CHRONOLOGY OF WATERFOWL MIGRATION

Spring 1974

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Bruce Turner

C.W.S. June,1974

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by

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and

Bruce C. Turner

Canadian Wildlife Service

Sackville, New Brunswick

Foreword

Observations at the John Lusby National Wildlife Area and Amherst Point Bird Sanctuary were by M. C. Bateman. Observations at the Tintamarre National Wildlife Area and Coles Island-Ram Pasture-Westcock Salt Marshes were by B. C. Turner. The Shepody National Wildlife Area and the Missaquash Marsh were observed by both Bateman and Turner.

The written report for the John Lusby NWA, Amherst Point Bird Sanctuary and the Shepody NWA is by Bateman (Parts I - III). The report for the Tintamarre NWA, Coles Island-Ram Pasture-Westcock Salt Marshes, and the Missaquash Marsh is by Turner (Parts IV - VI).

CHRONOLOGY OF WATERFOWL MIGRATION

Spring 1974

by

Myrtle C. Bateman

I Amherst Point Bird Sanctuary

II John Lusby National Wildlife Area

III Shepody National Wildlife Area and surrounding coastal areas

June 25, 1974

I Amherst Point Sanctuary

Procedure

Migratory waterfowl on the Amherst Point Sanctuary were observed on 34 days between March 29 and May 31. The area was visited several times weekly during the three weeks before March 29 to determine ice conditions.

Observation periods were in early morning (beginning at 7:00 a.m. local time) or late afternoon (beginning at 3:00 p.m. local time) in order to correspond to times of greatest waterfowl activity.

The method of observation was similar to previous years with the birds being watched from points that could be reached with a minimum of disturbance. Since Impoundment 2 was flooded for the first time in 1974, a somewhat larger area was observed than in previous years.

Results and Discussion

Black Ducks, American Green-winged Teal, Blue-winged Teal and Ring-necked Duck were the most numerous species (Table 1). The increased water area resulting from the flooding of Impoundment 2 caused an increase in the number of some species, notably Blue-winged Teal, using the area.

The number of Black Duck using the sanctuary was generally less than in other years during March and April, but greater during May (Figure 1). Two peaks in Black Duck numbers occurred - during the first week in April and the third week in April. Blacks appeared on

the sanctuary approximately 10 days later than in 1973 due to adverse weather and lack of open water. The migration pattern was otherwise similar to that of 1973.

A high percentage of Black Ducks observed after the first week in April and before mid-May was paired (Table 2).

American Green-winged Teal arrived on the sanctuary a week later than in 1973 and about the same time as in 1971 (Figure 2). They were more numerous than in previous years, with the exception of a short period in 1972. The larger number of birds over a longer period of time and a higher number of pairs (Table 3) indicates an increased nesting population in 1974.

The peak number of Pintails on the sanctuary did not reach the maximum number present in 1973, but high numbers were present over longer periods of time (Figure 3). That may only indicate that cold weather prevented movement during those times. There were two major peaks in Pintail migration - the first week in April, and the last week in April and first week in May. The number of male Pintails present was often greater than the number of females (Table 4).

Ring-necked Duck utilization of Amherst Point Sanctuary was greater in 1974 than in 1973 (Figure 4). The proportion of the ducks that were paired was similar to that in 1973 with many unpaired drakes (Table 5).

The number of American Wigeon using the Sanctuary was greater than in previous recorded years (Figure 5). Four pairs were regularly observed on the area. Single males were common in Impoundment 2 during the last week in May. Two pair were frequently observed in Lake A.

Blue-winged Teal were more numerous in 1974 than in previous years (Figure 6). The number of territorial pairs, three, frequently seen in the lakes was the same as last year. Ten additional pairs were often seen in Impoundment 2, indicating an increase in breeding pairs.

The winter was relatively mild with light snowfall. However, cold weather during March delayed opening of the lakes and impoundments until about a week later than in 1973 (Figures 7-11). The lakes and impoundments were completely ice-free somewhat earlier in 1974 than in 1973 - April 8 compared to April 19.

Large numbers of waterfowl were observed feeding in Impoundment 2 from the time the water was open (April 1) until observations were terminated. Ring-necks were most often observed in Lake A (Figure 7), but also made use of Impoundment 2.

One pair of blacks were frequently observed in each of the two lakes (Lake A and Layton's Lake). A brood of nine was observed in Impoundment 2 on May 21.

Flocks of predominantly male American-Green-winged Teal were most frequently observed in courtship activity (Table 6). Blue-winged Teal and Wigeon were frequently observed in territorial defence during May.

Table 1. The number of each species of waterfowl seen on each observation at Amherst Point Sanctuary - 1974

Date	Mall.	Blk.	A.wig.	Pin.	A.Gwt.	Bwt.	Shov.	Wood	Ring-n.	Scaup	C.Gold.	R-b.Merg.
Mar. 29 pm		19		3								
Apr. 1 am		8		4								
2 pm		23		11	10				2			
3 am		49		16	24				2			
4 pm		60		24	19							
5 am		41		13	15	2			5		1	
8 pm		9		3	7	8			13		2	
9 pm		25		32	30	3			24			
10 am		28		21	15	6			8			
12 pm		5			18				12	2		2
15 am		10		1	8				9	3		2
16 am		29			43	4			6			2
18 am		20	5	4	20	13			2	4		2
19 am		49	6	8	74	15			11	2		
22 pm		35	7	8	77	17			12	3	2	
23 am		10	4	4	47	13			15	3		2
26 am		28	4	36	125	21			24	4		
29 pm		30	6	16	105	13		2	20			
30 am		24	10	19	96	15		1	26			
May 1 pm		8	4	2	95	31			41			
3 pm		9	16	15	72				10			
6 pm	1	25	16	24	130	34			25			
7 am		20	5	15	63	21			18			
10 am		10	6	4	23	13			26			
13 pm		14	4	8	30	18	1		41			
14 am		21	16	9	36	30			37			
17 am		19	7	3	10	13			31			
20 pm		8	11		12	28		2	21			
21 am		22+brd	4	3	3	28			20			
24 am		12+brd	3		1	12			34			
27 pm		8	3	4	12	33			22			
28 am		11	12		2	15			27			
29 pm		9+brd	14	2	4	35		4	32			
30 am		12	10		1	23			17			

Table 1a. Additional waterfowl species observed at Amherst Point Sanctuary - 1974

Species	Total number	Date
Oldsquaw	1	April 2
	1	April 3
White-winged Scoter	1	May 7
Surf Scoter	2	April 26
Common Scoter	1	April 26
	1	April 29
	1	April 30
Great Blue Heron	1	April 22

Table 2. Black Duck - Total number, number of pairs and per cent paired on each observation date at Amherst Point Sanctuary-1974

Date	Total number	Number of pairs	Per cent paired
March 29	19	4	42
April 1	8	0	
2	23	6	52
3	49	10	41
4	60	25	83
5	41	14	68
8	9	3	67
9	25	9	72
10	28	10	71
12	5	2	80
15	10	4	80
16	29	10	69
18	20	9	90
19	49	23	94
22	35	10	57
23	10	3	60
26	28	11	78
29	30	12	80
30	24	10	83
May 1	8	4	100
3	9	4	89
6	25	9	72
7	20	7	70
10	10	4	80
13	14	6	86
14	21	6	57
17	19	5	53
20	8	4	100
21	22+brood	6	54
24	12+brood	3	50
27	8	3	75
28	11	2	36
29	9+brood	2	44
30	12	4	67

Table 3. American Green-winged Teal - Total number, number of pairs, per cent paired, and number of male and female on each observation date at Amherst Point Sanctuary - 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 29					
April 1					
2	10	0		8	2
3	24	1	8	20	4
4	19	3	32	16	3
5	15	?		?	?
8	7	2	57	5	2
9	30	7	47	11+	7+
10	15	2	27	12	3
12	18	8	89	10	8
15	8	4	100	4	4
16	43	0		21+	8+
18	20	4	40	15	5
19	74	19	51	28+	20+
22	77	24	62	52	25
23	47	9	38	22+	14+
26	125	59	94	66	59
29	105	48	91	56	49
30	96	43	90	53	43
May 1	95	40	84	52	43
3	72	23	64	48	24
6	130	33	51	36+	34+
7	63	18	57	27+	18+
10	23	4	35	19	4
13	30	14	93	16	14
14	36	15	83	21	15
17	10	3	60	7	3
20	12	3	50	9	3
21	3	1	67	2	1
24	1	0		1	0
27	12	4	67	8	4
28	2	1	100	1	1
29	4	2	100	2	2
30	1	0		1	0

Table 4. Pintail - Total number, number of pairs, per cent paired, and number of male and female on each observation date at Amherst Point Sanctuary - 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 29	3	0		3	0
April 1	4	1	50	3	1
2	11	4	73	7	4
3	16	3	38	13	3
4	24	5	42	19	5
5	13	5	77	8	5
8	3	1	67	2	1
9	32	7	44	25	7
10	21	5	48	16	5
12					
15	1	0		1	0
16					
18	4	2	100	2	2
19	8	3	75	5	3
22	8	3	75	5	3
23	4	1	50	3	1
26	36	6	33		
29	16	5	62	11	5
30	19	6	63	13	6
May 1	2	1	100	1	1
3	15	4	53	11	4
6	24	8	67	15	9
7	15	4	53	11	4
10	4	0		4	0
13	8	2	50	5	3
14	9	2	44	7	2
17	3	1	67	2	1
20					
21	3	1	67	2	1
24					
27	4	1	50	3	1
28					
29	2	0		2	0
30					

Table 5. Ring-necked Duck - Total number, number of pairs, per cent paired, and number of male and female on each observation date at Amherst Point Sanctuary - 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 29					
April 1					
2	2	0		2	0
3	2	0		2	0
4					
5	5	0		5	0
8	13	0		12	1
9	24	0		20	4
10	8	0		7	1
12	12	2	33	7	5
15	9	1	22	5	4
16	6	0		4	2
18	2	0		2	0
19	11	1	18	9	2
22	12	2	33	9	3
23	15	5	67	10	5
26	24	5	42	17	7
29	20	5	50	14	6
30	31	10	64	20	11
May 1	41	8	39	29	12
3	10	2	40	8	2
6	25	3	16	17	8
7	18	5	55	11	7
10	26	9	69	16	10
13	41	17	83	23	18
14	37	15	81	22	15
17	31	12	77	19	12
20	21	5	48	16	5
21	20	3	30	14	6
24	34	7	41	24	10
27	22	7	64	15	7
28	27	10	74	17	10
29	32	12	75	20	12
30	17	5	59	12	5

Table 6. Observations of waterfowl courtship and territorial behaviour at Amherst Point Sanctuary - Spring 1974

Date	Observation
April 2	Males in a flock of eight male and two female American Green-winged Teal peeping and performing 'head-up-tail-up' display.
April 3	Males of a flock of 14 male and two female American green-winged Teal performing 'head-up-tail-up' display, nodding their heads and darting at other males.
	Two male Ring-necked Ducks 'purring' and nodding their heads. There were no females present.
April 4	Flock of 19 American Green-winged Teal displaying. There were three paired females in the flock.
April 5	Several birds in a flock of ten Black Ducks doing 'head nods', flapping their wings, and darting at others in flock.
April 9	One male American Green-winged Teal landed near three pairs and began to display. Two of the paired males moved away with females following. The other paired male darted at the intruding male and the three flew.
April 10	Male American Green-winged Teal in a group of four male and one female doing 'head-up-tail-up' display etc.
	One female pintail inciting a group of seven males. The males were vigourously doing 'chin lifts' and 'head-up-tail-up' displays.
April 16	Many males of a flock of 21 male and eight female American green-winged Teal displaying.
April 19	Female American Green-winged Teal inciting four males.
April 22	Two male American Green-winged Teal displaying to one female.
April 23	Paired male Ring-neck rushed at male of another pair. The second pair flew.
April 26	Both males of a group of two male and one female Pintail nodding their heads. One male 'turned back of his head' to female.
April 29	Paired male Ring-neck with raised crest rushed at nearby group of males.
	Group of unpaired male American green-winged Teal displaying.

Table 6. continued

Date	Observation
April 30	Male Wigeon landed near a pair and one male. Paired male immediately flapped his wings and rushed open-beaked at the intruding male. Both single males stood on tails and flapped their wings. One single male swam up beside female and began preening behind wing. Paired male fluffed his feathers, flapped his wings and rushed at the single male with wings raised slightly. The single male swam away. The pair moved away and began feeding.
	One male of two pair of Blue-winged Teal flew at female of the other pair. The female swam into a stand of Typha. The male dipped his bill and bobbed his head to remaining female. The other male swam passively nearby. Displaying male swam up to passive male and nipped at his tail feathers causing this male to fly. Remaining female stretched her neck toward the remaining male.
May 3	One male American Green-winged Teal in a group of two males and one female displaying. The other male rushed at him and appeared to pull his wing feathers.
May 6	Male of one pair of American Green-winged Teal nodding his head and splashing.
	Males of a group of five males and one female Pintail doing head-up-tail-up display, diving, and splashing.
May 7	Two male and one female Blue-winged Teal landed. One male rushed at female and grabbed her back feathers. This male swam away about 15 feet when the other male flew at him. Remaining pair nodded their heads in unison then both began to preen.
	One bird of two pair of Black Ducksaggressively rushing at other three birds.
May 10	Male Blue-winged Teal swam near a pair and was chased away by paired male.
May 13	Female Ring-neck in a group of six males and one female inciting males. One belligerent male rushed at several other males with beak open.
May 14	Female of pair of Wigeon nodding her head and dipping her bill in water. Both birds had wings partly raised. A single male bird sat on each side of the pair. Paired male rushed at one single male with beak open. Single male swam away but moved back. Paired male rushed at the other single male. Female rushed at one of the single males with beak open. The pair moved off and began to preen.

Table 6. continued

Date	Observation
May 14	Male Black Duck landed in water in front of female sitting preening on Typha. Male swam back and forth dipping bill in water. Female flew and male followed. The pair circled the lake and landed near the spot they had left. Male continued dipping his bill in water. Both flew away.
May 17	Pair of Blue-winged -Teal nodding their heads in unison. Male of pair rushed at a single male feeding nearby.
	Male of a pair of Wigeon flew over and landed by the female of a pair swimming toward them. The three birds flew with the intruding male leading and the defending male close to the intruding female. The defending male then returned to his mate.
May 20	Single male Blue-winged Teal displaying to female of a pair. Male of the pair flew at him with neck outstretched. Single male flew over and displayed to female of another pair. That female flew with both males (her mate and the single male) behind her.
May 21	Male of a pair of Blue-winged Teal flew at intruding single male.
	One pair of Wigeon landed near another pair which were feeding. Male of the feeding pair swam toward intruding pair with neck outstretched and wings lifted.
May 27	Three male American Green-winged Teal landed close to a pair. One male swam up to paired male and thrust his bill at him. Paired male stretched his neck toward intruding male and flapped his wings. The three single males swam away.

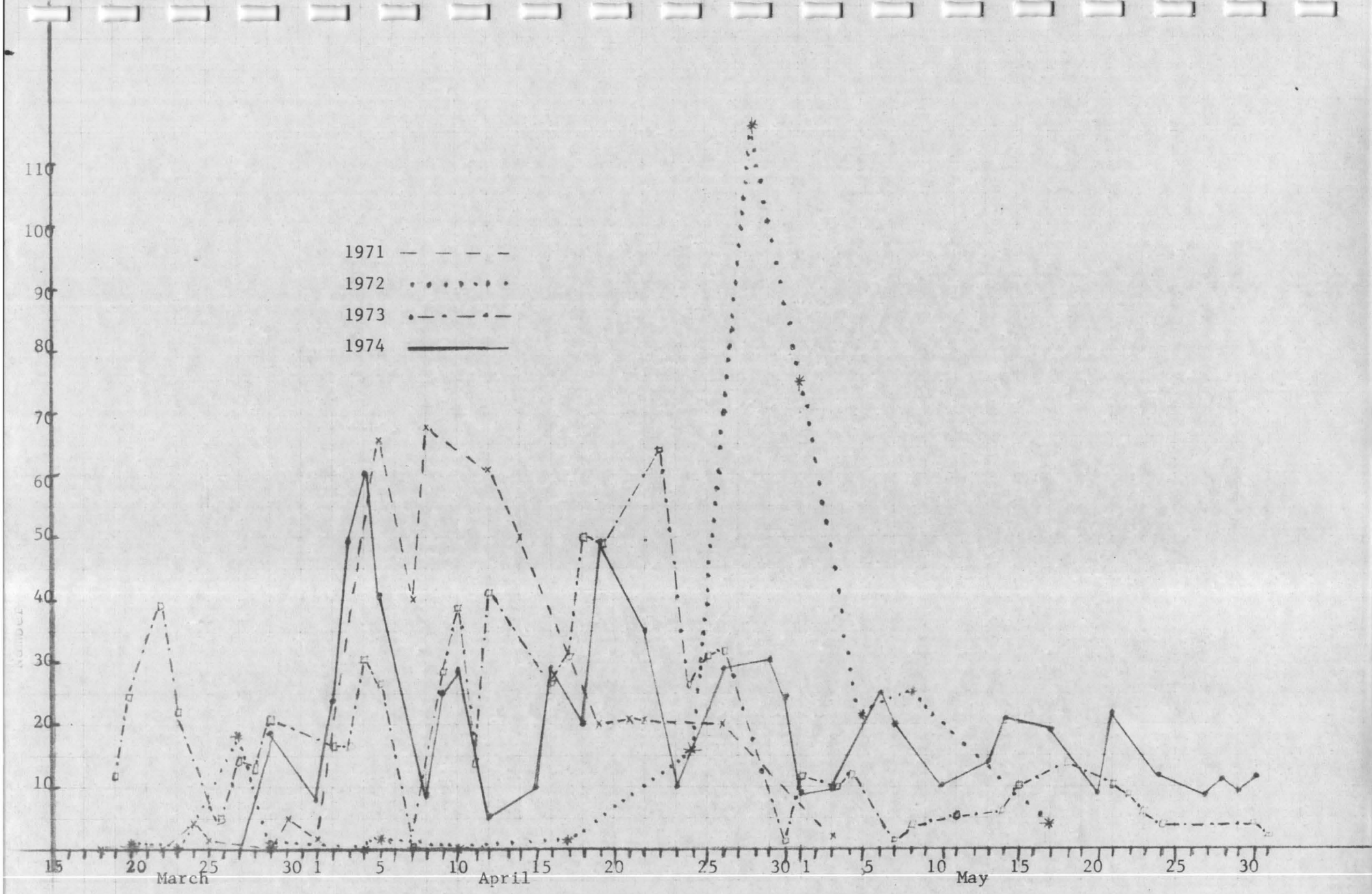

Figure 1. Black duck numbers at Amherst Point Sanctuary, 1971, 1972, 1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis (1972); and for 1973, from Bateman and McLennan (1973).

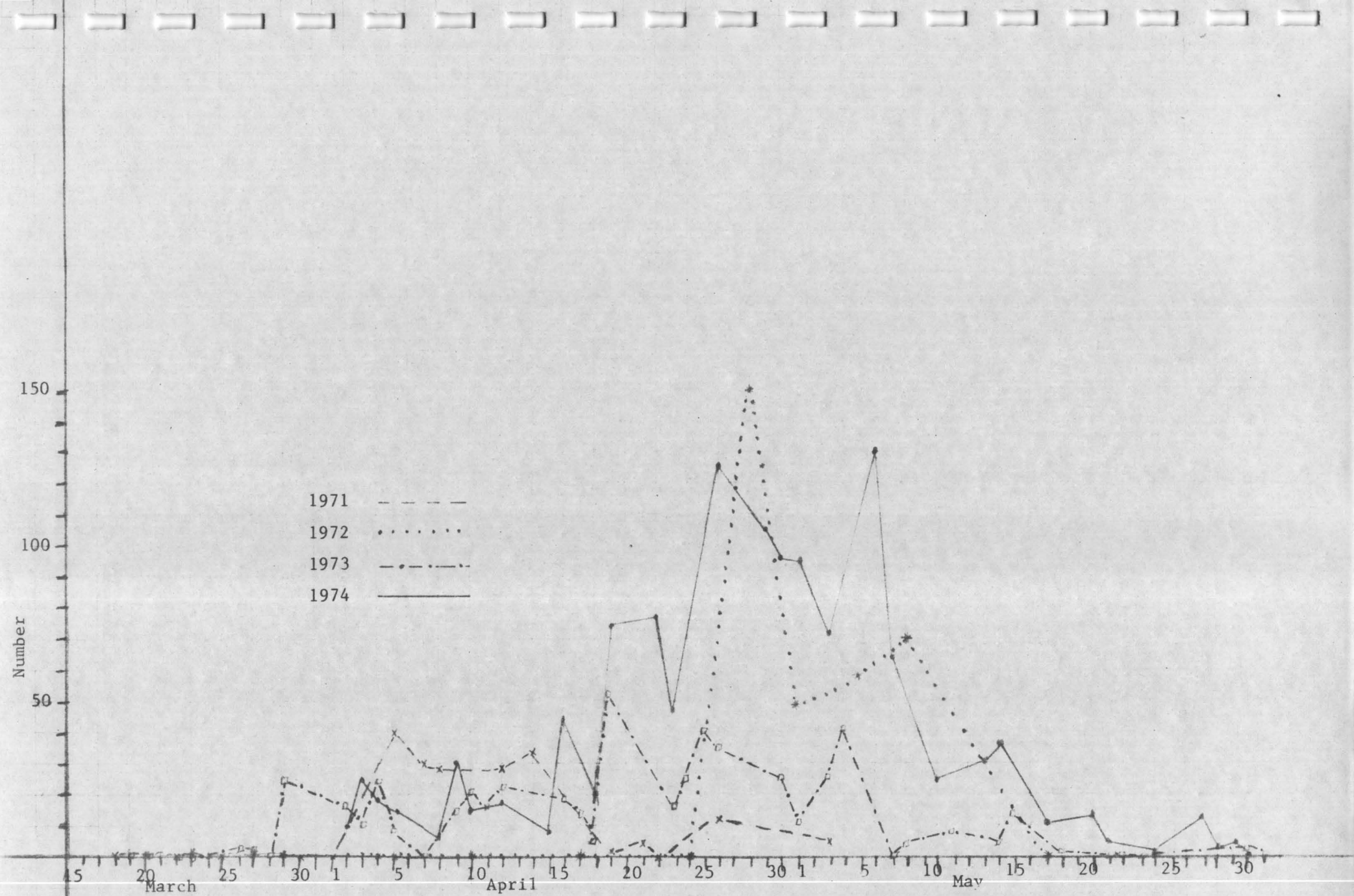

Figure 2. American green-winged teal numbers at Amherst Point Sanctuary, 1971, 1972, 1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis 1972); and for 1973, from Bateman and McLennan (1973).

