Progress Report

Waterfowl Surveys on Prince Edward Island 1996

M.C. Bateman
Canadian Wildlife Service

R. L. Dibblee
PEI Fish & Wildlife Division

December 1996

TABLE OF CONTENTS

Introduction

Consistent long-term monitoring surveys are a necessary part of waterfowl management. Managers must be able to monitor changes in populations and determine the effects of management strategies. In 1983 the Canadian Wildlife Service and the PEI Fish and Wildlife Division initiated a cooperative survey consisting of four annual counts each year. The 1996 season was the fourteenth 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. Results from this survey contributed to the decisions for changes in the waterfowl hunting regulations for PEI in 1989 and in 1996. This survey is one of the tools which is used to monitor the resulting population changes.

This report summarizes results from the 1996 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 8 May and 20 May through 3 June in 1996.

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 ensure consistency of methods used at each site each year (Appendix 1). Observations of waterfowl on each area were recorded by species, age of ducklings (Gollop and Marshall 1954), sex, and group size. 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. 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. Assessments of breeding pair data were not so restricted for other species.

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 after 1989. Prior to 1990, the sample size of wetlands surveyed on both Count 3 and 4 was small. The 1990 and later data were corrected for unsampled areas using the mean for each wetland with missing data and calculating a brood index (broods per wetland) for each year using 57 wetlands.

Results and Discussion

The survey was conducted by participants from the Canadian Wildlife Service and the PEI Fish and Wildlife Division. 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 minimum 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, Gadwall and Wood Ducks recorded on Counts 1 and 2 in 1985-1996 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 32 percent. Even though Count 1 is early for Blue-winged Teal, that species was 6 percent of the pairs recorded whereas Green-winged Teal was 16 percent. The composition of breeding birds recorded on count 2 was different because early breeders are not all visable and late arriving species are on site (Figure 3). Results from Count 2 show 20 percent of the observed breeding pairs were Black Ducks, 29 percent were ring-necks, 15 percent were blue-wings but only 11 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 18 percent of the total broods observed; Black Ducks, 31 percent; Green-winged Teal, 12 percent and Ring-necked Ducks, 11 percent.

Black Duck

In 1996, 74 wetlands were surveyed within the time periods specified for Black Ducks on Counts 1 and 2. The mean number of indicated pairs per wetland was 2.8 on Count 1 and 1.8 on Count 2 (Table 1, Figure 5). Results of a trend analysis using an average regression method

showed a stable population 1990 to 1996 (positive slope;$p<0.3$) using the Count 1 data. The results using Count 2 data were very similar- a non-significant positive slope ($p<0.3$). Analyses of Black Duck breeding pair data 1985 - 1996 show a non significant increase in numbers of breeding ducks on Count 1 ($p<0.1$) and Count 2 ($p<0.2$). 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 not always observed. However, both counts suggest a stable breeding population on Prince Edward Island since the regulation change in 1989 and since 1985. The trends in numbers of breeding pairs 1985-1989 was non-significant and negative on Count 1 and significantly negative ($p<0.05$) on Count 2.

The number of broods produced each year depends on factors other than the number of breeding pairs. Unfavourable weather conditions can, for example, cause high mortality in ducklings. 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 1996, 70 wetlands were surveyed on Counts 3 and 4. At least 75 Black Duck broods were produced on those wetlands. The mean number of broods per wetland was 1.1. Results of brood counts on 57 wetlands done relatively consistently were analyses to produce comparable indices 1990-1996 (Figure 6). Production of Black Ducks on Prince Edward Island was high in 1996.

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). The 1996 results were 0.9 indicated pairs per wetland and 1.6 birds per wetland compared to 0.5 and 0.7 in 1995. The number of broods recorded in 1996 (0.4 per wetland surveyed and 0.47 corrected index) suggest relatively successful production (Table 1, Figure 6).

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 the population may be declining since 1990 (Figure 9). In 1996, 2.1 birds per wetland and 1.4 indicated pairs per wetland were recorded compared to 2.3 and 1.3 in 1995. The number of broods observed in 1996 suggest an unproductive year (0.6 broods per wetland surveyed and a corrected index of 0.75) (Table 1, Figure 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 12 years of surveys (Figure 10). In 1996, 8.8 birds were recorded per wetland on Count 1 and 4.7 on Count 2 compared to 7.4 and 4.0 in 1995. Results of the brood surveys suggest that 1996 was a poor production year for Ring-necked Ducks when 0.4 broods were recorded per surveyed wetland and the corrected index was 0.47 (Table 1, Figure 6).

Summary and Recommendations

1. A ground survey of selected Prince Edward Island wetlands was carried out in 1996 for the twelfth 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 and since the survey began in 1985. Analyses of data 1985-1989 indicated no significant change on Count 1 but a significant decline ($p<.05$) on Count 2. Results of the brood survey suggest that 1996 was a good production year for Black Ducks.
3. Addition of the 1996 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 suggest a decline in breeding blue-wings on Prince Edward Island. Blue-wing production in 1996 was low.
5. The number of Ring-necked Ducks recorded per wetland suggests an increasing or stable population during the twelve years of surveys. The numbers recorded in 1996 were higher on Count 1 and Count 2 than in 1995. Ring-necked Duck production in 1996 was low.
6. It is recommended that the PEI survey continue to be carried out each year using the same methods as in 1996.

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.

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.

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).

Table 1. Results for the major species of waterfowl from the Prince Edward Island survey, 1996.

Species	Black Duck		Green-w Teal		Blue-w Teal	Ring-n Duck	
Count	1	2	1	2	2	1	2
No. of wetlands surveyed	74	74	74	74	74	74	74
No. of ind. pairs	205	131	120	69	100	235	185
Total birds observed	529	431	558	115	158	653	346
Mean no. birds per wetland	7.1	5.8	8	1.6	2.1	8.8	4.7
Mean no. ind. pairs per wetland	2.8	1.8	2	0.9	1.4	3.2	2.5
No. of wetlands surveyed for broods	70		70		70	70	
Min. no. of broods	75		29		44	28	
Mean no. broods per wetland	1.1		0.4		0.6	0.4	

