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Progress Report

Waterfowl surveys on Prince Edward Island 1994

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REPORT

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QL
696, A5
B328
1994

Progress Report

Waterfowl Surveys on Prince Edward Island 1994

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November 1994

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Introduction

Consistent long-term monitoring surveys are a necessary part of waterfowl management. Managers must be able to monitor changes in the populations and determine the effects of management strategies. The Canadian Wildlife Service and the PEI Fish and Wildlife Division initiated a cooperative survey consisting of four annual counts each year. The 1994 season was the twelfth consecutive year of the survey and makes it the longest-running breeding ground survey in the Atlantic provinces. However, the first two years of survey (1983 and 1984) are considered trial years and the data are not included here.

Data from the first six years of the survey (1983-1988) were compiled and analyzed previously (Bateman and Dibblee 1988). Evaluation of the results of the first six years of survey confirmed that it is a useful tool for monitoring breeding waterfowl on PEI. Those results contributed to the decisions for changes in the waterfowl hunting regulations for PEI. This survey is one of the tools which is being used to monitor the resulting population changes.

This report summarizes results from the 1994 counts and updates the long term data.

Methods

Selection of wetlands

One hundred wetlands were randomly selected by computer from the data file of freshwater wetlands on Prince Edward Island (later documented in Hudgins, 1987) (Figure 1). The total number of wetlands selected was restricted by manpower available to do the survey. The quality of selected wetlands ranged from poor to very good. Twenty-eight wetlands which had no apparent potential for waterfowl use were discarded after the initial survey in 1983. In addition, some wetlands were eliminated from the survey in subsequent years because of lack of waterfowl use, destruction of the wetland, or because a wetland was found impossible to survey in a reproducible manner. Subsequent analysis of data indicated that 900 wetlands must be surveyed to reliably detect a 10 percent change in the Black Duck population over five years.

Methods of survey

Four counts were scheduled for each year. Timing was adjusted for an "early" or "late" spring and the first count was scheduled to begin the last week in April or first week in May. The other three counts were scheduled 4 (count 2), 8 (count 3), and 12 (count 4) weeks after the first count. Count 1 and Count 2 were scheduled 24 April through 7 May and 22 May through 4 June in 1994.

The counts on each wetland were carried out by walking, canoeing, or observing from a blind. Each wetland was surveyed in a manner that permitted a complete count of all waterfowl present. Each wetland was assigned to an observer to reduce observer bias and to ensure consistency of methods used at each site each year (Appendix 1). Observations of waterfowl on each area were recorded by species, sex, and group size and ducklings were aged according to Gollop and Marshall (1954). In addition, behaviour of the birds was noted, and pairs thought to be breeding locally (indicated pairs) were determined by the observers. Weather conditions and time of the observations were also recorded.

Analysis of data

Data were analyzed on the basis of total ducks and indicated pairs observed. Counts 1 and 2 were analyzed separately because they represented different stages in the breeding chronology. Black Duck breeding pair data used in the analysis were from only those wetlands surveyed within definite two-week periods for each of Count 1 and Count 2. Assessments of breeding pair data were not so restricted for other species. Statistical analysis for trends in the Black Duck population was performed using a route regression analysis program prepared by B. Collins (CWS-HQ). Trend was determined using an averaged regression method.

Brood survey data from a wetland in any year were used only if both Count 3 and Count 4 were done on that wetland that year. The minimum number of broods of each species on each wetland was determined by assuming that broods of appropriate age for each count in that wetland were the same broods. Brood data were analysed on a sub-sample of wetlands that was surveyed regularly in both Counts 3 and 4. Even then, the sample sizes were not identical each year and the brood index (broods per wetland) on 32 wetlands was calculated using the mean of available data from each individual wetland for each missing datum on the wetland.

Results and Discussion

The survey was conducted by participants from the Canadian Wildlife Service and the PEI Fish and Wildlife Division (Appendix I). Workshops held in Charlottetown in March 1989 and April 1991 permitted discussion, evaluation and modification of survey techniques. As a result, observation methods may have been applied more consistently by all observers during the 1989, and later surveys than in previous years. Data from previous years are included in this report (except for 1983 and 1984) but comparisons with data prior to 1989 must be interpreted with caution. Wetlands were not all surveyed in all years, and some of the counts were not done on schedule.

Total counts of all waterfowl recorded are included in Appendix II, Tables i, ii. The numbers of broods recorded on all wetlands surveyed on both counts 3 and 4 are tabulated by species in Appendix II, Table iii. Graphic illustrations of the numbers of mallards, wigeon and gadwall recorded on counts 1 and 2 in 1985-1994 are included in Appendix III.

Black Ducks made up 28 percent of breeding pairs observed on count 1 (Figure 2) and Ring-necked ducks accounted for 25 percent. Even though count 1 is early for Blue-winged Teal, that species was 11 percent of the pairs recorded whereas Green-winged Teal was 14 percent. The composition of breeding birds recorded on count 2 was different because early breeders are not all visible and late arriving species are on site (Figure 3). Results from count 2 show 19 percent of the observed breeding pairs were Black Ducks, 31 percent were ring-necks, 20 percent were blue-wings but only 6 percent were green-wings. Blue-winged Teal, Black Duck, Green-winged Teal and Ring-necked Duck were the most numerous species in the brood counts (Figure 4). Blue-winged Teal broods made up 26 percent of the total broods observed; Black Ducks, 23 percent; Green-winged Teal, 14 percent and Ring-necked Ducks, 14 percent.

Black Duck

Seventy four wetlands meet the criteria to be surveyed annually. In 1994, 73 and 72 wetlands were surveyed within the time periods specified for Black Ducks on counts 1 and 2 respectively. The number of indicated pairs per wetland was 2.3 on count 1 and 1.6 on count 2 (Table 1, Figure 5). Results of a trend analysis using an average regression method showed a

stable population 1990 to 1994 (negative slope; $p < 0.5$) using the count 1 data. The results using count 2 data were very similar- a non-significant negative slope ($p < 0.5$). Results of count 1 and count 2 are not comparable and must be analysed separately. The first survey is affected by migrants and the second survey underestimates the breeding population because brooding females are seldom observed. However, both counts suggest an increase in Black Duck breeding population and a stable trend in numbers on Prince Edward Island since the regulation change in 1989. The number of indicated pairs of Black Duck was up 15 percent from 1993 on count 1 and up 23 percent on count 2. The general increase in Black Duck breeding pairs since 1989 followed a 40 percent reduction in the 1989 Black Duck harvest. The mean harvest 1989-1993 was 42 percent below the mean for 1984-1988 (CWS National Harvest Survey preliminary data).

Although breeding pairs represent potential broods, actual brood production and survival is dependent on weather conditions. Cold, wet weather in May and June can cause high mortality in young ducklings (downy young). The relationship between the number of pairs and the number of broods recorded varied between years during the surveys (Bateman and Dibblee, 1988). However, the results of brood surveys provide essential data for evaluation of wetland habitat and annual production. In 1994, 28 of the 32 brood survey wetlands were surveyed on counts 3 and 4 and were analysed for brood production. At least 37 Black Duck broods were produced on those wetlands. The mean number of broods per wetland (corrected for missing data) was 1.3 compared to 1.3 for the ten-year average (1985 to 1994). That suggests that 1994 was an average year for Black Duck production, but the best production year since 1991 (Figure 6).

Green-winged Teal

The results of count 1 for Green-winged Teal include a large number of migrant birds. The accuracy with which migrants were distinguished from local breeders is unknown. Results of count 2 are more likely to reflect trends in the breeding population. Results of count 2, expressed as indicated pairs of green-wings per wetland and as total birds per wetland, suggest a stable or upward trend (Figures 7, 8, Table 2). The 1994 results were 0.5 indicated pairs per wetland and 0.9 birds per wetland compared to 0.7 and 1.0 in 1993. The number of broods

recorded in 1994 (0.8 per wetland) suggest successful production compared to the ten-year average (1985-1994) of 0.5 broods per wetland (Table 2).

Blue-winged Teal

Count 1 was far too early to provide useful data on Blue-winged Teal. Count 2 may provide a useful index to the population. The number of indicated pairs and total number of ducks suggest a stable population (Table 3, Figure 9). In 1994, 2.5 birds per wetland and 1.6 indicated pairs per wetland were recorded compared to 3.1 and 1.9 in 1993 and a ten-year average (1985-1994) of 3.0 birds per wetland and 2.0 pairs per wetland. The number of broods observed in 1994 suggest an unproductive year (1.1 broods per wetland compared to 1.0 in 1993 and a ten-year average of 1.6).

