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New Jersey Bald Eagle Management Project

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Abstract:

Endangered and Nongame Species Program (ENSP) biologists and volunteer observers located and monitored bald eagle nests and territories, and cooperators coordinated the annual midwinter bald eagle survey. A total of fifteen eagle pairs, fourteen in southern and one in northern New Jersey, were monitored during the nesting season, while fourteen of those pairs were active. Eleven pairs were successful in fledging 17 young. Three nests, Bear Swamp, Horne Run (Mannington), and Raccoon Creek, failed. Contaminants may have caused the failures at Horne Run and Raccoon Creek. ENSP staff collected blood samples from six eaglets from three nests for contaminant analyses. Working with the U.S. Fish and Wildlife Service's Field Office, biologists submitted for analysis 35 blood samples taken in 1994-1996. Cooperators, ENSP staff, and volunteers reported a total of 176 bald eagles counted in January's midwinter survey, 43 in the north and 133 in the south.

Introduction

The bald eagle population in New Jersey has increased from a single nest in the 1970's and early 1980's to fourteen active pairs in 1997. Endangered and Nongame Species Program (ENSP) biologists have monitored the nesting and wintering populations each year since 1980, and implemented a recovery strategy to increase the productivity and range of nesting, to bring the bald eagle back from the brink of extirpation.

In 1982, after Bear Swamp, New Jersey's only active bald eagle nest, had failed at least six consecutive years, ENSP biologists removed the egg for artificial incubation, and fostered the young back to the nest. This technique compensated for the contaminant problem that caused the eggshells to be too thin to withstand incubation. It was continued successfully until 1989, when the female of the pair was replaced and the pair was able to hatch their own eggs.

Increasing the production from a single nest, however, was not enough to boost the state's population in a reasonable amount of time. Mortality rates are high in young eagles (as much as 80%), and they do not nest until four or five years of age. The ENSP instituted a hacking project in 1983 that resulted in the release of 60 young eagles in NJ over an eight year period (Niles et al. 1991). These eagles have contributed to the increase in nesting pairs since 1990 (Figure 1).

Bald eagles nesting in NJ face many threats: disturbance is the greatest problem, as people are naturally attracted to the sight of eagles (Niles et al. 1991). Habitat destruction is also a common problem. Further, in the long term, there is evidence that accumulation of contaminants may threaten the eagle population in NJ, especially in the Delaware Bay region.

ENSP biologists continually work to manage and reduce disturbance in eagle habitats, especially around nest sites. Education and established viewing areas are important in this effort, as are the efforts of eagle project volunteers. Biologists also work to protect habitat in a variety of ways, including working with landowners, land acquisition experts, and through the state's land use regulations. The ENSP is continuing to investigate the possible impacts of organochlorines and heavy metals in eagles and other raptors nesting in the Delaware Bay region. Bald eagles, ospreys, and peregrine falcons nesting in the region exhibit some reproductive impairment relative to other areas (Steidl, 1991 and ENSP unpub. data). The ENSP monitors these species during the nesting season to evaluate nest success and assess any problems that occur.

The population of wintering bald eagles has grown along with the nesting population, especially in the last nine years (Fig. 2). This growth reflects increasing nesting populations in NJ and the northeast, as each state's recovery efforts pay off. In recognition of this success, the federal government upgraded the status of the bald eagle from endangered to threatened in July of 1995. The federal status change reflects the increasing eagle population nationwide, but the eagle is still a state-listed endangered species, and regulatory protection remains the same.

Methods

Nest Survey

All known nest sites are monitored January though July. Volunteer observers watch nests from a minimum distance of 400 yards using binoculars and spotting scopes, for periods of one to three hours (or more) each week. They record all data including number of birds observed, courtship or nesting behaviors, incubation and exchanges, feeding, and other parental care behaviors which provide valuable information on the nesting status. ENSP staff contact volunteers weekly to discuss their observations. Dates are recorded for incubation, hatching, banding, fledging, and, if applicable, nest failure. This information is used to schedule eaglet banding, and to determine if closer nest investigation by ENSP biologists is warranted.