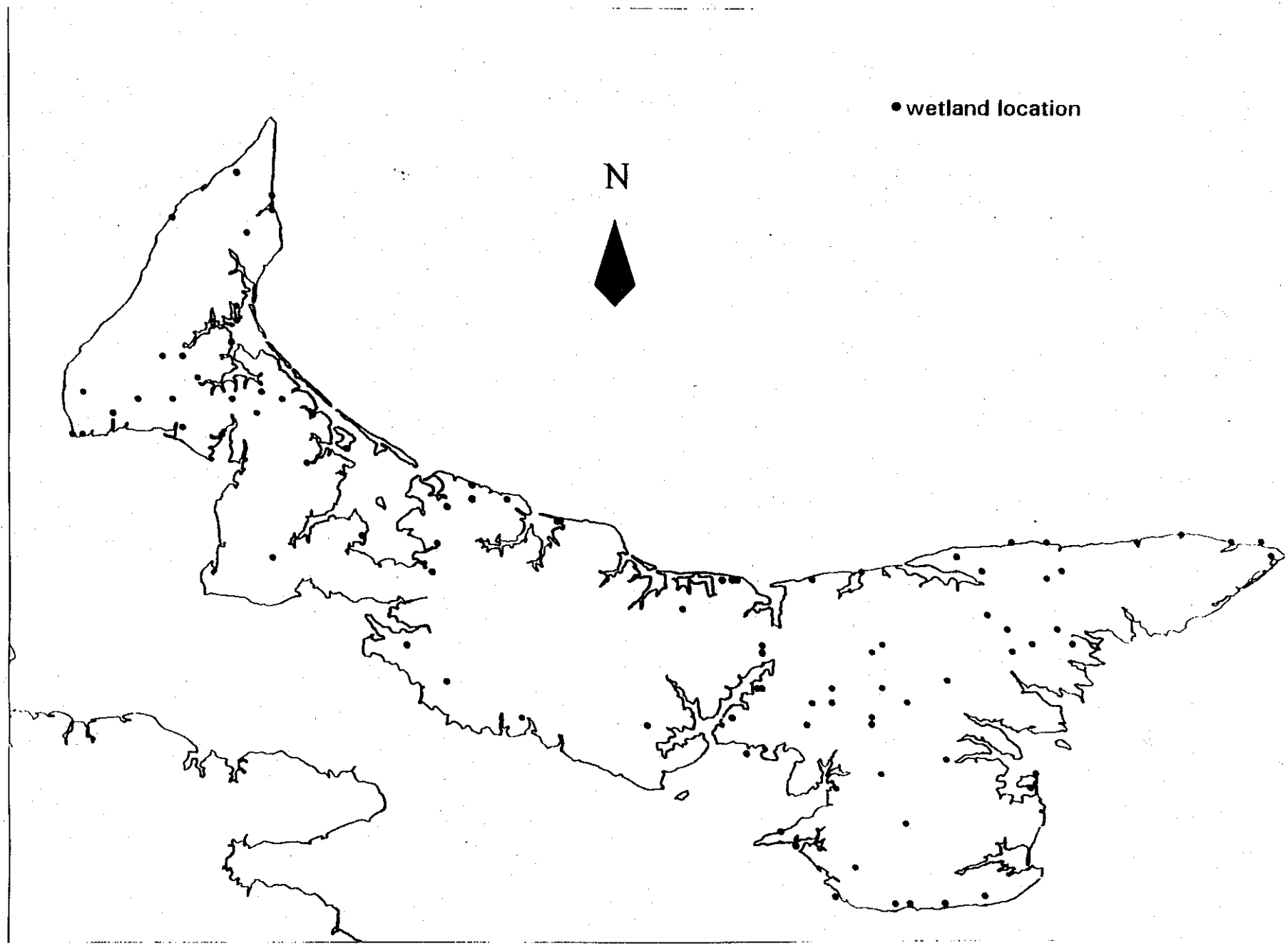

Figure 1. Locations of wetlands randomly selected for the P.E.I. Cooperative Surveys.

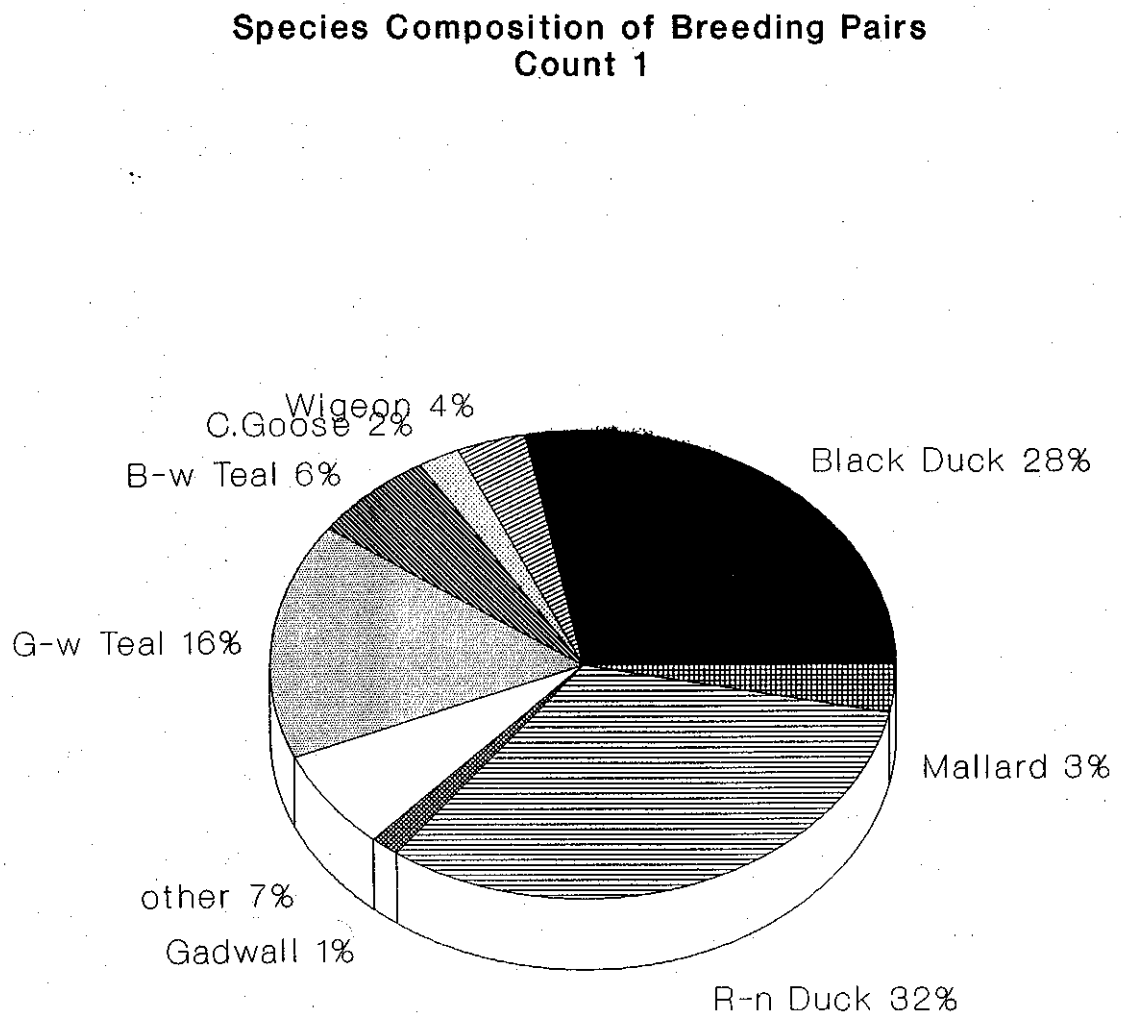

Figure 2. Species composition of waterfowl breeding pairs recorded on Count 1 (74 wetlands) on Prince Edward Island, 1996.