Ring-necked Duck

Breeding chronology and behaviour of the Ring-necked Duck were studied in Maine and New Brunswick, 1943-1955 by Mendall (1958). He found that the average date at which 50 percent of nests were initiated was 23 May but did not provide insight into the determination of local breeders vs migrants at this time of the year. Large flocks of Ring-necks were often recorded during Count 1 on PEI. The proportion of those birds that was local breeders cannot be determined but was probably relatively small. Count 2 may be a more valid index to the breeding population on PEI. The average number of ring-necks per wetland suggests an increasing or stable population over the ten years of surveys (Table 4, Figure 10). In 1994, 6.1 birds were recorded per wetland on Count 1 and 4.4 on Count 2 compared to 6.0 and 4.0 in 1993. Results of the brood surveys suggest that 1994 was not a successful production year for Ring-necked Ducks when 0.9 broods were recorded per wetland, compared to 1.1 in 1993 and a ten-year average of 1.3.

Summary and Recommendations

1. A ground survey of selected Prince Edward Island wetlands was carried out in 1994 for the tenth consecutive year (disregarding the trial years of 1983 and 1984). The survey consisted of four counts on each selected wetland each year. Although techniques used to count waterfowl were the same in all years, interpretation by observers may have been more consistent since 1989 when workshops to discuss techniques were begun.
2. Results of trend analysis on the Black Duck data showed a stable population since the regulation changes in 1989. The breeding population of Black Ducks on PEI has been declining over the long term and a more precise evaluation of the data will be carried out in winter 1994-95. Results of the brood survey suggest that 1994 was not a very successful production year for Black Ducks on Prince Edward Island.
3. Addition of the 1994 data did not affect the trend of the breeding Green-winged Teal population. The number of broods recorded suggested a successful production year for green-wings.
4. The number of Blue-winged Teal recorded per wetland and the mean number of indicated pairs recorded was lower than the ten year average. Blue-wing production in 1994 was low.
5. The number of Ring-necked Ducks recorded per wetland suggests an increasing or stable population during the ten years of surveys. The numbers recorded in 1994 were higher on count 1 count 2 than in 1993. Ring-necked Duck production in 1994 was low; the average number of broods per surveyed wetland was 0.9 compared to a ten-year average of 1.3.
6. It is recommended that the PEI survey continue to be carried out each year using the same methods as in 1994.

References Cited

- Bateman, M.C. and R.L. Dibblee. 1988. Six years of waterfowl surveys on Prince Edward Island. CWS manuscript report 10 pp. + tables and figures.
- Gollop, J.B. and W.H. Marshall. 1954. A guide to aging duck broods in the field. Miss. Flyway Council Tech. Sect. Rep. 9 pp. (mimeo).
- Hudgins, E. 1987 (revised). Prince Edward Island Wetlands Inventory Summary Data. Wetland Inventory Report No. 22. Wetland Protection Mapping Canadian Wildlife Service.
- Mendall, H.L. 1958. The Ring-necked Duck in the northeast. Univ. of Maine Bulletin. Vol. LX No. 16, 317 pp.

Table 1. Black Duck results from the PEI surveys, 1985-1994

	1985		1986		1987		1988		1989		1990		1991		1992		1993		1994	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
No. of wetlands surveyed within specified time period (see text)	53	74	76	79	74	66	62	67	78	79	76	73	71	73	70	63	75	74	73	72
No. of indicated pairs	113	116	165	90	131	83	105	95	136	80	167	115	154**	118	168*	86*	155*	97	167	116
Total birds observed	207	195	363	163	240	203	293	255	279	174	656	234	469	283	459	287	336	270	350	311
Mean no. birds per wetland	3.9	2.6	4.8	2.1	3.2	3.1	4.7	3.8	3.6	2.2	8.6	3.2	6.6	3.9	6.6	4.6	4.5	3.6	4.8	4.3
Ave. no. indicated pr. per wetland	2.1	1.6	2.2	1.1	1.8	1.3	1.7	1.4	1.7	1.0	2.2	1.6	2.2	1.6	2.4	1.4	2.0	1.3	2.3	1.6
No. of wetlands surveyed for broods (both surveys 3, 4)	33		33		28		30		22		25		29		25		30		28	
Min. no. Bl. Duck broods	38		34		48		39		27		29		48		26		34		37	
Ave. no. broods [†] per wetland	1.2		1.2		1.6		1.3		1.2		1.1		1.6		1.0		1.1		1.3	

* corrected for missing data
 † 1 Blk-Mal. pair included
 ** 1 Blk + Hyb. pair and 1 Blk + Mal. pair included

Table 2. The results for Green-winged Teal of ten years of breeding pair surveys on PEI, 1985-1994.

Year	1985		1986		1987		1988		1989		1990		1991		1992		1993		1994	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
No. of wetlands surveyed	53	74	76	79	80	78	79	73	73	79	77	74	71	73	70	63	75	74	73	72
No. of indicated pairs	100	27	122	26	99	44	63	48	111	32	115	43	160	57	102	51	105	52	86	36
Total birds observed	339	37	401	44	330	55	305	56	390	44	556	59	798	104	425	82	622	71	506	66
Ave. no. indicated pr. per wetland	1.9	0.4	1.6	0.3	1.2	0.6	0.8	0.6	1.4	0.4	1.5	0.6	2.2	0.8	1.4	0.8	1.4	0.7	1.2	0.5
Ave. no. birds per wetland	6.4	0.5	5.3	0.6	4.1	0.7	3.9	0.8	4.9	0.6	7.2	0.8	11.2	1.4	6.1	1.3	8.3	1.0	6.9	0.9
Ind. prs. as % of total birds	30	80	30	50	30	80	21	86	28	73	21	73	20	55	24	62	17	63	17	54
No. of wetlands surveyed for broods	33		33		28		30		22		25		29		25		30		28	
Min. no. broods	14		7		11		12		16		18		25		21		7		27	
Ave. no. broods* per wetland	0.4		0.2		0.4		0.4		0.5		0.6		0.8		0.7		0.2		0.8	

* corrected for missing data

Table 3. The results for Blue-winged Teal of ten years of breeding pair surveys (count 2) on PEI, 1985-1994.

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
No. of wetlands surveyed	83	79	78	73	79	74	73	63	74	74
No. of indicated pairs	187	143	140	143	156	187	186	126	144	122
Total birds observed	265	224	221	221	237	298	206	198	231	186
Ave. no. indicated pr. per wetland	2.2	1.8	1.8	1.9	2.0	2.5	2.5	2.0	1.9	1.6
Ave. no. birds per wetland	3.2	2.8	2.8	3.0	3.0	4.0	2.8	3.1	3.1	2.5
No. of wetlands surveyed for broods	33	33	28	30	32	24	29	25	30	28
Min. no. broods	51	52	66	63	34	48	57	41	33	33
Ave. no. broods* per wetland	1.7	1.6	2.2	2.0	1.5	1.9	2.0	1.4	1.0	1.1

* corrected for missing data

Table 4. The results for Ring-necked Duck of ten years of surveys on PEI, 1985-1994.

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Count	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2	1 2
No. of wetlands surveyed	81	80	81	79	79	77	71	70	75	73
Total R.-necked Ducks	514	515	734	467	564	497	538	593	448	446
Ave. no. per wetland	6.3	6.4	9.1	5.9	7.1	6.4	7.6	8.5	6.0	6.1
No. of wetlands surveyed for broods	33	33	28	30	22	25	29	25	30	28
Min. no. of broods	50	36	48	35	56	36	31	40	34	27
Ave. no. broods* per wetland	1.5	1.1	1.6	1.2	2.0	1.5	1.0	1.3	1.1	0.9