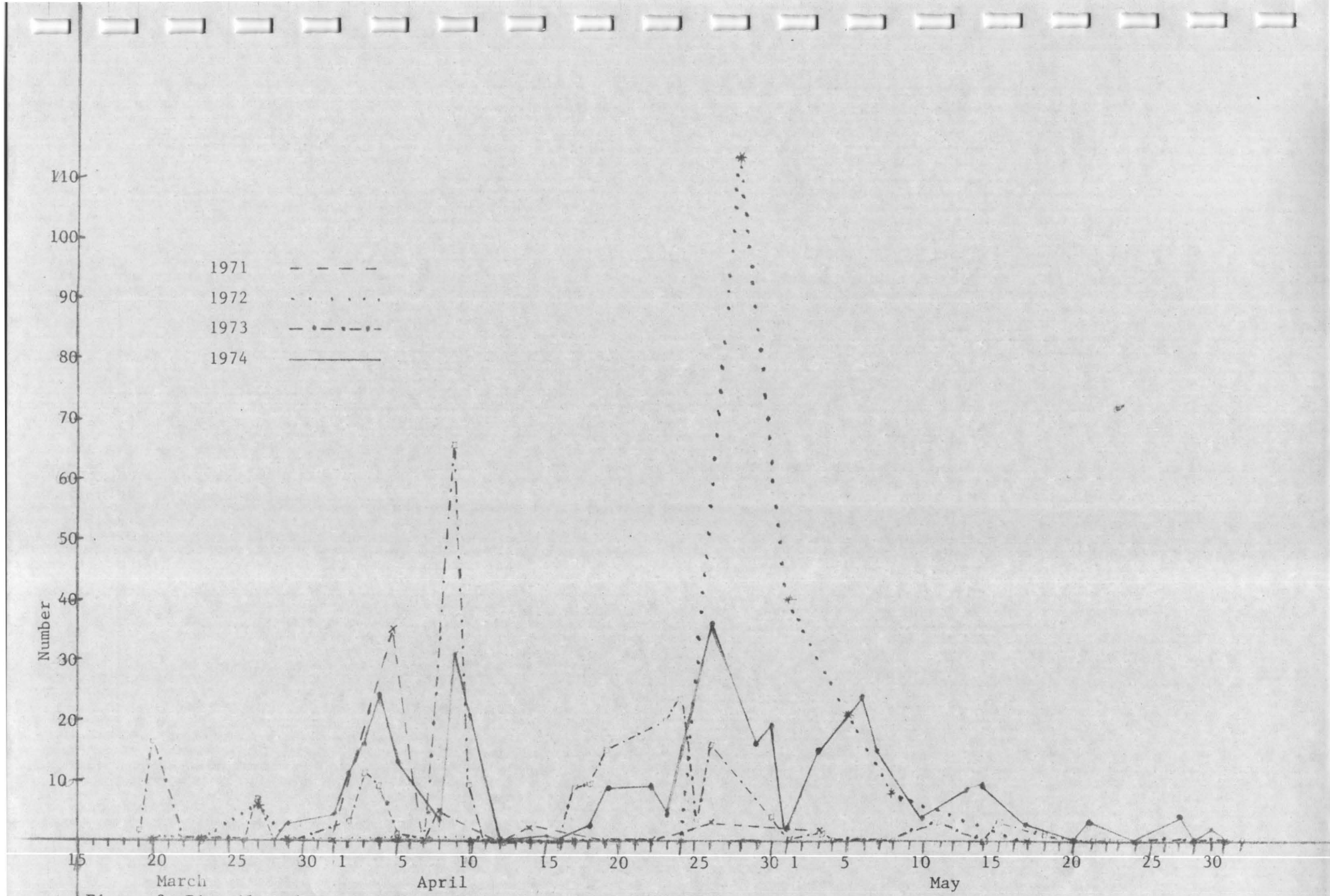

Figure 3. Pintail numbers at Amherst Point Sanctuary, 1971,1972, and 1973.
The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis (1972); and for 1973, from Bateman and McLennan (1973).

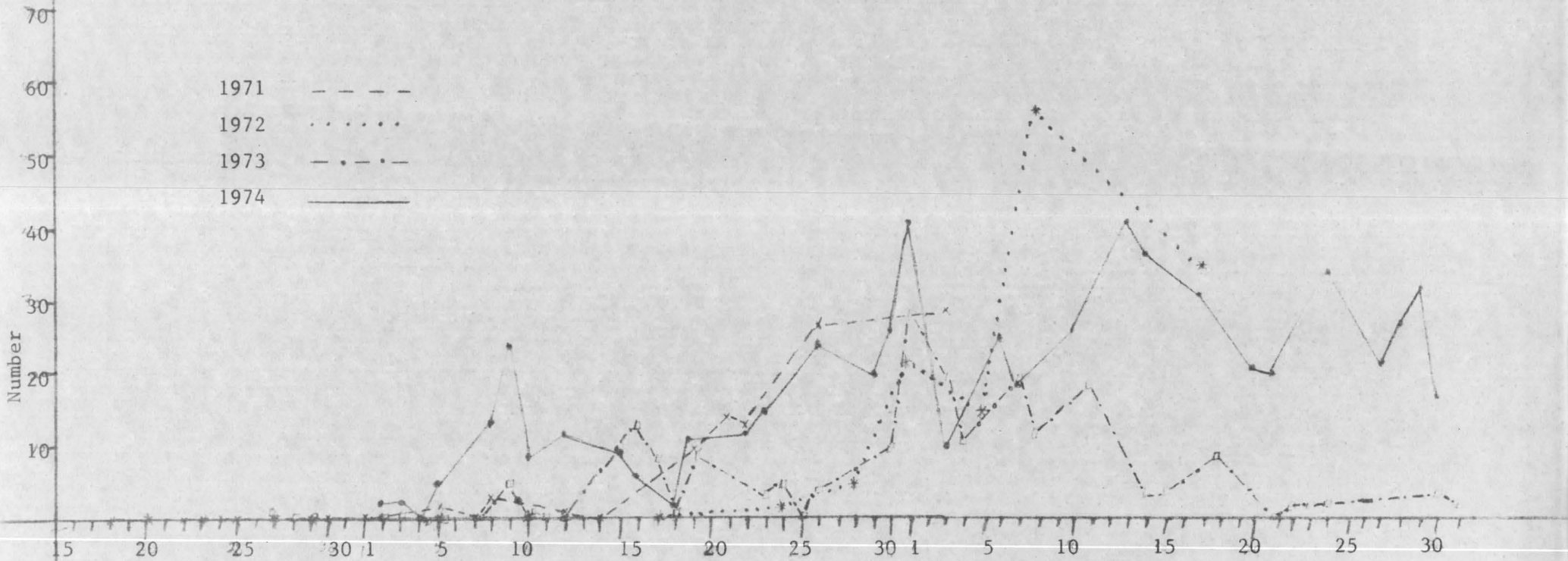

Figure 4. Ring-necked duck numbers at Amherst Point Sanctuary, 1971, 1972, 1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis (1972); and for 1973, from Bateman and McLennan (1973).

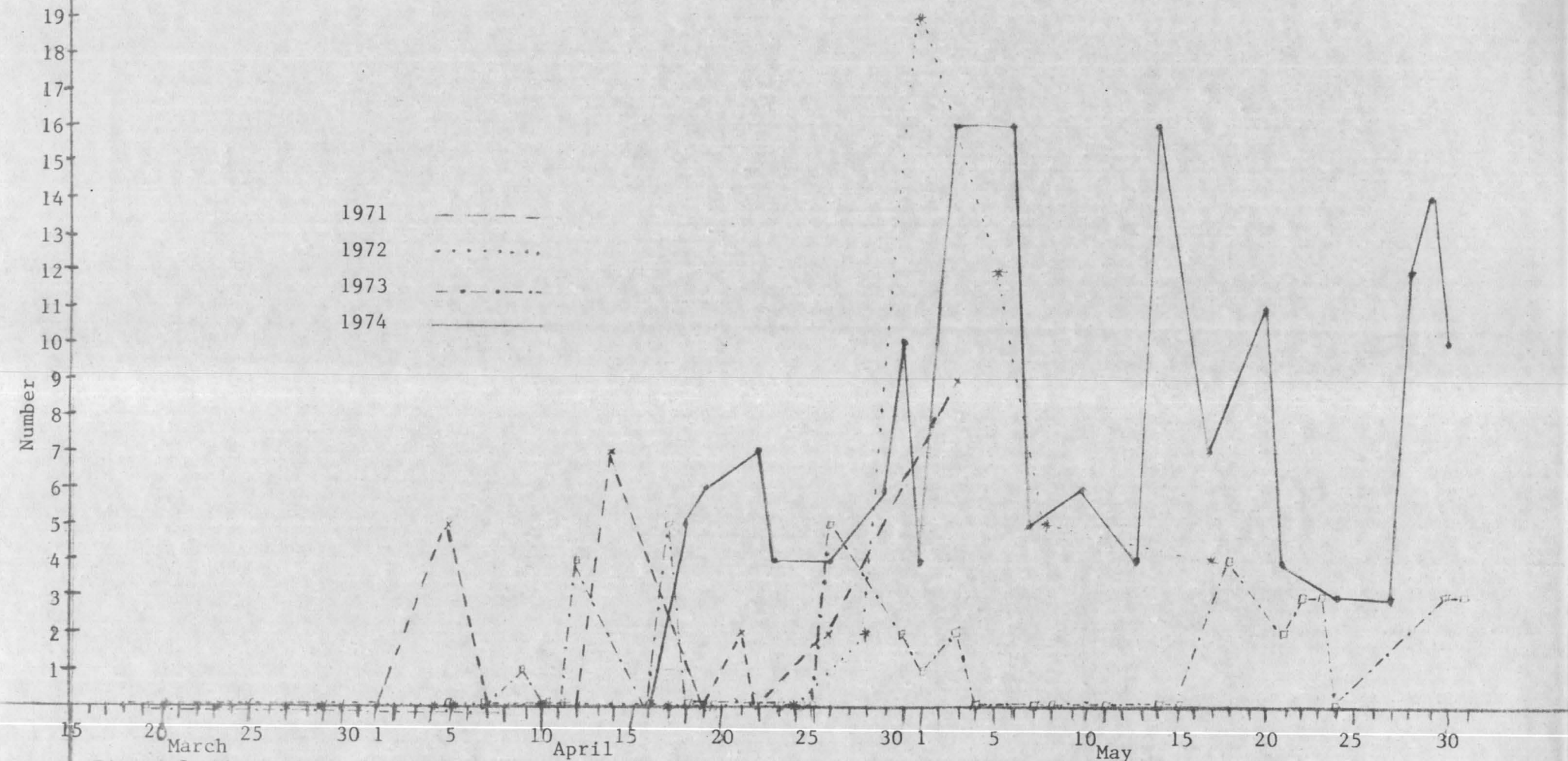

Figure 5. The number of American wigeon at the Amherst Point Sanctuary, 1971, 1972, 1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis (1972); and for 1973, from Bateman and McLennan (1973).

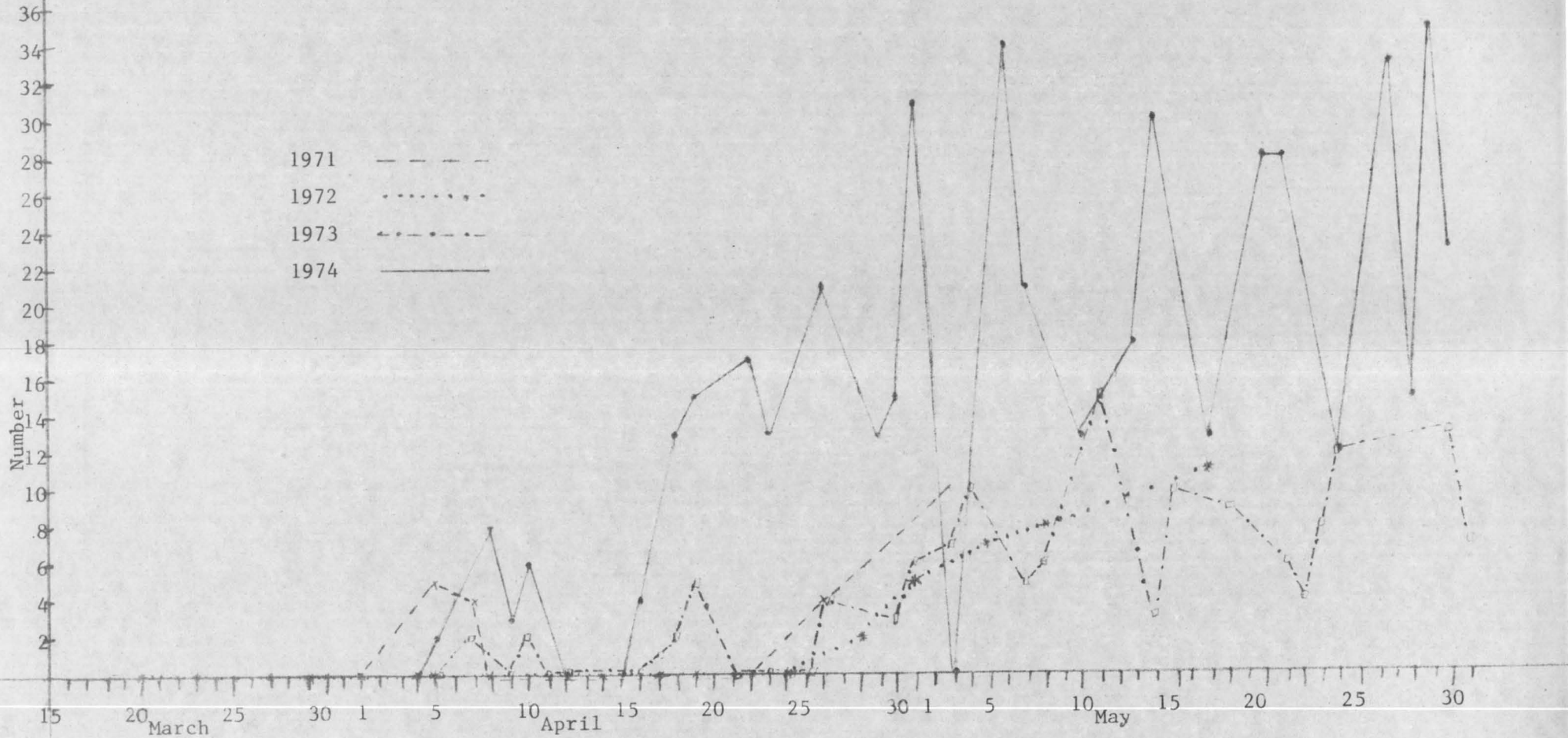

Figure 6. The number of blue-winged teal at the Amherst Point Sanctuary, 1971, 1972, 1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and MacInnis (1972); and for 1973, from Bateman and McLennan (1973).

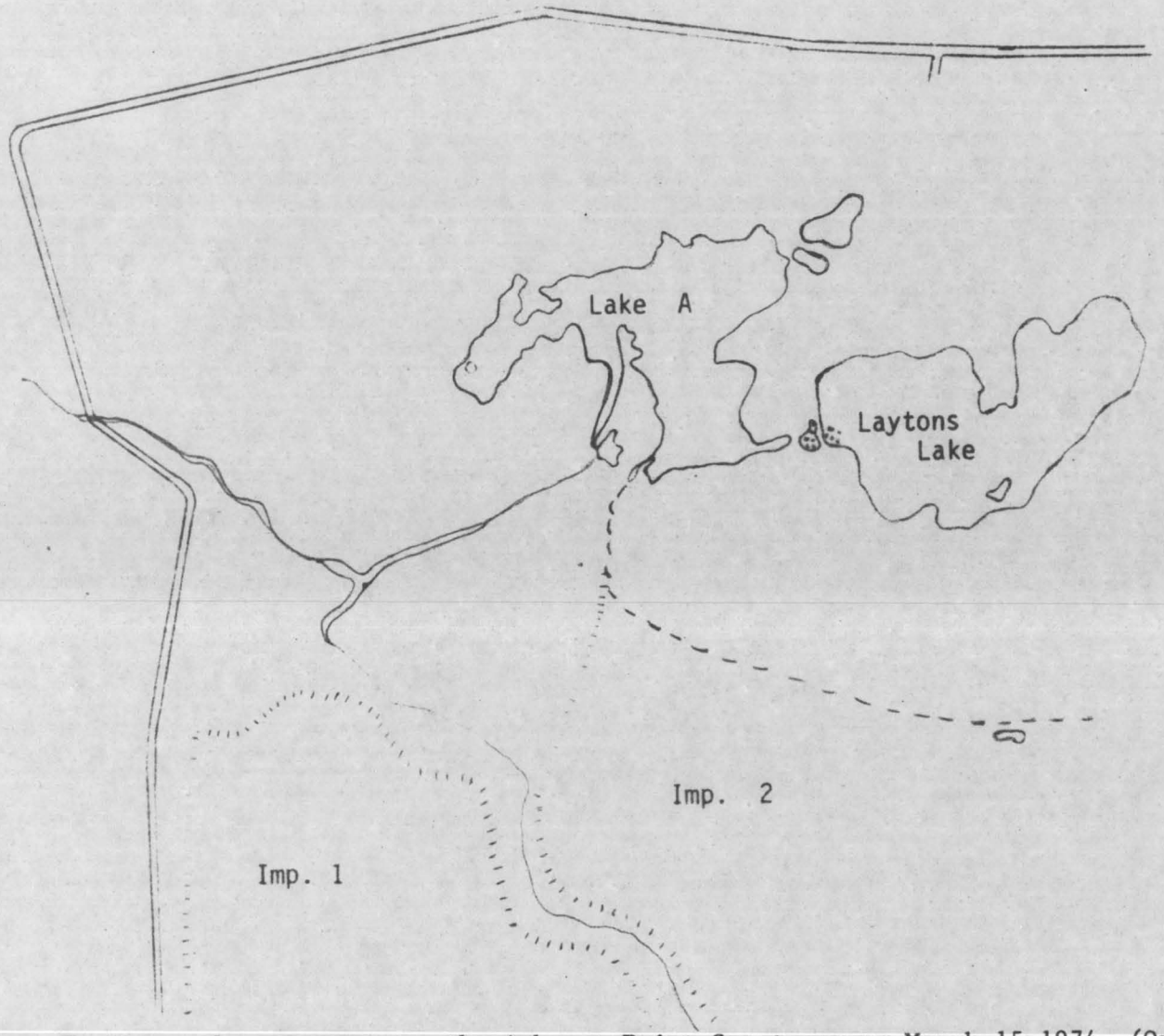

Figure 7. Areas of open water on the Amherst Point Sanctuary on March 15,1974. (Open areas are shaded).

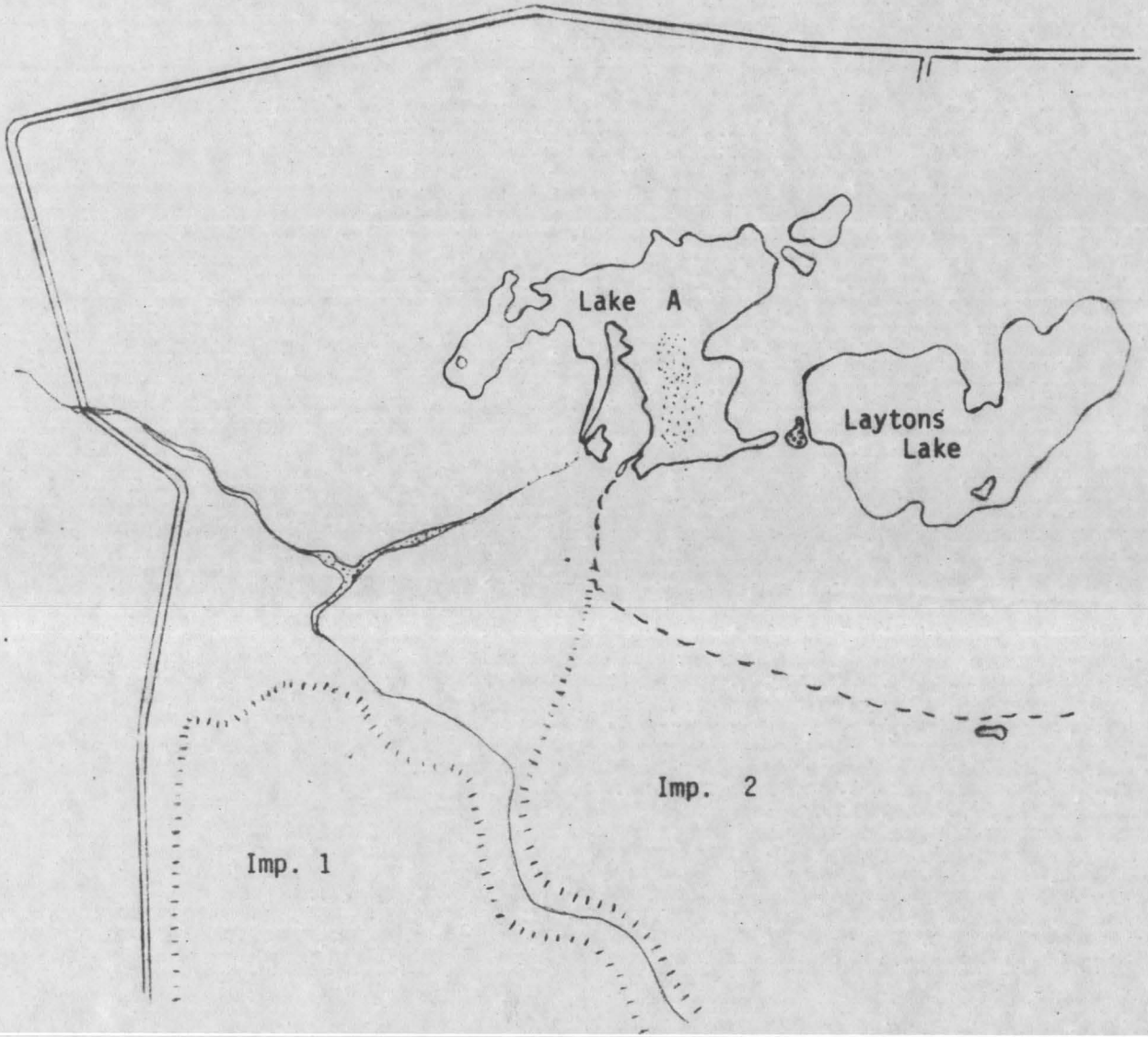

Figure 8. Areas of open water on the Amherst Point Sanctuary on March 25,1974. (Open areas are shaded).

