

1985

## Bald Eagle Investigations

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### Recommended Citation

Byrd, M. A. and W. H. Taylor. 1985. Bald Eagle Investigations. Virginia Non-Game and Endangered Wildlife Investigations, Annual Report. CCBTR-85-01. U.S. Fish and Wildlife Service Federal Aid Program. Virginia Commission of Games and Inland Fisheries. 16 pp.

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PERFORMANCE REPORT

STATE: VIRGINIA PROJECT NO.: W-77-R-1  
PROJECT TYPE: Research and/or Survey STUDY NO.: I  
PROJECT TITLE: NON-GAME AND ENDANGERED SPECIES JOB NOS.: I-A,B,C,  
D,E,F  
INVESTIGATIONS  
STUDY TITLE: BALD EAGLE INVESTIGATIONS  
JOB TITLE: BALD EAGLE INVESTIGATIONS  
PERIOD COVERED: July 1, 1984 - June 30, 1985

JOB I-A . To obtain a winter inventory of Bald Eagle numbers  
OBJECTIVE: and determine range of these birds in Virginia.

JOB I-B To determine hatching and rearing success of Bald  
OBJECTIVE: Eagles in Virginia.

JOB I-C To develop and utilize techniques to introduce Bald  
OBJECTIVE: Eagles into formerly occupied habitat through hacking  
techniques and to introduce captivity reared Bald  
Eagle young into foster parent nests.

JOB I-D To determine post-nesting dispersal and other movements  
OBJECTIVE: of young eagles through the use of radio telemetry.

JOB I-E To monitor activities at two active eagle nest sites  
OBJECTIVE: from egg laying through fledging of young through the  
use of video equipment. In addition, all aspects of  
incubation and post-incubation behavior will be  
observed from two blinds at two additional sites.

JOB I-F To monitor Bald Eagle populations at the Caledon  
OBJECTIVE: State Park.

SUMMARY:

Aerial and ground surveys resulted in the location of 65 active bald eagle nests. A total of 91 known young hatched, of which, 84 reached fledging age. This resulted in a production of 1.29 fledglings per active nest and 1.7 fledglings per productive nest.

Seventy-one of 84 eaglets which reached fledging age were banded and also marked with white plastic bands with alpha-numeric codes.

Shoreline surveys were conducted weekly of two large summering populations of eagles, one on the James River and one on the Potomac River.

A mid-winter survey of eagles was conducted in January, resulting in the location of 178 birds. The mid-winter population consisted of 112 adults and 66 immatures.

HATCHING AND FLEDGING SUCCESS

Aerial surveys were conducted during March, April and May to locate active nests and to monitor the fate of each located nest. Surveys covered the entire Tidewater section of the state.

Aerial surveys resulted in the location of 65 active nests. One additional active nest was reported from Halifax County on the John H. Kerr Reservoir by the resident biologist. All active nest locations were plotted on 7 1/2 minute topographic sheets. The fate of each active nest is shown in Table 1.

Table 1. Location and productivity of Active Bald Eagle Nests in Virginia 1985

County	Nest Number	Reproductive Success	
		Number of Young Hatched	Number of Young Fledged
Accomac	AC-80-01	2	2
Charles City	CC-85-01	0 <sup>1</sup>	0
Charles City	CC-85-02	2	1
Caroline	CA-82-01	0	0
Essex	ES-84-01	3	3 <sup>2</sup>
Gloucester	GL-83-01	2	1 <sup>3</sup>
Gloucester	GL-84-01	1	1
Fairfax	FF-80-01	0	0
Henrico	HE-83-01	3	2 <sup>4</sup>
Halifax	HF-85-01	2	1 <sup>5</sup>
James City	JC-83-01	3	2 <sup>6</sup>
James City	JC-83-02	1	1
James City	JC-84-01	2	2
King George	KG-79-04	0	0
King George	KG-82-02	0	0
King George	KG-82-03	0	0
King George	KG-83-01	2	2
King George	KG-83-02	1	1
King George	KG-84-02	3	3
King George	KG-85-02	0	0
King George	KG-85-04	1	1
King William	KW-77-01	3	2 <sup>7</sup>
King William	KW-79-01	3	3 <sup>7</sup>
King William	KW-85-01	0	0
Lancaster	LA-75-01	0	0
Middlesex	MI-77-01	2	2
Middlesex	MI-80-02	2	2
Middlesex	MI-84-01	3	3 <sup>8</sup>
Middlesex	MI-84-02	3	2 <sup>9</sup>

Table 1. continued

County	Nest Number	Reproductive Success	
		Number of Young Hatched	Number of Young Fledged
Middlesex	MI-85-01	1	1
Northumberland	ND-70-01	0	0
Northumberland	ND-79-01	2	2
New Kent	NK-79-04	0	0
New Kent	NK-85-01	1	1
New Kent	NK-85-02	1	1
Northhampton	NT-82-01	2	2
Northhampton	NT-83-01	2	2
Prince George	PG-61-01	3	3
Prince William	PW-82-01	2	2
Prince William	PW-85-01	0	0
Richmond	RI-74-01	2	2
Richmond	RI-78-01	2	2
Richmond	RI-81-02	1	1
Richmond	RI-84-02	1	1
Richmond	RI-84-03	1 <sup>10</sup>	1
Richmond	RI-85-01	2	2
Richmond	RI-85-02	2	2
Richmond	RI-85-03	2	2
Stafford	ST-82-01	2	2
Stafford	ST-84-02	1	0 <sup>11</sup>
Stafford	ST-85-01	2	2
Surry	SU-81-01	1	1
Surry	SU-82-01	2	2
Surry	SU-84-01	0	0
Westmoreland	WE-78-01	0	0
Westmoreland	WE-79-01	0	0
Westmoreland	WE-79-05	3	3
Westmoreland	WE-81-01	1	1
Westmoreland	WE-83-01	1	1
Westmoreland	WE-83-02	0	0
Westmoreland	WE-83-03	2	2
Westmoreland	WE-83-04	2	2
Westmoreland	WE-84-01	0	0
Westmoreland	WE-84-02	2	2
Westmoreland	WE-84-04	2	2
Totals		91	84