* corrected for missing data

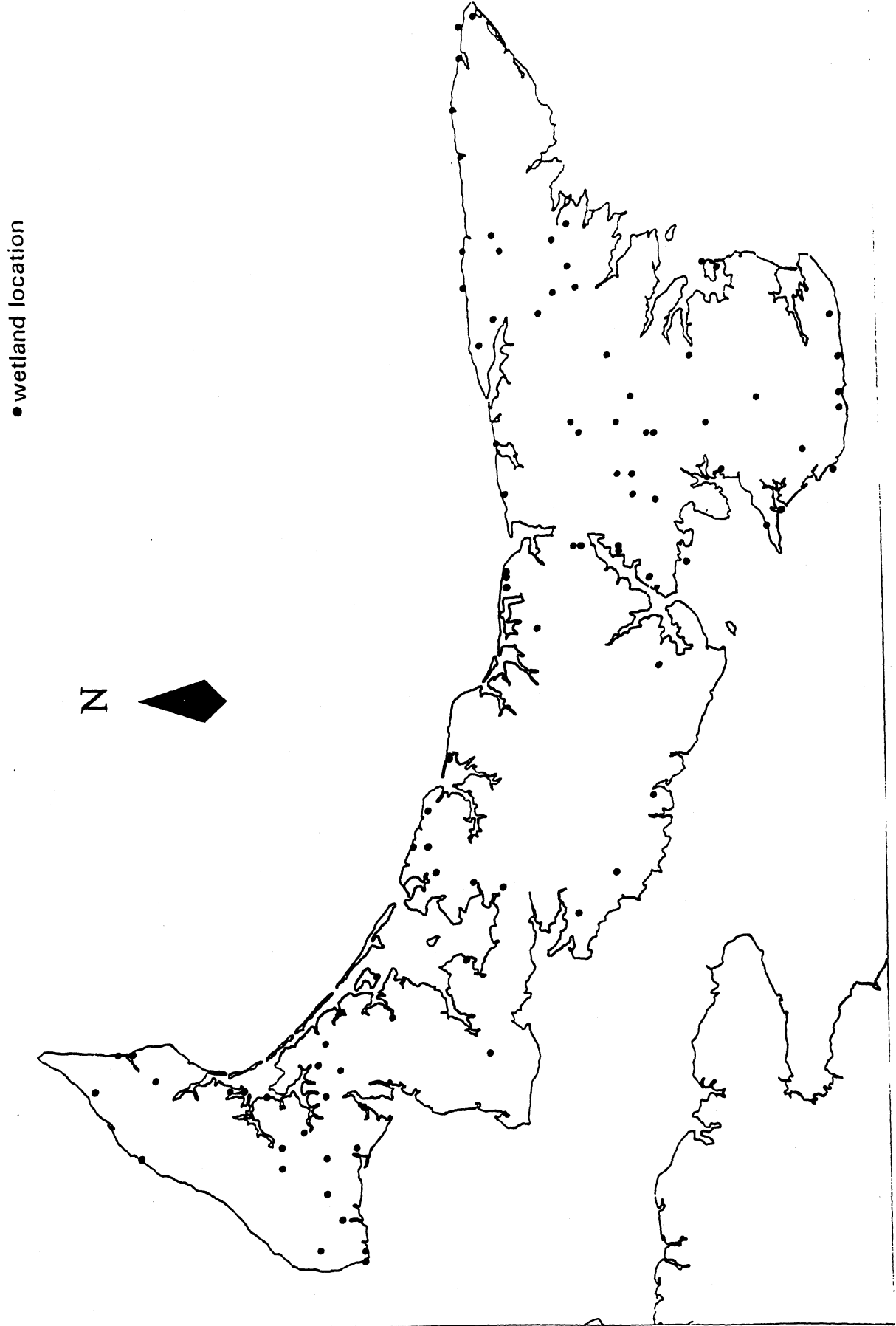


Figure 1. Locations of wetlands randomly selected for the P.E.I. Cooperative Surveys.

Species Composition of Breeding Pairs
count 1

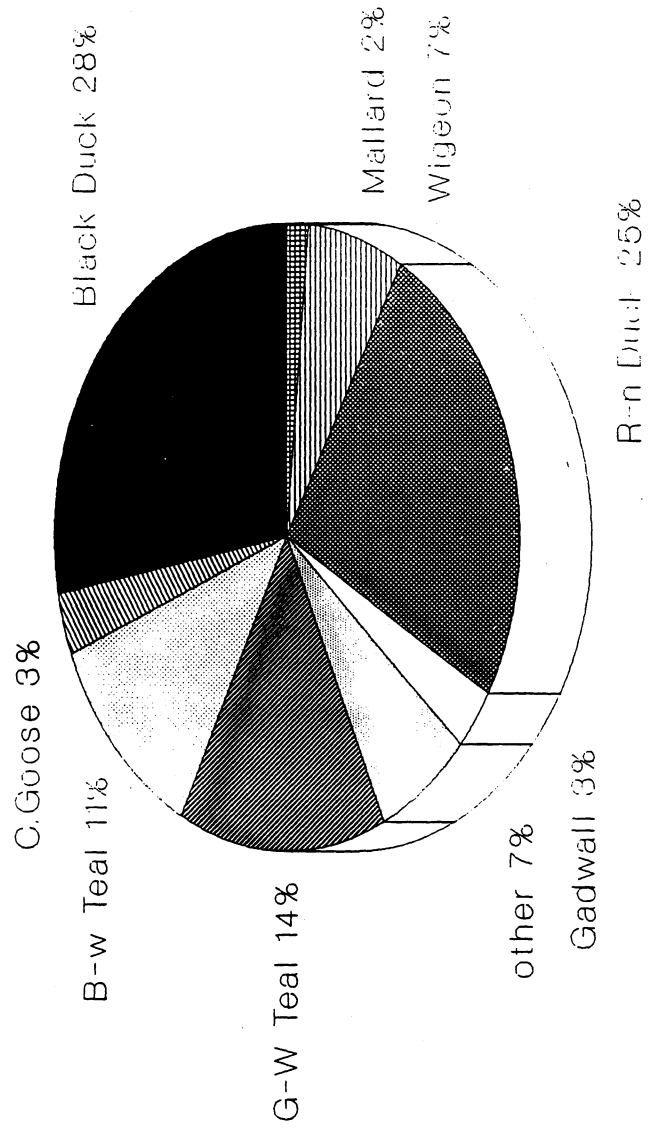


Figure 2. Species composition of waterfowl breeding pairs on count 1 on 73 wetlands on Prince Edward Island in 1994.

Species Composition of Breeding Pairs
count 2

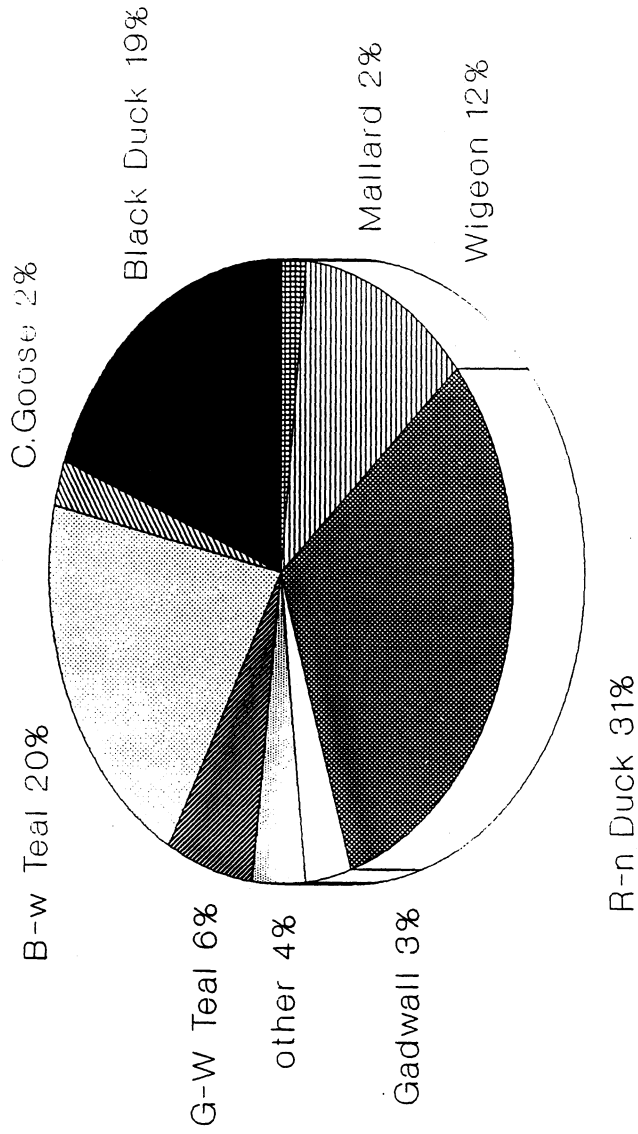


Figure 3. Species composition of waterfowl breeding pairs on count 2 on 72 wetlands on Prince Edward Island in 1994.