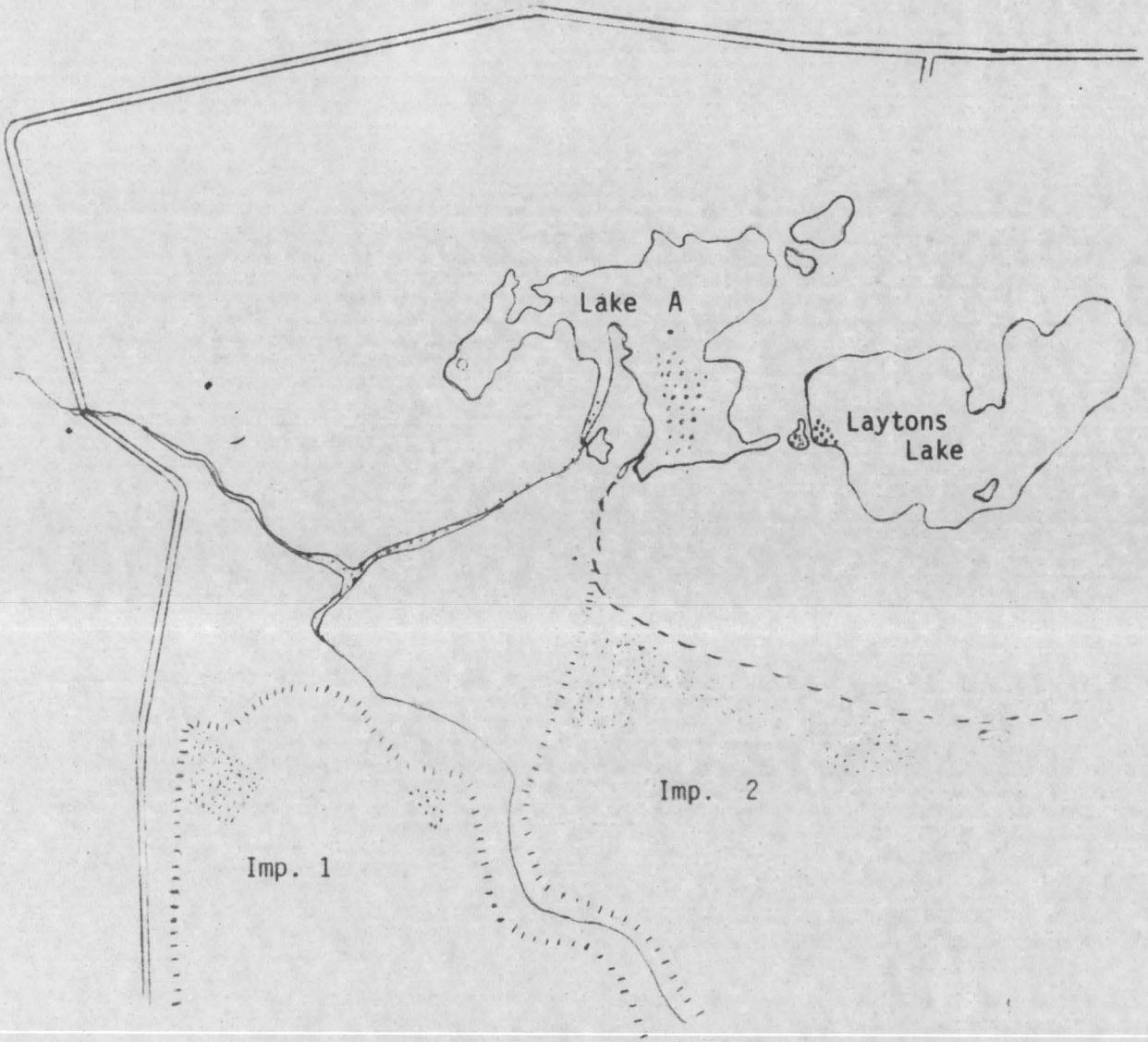

Figure 9. Areas of open water on the Amherst Point Sanctuary on April 1,1974. (Open areas are shaded).

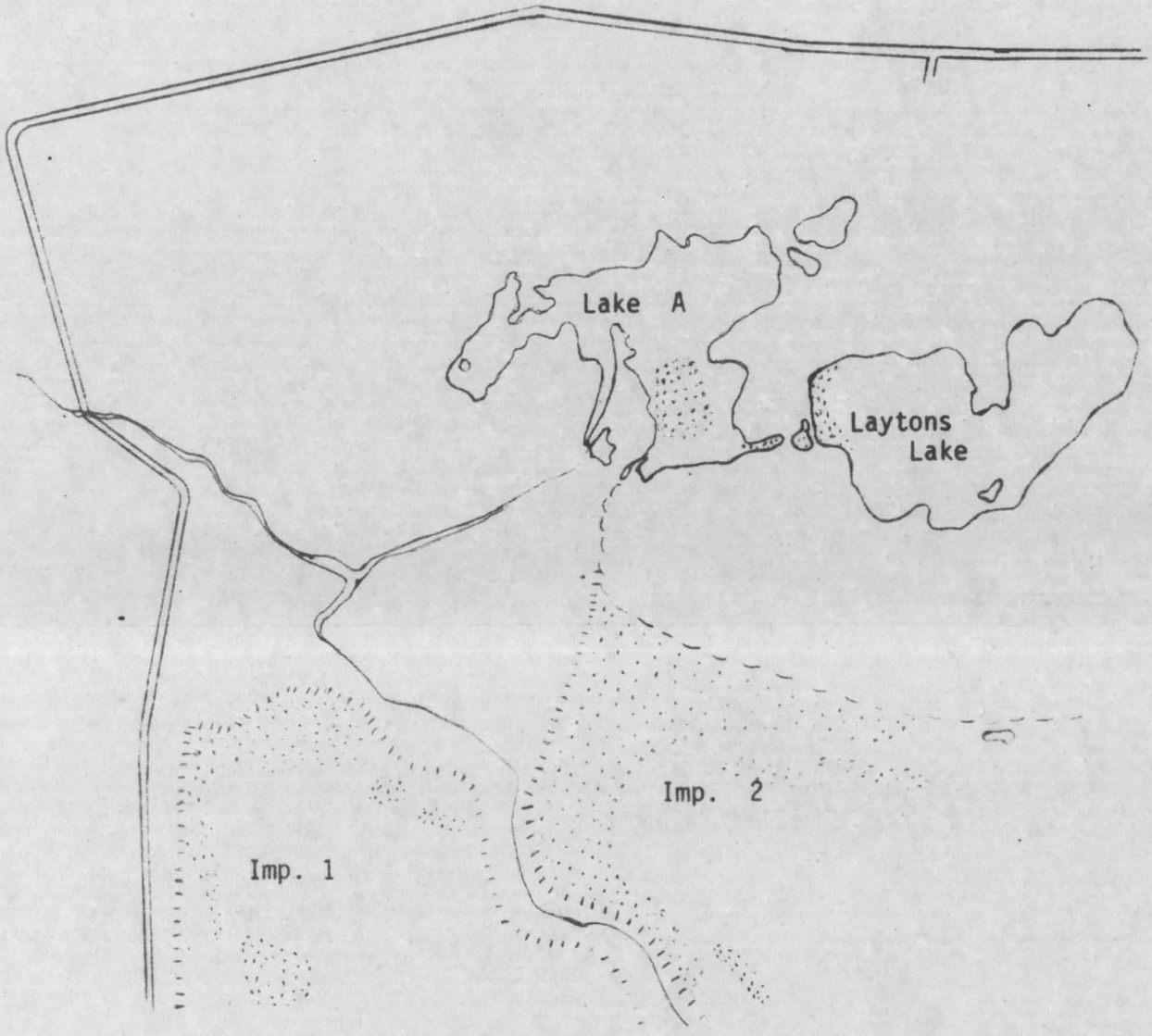

Figure 10. Areas of open water on the Amherst Point Sanctuary on April 3,1974. (Open areas are shaded).

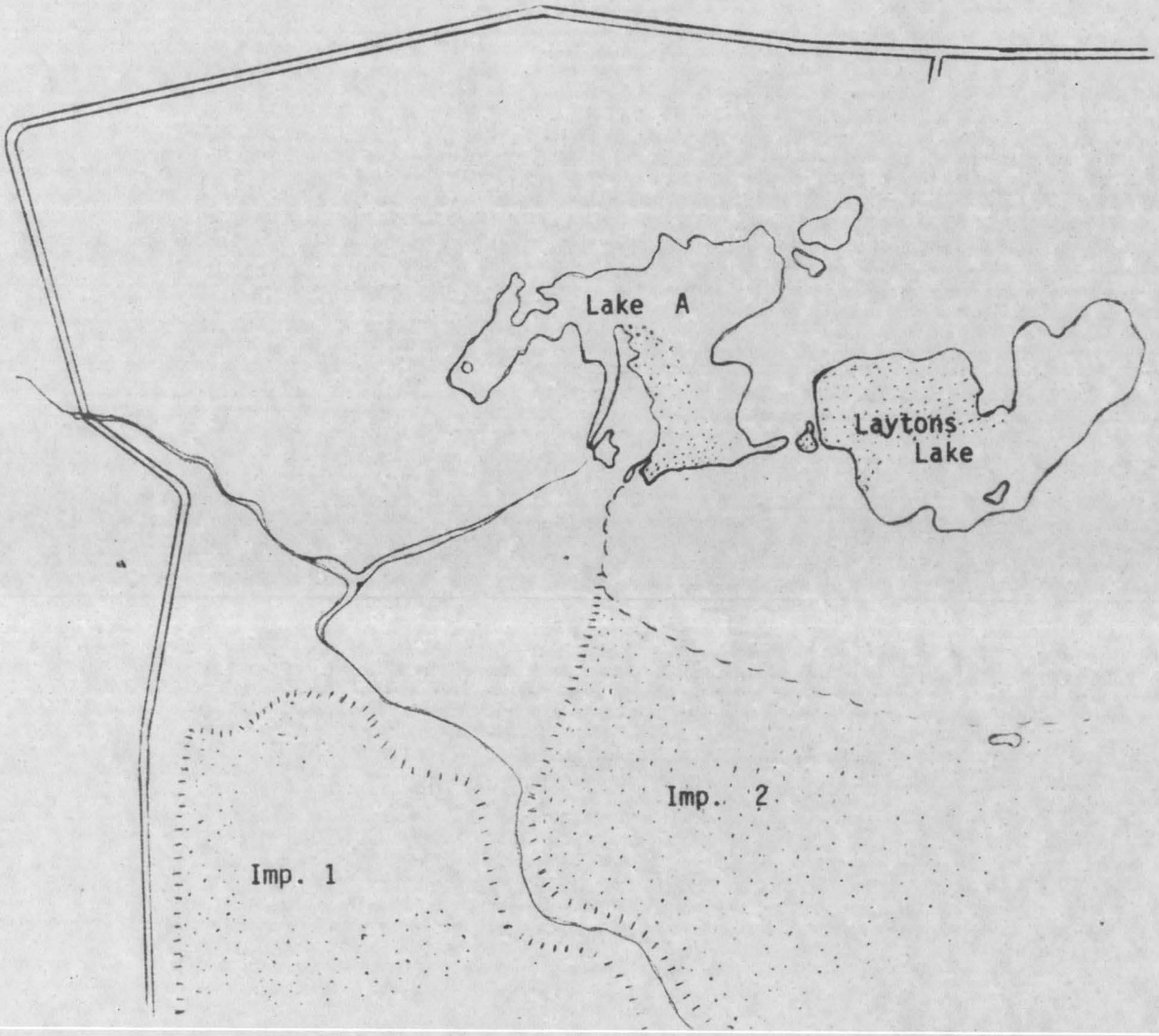

Figure 11. Areas of open water on the Amherst Point Sanctuary on April 5, 1974. (Open areas are shaded).

II - John Lusby National Wildlife Area

Procedure

Migratory waterfowl on the John Lusby National Wildlife Area were observed on 55 days between March 6, when Canada Geese first appeared, and May 31, when the observations were terminated. The observations were made in the same way as in 1973, primarily from three observation points (Figure 1). Morning observations began at approximately 7:00 a.m. local time, and afternoon observations at 3:00 p.m. local time.

Results and Discussion

Canada Geese arrived earlier than usual in 1974, the first flock of 100 - 200 appearing on March 6 (Figure 2). There was no snow and only small areas of ice remaining on the salt marsh at that time. Twenty-four hours of high south-west wind and showers preceded the arrival of the geese.

No waterfowl were observed on the area during four cold days March 11 to 15. After March 15, the number of Canada Geese built up to the first major peak of 1,889 birds on March 26 (Table 1). Despite their early arrival, the greatest number of geese observed was not until April 8 - some 3,800 birds. That was more than the number observed at any one time on the area in the last three years, although 4,400 were recorded in 1970. The date of maximum number is approximately 10 days later than 1973, and two weeks later than in 1971, probably due to unseasonably cold weather.

A small area of open water was present in Amherst Point Impoundment #1 (Figure 1) on March 25, but the first birds were recorded feeding there on April 4. By April 8 both impoundments on the area were ice-free. The water level in the John Lusby Impoundment A was raised for the first time in 1974. That impoundment was used as a feeding and loafing area more than in 1973. The water area west of the impoundment was again widely used by American Green-winged Teal, Black Ducks and Pintails. A pair of American Wigeon were frequently seen in the John Lusby Impoundment A during May.

The number of Black Ducks on the area did not reach the maximum numbers recorded in 1973 (Figure 3) or other years. There was, however, a high number of blacks present during the entire month of April. A relatively large number of blacks was present after mid-May. Many of those birds were probably males as shown by the decrease in per cent of birds paired (Table 2). The increase in number was greater than at that time in previous years.

There was often a large flock of blacks observed feeding in Amherst Point #1 Impoundment, and on several occasions in John Lusby Impoundment A.

The maximum number of American Green-winged Teal was observed on April 22, compared to April 25 in 1973 (Figure 4). Although the maximum number (345) observed in 1974 was greater than in 1973, there were often fewer green-wings on the marsh in 1974.

An excess of unpaired males was commonly present on the area (Table 3). From April 18 to 25, a large number of pairs of green-wings were observed feeding in Amherst Point Impoundment #1 and loafing on the dike.

Pintail, as well as Canada Geese and Black Duck were later reaching their peak number on the area in 1974 than in 1973 (Figure 5). Between mid-April and mid-May the number of Pintail present was generally greater than in the same time period in 1973. A large part of the first Pintail to arrive were males, and an excess of males was present throughout the study period (Table 4). A relatively large per cent of the birds were paired during April.

Red-breasted Merganser were not accurately counted on the area before 1973. The numbers present in 1974 were comparable to those in 1973 (Figure 6). The major peak in number of birds occurred the last week in April. There were fewer merganser present during May in 1974 than in 1973. As in 1973, many of the merganser observed on the John Lusby National Wildlife Area were in Amherst Point #1 Impoundment.

Black Duck were first observed displaying on March 22 (Table 5). Green-winged Teal and Red-breasted Merganser were the species most frequently seen displaying.

An unusually large buildup of some species of waterfowl during April may have been caused by unseasonably cold weather. A summary of daily weather conditions from March 10 to May 31 is included in Appendix I.

Ring-necked Duck were again observed in Amherst Point Impoundment #1, but in fewer numbers than in 1973. Wigeon also were observed in fewer numbers than in 1973. The presence of eleven Snow Geese on the area from April 15 to 19 was unusual.

Table 1. The number of each species of waterfowl seen on each observation at the John Lusby National Wildlife Area - 1974. am indicates a morning observation, pm, an afternoon observation; neither designation indicates a mid-day observation.

Date	Canada Goose	Snow Goose	Mall.	Blk.	Wig.	Pin.	Gwt.	Bwt.	Shov.	Ring.	C.Gold.	Eider	C.Merg.	R-b.Merg.
March 6	100-200													
7	122			87		3								
8	128			47		17							3	
11														
13													4	
15	160													
18	618			27		12								
19*	511			5										
20	306			24	1	10								
21	804			5										
22	756			2		9								
25	1,532	1		87		11								
26	1,889			147		28	3							
27	1,399			11		6								
28	706			4		6								
29	840													
April 1 am	1,558			115		9								
2 pm	1,150			107		20								
3 am	1,570		2	122		20	6							
4 pm	2,155			23		4								5
5**am				27		11	12							
8 pm	3,810			108		2				2	2			7
9 am	2,750			178	2	46	64							7
10 am	1,256			112		15	41							10
11 pm	3,305			34	7	6	28							49
13 am	1,309		1	196	11	23	60				21	1		2

* Aerial survey

** Visibility poor due to fog

Table 1. continued

Date	Canada Goose	Snow Goose	Mall.	Blk.	Wig.	Pin.	Gwt.	Bwt.	Shov.	Ring.	C.Gold.	Eider	C.Merg.	R-b.Merg.
April 15 am	1,770	11		70	11	18	14					1		37
16 am	1,699	11		62	12	18	11	4				1		26
18 am	1,542	11		174	6	21	53			7	3			51
19 pm	996	11		148	4	57	58	8		6				6
20 am	640		2	226	4	79	145			2				64
22 pm	535		2	139	2	58	345		1	2				7
23 pm	735			115	3	53	88	4		3				2
25 am	989			96	4	40	60	2	1					156
26 pm	572			101	2	32	16			14				153
27 am	1,110		1	149	12	24	130		1	5			1	130
29 am	566		1	112	5	71	107	1	1				2	135
30 pm	895			55	5	34	19		1					50
May 1 am	380			34	2	9	57							68
4	626			15		2	15	2						
6 am	709		1	68	2	35	60	4	3	2				30
7 pm	416			52	3	19	29	2		4				18
10 pm	159			21	2	16	40	2	1					18
11 am	300			40	1	20	42	1		2				42
13 am	200		1	37	2	13	64							44
15 pm	111			33		2	4			2				28
17 am	10			104	9	3	8	3	2	2				31
18 am	13			103		3	11	3	1	2				6
20 am	25			66	2	1	4	4		3				12
24 pm				52	3	4	5	7	2					1
25 am	12			77	2	8	5	3	2					2
27 pm				32		7	8	10						2
28 pm				1		2								13
29 am				10	2	5	1							3
31 am				33		9	3							13

1 Gadwall seen on May 6.

Table 2. Black Duck - Total number, number of pairs and per cent paired on each observation date on the John Lusby NWA-1974

Date		Total number	Number of Pairs	Per cent paired
March	6			
	7	87	0	
	8	47	0	
	11			
	13			
	15			
	18	27	0	
	19	5	0	
	20	24	0	
	21	5	1	40
	22	2	1	100
	25	87	12	28
	26	147	2	3
	27	11	2	36
	28	4	0	
	29			
April	1	115	7	12
	2	107	27	50
	3	122	28	46
	4	23	11	96
	5	27	5	37
	8	108	12	22
	9	178	35	39
	10	112	30	54
	11	34	10	59
	13	196	40	41
	15	70	6	17
	16	62	17	55
	18	174	41	47
	19	148	35	47
	20	226	33	29
	22	139	19	27
	23	115	28	49
	25	96	38	79
	26	101	17	34
	27	149	28	38
	29	112	51	91
	30	55	15	54
May	1	34	7	41
	4	15	6	80
	6	68	9	26
	7	52	21	81
	10	21	2	19
	11	40	17	85
	13	37	6	32
	15	33	8	48
	17	104	6	12
	18	103	7	14
	20	66	8	24
	24	52	2	8
	25	77	2	5
	27	32	1	6

Table 3. American Green-winged Teal - Total number, number of pairs, per cent paired, and number of male and female on each observation date on the John Lusby NWA - 1974

Date		Total number	Number of pairs	Per cent paired	Number males	Number females
March	26	3	0		3	
	27					
	28					
	29					
April	1					
	2					
	3	6	0		6	
	4					
	5	12	0		10	2
	8					
	9	64	9	28	50	14
	10	41	2	10	9+	2+
	11	28	3	21	16+	6+
	13	60	10	33	40	20
	15	14	3	43	11	3
	16	11	3	54	7	4
	18	53	19	72	33	20
	19	58	14	48	33	25
	20	145	32	44	33+	32+
	22	345	25	14	55+	30+
	23	88	28	64	32+	29+
	25	60	21	70	37	23
	26	16	7	88	9	7
	27	130	52	80	68	54
	29	107	42	78	64	43
	30	19	9	95	9	10
May	1	57	28	98	28	29
	4	15	0			
	6	60	25	83	35	25
	7	29	13	90	16	13
	10	40	2	10	8+	2+
	11	42	15	71	22+	15+
	13	64	4	12	10+	4+
	15	4	2	100	2	2
	17	8	4	100	4	4
	18	11	4	73	7	4
	20	4	2	100	2	2
	24	5	1	40	4	1
	25	5	1	40	4	1
	27	8	3	75	5	3

Table 4. Pintail - Total number, number of pairs, per cent paired and number of male and female on each observation date on the John Lusby NWA - 1974

Date		Total number	Number of pairs	Per cent paired	Number males	Number females
March	7	3	0		2	1
	8	17	0		13	4
	11					
	13					
	15					
	18	12	0		12	
	19					
	20	10	0		8	2
	21					
	22	9	0		8	1
	25	11	0		10	1
	26	28	0		26	2
	27	6	1	33	3+	1+
	28	6	0		6	0
	29					
April	1	9	0		8	1
	2	20	2	20	17	3
	3	20	2	20	18	2
	4	4	0		4	0
	5	11	1	18	10	1
	8	2	1	100	1	1
	9	46	18	78	28	18
	10	15	5	67	10	5
	11	6	1	33	5	1
	13	23	5	43	17	6
	15	18	4	44	14	4
	16	18	4	44	14	4
	18	21	5	48	16	5
	19	57	13	46	40	17
	20	79	14	35	59	20
	22	58	14	48	43	15
	23	53	14	53	33	15
	25	40	10	50	30	10
	26	32	8	50	24	8
	27	24	7	58	17	7
	29	71	22	62	49	22
	30	34	4	24	28	6
May	1	9	2	44	7	2
	4	2	1	100	1	1
	6	35	12	68	23	12
	7	19	5	53	14	5
	10	16	2	25	14	2
	11	20	3	30	17	3
	13	13	2	31	11	2
	15	2	1	100	1	1
	17	3	0		3	0
	18	3	0		3	0
	20	1	0		1	
	24	4	0		4	0
	25	8	2	50	6	2
	27	7	1	28	6	1

Table 5. Observations of waterfowl courtship and territorial behaviour at John Lusby National Wildlife Area - Spring 1974

Date	Observation
March 22	One of a pair of Black Duck in the creek swimming around the other duck in rapid circles with head stretched low over the water.
April 3	Many birds of a total of 66 blacks in creek were nod-swimming and aggressively flapping their wings.
April 8	Many birds in a flock of 18 Black Ducks in creek flapping wings and chasing others.
	Seven male Red-breasted Merganser doing 'knicks' display.
April 9	Male of a pair of Common Goldeneye doing 'head-throws' and lateral 'head-turning'.
April 10	Males of flock of 49 Red-breasted Merganser doing 'knicks' display.
April 13	Three male Pintail displaying to one female. Displays included 'burping', 'head-up-tail-up', and nod-swimming.
	Males in a flock of twenty male and eight female American Green-winged Teal doing 'head-up-tail-up' display and 'head nods'.
	One male Common Goldeneye continuously rushing at the only other male in a group of 10 birds.
April 18	Two male American Green-winged Teal in a group of three males and one female displaying. The other male darted at the displaying males causing one to swim away. The other displaying male was chased back and forth several times, then he flew away. The remaining male rested on the dike beside the female.
	Several Black Ducks in a group of 38 doing 'head nods' and flapping their wings.
April 19	Males in a flock of nine female and nine male American Green-winged Teal doing 'head-up-tail-up' display and head nods. Some females inciting.
	Five male Red-breasted Merganser doing 'knicks' display. There was one female present.
April 20	Female Pintail inciting seven males. Males doing 'head-up-tail-up' display.
April 23	Female Pintail 'chin-lifting'. Two males displaying.

Table 5. continued

Date	Observation
April 25	Sixteen male American Green-winged Teal doing 'head-nods' and 'head-up-tail-up' display. There were two females in the flock.
April 27	A flock of ten male and one female American Green-winged Teal displaying. Males doing 'head-up-tail-up' display and rushing each other.
April 29	Male American Green-winged Teal in a group of 15 male and one female were doing 'head-up-tail-up' display, head nods, etc.
	Six male Pintail displaying to one female resting on impoundment dike.
April 30	Three of a group of ten Blacks 'nod-swimming', flapping wings, and darting at other birds with neck outstretched.
	Five male Pintails displaying to one female. Female snapped her beak at any male too near her.
May 6	Three male American Green-winged Teal displaying to one female sitting on dike of impoundment. Female got up and followed one of the males away.
May 7	Four unpaired male Pintails displaying to female of a nearby pair. One unpaired male and the paired male circled each other in a tight circle with necks stiff and toward the centre of the circle.
May 10	Seven male Pintail displaying near one pair. The male of the pair led the female away.
May 17	Single male Blue-winged Teal flew over a pair. The paired male jumped off the water but settled down whistling and pumping his head.
May 24	A single male American Wigeon swam close to a pair while dipping his bill in the water. The male of the pair swam toward him with bill wide and wings high. The paired male followed the single male to the opposite side of the impoundment before returning to his mate.

