BLACK DUCK JOINT VENTURE

PROGRESS REPORT FOR 1992

January 1993

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Introduction:

The goal of the Black Duck Joint Venture (BDJV) is to implement a cooperative international program of population monitoring and research. The program will provide information required to improve the management of black ducks. The primary objectives, as stated in the BDJV Strategic Plan (1993), are to:

i) provide statistically reliable indices of population trends and relative densities of black ducks and other waterfowl species throughout the primary breeding range of black ducks,

ii) determine the distribution and derivation of the harvest of black ducks and mallards from throughout the breeding range, and their harvest and survival rates,

iii) determine, through research, the important factors influencing population status and dynamics of black ducks.

The purpose of this report is to describe the progress made in 1992 toward meeting those objectives.

Surveys:

Helicopter surveys were conducted as described in the BDJV Operational Plan (1992). The survey was designed to detect a 10% change in numbers of black ducks in the survey area with 90% confidence over a 5-year period. The sample was enhanced to allow detection of significant changes within each province/state over a 10-year period.

In total, 229 100-km^2 plots were surveyed (Ontario - 44, Quebec - 83, Nova Scotia - 25, New Brunswick - 25, Newfoundland -19, Labrador - 6, and Maine - 27). Spring was late in arriving in 1992. Good survey conditions prevailed for the most part, and the survey was completed successfully. Trend analysis of the first three years showed that black duck numbers increased in Ontario, but declined in Quebec and Maine. As yet, the results remain inconclusive for New Brunswick, Nova Scotia and Newfoundland. A description of the first three years of helicopter surveys are described in Appendix A.

Helicopter surveys in the Lake States in 1990 (northern Wisconsin, Minnesota and Michigan) confirmed that these areas support low densities of breeding black ducks.

To increase cost-efficiency, the Lake States were instead surveyed by fixed-wing aircraft since 1991. For the same reason, 4 helicopter plots in northwestern Ontario were discontinued after 1990, which meant that one fewer survey crew was required. These changes did not affect the ability of the survey to detect population trends, but did reduce the associated costs.

The fixed-wing surveys in the southern part of the survey area were also completed. Results of the second year of these surveys in the Lake States are shown in Appendix B, and the third year of fixed-wing surveys in southern Ontario, Quebec and New York are shown in Appendix C. Helicopters were used to establish visibility rates for species sufficiently common to allow calculation of the ratio.

The following table shows the distribution of funds within the survey program. The values are given in Canadian dollars. To convert to American dollars, they can be multiplied by 0.87 (the approximate exchange rate during the field season).

	USFWS Region 5	Canadian Wildlife Service
Helicopter (Canada)	181,700	315,000
Helicopter (US)		
Maine	63,250	
Visibility Rates	11,500	
Helicopter - Total	256,450	315,000
Fixed-wing Surveys		
Ont., Que., NY	28,750	
Mich., Minn.	17,250	
Fixed-wing Total	46,000	
GRAND TOTAL	302,450	315,000

To evaluate whether the survey program as currently conducted is meeting the objectives outlined in the BDJV Strategic Plan (1993), the Technical Committee reviewed the experimental design for the helicopter survey. At the outset of the survey, little information was available on the expected distribution of black ducks. However, following the 1992 survey, three years of data were available to evaluate the distribution of the observations and adequacy of the sample size. It was concluded that: i) we are meeting the stated goals of being able to detect trends at a given level of precision, both "continentally" and regionally, ii) there are alternative ways to conduct the survey that would reduce the costs.

The Technical Committee also looked at the results from the fixed-wing and helicopter surveys in the area where both were conducted. The results from the two were not wildly different, however, the coefficients of variation (CV) for the fixed-wing results (corrected for visibility bias by helicopter transects) were large (30-35%). A larger sample of transects measuring visibility rates is needed to increase the precision of the estimates.

A more thorough evaluation is currently being planned, and will include an analysis of cost-effectiveness of alternative survey methods.

Other surveys of relevance to the BDJV include ground counts that are conducted annually in Prince Edward Island, and at intervals in southern Ontario. 1992 was the ninth consecutive year of the ground-based survey of breeding waterfowl in Prince Edward Island. One hundred randomly selected wetlands covering a wide range of habitat types are surveyed four times each summer. The number of early and late breeding pairs (Appendix D), and their productivity are estimated annually. Ground surveys of waterfowl breeding in southern Ontario have been conducted at intervals since 1971. Appendix E shows the results from the most recent three surveys.