Species Composition of Broods
wetlands done on both counts 3 and 4

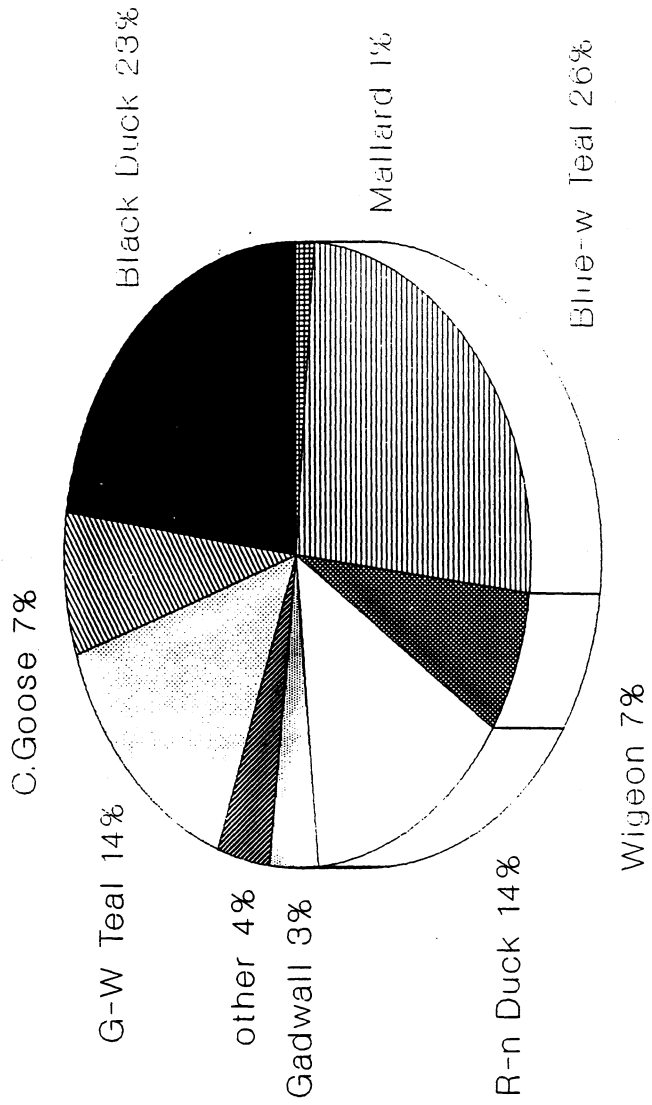


Figure 4. Species composition of broods recorded on wetlands surveyed on counts 3 and 4 on Prince Edward Island in 1994.

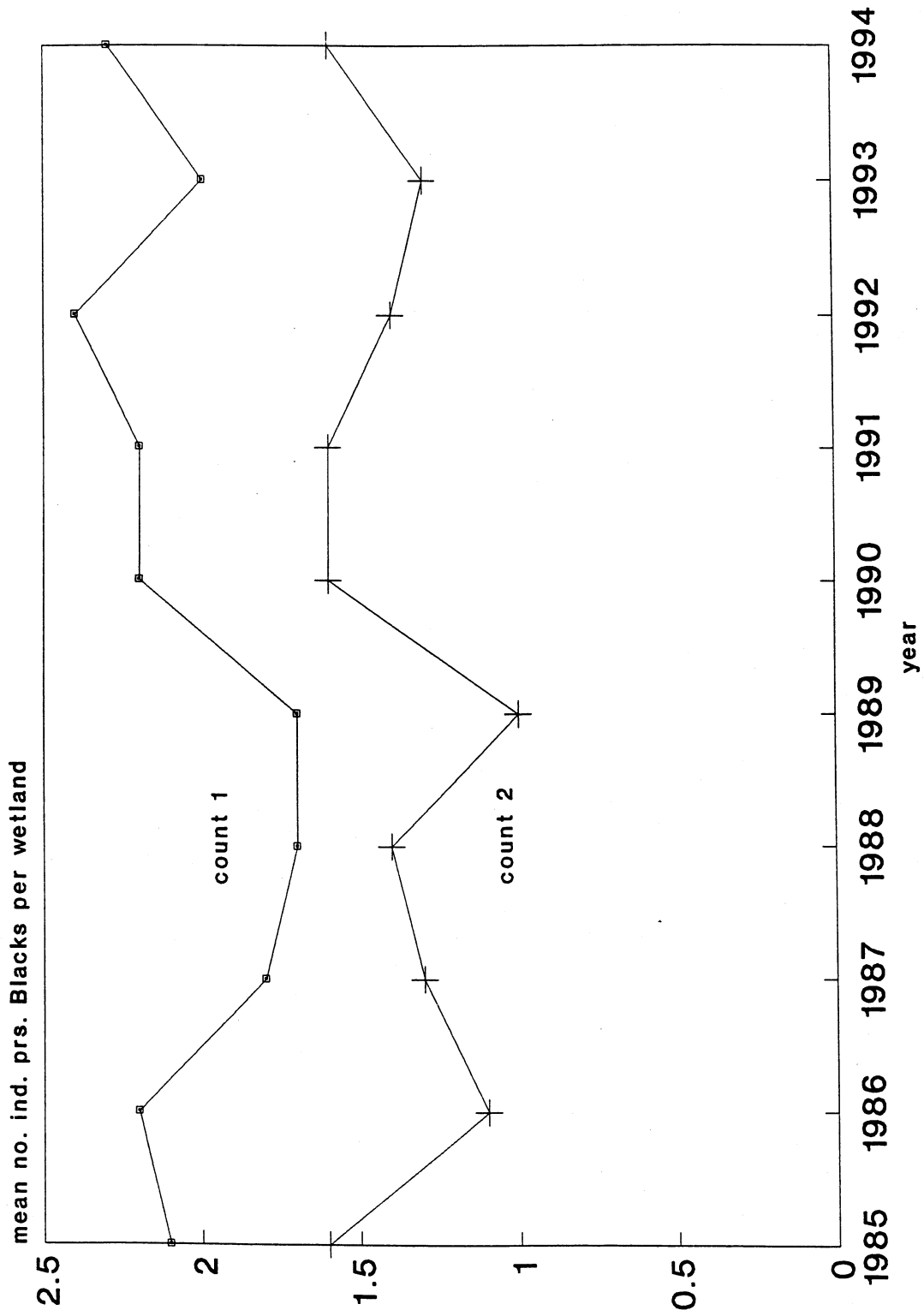


Figure 5. The mean numbers of indicated pairs of Black Ducks recorded per wetland during counts on Prince Edward Island, 1985-1994.