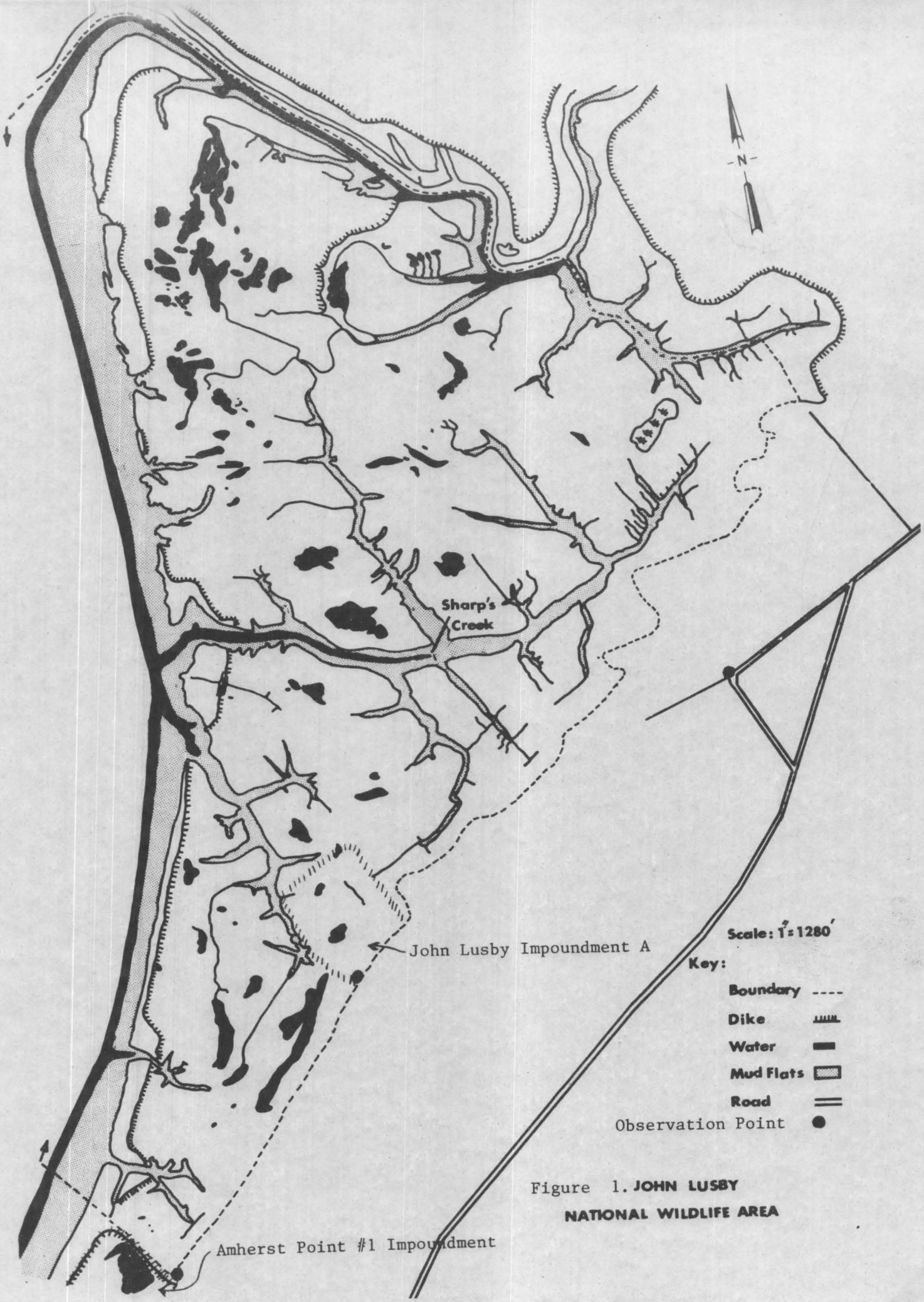

Figure 1. **JOHN LUSBY NATIONAL WILDLIFE AREA**

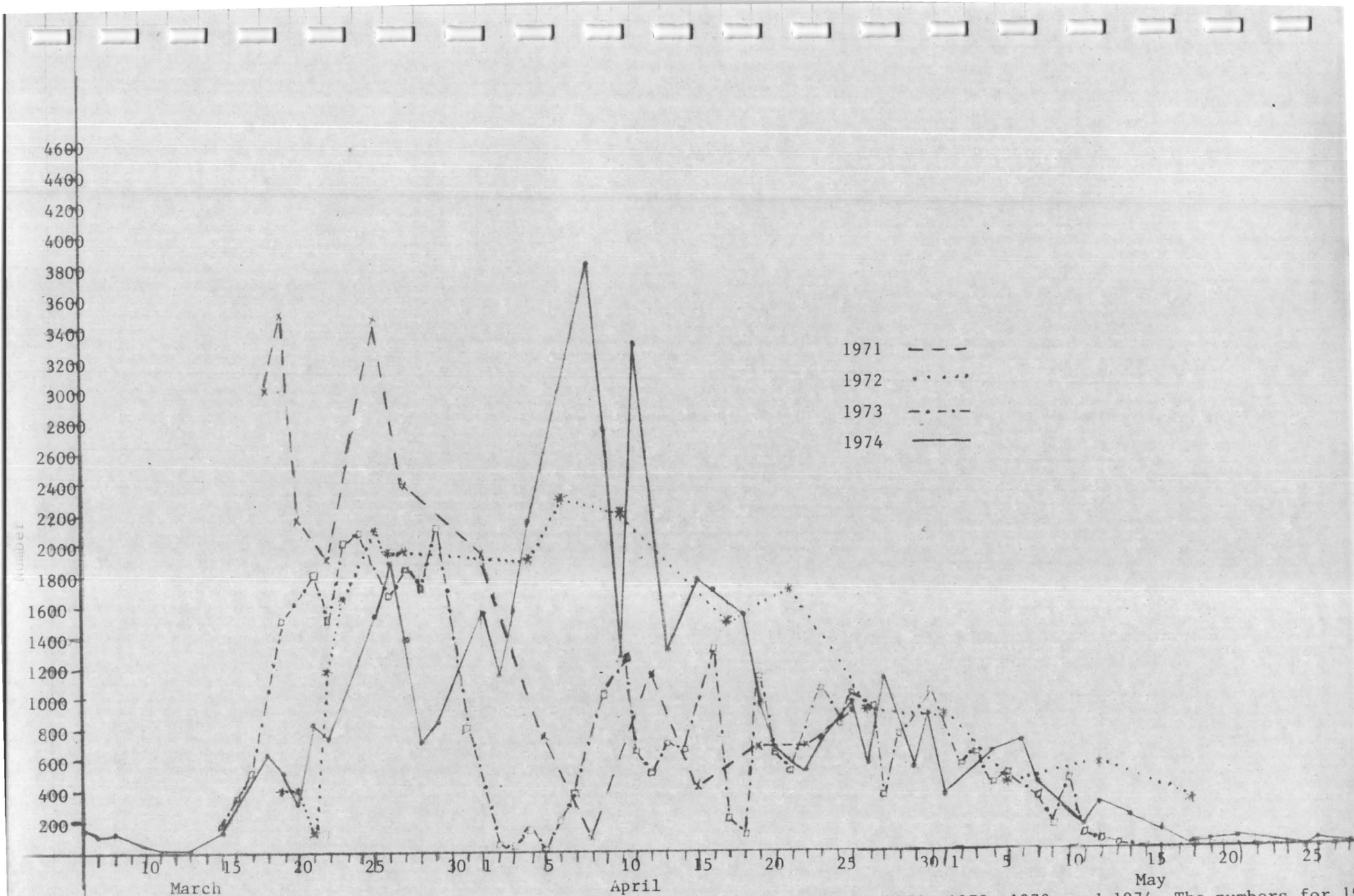

Figure 2. The numbers of Canada geese on the John Lusby National Wildlife Area, 1971, 1972, 1973, and 1974. The numbers for 19
from Hall (1971); for 1972, from Hall and McInnis (1972); for 1973, from Bateman and McLennan (1973).

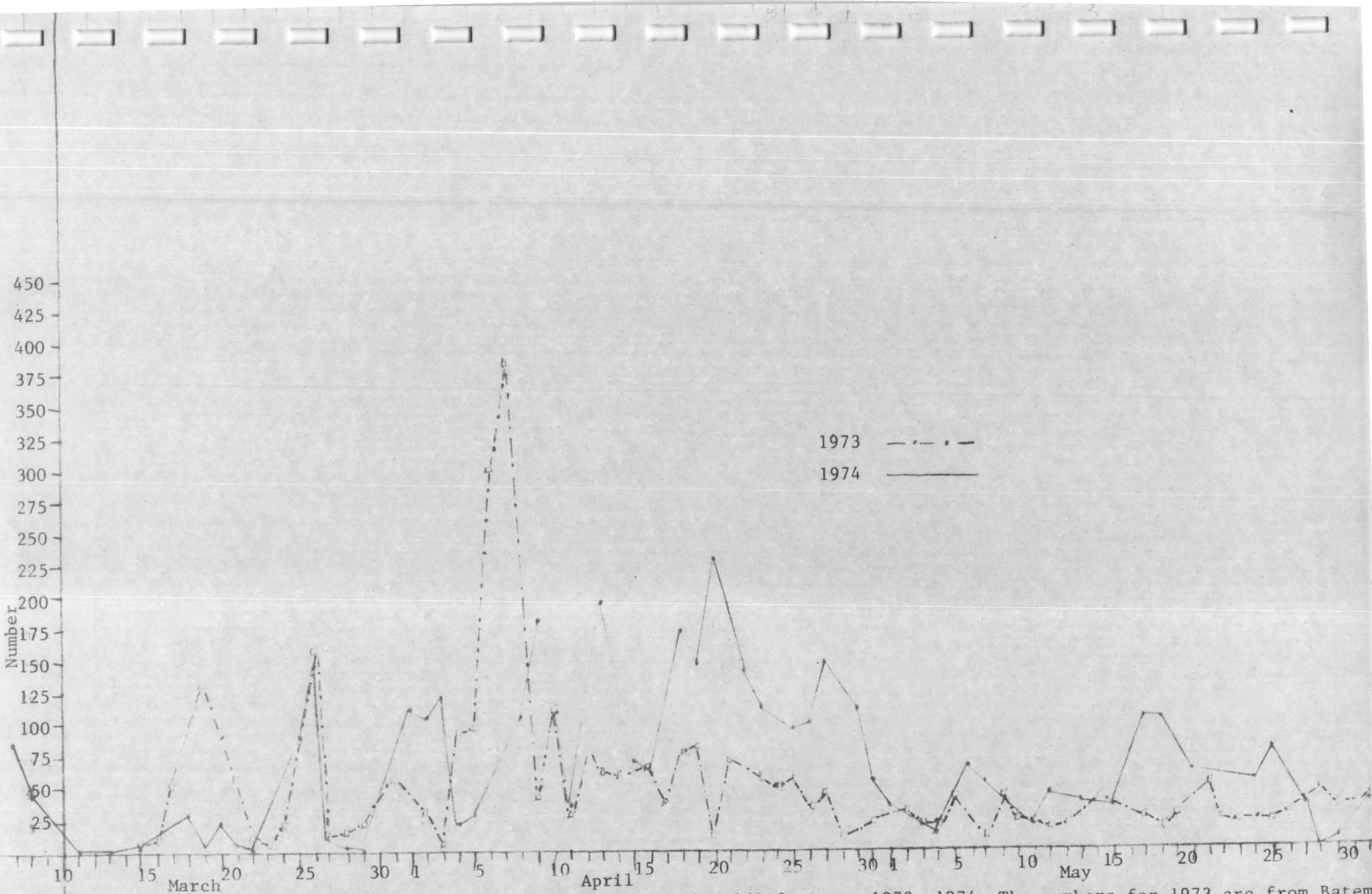

Figure 3. The number of black ducks on the John Lusby National Wildlife Area, 1973, 1974. The numbers for 1973 are from Batem and McLennan (1974).

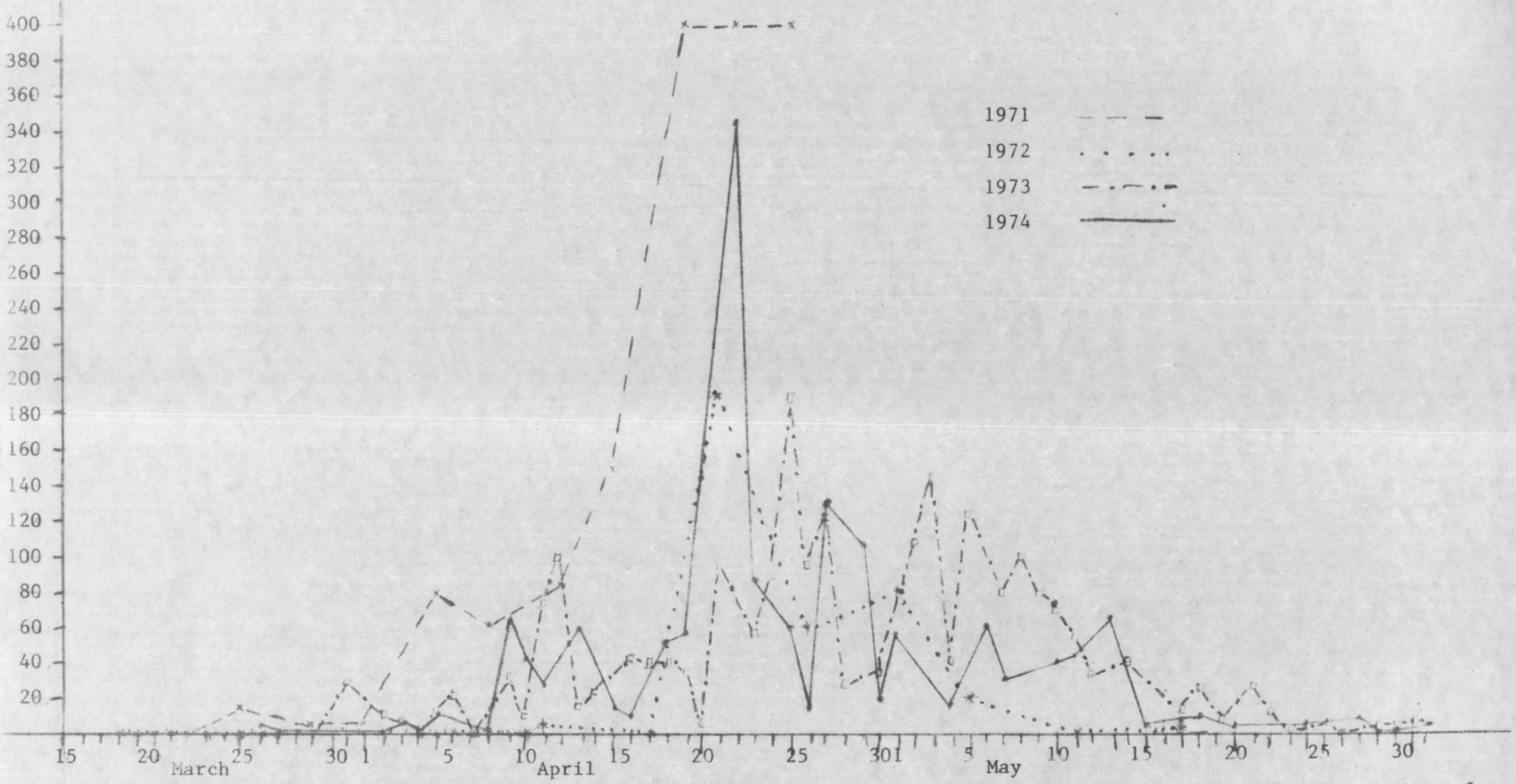

Figure 4. The numbers of green-winged teal on the John Lusby National Wildlife Area, 1971, 1972, 1973, 1974. The numbers for 1971 are from Hall (1971); for 1972,are from Hall and MacInnis (1972); for 1973, are from Bateman and McLennan (197

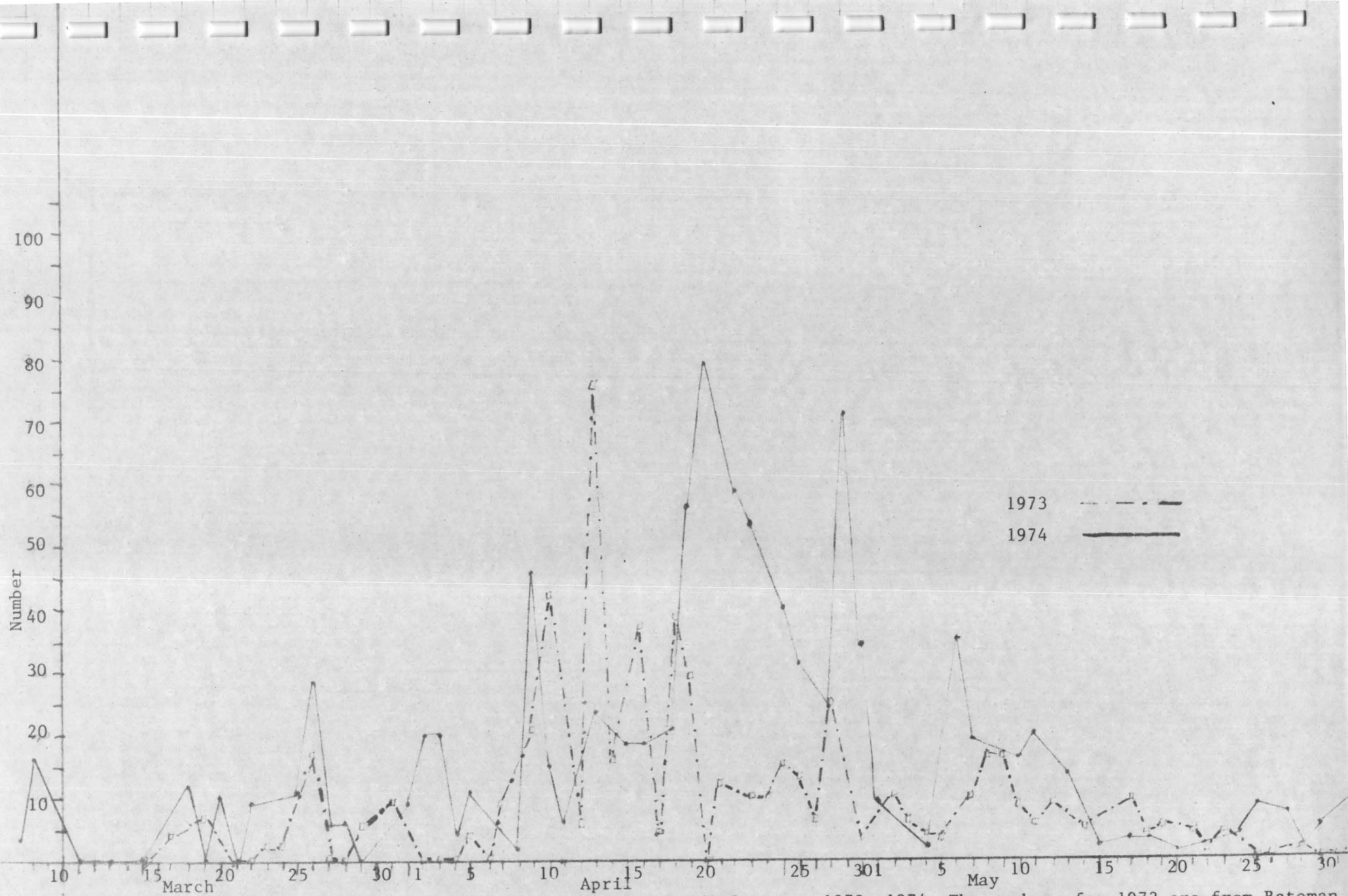

Figure 5. The number of pintails on the John Lusby National Wildlife Area, 1973, 1974. The numbers for 1973 are from Bateman McLennan (1973).

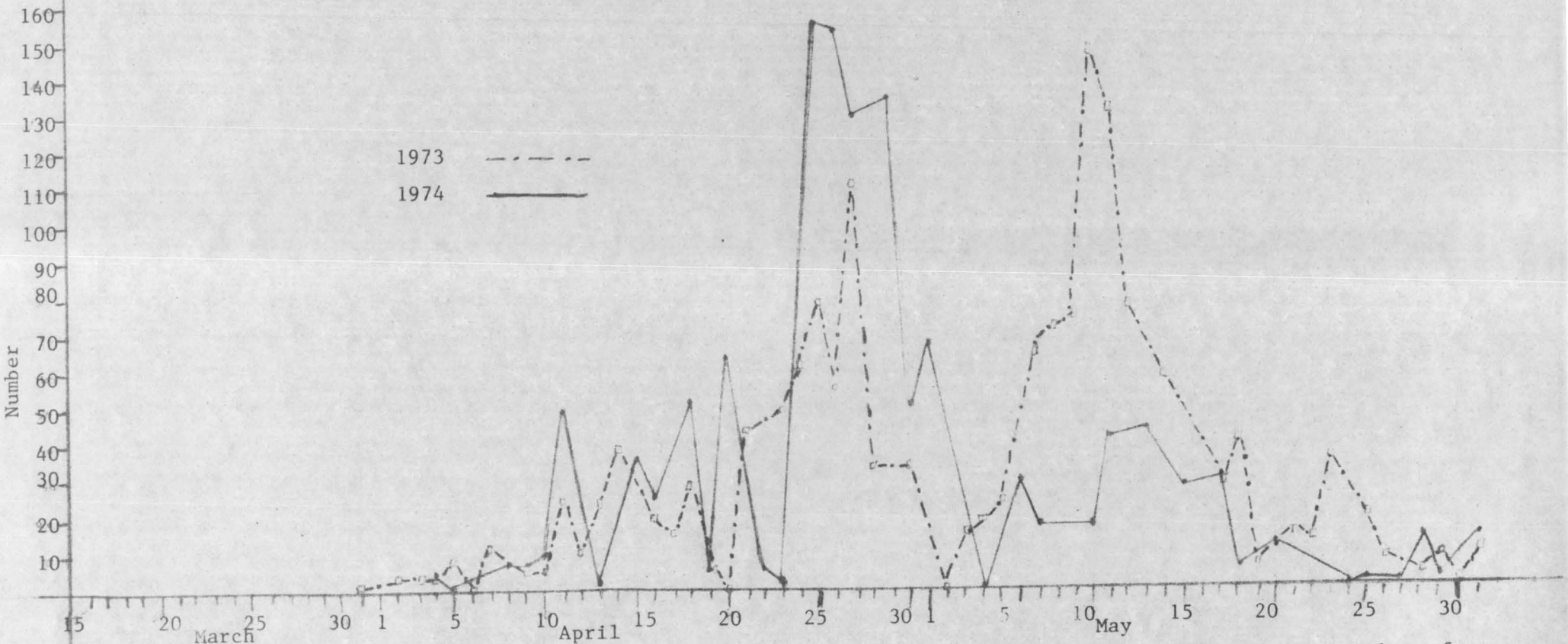

Figure 6. The numbers of red-breasted mergansers on the John Lusby National Wildlife Area, 1973,1974. The numbers for 1973 are from Bateman and McLennan (1973).

III - Shepody National Wildlife Area

Procedure

The Shepody National Wildlife Area and five coastal areas were observed on nine occasions between March 19 and May 27. The March 19 count was made during an aerial survey of the south coast of New Brunswick.

The coastal marshes were observed from points indicated on Figure 1. Observations on the Shepody National Wildlife Area were made from a canoe except on May 2 and 16 when high winds prevented canoe travel down the river. On those two days waterfowl counts were made with a spotting scope from the road. Most counts were made between 10:00 a.m. and 2:00 p.m.