Appendix F shows the results of the midwinter inventories from 1955-1992. The estimated number of black ducks declined in 1992. The winter population appears to have stabilized since 1980 at about 300,000 birds, about 85,000 below the population goal as stated in the North American Waterfowl Management Plan.

Banding:

Existing banding sites were successfully maintained in 1992. The number of ducks banded at Canadian sites is shown in Appendix G where they are, for the most part, broken down by age and sex categories. A final report on the preseason banding activities is provided annually at the July meeting of the Atlantic Flyway Technical Section.

In general, fewer black ducks were banded this year. It was felt that the number of young being captured was low, and may indicate that production was not as successful as had been anticipated. Alternative sites are needed in eastern Labrador, in Ontario north of Sault Ste. Marie, and in reference areas not currently represented by banded birds (primarily in boreal Quebec).

The following table shows the distribution of funds within the banding program. The values are shown in Canadian dollars. To convert to American dollars, they can be multiplied by 0.87 (the approximate exchange rate during the field season).

	USFWS Region 5	Atlantic Flyway Council	Mississippi Flyway Council
Cooperative Banding Program			
Ontario	30,705	38,295	12,659
Quebec	30,705	38,295	
Atlantic	30,705	38,295	
Subtotal	92,000	115,000	12,659
Nikip Lake, Ontario	13,800		
Woodstock, New Brunswick	13,800		
GRAND TOTAL	119,600	115,000	12,650

Research:

Trends in population size, productivity, survival and harvest rates can not be explained, or managed, without adequate understanding of the relationships among population parameters and ecological factors. The research component of the BDJV addresses important information gaps in our knowledge that are required to improve the management of black ducks, and to provide necessary information to the habitat oriented joint ventures. It remains unclear to what extent production, mortality, habitat change, and hybridization with mallards has affected the status of black duck populations. Research funded by the BDJV is intended to assess the relative importance of these factors.

Several research projects were funded in 1992. The objectives and current status of each project are presented in Appendix H. Briefly, they addressed such issues as: nest success and summer survival of ducklings and adult female black ducks and mallards, the use of LANDSAT satellite images to characterize breeding habitat of black ducks, the effects of timing and duration of drawdown on impoundment productivity, the fate of phosphorous in lakes following fertilizer addition, the relative resistance of mallards and black ducks to a blood parasite, and the effects of reduced calcium and elevated cadmium intake on the behaviour of captive American black ducks.

The following table shows the distribution of funds within the research program. The values are shown in Canadian dollars. To convert to American dollars, they can be multiplied by 0.87 (the approximate exchange rate during the field season).

	USFWS Patuxent Research Center	Canadian Wildlife Service
Patuxent Research Program	448,000	
Petrie and Sears	12,000[1]	8,800
Bordage and Plante		43,000
Hanson		13,000
Daborn et. al.		5,000
Shutler, Ankney and Dennis		22,219
Silver Nudds		7,125
TOTAL	460,000	95,000

[1] approximate value of equipment purchased

Total Budget:

The following table summarizes the overall allocation of 1992 BDJV funds. The upper value is in Canadian dollars, and the lower in US dollars.

	Surveys	Research	Banding	Communications
Canadian Wildlife Service	315,000	95,000		
	273,913	82,609		
USFWS Region 5	302,450		119,600	32,200
	263,000		104,000	28,000
Patuxent Wildlife Research Center		460,000		
		400,000		
Atlantic Waterfowl Council			115,000	
			100,000	
Mississippi Flyway Council			12,650	
			11,000	
Total	617,450	555,000	247,250	32,200
	536,913	482,609	215,000	28,000

Appendix A

Breeding Waterfowl Survey in Eastern Canada and the State of Maine

1992

Progress Report

July 15, 1992

A component of the Black Duck Joint Venture

Surveys conducted by:
Atlantic, Quebec, and Ontario Regions
of the Canadian Wildlife Service, and the
Maine Department of Inland Fisheries and Wildlife

Introduction

In the past, surveys of black ducks on their wintering areas have been used to examine trends in population size. This information is useful for studying overall population trends, but not for evaluating the status of various components of the breeding population. Among other goals, the Black Duck Joint Venture (BDJV) of the North American Waterfowl Management Plan (NAWMP) was designed to provide improved information on black duck populations in their breeding areas.