Numerous observers report statewide bald eagle observations to ENSP biologists, who analyze the data for potential nest locations. ENSP staff and volunteers investigate territorial bald eagle pairs for possible nest sites through field observations. When enough evidence has been collected to substantiate a probable location, ENSP biologists conduct aerial surveys of the region to locate a nest.

All nests are secured from disturbance by barriers and/ or posted signs. ENSP staff work in partnership with landowners and/ or land managers to cooperatively protect each nest. Volunteers notify ENSP staff immediately if any unusual or threatening activities are seen around the nest site. The Division's Bureau of Law Enforcement act to enforce protection measures as needed.

When nestlings are between five and eight weeks old, biologists enter the nest site to band the young. A biologist climbs the tree and places the nestlings, one at a time, into a large duffel bag and lowers it to the ground. A team works on each bird quickly, taking measurements (bill depth, eighth primary length, tarsus, and weight), and banding the eaglet with both a federal and

color band. A veterinarian examines each bird and takes a blood sample for contaminant analysis. Blood is collected and stored following techniques in Bowerman et al. (1994). Samples are stored frozen pending analysis by a technical lab. Nests active for the first time or relocated in different trees are not climbed the first season to avoid associating undue disturbance with the new site.

Wintering Eagle Survey

The nationwide Midwinter Bald Eagle Survey is conducted every January to monitor population levels. The ENSP contracted Pat Sutton and Jerry Liguori of New Jersey Audubon Society's Cape May Bird Observatory and Allan Ambler of the Delaware Water Gap NRA to coordinate the survey in southern and northern NJ respectively. These researchers organized volunteers to cover all suitable and known wintering habitat, then tracked the number of individual eagles observed on both days of the survey using plumage characteristics and time observed. Their results as well as additional volunteers in the north were compiled by ENSP biologists to reflect statewide totals. Final results are compiled by ENSP staff according to standardized survey routes, and provided to the Raptor Research and Technical Assistance Center in the federal Bureau of Land Management, compilers of the national totals.

Results

Nest Survey

Fourteen nests were monitored in 1997, all of which were active, defined by laying eggs (Table 1). Eleven nests were successful in producing 17 young, for a productivity rate of 1.21 (young/active nest), slightly greater than that required for population maintenance (0.9-1.1 young/active nest). The number of nests has increased markedly over the last eight years (Fig. 1). High spring winds caused some nest damage and eaglet mortality in 1997. All nests and potential sites are described individually below.

Alloways Creek

A new bald eagle pair built a nest in a willow oak (*Quercus phellos*) adjacent to an active farm field. Unlike many other first year nesting pairs, this couple did not "housekeep" in which they build a nest and defend a territory but do not lay eggs. Incubation began on March 16, and the egg hatched on April 20. The one eaglet was not banded because of the nest's first year status, and the young began flying around July 15.

Bear Swamp

The eagle pair at Bear Swamp continued to use the oldest active nest site in the state. The nest sits atop a large pond pine (*Pinus serotina*), lying in a large contiguous wetland forest. The pair began incubation on February 5, and exhibited brooding behavior on March 12. Nest observer John Delany reported the nest missing on March 28, a casualty of high winds. ENSP biologists and nest observers found one surviving eaglet atop the nest remains at the base of the tree on March 29. Don Bonica of Toms River Avian Care ensured the health of the eaglet, which was

fostered into the Raccoon Creek nest on April 3. ENSP biologists and nest observers rebuilt the nest in Bear Swamp in the same tree on December 5.

Belleplain (East Creek Pond)

The Belleplain State Forest eagles reoccupied their old nest in a pitch pine (*Pinus rigida*) near East Creek Pond. The nest tree was in extremely poor health, being devoid of needles, probably caused by pine looper infection. The pair started incubating on February 25, and three young hatched on April 1. G. Conover, pilot for Cape May Co. Mosquito Commission notified ENSP on May 23 that the nest, along with a large section of the tree, had fallen. The next morning, ENSP staff recovered one eaglet on the ground, which was placed in a nest built in the nearest pitch pine (*Pinus rigida*). George Conover confirmed by overflights that the eaglet successfully fledged from the new nest around June 24.