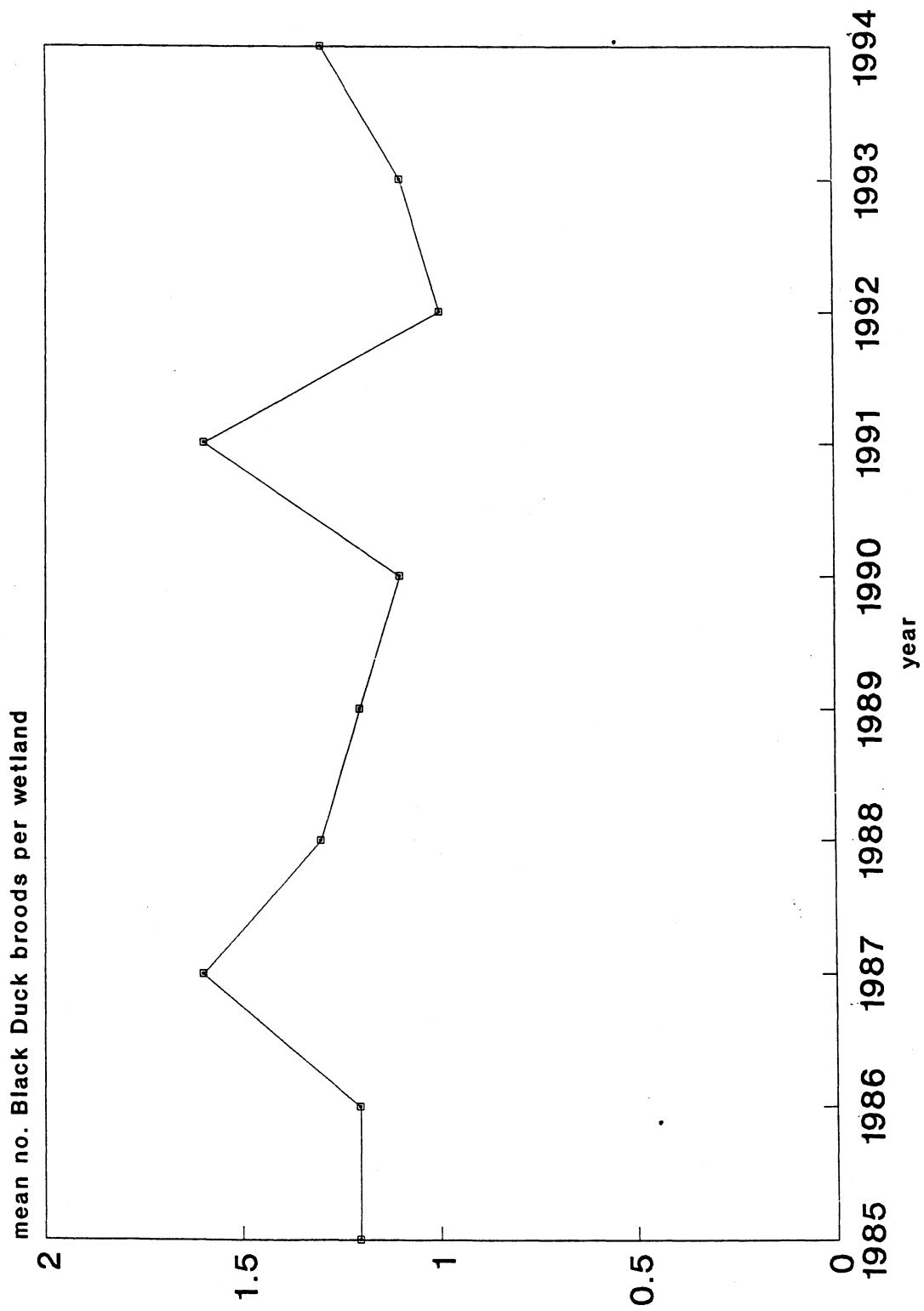


Figure 6. The mean numbers of Black Duck broods per surveyed wetland during ground counts on Prince Edward Island, 1985-1994.

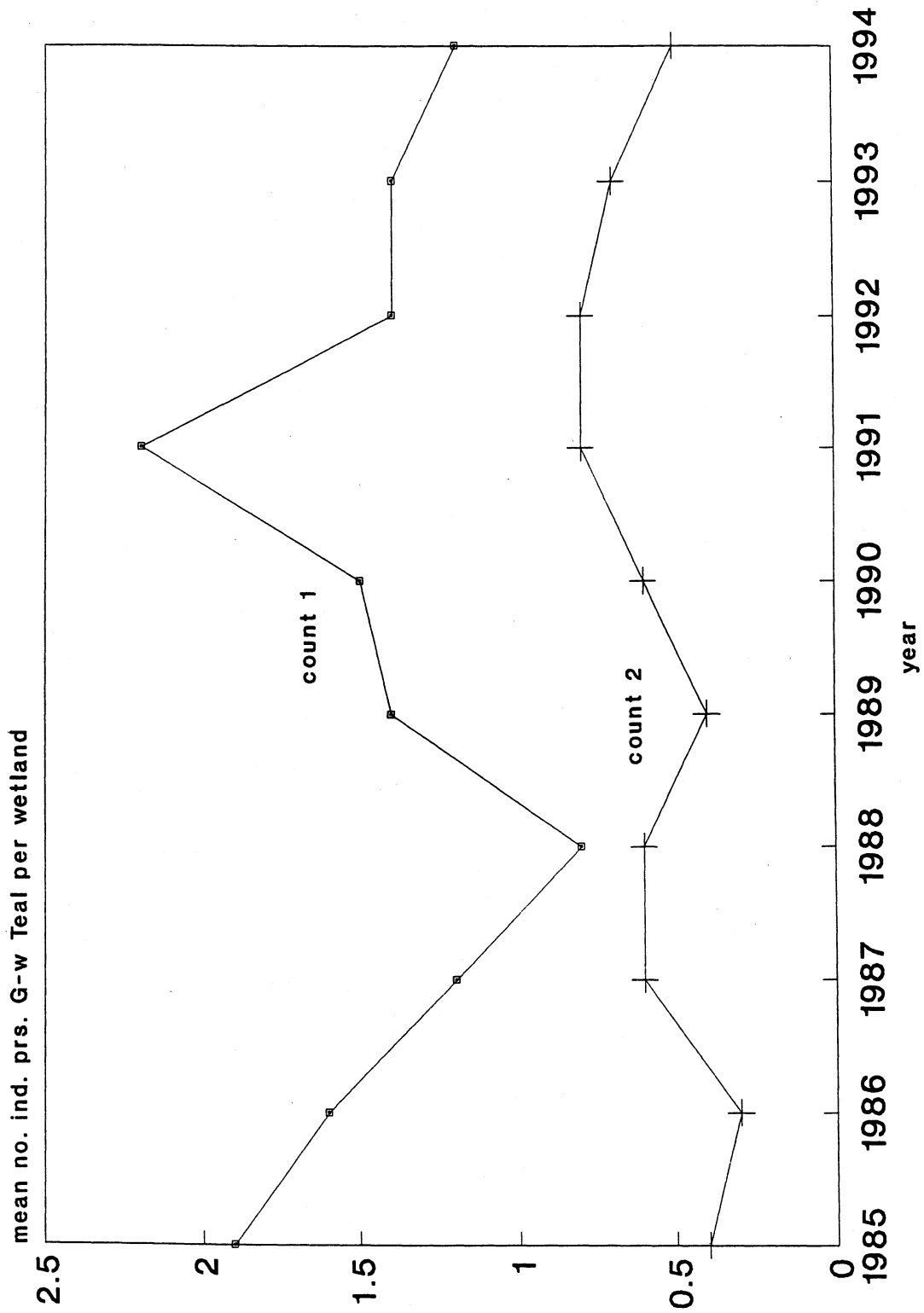


Figure 7. The mean numbers of indicated pairs of Green-winged Teal recorded per wetland on Prince Edward Island surveys, 1985-1994.

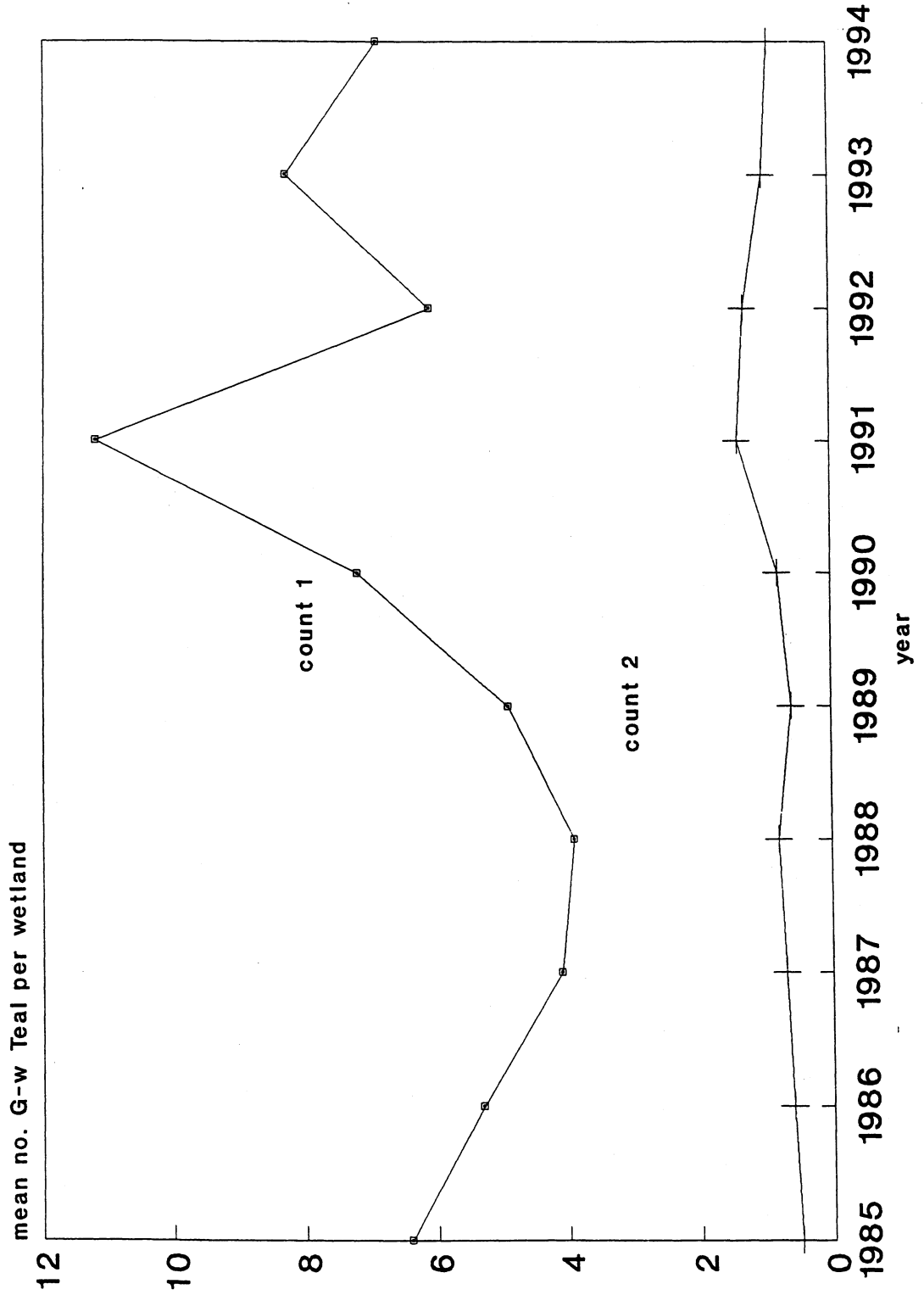


Figure 8. The mean numbers of Green-winged Teal recorded per wetland on Prince Edward Island surveys, 1985-1994.