## Footnotes:

- (1) Egg collected
- (2) One young transferred to North Carolina, fledged there
- (3) One young killed by unknown, unidentified predator
- (4) One young found dead in nest following death of adult
- (5) One young found dead at base of tree
- (6) One young found dead in nest

Footnotes continued:

- (7) One young transferred to North Carolina, fledged there
- (8) One young transferred to North Carolina, fledged there
- (9) One young disappeared from nest
- (10) One egg collected
- (11) One young disappeared from nest

Of 65 active nests, 47 were successful and 18 were unsuccessful, for a success rate of 72 per cent. Total number of young known to have been hatched was 91, of which seven were lost prior to hatching. Three pre-fledglings were sent to North Carolina for hacking and successfully fledged. These 3 young, therefore, are included in the number of fledglings in Table 1. Eighty-four young apparently reached fledging age for an average of 1.29 fledglings per active nest.

This production per active nest was an increase of 33% over production (0.97) for 1984. The reasons for this sharp increase are unclear but may be related to the long period of mild and relatively dry weather which occurred during most of the incubation period.

The number of fledglings per productive nest was 1.79 as compared with 1.68 in both 1983 and 1984. A total of ten pairs produced three young each although one young was lost from each of three of those nests.

Data on productivity for the period 1977-1985 are summarized in Table 2.

Table 2. Bald Eagle Productivity in Virginia for the Period 1977-1985

Year	Total Active Nests	Total Prod. Nests	Total Unprod. Nests	Percent Nest Prod.	Total Young Fledged	Fledglings Productive Nest	Fledglings Active Nest
1977	33	13	20	39	18	1.38	0.54
1978	37	14	23	38	18	1.29	0.54
1979	33	15	18	45	20	1.33	0.61
1980	35	23	12	66	35	1.52	1.00
1981	39	27	12	69	40	1.48	1.02
1982	45	28	17	62	41	1.52	0.93
1983	52	31	21	60	51	1.68	0.98
1984	60	34	26	57	58	1.68	0.97
1985	65	47	18	72	84	1.79	1.29

## WINTER SURVEYS

Personnel on the project, in conjunction with cooperators, participated in the mid-winter survey sponsored by the National Wildlife Federation. All major tributaries of the state were covered by aerial survey by project personnel. Ground parties participated in coverage of the James, Piankatank and Potomac Rivers. Data on the mid-winter survey are shown in Table 3.

Table 3. Bald Eagles Observed During Mid-Winter Survey, January, 1985

Area	Adults	Immatures	Total Eagles
James-Chickahominy River	35	32	67
Rappahannock River	19	8	27
Potomac River	41	18	59
Piankatank River-Mobjack Bay	3	1	4
York, Pamunkey, Mattaponi Rivers	6	1	7
Inland Impoundments	5	4	9
Eastern Shore	3	2	5
	112	66	178

The observed percentage of adults and immatures was 63 and 37 respectively. Total number of eagles observed was down from 1984. Annual fluctuations in the number of eagles observed are to be expected because of variations in temperature, ice conditions, and other factors. In 1985, the temperatures prior to and during the midwinter count were very mild, possibly resulting in fewer northern birds reaching the state. The mid-winter survey in conjunction with the summer censuses continues to indicate the importance of the James River system as a bald eagle habitat in the state.

## SUMMER CONCENTRATIONS:

Two major summer concentrations of eagles have been monitored in the spring and summer of 1985. The population of the Caledon-Cedar Grove Farm area is one of these. This is a continuation of shoreline studies reported upon in the final report, Caledon State Park Bald Eagle Study, Final Federal Aid Report. Final survey reports for the summer of 1984 are included for comparative purposes.

### Caledon State Park (Methods)

The Caledon shoreline bald eagle census route, initially established in 1983 (Wallin & Byrd 1982), was again monitored in the summer of 1984 and continued in 1985. Census runs were conducted approximately once a week from May through August. In 1983, censusing was conducted three times per week with one per week conducted from 07:00-11:00, one per week conducted from 11:00-15:00 and the remaining one conducted from 15:00-19:00.

During 1983 significantly higher counts were obtained during the 07:00-11:00 time period and the lowest counts were obtained during the 15:00 to 19:00 time period.

In 1984, we chose to conduct our census runs during the 11:00-15:00 period because:

1. it was felt that the better lighting conditions during this period would yield a more complete count of those birds present in the area; and

2. censusing activities during this period would not impinge upon the best hours of foraging activity. Jaffe (1980) and Wallin (1982) report significantly higher foraging rates in this study area prior to 09:00. Details of the Caledon area shoreline route, including some habitat variables, and procedural details are included in Wallin & Byrd (1984).

Briefly, the census route included 10km of shoreline on the Virginia side of the Potomac River, centered on the Caledon State Park and Cedar Grove farm properties and an additional 10 km section of shoreline directly across the river on the Maryland side. The census was conducted from a small boat cruising approximately 50-150 meters offshore at a speed of approximately 15-20 km/h. The number, age (adult or immature) and activity (perched or in flight) of all eagles within each 0.5 km section of rivershore was recorded. When an eagle flew ahead of the survey boat and did not appear to leave the river shore, the next eagle sighted with similar plumage was not included in the count. Hence, recounting of the same individual on a given day was probably very infrequent.