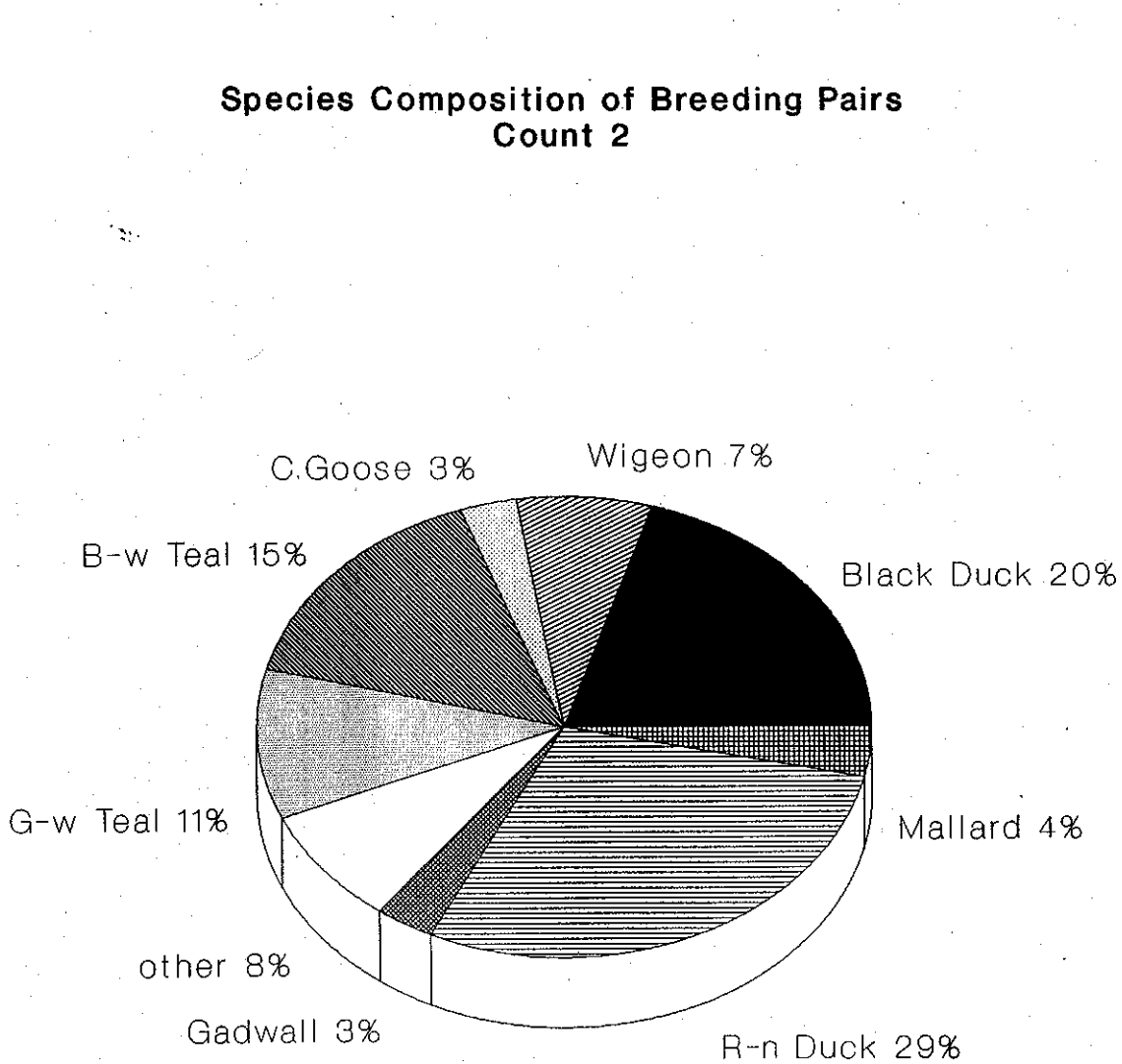

Figure 3. Species composition of waterfowl breeding pairs recorded on Count 2 (74 wetlands) on Prince Edward Island, 1996.

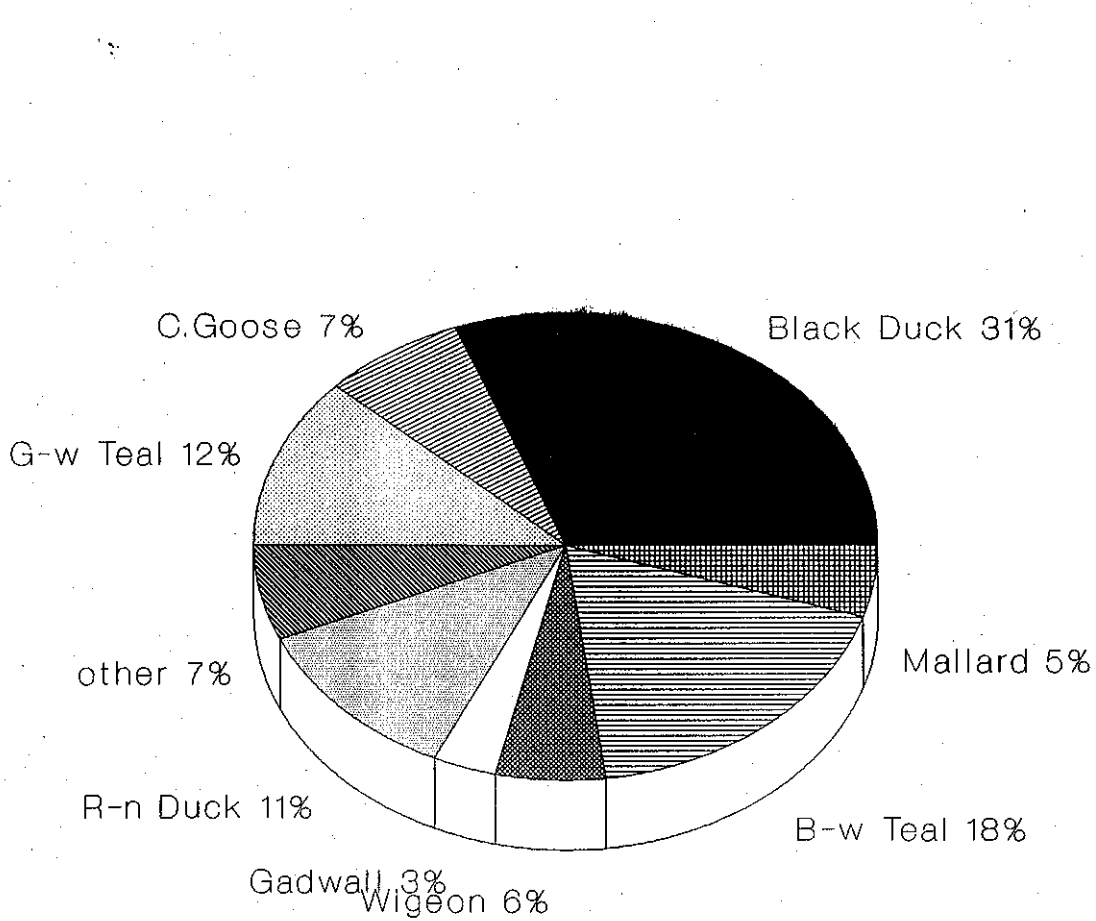

Figure 4. Species composition of broods on wetlands surveyed on Counts 3 and 4 (70 wetlands) on Prince Edward Island, 1996.

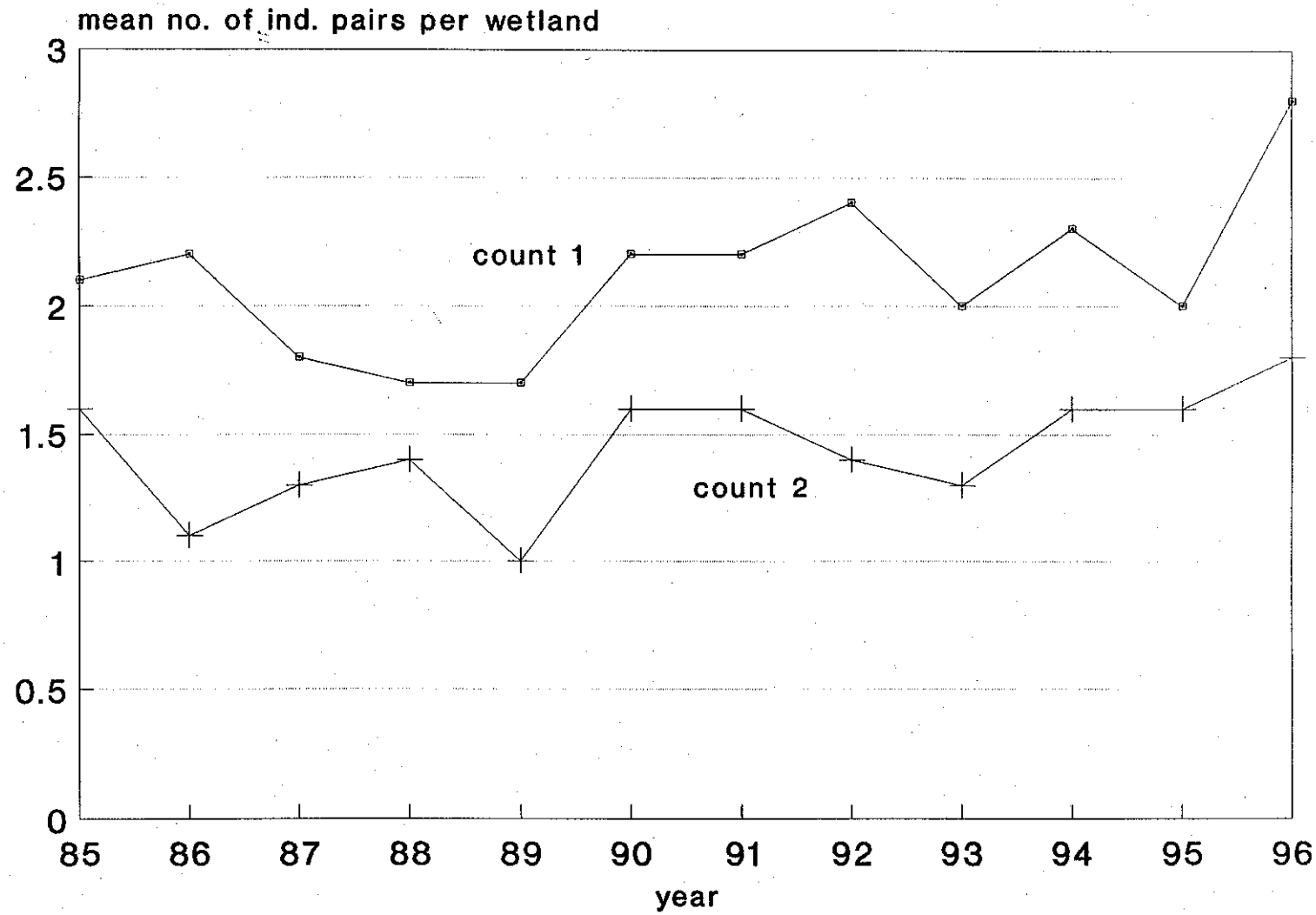

Figure 5. The mean number of indicated pairs of Black Ducks recorded per wetland surveyed on Counts 1 and 2 on Prince Edward Island, 1985-1996.