A historical database of waterfowl population status does exist for breeding areas, but it is not continous. In Ontario, for instance, the relative abundance of breeding ducks was measured in 1951 (Boyd 1974) and surveys from 1971 to 1987 documented the decline of black duck populations in the south (Dennis et. al. 1989). Some early information on black ducks in boreal Ontario, Quebec and Labrador was recorded by Kaczynski and Chamberlain (1968) in the late 1950s and 1960s. Ross (1987, 1990) has been studying waterfowl population densities in northern Ontario since about 1980.

Surveys of breeding areas, with varying levels of intensity, have also been ongoing in various parts of Atlantic Canada since the 1930's (Erskine 1987). During the early years, biologists from the USFWS visited the Atlantic provinces and produced unpublished reports giving their impressions of population trends. Since that time, increasingly systematic surveys have been implemented. In the late 1950's ground surveys of breeding waterfowl populations were initiated in Prince Edward Island and continue today although they have not been run continuously since that time. Waterfowl in forested areas of the Maritimes were studied in the late 1960's, and in Newfoundland and Labrador in the early 1970's (Boyd 1974), late 1970's and early 1980's (Erskine 1987).

To improve the continuity and coverage of surveys of eastern waterfowl populations, systematic helicopter surveys have been conducted in the Atlantic provinces, Quebec and Ontario since about 1985. These surveys provided a basis for the BDJV surveys that were initiated in 1990. The much expanded effort in eastern Canada and Maine was repeated the following years, and this report summarizes results obtained in 1992 in comparison to 1990.

Spring 1992 Habitat Conditions

Spring in Newfoundland and Labrador was again delayed in 1992 due to cold weather in April and early May. Weather conditions were generally normal after mid-May and although breeding chronology was approximately one week late, production is expected to be average.

In Nova Scotia and New Brunswick, breeding chronology was delayed by prolonged cold weather following an initial warm period in April. No significant adverse environmental conditions occurred after mid-May but the waterfowl hatch is expected to be one or two weeks late.

The 1991-92 winter could be considered normal for Quebec but, like last year, spring was very late and the survey had to be delayed by four days. During the survey, the temperature ranged from -4°C to 29°C with an average of 11°C.

Spring also came late in Ontario and cooler temperatures continued until the second week of May resulting in a substantial delay in vegetational phenology of the whole

area (although this was particularly marked in southern section). The delayed melt of the snow pack plus additional precipitation received in April led to generally high water levels and good nesting conditions. Good habitat quality and warm and dry weather most of May mitigated the negative effects of retarded phenology. Waterfowl productivity should be at least average, and could be above average for late nesting species.

In Maine, snow melt in April was rapid and ahead of schedule for most of the State, especially in the northern area in spite of cool temperatures. No significant flooding was recorded during April or May and the ice-out date for many lakes was 1-2 weeks later then normal. Habitat conditions and weather were favorable for nesting and early hatching even though temperatures were on the cool side through May. Precipitation, during May, was below normal for all regions of the State.

The 1992 Survey

Helicopter surveys were undertaken as described in the Strategic Plan for Implementation of the Black Duck Joint Venture (1992). In total, 229 100-km^2 plots were surveyed, and were distributed as follows: Ontario - 44, Quebec - 83, Nova Scotia - 25, New Brunswick - 25, Newfoundland - 19, Labrador - 6, and Maine - 27 (Figure 1). In 1991, Ontario reduced the total number of plots surveyed by 4 in comparison to 1990, and Wisconsin, Minnesota and Michigan survey areas were instead included in the area surveyed by fixed-wing aircraft. These changes were made in reponse to very low densities of black ducks which made surveys of these plots cost-ineffective. The results of the fixed-wing surveys are described in a report separate titled "Waterfowl Breeding Population Survey - Ontario, Quebec and New York - May 1992" (1992).

All waterfowl were counted and the social structure of groups was recorded. Birds were recorded by sex, when possible, and identified as individuals, pairs, groups or flocks. The total numbers of birds of each species were calculated by summing all observations for each plot. The results are presented in Table 1 as densities (birds per 100-km^2 to allow comparison between areas. The total, or overall density was calculated as the number of black ducks observed/number of plots. This can be viewed as a weighted value as the number of samples originally assigned to each region depended on the size of the area to be surveyed.

