

New Jersey Department of Environmental Protection

Division of Fish and Wildlife

Martin McHugh, Director

Lawrence J. Niles, Ph.D., Chief
Endangered and Nongame Species Program

New Jersey Bald Eagle Management Project

2005

Prepared by: Larissa Smith, Kathleen E. Clark, Lawrence J. Niles

December, 2005



CONTENTS

Abstract..... 1

Introduction 1

Methods

 Nest survey..... 2

 Wintering Eagle Survey..... 3

Results

 Nest Survey..... 4

 Wintering Eagle Survey 15

 Nest Histories..... 17

 Contaminants Research 18

 Recoveries 18

Acknowledgments 20

Literature Cited 21



*Photo above by Bob Baruzzi at Dividing Creek February 26, 2003.
Cover photo by Daniel Thomas at the Princeton nest May 26, 2005.*

New Jersey Bald Eagle Management Project, 2005

Prepared by: Larissa Smith, Kathleen Clark, and Lawrence Niles

Project personnel: Lawrence Niles, Kathleen Clark, Michael Valent, Kris Schantz, Melissa Craddock and Larissa Smith

Abstract

The Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP) biologists and volunteer observers located and monitored bald eagle nests and territories. A new record high of 53 eagle pairs was monitored during the nesting season; 48 of those were active (with eggs) and five more were territorial (in a nest area). Southern New Jersey remained the state's stronghold, with 80 percent of the nests in Cumberland and Salem counties. Three new nests were found this year in northern New Jersey. Forty nests were successful in producing 64 young, for a productivity rate of 1.33 young per active nest. ENSP staff banded and took blood samples from 16 eaglets at 10 nests. Eight nests failed to produce viable hatchlings and for the most part the causes were unknown. ENSP staff, regional coordinators, and volunteers reported a total of 179 bald eagles counted in the January 2005 annual Midwinter Bald Eagle Survey. Thirty-one eagles were recorded in north NJ and 148 in the south. The state's eagle population would not be thriving without the efforts of the dedicated eagle volunteers who observe nests, report sightings, and help protect critical habitat.

Introduction

Historic records indicate New Jersey hosted more than 20 pairs of nesting bald eagles, mostly in the Delaware Bay region of the state (Holstrom, 1985). As a result of the use of the pesticide dichlorodiphenyltrichloroethane, commonly known as DDT, the number of nesting pairs of bald eagles in the state declined to only one by 1970 and remained at one into the early 1980's. Use of DDT was banned in the United States in 1972. That ban, combined with restoration and management efforts by biologists within the Division of Fish and Wildlife's Endangered and Nongame Species Program (ENSP), resulted in a population increase to 48 active pairs by 2005. ENSP recovery efforts – implemented since the early 1980's – have resulted in an exceptional recovery as New Jersey's eagle population has rebounded from the edge of extirpation.

Recovery efforts were multifaceted. In 1982, after the Bear Swamp nest – New Jersey's only remaining nest since 1970 – had failed at least six consecutive years, ENSP biologists removed the egg for artificial incubation, and fostered the young nestling back to the nest. As a result of residual DDT contamination, the Bear Swamp eggs were too thin to withstand normal incubation. Artificial incubation and fostering chicks 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 high as 80%), and they do not reproduce until about five years of age. 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 contributed to the increase in nesting pairs since 1990.

Bald eagles nesting in NJ face many threats. Disturbance is the greatest of these, as people are naturally attracted to the sight of them (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. A corps of experienced volunteers, as well as public education and established viewing areas, are crucial to this effort. Biologists also work to protect habitat in a variety of ways, including working with landowners, land acquisition and management, and applying the state's land use regulations. ENSP is also continuing to investigate the 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 et al. 1991, Clark et al. 1998, 2001). ENSP monitors these species during the nesting season to evaluate nest success and assess any problems that occur.

The ENSP, with the Division's Bureau of Law Enforcement and volunteer assistance, works intensively to protect bald eagle nest sites. However, with increasing competition for space in the most densely populated state in the nation, it is clear that critical habitat needs to be identified and, where possible, protected. Critical habitat for eagles includes areas used for foraging, roosting and nesting, and is included in the program's Landscape Project mapping of critical wildlife habitats.

The population of wintering bald eagles has grown along with the nesting population, especially in the last ten years. This growth reflects increasing nesting populations in NJ and the northeast, as each state's recovery effort pays off. In recognition of this success, the federal government upgraded the status of the bald eagle from endangered to threatened in July of 1995, and in 2000 proposed federal de-listing of the species. The federal status remains threatened; however, the eagle remains endangered in New Jersey, and regulatory protection remains the same.

Methods

Nest Survey

All known nest sites are monitored from January through July. Volunteer observers watch nests from a minimum distance of 1000 feet. using binoculars and spotting scopes, for periods of two or more hours each week. They record all data including number of birds

observed, courtship or nesting behaviors, incubation and exchanges, feeding, and other parental care behaviors that 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. Hatching dates are used to schedule eaglet banding, and observers' notes determine if closer nest investigation by ENSP biologists is warranted.

Observer's statewide report bald eagle observations to ENSP biologists, who analyze the information for potential nest locations. ENSP staff and volunteers investigate territorial bald eagles for possible nest sites through field observations. When enough evidence has been collected to suggest a probable location, ENSP biologists often conduct aerial surveys of the region to locate a nest.

When appropriate nests are secured from disturbance with barriers and/or posted signs. ENSP staff works in partnership with landowners and 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 acts 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 nestlings into a large duffel bag and lowers them, one at a time, to the ground. A team records measurements (bill depth and length, eighth primary length, tarsal width, and weight) and bands each eaglet with a federal band and a green state 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. Nest trees are generally not climbed the first season to avoid associating disturbance with the new site.