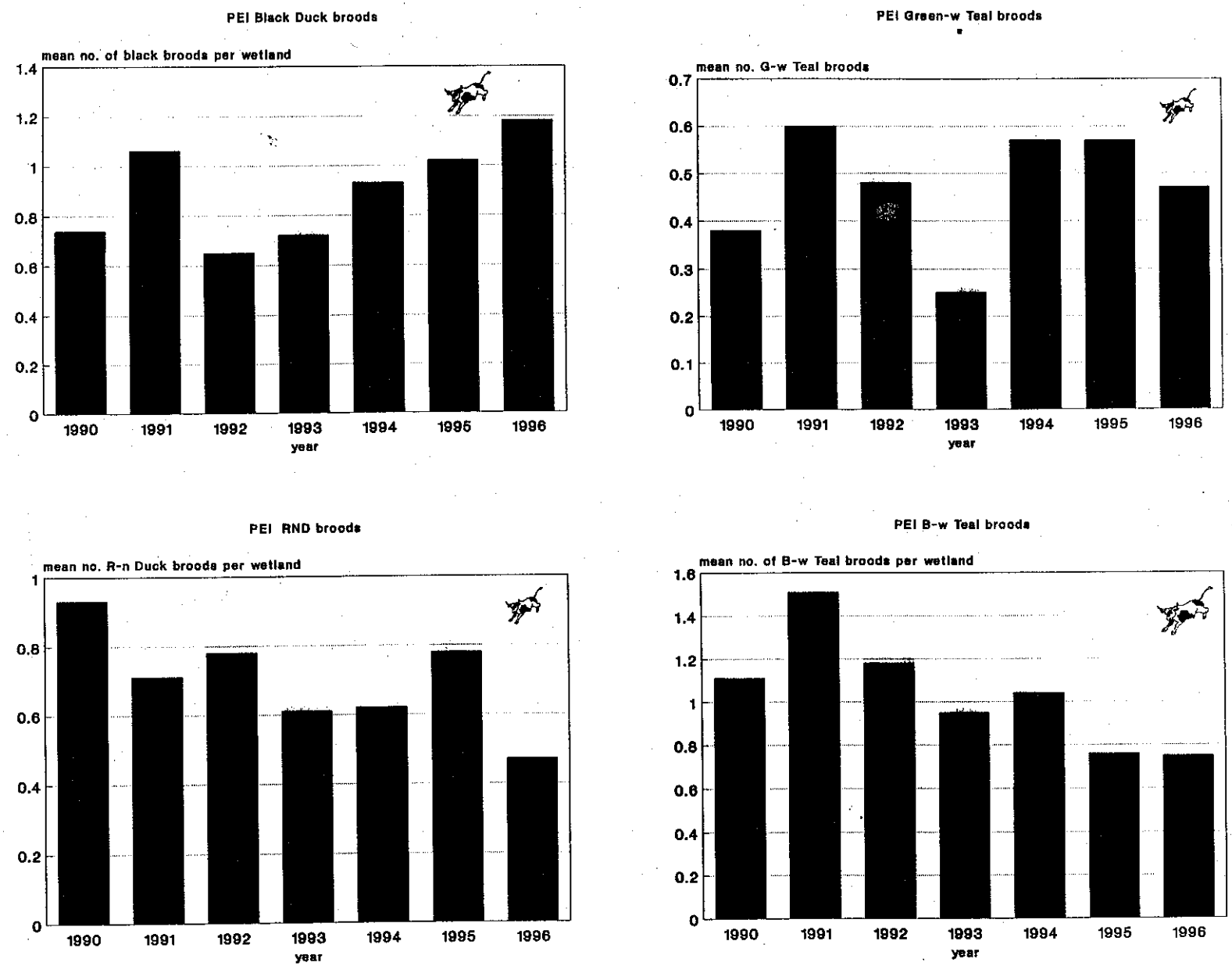

Figure 6. The mean numbers of Black Duck, Green-winged Teal, Blue-winged Teal and Ring-necked Duck broods per wetland (corrected for missing data on 57 wetlands) on Prince Edward Island, 1985-1996.

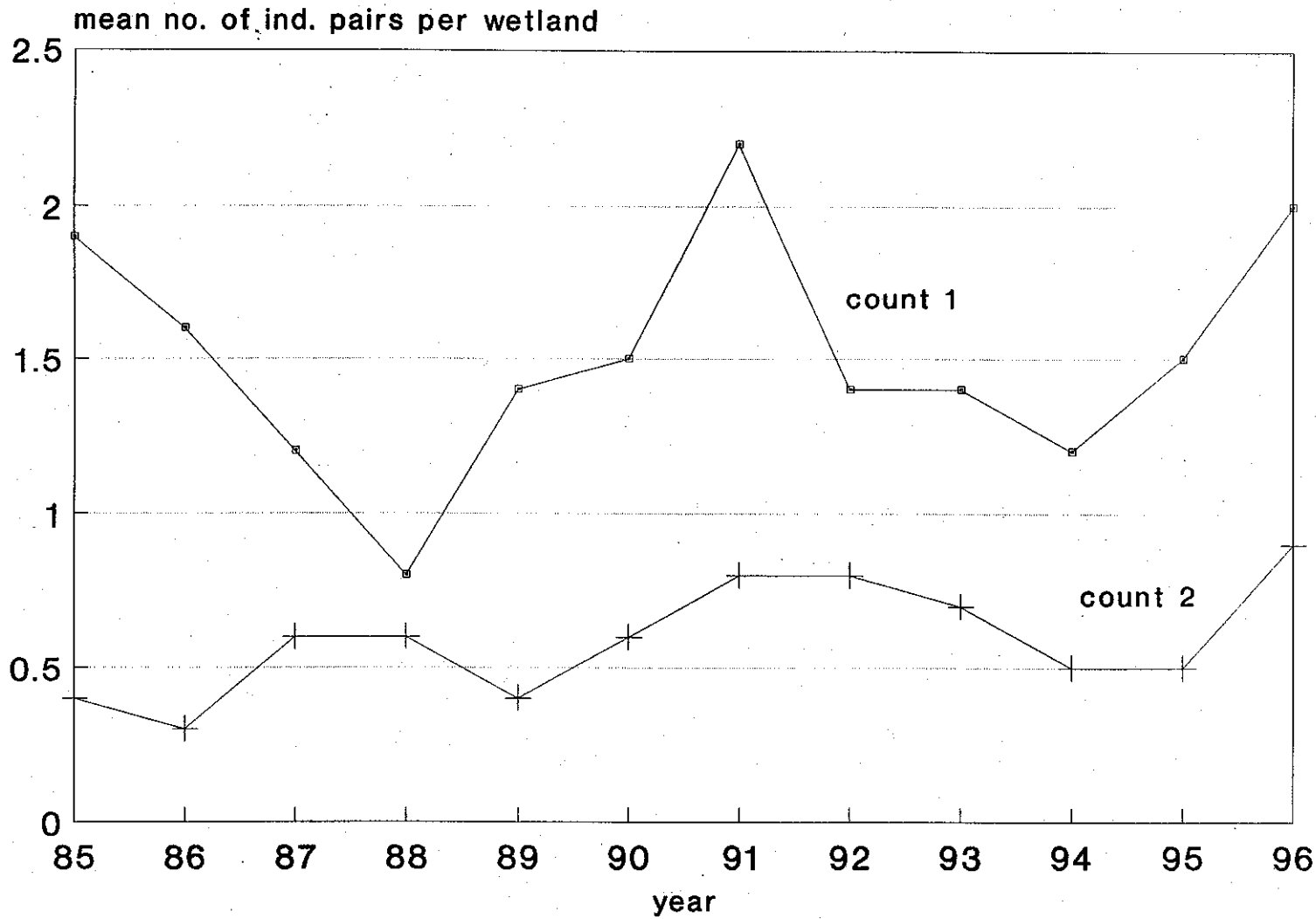

Figure 7. The mean numbers of indicated pairs of Green-winged Teal recorded per wetland on Prince Edward Island, 1985-1996.