Plots showing the distribution of total black ducks in 1990, 1991 and 1992 are shown in Figures 2, 3 and 4. The distributions were mapped using POTMAP, a routine of the Spatial Analysis System (SPANS) that interpolates point data to create a smoothed or averaged surface. Note that the densities shown in P.E.I. are solely the result of interpolation, as there are no survey plots located in that province.

SPANS requires that values for various map parameters be specified (egs. radius of sampling circles and formula for weighting of neighbouring points), and diffenrences in these values can result in different maps. For these maps, alpha (radius of inner sampling circle) was 10 km., gamma (radius of outer sampling circle) was 50 km. and the weighting function, beta, was assigned the value of 0.5 (linear).

Because the most appropriate technique for estimating pairs has not yet been determined, Table 2 presents, for interest, one analysis for common species of the density of breeding pairs. These results may be different from those presented in individual reports by survey biologists depending on how the number of indicated

pairs was calculated. In this table, two bird groups and lone individuals were used to represent pairs for all species except ringnecked ducks and goldeneye for which only observed pairs were counted. It is felt that this technique might underestimate the number of pairs actually breeding, but it could serve as a useful index over time. There are other possible estimators. One could use the proportion of each sex in groups of birds where the sex was recorded as a correction for unsexed birds in the same group size, and then estimate breeding pairs.

Note

The survey was designed to detect a 10% change in numbers of black ducks in the survey area with 90% confidence over a 5-year period. The sample was enhanced to allow detection of significant changes within each province/state over a 10-year period. The design of the survey is currently being evaluated using the data from the first three years. Based on this evaluation, the survey may be altered in future to increase cost efficiency, but only without compromising the power of the design.

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BANDING REPORT Atlantic Region

1992 Preseason Banding Report by: New Brunswick Fish & Wildlife Branch
Department of Natural Resources & Energy

Banding Station Location: Fredericton to Gagetown, Saint John River, NB

Coordinates: 454-0660

Starting Date: August 10, 1992 Ending Date: September 9, 1992

Crew Members: Susan Bowes, Lynn Davidson, Chris Connell

Conditions:

Results:

Species	AHY M	AHY F	HYM	HYF	LM	LF	Total
Black Duck	40	71	310	211	5	8	645
Mallard	17	11	50	24	8	6	116
Mallard x Black Duck	0	1	5	7	0	0	13
Wood Duck	82	16	12	11	11	11	143
Northern Pintail	0	1	4	5	3	2	15
Ringnecked Duck	2	4	1	3	3	5	17
American Wigeon	0	0	1	2	0	0	3
Blue-winged Teal	4	4	7	6	2	3	26
Green-winged Teal	22	16	11	4	0	0	53
Total	167	124	401	273	31	35	1031

Recommendations:

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Nova Scotia

BANDING STATION TITLE: Cape Breton Island

STARTING DATE: 25 August 1992 **ENDING DATE:** 1 October 1992

CREW MEMBERS: O. Dewberry and A. Doucette

DESCRIPTION OF CONDITIONS:

Birds were bait trapped in ponds, rivers mouths and harbours (tidal) near Judique,Margaree and Lake Ainsley.

RESULTS:

193 ducks banded (6 species)
118 American Black Duck (see attached)

RECOMMENDATIONS:

This station will be operated next year because an adequate sample has not been obtained.

Table I. Age, sex and species composition of waterfowl banded at Cape Breton Island Station, 1992.

SPECIES	LOCAL			HATCH YEAR			AFTER HATCH YEAR			Total
	M	F	Tot	M	F	Tot	M	F	Tot	
Mallard	0	0	0	2	0	2	0	1	1	3
Black Duck	4	3	7	51	49	100	3	8	11	118
Bl .x Mal. Hybrid	0	0	0	4	2	6	0	0	0	6
Green-w.Teal	0	0	0	5	10	15	1	1	2	17
Blue-w. Teal	0	0	0	12	18	30	1	4	5	35
Wood Duck	0	0	0	1	0	1	4	0	4	5
Ring-n. Duck	0	0	0	5	4	9	0	0	0	9
Total	4	3	7	80	83	163	9	14	23	193

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Newfoundland

BANDING STATION TITLE: Carmanville

STARTING DATE: 2 August 1992 **ENDING DATE:** 14 September 1992

CREW MEMBERS: G.S. Brinson

DESCRIPTION OF CONDITIONS:

Birds were trapped on a salt water arm near Carmanville.