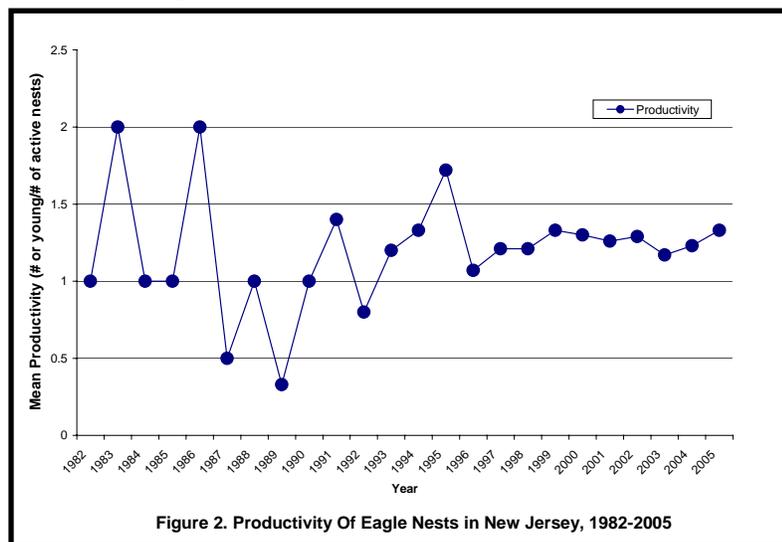
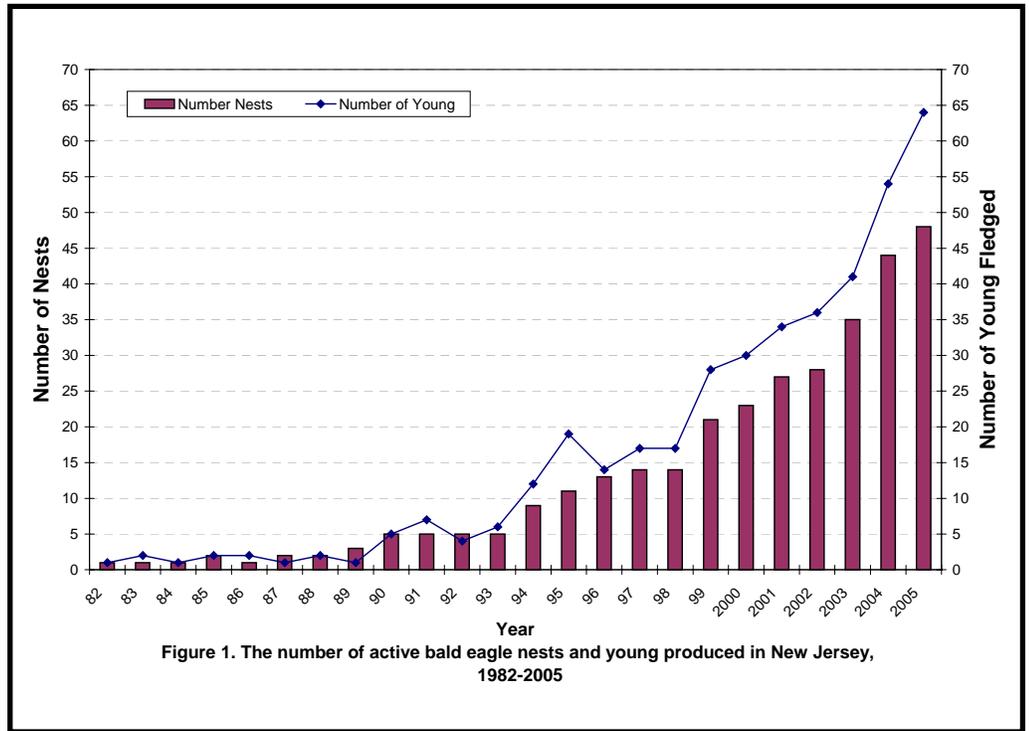
Wintering Eagle Survey

The nationwide Midwinter Bald Eagle Survey is conducted every January to monitor population levels. The ENSP contracted New Jersey Audubon Society's Cape May Bird Observatory and Allan Ambler of the Delaware Water Gap National Recreation Area 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 those from ENSP volunteers at northern reservoirs, were compiled by ENSP biologists to determine statewide totals. Final results were tabulated 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. For the third year volunteers also mapped eagle activity during the two-day survey; these data delineating critical eagle wintering habitat will be incorporated into the NJ Landscape Project.

Results

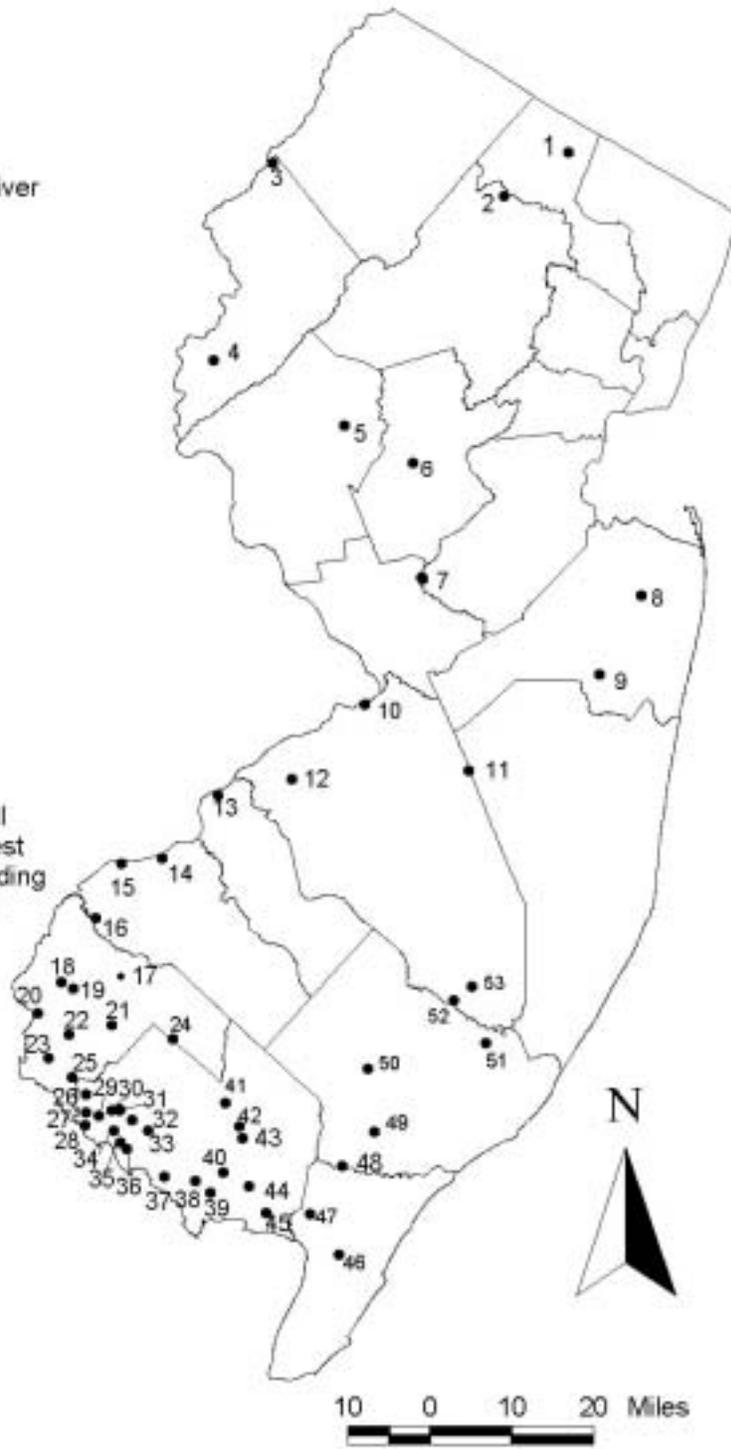
Nest Survey

The statewide population increased to 53 pairs in 2005, up from 48 in 2004. Forty-eight pairs were known active (meaning they laid eggs). Forty nests were known to be successful in producing 64 young, for a productivity rate of 1.33 young per active nest, which is greater than that required for population maintenance (0.9-1.1 young/active nest) (Figure 2). The location and outcome of three pairs was unknown. Most nests were located in the southern part of the state, particularly within 20 km of Delaware River and Bay (Map 1). All nests and potential sites are described individually below and in Table 1. Most nests (38, 72%), were located on private land, compared to 15 (28%) on public and conservation lands. Disturbance was a management issue at many nests, and posting and regular surveillance by staff and nest observers was essential to protecting nests and assuring success.



