

**THE STATUS AND DISTRIBUTION OF BREEDING BALD
EAGLES (*HALIAEETUS LEUCOCEPHALUS*) IN ALABAMA,
1985-2006**

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The number of breeding Bald Eagles (*Haliaeetus leucocephalus*) in Alabama has varied significantly in the last century. At the beginning of the 1900's, the Bald Eagle was a fairly common resident on the Gulf Coast and occurred locally in the interior of the state, especially along the Tennessee River (Howell 1928). By about 1960, however, Bald Eagles were no longer breeding in Alabama (Imhof 1976). Similar Bald Eagle declines in the first half of the 20th century occurred throughout the contiguous United States because of the use of pesticides such as dichloro-diphenyl-trichloroethane (DDT), as well as persecution by humans (Howell 1928, Federal Register 1995, Buehler 2000). Due to the species' precipitous decline in the contiguous United States, the population south of the 40th parallel was listed as endangered under the Endangered Species Act (ESA) in 1978 (Federal Register 1995, Buehler 2000). With the banning of DDT in 1972, the protection offered by the ESA, a new public environmental awareness, and state and federal breeding recovery programs, the Bald Eagle has made a dramatic recovery throughout its range in the last 20 years (Buehler 2000, Federal Register 2006). Due to the recovery of the Bald Eagle, it was reclassified as threatened by the USFWS in 1995, and is currently being considered for delisting (Federal Register 2006).

The ESA requires the USFWS to develop and implement recovery plans for listed species. In 1984, the southeastern recovery plan, which includes Alabama, was finalized (Federal Register 1995). During that year, the Alabama Department of Conservation and Natural Resources (ADCNR) initiated a state plan to recover the species (Hudson 2002) and set goals that included having a minimum of ten nests annually with average productivity estimates of 0.9 fledglings/nest, and 1.5 fledglings/successful nest, for three consecutive years. Although information concerning the recent wintering population of the Bald Eagle in Alabama has been published (Haggerty et al. 1999), a detailed report of the more recent breeding status of the eagle is lacking. Therefore, in this paper we present (1) the population trend data for nesting Bald Eagles in Alabama from 1985 through 2006, (2) productivity estimates for breeding

pairs, and (3) distribution information on nesting pairs in the state.

METHODS

As part of the state recovery plan, 92 juvenile eagles were released between 1985 and 2004. Thirty-five were released at Mud Creek Wildlife Management Area, Jackson County, between 1985-1989, and three were released at Bon Secour National Wildlife Refuge, Baldwin County, in 1991 and 1992. In 1991, an additional 53 eagles were released from 4 sites in four counties [Tuscaloosa (15), Sumter (12), Lowndes (13), and Choctaw (13)] in west-central Alabama. In 2004, a single juvenile was released along the Alabama River in Lowndes County. Some juvenile eagles were obtained from zoos, but the majority was obtained from eggs that were removed from the nests of wild pairs in Florida. Eggs from Florida nests were sent to the George Miksch Sutton Avian Research Center in Oklahoma where they were incubated, and hatched, with the young being hand-reared. Young were 10-12 weeks old when they were received for release and typically fledged when they were approximately 15 weeks old. All released juveniles were banded with a USFWS metal band, and all but a few were also banded with numeric, color-coded plastic bands.

Nest searching and monitoring were conducted from 1985 through 2006. Nest searches were made from early January through May of each year and were carried out on foot, as well as by boat and/or airplane, following any report of a potential nest. Very few direct searches were made without a previous report of a potential nest. Nest monitoring included counting eggs, nestlings, and fledglings. Nests that fledged at least one young were considered successful. Only nests with eggs or young were considered active nests and counted. Nests were monitored from the ground, as well as by boat and/or fixed-wing airplane. In more recent years, about two eight-hour days of flying statewide were needed to monitor nests, and each nest was typically visited three times or more to determine productivity. Latitude and longitude measurements were taken at nest sites. JMP (version 5.1.2) was used for statistical analyses and P values < 0.05 were considered significant.