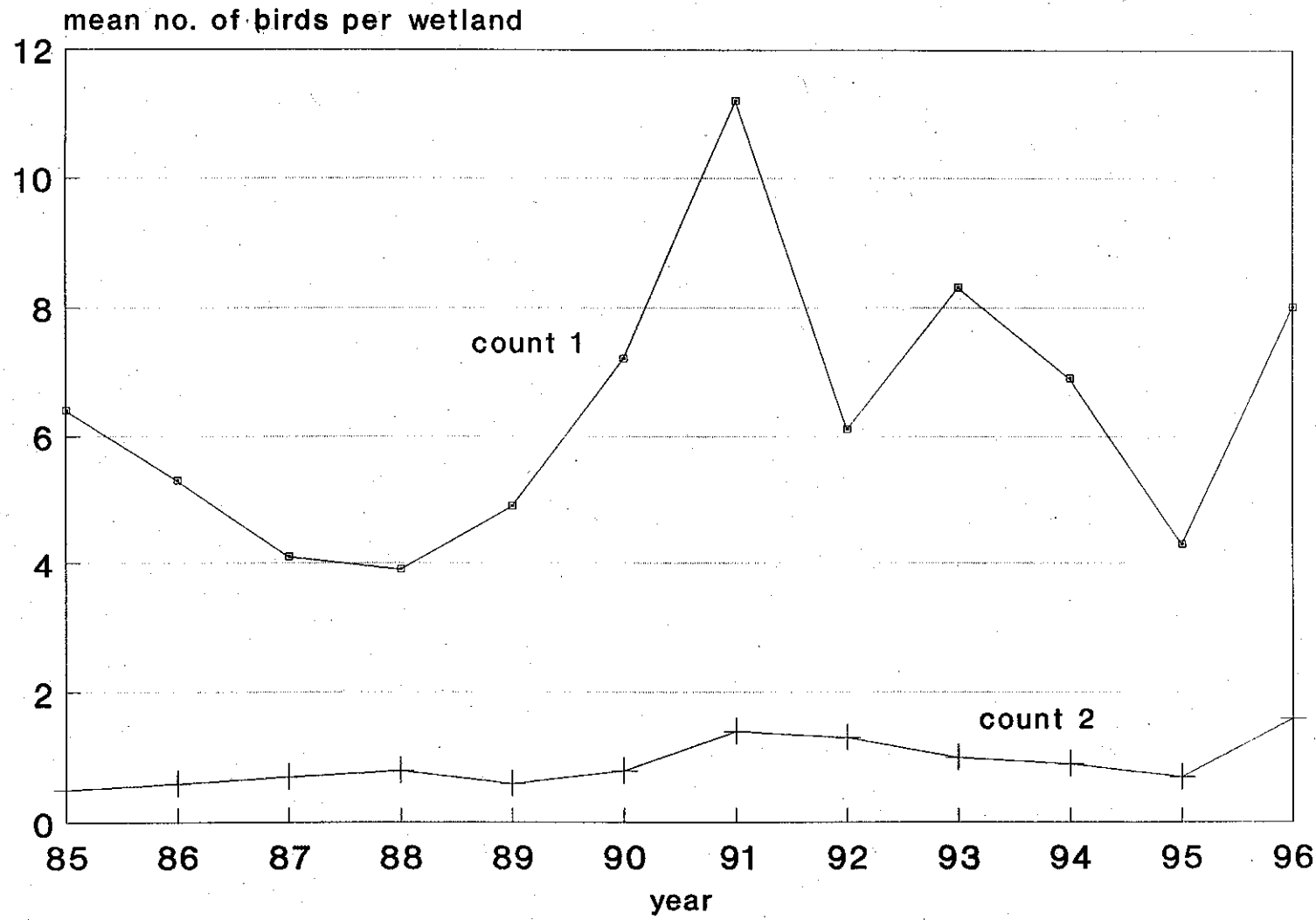

Figure 8. The mean numbers of Green-winged Teal recorded per wetland on Prince Edward Island, 1985-1996.

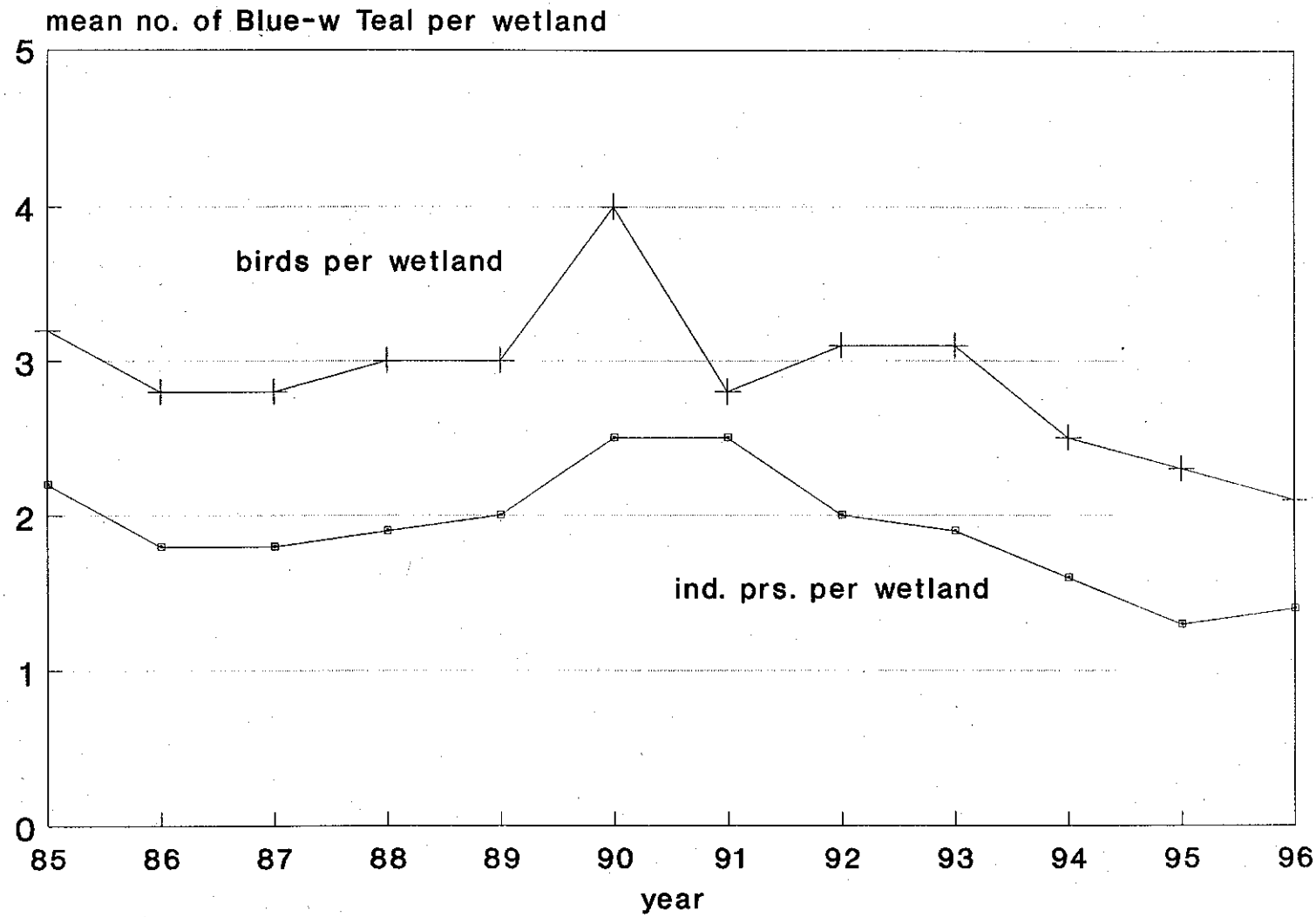

Figure 9. The mean numbers of Blue-winged Teal and mean numbers of indicated pairs recorded per wetland on Count 2 on Prince Edward Island, 1985-1996.