Map 1. Bald Eagle Nest Sites, 2005

- 1 Wanaque
- 2 Rockaway
- 3 Delaware Water Gap
- 4 Merrill Creek Reservoir
- 5 Round Valley Reservoir
- 6 Raritan River
- 7 Princeton
- 8 Navesink River
- 9 Manasquan River
- 10 Burlington County/Delaware River
- 11 Fort Dix Military Reservation
- 12 Rancocas Creek 1
- 13 Camden County
- 14 Mantua Creek
- 15 Raccoon Creek
- 16 Oldman's Creek
- 17 East Lake
- 18 Mannington Meadows 1
- 19 Mannington Meadows 2
- 20 Supawna
- 21 Alloways Creek 2
- 22 Alloways Creek 3
- 23 Alloways Creek 1
- 24 Elmer
- 25 Stow Creek 1
- 26 Stow Creek 2
- 27 Wheaton Island
- 28 Bayside
- 29 Cohansey River- Greenwich
- 30 Cohansey River- Teaburner
- 31 Cohansey River- Shepards Mill
- 32 Cohansey River- Hopewell West
- 33 Cohansey River- Tindells Landing
- 34 Cohansey River-Middle Marsh
- 35 Cohansey River-Dix
- 36 Seabreeze
- 37 Nantuxent Creek
- 38 Turkey Point
- 39 Dividing Creek
- 40 Bear Swamp
- 41 Union Lake
- 42 Maurice River (Millville)
- 43 Maurice River (North)
- 44 Maurice River (Commercial)
- 45 Heislerville
- 46 South Dennis
- 47 Belleplain
- 48 Tuckahoe
- 49 Egg Harbor
- 50 Lake Lenape
- 51 Galloway
- 52 Mullica River
- 53 Wading River



Alloways Creek 1 (Hancocks Bridge)

This is the ninth season that this pair nested in a willow oak (*Quercus phellos*) adjacent to an active farm field. Incubation began on March 7 and hatching occurred on April 14. Two chicks were observed in the nest and fledging was reported on July 6.

Alloways Creek 2 (Alloway)

For the second season this pair nested in an oak tree along the upper Alloways Creek drainage in a large forest on state land. This is the seventh year that this pair nested in the area. This nest is very difficult to observe once the leaves come out. Incubation began around February 20 and hatching was reported on March 29. Biologists banded the one chick on May 16. It is estimate that fledging occurred around June 13.

Alloways Creek 3 (Quinton)

For the third season this pair nested along the edge of a farm field near Alloways Creek. The pair began incubation on February 17 and hatching occurred on March 27. This nest is also difficult to observe once the leaves are out. Two chicks fledged on the estimated date of June 12.

Bayside

This new pair nested in the marsh along Delaware Bay in Cumberland County. Incubation began February 17 and hatching occurred on April 8. Two young birds fledged around June 24.

Bear Swamp

At the state's oldest nest site, the pair used a partially dead tulip poplar (*Liriodendron tulipifera*) for the third year in a row. This nest is difficult to view and can only be observed from up in a tree stand from a far distance. The pair began incubation in mid February and hatching occurred around March 17. The observer originally reported that two chicks fledged on June 24, but on a later visit was surprised to see a third fledgling at the nest.

Belleplain (East Creek Pond)

The Belleplain State Forest eagles for the seventh year nested in a pitch pine (*Pinus rigida*) lying in a large contiguous forest. This nest is not safely viewable from the ground. On May 19 a biologist flew over the nest and reported an approximately seven-week old chick in the nest. Because of the difficulty in viewing this nest fledging was not confirmed but assumed.

Burlington County/ Delaware River

For the third year this pair nested in a poplar tree in Burlington County near the Delaware River. This was the seventh nesting season for this pair along the river. Incubation began around March 13 and hatching occurred around April 15. Nest failure was reported on May 15. The reason for the failure at this nest was unknown.

Camden County Nest

After nesting for two seasons on an island in the Delaware River in Camden County, the pair moved to nest across the river on the Camden waterfront. Incubation was reported on March 11 by the nest observer. On April 16 ENSP biologists removed the egg and placed a two-

week old foster chick into the nest. The egg was incubated in the lab but failed to hatch. The fostered nestling did well and fledged on June 16.

Cohansey River (Dix)

For the third year this pair nested in a Wildlife Management Area. This nest is difficult to observe without disturbing the birds and must be viewed from a long distance. Incubation began on March 6 and hatching occurred on April 12. Three chicks were reported fledged on June 23.

Cohansey River (Fairfield)

For the past two seasons it was unknown where this pair was nesting. Observers had seen the pair and knew they were in the area. This season nest observers found a new nest and the birds' behavior indicated that incubation began in the end of January. This new nest is very far out in the marsh and extremely difficult to observe. Observers saw feeding behavior on March 30, which indicated that hatching occurred. On May 22 observers saw a juvenile bird perched along the nest tree line and on several occasions after this. It is assumed that this one chick fledged from the nest.

Cohansey River (Greenwich)

For the sixth season the Greenwich pair occupied their nest in a tulip poplar. The pair began incubation on February 9, and hatching occurred on March 19. Biologists banded one eaglet April 29 and fledging was reported on June 26.

Cohansey River (Hopewell West)

For the second year the pair used a nest next to an active farm field and along the Cohansey River. The pair was incubating as of February 18. Failure was reported on March 28, the reason for this failure was unknown.

Cohansey River (Sheppards Mill)

For the third year this pair occupied a nest in a tulip poplar along the Cohansey River adjacent to farm fields. The birds began incubating January 29 and hatching occurred on March 7. Biologists banded two chicks on April 21 and they fledged on May 30.

Cohansey (Teaburner)

This new pair was discovered early in the season nesting along side of an agricultural field near a tributary of the Cohansey River. The pair began incubating on February 6 and hatching occurred on March 13. Two chicks were reported fledged on June 17.

Cohansey River (Tindells Landing)

For the second season the pair nested in a patch of woods next to a field and house. Incubation began on February 4 and hatching was reported on March 11. Biologists banded one chick on April 29 and the chick fledged around June 10.

Delaware Water Gap (Walpack)

The nest tree that this pair used for two seasons along New Jersey's upper Delaware River was found snapped in half along the trunk. The pair was not located and it was unknown

whether they built a new nest elsewhere. Biologists and observers will continue to search for the pair next nesting season.