RESULTS

There were significant increases in the number of Bald Eagle nests ($r = 0.89$, $P < 0.0001$) and fledged young ($r = 0.94$, $P < 0.0001$) between 1986 and

2006 (Fig. 1), with an average annual increase of 32%. In just 22 years the breeding population went from 0 nesting pairs in 1985 to 77 in 2006 (Fig. 2). A total of 493 active nests was discovered and 355 (72%) were successful. The average yearly success rate was 66% and a total of 559 young fledged. The average number of fledglings/nest was 0.97 and the average number of fledglings produced per successful nest was 1.37. The population experienced exponential growth with an average doubling time of 3 years (range = 1-6) and there was no indication that the population had reached its carrying capacity (Fig. 1).

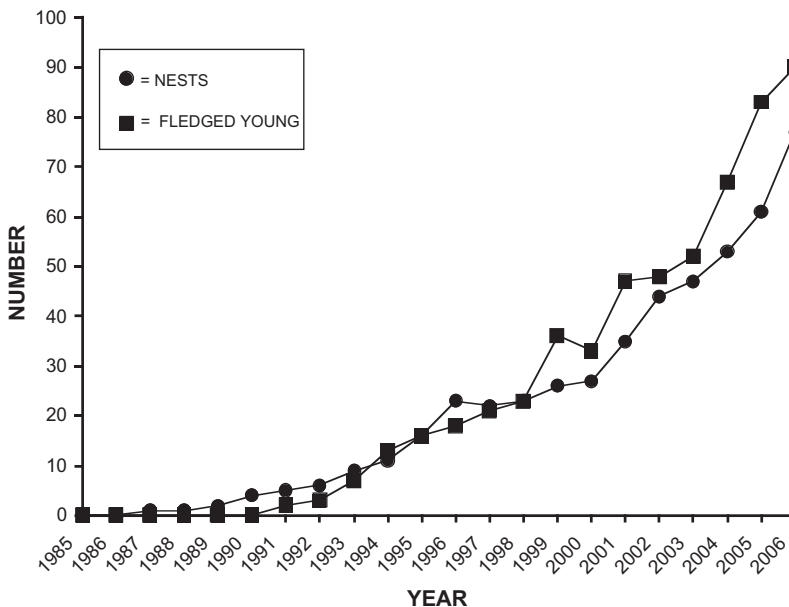


FIGURE 1. Number of Bald Eagle nests and fledged young in Alabama, 1985-2006.

Nests were found along 13 river systems with the greatest number of nests along the Tennessee, Tombigbee, and Alabama rivers (Table 1, Fig. 3). The nests of the Tennessee River system produced the greatest number of young (30% of total) and had nesting pairs for the longest period of time (Table 1, Fig. 3). The more coastal river systems (e.g., Mobile Bay, Escatawpa, Peridido, Pea) have had nesting pairs for the fewest number of years (Table 1). All of the river systems had nest success rates greater than 60%, and all nests in the Conecuh, Escatawpa, Mobile Bay, and Pea systems were successful. The nests

of the Coosa River system had the highest failure rate (39%)(Table 1). Four river systems (Escatawpa, Conecuh, Cahaba, and Mobile Bay) had productivity rates > 1.40 young/nest, whereas the Coosa and Tennessee River systems had productivity rates < 1 young/nest.