The five coastal areas surveyed were: (1) Calhoun Flats, (2) Mountville Flats, (3) agriculture land protected by the Shepody Dam (Harvey Marsh), (4) salt marsh below the Shepody Dam (Mary's Point), and (5) Anderson Hollow (Waterside).

Results and Discussion

The salt marshes were essentially bare of snow and ice on March 19. All water on the National Wildlife Area was frozen except the Shepody River.

The Wildlife Area was first surveyed from a canoe on April 11. At that time part of Germantown Lake was frozen, but the maximum number (52) of blacks was seen. The area was ice-free by the following week, April 17.

The maximum total number of Canada Geese on all the areas was present on April 17 (Table 1). That was later than in 1973 when the maximum number was counted on March 30 (Figure 2). Thirteen Snow Geese were present on the Harvey Marsh (Area 3) on April 24 and May 2.

There were more Black Ducks, in total on all the areas, during the spring of 1974 than in 1973 (Figure 3). The peak number of blacks was present on April 11 and was followed by a decline until the first of May. The percentage of blacks that were paired ranged from 12 to 100 per cent (Table 2).

Green-winged Teal were first observed on April 11 (Figure 4). The number observed remained at a low level throughout the observation period.

Little courtship behaviour was observed because of a shortage of time for observation (Table 3).

* Area - 1. Calhoun Flats
2. Mountville Flats
3. Protected land above Shepody Dam (Harvey Marsh)
4. Salt marsh below Shepody Dam (Mary's Point)
5. Anderson's Hollow (Waterside)
6. Shepody National Wildlife Area

** Data from aerial survey

*** The National Wildlife Area (Area 6) was observed from the road.

Table 1. The number of each species of waterfowl observed on each day of observation at Shepody National Wildlife Area and five surrounding coastal areas - 1974

Species	Area*	March	April			May				
		19**	11	17	24	2***	8	16***	23	27
Canada Goose	1		19	6	11	8	12			
	2		50		56	16				
	3	200	300	1150	550	448	516	8		
	4		2	2						
	5		154	39	32			2		
	6									
	Total	200	525	1197	649	472	528	10		
Snow Goose	3				13	13				
Mallard	5		4							
	6		10	9	3	3		2	2	
	Total		14	9	3	3		2	2	
Black Duck	1		27	31	9	5			3	7
	2		40	23	65	16	28	9	10	10
	3				1		2			
	4		41	10			1		1	1
	5		110	4	4	2	13	22	17	12
	6	4	52	41	18	16	8	4	12	8+brd
	Total	4	270	109	97	39	52	35	43	38
Am. Wigeon	2				2					
Am. G-w. Teal	1				1					
	2				7					
	3									
	4									
	5		34	6	12					
	6		2	4						
	Total		36	10	20					

Table 1. continued

Species	Area*	March	April			May				
		19**	11	17	24	2***	8	16***	23	27
B-w. Teal	5		1	4		2	10	6		
	6						6	3	5	6
	Total		1	4		2	16	9	5	6
Shoveler	2				1					
Ring-n. Duck	5						1			
	6					2				
	Total					2	1			
C.Goldeneye	6	3								
Eider	5			700-800						
Surf Scoter	5						32			
C.Merganser	6	3	2				2			
R-b.Merganser	1			16		12	4			
	2			15	2	1				
	3									
	4			2		3				
	5		37	2	45	14	105	80	3	17
	6									
	Total		37	35	47	30	109	80	3	17
G.Blue Heron	1		2		2					
	2		16	7						
	3									
	4						1			13
	5		12	4	8		1			
	6		1							
	Total		31	11	10		2			13

Table 2. Black Duck - Total number, number of pairs and per cent paired on each observation at Shepody National Wildlife Area and five surrounding coastal areas - 1974

Date	Total number	Number of pairs	Per cent paired
March 19	4	2	100
April 11	270	58	43
17	109	25	46
24	97	6	12
May 2	39	11	56
8	52	9	35
16	35	7	40
23	43	4	19
27	38	9	47

Table 3. Observations of waterfowl behaviour in the Shepody National Wildlife Area and surrounding areas, 1974

Date	Observation
April 17	Several birds in a flock of 16 Red-breasted Merganser (only one was positively identified as female) on Calhoun Flats doing 'knicks' display.
April 24	A Black Duck landed beside its mate and both birds began doing 'head-nods'. One bird swam in circles around the other with neck outstretched.
May 8	Eight male Red-breasted Merganser at Waterside doing 'knicks' display. No females were observed.
	Six male Blue-winged Teal displaying to one female resting at the edge of the water.

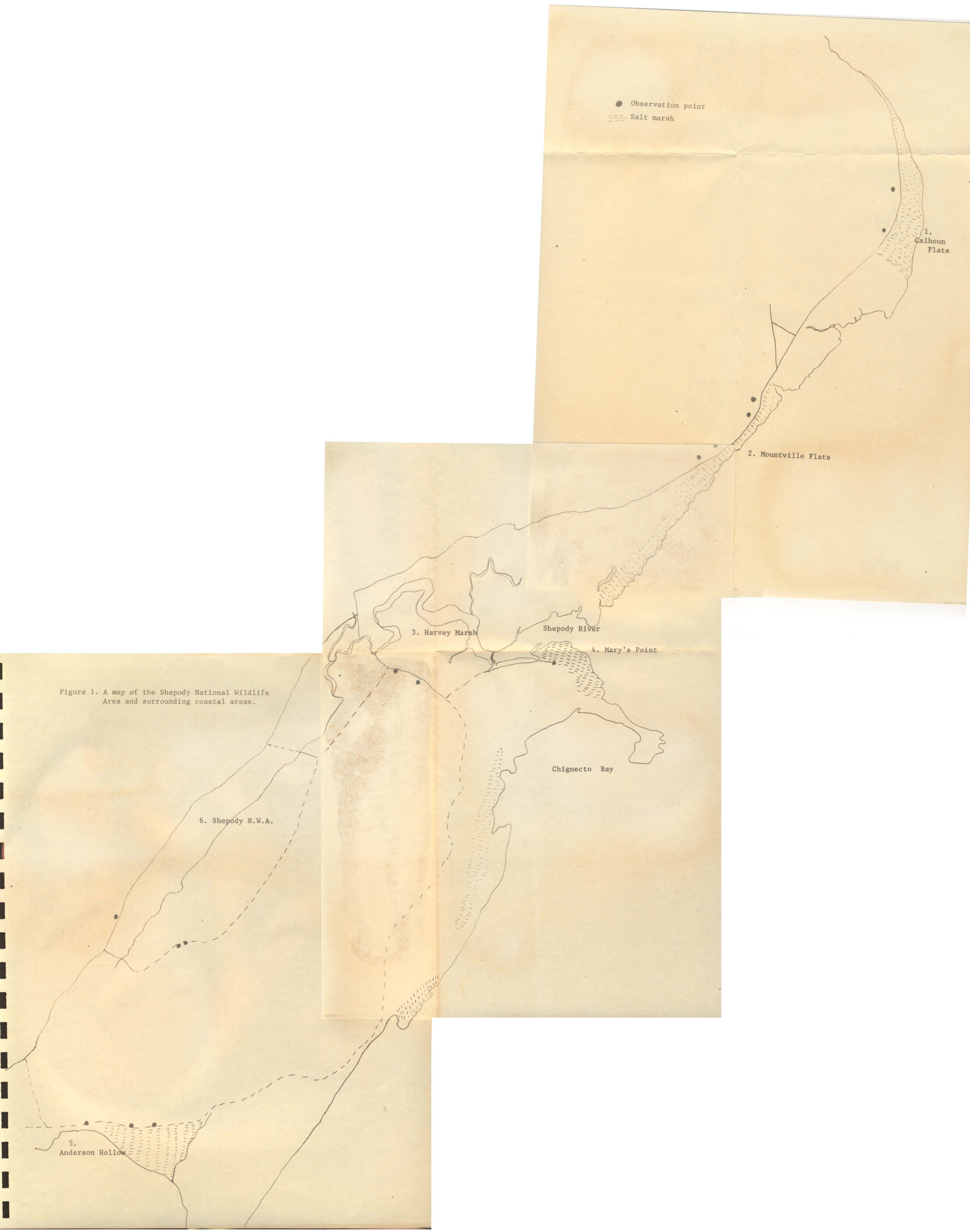

Figure 1. A map of the Shepody National Wildlife Area and surrounding coastal areas.

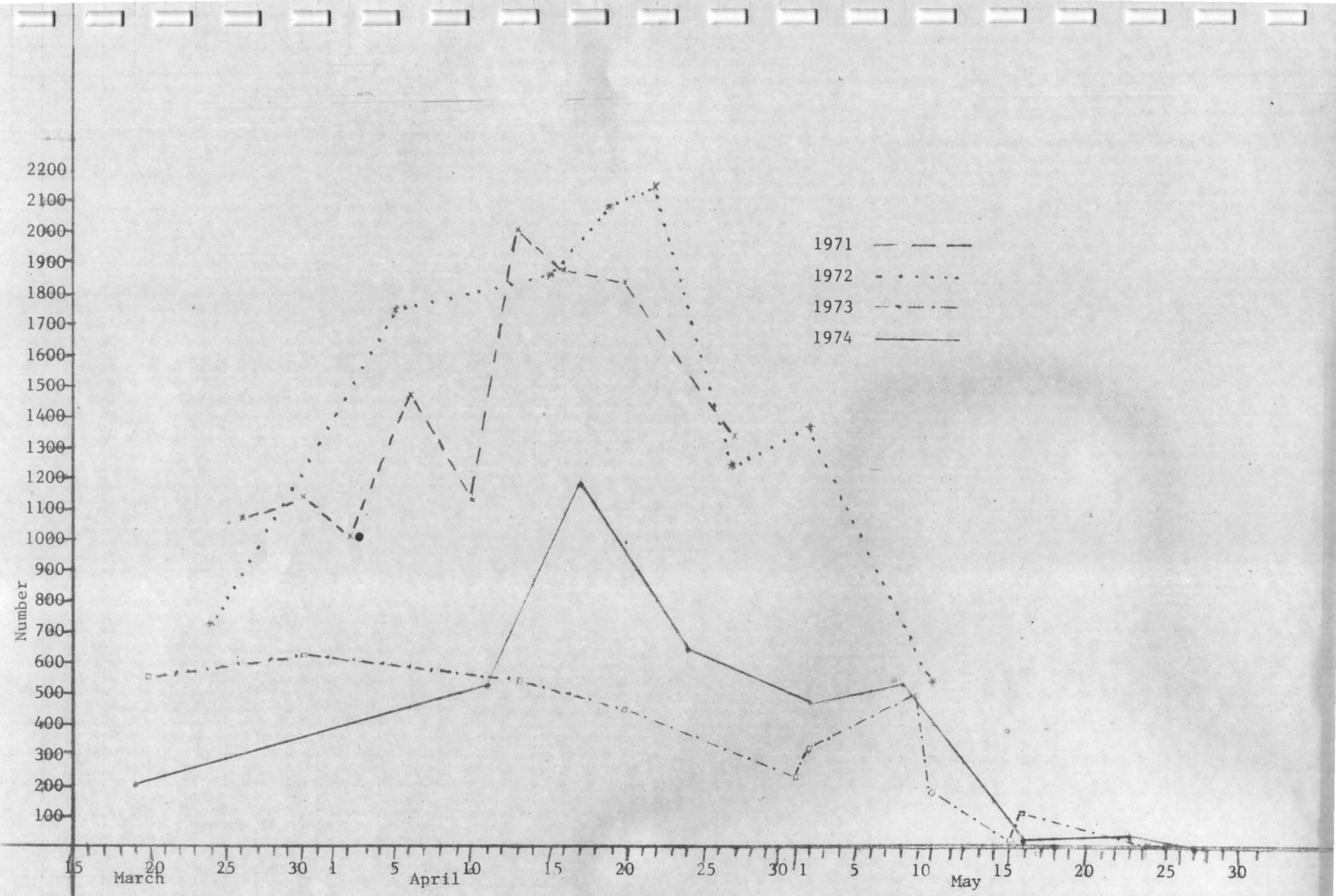

Figure 2. The number of Canada geese on the Shepody National Wildlife Area and surrounding marshes, 1971,1972,1973, and 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and McInnis (1972); for 1973, from Bateman and McLennan (1973).

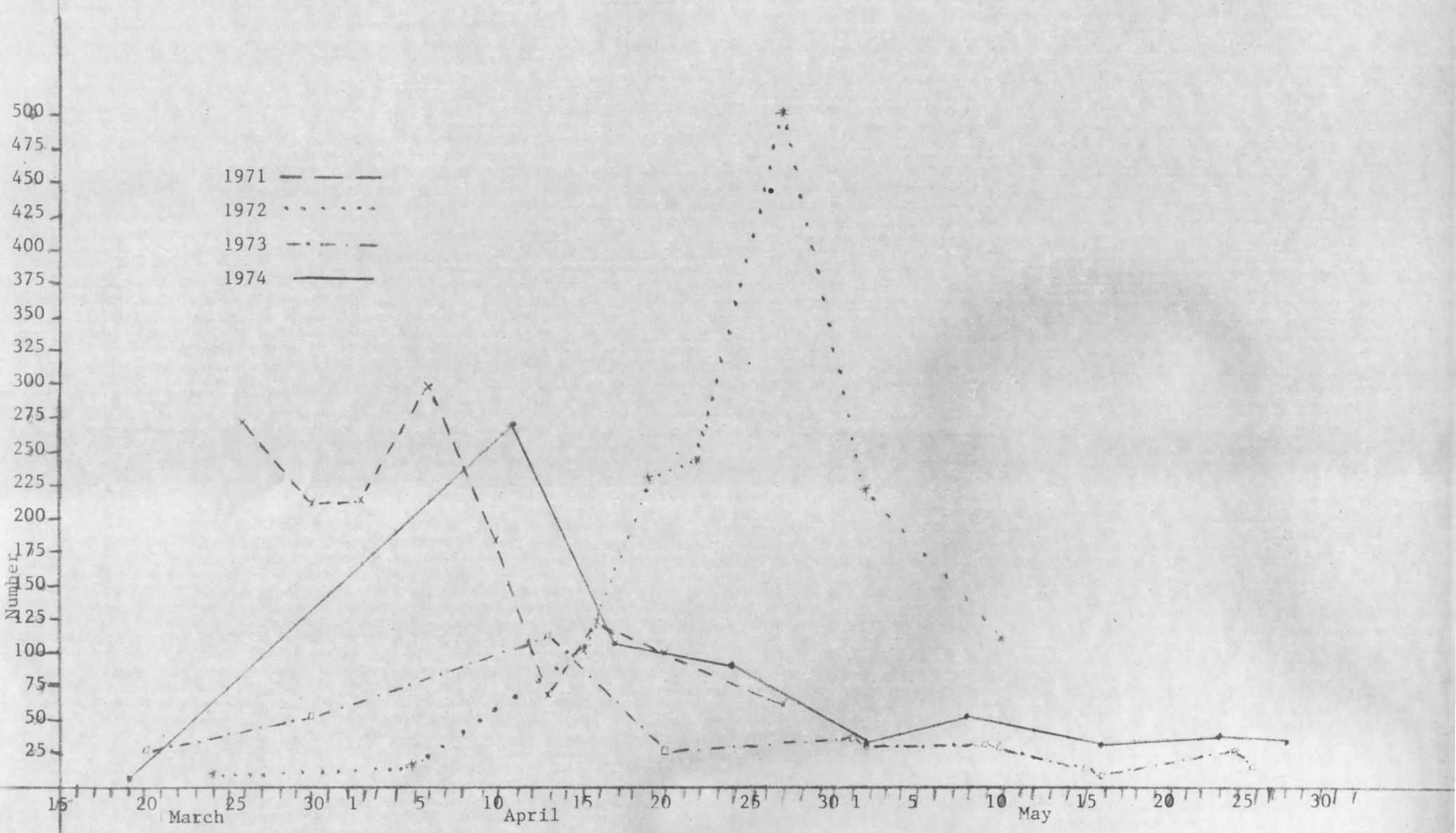

Figure 3. The number of black ducks on the Shepody National Wildlife Area and surrounding marshes, 1971, 1972, 1973, 1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and McInnis (1972); and for 1973,from Bateman and McLennan (1973).

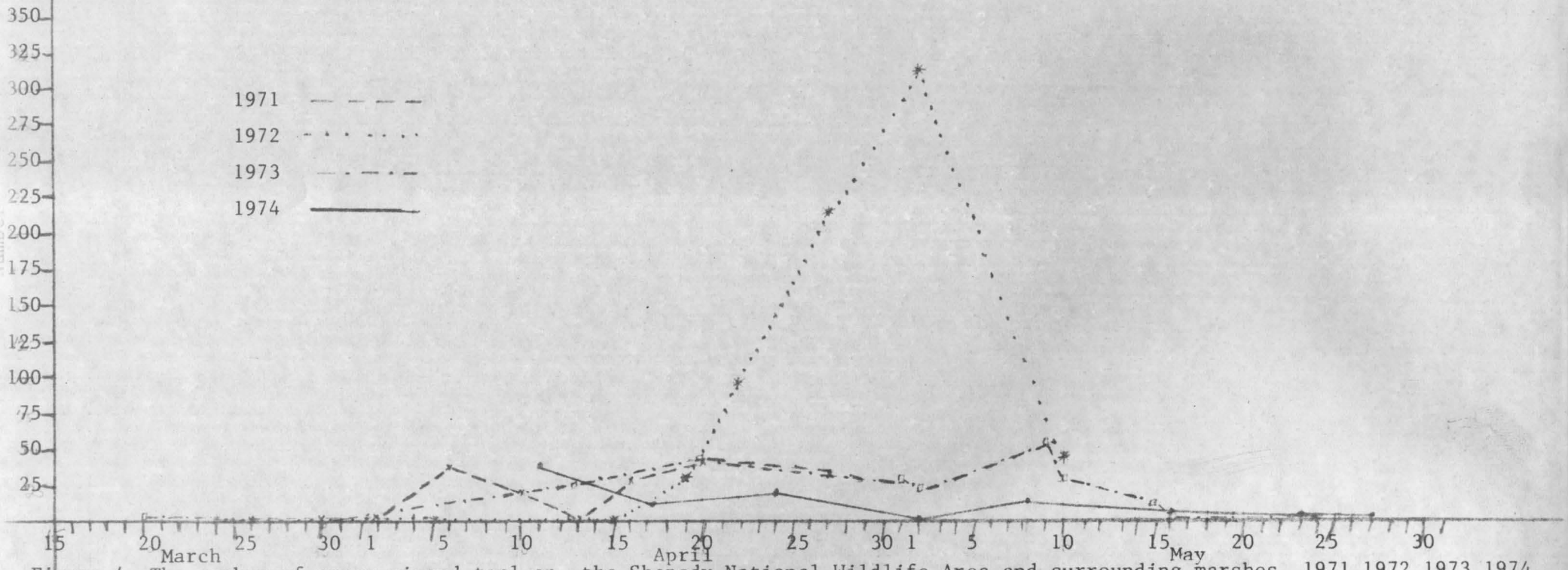

Figure 4. The number of green-winged teal on the Shepody National Wildlife Area and surrounding marshes, 1971,1972,1973,1974. The numbers for 1971 are from Hall (1971); for 1972, from Hall and McInnis (1972); for 1973, from Bateman and McLennan (1973).

INTRODUCTION

Concurrent with the creation of artificial impoundments and improvement of waterfowl habitat in the New Brunswick - Nova Scotia Border Region, census projects have been introduced to evaluate the immediate and long term response of waterfowl as a measure of the effectiveness of the particular management practices.

The chronology of waterfowl migration conducted each spring from late March to the end of May was started in 1971 to complement the brood survey in reaching these objectives. Essentially the survey provides figures on waterfowl populations that utilize the region on the northward migration and breeding pairs that are attracted to the marshes and remain to nest.

Throughout the course of the survey, the following three areas were censused:

1. Missaquash Marsh
2. Coles Island - Ram Pasture - Westcock salt marsh complex
3. Tintamarre National Wildlife Area.

Each area is discussed separately with regard to total numbers of all waterfowl species; total numbers, number of pairs, per cent paired and sex composition of the major species*, and consistencies and/or variations of population numbers since the introduction of the survey. Observations on courtship and breeding behaviour are also given.

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* sex composition not given for Black Duck

MISSAQUASH

Materials and Methods

The Missaquash marsh was visited on twelve occasions between March 15 and May 30. The first four counts were conducted by M.Bateman and due to ice conditions were restricted to the dykes at the southern end of the area (Figure 1). By April 12 ice conditions had relaxed sufficiently on the old impoundment to enable censusing with canoe and motor. At that time a 17-foot Grumman canoe accompanied by a 4 hp Evinrude outboard motor was used on the old impoundment and a definite route was established (Figure 1).

Observations were conducted at approximately one-week intervals using Bushnell binoculars (7 x 35) and a Bushnell Spacemaster spotting scope. It was found that a 25x eyepiece was the most effective since higher magnification powers tended to pick up heat radiation which distorted the appearance of the object and made identification difficult.

Results and Discussion

The first four visits to the Missaquash revealed a complete absence of all waterfowl species. This is not surprising since the main canal did not open completely until March 26 and by April 4 ice still persisted in the impoundments.

The results of the remaining eight counts conducted between April 12 and May 30 are presented in Table 1. On April 12 rotten ice still persisted in zones of dense Carex spp., Spiraea spp., Typha spp.,

and Sparganium spp. but was scarcely thick enough to impede the movement of the canoe. By April 18, the entire marsh was ice-free.

The Black Duck (Anas rubripes) was the first waterfowl species to occur in relatively large numbers. From a total of thirty-two observed on April 12, numbers rose to a high of 71 on April 18, showed a peak number of pairs on the same date, dropped to a low of three on May 9 and increased to 50 on May 30 (Table 2). The increase in numbers toward the end of May is attributed to a large flock, considered to be a concentration of adult males preparing for the post-nuptial moult.

Between April 12 and 18 a marked influx of Pintail (Anas acuta) and American Green-winged Teal (A. crecca carolinensis) occurred. The numbers of Pintail reached thirty-six while the American Green-winged Teal reached thirty-seven on April 18. On that date the peak number of Pintail pairs also occurred. The emigration of Pintail was quite rapid since the population dropped to a mere nine individuals by April 25 (Table 3). Consequent to that date Pintail numbers remained quite low and exceeded nine only one occasion, May 3, when a total of ten were observed (Table 1). Throughout the observations a preponderance of males was expressed. All evidence suggests poor production of Pintail on the Missaquash Marsh.

From a number of thirty-seven American Green-winged Teal observed on April 18, the population continued to rise until May 3, when a total of seventy-five were observed (Table 1). The peak number of pairs was observed on that date (-Table 4). A comparison with the data of 1973 indicates a sharp increase in the American Green-winged Teal population.

Ring-necked Duck (Aythya collaris) and Blue-winged Teal (Anas discors) were first observed on April 18. Both species peaked very late. The largest number of Blue-winged Teal occurred on May 15 and the Ring-necked Ducks peaked a week later (Table 1). The peak number of pairs occurred on May 15 for both species (Table 5 and Table 6). That is two and three weeks later than 1973 for the Blue-winged Teal and Ring-necked Duck respectively.

As in previous years, American Wigeon (Anas americana) and Wood Duck (Aix sponsa) were observed in low numbers (Table 1). Wood Ducks were observed on two occasions only, April 25 and May 30 when six and two occurred, respectively (Table 1). American Wigeon first appeared on April 18 and were observed consistently until the termination of the counts. Peak numbers of pairs occurred on both May 9 and May 22 (Table 7). The number of pairs is up slightly from last year.