Cohansey River

The bald eagle pair on the Cohansey River reoccupied their 1996 nest, built atop a tall white pine (*Pinus strobus*) located in a large hardwood swamp tract. The pair began incubation on February 25, and the eggs hatched on April 1. The two eaglets were banded because on May 14, and both fledged on June 24.

Egg Harbor River

Despite intense efforts, volunteer observers and ENSP biologists could not locate the Egg Harbor River pair. The puzzle was solved on March 21. An observer sighted a transition male copulating with an adult female on an old osprey platform near the 1996 nest. Apparently, the 1996 adult male had died and the female could not recruit a new mate in time for the 1997 nesting season. Based upon previous experience, the pair is expected to establish an active nest in 1998.

Galloway Township

This pair again nested in a large pitch pine (*Pinus rigida*) adjacent to a clear-cut. The pair was frequently seen foraging at Forsythe National Wildlife Refuge. Incubation started on March 2, and the young hatched around April 2. Two eaglets fledged around June 26. The nest observer noticed the female had a green anodized leg band, distinguishing it as a New Jersey born bird. The nest blew down in September, and ENSP biologists rebuilt it on November 25.

Horne Run (Mannington)

The Horne Run eagles returned to their 1994 nest atop a tall tulip poplar (*Liriodendron tulipifera*), lying between an active farm field and a tidal estuary. The eagles started incubating on February 13. As in 1995 and 1996, the pair briefly exhibited brooding behavior, suggesting possible egg hatching, and abandoned the nest on March 27. This pair has failed to produce young since their 1987 arrival in Mannington Meadows. No egg samples have been obtained for

analysis that might provide evidence for the cause of the problem, although biologists suspect high levels of PCBs.

Maurice River

The Maurice River pair again nested in a pitch pine (*Pinus rigida*) at the forest-tidal marsh interface on the river. The eagles began incubating on February 25, and the young hatched around April 1. ENSP biologists banded two eaglets on April 16 when ENSP biologists sought to foster one of the eaglets to the Stow Creek nest. The eaglet was returned to the nest in excellent health on April 17, and the eaglets fledged around June 24.

Nantuxent Creek

The bald eagle pair reoccupied their nest in the tulip poplar (*Liriodendron tulipifera*) that lies on the edge of a fallow field adjacent to tidal marsh. The pair began incubating on February 25, and the eaglet hatched on April 1. ENSP biologists banded two young on May 14, and both fledged around June 24.

Raccoon Creek (Delaware River)

The Raccoon Creek bald eagle pair initially returned to their 1996 nest, but in mid-February, they relocated to a stand of Eastern cottonwoods (*Populus deltoides*) on the Delaware River. The eagles commenced incubation on March 6. On April 3, ENSP biologists fostered the banded Bear Swamp eaglet to this nest, and the pair's infertile egg was collected for contaminant analysis. The eaglet, nicknamed "Lucky," fledged the nest on June 4. This marks the first time since 1991 that this pair has fledged young.

Rancocas Creek

The eagle pair reoccupied their 1996 housekeeping nest in a white pine (*Pinus strobus*) adjacent to an active farm field. The Rancocas nest site, surrounded by nearby houses, is unique in New Jersey. The Division's Bureau of Law Enforcement worked closely with the municipal police to minimize nest disturbance. Incubation began on February 22, and the egg hatched on March 28. An eaglet fell to the ground during a wind storm that damaged the nest in early May. The eaglet had a broken bone in the right wing that was healing in-line. ENSP biologists banded and returned the eaglet to the nest on May 7, and it fledged on June 22. One of the adults has a red-anodized leg band, making it the only known hacked bird nesting in New Jersey.