Dividing Creek

For the fourth year this pair nested in a pine tree located in the tidal marsh along Delaware Bay. Incubation was reported on February 12 and hatching occurred around March 19. One bird fledged on June 12.

East Lake

This new pair began building a nest on the edge of the lake early in the nesting season. Over the past year there had been numerous reports of eagle sightings in the area, but this was the first season a nest was found. The pair began incubating on March 2 and hatching occurred on April 16. One chick fledged on July 4. The state recently purchased the land on which the nest is located.

Egg Harbor River

For the second season this pair nested along the Egg Harbor River. Incubation began around February 24 and hatching around March 31. This nest cannot be seen after leaf-out. A biologist who flew over of the nest on May 19 reported a seven-week old chick. Due to the difficulty in viewing this nest fledging was assumed.

Elmer (renamed Centerton)

For the second season this pair nested along an old irrigation ditch in Cumberland County. The pair began incubating in early February and hatching occurred in March. One bird fledged in early June.

Fort Dix

For the sixth year eagles nested in a large forest on the Fort Dix Military Reservation. Incubation was reported on February 22 and hatching occurred on March 31. Biologists banded two chicks on May 13. Fledging occurred around June 24.

Galloway Township

For the seventh year the Galloway pair nested atop a pitch pine on a tidal creek tree island. Incubation began on February 17. Nest failure was reported on April 6. The reason for this nest failure was unknown.

Heislerville

For the second year this pair nested along the edge of a tidal marsh. Incubation began on February 8 and hatching occurred on March 20. Two chicks fledged around June 21.

Lake Lenape

This is the eighth year that the pair nested along Lake Lenape. For the second season the pair returned to their 1998 nest located on an island. The nest was posted by Atlantic County Parks personnel to discourage disturbance. The birds were found incubating on February 27 and hatching was reported on April 1. On April 16 one of the two chicks was removed and fostered into the Camden County nest. The remaining eaglet fledged on June 21.

Manasquan Reservoir

For the fourth year this pair nested at a reservoir managed by Monmouth County Park Commission. This is the third season that the pair nested in a tree across the reservoir from their previous nest. The area around the nest and the reservoir near the nest were posted to prevent undue disturbance during nesting. The pair began incubating on February 26. On March 2 reservoir personnel alerted ENSP biologists that the female bird was on the nest and not moving. ENSP biologists climbed the nest and found the female dead in the incubating position. Two eggs were collected that had frozen and cracked. A necropsy was performed by Dr. Doug Roscoe, Division pathologist, and it was found that the female died of a prolapsed uterus that occurred while laying a third egg. Nest observers reported that within a few days of the female eagle's death, a new female was seen with the male. Observers will monitor this pair closely next season.

Mannington Meadows 1 (Horne Run)

For the past six seasons this pair has nested atop a large black oak (*Quercus velutina*) between a farm field and tidal water spit. This season the pair did not return to the nest. Observers searched the area for a possible new nest, but did not locate one. It was unknown whether the pair nested in a new nest or if they were territorial this season. Nest observers will continue to closely monitor this pair.

Mannington Meadows 2 (Halls Run)

For the third year this pair nested along the edge of an active agricultural field. The pair was incubating by February 27 and hatching was reported on April 6. Biologists banded two birds on May 23 and fledging was first observed on July 5.

Mantua Creek

The Mantua Creek pair for the second year nested in a cottonwood (*Populus deltoides*) close to the Delaware River. The pair began incubation on March 5 and hatching occurred on April 13. Biologists banded two six-week old birds on May 23. Fledging was reported on July 4.

Maurice River (Commercial)

For the seventh year the eagle pair nested atop a partially dead (and unclimbable) red maple (*Acer rubrum*). The tree lies on a forested peninsula jutting out into the rich Maurice River estuary, and the nest is quite difficult to observe. Incubation was underway on or before March 10 and hatching occurred in mid-April. One bird fledged in late June.

Maurice River (Millville)

For the second season this pair nested along the Maurice River on Nature Conservancy property. Incubation began around February 19 and hatching occurred around April 6. The nest is very difficult to observe once obscured by the foliage, but on June 29 the observer reported a juvenile bird near the nest tree.

Maurice River North

For the fifth year this pair nested in a pitch pine along the edge of the Maurice River. Incubation was reported in late February and hatching occurred by April 12. Two chicks were reported fledged in June.

Merrill Creek Reservoir

This was the sixth year of nesting along the reservoir and the fourth year the pair used their nest in a tulip poplar on the shore of the reservoir. Reservoir personnel worked closely with ENSP staff to protect the nest site. Incubation was reported on February 18, and hatching was reported on March 25. Nest failure was reported on April 10, when the nestlings would have been about two weeks old. The reason for this failure was unknown.

Mullica River

For the fifth year this pair nested in a pitch pine on the Mullica River. Incubation began around March 5 and hatching occurred on April 10. After failing for the past two seasons this pair produced two young that fledged around July 3.

Nantuxent Creek

This pair moved to a new location in the marsh along Nantuxent Creek, making it their fourth location in eleven years in the area. Incubation began on February 23 and hatching was reported on March 30. This nest is difficult to observe once the leaves come out. It is assumed that one chick fledged sometime in June.

Navesink River

This is the sixth season this pair has nested along the river. This season there was a new male and the pair returned to their original nest in a red oak. Incubation began very late in the season on April 4 and hatching occurred on May 10. One chick was banded by biologists on June 17 and the bird was reported fledged on August 8.

Oldman's Creek

After suspecting for several years that Oldman's Creek was a potential nest site, this new pair nested in a wooded lot next to an active farm field in close vicinity to Oldman's Creek. The pair began incubation February 20 and hatching occurred on April 1. One chick fledged on June 25.

Princeton

For the second season this pair nested in a wooded lot in a developed area near Carnegie Lake. The pair began incubating on February 25 and hatching occurred on April 7. Biologists banded two chicks on May 26 and the birds fledged on June 21. Disturbance was limited due to the efforts of volunteers and property owners near the nest.

Raccoon Creek (Delaware River)

The pair occupied the Delaware River site they have used since 1997. This season there was a new female in the pair. The pair worked on the nest but failed to lay eggs, possibly due to the mate change.

Rancocas Creek 1

For the fourth year this pair used a nest in a sweetgum tree located on the edge of an active farm field, their third nest site in their 9-year history. Incubation began on February 28. The pair continued to incubate until May 10 when they abandoned the nest. This was over a month from the expected hatch date. This is the third year in a row that this pair has failed, and biologists suspect contaminants as the cause.

Raritan R.

This new pair was found nesting along the Raritan River on private land. Incubation was reported on March 22 and hatching was reported on April 25. Two chicks fledged around June 29.

Rockaway

A new nest on a northern NJ reservoir was reported to ENSP biologists and confirmed on June 1. When found there were two chicks in the nest estimated to be about seven weeks old. The two chicks fledged in early July.