Most waterfowl were observed in an area to the right of the main ditch and stretching from the lower dike to a point opposite Black Island. Large numbers of American Green-winged Teal were usually observed at the point where the first major cross ditch approaches the upland on the right side of the marsh.

An interesting observation was the very limited use of the newly impounded areas by any waterfowl. That can be attributed, at least in part, to the water levels which were altered on two occasions during the census period. Initially water levels were too high, having left large areas of submerged vegetation and the associated invertebrates far outside of the reach of dabbling ducks. The water

levels were drawn down but were raised again after a two-week period. The latter action could have been quite detrimental to the success of nesting ducks.

Since nesting habitat is at a premium, having been reduced by new impoundments and existing only in peripheral areas, it is suggested that effectively managed water levels could provide the needed habitat which would result in a larger breeding population.

Table 1. Daily totals of waterfowl - Missaquash Marsh, 1974

Date	C.goose	Mall.	Blk.	A.wig.	Pin.	A.Gwt.	Bwt.	Shov.	Wood	Ring-n.	C.Goldeneye
April 12	3		32		1	6					1
18			71	2	36	37	7			9	
25			31	7	9	40	13		6	10	
May 3		3	25	4	10	75	31	2		19	
9	1	1	3	8	4	37	30			15	
15	1	1	17	7	8	22	52			24	
22	5		20	8	5	17	29			30	
30			50	10	2	11	19		2	18	

Table 2. Black Duck - Daily totals, number of pairs and per cent paired for Missaquash Marsh - Spring, 1973

Date	Total number	Number of pairs	Per cent paired
April 12	32	11	69
18	71	16	45
25	31	15	97
May 3	25	9	72
9	3	1	67
15	17	3	35
22	20	9	90
30	50	3	12

Table 3. Pintail - Daily totals, number of pairs, per cent paired, and sex composition - Missaquash Marsh - Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 12	1			1	
18	36	5	28	10+	6+
25	9	3	67	6	3
May 3	12	4	67	8	4
9	4	2	100	2	2
15	10	3	60	7	3
22	7	1	29	6	1
30	2	1	100	1	1

Table 4. American Green-winged Teal - Daily totals, number of pairs, per cent paired, and sex composition - Missaquash Marsh, Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 12	6	1	33	4	2
18	37	6	32	7+	7+
25	40*	5	25		
May 3	75*	10	27		
9	37 *	6	32		
15	22*	3	27		
22	17*	5	59		
30	11	3	55	8	3

* Occurring in flocks and separation of sexes not possible

Table 5. Ring-necked Duck - Daily totals, number of pairs, per cent paired, and sex composition - Missaquash Marsh, Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 12					
18	9	2	44	7	2
25	10	2	40	7	3
May 3	19	3	32	15	4
9	15	4	53	8	7
15	36	15	83	19	17
22	31	13	84	16	15
30	20	7	70	12	8

Table 6. Blue-winged Teal - Daily totals, number of pairs, per cent paired, and sex composition - Missaquash Marsh, Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 12					
18	7	2	57	5	2
25	19	5	53	12	7
May 3	31	7	45	7+	7+
9	36	15	83	19+	17+
15	52	20	77	28	23
22	29	10	69	17	10
30	21	7	67	13	8

Table 7. American Wigeon - Daily totals, number of pairs, per cent paired, and sex composition - Missaquash Marsh, Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 12					
18	2	1	100	1	1
25	7	2	57	4	3
May 3	4	2	100	2	2
9	8	4	100	4	4
15	7	2	57	4	3
22	8	4	100	4	4
30	10	3	60	6	4

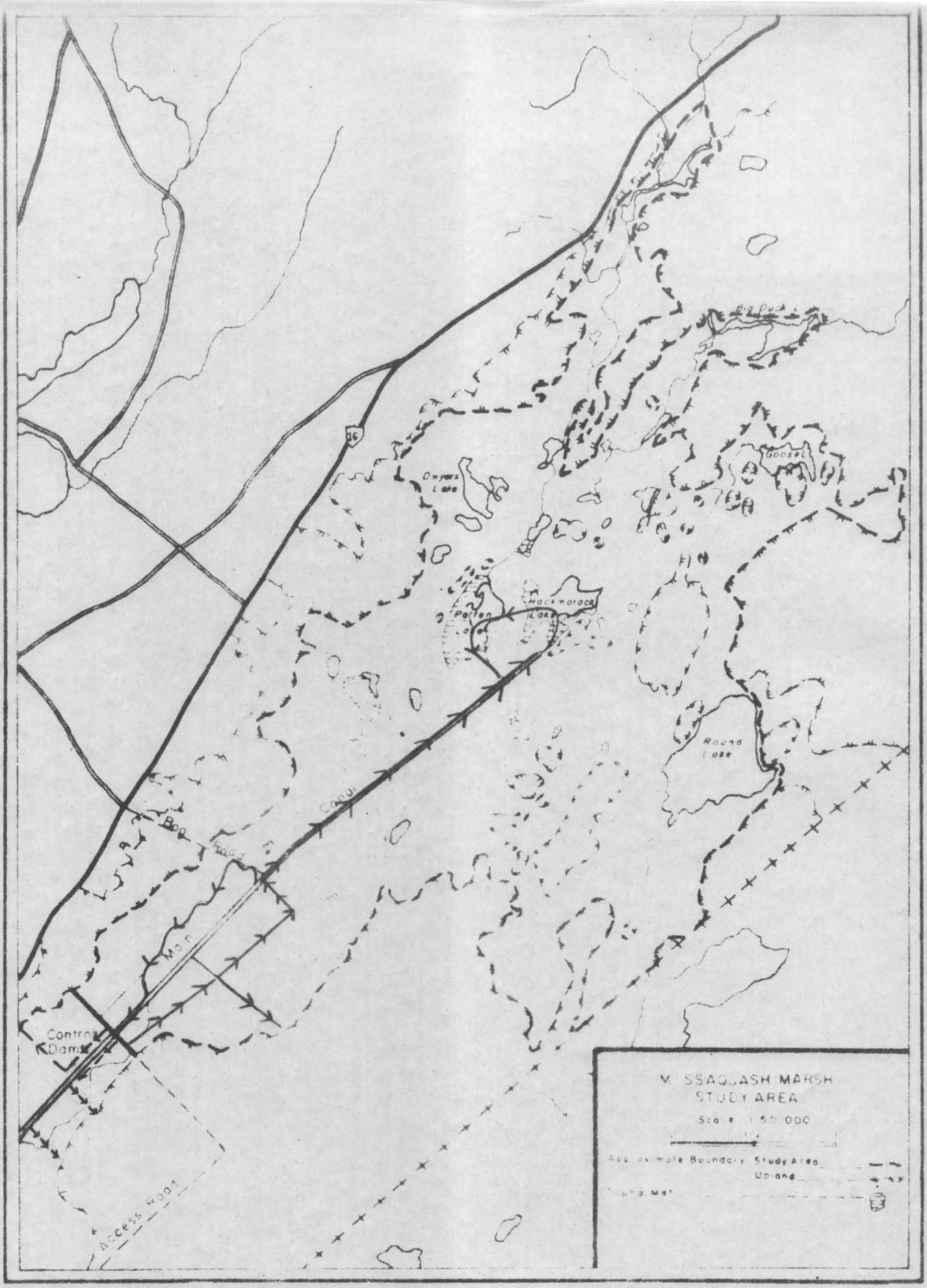

Figure 1. Census routes for Missaquash Marsh. Canoe Route ⟶

Dike Route —→

COLES ISLAND - RAM PASTURE - WESTCOCK SALT MARSHES

Materials and Methods

At the beginning of the survey, Coles Island, Ram Pasture and Westcock Salt Marshes were censused on a daily basis, alternating between morning and evening counts with Tintamarre National Wildlife Area. Both recommended and new observation points and routes were used (Figure 1). It was soon realized that such an intense schedule would negatively affect the accuracy of the counts and practically eliminate the opportunity of observing courtship behaviour. Accordingly, it was decided to alternate counts with Tintamarre NWA on a daily basis.

To eliminate biases of double counts Westcock, Ram Pasture, and Coles Island were sampled in that sequence because the first two areas could be censused with minimum disturbance.

Results and Discussion

The species composition and total numbers observed during the 1974 survey are presented in Table 1. The first count was conducted on April 13 but in view of weather conditions, Canada Geese (Branta canadensis) and Black Duck (Anas rubripes) were undoubtedly utilizing the marsh prior to that date.

Throughout the census period, numbers of Canada Geese remained quite consistent except on April 19 when a total of 240 individuals were observed. That sudden increase is probably the result of an influx

of a segment of the population staging on the John Lusby National Wildlife Area.

In comparison with the data of 1973, the population peaked at a later date in 1974, but the trend and dates of emigration are similar for both years (Figure 2).

In 1974, population numbers of the Black Duck far exceeded the figures for 1973 (Figure 3). The peak number observed in 1973 was 18 while numbers reached a high of 62 in 1974. Although the Black Duck was not observed in any courtship behaviour, the salt marsh was used heavily by breeding pairs (Table 2).

A comparison of the data for American Green-winged Teal (A. crecca carolinensis) for 1973 and 1974 shows close agreement in population numbers and dates of peaks (Figure 4). Although American Green-winged Teal were observed in courtship display on four occasions, a large percentage of the ducks were paired (Table 3).

Numbers of Red-breasted Merganser (Mergus serrator) did not differ significantly from last year (Figure 5). The population peaked on May 1 and remained quite high for two weeks during a period of unfavourable weather. Courtship behaviour was frequent and on numerous occasions "knicks and sprints" were observed.

Table 1. Daily total by species of waterfowl - Coles Island - Ram Pasture - Westcock Salt Marshes, 1974

Date	C.Goose	Mall.	Blk.	Pin.	A.Gwt.	Bwt.	Shov.	C.Eider	R-b.Merg.	C.Merg.
April 13	120		16							
14	113		20	11	7	2			8	
15	88		32		11	2			12	
16	130		26	2	5				11	
18	81		27		19				16	
19	240	1	19	5	2				7	2
20	63		62	12	4	2			15	
23	78		57	2	8	11			27	
27	87		46	11	12			4	16	
29	6		29		14		1		9	
May 1	62		17	2	8		1		57	
5	16	1	15	10	9				51	
7	17		21	5	33	4	2		36	5
12			17	4	20		1		46	
13	6	1	11	1	7				5	
14		1	11	4	28	1	1		18	
19			17		2				21	
20			27	3	10				16	
21	2		22	1	3				2	
28			2						8	
31			21	6		1				

Table 2. Black Duck - Daily totals, number of pairs and per cent paired for Coles Island, Ram Pasture and Westcock Salt Marshes, Spring 1974

Date	Total number	Number of pairs	Per cent paired
April 13	16	6	75
14	20	7	70
15	32	14	88
16	26	10	77
18	27	12	89
19	19	6	63
20	62	24	17
23	57	17	60
27	46	20	87
29	29	12	86
May 1	17	8	94
5	15	7	93
7	21	9	86
12	17	5	60
13	11	1	18
14	11	1	18
19	17	5	60
20	27	2	15
21	22	3	27
28	2	-*	-
31	21	3	28

* marsh not walked

Table 3. American Green-winged Teal - Daily totals, number of pairs, per cent paired, and sex composition - Coles Island, Ram Pasture, and Westcock Salt Marshes, Spring, 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
April 13					
14	7			2	5
15	11	4	73	5	6
16	27	2	15	2+	12+
18	19	4	42	8	11
19	2	-		-	2
20	4	2	100	2	2
23	8	4	100	4	4
27	12	5	83	5	7
29	14	5	71	6	8
May 1	8	4	100	4	4
5	9	4	89	4	5
7	33	9	55	12+	15+
12	20	9	90	9	11
13	7	2	57	2	5
14	28	8	57	11	17
19	2	1	100	1	1
20	10	4	80	4	6
21	3	1	67	1	2
28	-			-	-
31	-			-	-

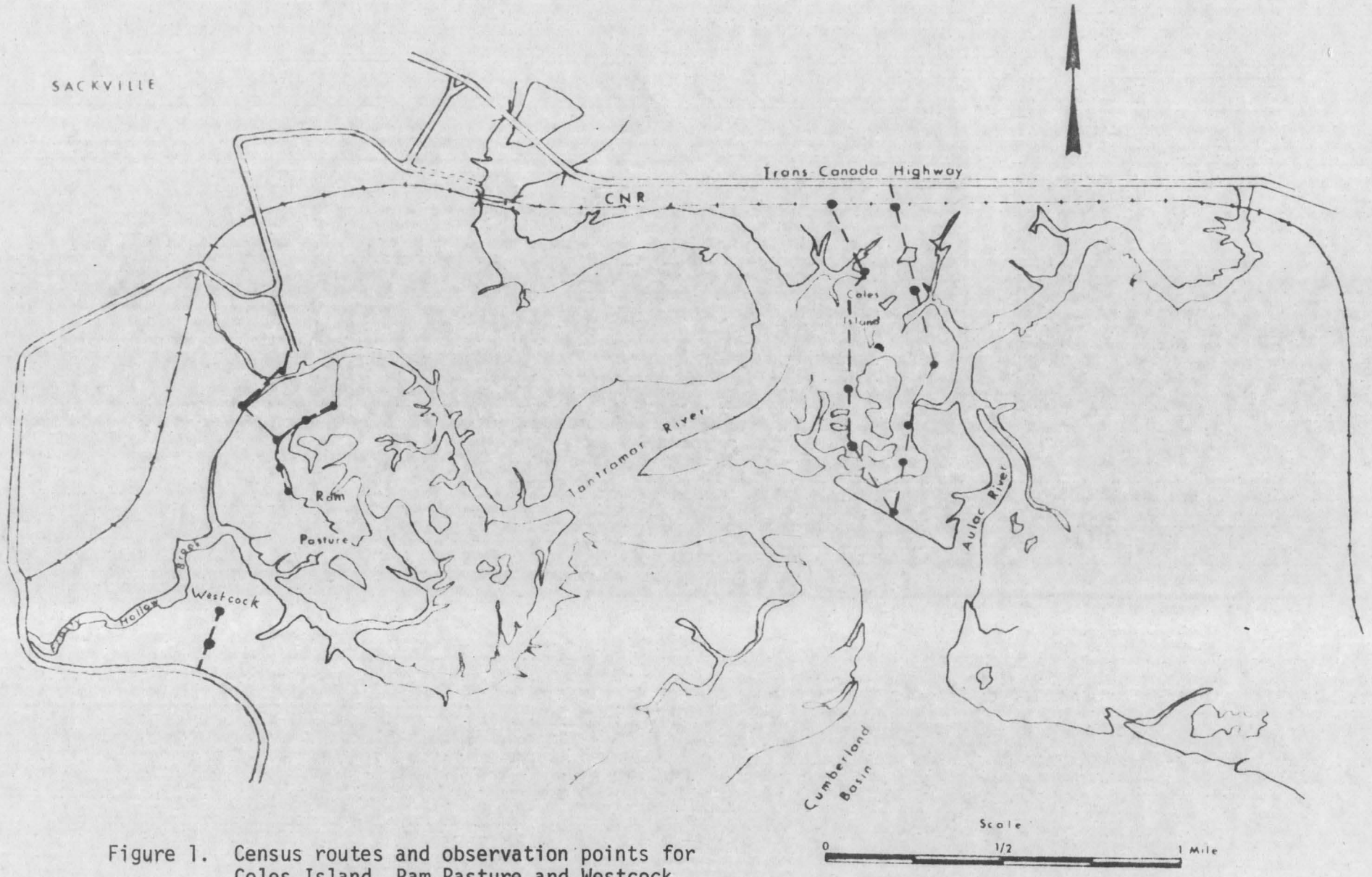

Figure 1. Census routes and observation points for Coles Island, Ram Pasture and Westcock Salt Marshes

Census Route: — — — Observation Points: ●

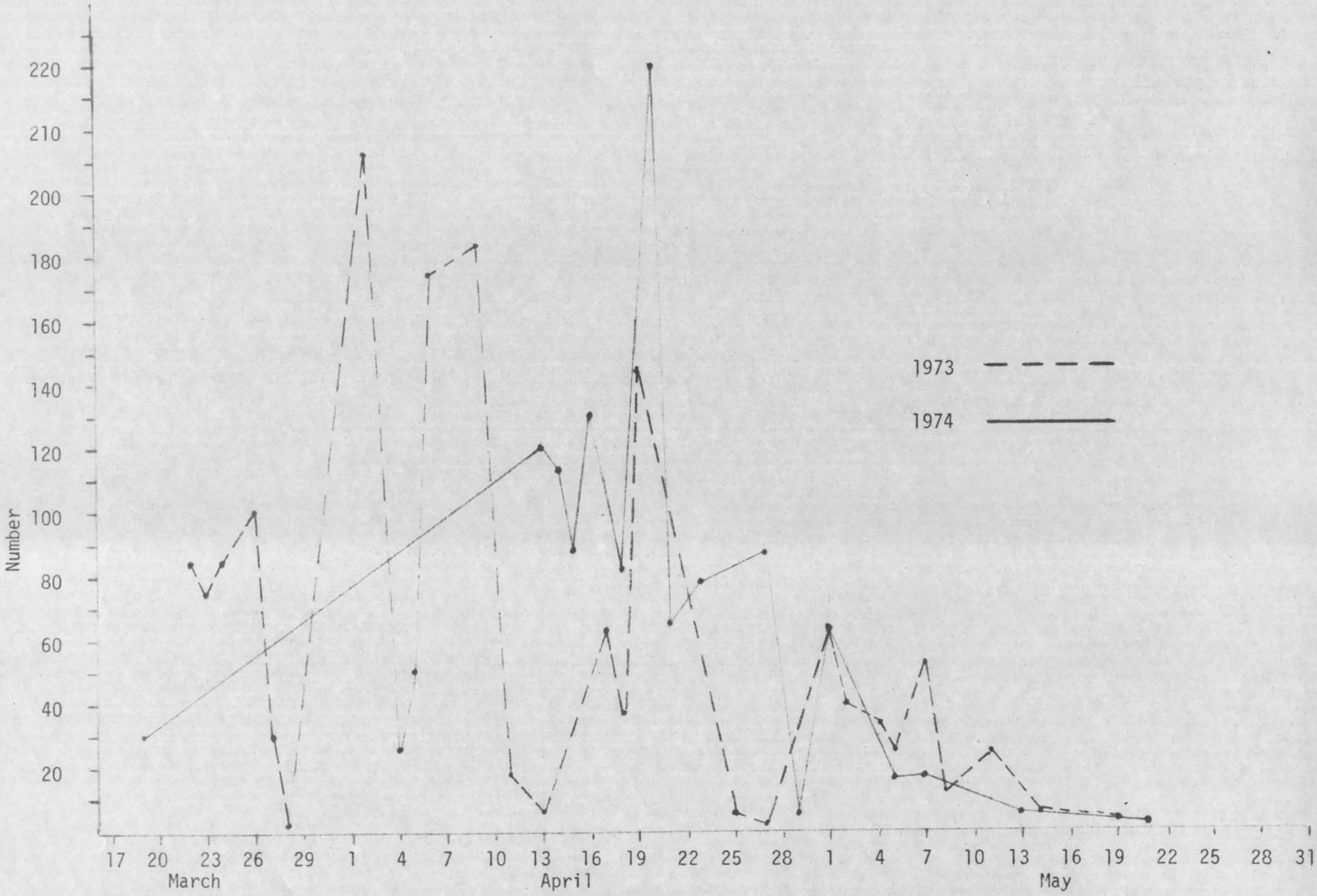

Figure 2. Daily totals of Canada Geese at Coles Island, Ram Pasture and Westcock Salt Marshes, Spring 1973 and 1974 (March 19, 1974 count by M. Bateman)

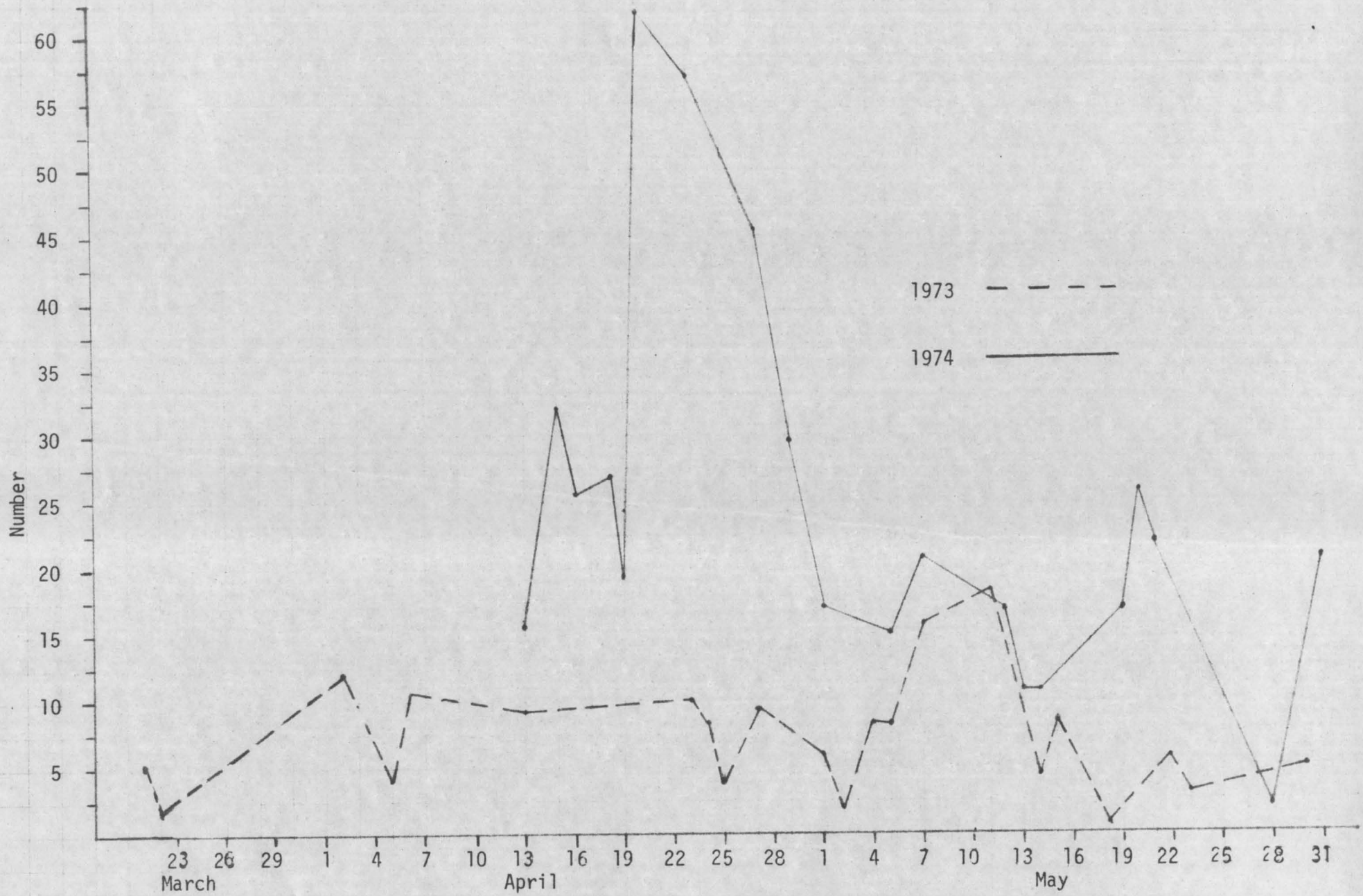

Figure 3. Daily totals of Black Duck at Coles Island, Ram Pasture and Westcock Salt Marshes for 1973 and 1974