### James River (Methods)

In 1983, a similar shoreline census route was established on the James River 6 km downstream from the B. Harrison Memorial Bridge (Rt. 156 near Hopewell). This census route was again monitored in 1984. The census route is approximately centered on a large night roost discovered in 1982 by M. A. Byrd and F. R. Scott. The shoreline census route begins in the vicinity of Coggin's Point on the south side of the river and extends eastward 13 km of shoreline to the vicinity of Ward's Creek. On the north side of the river the route begins in the vicinity of Weyanoke Point and extends westward for 14 km to the vicinity of Harrison's Landing. Census methods generally followed

# James River Shoreline Bald Eagle Survey

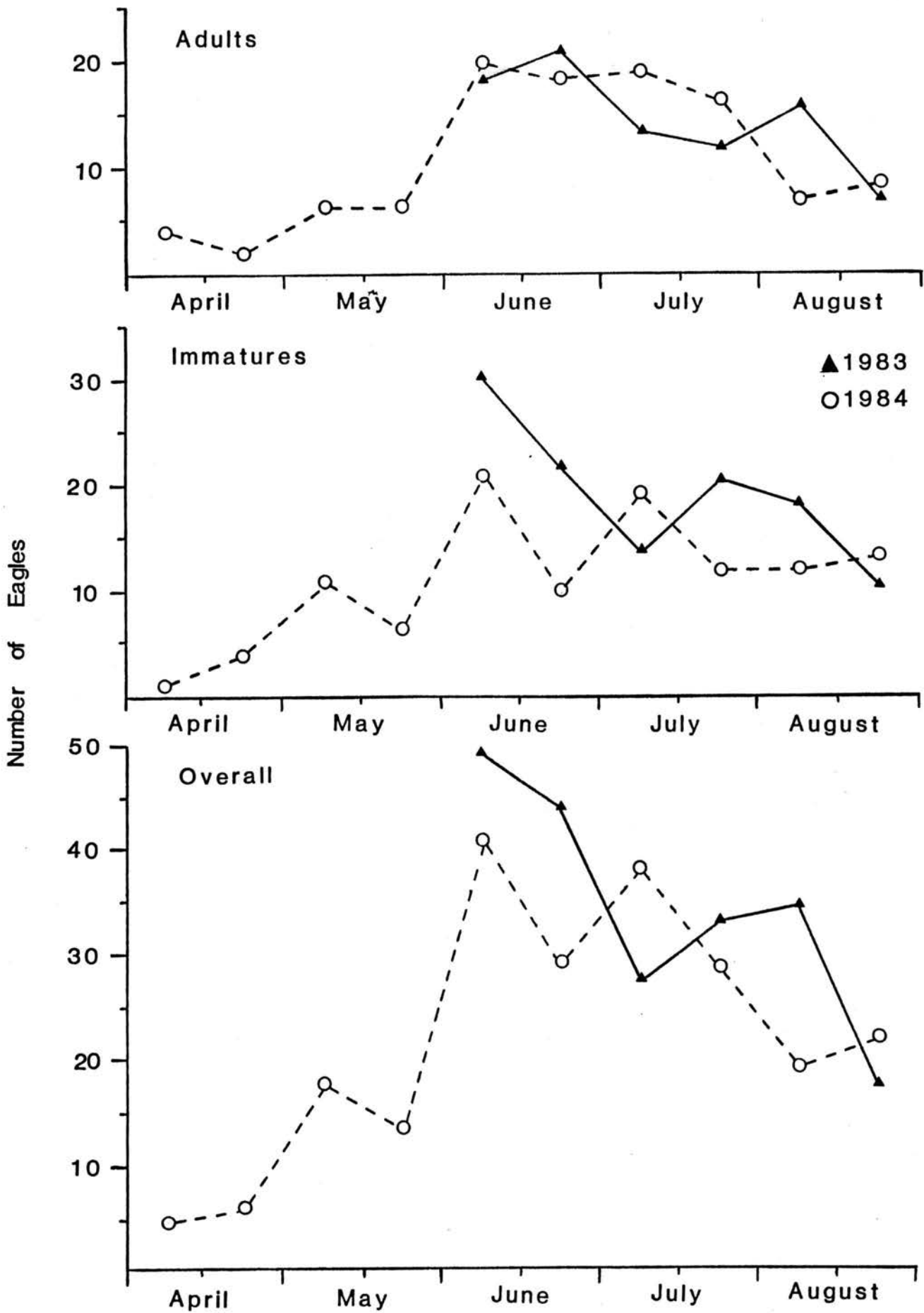