Round Valley Reservoir

The pair nested at the Round Valley Reservoir where they have been nesting since 1995. Incubation was reported on February 27 and nest observers reported feeding activity on April 6. The nest could not be seen after leaf-out, so biologists flew over the nest on April 20. No chicks or eggs were observed in the nest. The reason for this failure was unknown; a field visit was inconclusive.

Sea Breeze

After two unsuccessful nesting seasons along a marsh in Cumberland County, this pair started incubating on February 27. Hatching occurred on March 30 and one chick fledged on June 23.

South Dennis

For the second season this pair nested in a partially dead tree along a marsh in a wildlife management area. This season a portion of the water was posted to limit disturbance to the nesting birds. The pair started incubating on March 5 and hatching occurred on April 12. Two eaglets fledged on July 3.

Stow Creek North (Canton)

The Stow Creek pair moved their nest about one mile from their 2004 nest and along the Canton Drain. The nest was located in an active blue heron rookery where they had nested once before. The pair started incubating on February 18 and hatching occurred on March 28. One young bird fledged on June 13.

Stow Creek South (Raccoon Ditch)

This was the third year that this pair nested in a pine tree in a somewhat residential area. The pair began incubation on February 8 and hatching occurred on March 12. Two eaglets fledged on May 28.

Supawna Meadows

The Supawna eagles for the seventh year occupied a nest built on a PSE&G transmission tower in Supawna Meadows National Wildlife Refuge. The pair began incubating on February 26 and hatching occurred around April 3. One chick fledged July 6.

Tuckahoe

For the fourth year this pair nested along the Tuckahoe River. Incubation began on March 7 and hatching occurred around April 5. In June the nest observers found the adult male on the river entangled in fishing line and near death. The observers got the bird to Toms River Avian Care where it was treated and released on July 13. (see recoveries). Two birds were reported fledged on June 29.

Turkey Point

This was the second year this pair occupied a nest located on land owned by the Natural Lands Trust. Incubation began on March 5 and hatching occurred on April 10. Two chicks fledged on July 3.

Union Lake

This was the twelfth season that this pair nested along the lake. The birds were seen working on their nest but failed to lay eggs. Probable cause for this is most likely due to a mate change, with the female a new bird this season. ENSP staff continued to post a small lake cove near the nest as a "Restricted Area" to minimize disturbance to the pair.

Wading River

The Wading River pair was sighted on several occasions this season. It is suspected that the pair nested but the nest location was unknown, as they did not return to their 2002 nest. Volunteers and staff will continue to monitor this area next season.

Wanaque

This new nest was discovered along the reservoir by an eagle project volunteer on March 20. Incubation was confirmed on April 2 and hatching was confirmed on April 24. Two chicks were seen in the nest. This nest was difficult to observe after leaf-out, but both chicks fledged in July.

Wheaton Island

This is the second season that this pair nested in a willow oak (*Quercus phellos*) in Cumberland County. The pair started incubating on February 25 and hatching was reported on April 3. Biologists banded two chicks on May 16 and the two fledged around June 19.

Potential Nest Sites

ENSP biologists and observers actively searched for possible nesting bald eagles in several different locations. The searches were in response to the many reports of eagles engaging in breeding behaviors. Areas that remain promising are Big Timber Creek, Batsto Lake, Oswego Lake and the Williamstown area, which all have year-round eagle activity. In addition, several inland reservoirs in the north hold promise of eventual eagle nesting.

Table 1. Production and Significant Dates of Bald Eagles Nesting in NJ, 2005

Nest Site	Incubation	Hatching	Banding	Fledging	# fledged	Notes
Alloways Creek 1	3/7/05	4/14/05		7/6/05	2	
Alloways Creek 2	~2/20/05	3/29/05	5/16/05	*6/13/05	1	
Alloways Creek 3	2/17/05	3/27/05		*6/12/05	2	
Bayside	2/17/05	4/8/05		6/24/05	2	New nest
Bear Swamp	2/7-2/20/05	~3/17/05		6/24/05	3	
Belleplain	*2/05	~3/31/05		*6/16/05	1	F 5/19/05, 1chick~7wks
Burlington Co./Del.R.	3/13/05	4/15/05			0	Failed ~5/15/05
Camden County	3/11/05			6/16/05	1	4/16 foster chick placed into nest
Cohansey (Dix)	3/6/05	4/12/05		6/23/05	3	
Cohansey (Fairfield)	<2/22/05	~3/30/05		~5/22/05	1	
Cohansey (Greenwich)	2/9/05	3/19/05	4/29/05	6/26/05	1	
Cohansey (Hopewell)	2/18/05				0	Failed 3/28/05
Cohansey (Sheppards Mill)	1/29/05	3/7/05	4/21/05	5/30/05	2	
Cohansey (Teaburner)	2/6/05	3/13/05		6/17/05	2	New nest
Cohansey (Tindells Landing)	2/4/05	3/11/05	4/29/05	~6/10/05	1	
Delaware Water Gap	moved				?	Move, nest location unknown
Dividing Creek	2/12/05	3/19/05		6/12/05	1	
East Lake	3/2/05	~4/16/05		7/4/05	1	New nest
Egg Harbor River	~2/24/05	~3/31/05		*6/16/05	1	F 5/19/05, 1chick ~7wks
Elmer	<3/14/05	~4/05		~6/05	1	
Fort Dix	2/22/05	3/31/05	5/13/05	6/24/05	2	
Galloway	2/17/05				0	Failed 4/6/05
Heislerville	2/8/05	3/20/05		6/21/05	2	
Lake Lenape	2/27/05	4/1/05		6/21/05	1	4/16 chick fostered into Camden nest
Manasquan Reservoir	2/26/05				0	Failed 3/2/05; female dead on nest
Mannington Meadows 1	moved				?	Pair in area, moved, nest not found
Mannington Meadows 2	2/27/05	4/6/05	5/23/05	7/5/05	2	
Mantua Creek	3/5/05	4/13/05	5/23/05	7/4/05	2	
Maurice River (Commercial)	3/10/05	~4/10/05		~6/05	1	
Maurice River (Millville)	~2/19/05	4/6/05		6/29/05	1	
Maurice River (North)	~2/26/05	<4/12/05		6/5/05	1	
Merrill Creek	2/18/05	3/25/05			0	Failed 4/10
Mullica River	3/5/05	4/10/05		7/3/05	2	
Nantuxent Creek	2/23/05	3/30/05		6/5/05	1	
Navesink River	4/4/05	5/10/05	6/17/05	8/8/05	1	
Oldman's Creek	2/20/05	4/1/05		6/25/05	1	New pair
Princeton	2/25/05	4/7/05	5/26/05	6/21/05	2	
Raccoon Creek					N/A	New bird in pair, no eggs
Rancocas Creek	2/28/05				0	Failed
Raritan River	~3/22/05	<4/25/05		6/29/05	1	New nest
Rockaway		~4/13		7/5/05	2	New nest, found with 2 chick ~7wks
Round Valley	~2/27/05	~4/6/05			0	Failed, Flew 4/20 no chicks in nest
Seabreeze	2/27/05	3/30/05		6/23/05	1	
South Dennis	3/5/05	4/12/05		7/3/05	2	
Stow Creek N. (Canton)	2/18/05	3/28/05		6/13/05	1	New nest location
Stow Creek S.(Raccoon Ditch)	2/8/05	3/12/05		5/28/05	2	
Supawna Meadows	2/26/05	4/3/05		7/6/05	1	
Tuckahoe	~3/7/05	~4/5/05		6/29/05	2	New nest location
Turkey Point	3/5/05	4/10/05		7/3/05	2	
Union Lake					N/A	New bird in pair, no eggs
Wading River	moved				?	Nest location unknown
Wanaque	4/2/05	4/24/05		7/5/05	2	New nest
Wheaton Island	2/25/05	4/3/05	5/16/05	6/19/05	2	
Totals 53 pairs	Active 48				64	

* These dates are estimates based on events with known dates.

