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Aerial Surveys of Waterfowl Breeding Pairs in New Brunswick and Nova Scotia 1954-60 and 1978-84

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Introduction

Aerial waterfowl survey transects established during the early 1950's in the lower Saint John River and the N.B.-N.S. border area were surveyed annually from 1954 to 1960. In 1978 the N.B.-N.S. border area transects were reactivated followed by the Saint John River transects in 1979. Transects in both locations have been surveyed annually since that time. The objectives are to (1) compare breeding waterfowl populations of the 1950's to those of the late 1970's and 1980's; (2) establish an inexpensive survey to evaluate breeding populations on an annual basis; and (3) identify trends in breeding populations over a long term.

Saint John River Transects

A series of 25 transects was established in the lower Saint John River in 1952 beginning at the western end of Oromocto Island, extending in a roughly northeast-southwest direction across the Saint John River at one mile intervals to Lower Musquash Island below Jemseg (Figure 1). Approximately 205 survey kilometers are covered by the transects which vary in length from one km to 14 km. The first survey was flown in 1952 by C. E. Addy and W. F. Crissey and continued in 1953 by G. R. Boyer; however, data recorded on those surveys have not been found and thus are not included in this report. The surveys were continued in 1954 and 1955 by G. R. Boyer; B. C. Carter and G. F. Boyer in 1956; B. C. Carter in 1957-59; and C. O. Bartlett in 1960. Survey times most commonly occurred in mid-May but varied from 9 May to 22 May. Most surveys were