Round Valley Reservoir

The bald eagle pair at Round Valley continues to be the only nest in northern New Jersey. The eagles reoccupied their 1996 oak tree (*Quercus spp.*) nest near Round Valley Reservoir. ENSP biologists worked with the Division of Parks and Forestry to close a nearby trail during the nesting season to minimize disturbance. The pair commenced incubation on February 28, and

brooding behavior was observed on April 4. During an aerial survey in late April, two eaglets were observed, one of which successfully fledged around June 27.

Stow Creek

For the past seven years, these eagles have nested in a sycamore tree (*Platanus occidentalis*) in an active farm field adjacent to the tidal creek. The pair began incubating on March 7. A trespassing photographer flushed the incubating adult from the nest on March 12. The nest observer noticed erratic incubation behavior shortly after the anticipated hatch date, and ENSP biologists were unsuccessful in an attempt to foster one of Maurice River's eaglets on April 16. One egg was collected and preserved for contaminant analysis. Examination revealed the embryo had died shortly before hatching. An osprey pair co-opted the nest in May and successfully fledged three young. On July 8, ENSP biologist placed a viewing platform on the Canton side of the creek. Platform funding was provided by a grant from the National Foundation to Protect America's Eagles.

Union Lake

The Union Lake eagles, in their fourth active nesting season, reoccupied their nest atop a large pitch pine (*Pinus rigida*) near Union Lake. The pair started incubating on February 20, and the young hatched on March 27. ENSP biologists banded the two eaglets on May 8. Both successfully fledged around June 20.

Wading River

This year proved to be the third successful breeding season for these eagles. The pair renested in a rather small (18" dbh) pitch pine adjacent to an active cranberry bog. Incubation began on January 29, the earliest known date for New Jersey. The eggs hatched on March 7, and two eaglets successfully fledged around May 28.

Potential Nest Sites

ENSP biologists and observers actively searched for possible nesting bald eagles on several inland reservoirs in northern NJ. Unlike 1996, courtship activity was absent at the Wanaque Reservoir. Other areas including the Egg Harbor and Manumuskin Rivers, Delaware Water Gap, and Mullica River were also intensively monitored. Sightings were made at these areas by staff and volunteers throughout the spring and summer.

Wintering Eagle Survey

A total of 176 bald eagles were observed during the midwinter survey on January 11 & 12, 1997 (Table 2). This count is the highest ever, surpassing the previous high of 113 recorded in 1996 (Figure 2). The cold temperatures of the early winter forced eagles south, increasing the number

seen in NJ. Southern NJ continued to host the majority of the state's wintering birds, perhaps due to large open water areas and relatively warmer temperatures .

One hundred and thirty-three bald eagles were counted in southern New Jersey, of which 68 were adults (Sutton and Liguori 1997). The eagles were fairly evenly distributed between the Delaware Bayshore (45%) and the Atlantic Coast (51%) watersheds, while only a few were sighted on the lower Delaware River (4%) (Figure 3). For the first time, the greater Mullica River drainage, with 38 bald eagles, had the highest concentration in the state, followed by the Maurice River's 23 eagles on the Delaware Bayshore.

The main sites for northern New Jersey's wintering eagles were the Delaware Water Gap (65%) and northern reservoirs (30%) (Figure 3). Two eagles were counted at the Palisades-Hudson River route (4%). Like 1996, the northern reservoirs had significant ice coverage compared to 1995, which likely accounts for the smaller percentage of eagles using the reservoirs in 1997 and 1996 compared to 1995 (30% and 34% versus 57%).

Recoveries

ENSP biologists recovered four dead bald eagles in 1997. Sadly, the first eagle **(**#629-32114**)**, which died of electrocution in January near the Rappahannock River in Virginia, was the only successful offspring of the Raccoon Creek bald eagle pair. The bird successfully fledged the Gibbstown nest in 1991, the pair's first known active year.

Two other recovered eaglets died from power line electrocution. A 1993 fledgling from Millsboro, Delaware (#629-33932), was found dead in Hopewell Township, Cumberland County at the base of a pole on Jan. 31. A second, an unbanded hatching year eagle, was found dead at the base of a pole at Stow Creek Landing by Conservation Officer Chuck Fletcher. The utility companies have made changes to both poles to prevent future electrocutions.