F This is the date of flyover, actual incubation dates are unknown.

Wintering Eagle Survey

A total of 179 bald eagles were observed during the Midwinter Survey on January 8-9, 2005 (Table 2). This was the highest count ever, with two more birds than last year's record of 177 (Figure 3). Southern New Jersey's Delaware Bay region continued to host the majority of the state's wintering birds.

One hundred forty-eight bald eagles were counted in southern NJ, of which 94 were adults (Table 2; Elia 2005). The number of eagles observed in the three regions were fairly equal with the lower Delaware River (34%), followed by the Atlantic Coast watersheds (33%) and the Delaware Bay region (33%). The transects with the highest counts were the Salem River with 32 eagles, the Mullica and Wading Rivers with 27, and Maurice River, Turkey Point, Bear Swamp with (33%).

The many tributaries of southern NJ hold some of the best habitat and therefore more birds. In northern NJ, the best habitats are along the Delaware, in the Delaware Water Gap National Recreation Area, and the inland reservoirs. The Water Gap hosted 4 bald eagles (Ambler 2005), while the inland reservoirs and lakes had 21. Six eagles were counted in northeastern NJ along the Palisades on the Hudson River.

Most survey volunteers recorded details on individual eagles sighted, as well as point locations on maps. These point locations were digitized and will be used to design critical wintering habitat areas.

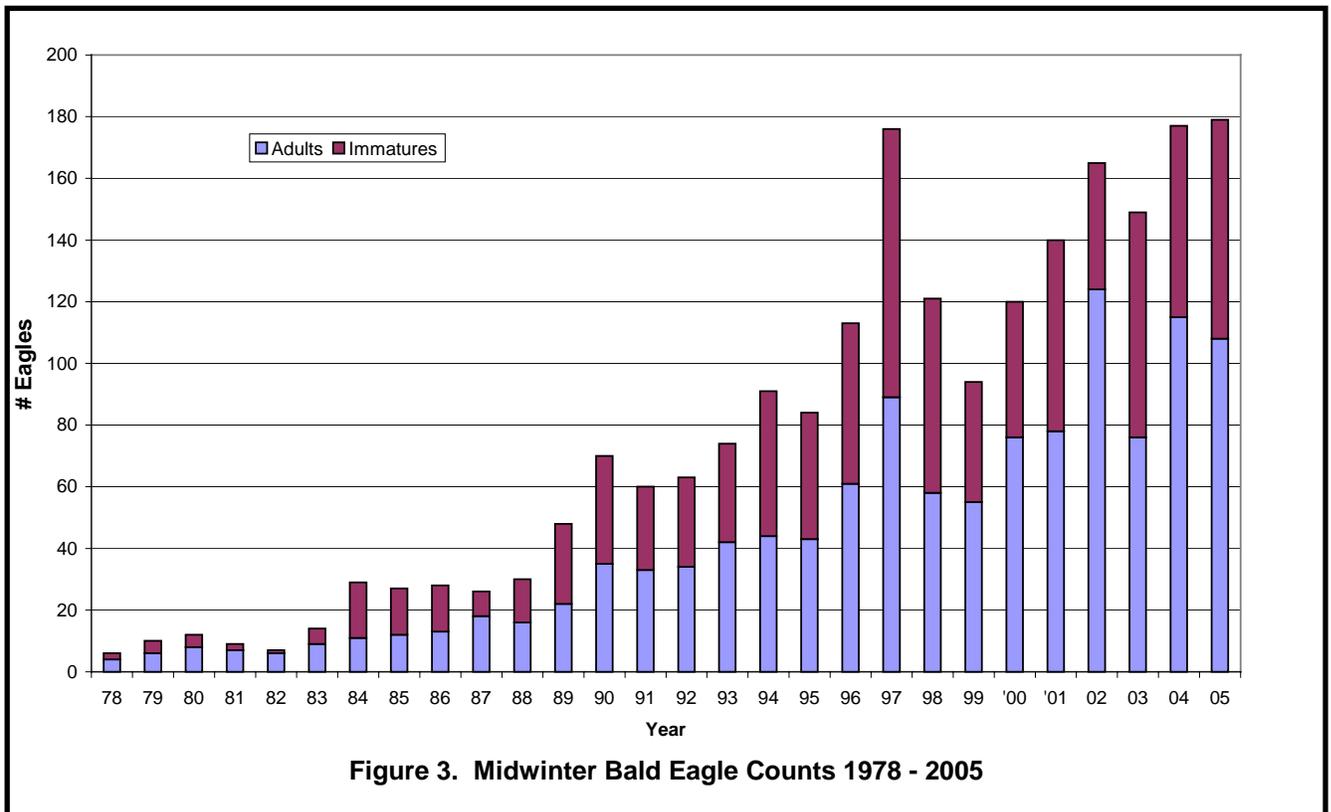


Table 2. Bald Eagles counted in the NJ Midwinter Bald Eagle Survey, January 8-9, 2005

Region	Survey Transect	Subregion	BE Total	Adult	Immature	Unkn. BE	Golden
South	Brigantine NWR	AC	4	2	2	0	0
	Cohansey River	DB	15	11	4	0	0
	Delaware River - Riverton to Trenton	SD	4	4	0	0	0
	Fortescue to Stow Creek	DB	6	6	0	0	0
	Fort Dix	AC	0	0	0	0	0
	Great Egg Harbor & Tuckahoe Rivers	AC	7	5	2	0	1
	Manahawkin to Lower Bass River	AC	0	0	0	0	0
	Manasquan Reservoir	AC	3	2	1	0	0
	Maurice River, Turkey Point, Bear Swamp	DB	19	11	8	0	1
	Mullica & Wading Rivers	AC	27	15	12	0	0
	Oldman's Creek	SD	6	5	1	0	0
	Princeton	SD	2	2	0	0	0
	Raccoon Creek	SD	4	4	0	0	0
	Rancocas Creek	SD	2	2	0	0	0
	Salem County	SD	32	19	13	0	0
	Stow Creek	DB	6	3	3	0	0
	Swimming River Reservoir	AC	0	0	0	0	0
	Thompson's to Reeds Beach	DB	3	2	1	0	0
	Whitesbog	AC	8	1	7	0	0
South	Subtotal		148	94	54	0	2
North	Delaware River - Columbia to Trenton	ND	0	0	0	0	0
	Delaware Water Gap	DWG	4	2	2	0	0
	Hudson River - Palisades	P	6	2	4	0	0
	Jersey City Reservoirs (Boonton & Split Rock)	IR	3	2	1	0	0
	Merril Creek Reservoir	IR	2	2	0	0	0
	Newark Watershed (Clinton & Charlottesburg)	IR	3	1	2	0	0
	Oradell Reservoir	IR	5	2	3	0	0
	Round Valley Reservoir	IR	1	1	0	0	0
	Wanaque & Monksville Reservoir	IR	7	2	5	0	1
North	Subtotal		31	14	17	0	1
State	Total		179	108	71	0	3