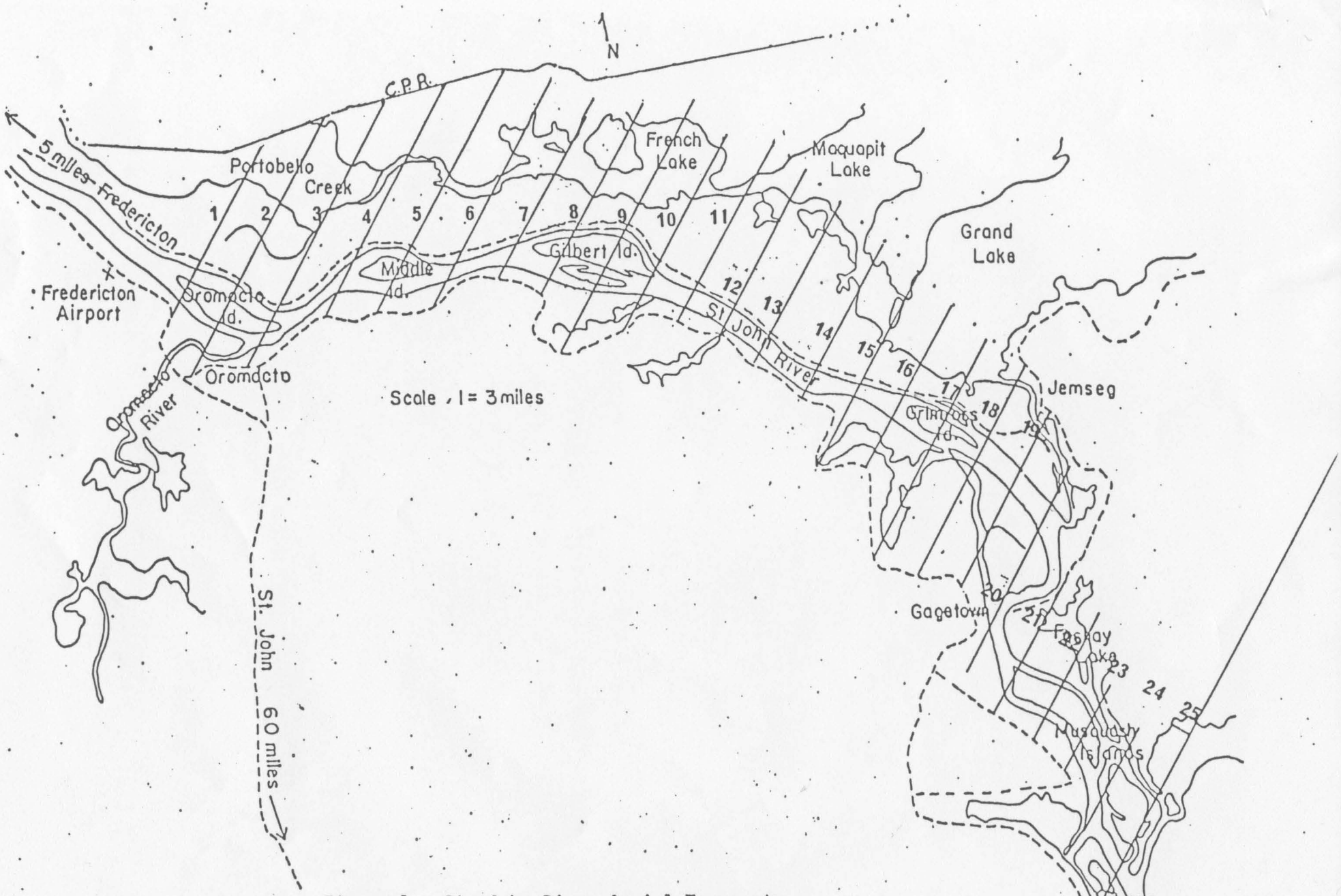


Figure 1: St. John River Aerial Transects

conducted by one observer using a high-winged single engine aircraft and with the exception of 1960, continuity of observers was maintained. The surveys were discontinued in 1961.

In 1979 the surveys were re-activated following as closely as possible the techniques and routes established in the 1950's. Continuity of observers has been maintained since revival of the survey although different pilots have been used. Aircraft type has also remained comparable (Cessna 172 and 185) and two observers have consistently participated. Survey timing has been based upon waterlevel readings at the Fredericton pumping station. Waterlevels at the time surveys were conducted between 1954 to 1959 averaged 4.0 metres but ranged from a low of 3.6 m to a high of 4.5 m. A level of 6.7 prevailed in 1960; however, surveys between 1979 and 1984 were conducted at waterlevels in the Saint John River largely determines availability of nesting habitat for most species, waterlevel is considered to be the most appropriate indicator upon which to base survey time. Acceptable levels are usually reached by the second or third weeks in May (range May 9-22) which suggests that nesting opportunity can vary as much as two weeks from one year to the next.

Results and Discussion

Total waterfowl counts (Table 1) for seven annual surveys between 1954 and 1960 were significantly higher for almost all species than counts conducted between 1979 and 1983. Exceptions were Green-winged Teal, Pintail, Wood Duck and Shoveler which showed increases in some surveys. Comparisons of average numbers by species for the seven-year period prior to 1960 with average numbers from 1979 to

Table 1. Total numbers of waterfowl observed on the Saint John River transects, 1954-60 and 1979-84.

Species	1954	1955	1956	1957	1958	1959	1960	7-yr. ave.	1979	1980	1981	1982	1983	1984	6-yr. ave.
Black Duck	353	471	294	410	302	313	400	363	314	108	93	141	236	337	205
GWt	11	0	6	3	3	17	0	6	13	1	4	2	32	17	12
Bwt	0	10	7	11	25	32	3	13	2	1	5	2	31	3	7
Goldeneye	119	392	298	272	119	106	55	194	9	48	13	16	8	11	18
R-n. Duck	258	136	133	63	137	144	14	126	0	3	4	9	11	11	6
Pintail	0	0	0	10	0	3	2	2	5	0	8	2	0	0	2
Merganser	0	43	16	8	0	0	12	8	15	4	12	8	15	32	14
Scaup	27	25	0	0	78	100	246	68	56	21	0	9	15	0	17
Wigeon	0	0	0	0	0	0	2	0	0	1	0	0	0	0	0
Wood Duck	0	0	0	0	0	0	0	0	5	10	2	1	0	0	3
Shoveler	0	0	0	0	0	0	0	0	2	3	0	0	0	0	1
Eiders and Scoter	25	0	0	0	0	0	0	4	19	0	0	0	0	0	3
Canada G.	90	86	0	6	106	0	8	42	0	0	0	9	0	3	2
Other	13	4	8	4	29	9	0	10	1	5	4	7	20	2	6
TOTAL	896	1187 6	762	~~781~~ 787	799	724	~~730~~ 742	~~922~~ 836	~~432~~ 441	~~216~~ 205	~~138~~ 145	~~210~~ 206	~~365~~ 368	416	296

1983, show that major nesting species have declined drastically in number. Black Duck declined by 51%; Common Goldeneye by 90% and Ring-necked Duck by 96%. During the early survey periods, waterfowl numbers in total were highest in 1955 and lowest in 1959 while during the most recent surveys high and low counts were recorded in 1979 and 1981, respectively. In 1984, the total number of Black Duck reached the highest level since the surveys were revived in 1979 and surpassed counts made in 1956, 1958 and 1959. Other species, however, remained at characteristically low levels.