Figure 1



### Caledon Shoreline Bald Eagle Survey

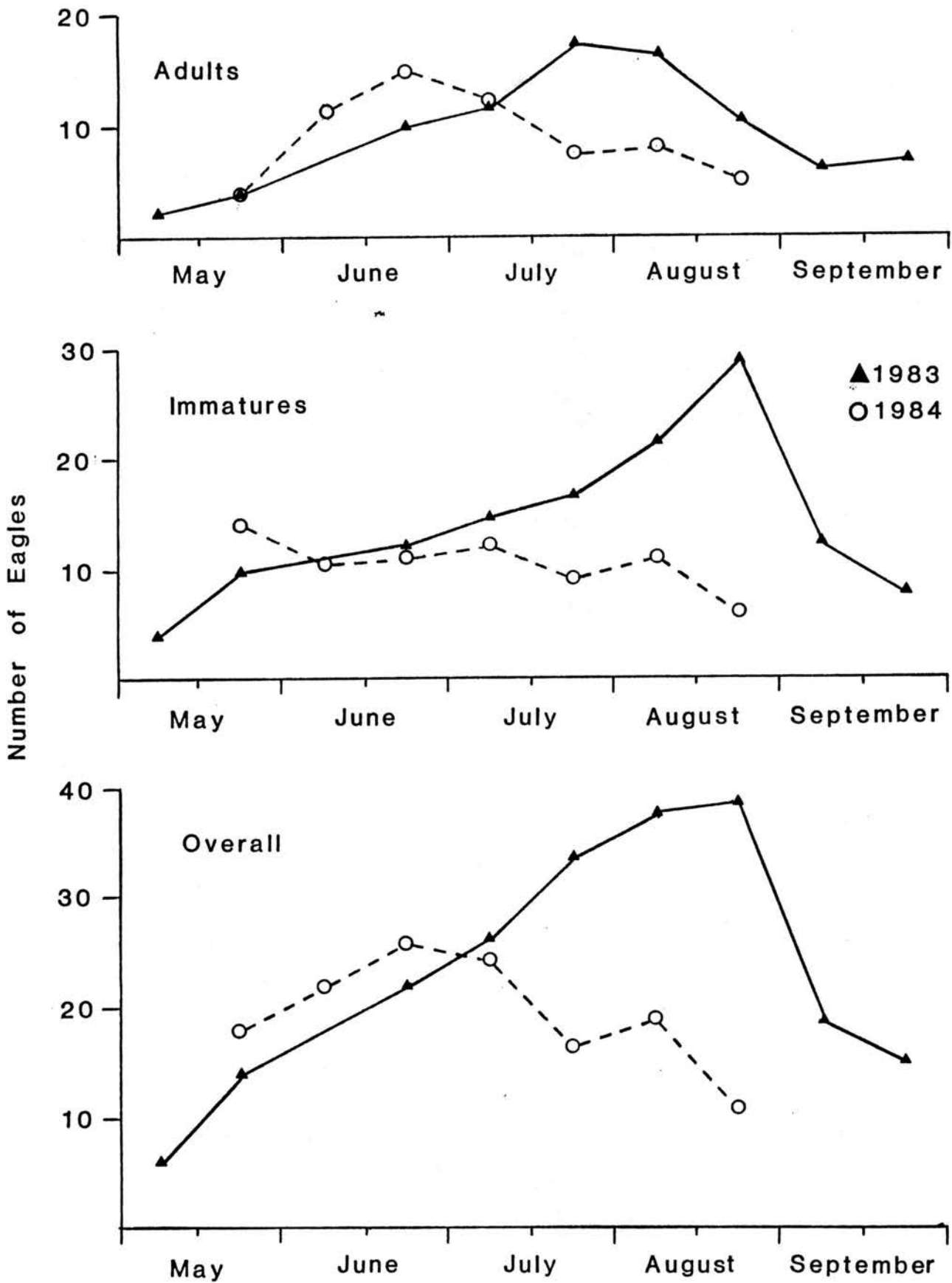


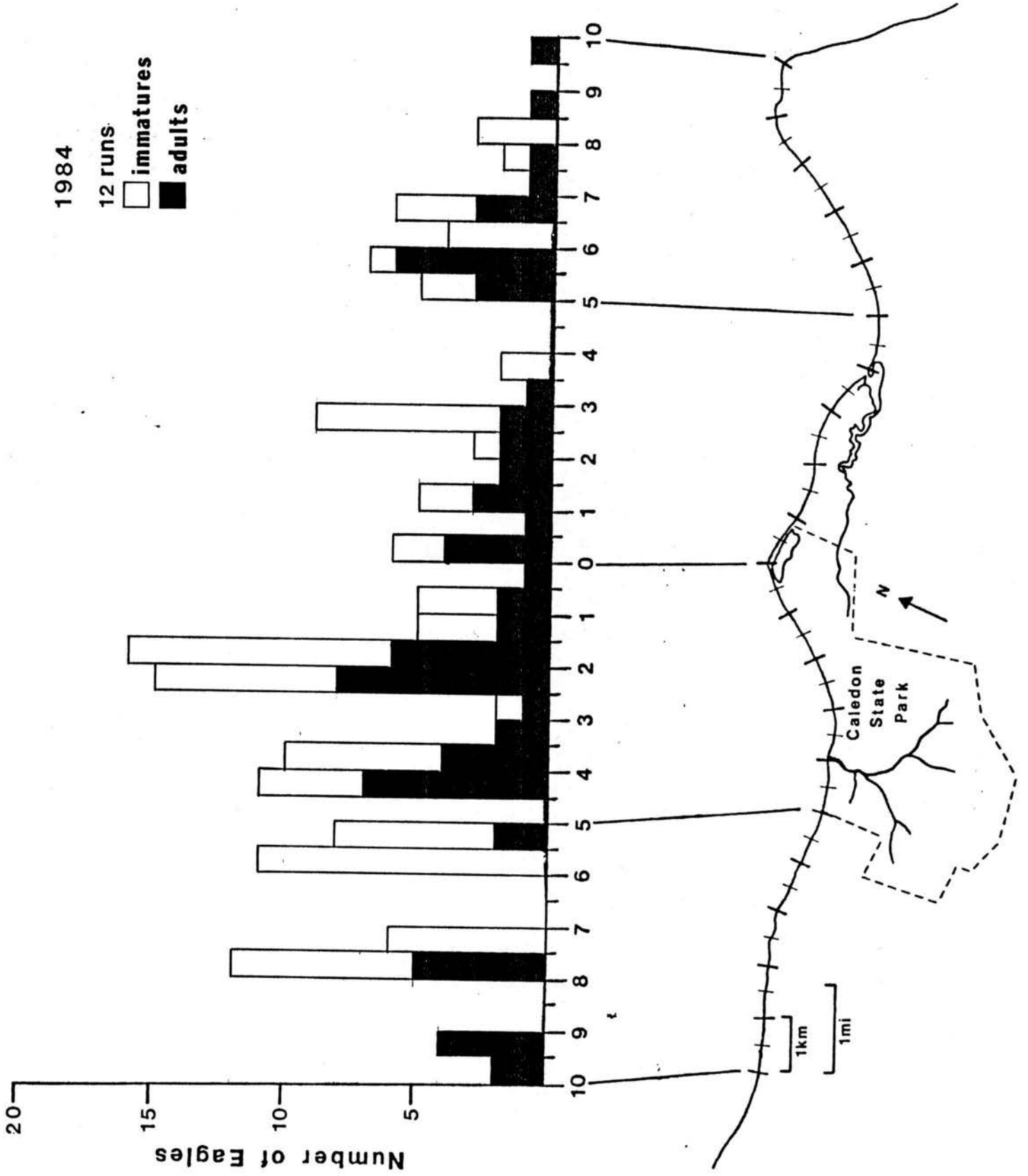
Figure 2

1984

12 runs

□ immatures

■ adults



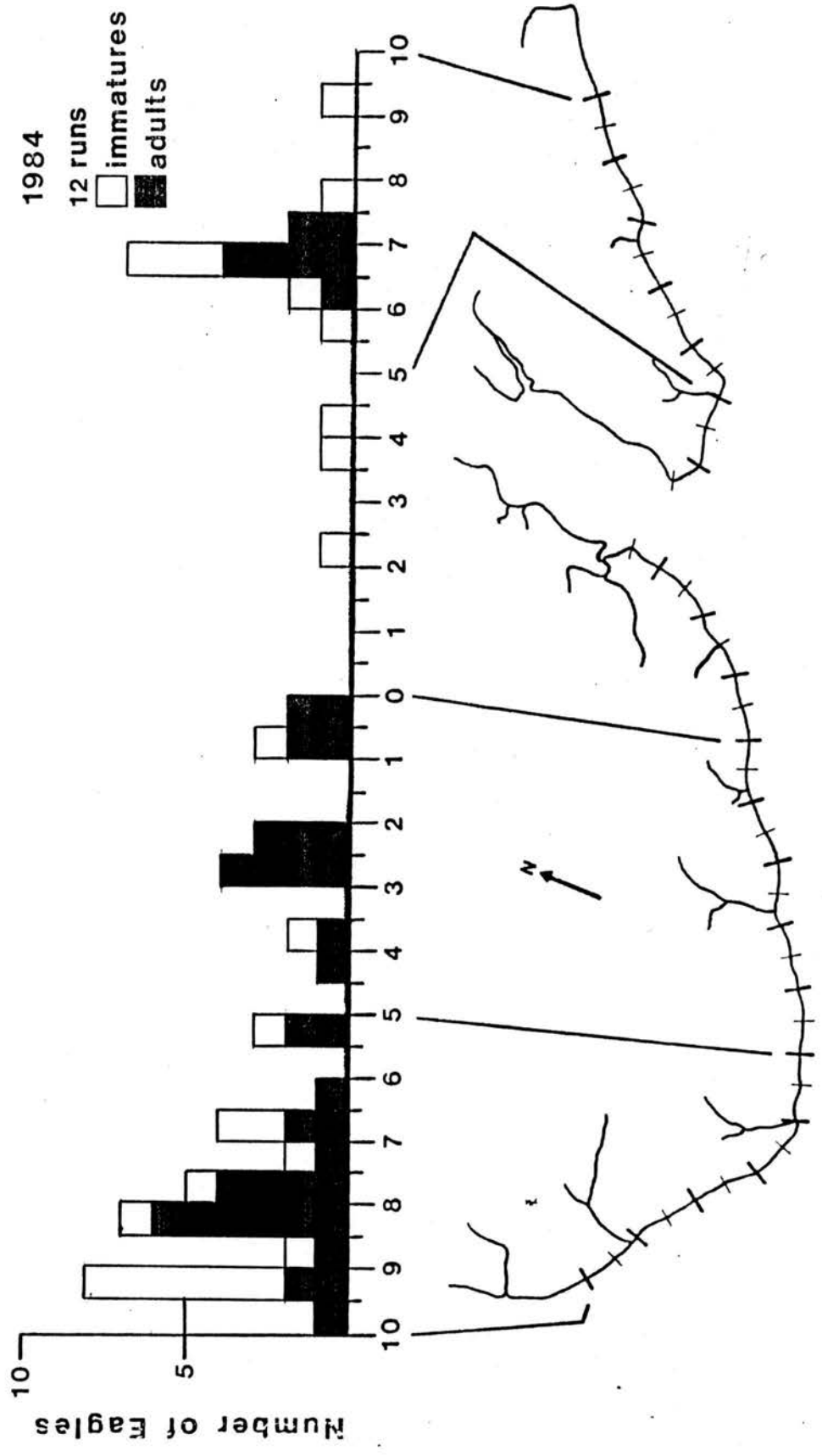