Subregion: AC=Atlantic Coast, DB=Delaware Bay, DWG=Delaware Water Gap, IR=Inland Reservoirs, ND=Northern Delaware River, P=Palisades-Hudson River, SD=Southern Delaware River

Nest Histories

Productivity has been fairly stable since 1997 (Fig. 2) and has averaged 1.25, helping to account for the population growth in the state. The mean productivity for each nesting pair was determined by dividing the number of young produced, by the number of years that the pair was active. The above-average productivity results from 81% of pair's (43) that have produced above the 1.0 productivity rate required for population maintenance (Figure 4). Eighteen percent (10) of pairs have averaged below the 1.0 rate; half of those nests have known contamination problems accounting for failure to hatch and thrive.

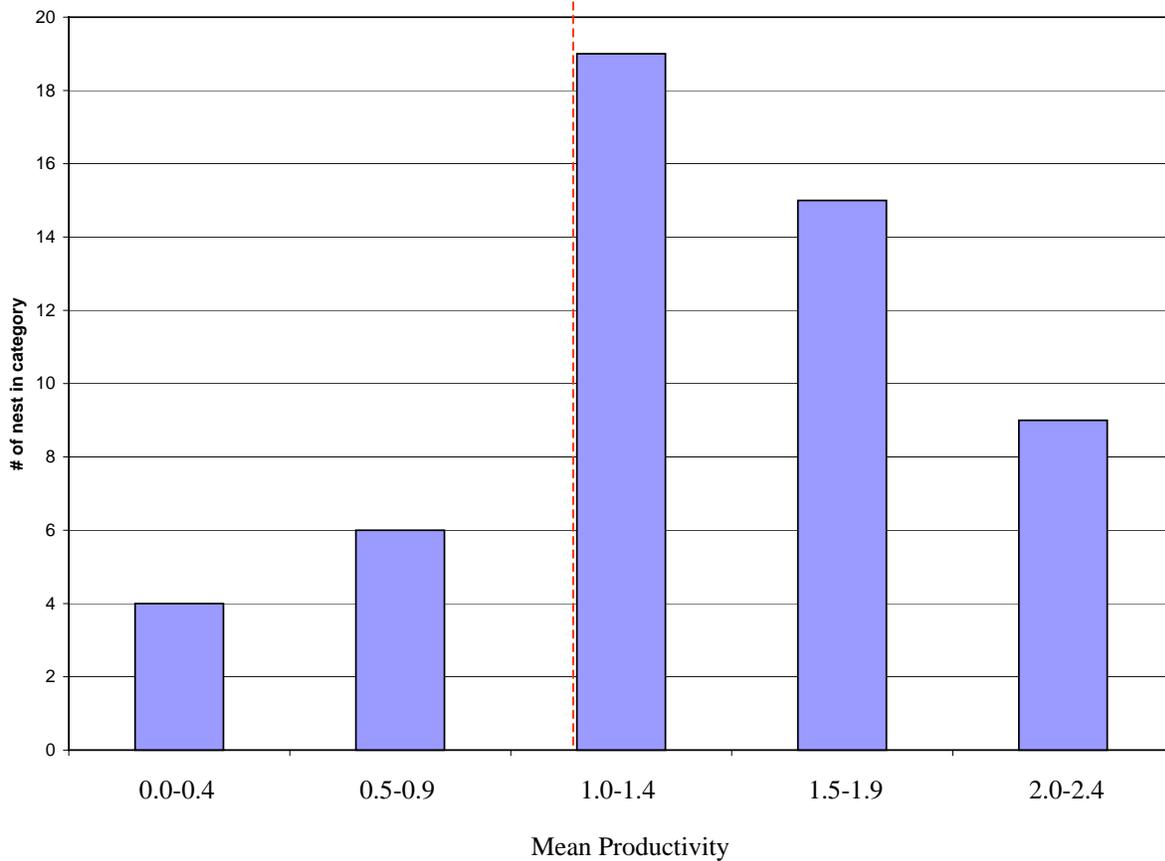


Figure 4. Mean productivity of NJ eagle nests summarized from individual nest histories beginning in 1982. The vertical red line indicates productivity of 1.0, the minimum needed for population maintenance.

Contaminants Research

Environmental contaminants like DDT and PCBs seem to affect at least five pairs of eagles, most in the lower Delaware River region. As part of our monitoring program, biologists collected blood samples from nestling eagles during nest visits in late April through June. A total of 16 nestlings were sampled from ten nest sites. These blood samples were stored frozen to await future analysis for environmental contaminants.

We had the opportunity to collect other samples this year. Eggs were collected from three sites: one from the Camden nest that failed to hatch; two from the Manasquan Reservoir nest that froze when the incubating female died; and one egg from the Greenwich nest found at banding time.

Biologists submitted egg and tissue samples for analysis to the Texas A&M Geochemical and Environmental Research Group Lab in September, and expect results in early 2006. The samples under analysis include eggs (2005 Camden, Manasquan, Greenwich, 2000 Merrill Creek), and tissues taken from chicks that died shortly after hatching (Camden and Rancocas). These analyses are expected to shed light on the reasons for nest failure, as well as regional and site-specific contaminant threats.

Recoveries

On February 7 an eagle was found grounded in a field in Sussex County, Delaware, and was taken to Tri-State Bird Rescue and Research. The eagle suffered from a dislocated elbow joint and the prognosis was that it would never be able to fly again, so it was euthanized. The bird had been banded (629-05427) in 2001 at the Greenwich nest, Cumberland County.

On March 2 Manasquan reservoir personnel alerted ENSP biologists that the female bird was on the nest but not moving. ENSP biologists climbed the nest and found the female dead in the incubating position. Two eggs were collected that had frozen and cracked. A necropsy was performed and it was found that the female died of a prolapsed uterus that occurred when she was laying a third egg.

On March 12 an adult female eagle was found injured in Franklin Township, Cumberland County, and was brought into Cedar Run Wildlife Refuge. The bird was transferred to Tri-State Bird Rescue and Research where she was treated for multiple puncture wounds, likely from a territorial dispute with another eagle. After being banded the eagle was released on April 4 close to where it had been found.