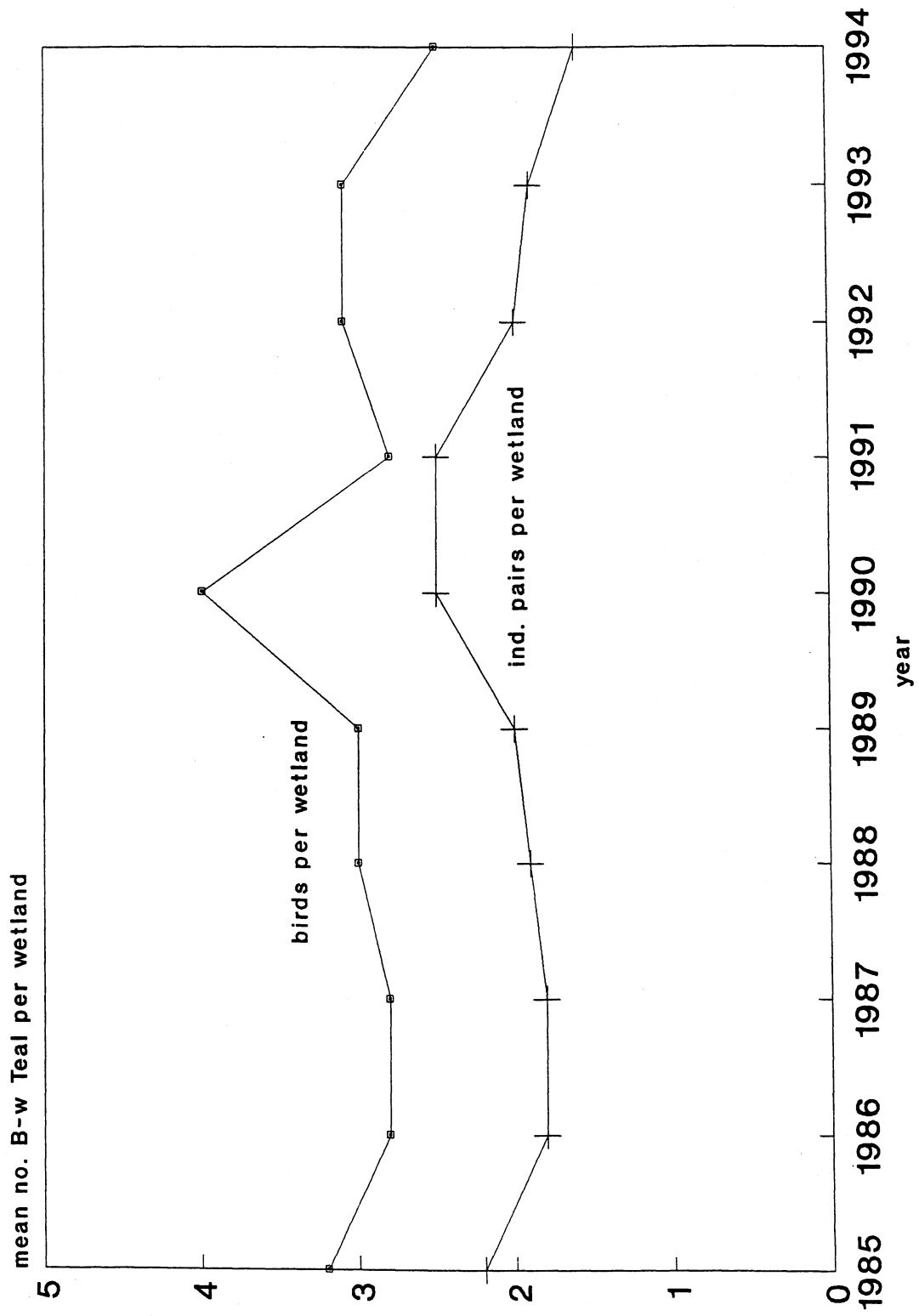


Figure 9. The mean numbers of Blue-winged Teal and mean numbers of indicated pairs per wetland on count 2 of the Prince Edward Island surveys, 1985-1994.

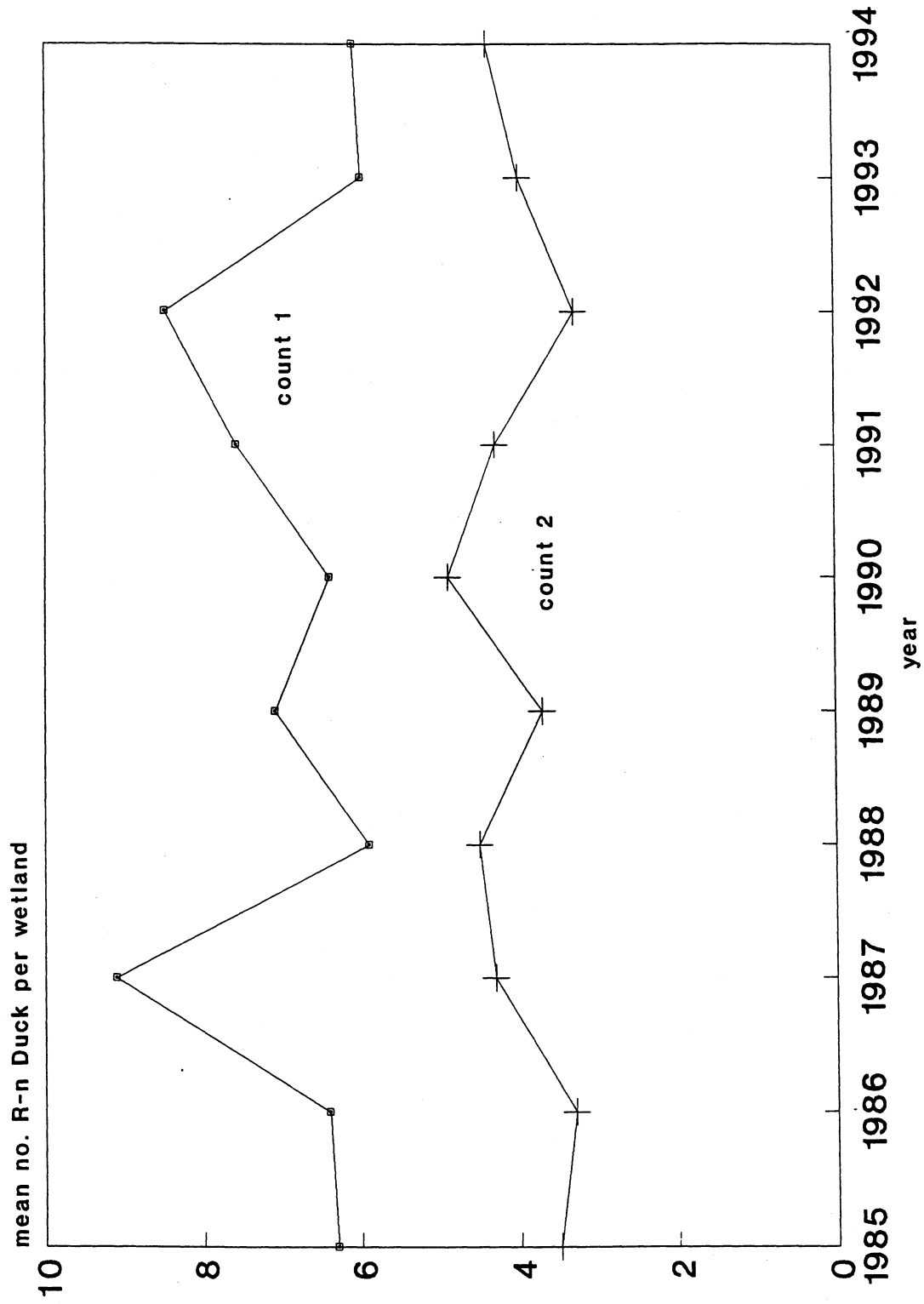


Figure 10. The mean numbers of Ring-necked Ducks per wetland recorded on the Prince Edward Island surveys, 1985-1994.