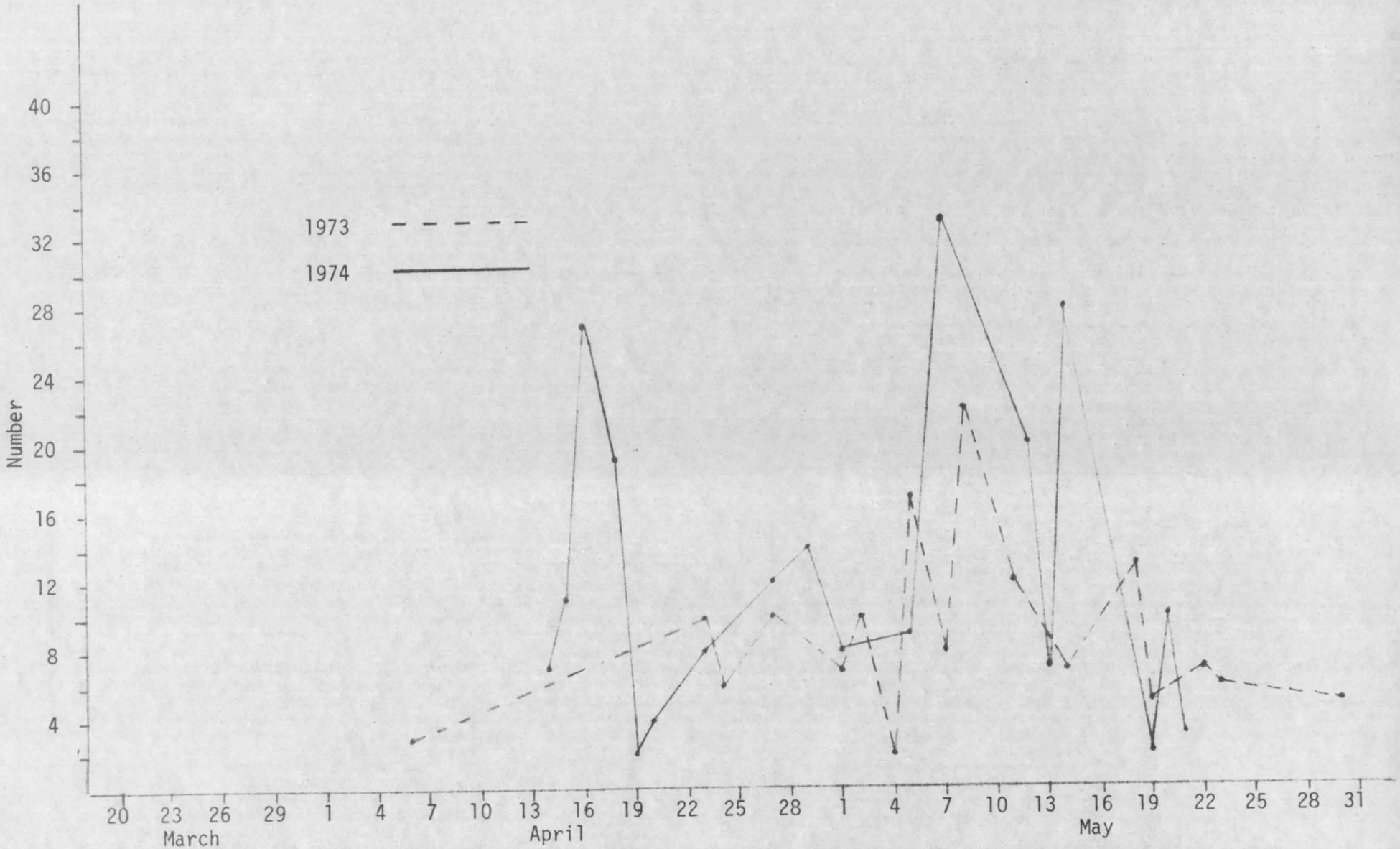

Figure 4. Daily totals of American Green-winged Teal at Coles Island, Ram Pasture and Westcock Salt Marshes for 1973 and 1974

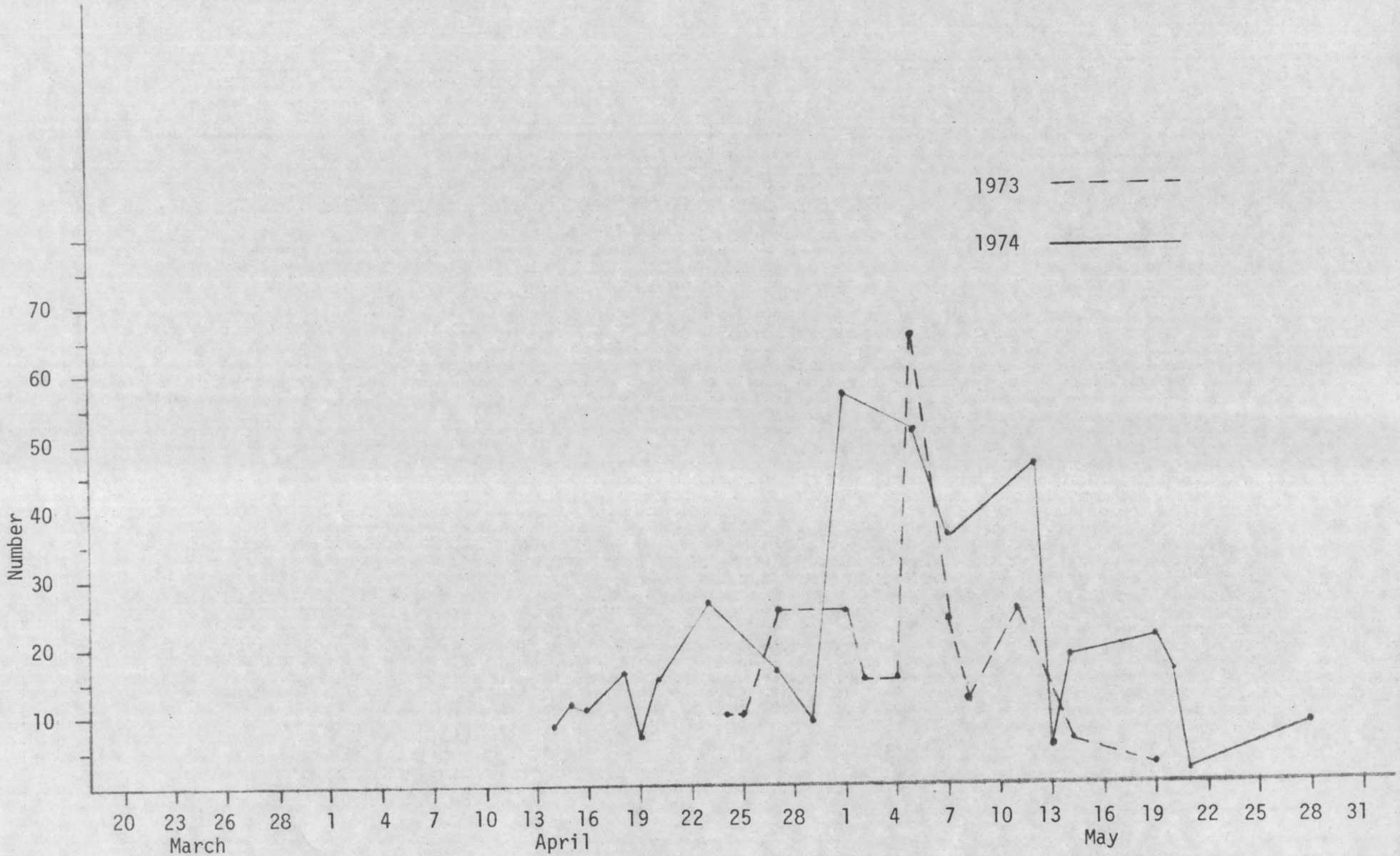

Figure 5. Daily totals of Red-breasted Mergansers at Coles Island, Ram Pasture and Westcock Salt Marshes, 1973 & 1974

TINTAMARRE NATIONAL WILDLIFE AREA

Materials and Methods

The Tintamarre National Wildlife Area was visited on thirty-three occasions between March 18 and May 28. The twelve counts between March 18 and April 8 were carried out by M. Bateman. The remaining twenty-one observations were conducted by the author. Bushnell (7 x 35) binoculars and a Bushnell Spacemaster spotting scope accompanied by 25 power eyepiece were used for all observations.

Front Lake was surveyed from the roads at both ends. Long Lake was surveyed from the causeway and Large Lake was viewed from the cabin and the site of the boat launch. Due to the level topography of the impoundments and surrounding areas good observation sites were not available. To afford minimum disturbance, the dikes were walked on the lower side and observation points were set up at intervals (Figure A).

Results and Discussion

The species composition and daily totals are presented in Table 1. Between March 18 and April 8 waterfowl use was limited by ice conditions. By March 30, the main drainage ditch, Fillmore's Hole, and a small zone by the observation tower in Front Lake represented the only areas of available water. By April 11 Front Lake and the impoundments were open except in zones of dense vegetation. Long Lake was ice-free on April 15 but the major portion of Large Lake was still covered with rotten ice, which had melted completely by April 19.

Large numbers of Black Ducks (Anas rubripes) first appeared on April 8 when 30 were recorded. The population peaked on April 18 and the peak number of pairs were observed a day later (Table 2). The trend of the Black Duck population and the relation between total numbers and numbers of pairs is depicted in Figure 1. It is observed that the peak number of pairs occurs shortly after the peak in total numbers. Since Black Ducks were seen in sexual display on one occasion only, it is assumed that pair formation had occurred prior to arrival. The same graph shows a rise in total numbers with no change in numbers of pairs toward the end of May. That suggests that males were leaving the territory at that time and forming loose flocks in preparation for the post-nuptial moult.

In view of total numbers, numbers of pairs and an extensive grass fire in the community pasture, a lower than average production is anticipated for the Black Duck. compared to 72?

The Pintail (A. acuta) was a late arrival and was not recorded until April 8. Observations suggest that two distinct waves passed through the area - the first on April 23 when the population peaked and the second on May 6 (Table 3). On both occasions the data suggest a preponderance of males. The peak number of pairs was observed on May 4, about two weeks after the population peak (Figure 2). In comparison with last year's data, the number of Pintails was down considerably.

The American Green-winged Teal (A. crecca carolinensis) also arrived on April 8 (Table 4). Numbers remained quite low for ten days until a couple of large flocks reached the area (Figure 3).

The population rose rapidly and had peaked by April 26. During the three weeks following that those ducks were frequently observed in courtship display. Peak number of pairs occurred on May 11, when a total of 15 was recorded. Population numbers dropped rapidly after April 13 and males formed the major component of the population.

The Blue-winged Teal (A. discors) population peaked on April 22, about two weeks earlier than in 1973 (Table 5). Peak number of pairs was recorded on May 18 (the latest of any species) when a total of 20 were observed (Figure 4). Total numbers were up marginally from last year.

Although large numbers of Blue-winged Teal were present, that species was not actively involved in courtship behaviour. Head-pumping performed by a male and female late in May is indicative of nest destruction and pre-renesting behaviour.

In spite of the relatively large population, production will probably be low, being limited by poor nesting habitat. Due to inadequate nesting cover, those ducks often choose to nest on dikes - routes regularly used by predators. Evidence is available for the destruction of two nests occurring on dikes and a clutch of two located on June 11 is highly indicative of a renesting attempt.

Undoubtedly the most notable observation of the 1974 survey was the remarkable increase in numbers of Ring-necked Ducks (Aythya collaris). On almost all occasions the Ring-necked Duck occurred more frequently and in higher numbers than any other waterfowl species (Table 1). As recent as 1971 Ring-necks were absent from Tintamarre NWA. During the 1974 survey a peak number of 100 individuals

occurred (Table 6). The peak number of pairs, the highest of any species, occurred on May 11, about two weeks later than the population peak (Figure 5). The increased abundance of Ring-necks can probably be attributed to an eastward movement of the continental population and/or the high success of this pioneering species. The latter postulation is not unlikely since the Ring-neck has moved into a previously unexploited niche. It is anticipated that the Ring-neck will lead all species in brood production.

As in previous years the Shoveler (Anas clypeata) and American Wigeon (A. americana) occurred in low numbers (Table 1). Shovelers were observed most frequently in Impoundments II and IV, while the American Wigeon were consistently associated with a raft of Ring-necked Ducks in Front Lake.

Table 1. Daily totals of waterfowl species at Tintamarre NWA - Spring, 1974

Date	C.goose	Mall.	Blk.	A.wig.	Pin.	A.Gwt.	Bwt.	Shov.	Wood	Ring-n.	C.Goldeneye
March 18	9										
19											
21	12		2								
24											1
25											
26											
29											
30			2								
April 2											
3			2								
4			13							3	
8			30		4	4	5			8	
11			34			7				4	1
13			25		15	9			1	18	
15			33		10		1		1	30	
16		5	51		8	2				38	3
18			52		11	3	5			52	
19		1	35		57	45	36			65	1
20	20		19		18	38	21	3		52	3
21			42		11	44	17	5		92	
22		2	29	7	59	63	48			89	
26		2	26	6	29	118	44		1	52	
28			18	6	14	94	36	5	2	88	
30			21	10	11	83	30	1		100	
May 4			11	5	35	46	15	4		56	
6			20	4	51	97	42	4		67	
11		1	20		25	68	38	2		72	
13		1	33	2	17	83	44	5	1	60	
18		2	18	3	18	14	35	5	2	46	
20		1	24		15	39	40	5		54	
21		1	32	2	21	13	33	5		31	
24		1	33		20	17	25	2	1	43	
28			14		11	6	23	4	1	29	

Table 1a. Additional waterfowl species observed on Tintamarre NWA, Spring, 1974.

Species	Total number	Date
Greater scaup	7	April 26
Common eider	5	April 20
Surf scoter	13	April 19
Common merganser	2	March 30
	2	May 6
Red-breasted merganser	1	April 19
	1	April 20
	1	April 21
	1	April 28

Table 2. Black Duck - Total number, number of pairs and per cent paired - Tintamarre NWA, Spring 1974

Date	Total number	Number of pairs	Per cent paired
March 18			
19			
21	2	1	100
24			
25			
26			
29			
30	2	1	100
April 2			
3	2	1	100
4	13	5	38
8	30	7	47
11	34	9	53
13	25	7	56
15	33	8	48
16	51	7	27
18	52	10	38
19	41	19	93
20	19	9	95
21	42	10	48
22	29	14	97
26	26	10	80
28	18	8	88
30	21	9	85
May 4	11	2	36
6	20	5	50
11	20	4	40
13	33	3	18
18	18	5	55
20	24	4	33
21	32	5	31
24	33	4	24
28	14	3	42

Table 3. Pintail - Daily totals, number of pairs, per cent paired and sex composition - Tintamarre NWA, Spring 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 18					
19					
21					
24					
25					
26					
29					
30					
April 2					
3					
4					
8	4	2	100	2	2
11					
13	15	2	26	11	4
15	11	3	54	8	3
16	8	2	50	6	2
18	11	2	36	7	4
19	57	3	11	7+	4+
20	18	3	33	11	7
21	11	2	36	9	2
22	59	12	41	18+	12+
26	31	8	52	22	9
28	17	7	82	9	8
30	23	9	78	13	10
May 4	35	14	80	21	14
6	51	9	35	18+	9+
11	29	7	48	22	7
13	17	2	24	7+	4+
18	18	4	44	12	6
20	15	3	40	10	5
21	20	5	100	15	5
24	19	2	21	14	5
28	11	1	18	10	1

Table 4. American Green-winged Teal - Daily totals, number of pairs, per cent paired and sex composition - Tintamarre NWA, Spring 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 18					
19					
21					
24					
25					
26					
29					
30					
April 2					
3					
4					
8	4	1	50	3	1
11	2	1	100	1	1
13	9	-		5	4
15					
16	2	1	100	1	1
18	3	-		2	1
19	45	4	18	17+	9+
20	38	3	16	5+	3+
21	44	4	18	4+	4+
22	63	4	13	14+	8+
26	118	14	24	14+	14+
28	94	7	15	9+	7+
30	83	24	58	26+	24+
May 4	46	22	96	22+	22+
6	97	16	33	17+	16+
11	68	25	74	30+	29+
13	83	17	41	19+	17+
18	14	7	100	7	7
20	39	8	41	11+	8+
21	13	2	31	11	2
24	17	2	24	13	4
28	6	-		6	

Table 5. Blue-winged Teal - Daily totals, number of pairs, per cent paired and sex composition - Tintamarre NWA, Spring 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 18					
19					
21					
24					
25					
26					
29					
30					
April 2					
3					
4					
8	5	2	80	3	2
11					
13					
15	1			1	
16					
18	5	2	80	3	2
19	36	8	44	8+	8+
20	21	4	38	5+	4+
21	17	6	71	6+	6+
22	48	4	17	8+	6+
26	44	11	50	13+	11+
28	36	10	56	18+	10+
30	30	11	73	14+	11+
May 4	15	3	40	5+	3+
6	42	13	62	20+	13+
11	38	14	74	24	14
13	44	19	86	23	19
18	44	20	91	24	20
20	40	16	80	24	16
21	33	8	48	23	10
24	25	8	64	17	8
28	23	5	43	20	6

Table 6. Ring-necked Duck - Daily totals, number of pairs, per cent paired and sex composition - Tintamarre NWA, Spring 1974

Date	Total number	Number of pairs	Per cent paired	Number males	Number females
March 18					
19					
21					
24					
25					
26					
29					
30					
April 2					
3					
4	3	-		3	
8	8	1	25	6	2
11	4	2	100	2	2
13	18	-		15	3
15	30	4	27	19	11
16	38	2	11	28	10
18	32	4	15	41	11
19	65	3	9	49	16
20	52	14	54	32	20
21	92	15	33	66	26
22	89	14	31	68	21
26	52	12	46	35	17
28	88	10	23	12+	10+
30	100	19	38	69	31
May 4	56	26	96	30	26
6	67	21	63	43	24
11	78	34	87	44	34
13	66	28	85	38	28
18	46	18	78	27	19
20	54	20	74	33	21
21	31	9	58	22	9
24	43	11	51	30	13
28	29	5	34	24	5

Figure A. Observation sites for Tintamarre NWA Impoundments

Observation sites: •

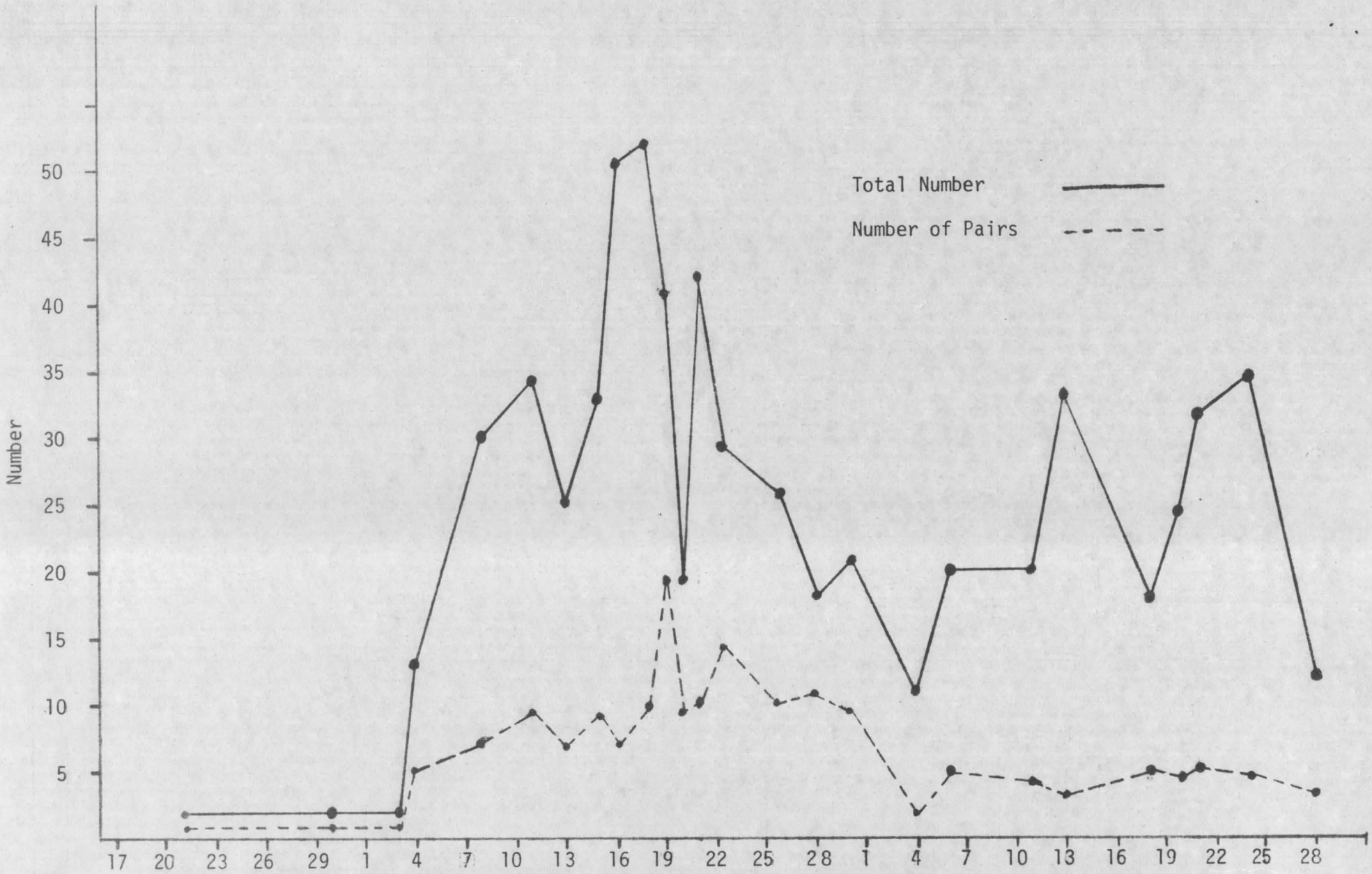

Figure 1. Total number and number of pairs of Black Duck at Tintamarre NWA, Spring 1974