On June 19 Tuckahoe nest observers found an eagle entangled in fishing line along the edge of the river. This adult male was entangled with fishing line throughout the right wing and primaries. They were able to remove all the fishing line, but the bird was extremely weak and the primary feathers were damaged. The bird was transferred to Toms River Avian Care, where it was determined he did not suffer any major injuries. After two weeks of care the bird was banded and released July 13 on the Tuckahoe River, where he rejoined his mate and two fledglings.

On July 20 personnel at the New Jersey-American Water Company Swimming River Treatment Plant in Shrewsbury found an adult female bald eagle dead. A necropsy showed that the cause of death was electrocution. The bird had been banded by ENSP biologists in May of 2000 at the Lake Lenape nest.

On October 2 an injured first year eagle was recovered in Cape May County. The bird was taken to the Raptor Trust where it died. The cause of death was determined to be from trauma due to a possible impact.

Acknowledgments

We thank the following people for their dedication to this program and for providing invaluable field data and assistance with the NJ bald eagle project.

Allan Ambler, Rusty Asdourian, Bruce Beans, Rich Beck, Stephanie Belvedere, Don Bishop, Dave and Kellie Bodmer, Peter Bosak, William Brader, Ed Bruder, Frank Budney, Jane Burman, Andy Campbell, Dorie Capiello, Jody Carrara, Bunny and Elmer Clegg, Jack Connor, George and Mary Coulter, Barb Craig, Ginny Diehm, Loretta Dunne, Todd Edwards, Marian Evans, Leslie and Tony Ficcaglia, Walt Ford, Jane Morton –Galetto, Peter Galetto, Victor Gano, Don Garrison, Steve Gates, David George, Elaine Giberson, Steven Glynn, Mary Harper, Ed Hazard, John Healy, Bert Hixon, Debbie & Bob Holzinger, Mary Jane and Leroy Horner, Paul and Teresa Jackson, Robert Johnson, John and Carol Knapp, Don Krider, Chris Kunz, Carol and Dan LaFon, Penny Laning, Joe Leoni, Teri Loy, Ed Manners, Bill McDermot, John Mikalonis, Barney and Carol Monks, George Palir, Dan Palyca, James and Carolynn Pauze, Linn Pierson, Donna & Heiki Poolake, Todd Pover, Valerie Pullen, Katherine Spence, Mary Lou and Ed Nelson, Mike Palance, Doug Roscoe, Rick Sedevic, Augie Sexauer, Roger and Terry Smith at the Fort Dix Military Reservation, Tracy Smith, Jonathan Stillwell, John Stuebing, Helen and Henry Swanson, Daniel Thomas, Paul & Peg Totten, Matthew Tribulski, Fred Vanderburgh, Bob Verdon, Judy & Charles Welch, Jack and Patty Wettstein, David Yundt.

Margaret Atack, Clayton Ingersoll and the staff at Atlantic County Parks; Scott Mauger, Cindy and Kathleen Myer of Belleplaine State Forest; Lynn Hayward of Cape May County Mosquito Commission; Mr. Jack McCrossin at the Citgo Petroleum Corporation; Chris Aquila and staff at Duke Farms Foundation; Moe Pirestani, Staff and Tom Matlock at DuPont; Jane Bullis, Jim Mershon and the staff of the Merrill Creek Reservoir; Patty O'Rourke & Ken Thoman of the Monmouth County Park System; Tom Koeppel, Chief Forester of the Newark Dept. of Water and Sewer Utilities Division; Kevin Keane of New Jersey-American Water; Andrew Schneier of Round Valley Recreation Area; Ray Sexton of the Sunrise Rod and Gun Club; Patrick Didomizio and Linda Ziamba of Supawna Meadows NWR; Bill Caldwell and Jim Markel at Unimin; Chief Joe Cisco and his security personnel of the Wanaque Reservoir.

We are grateful to Dr. Erica Miller of Tri-State Bird Rescue and Research for her veterinary assistance in fieldwork, and Don and Karen Bonica of Toms River Avian Care for their indefatigable availability. We thank Len Soucy and The Raptor Trust, Stephen Serwatka of NJ Nature, and the New Jersey State Police for support in conducting aerial surveys. We also thank Pat and Clay Sutton for their intimate knowledge of New Jersey eagles; David Mizrahi, Eric Stiles, Vince Elia and New Jersey Audubon staff; the New Jersey Forest Fire wardens for their keen eyesight. We thank John Strep, the Hinchmans, Vincent and Christine Petka, Nanu and Lila Maisuria, Kenny and Harold Truellender, Mr. and Mrs. Sam Owens, Geoffrey Cramer, Anna Marie Sheppard, Raymond Sheppard, Ed Sheppard, Don and Valerie Ireland, Paul Ludwig, Dean and Cindy Kershaw, William and Margaret Donaghy, Doug Vogal, Barbara Sommes, Paul Galleta, and Ranch Hope personnel.

Special thanks to Division Conservation Officers for their help protecting the state's eagles.

This work is funded by people who donate to the NJ Tax Check-Off for Wildlife and buy Conserve Wildlife license plates, and by Federal State Wildlife Grants.

Literature Cited

- Ambler, A. 2005. Midwinter bald eagle survey, northern NJ. Unpubl. rep. to Endangered and Nongame Species Program, NJ Div. of Fish and Wildlife.
- Bowerman, W., D.A. Best, J.P. Giesy, T.J. Kubiak, and J.G. Sikarskie. 1994. The influence of environmental contaminants on bald eagle (*Haliaeetus leucocephalus*) populations in the Laurentian Great Lakes, North America. P. 703-791 in B.U. Meyburg and R.D. Chancellor, eds., Raptor Conservation Today. Pica Press, London.
- Clark, K.E., W. Stansley, and L.J. Niles. 2001. Changes in contaminant levels in New Jersey osprey eggs and prey, 1989 to 1998. Archives of Environ. Contam. Toxicol. 40:277-284.
- Clark, K.E., L.J. Niles, and W. Stansley. 1998. Environmental contaminants associated with reproductive failure in bald eagle (*Haliaeetus leucocephalus*) eggs in New Jersey. Bull. Environ. Contam. Toxicol. 61:247-254.
- Elia, V. 2005. Midwinter bald eagle survey, southern NJ. Unpubl. rep. to Endangered and Nongame Species Prog., NJ Div. of Fish and Wildlife.
- Holstorm, C. 1985. Bald Eagle nesting habitat in southern New Jersey. Rutgers Univ. 18pp.
- Niles, L., K. Clark and D. Ely. 1991. Status of bald eagle nesting in New Jersey. Records of NJ Birds 17(1):2-5.
- Steidl, R.J., C.R. Griffin, and L.J. Niles. 1991. Contaminant levels in osprey eggs and prey reflect regional differences in reproductive success. J. Wildl. Manage. 55(4):601-608.