PERFORMANCE REPORT

STATE: Virginia

PROJECT NUMBER: W-40-R-24
STUDY NUMBER : VI
JOB NUMBER : VI-E

PROJECT TYPE: Research and/or Inventory

PROJECT TITLE: Endangered Species Investigations

PERIOD COVERED: July 1, 1976 to June 30, 1977

STUDY TITLE: Bald Eagle Investigations

STUDY OBJECTIVES: To obtain a winter inventory of bald eagle numbers and to determine the number of active nests in the state.
To determine hatching and rearing success of bald eagles in Virginia.
To collect unhatched eggs for contaminant analysis.
To study general biology and behavior of the species in this state.

SUMMARY:

Aerial surveys resulted in the location of 33 active eagle nests in which 18 young were produced for an average production of .54 young per active and 1.38 young per productive nest. Thirteen of the known 18 young were banded and marked with colored vinyl streamers on the bands. Two egg transplant experiments were conducted, one of which was successful. Four inviable eggs were collected for contaminant analysis and egg shell thickness measurements.

SURVEYS:

Aerial surveys were conducted during March, April, and May throughout Tidewater Virginia to locate active bald eagle nests and to determine success of each nest.

Extensive surveys also were conducted on several of the large inland lakes, including Lake Gaston, North Anna Lake, and Kerr Reservoir. These inland sites were selected for survey primarily because of frequent reports of adult bald eagles on the lakes during the winter. No active eagle nests were located on any of the inland lakes. Surveys in the Tidewater area resulted in the location of 33 active nests. Location by county and fate of each nest is indicated in Table 1. All nest locations were plotted on 7 1/2 minute series topographic sheets.

Table 1. Location and Productivity of Active Bald Eagle Nests in Virginia, 1977.

County (Nest No.)	Reproductive Success	No. of Young
Fairfax		
F.F. 63-2	Productive	1

Stafford

75-1	Unproductive	0

King George

75-1	Unproductive	0
75-2	Unproductive	0
74-4	Productive	2
74-3	Unproductive	0
77-1	Unproductive	0
75-3	Unproductive	0
76-1	Unproductive	0

Westmoreland

77-3	Unproductive	0
71-1	Productive	1
73-3	Unproductive	0
77-1	Productive	2
77-2	Unproductive	0
71-4	Productive	3

New Kent

NK-74-1	Unproductive	0
NK-65-2	Unproductive	0
NK-77-1	Productive	1

Richmond

70-1	Unproductive	0
71-2	Productive	1
74-1	Productive	1
73-1	Unproductive	0

Essex

75-1	Productive	1

Middlesex

77-1	Productive	1
77-3	Unproductive	0

Lancaster

75-1	Productive	1
75-2	Productive	2

Northumberland

74-1	Unproductive	0
70-1	Unproductive	0
75-3	Unproductive	0
75-2	Unproductive	0

Accomac	Productive	1
Mathews	Unproductive	0

Of the 33 active nests, 13 were productive and 20 were unproductive. Total production was 18 young or an average of .54 young per active nest and 1.38 young per productive nest. Young reported in aerial surveys for 1976 totaled 6 individuals. The 1977 data suggest either a greatly increased productivity or a more complete survey. It is suspected that the larger number of young observed in 1977 may be a reflection of both of these factors.

BANDING RESULTS:

An attempt was made to band and color code all young eaglets in Virginia (see separate report). Ownership was determined for the land on which seventeen active nests were located. Fourteen of these nests were visited for banding purposes. Thirteen young from eight nests were banded with U.S. Fish and Wildlife Service bands with blue vinyl tags attached. Color tags were numbered V01 through V13. Three nests contained one young each, all of which were too old for banding at the time of nest visitation. Two nests were not located on the ground. At two nests, permission to band young was denied by the landowner. The remaining nest was not visited because the landowner was absent and could not grant permission.

Photographs were taken of each nest visited. The species of tree was recorded as well as measurements of the tree and nest. Prey remains were collected in and under nests for later identification. One egg and several egg shells were collected for study.

Juveniles will be monitored for colored leg bands during the winter to try to gain information on movements and post-nesting dispersal.

EGG TRANSPLANTS:

Three eggs from a captive bald eagle at the Patuxent Wildlife Research Center were introduced into two Virginia nests, both of which had a long history of reproductive failure. Two eggs were introduced into a nest at Mason Neck National Wildlife Refuge and one into a nest on private land in New Kent County. Following introduction of the eggs, adult eagles returned to both nests to resume incubation.

The single egg in the New Kent nest was incubated approximately three more weeks before abandonment. One of the two introduced eggs at Mason's Neck successfully hatched. Natural eggs from both nests were collected at the time of the transfer and returned to Patuxent Wildlife Research Center in an incubator. Subsequent examination of the eggs revealed them to be inviable and they were processed for egg shell thickness and contaminant analysis.

Although the egg transfer technique appears to have little immediate applicability for increasing populations, it does provide a means of adding one or more eaglets to the annual production. In addition, it provides for a possible source of addled eggs for contaminant analysis.