A comparison of the average number of breeding pairs during the two survey periods, 1954-60 and 1979-84 shows significant declines between the two periods in major waterfowl species nesting in the area. Within the period 1979-84, numbers have not fluctuated significantly in most cases although some highs and lows may be seen in the case of Blue-winged Teal, Goldeneye, and Ring-necked Duck. On the average, the Ring-necked Duck has shown the greatest decline (82%); Goldeneye (78%); and Black Duck (41%). Teal have remained relatively comparable between the two survey periods. For most species the number of breeding pairs increased from 1954-59, but declined sharply in 1960. When surveys were removed in 1979 numbers of breeding pairs had recovered to levels approximating the 1954-55 years. Between 1979 and 1984 the most obvious declines were recorded in 1980. In that year, the number of Black Duck pairs reached an all-time low. Table 2 summarizes breeding pair data for major species breeding in the Saint John River survey area.

Table 2. Total breeding pairs of major waterfowl species observed on the Saint John River transects 1954-60 and 1979-84*.

Species	1954	1955	1956	1957	1958	1959	1960	7-yr. ave.	1979	1980	1981	1982	1983	1984	6-yr. ave.
Black Duck	30	45	68	78	89	109	25	63	39	18	40	44	41	40	37
G.-w. Teal	1	0	3	2	3	9	0	3	5	1	3	2	5	5	4
B.-W. Teal	0	2	4	4	1	13	5	4	1	1	3	2	13	2	4
Goldeneye	8	2	36	47	45	41	4	32	6	13	10	3	5	6	7
R.-n. Duck	2	14	15	14	29	40	4	17	0	0	3	5	3	6	3
TOTAL	41	~~103~~ 63	126	145	167	212	38	119	51	33	59	56	67	59	55

*Single birds are counted as pairs

N.B.-N.S. Border Area Transects

In the early 1950's a series of fourteen transects were established in the N.B.-N.S. border area for the purpose of conducting aerial breeding waterfowl inventories. A search of old files and reports has recovered data for those inventories from 1954 to 1960 inclusive. The data were collected during that seven-year period by G. Boyer, H. Webster, B. Carter, G. Vaillancourt, C. Bartlett, and A. J. Erskine; however, surveys were discontinued in 1961.

Since 1960, there have been numerous improvements in breeding habitat within the border region resulting from acquisition and management programs of the CWS and Ducks Unlimited. Very little habitat has been lost during the same period. Waterfowl have responded favourably to habitat management in the area reaching their highest concentrations on man-made impoundments. The extent to which impoundments have detracted from production in surrounding natural marshes is difficult to document although irregular surveys over a ten-year period have suggested little or no change in natural areas.

In 1978, the border area transects were resurveyed. Maps showing original flightlines were followed in an attempt to duplicate previous surveys as closely as possible (Figure 2). The objective was to compare 1978 breeding waterfowl populations in the N.B.-N.S. border area with those of the 1950's and, thereby; obtain assessment of the effect of habitat acquisition and management on populations in the area.