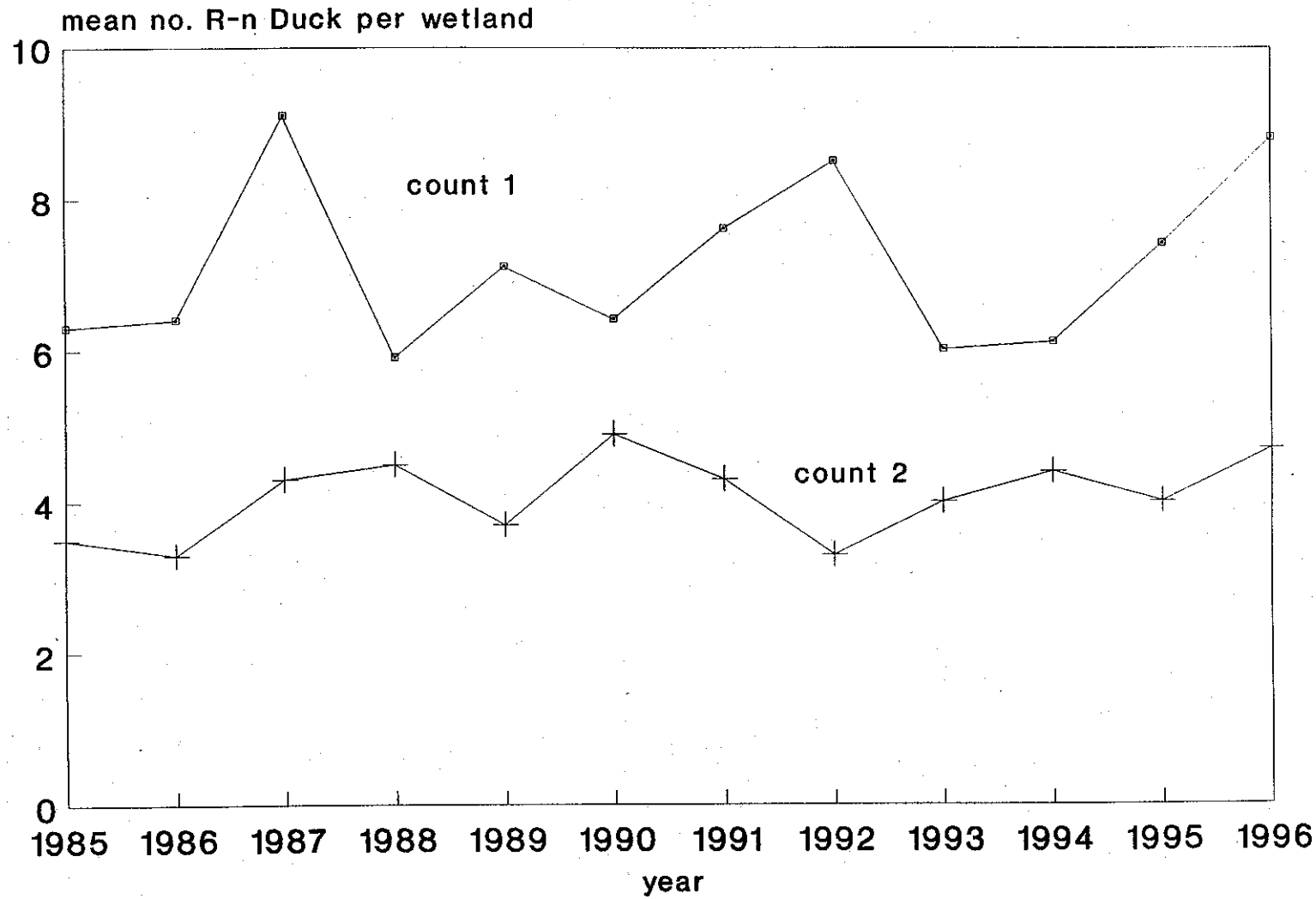

Figure 10. The mean numbers of Ring-necked Ducks recorded per wetland on Prince Edward Island, 1985-1996.

Appendix I

Participants in the PEI Waterfowl Surveys - 1996

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, 75,51
Buddy MacIntyre	1, 66, 85, 94, 86, 89, 61, 100, 53, 49,83
Art Smith	44, 19,71,60
Karen Jackson	36, 54, 34
Tom Duffy	97

Also students and George (Duke) Ferguson

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

Also Colin MacKinnon, Andrew Hicks, Nev Garrity, John Wilson, Mark Bowes

Appendix II

Table *i.* Results of Waterfowl Count 1 on Prince Edward Island, 1996

Species	Pairs	Singles	Flocks	Estimated Pairs	Total Birds Recorded
Black Duck	131	74	190	205	529
Pintail	9	2	43	11	63
Mallard	14	10	3	24	43
B-M hybrid	0	0	0	0	1
Wigeon	22	4	0	26	48
Blue-winged Teal	39	8	10	47	96
Green-winged Teal	96	24	342	120	558
Wood Duck	1	2	0	3	4
Ring-necked Duck	164	81	244	235	653
Goldeneye	1	0	0	1	2
Gadwall	9	2	0	11	20
Shoveler	1	0	0	1	2
Lesser Scaup	0	0	3	0	3
Greater Scaup	2	3	0	5	7
Red-breasted Merganser	0	0	70	0	70
Common Merganser	7	0	65	0	79
Hooded Merganser	0	0	0	0	0
Canada Goose	6	9	268	16	289
Brant					
Oldsquaw					
White-winged Scoter					
Black Scoter					
Surf Scoter					
Common Eider					
Merganser Unknown	0	0	2	0	2
Black: Mallard Hybrid Pair[1]	3		3	3	
Bufflehead					
Unidentified Scaup	0	0	54	0	54
Unidentified Duck	0	0	2	0	2
Total	505	219	1296	708	2525

[1]birds recorded under mallards and black and hybrids.

Table *ii.* Results of Count 2 on Prince Edward Island, 1996

Species	Pairs	Singles	Flocks	Estimated Pairs	Total Birds Recorded
Black Duck	55	77	243	131	431
Pintail	4	4	0	8	12
Mallard	5	19	19	23	48
Black Mallard hybrid	-	-	-	-	1
Wigeon	23	23	4	46	73
Blue-winged Teal	54	45	5	100	158
Green-winged Teal	34	33	14	69	115
Wood Duck	1	26	50	22	78
Ring-necked Duck	111	54	70	185	346
Goldeneye	0	1	0	0	1
Gadwall	14	6	8	20	42
Shoveler	2	0	0	2	4
Lesser Scaup	0	1	0	0	1
Greater Scaup	-	-	-	-	-
Red-breasted Merganser	0	0	27	0	27
Common Merganser	0	0	0	0	0
Hooded Merganser	0	1	0	0	1
Canada Goose	11	6	19	19	47
Brant					
Red Head	0	1	0	0	1
White-winged Scoter					
Black Scoter					
Surf Scoter					
Common Eider					
Merganser Unknown					
Black: Mallard Hybrid Pair[1]	1	0	0	1	0
Bufflehead					
Unidentified Scaup					
Unidentified Duck					
Total	315	297	459	626	1386

[1]birds recorded under mallards and blacks and hybrids

Table *iii.* Minimum number of broods observed on 70 wetlands surveyed on both counts 3 and 4 on Prince Edward Island, 1996.

Species	**Number of Broods**
Mallard	12
Black Duck	75
Gadwall	8
Wigeon	14
Pintail	3
Green-winged Teal	29
Blue-winged Teal	44
Wood Duck	9
Ring-necked Duck	28
Unidentified duck	3
Canada Goose	18
Shoveler	1
Total	244

Appendix III

Figure i. The total number of mallards recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1996.

