 averaged 64% adults (n=2,425), 33% subadults (n=1,255), and 2% unknown (n=86) (Table 13). In 2002, the percentage of adults counted (58.7%) was below, while the percentage of subadults (36.6%) was just above historic levels.

We attribute the high number of bald eagles counted this year to an unusually concentration on the lower Black River. Excluding 2002 and 2001, we observed an average of 18.4 (n=147) bald eagles per year on this route. In 2001, the area was not surveyed due to severe weather conditions and in 2002 we found 105 bald eagles. The high concentration of bald eagles on the lower Black River may be attributed to Arizona's extended drought. As a result, water levels remained diminished in reservoirs and tanks throughout the state, and counts were lower on these routes (e.g. San Carlos Reservoir, Roosevelt Lake). These lowered water levels forced wintering bald eagles to the available open water of the perennial rivers and streams. In addition, due to the limited rainfall, water turbidity levels were lower than normal during the count on the lower Black River, which increased bald eagle foraging opportunities on fish.

#### 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.

Implement the use of survey area maps during the winter count to document the location and abundance of wintering eagles, spatially identify important habitat use areas, and develop statewide maps for distribution to managing agencies.

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

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APPENDIX A: 2002 WINTER COUNT

Table 1. Results of the 2002 Arizona bald eagle winter count, Apache County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
1	Becker Lake	15	2	0	0	0
2	Little Colorado River (LCR)	15	0	0	0	0
3	S. Fork LCR – Campground	20	0	0	0	0
4	Casa Malapais – LCR	10	0	0	0	0
5	Greer Lakes (River, Bunch, and Tunnel Reservoirs)	100	0	2	0	0
6	Sponseller Lake	10	0	0	0	0
7	Mexican Hay Lake	60	0	1	0	0
8	White Mountain Hereford Ranch (Trinity, Glen Livet, McKay reservoirs)	60	3	0	0	0
9	The Ranch Lake	20	0	0	0	0
10	Ortega Lake	32	0	0	0	0
11	Concho Lake	23	2	0	0	0
12	Luna Lake	45	2	0	0	0
13	Nelson Reservoir	45	2	0	0	0
14	Nutriosio Reservoir	15	0	0	0	0
15	Tenney Pond	15	0	0	0	0
16	San Francisco River (Alpine RD to New Mexico)	Not Surveyed				
17	Campbell Blue Creek	Not Surveyed				
Total		485	11	3	0	0

Table 2. Results of the 2002 Arizona bald eagle winter count, Cochise County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
18	Parker Canyon Lake	60	2	0	0	0
19	Willcox Playa	240	0	1	0	0
20	Sulphur Springs Valley – Whitewater Draw	45	0	0	0	0
Total		345	2	1	0	0

Table 3. Results of the 2002 Arizona bald eagle winter count, Coconino County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
21	Long Lake Complex	270	10	7	2	0
22	Stoneman Lake	250	4	6	0	1
23	FH3	130	1	0	0	1
24	I-17, Sedona to Flagstaff	260	10	7	0	0
25	Bellefont	295	2	1	0	0
26	Townsend/Winona A/B	340	3	0	0	0
27	HWY 89 North/Sunset Crater - Wupatki	390	3	0	0	0
28	FH3 Lakes (Mary, Mormon, Marshall, Prime)	566	6	0	0	0
29	Continental Country Club Lakes	150	3	1	0	0
30	Chevelon Canyon Lake	60	1	3	4	1
31	Holden Lake	15	0	0	0	0
32	Spring Valley Wash	180	2	0	0	2
33	Red Lake Valley	40	0	0	0	0
34	Kaibab Lake	90	0	0	1	0
35	Pittman Valley	25	1	0	0	0
36	Davenport Lake	15	1	0	0	0
37	Scholz Lake	30	1	0	0	0
38	Cataract Lake	15	1	0	0	0
39	Willow Springs Lake	105	0	0	0	0
40	West Chevelon Canyon	70	0	0	0	0
41	Willow Creek	90	0	0	0	0
42	White Horse Lake – Pomeroy Tanks	60	1	0	0	0
43	JD Dam Lake	25	3	0	0	0
44	Barney Flat Wetland	30	0	0	0	0
45	Steel/Stone Road	60	0	0	0	0
46	Pine Flat	120	0	0	0	0
47	Boggy Tank	120	0	0	0	0
48	Blue Stem Wash-Babbitt property	120	0	0	0	0