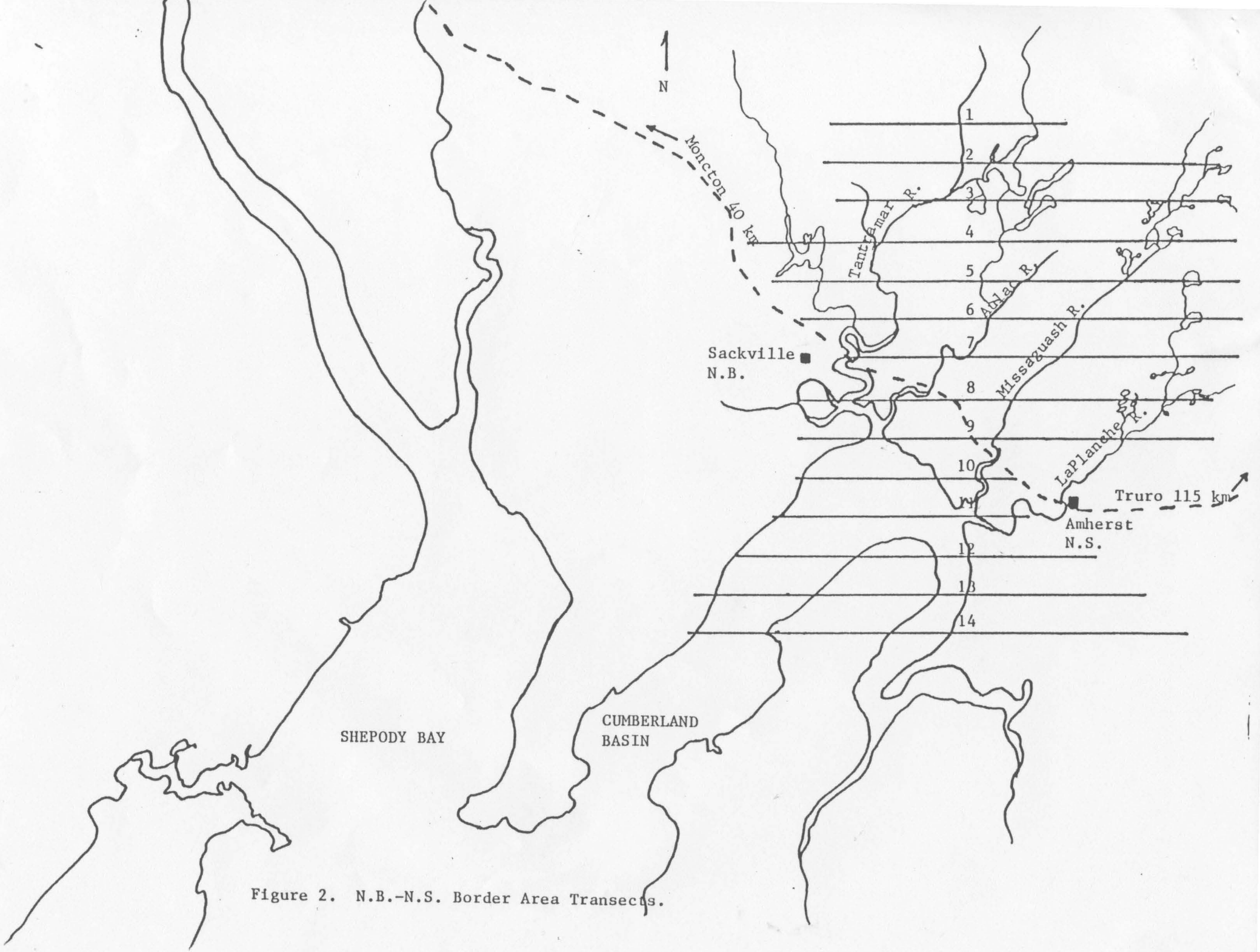


Figure 2. N.B.-N.S. Border Area Transects.

A straight line distance of approximately 120 miles was flown along 14 transects. The transects were spaced at roughly one mile intervals and extended parallel to each other from the upland west of Sackville to the upland east of the LaPlanche River system. From north to south the area covered extended from the town of Midgic to Amherst.

High-winged Cessna aircraft carrying one observer in the rear and an observer and pilot in the front were used for all surveys during the period 1978-84. Continuity of observers was also maintained as were survey dates. All surveys were flown during mid to late May. During earlier surveys, high-winged aircraft and similar survey dates were used; however, only one observer was commonly used and continuity varied. Transects were flown beginning with the northernmost line at an altitude of 60 metres and a speed of 145 km/hr. Breeding pairs, single birds and flocks of three or more were recorded by species and transect.

Results and Discussions

The development and management of large amounts of high quality nesting and brood rearing habitat in the N.B.-N.S. border area since 1965 have had a significant influence on waterfowl populations in the area. Total waterfowl numbers (Table 3) in 1984 surpassed all years except 1957. The most dramatic increase was observed in Black Duck whose number was only slightly less than the all-time high. Comparison of average number for the two seven-year survey periods shows totals for the five major nesting species to be higher for Black Duck, Blue-winged Teal and Ring-necked Duck in the 1978-84 period than during the earlier surveys. Green-winged Teal and Pintail were higher during the earlier survey period. The average

Table 3. Total numbers of waterfowl observed on the N.B.-N.S. Border Area Transects - 1954-60 and 1978-84.