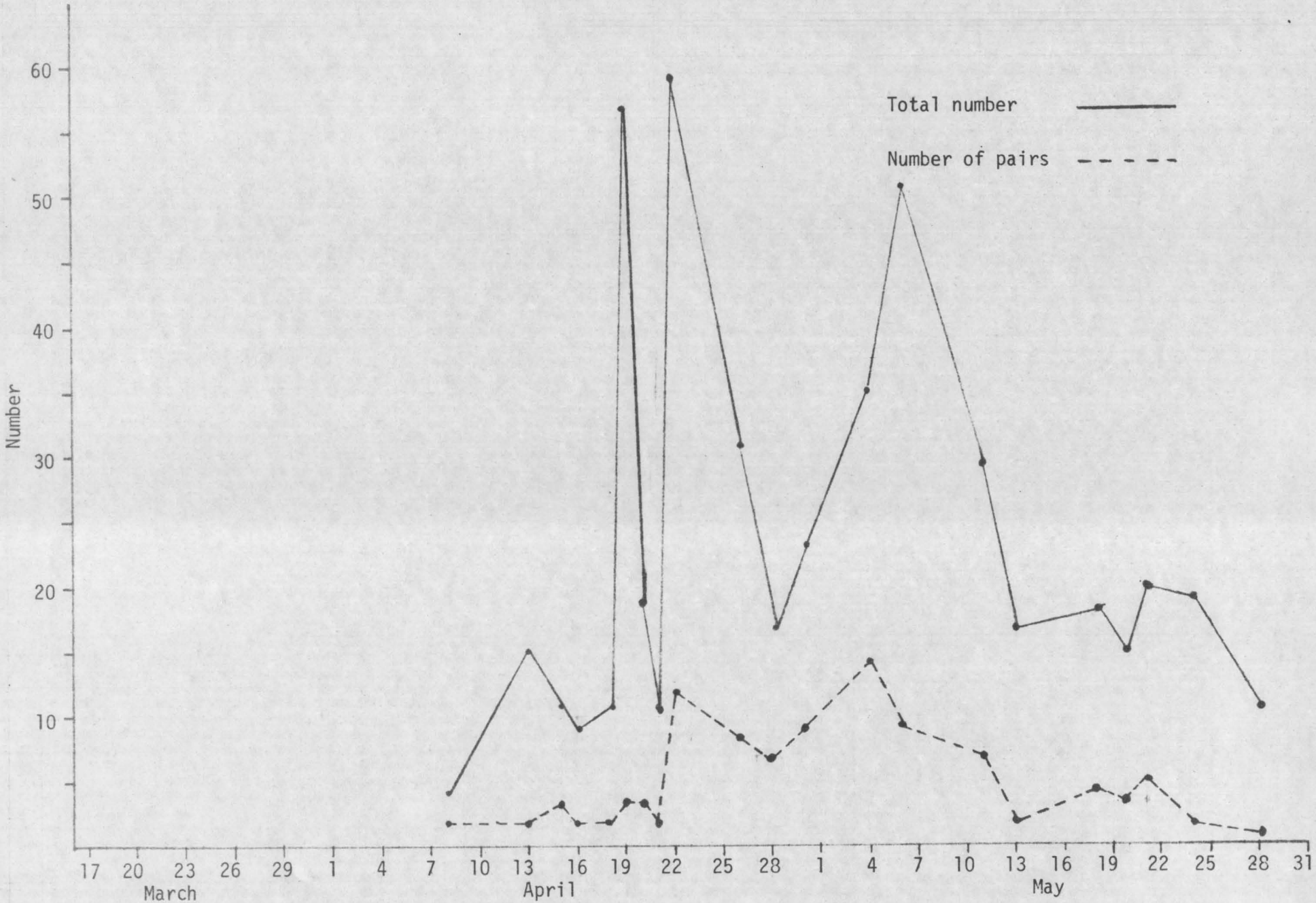

Figure 2. Total number and number of pairs of Pintail at Tintamarre NWA, 1974

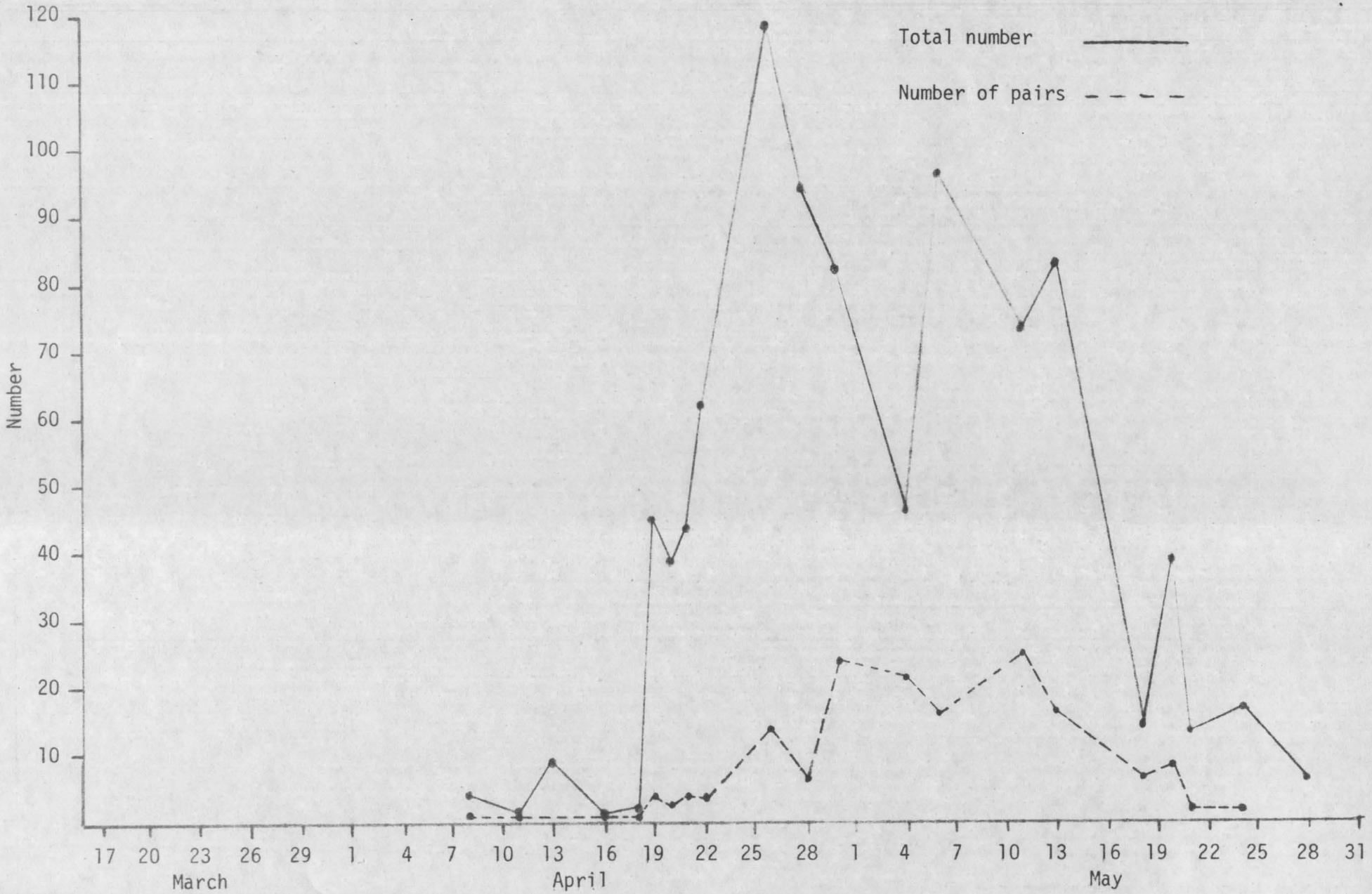

Figure 3. Total number and number of pairs of American Green-winged Teal at Tintamarre NWA, Spring, 1974

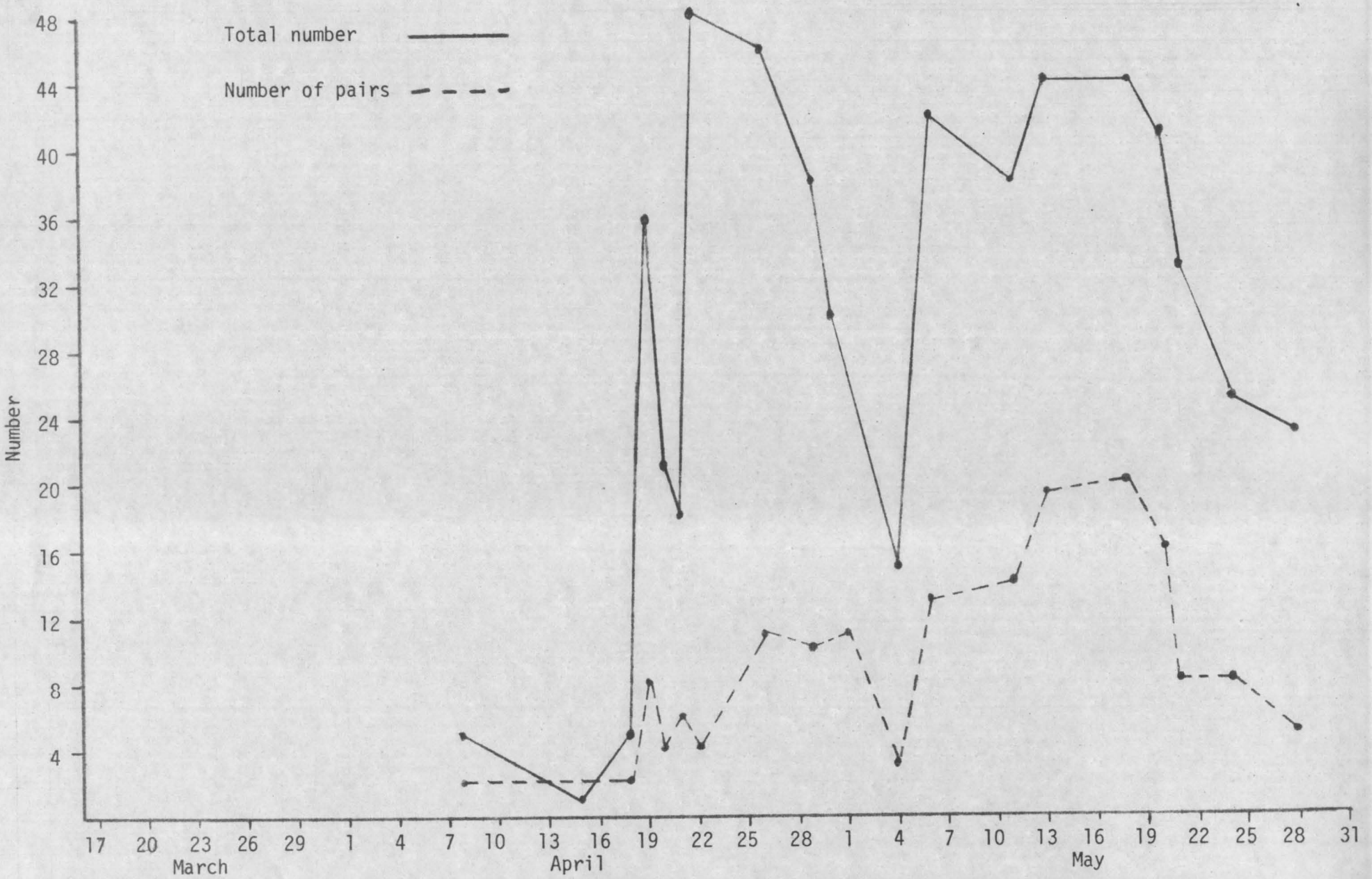

Figure 4. Total number and number of pairs of Blue-winged Teal at Tintamarre NWA, Spring 1974

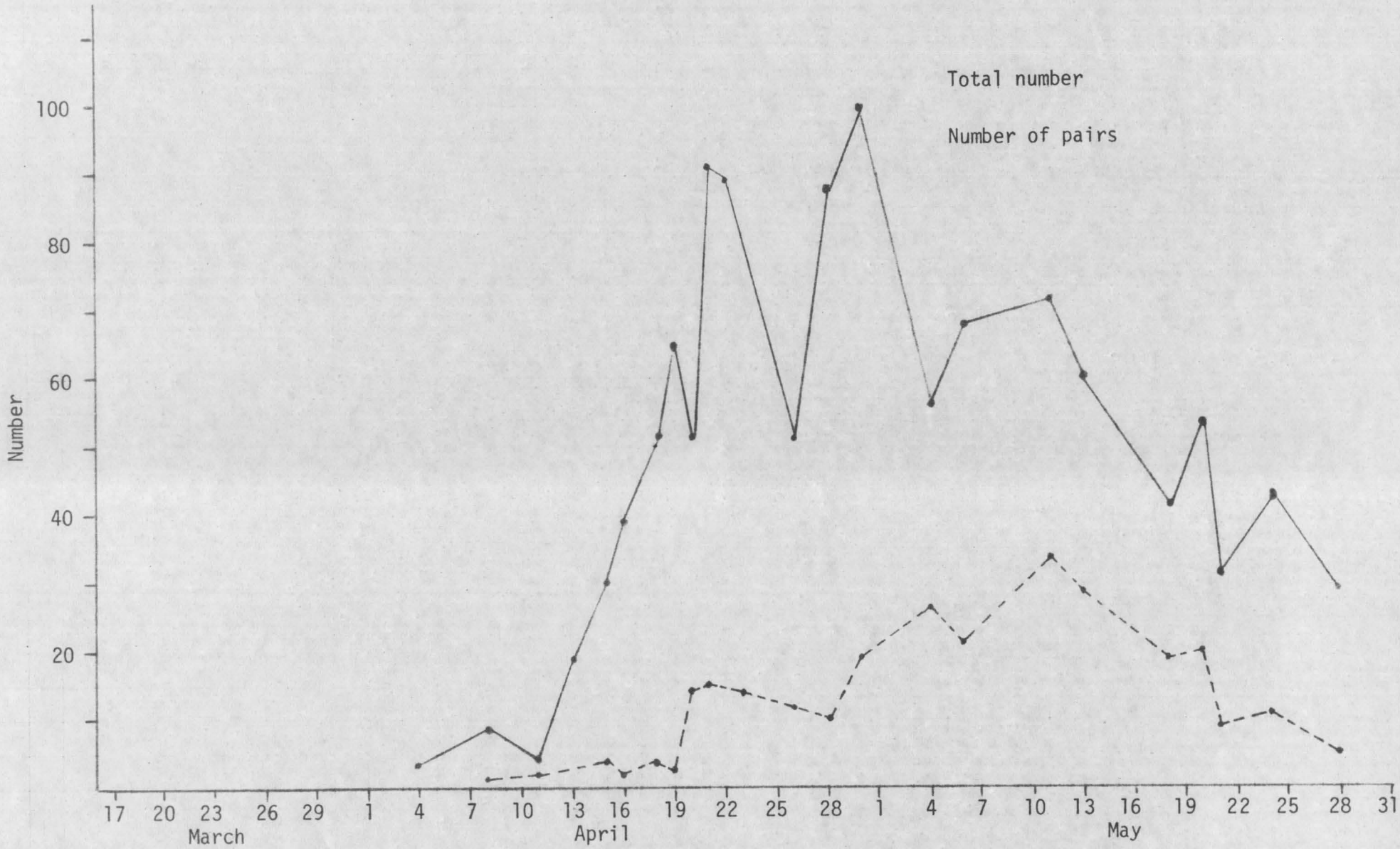

Figure 5. Total number and number of pairs of Ring-necked Duck at Tintamarre NWA, Spring 1974

Observations on Waterfowl Courtship and Breeding Behaviour

April 13 - Ringneck - Front Lake: Nine ducks consisting of 8 males and one female were observed in a compact group. The individuals were swimming in unison through frequent changes of direction that were apparently determined by the female which maintained a central position. Males frequently threatened and chased each other by swimming rapidly with neck extended along water.

April 13 - Ring-neck - Impoundment 2 - In a group of nine ducks seven males were observed performing sexual display to two females. Head-throws were the common display while wing-flaps and preening-behind-the-wing occurred less frequently. That behaviour evoked no apparent response from the two females. Both sexes were quite vocal.

April 16 - Mallard: A single grunt-whistle performed by a male mallard. This was the only sexual display of a group of 33 ducks consisting of 29 Blacks and 4 Mallards.

April 16 - Ring-neck: Front Lake - Males threatened each other with neck extended along water. Each of five females attended by four to six males.

April 16 - Green-winged Teal - Westcock Marsh: Antagonistic behaviour exhibited by two males which vigorously offended each other with flapping wings and snapping with the bill. The encounter lasted about 8 seconds until one male conceded and swam away.

April 16 - Red-breasted merganser - Ram Pasture: Head-nods were performed by a female, while males were observed 'sprinting' in a closed wing fashion.

April 18 - Ring-neck - Front Lake: Antagonistic behaviour exhibited by groups of males attending single females.

April 18 - Black Duck - Front Lake: Seven of a group of 30 were attracted to one duck (obviously a female) and antagonistic behaviour resulted. One male was observed with neck extended horizontally along water while chasing another for a short distance.

April 19 - Ring-neck - Impoundment 5: Males frequently performed head-throws. Head thrown back to assume horizontal position over back.

April 19 - Green-winged Teal - Impoundment 5: Four of 12 males actively displayed the grunt-whistle to five females. Wing-flaps were also observed.

April 20 - Black Duck - A nest containing four eggs was found on north-west dyke of Impoundment 4. This nest was later destroyed by a predator.

April 20 - Green-winged Teal - Impoundment 4: In a group of 30 several males were observed performing the grunt-whistle, head-up-tail-up, and tail-up. The exact number of participants could not be determined since the males often performed in near synchrony, while actively swimming through Spiraea sp. and Carex rostrata.

April 22 - Ring-neck - Front Lake: An inciting female was attended by several males. On two occasions the female led the flock on a flight around Front Lake. At the termination of each flight, some males immediately began head-throwing.

April 22 - Ring-neck - Impoundment 4: A female of a pair was approached by her mate from a postero-lateral direction. While obtaining a grip on thenape of the female, the male mounted. Copulation lasted about 10 seconds during which time the female was completely submerged except for the head.

April 22 - Green-winged teal - Impoundment: Grunt-whistle and head-up-tail-up were observed.

April 23 - Red-breasted Merganser - Coles Island: 'Sprints' performed by males.

April 29 - Green-winged Teal - Coles Island: Two males were observed performing the grunt-whistle, and head-up-tail-up to a single female. Wing-flaps were also displayed but considerably less frequent.

April 29 - Green-winged Teal - Ram Pasture: Grunt-whistle, followed immediately by head-up-tail-up was displayed.

April 30 - Blue-winged Teal - Impoundment 2: A single male alighted within 10 feet of a mated pair. Having been attracted by the quacking and neck stretch of the mated female, the lone male swam toward the pair and began bill-dipping in his approach. At a distance of 2 feet, the intruder was discouraged by a neck stretch of the mated male and swam away.

April 30 - Ring-neck - Impoundment 3: Having been disturbed by the observer, a pair of ring-necks became very upset and circled overhead on four occasions. This is not an uncommon reaction.

May 1 - Red-breasted Merganser - Ram Pasture: In a flock of 57, the males were very active and displayed frequently with 'knicks' and 'sprints'.

May 4 - Green-winged Teal - Impoundment 4: Ina dispersed group of 40 ducks, calculated to contain 15 pairs, the males were actively performing the grunt-whistle and the associated head-up-tail-up. The tail-up was also observed but apparently not linked to any other display. Wing-flaps occurred.

May 6 - Ring-neck - Front Lake: All females not paired as several males in a group of 19 performed the head-throw. Only three females were present and fighting occurred among the males.

May 7 - Green-winged Teal - Ram Pasture: Males performed grunt-whistle and head-up-tail-up.

May 7.- Red-breasted Merganser - Ram Pasture - Males performed 'knicks'.

May 18 - Ring-neck - Impoundment 2: In a group of 5 ducks consisting of 4 males and one female, one male performed the head-throw.

May 21 - Blue-winged Teal - Impoundment 2: Head-pumping by two females evoked the same behaviour from four males.

May 24 - Mallard - Impoundment 5: Male mallard was observed sitting in the same pool for the sixth time since May 11.

May 28 - Blue-winged Teal - Impoundment 4: A female, inciting with head-pumps evoked same behaviour from one of three attending males.

Appendix I. A summary of weather conditions during the Migration Chronology Study - 1974. Maximum and minimum temperatures are from the Atmospheric Environment Service, Department of the Environment, Monthly Meteorological Summary, Moncton, New Brunswick Station

Date		Max. Temp*	Min. Temp*	Cloud cover	Wind speed	Wind direction	Precipitation
March	10	28	12	overcast	moderate	SE	snow
	11	20	2	overcast	moderate	NW	snow flurries
	12	14	-2	clear	high	W	
	13	29	3	overcast	moderate	W	snow flurries
	14	34	18	> ½ overcast	moderate	WNW	snow flurries
	15	36	15	clear	light	WSW	
	16	43	19	clear	light	SSW	
	17	48	33	overcast	moderate	ESE	showers
	18	38	30	> ½ overcast	moderate	WSW	
	19	36	27	> ½ overcast	moderate	W	
	20	28	10	> ½ overcast	moderate	WNW	snow
	21	33	5	overcast	light	E	snow
	22	34	21	clear	moderate	W	
	23	43	19	overcast	moderate	SSW	
	24	49	27	overcast	moderate	S	showers
	25	27	12	> ½ overcast	moderate	WNW	
	26	32	9	clear	moderate	SSW	
	27	29	9	> ½ overcast	moderate	NW	snow
	28	21	4	> ½ overcast	moderate	NW	
	29	29	3	clear	light	WNW	
	30	40	10	clear	light	SSE	
	31	34	24	overcast	light	E	rain
April	1	38	32	overcast	moderate	W	
	2	39	28	> ½ overcast	moderate	NE	
	3	36	27	overcast	light	NE	snow flurries
	4	43	30	overcast	moderate	SE	rain
	5	50	40	overcast	light	SW	fog
	6	47	31	> ½ overcast	light	WSW	showers
	7	43	29	clear	moderate	W	
	8	42	23	overcast	moderate	WSW	
	9	31	19	clear	moderate	ENE	
	10	32	27	overcast	moderate	NNE	fog-drizzle
	11	35	25	overcast	moderate	NW	
	12	40	22	clear	moderate	NW	
	13	43	20	clear	light	SW	
	14	37	29	overcast	light	S	rain
	15	51	35	overcast	moderate	SSE	rain
	16	43	29	overcast	moderate	W	showers
	17	56	28	clear	moderate	W	
	18	64	29	clear	moderate	SSW	
	19	42	24	clear	moderate	NNE	
	20	44	19	clear	light	WNW	

* degrees Farenheit

Appendix I. continued

Date	Max. Temp	Min. Temp	Cloud cover	Wind speed	Wind direction	Precipitation
April 21	53	24	clear	light	WSW	
22	53	38	overcast	light	ENE	snow flurries
23	48	33	overcast	light	NNE	rain
24	34	30	overcast	moderate	NE	snow flurries
25	35	29	overcast	moderate	NNE	
26	38	28	overcast	moderate	NNE	snow flurries
27	61	28	clear	light	WSW	
28	71	39	>½ overcast	light	WSW	
29	59	42	overcast	light	SSW	showers
30	54	37	overcast	light	NNE	showers
May 1	51	31	overcast	moderate	S	rain
2	46	24	>½ overcast	moderate	W	
3	50	29	clear	moderate	WNW	
4	52	34	overcast	light	SSE	
5	48	30	overcast	moderate	WNW	
6	54	27	clear	light	W	
7	52	31	overcast	moderate	NE	
8	44	33	overcast	light	W	showers
9	55	32	clear	light	E	
10	58	33	clear	moderate	E	
11	50	38	overcast	light	S	light rain
12	58	41	overcast	light	S	
13	60	41	overcast	moderate	SSE	showers
14	62	42	clear	moderate	W	
15	79	45	clear	moderate	SSE	
16	70	42	clear	moderate	W	
17	54	39	overcast	light	S	showers
18	57	40	clear	moderate	WNW	
19	52	39	overcast	moderate	NNW	
20	52	30	overcast	moderate	N	
21	56	28	clear	light	WSW	
22	47	36	overcast	light	ENE	
23	56	36	>½ overcast	light	ENE	
24	45	39	overcast	moderate	E	rain
25	45	39	overcast	light	E	showers
26	46	38	overcast	moderate	E	
27	48	35	overcast	moderate	N	showers
28	40	32	overcast	moderate	NE	rain
29	44	30	overcast	moderate	N	rain
30	60	28	overcast	light	WSW	
31	65	30	clear	light	SE	