Table 3. (continued)						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
49	Glen Canyon Nat'l Rec Area (Lee's Ferry)	75	3	0	0	0
50	Colorado River, Lee's Ferry to Little Colorado River	Not Surveyed				
Total		3,996	56	25	7	5

Table 4. Results of the 2002 Arizona bald eagle winter count, Graham, Greenlee, and Maricopa Counties.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
51	Point of Pines Lake Area	140	8	9	0	3
52	Greys Peak	35	0	0	0	0
53	Painted Rock Reservoir	Not Surveyed				
Total		175	8	9	0	3

Table 5. Results of the 2002 Arizona bald eagle winter count, Mohave County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
54	Lake Mohave	480	0	2	0	1
55	Havasu National Wildlife Refuge, Topock Marsh	Not Surveyed				
56	Lake Mead, Temple Bar	480	10	4	0	0
57	Alamo Lake	30	1	0	0	0
Total		990	11	6	0	1

Table 6. Results of the 2002 Arizona bald eagle winter count, Navajo County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
58	Lake of the Woods	10	0	0	0	2
59	Rainbow Lake	35	4	0	0	0
60	Little Mormon Lake	10	0	0	0	0
61	Whipple Lake	23	0	0	0	0
62	Long Lake	90	0	0	0	0
63	Lone Pine Lake	25	1	0	0	0
64	Schoens Reservoir	10	0	0	0	0
65	White Mountain Lake	40	1	0	0	0
66	Dry Lake	60	0	0	0	0
67	Jacques Marsh	30	0	0	1	0
68	Scott's Reservoir	30	0	0	0	0
69	Showlow Lake	50	1	1	0	0
70	Pintail Lake	26	0	0	0	0
71	Telephone Lake	19	0	0	0	0
72	Fool Hollow Lake	70	1	1	0	0
73	Fred's Lake	5	0	0	0	0
74	Edeler's Lake	5	0	0	0	0
75	Cottonwood Wash/Clay Springs	43	3	0	0	0
76	White Lake	11	0	0	0	0
Total		492	11	2	1	2

Table 7. Results of the 2002 Arizona bald eagle winter count, Pima, Pinal, and Santa Cruz Counties.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
77	Arivaca Lake	127	0	0	0	0
78	Picacho Reservoir	54	0	0	0	0
79	Bog Hole	45	0	0	0	0
80	Patagonia Lake	Not Surveyed				
81	San Raphael Valley	60	0	0	0	0
82	Pena Blanca Lake	90	0	0	0	0
Total		376	0	0	0	0

Table 8. Results of the 2002 Arizona bald eagle winter count, Yavapai County.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
83	Wet Beaver Creek	360	1	1	0	0
84	Oak Creek	445	1	1	0	0
85	Willow Lake	150	1	0	0	0
86	Lynx Lake	180	2	0	0	0
87	Watson Lake	1	1	0	0	0
88	Goldwater Lake	60	0	0	0	0
Total		1,196	6	2	0	0

Minutes not recorded. Times averaged from those reported 1994 – 2000.

Table 9. Results of the 2002 Arizona bald eagle winter count, Yuma and LaPaz Counties.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
89	Imperial National Wildlife Refuge Cibola/Martinez Lake – Colorado River	120	1	1	0	0
Total		120	1	1	0	0