EGG SHELL THICKNESS AND CONTAMINANT ANALYSIS:

Three eggs were collected during the egg transplant experiment and one was collected during banding operations. Shell fragments also were collected from in and around several nests. Shell measurements and contaminant analysis were made through W. L. Reichel and S. N. Wiemeyer at the Patuxent Wildlife Research Center.

Egg shell thickness measurements based on one whole egg and several segments are presented below:

Nest: VA-WE-77-03, about 1.5 miles WSW of Wakefield Corner
Westmoreland Co., Virginia
Collection Date: 26 May 1977
Length: 7.28 cm Breadth: 5.80 cm
Total Weight: 33.33 g Estimated Volume: 122 cc
Weight of Specimen for Analysis: 19.65 g (dry)
Embryo Development: none detected
Approximate Shell Thickness: 0.59 mm; 4% below the pre-1946 norm.

The shell fragments came from the following nests:

Nest: VA-WE-71-4 (Pierce Creek)
Collected: 29 May 1977
Fragments found on ground under the nest; three young were in the nest, therefore the fragments presumably came from a hatched egg. The fragments were very small. I was unable to determine what part of the egg they may have come from.
Shell Thickness: with at least one shell membrane present -0.55 mm; with no membranes present -- 0.52 mm. There was probably less than 10% shell thinning for the egg(s) represented.

Nest: VA-WE-71-01 (Wakefield)
Collected: 26 May 1977
Fragments found on ground under the nest. One young was in the nest. Again the fragments were small and I was unable to determine what part of the egg they came from.
Shell thickness: with no shell membranes present 0.41 mm.

The egg shell of the intact egg showed 10-15% thinning below the pre-1946 standard. No conclusions may be drawn from the shell fragments represented above.

Contaminant analyses of the two New Kent eggs collected during the egg transfer experiment are presented below:

Sample No.	Submitter's No.	Gram Lipid/cc Volume
77-585	York River - 1	0.054
77-586	York River - 2	0.054

Results: ppm corrected wet weight; organochlorine compounds. Lower limit of detection - 0.05 ppm.

Compound	77-585	77-586
p,p'-DDE	9.1	9.9
p,p'-DDD	0.68	0.81
p,p'-DDT	-	-
Dieldrin	0.58	0.68
Heptachlor epoxide	0.05	0.05
Oxychlordane	0.06	0.08
cis-Chlordane	0.31	0.32
trans-Nonachlor	0.13	0.15
cis-Nonachlor	0.12	0.15
Endrin	-	-
Est. Toxaphene	-	-
HCB	-	-
Mirex	-	-
Est. PCB	46.	53.
Kepone	5.1	5.4

(- = none detected)

The levels of DDE in these eggs are probably low enough to permit successful reproduction. Dieldrin levels also appear to be within safe levels. The PCB levels appear relatively high and are several times higher than levels of the same compound from osprey eggs analyzed from the area in 1975 and 1976.

The Kepone levels are high but no data are available on the levels of this compound which may cause reproductive failure. The role of the PCB compounds is equally unclear.

Contaminant analysis for the single egg collected at Masons Neck National Wildlife Refuge is presented below:

Sample No.	Gram Lipid/cc Volume
77-584	0.059

Results: ppm corrected wet weight; organochlorine compounds. Lower limit of detection = 0.05 ppm. Results confirmed by GC-MS.

Compound	77-584
p,p'-DDE	26.
p,p'-DDD	3.7
p,p'-DDT	0.05
Dieldrin	2.8
Heptachlor epoxide	0.25
Oxychlordane	0.34
cis-Chlordane	3.6
trans-Nonachlor	1.9
cis-Nonachlor	1.5
Endrin	-
Est. Toxaphene	-
HCB	0.26
Mirex	-
Est. PCB	218.
Kepone	-

(- = none detected)

The levels of DDE, DDD, dieldrin, and total chlordane (including nonachlor) in this egg are moderately higher than the levels found in an egg collected from the same nest in 1976 and analyzed at the Patuxent Wildlife Research Center. Kepone and mirex were detected in the 1976 egg, but were not detected in the egg collected in 1977. The level of PCB in this egg was nearly four times that found in the egg collected in 1976. This PCB level (218 ppm) is reported to be the highest found in any bald eagle egg analyzed at the Patuxent Research Center and probably is the highest ever found anywhere in an egg of this species.

The levels of DDE and dieldrin would appear to be high enough to have caused the failure of the eggs to hatch. Data on the role of PCB in causing embryonic mortality and reproductive failure in eagles and other raptors is lacking. The level reported above would appear to be high enough to cause failure.

The data on contaminant levels presented above suggest the desirability of more thorough nest monitoring in an attempt to collect a more broadly based sample of abandoned and addled eggs for analysis.

BEHAVIORAL OBSERVATIONS:

Behavioral observations were begun on a group of adult and juvenile eagles which roost around and utilize a small pond on the Potomac River. Data were gathered on interactions of these individuals.

TARGET DATE FOR COMPLETION: June 30, 1981

STATUS OF PROGRESS: On Schedule

SIGNIFICANT DEVIATIONS IN PROGRESS: None

RECOMMENDATIONS: Continue with Remaining Project Plans

COST THIS SEGMENT: FEDERAL: $2442 STATE: $3058 TOTAL: $5500

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DATE: June, 1977

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