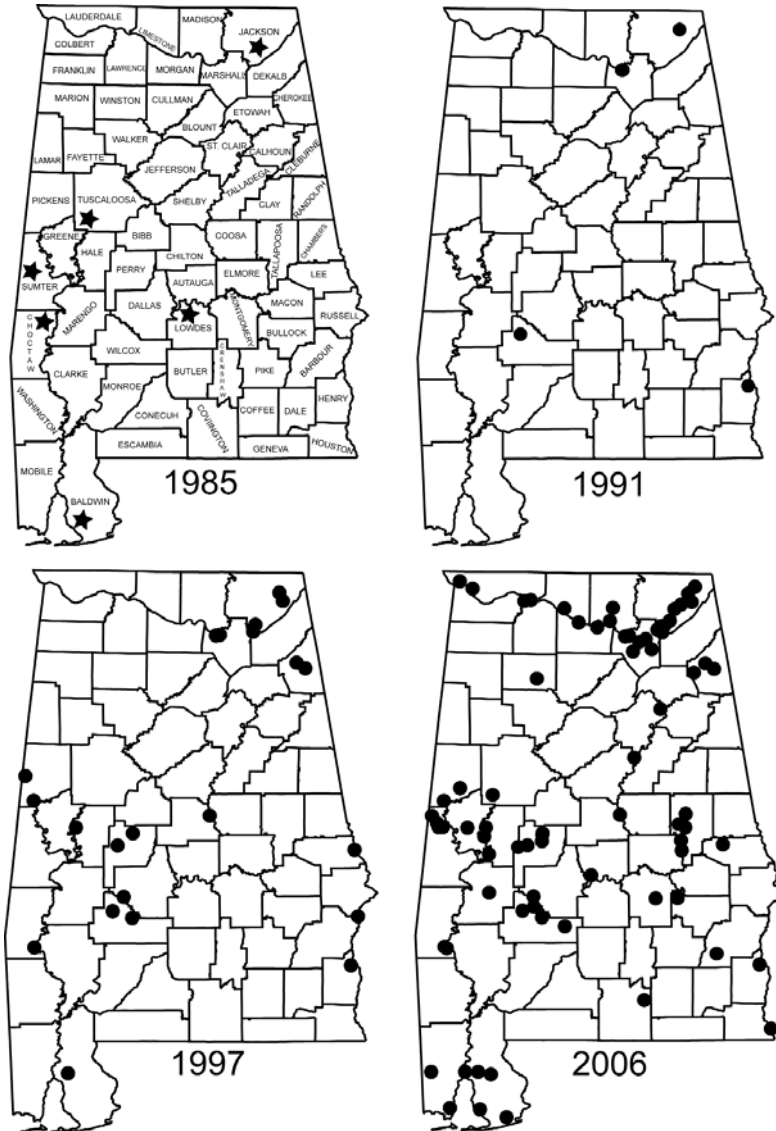


FIGURE 2. Density and distribution of Bald Eagle nests in 1985, 1991, 1997 and 2006 in Alabama. Note densities in northeastern and west-central portions of the state. Stars denote counties where hand-reared juveniles were released between 1985-2004.

TABLE 1. Comparison of Bald Eagle nesting and productivity in major river systems of Alabama, 1985-2006. See Fig. 3 for location of river systems.

River System	Number of Nests	Number of Successful Nests	% Successful Nests	Number of Young	Number of Years
Alabama	56	42	75.00	59	16
Black Warrior	40	28	70.00	51	11
Cahaba	20	15	75.00	29	12
Chattahoochee	34	29	85.29	49	16
Conecuh	8	8	100.00	13	6
Coosa	49	30	61.22	47	14
Escatawpa	5	5	100.00	9	5
Mobile Bay	4	4	100.00	6	3
Pea	7	7	100.00	10	7
Perdido	6	4	66.67	6	5
Tallapoosa	21	18	85.71	30	7
Tennessee	167	108	64.67	166	20
Tombigbee	76	57	75.00	84	14

Active nests were found in 40 counties, and Marshall and Jackson counties had the greatest number of nests and produced the greatest number of young (Fig. 3). Five counties (Winston, Franklin, Limestone, Madison, and Shelby) had active nests that failed to produce any young. Marengo County had five nests from which only one young fledged (Fig. 3). The nests in Bullock, Covington, Houston, Elmore, Montgomery, and Mobile counties showed the highest levels of productivity (i.e., > 1.50 young/nest) (Fig. 3). Of the seven counties that had over 20 nests (Marshall, Jackson, Perry, Wilcox, Cherokee, Pickens, Baldwin), the Perry County nests were the most productive (1.50 young/nest).

DISCUSSION

These results indicate that Bald Eagles are again breeding in Alabama. All of the initial recovery program goals of the ADCNR have been met. The goal of having ten nests in the state for three consecutive years was reached in 1996, when the nest number doubled (i.e., 11 to 23) between 1994 and 1996 (Fig. 1). Since the greatest nesting densities occurred in areas where juvenile individuals were released (i.e., northeastern and central-east regions), we suspect that

the dramatic nesting increase was partly due to the release of juvenile eagles (Fig. 2). Banding data, however, were difficult to collect, so the actual number of individuals returning to nest near their release areas is not known. We also suspect that the recovery programs and growth of eagle populations in nearby states contributed to the growth of Alabama's eagle population during the study period. For example, between 1980 and 1997, Tennessee released 267 young Bald Eagles (Haggard 1999) and between 1979 and 1995, Georgia released 89 (Ozier 1997).