Appendix I

Participants in the PEI Waterfowl Surveys - 1994

PARTICIPANTS

WETLAND NUMBERS

PEI Fish and Wildlife

Clare Birch	82, 95, 20, 45, 6, 65, 79, 47
John Clements	29, 84, 27, 58,
Randy Dibblee	33, 48, 63, 90, 88, 39, 70, 74, 99, 21, 23, 35, 202
Alan McLennan	87, 10, 9, 46, 42, 28, 55, 22, 24
Ross Bernard	
Rolland Richard	73, 59, 38, 32, 52, 76, 41, 77, 75
Buddy MacIntyre	1, 66, 85, 94, 86, 89, 61, 100, 53, 49, 83
Art Smith	44, 19
Walter (Spud) Stewart	36, 54, 34, 60, 71
Tom Duffy	97

Also students

CWS

Myrtle Bateman	57, 72, 81, 78, 69, 80, 98, 15
Randy Hicks	93, 92, 68, 91

Also Richard Daury , Colin MacKinnon and Andrew Hicks.

Appendix II

Table i. Results of waterfowl count 1 on PEI, 1994.

Table ii. Results of waterfowl count 2 on PEI, 1994.

Table iii. Minimum total number of broods observed on 68 wetlands surveyed on both counts 3 and 4 on Prince Edward Island, 1994.

Table i. Results of waterfowl count 1 on Prince Edward Island, 1994.

Species	Pairs	Singles	Flocks	Estimated Pairs	Total Birds Recorded
Black Duck	105	63	77	167	350
Pintail	5	4	2	9	16
Mallard	4	5	1	9	14
Wigeon	34	14	9	40	91
Blue-winged Teal	56	18	16	67	146
Green-winged Teal	76	19	335	86	506
Wood Duck	2	6	7	5	17
Ring-necked Duck	150	38	108	150	446
Goldeneye	4	1	6	4	15
Gadwall	14	5	0	19	33
Shoveler	1	1	0	2	3
Lesser Scaup	0	0	0	0	0
Greater Scaup	1	0	0	1	2
Red-breasted Merganser	4	2	20	4	30
Common Merganser	5	11	7	14	28
Hooded Merganser	0	0	0	0	0
Canada Goose	14	8	2042	19	2097
Brant	0				
Oldsquaw	0				
White-winged Scoter	0				
Black Scoter	0				
Surf Scoter	0	1			
Common Eider	0				
Merganser Unknown	0				
Black:Mallard Pair	0				
Bufflehead	0				
Scaup unknown	7		73		87
Total	475	196	2703	596	3881

Table ii. Results of waterfowl Count 2 on Prince Edward Island, 1994.

Species	Pairs	Singles	Flocks	Estimated Pairs	Total Birds Recorded
Black Duck	52	63	144	116	312
Pintail	1	2	0	3	4
Mallard	2	8	1	10	14
Wigeon	30	42	5	72	107
Blue-winged Teal	60	62	4	122	186
Green-winged Teal	9	27	21	36	66
Wood Duck	2	13	51	15	68
Ring-necked Duck	122	67	9	188	320
Goldeneye	0	0		0	0
Gadwall	14	5		19	33
Shoveler	0	1		1	1
Lesser Scaup	0				
Greater Scaup	0				
Red-breasted Merganser	1		1	1	3
Common Merganser	0	1	4	1	5
Hooded Merganser	0	1		1	1
Canada Goose	14	1	21	14	50
Brant	0				
Oldsquaw	0				
White-winged Scoter	0				
Black Scoter	0				
Surf Scoter	0				
Common Eider	0				
Merganser Unknown	0	0	4	0	4
Black:Mallard Pair	1				
Unknown	-				
				Birds recorded under mallard and Black Duck totals	
				0	0
Totals	308	293	265	599	1174

Table iii. Minimum total number of broods observed on 68 wetlands surveyed on both counts 3 and 4 on Prince Edward Island, 1994.

Species	Number of Broods
Mallard	3
Black Duck	56
Gadwall	8
Wigeon	18
Pintail	0
Green-winged Teal	35
Blue-winged Teal	63
Wood Duck	2
Ring-necked Duck	35
Unidentified Duck	7
Canada Goose	18
Total	245

Appendix III

- Figure i. The total number of mallards recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1994.
- Figure ii. The total number of wigeon recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1994.
- Figure iii. The total number of gadwall recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1994.

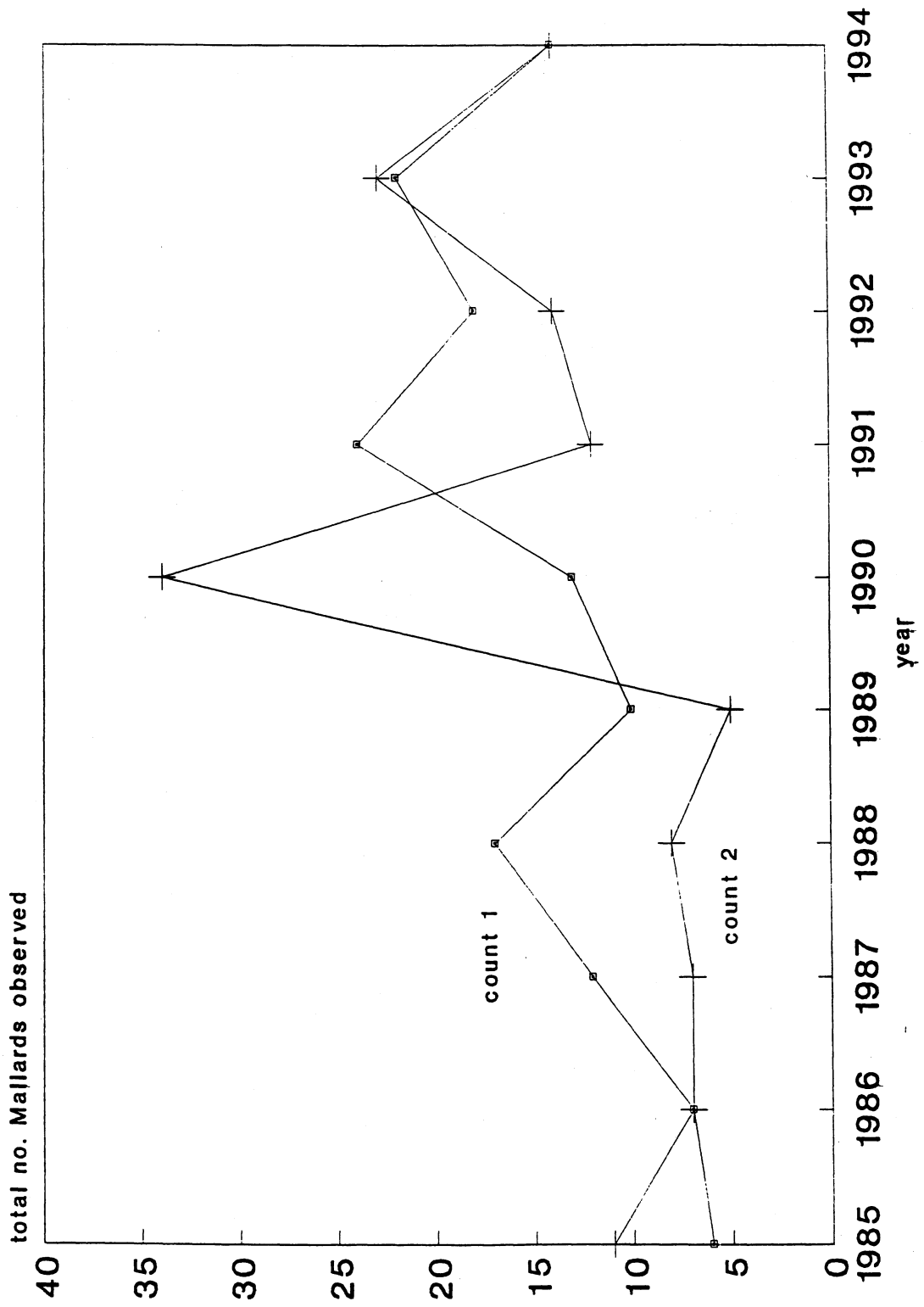


Figure i. The total numbers of mallards recorded on counts 1 and 2 on the Prince Edward Island surveys, 1985-1994.