RESULTS: 337 ducks banded
217 American Black Ducks

RECOMMENDATIONS:

This station will not be opened in 1993 because we have a good sample from the area. The effort will be directed to a different area.

Table I. Age, sex and species composition of waterfowl banded at Carmanville, Newfoundland 1992.

SPECIES	HATCH YEAR			AFTER HATCH YEAR			TOTAL		
	M	F	Tot	M	F	Tot	M	F	Tot
Black Duck	76	82	158	32	27	59	108	109	217
Green-w.Teal	40	54	94	11	7	18	51	61	112
Blue-w. Teal		2	2					2	2
Northern Pintail	3	3	6				3	3	6
Total	119	141	260	43	34	77	162	175	337

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: New Brunswick

BANDING STATION TITLE: Bathurst

STARTING DATE: 8 September 1992 **ENDING DATE:** 26 October 1992

CREW MEMBERS: A. Foster and T. MacAllum

DESCRIPTION OF CONDITIONS:

Trapping was all in tidal salt marshes, except 1 freshwater, man-made impoundment. Lots of ducks (and Canada Geese) in the harbour but could not lure them into the trap readily.

RESULTS:

422 ducks banded
384 American Black Ducks

RECOMMENDATIONS:

This is a continuing, monitoring station

Table 1. Age, sex and species composition of waterfowl banded at Bathurst, New Brunswick, 1992.

SPECIES	LOCAL			HATCH YEAR			AFTER HATCH YEAR			Total
	M	F	Tot	M	F	Tot	M	F	Tot	
Mallard				5	2	7	6	4	10	17
Black Duck				88	73	161	153	70	223	384
Blk x Mal. Hybrid							2	-	2	2
Green-w.Teal				2	2	4				4
Northern Pintail				1	-	1	1	-	1	2
Canada Geese				-	3	3	5	2	10	13
Total				96	80	176	167	76	246	422

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Newfoundland

BANDING STATION TITLE: Codroy

STARTING DATE: 11 September 1992 **ENDING DATE:** 7 October 1992

CREW MEMBERS: J.H.B. Holmes and K. Pilgrim

DESCRIPTION OF CONDITIONS:

RESULTS:

359 ducks banded (2 species)
252 American Black Ducks (see attached)

RECOMMENDATIONS:

This is a continuing, monitoring station.

Table I. Age, sex and species composition of waterfowl banded at Codroy, Newfoundland 1992.

SPECIES	LOCAL			HATCH YEAR			AFTER HATCH YEAR			Total
	M	F	Tot	M	F	Tot	M	F	Tot	
Black Duck				147	91	238	6	8	14	252
Green-w.Teal				41	51	92	3	12	15	107*
Total				188	142	330	9	20	29	359

* One band destroyed

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Newfoundland

BANDING STATION TITLE: Bonavista Peninsula

STARTING DATE: 15 August 1992 **ENDING DATE:** 19 September 1992

CREW MEMBERS: L. Pike

DESCRIPTION OF CONDITIONS:

Bait trapping operations were conducted on tidal estuaries and fresh water wetlands. Birds were difficult to easy to trap. Duck populations are reported to be low. Broods were late.

RESULTS:

48 ducks banded
46 American Black Ducks (see attached)

RECOMMENDATIONS:

This was a trial operation in a new area. It may be operated next year with some modifications.

Table 3. Age and sex composition of waterfowl banded at Bonavista (Tables 1 and combined), 1992.

Species	HY			AHY			Totals		
	M	F	Total	M	F	Total	M	F	Total
American Black Duck	18	27	45	-	1	1	18	28	46
American Green-winged Teal	1	-	1	1	-	1	2	-	2

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Prince Edward Island

BANDING STATION TITLE: Central Prince Edward Island

STARTING DATE: 27 July 1992 **ENDING DATE:** 28 August 1992

CREW MEMBERS: T. Godfrey and B. Thompson

DESCRIPTION OF CONDITIONS:

RESULTS:

333 ducks were banded (9 species)
135 American Black Ducks (see attached)

RECOMMENDATIONS:

This station will be operated next year because an adequate sample of Black Ducks has not been obtained.