Species	1954	1955	1956	1957	1958	1959	1960	7-yr. ave.	1978	1979	1980	1981	1982	1983	1984	7-yr. ave.
Black Duck	149	127	92	307	149	62	87	139	216	144	111	100	90	91	283	148
G.-w. Teal	113	48	15	161	14	6	0	51	29	25	18	11	9	6	43	20
B.-w. Teal	0	0	17	53	13	3	6	13	42	25	4	19	12	13	47	25
R.-n. Duck	27	26	30	52	45	17	0	28	52	36	23	27	52	32	36	37
Pintail	5	12	36	64	4	11	2	19	20	23	20	12	0	7	7	13
Sub-total	294	213	190	637	225	99	95	250	359	253	176	169	163	149	416	243
Blk X Mal Hybrid	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	<1
Mallard	0	0	0	0	0	0	0	0	3	7	5	5	3	0	3	4
Wigeon	0	0	0	0	0	0	2	0.30	1	7	2	0	2	2	2	2
Wood Duck	0	0	0	0	0	0	0	0	2	3	2	0	0	0	1	1
R.-b. Merg.	6	0	0	0	0	0	0	0.9	4	1	6	0	1	4	0	2
Scoter	0	77	0	0	115	0	0	27	125	0	0	0	0	0	50	25
Shoveler	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	<1
Red Head	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	~~1~~ 0
C. Goldeneye	0	0	7	20	0	1	0	4	0	0	0	0	0	0	0	0
Canada G.	0	0	0	0	0	0	0	0	6	16	0	30	2	4	2	9
Unident.	3	3	5	0	36	8	0	8	62	1	13	15	40	12	0	12
TOTAL	303	293	202	657	376	108	~~91~~ 97		562	291	204	221	211	~~173~~ 171	474	

numbers of breeding pairs (Table 4) have increased for all species in recent years. Increases in pairs of Black Duck, Blue-winged Teal and Ring-necked Duck have been most significant with Green-winged Teal and Pintail increasing only slightly.

Total species composition in the surveys varied between the two survey periods. During the early flights, nine species of waterfowl were recorded, compared to 13 species in the later surveys. Also mixed pairs of Black Duck and Mallard were first noted in 1981. The new species observed during the later surveys include Mallard, Wood Duck, Shoveler, Redhead Duck, and Canada Geese. Common Goldeneye, on the other hand, have not been observed in aerial counts since 1959. The redhead is an uncommon breeder but has been observed annually in the N.B.-N.S. border area during the past several years. Although not an uncommon breeder, the Shoveler is not abundant in the N.B.-N.S. border area. These two species probably reflect the influence of habitat management which has created conditions approximating their habitat requirements found in western areas. The establishment of breeding Wood Duck and Canada Goose populations may be attributed primarily to transplant and nest box programs while the appearance of Mallard pairs more likely reflects the general eastward expansion of that species than the influence of habitat management.

Although it is apparent that total numbers, breeding pairs and species of waterfowl generally increased as a result of habitat acquisition and management in the N.B.-N.S. border area between the two survey periods, the trend appears to suggest a decline in populations during the latest seven-year period. Since 1978 and

Table 4. Total breeding pairs of five major waterfowl species observed on the N.B.-N.S. Border Area Transects 1954-60 and 1978-84*.

Species	1954	1955	1956	1957	1958	1959	1960	7-yr. ave.	1978	1979	1980	1981	1982	1983	1984	7-yr. ave.
Black Duck	41	31	19	110	18	20	8	35	83	55	31	36	32	47	51	48
G.-w. Teal	1	1	8	7	0	2	0	3	18	11	6	5	3	1	15	8
B.-w. Teal	0	0	7	2	4	3	5	3	16	14	4	11	5	5	12	10
R.-n. Duck	2	4	6	1	3	5	0	3	26	17	11	17	27	17	19	19
Pintail	3	7	10	12	2	4	1	6	9	14	8	6	0	5	4	7
TOTAL	47	43	50	132	27	39	14	50	152	111	60	75	67	75	101	92

1979, the number of breeding pairs and total numbers for the five major species either declined or remained stable in most surveys. Notable exceptions are the recovered in number of breeding pairs of Black Duck in 1983 and 1984 and the total number of Ring-necked Duck in 1982. Some other variations have also occurred but in general counts have remained below the 1978-79 surveys.