Figure 4

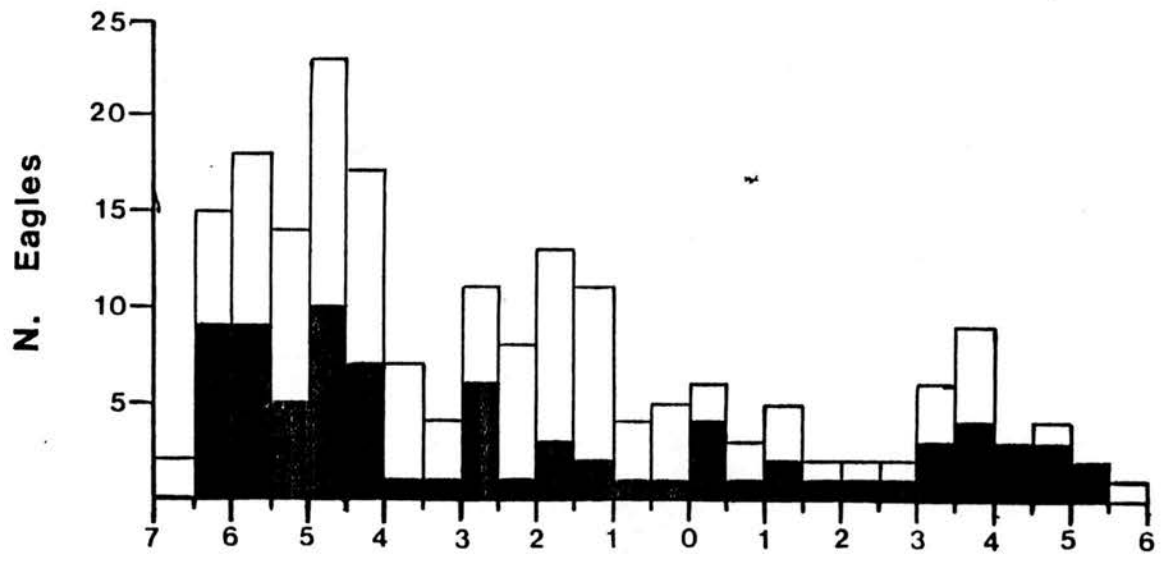
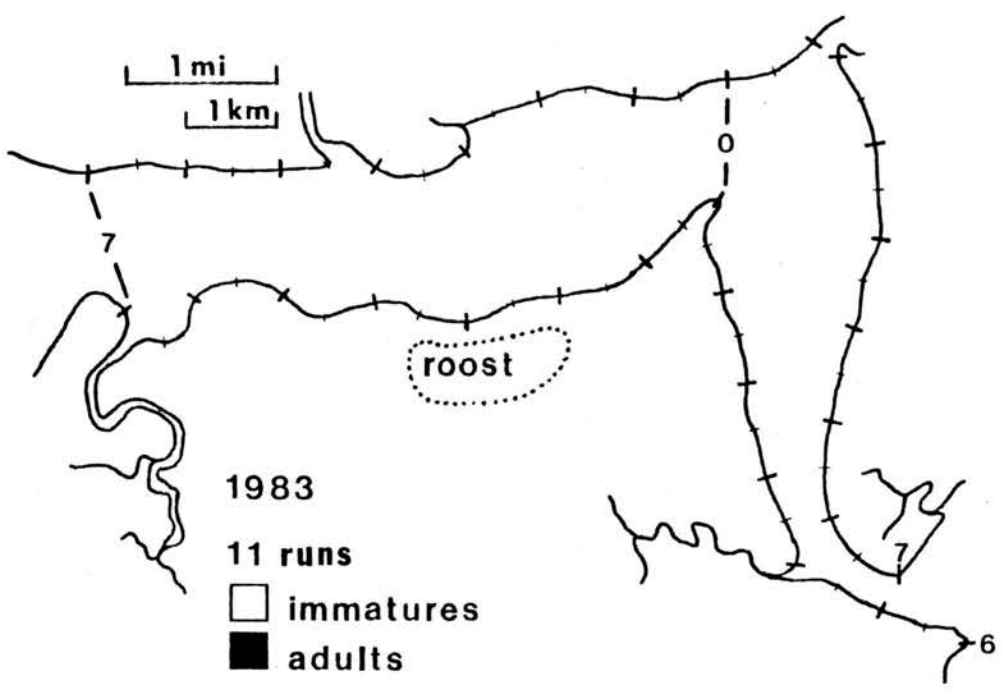
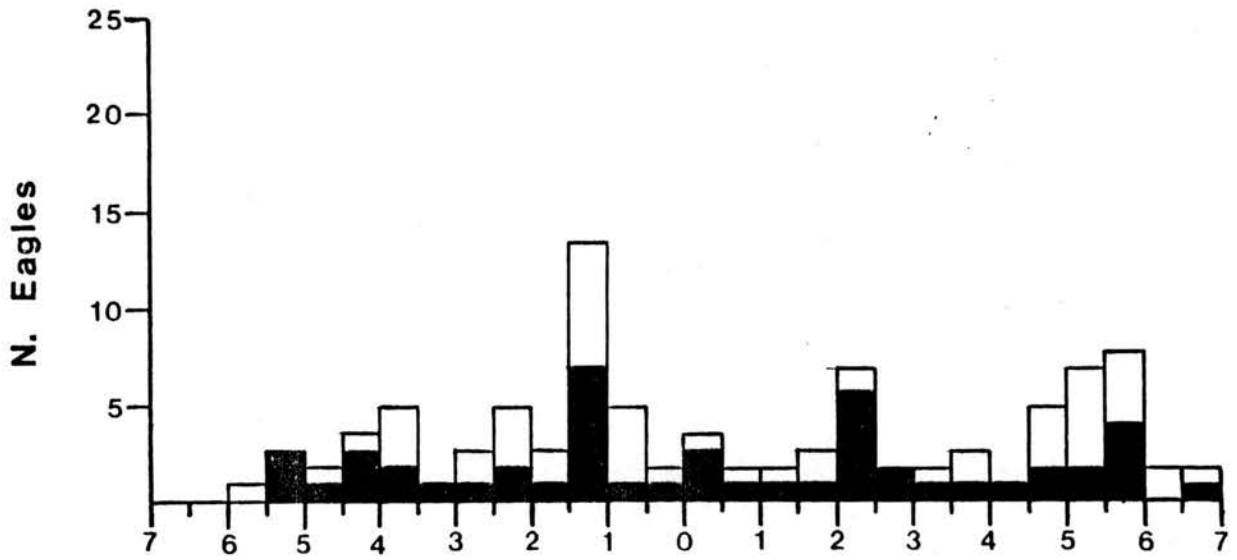
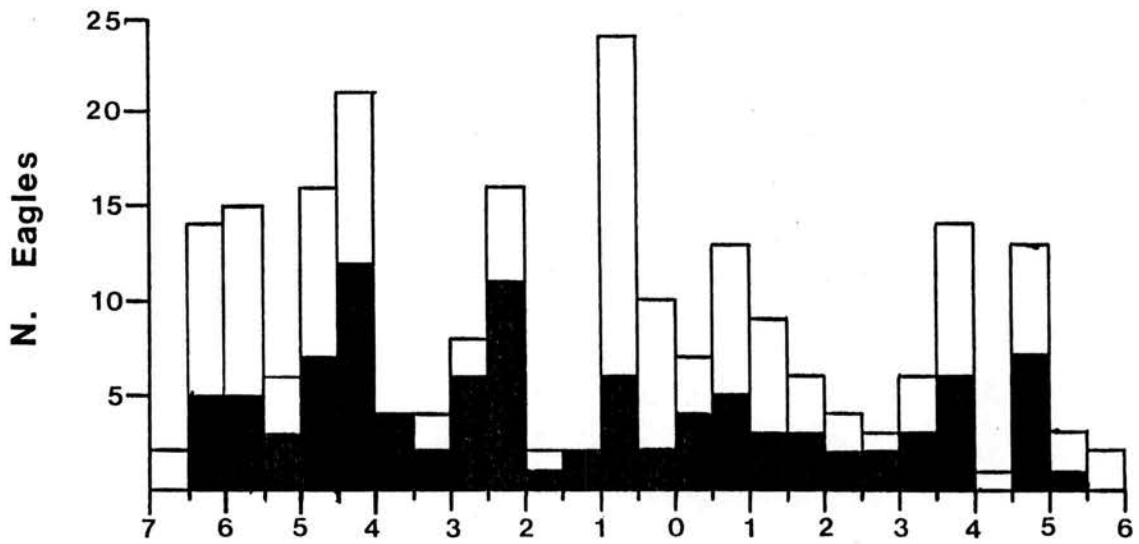
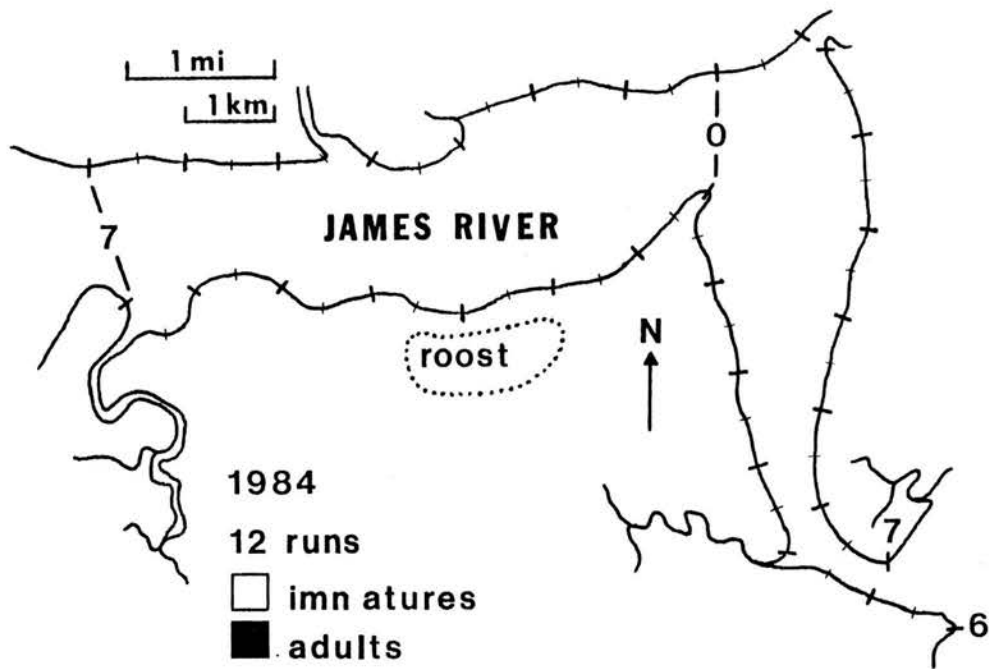
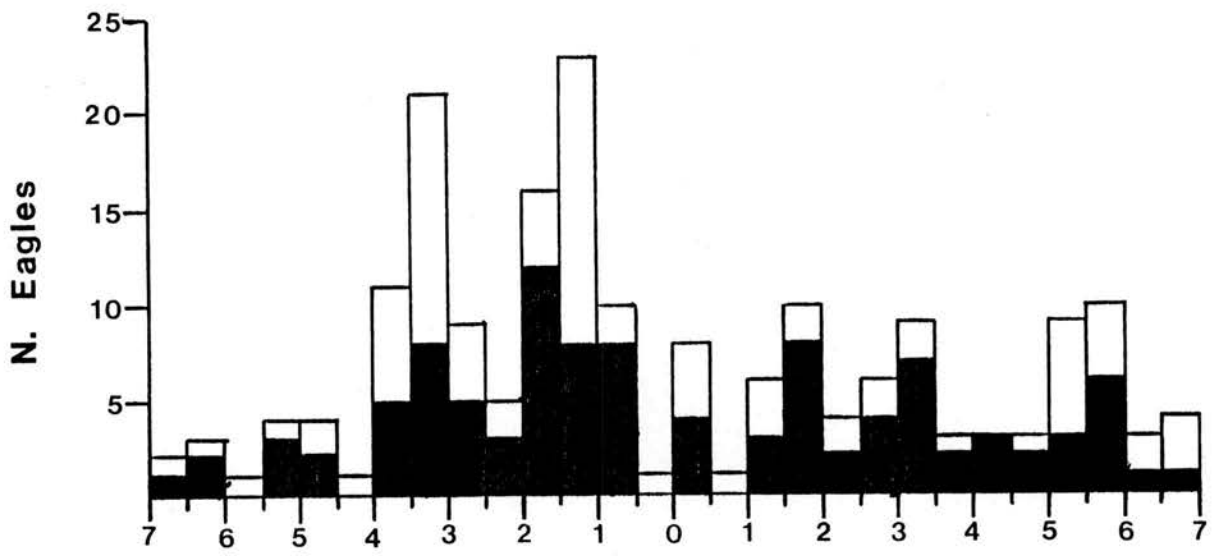