Table 10. Results of the 2002 Arizona bald eagle winter count, helicopter surveys.						
Route Number	Route Name	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
90	Verde River	194	19	4	0	0
91	Lower East Verde River	16	1	1	0	0
92	Lower West Clear Creek	29	3	5	0	0
93	Lower Salt River	114	6	3	0	0
94	Upper Salt River	47	7	5	0	0
95	Lower Tonto Creek	25	3	0	0	0
96	Lower Cherry Creek	8	0	0	0	0
97	Lower Canyon Creek	8	0	0	0	0
98	Lower Cibecue Creek	12	0	0	0	0
99	Lower Carrizo Creek	5	1	0	0	0
100	White River	20	6	2	0	0
101	North Fork White River	27	10	11	0	0
102	Lower Black River	59	55	50	0	0
103	Big and Little Bonito Creeks	39	4	3	0	0
104	San Carlos River (Talkalai Lake)	41	1	0	0	0
105	San Carlos Reservoir	13	3	0	0	0
106	Upper and Lower Gila River	63	4	10	0	0
107	Eagle Creek	38	3	2	0	0
108	Bonita Creek	14	0	0	0	0
109	Lower San Francisco River	35	1	1	0	0
110	Blue River	13	2	0	0	0
111	Sunrise Lake	2	0	0	0	0
112	Big Lake	1	0	0	0	0
113	Lee Valley Reservoir	1	0	0	0	0
114	Crescent Lake	1	0	0	0	0
115	Lake Pleasant	32	1	1	0	0
Totals		857	130	98	0	0

Table 11. Summary of 2002 Arizona bald eagle winter count.							
County	Routes	Minutes	Adult	Subadult	Unknown	Total	Total/minute
Verde River drainage	3	239	23	10	0	33	0.1381
Salt River drainage	11	364	92	74	0	166	0.4560
Gila River drainage	7	217	14	13	0	27	0.1244
Various helicopter	5	37	1	1	0	2	0.0541
Apache	15	485	11	3	0	14	0.0289
Cochise	3	345	2	1	0	3	0.0087
Coconino	29	3,996	56	25	12	93	0.0233
Graham	1	140	8	9	3	20	0.1428
Greenlee	1	35	0	0	0	0	0
Maricopa	--	--	--	--	--	--	--
Mohave	3	990	11	6	1	18	0.0182
Navajo	19	492	11	2	3	16	0.0325
Pima	1	127	0	0	0	0	0
Pinal	1	54	0	0	0	0	0
Santa Cruz	3	195	0	0	0	0	0
Yavapai	6	1,196	6	2	0	8	0.0067
Yuma and LaPaz	1	120	1	1	0	2	0.0167
Totals	109	9,032	236	147	19	402	0.0445



Table 12. Results of the 2002 Arizona bald eagle winter count, non-standardized routes.						
Route Name	County	Minutes Surveyed	Adults	Subadults	Unknown Bald Eagle	Unknown Eagle
I-40 Corridor – Ash Fork to Belmont	Coconino	90	2	1	0	0
Upper Basin – HWY 64 to Sand Tank	Coconino	120	2	1	0	0
Knoll Lake	Coconino	120	0	0	0	0
HWY 180	Coconino	200	0	0	0	0
HWY 87 South	Coconino	120	0	0	0	0
HWY 87 North	Coconino	155	1	0	0	0
McLellan	Coconino	25	2	0	0	0
Show Low Creek	Navajo	--	1	0	0	0
Mortenson Wash	Navajo	30	1	2	0	0
Woodland Lake/Big Springs	Navajo	50	0	0	0	0
Camp Verde	Yavapai	60	0	0	0	0

Table 13. Summary of statewide Arizona bald eagle winter counts, 1981-1985, 1992-2002.						
Year	Survey Time	Birds/minute	Adults	Subadults	Unknown	Total
1981	- <sup>1</sup>	-	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 <sup>2</sup>	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 <sup>3</sup>	0.0416	183 (63%)	103 (36%)	4(1%)	290
1999	8378 <sup>3</sup>	0.0500	248 (62%)	144 (36%)	11 (3%)	403
2000	9402 <sup>3</sup>	0.0346	202 (62%)	115 (35%)	8 (2%)	325
2001	8726 <sup>3</sup>	0.0248	141 (66%)	70 (32%)	5 (2%)	216
2002	9032	0.0445	236 (59%)	147 (37%)	19 (5%)	402
Totals	94952 <sup>3</sup>	0.0446	2719 (64%)	1416 (33%)	103 (2%)	4238

<sup>1</sup>The effort for the 1981-1984 counts was described in miles flown.

<sup>2</sup>Beginning of use of 115 standardized routes from the 1992-1994 surveys.

<sup>3</sup>Some survey times not recorded. Times averaged from reported times of previous counts.