Summary and Conclusions

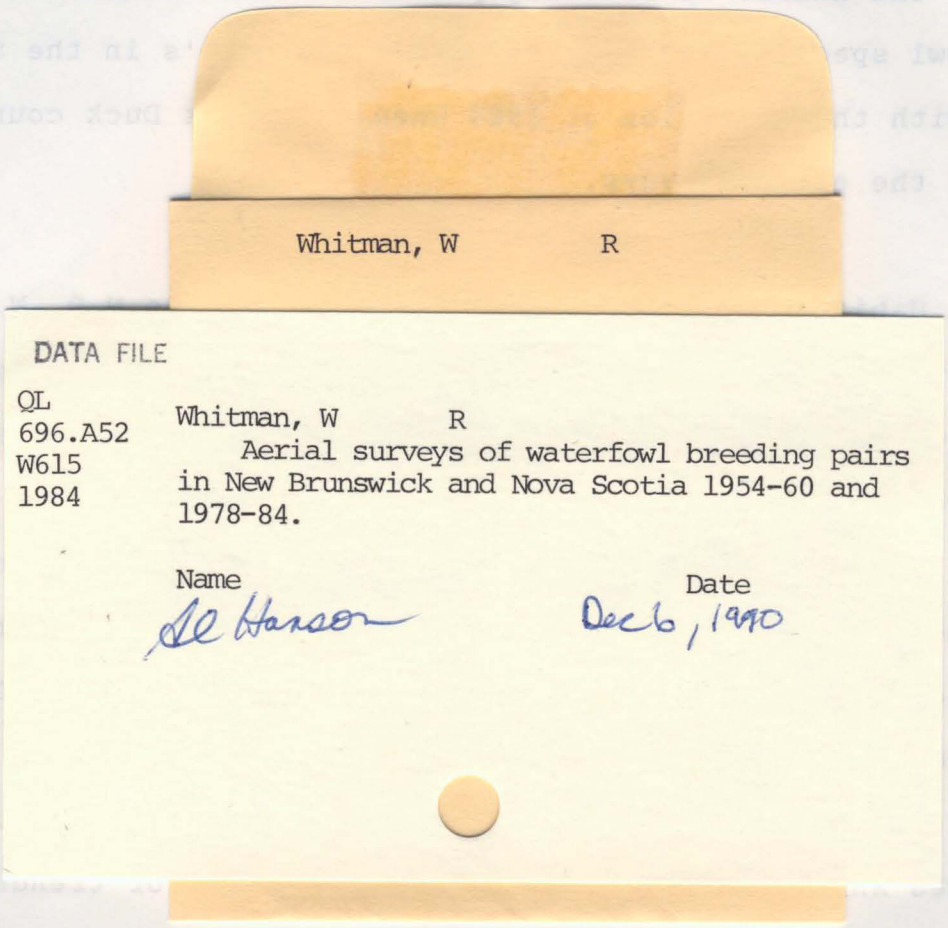
Aerial surveys along fixed line transects were conducted annually from 1954 to 1960 in the Saint John River and the N.B.-N.S. border area. Those surveys were revived in 1978 in the border area and in 1979 in the Saint John River and an examination of the data tends to support the following conclusions:

1. The number of breeding pairs and total numbers of major waterfowl species have declined since the 1950's in the Saint John River with the exception of 1984 when the Black Duck count surpassed some of the early surveys.

2. Habitat acquisition and management in the N.B.-N.S. border area have resulted in increased breeding populations of major waterfowl species and has in part accounted for the appearance of new species.

3. Since revival of surveys in 1978, average total numbers and breeding pairs of most major waterfowl species have generally increased in the N.B.-N.S. border area. Exceptions are Green-winged Teal and Pintail.

4. These surveys are inexpensive to conduct and should be continued annually as one of the few indicators of trends in breeding waterfowl populations in N.B. and to a lesser extent in N.S. In the case of the Saint John River, surveys should definitely be continued for another year which would provide seven years of data during recent years is now available in the N.B.-N.S. border area.



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