Figure ii. The total number of wigeon recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1996

Figure iii. The total number of gadwall recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1996

Figure *iv*. The total number of Wood Ducks recorded on Counts 1 and 2 of the Prince Edward Island surveys, 1985-1996

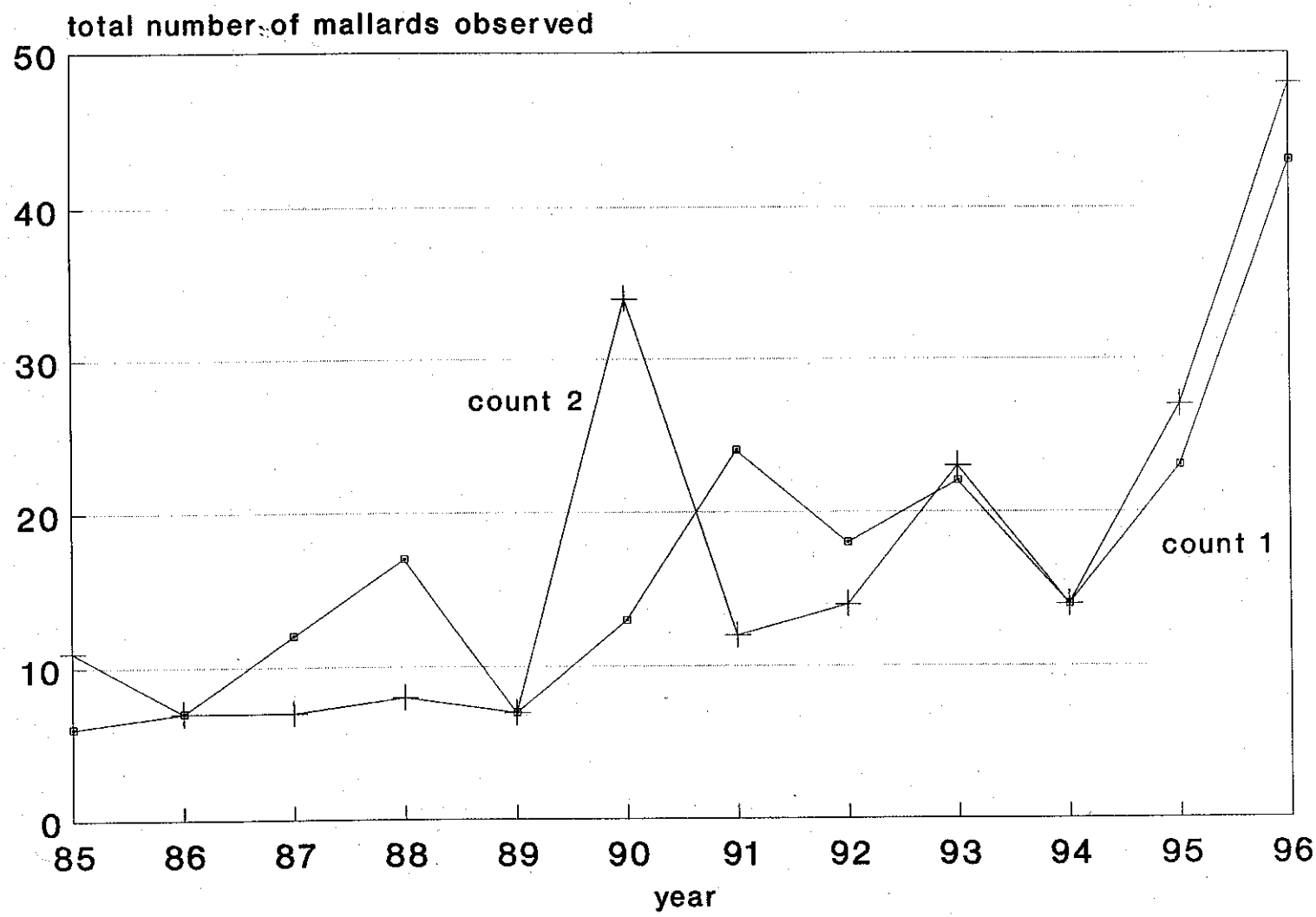

Figure i. The total numbers of Mallards recorded on Counts 1 and 2 on the Prince Edward Island surveys, 1985-1996.

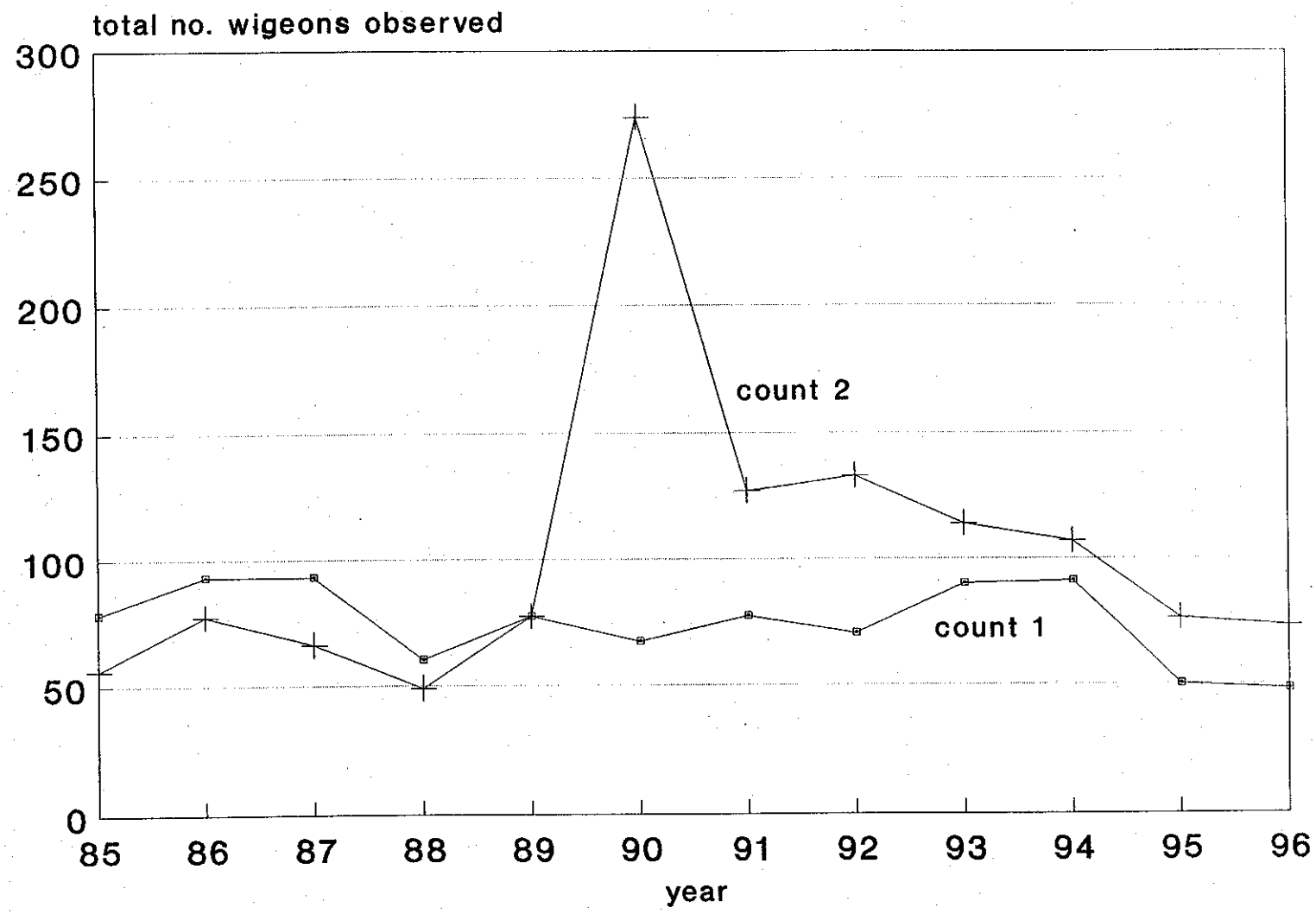

Figure ii. The total numbers of American Wigeon recorded on Counts 1 and 2 on the Prince Edward Island surveys, 1985-1996.