Figure 5



All statistical tests were performed using appropriate programs in the Statistical Analysis System (Helwig & Council 1979) or the Statistical Package for the Social Sciences (Nie et al. 1975).

#### CALEDON STATE PARK AND JAMES RIVER SURVEYS (Results)

At the James River site, the numbers of bald eagles observed in 1983 and 1984 (Figure 2) were not significantly different for adults, immatures or for all eagles (one-way ANOVA,  $p=0.71$ ,  $p=0.23$ ,  $p=0.62$  respectively). The variation in the number of eagles present over the course of the summer also appears similar (Figure 1).

In contrast, the numbers of immatures and the overall number of bald eagles present at Caledon in 1983 and 1984 (Figure 2) were significantly different (one-way ANOVA  $p=0.0005$ ,  $p=0.0028$  respectively). However, there was no significant difference in the number of adults present at Caledon in 1983 and 1984 (one-way ANOVA,  $p=0.15$ ).

At present the reason for the consistency in eagle use at the James River site and the apparent decline in Eagle use of Caledon remains unclear. Although no statistically significant relationship can be demonstrated with the present data set, there is the suggestion of a relationship between temperature and the number of eagles present in the Caledon area (Table 4, Figure 2).

During 1983, the warmest temperatures occurred during late July and late August with a brief cooler period in early August. In contrast, the summer of 1984 began with very warm temperatures in early June followed by a general cooling trend which continued throughout the summer. The survey data for Caledon, in general, seem to follow these trends.

The survey data for the James River site do not appear to follow these temperature trends. Although data collection for the 1985 season is still in progress, the results thus far are consistent with a temperature dependent component to eagle utilization of the Caledon area. With mild temperatures in June of 1985, the number of eagles observed at Caledon was low ( $\bar{x}=15$ ). During the first half of July, with considerably higher temperatures, an average of 31.5 eagles were observed. Note that this figure represents a considerable increase over that observed during the same period in 1983 and 1984 (Figure 2).

This apparent relationship between temperature and utilization of the Caledon area by bald eagles may be related to temperature induced fluctuation in prey abundance. It would appear that a different set of factors are responsible for influencing eagle utilization of the James River site.

Overall utilization of different sections of the census route by bald eagles at Caledon in 1983 (Wallin and Byrd, 1984) and 1984 (Figures 3 and 4) appears similar. At the James River site, utilization of the north side of the river and the southeast section of the census route appeared somewhat higher in 1984 (Figures 5 and 6).

Table 4. Average daily temperature (C<sup>o</sup>). Data collected by the National Weather Service Station at Byrd Field, Richmond, VA

<u>Month</u>	<u>1983</u>	<u>1984</u>
June 1 - 15	22.7	26.3
16 - 30	26.0	24.8
July 1 - 15	26.0	25.3
16 - 31	26.8	23.7
August 1 - 15	24.9	27.0
16 - 31	26.3	23.4

#### RADIO-TELEMETRY STUDIES

No studies were conducted during the reporting period. Twelve days were spent at known concentration areas monitoring for telemetered birds hacked in New Jersey and New York. No birds with radio-packs were located but one bird with a patagial marker was noted at Curles Neck Farm on the James River in November. This proved to be a bird hacked in New Jersey but could not be further identified because of fading of the number on the patagial marker.

#### TELEVISION MONITORING STUDIES

No field activities were conducted under this job.

#### CONTAMINANT ANALYSIS

Two unhatched eggs were collected in 1984. Eggshell thickness and contaminant levels would not appear to have been responsible for the failure of these two eggs.

#### BANDING AND MARKING PROGRAM

In collaboration with the Raptor Information Center, National Wildlife Federation, banding and color marking activities were conducted. All eaglets were banded with Fish and Wildlife Service aluminum bands and white plastic bands with alpha numeric codes. Of 84 young which reached fledging age, 71 (84.5%) were banded. More complete data on banding activities appears in a separate report.

## TRANSLOCATION AND RELOCATION

No eagles were moved into or within the state. One eight-week old eagle was removed from each of three, three-young nests and flown to North Carolina for use in the state's bald eagle reintroduction program. The donor nests were located in King William, Middlesex, and Essex Counties.

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TARGET DATE FOR COMPLETION:

STATUS OF PROGRESS:

SIGNIFICANT DEVIATIONS IN PROGRESS: None

RECOMMENDATIONS:

COST THIS SEGMENT: Federal \_\_\_\_\_ : State \_\_\_\_\_ : Total \_\_\_\_\_

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DATE: August 1, 1985