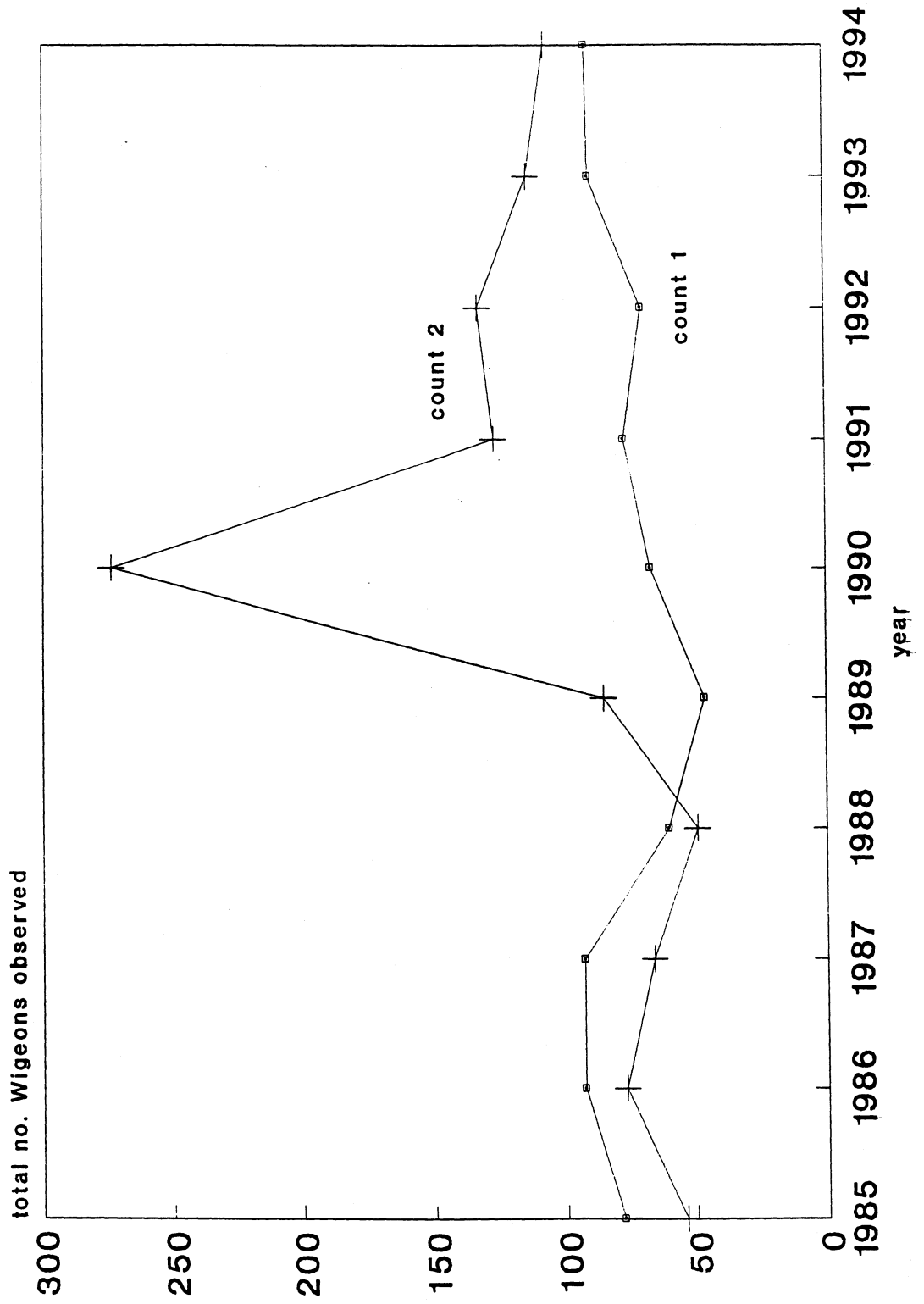


Figure ii. The total number of wigeon recorded on counts 1 and 2 on the Prince Edward Island surveys, 1985-1994.

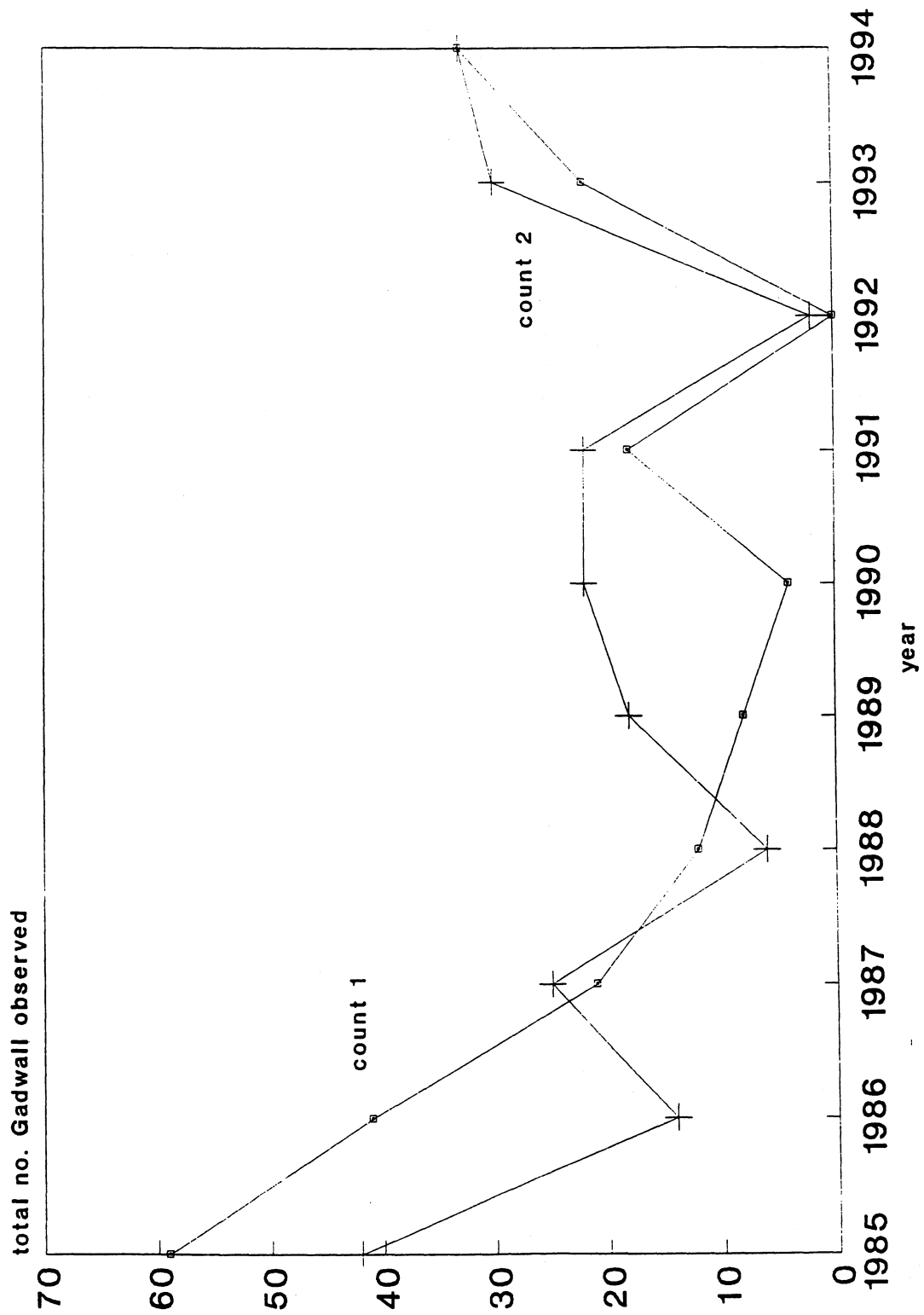


Figure iii. The total numbers of gadwall recorded on counts 1 and 2 on the Prince Edward Island surveys, 1985-1994.