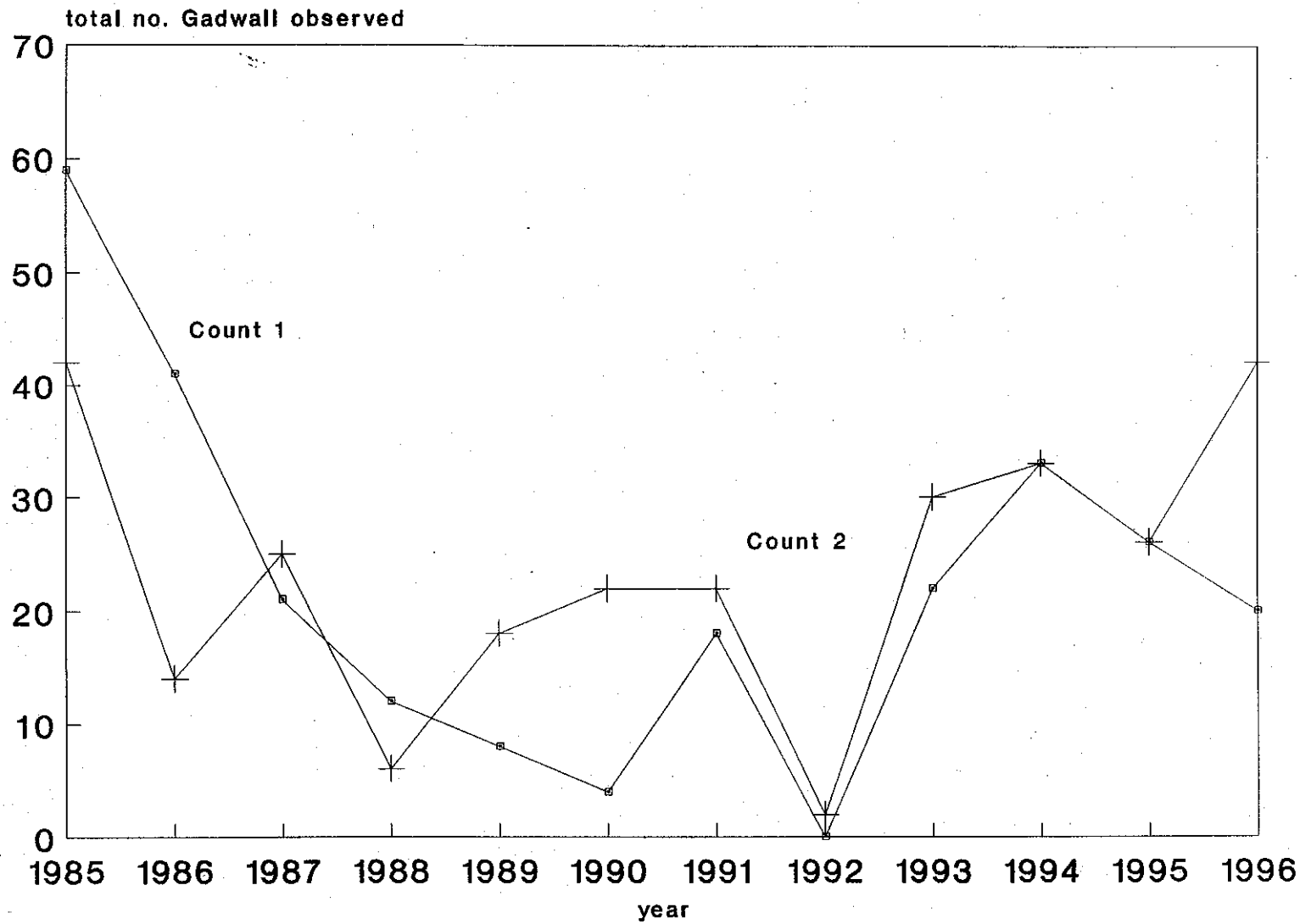

Figure iii. The total numbers of Gadwall recorded on Counts 1 and 2 on the Prince Edward Island surveys, 1985-1996.

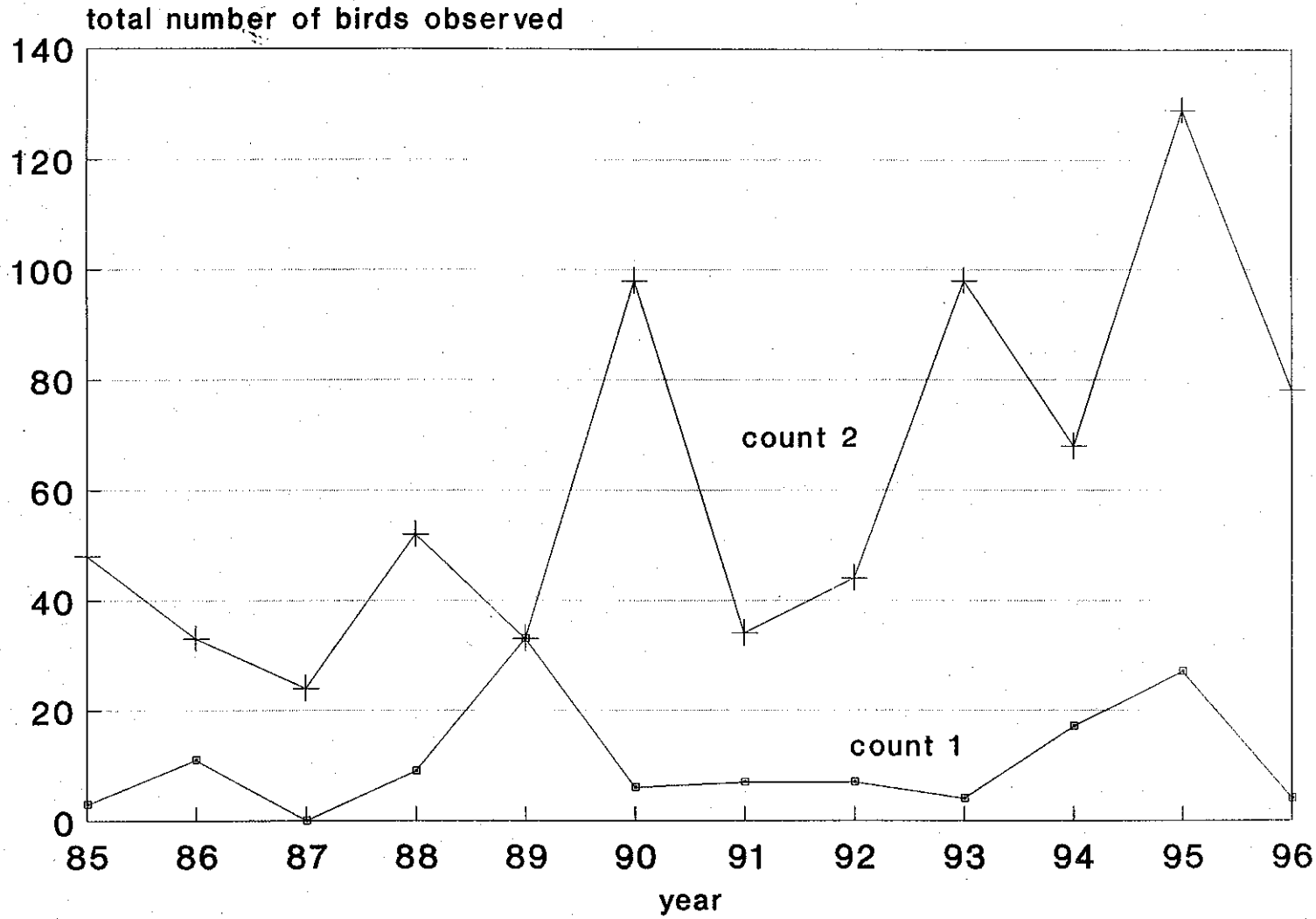

Figure iv. The total numbers of Wood Ducks recorded on Counts 1 and 2 on the Prince Edward Island surveys, 1985-1996.