A fourth eagle died of unknown causes; in April, the remains of eagle #629-32123, a 1993 Cohansey nest offspring, were found in Georgetown, DE. The USFWS investigated the death.

Contaminants Research

ENSP biologists collected blood samples from six eaglets during banding procedures at three nests. Blood was frozen within six hours, and samples were stored pending transfer to a lab for analysis of organochlorine compounds such as DDT, its derivatives and PCBs, and heavy metals such as mercury, cadmium and arsenic. ENSP biologists transferred 35 samples taken from eaglets in 1994-1996 to the U.S. Fish and Wildlife Service’s Field Office staff for submission to labs; those analyses will not be available until early 1998. The last study on samples from 1992 and 1993 was inconclusive (USFWS and NJ Div. Of Fish, Game and Wildlife 1995) in terms of effect of contaminants on productivity, and the new study will include additional testing for levels of PCBs and dioxin-like compounds.

In 1997, ENSP biologists had three eagle eggs analyzed: from Stow Creek (1997) and Raccoon Creek (1997 and 1995). These tests show that PCBs have nearly doubled, to 55 ppm, in the

Raccoon Creek pair since 1993. The Stow Creek egg from this year had PCBs of 20 ppm, nearly as much as the Raccoon Creek egg from 1993, when that nest was failing. These results alerted us to a possible problem at Stow Creek, one which will take time to evaluate. Clearly, PCBs are a chronic problem for eagles in New Jersey.

Field observations of eagle nesting behavior and chronology are vital to this study. Volunteer observers have collected essential data that help biologists make the link to contaminant problems. Observations of apparent hatching and death of eaglets in Raccoon Creek nest have correlated with toxic levels of PCBs in eggs, and similar observations have been made at the Mannington Meadow nest.

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Table 1. Production and significant dates of Bald Eagles nesting in NJ, 1997.

Nest Site	Incubation	Hatching	Banding	Fledging	# Fledged	Notes
Alloways Creek	3/16/97	4/20/97		7/11/97	1	
Bear Swamp	2/5/97	3/12/97				Nest blew down in storm around 3/25/97, Rebuilt nest on 12/5/97
Belleplain	2/25/97	4/1/97	5/24/97	6/24/97	1	Built new nest on 5/24/97
Cohansey River	2/25/97	4/1/97	5/14/97	6/24/97	2	
Galloway	3/2/97	4/8/97		6/26/97	2	Rebuilt nest on 11/25/97
Horne Run	2/13/97					Nest abandoned on 3/27/97
Maurice River	2/25/97	4/1/97	4/16/97	6/24/97	2	
Nantuxent Creek	2/25/97	4/1/97	5/14/97	6/24/97	2	
Raccoon Creek	3/6/97		4/3/97	6/4/97	1	Bear swamp eaglet transferred to nest on 4/3/97
Rancocas Creek	2/22/97	3/28/97	5/7/97	6/22/97	1	Eaglet fell from nest in storm on 5/1/97 and placed back in nest on 5/7/97
Round Valley	2/28/97	4/4/97		6/27/97	1	
Stow Creek	3/7/97					Nest abandoned on 4/16/97
Union Lake	2/20/97	4/1/97	5/8/97	6/20/97	2	
Wading River	1/29/97	3/5/97		5/30/97	2	

Table 2. Bald Eagles counted in the NJ Midwinter Bald Eagle Survey, January 11&12, 1997

Region	Adults	Immature	Unknown	Total
Delaware Bay	26	34	0	60
S. Delaware River	1	4	0	5
Atlantic Coast	41	27	0	68
N. Delaware River	0	0	0	0
Delaware Water Gap	13	15	0	28
Inland Reservoirs	7	6	0	13
Palisades	1	1	0	2
Total South	68	65	0	133
Total North	21	22	0	43
Total Statewide	89	87	0	176