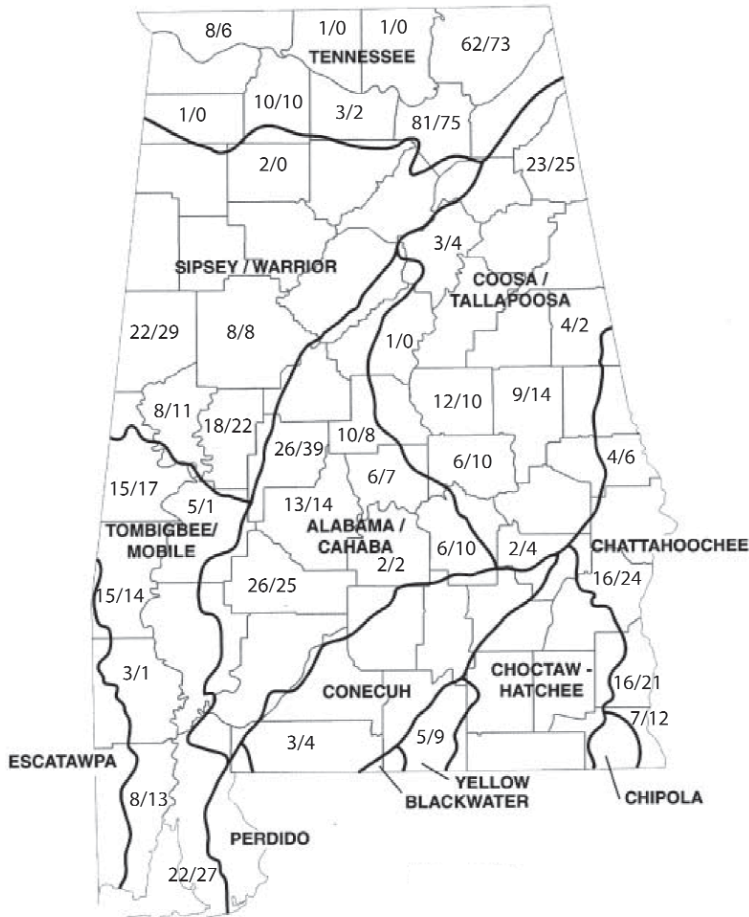


FIGURE 3. Alabama map showing number of Bald Eagle nests (top number) and number of fledged young (bottom number) in counties, 1985-2006, and outlines of river basins. See Fig. 1 for county names.

The ADCNR goal of having an average productivity of 0.9 fledglings/nest for three consecutive years was attained in 1999. The estimate has been 1.0 or greater since 1997, which is a productivity level high enough to support a stable population (Buehler 2000). The goal of having 1.5 fledglings/successful nest for three consecutive years has been more difficult to attain. Although the estimate was 1.2 or higher since 1993, the goal was not reached until 2001. The delay in obtaining this final goal may have been due to the young age of many of the individuals in the population. The possible positive relationship between pair age and productivity needs investigation.

Our distribution results indicate that the Bald Eagle has recovered throughout its historical range in Alabama and is probably more widely distributed today than it was prior to some of the environmental changes of the 1900's (Howell 1928, Imhof 1976). During our study, eagles nested along most of the major river systems in the state and in 60% of the counties (Fig. 3). Bald Eagles prefer to nest in forested areas with large, easily accessible nesting trees which are near large bodies of water that provide them with good foraging habitat (e.g., available fish prey, shallow water, absence of human development and disturbance) (Buehler 2000, Watts et al. 2006). The numerous lakes and reservoirs created by the building of dams on most major waterways in Alabama in the last century, as well as the creation of numerous catfish farms in the Black Belt region, have probably provided ample foraging habitat in areas where it previously did not exist.

In summary, Bald Eagles are once again breeding successfully in Alabama at rates that can easily sustain a stable population. The breeding population is probably greater today than it has been in the past, and population trend data suggest that growth should continue. The current breeding population is widely distributed in the state with the greatest densities occurring in the northeast and west-central regions. The relatively rapid recovery of the Bald Eagle population in Alabama can probably be attributed to the removal of pesticides from the food chain, state and federal recovery programs, protection laws associated with the ESA, and the availability of good foraging and nesting habitat throughout the state.

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