Table 1. Age, sex and species composition of waterfowl banded at the PEI station in 1992.

Species	Local M	Local F	Hatch Year M	Hatch Year F	After Hatch Year M	After Hatch Year F	Totals
Mallard	-	-	-	2	-	-	2
Black Duck	16	12	40	42	10	15	135
BlkXMal Hyb.	-	3	-	-	-	1	4
Green-w. Teal	2	4	8	9	3	5	31
Blue-w. Teal	11	4	46	67	8	7	143
Am. Wigeon	1	-	1	-	-	-	2
N. Pintail	3	5	1	-	-	3	12
N. Shoveler	1	1	-	-	-	-	2
Ring-n. Duck	1	-	-	-	-	-	1
Pied-b. Grebe	-	1	-	-	-	-	1
Total	35	30	96	120	21	31	333

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Prince Edward Island

BANDING STATION TITLE: CWS Dragonfly Airboat

STARTING DATE: 15 July 1992 **ENDING DATE:** 20 August 1992

CREW MEMBERS: P. Walker, A. McLellan and S. Collins

DESCRIPTION OF CONDITIONS:

Birds were captured on ponds, impoundments, and tidal salt marshes on Prince Edward Island.

RESULTS:

501 ducks banded (11 species)
132 American Black Ducks (see attached)

RECOMMENDATIONS:

This operation will continue in 1993. It adds to the sample of Black Ducks banded on PEI and captures birds in different wetlands from those worked with bait traps.

Table 1. Age and sex composition of waterfowl banded with the PEI airboat in 1992.

Species	Local			Hatch Year			After Hatch year			Total
	M	F	T	M	F	T	M	F	T	
Green-w. Teal	2	4	6	10	9	19	31	11	42	67
Blue-w. Teal	14	11	25	52	38	90	41	20	61	176
Ring-n. Duck	2	10	12	-	3	3	5	4	9	24
Wood Duck	-	-	-	-	-	-	2	-	2	2
Gadwall	11	14	25	6	7	13	2	-	2	40
Pintail	-	-	-	3	3	6	-	1	1	7
Shoveler	-	2	2	-	-	-	1	-	1	3
Wigeon	8	11	19	4	12	16	7	5	12	47
Black Duck	37	52	89	15	18	33	3	7	10	132
Mallard	2	-	2	-	-	-	-	-	-	2
White-w. Scoter	-	-	-	-	-	-	-	1	1	1
Total	**76**	**104**	**180**	**90**	**90**	**180**	**92**	**49**	**141**	**501**

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: Newfoundland

BANDING STATION TITLE: Baikie Lake, Labrador

STARTING DATE: 21 August 1992 **ENDING DATE:** 25 September 1992

CREW MEMBERS: L.T. Willet and R.K. Wheadon

DESCRIPTION OF CONDITIONS:

Spring break up of ice on the lakes was approximately two week late causing poor production, hence small number of waterfowl was captured.

RESULTS:

84 ducks banded (4 species).
27 American Black Ducks (see attached)

RECOMMENDATIONS:

We do not have an adequate sample of Black Ducks banded in Western Labrador. We will attempt to locate a more productive spot for the 1993 banding.

Table 3. Age, sex and species composition of waterfowl banded at Baikie Lake during the summer of 1992.

SPECIES	LOCAL			HATCH YEAR			AFTER HATCH YEAR			TOT
	M	F	Tot	M	F	Tot	M	F	Tot	
Mallard	0	0	0	0	0	0	1	0	1	1
Black Duck	0	0	0	4	3	7	7	13	20	27
Green-w.Teal	0	0	0	1	3	4	1	2	3	7
Pintail	0	0	0	19	21	40	0	9	9	49
Total	0	0	0	24	27	51	9	24	33	84

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: New Brunswick - Nova Scotia

BANDING STATION TITLE: New Brunswick - Nova Scotia Border Area

STARTING DATE: 27 July 1992 ENDING DATE: 28 August 1992

CREW MEMBERS: D. Patterson and A. Parker

DESCRIPTION OF CONDITIONS:

Trapped on fresh and brackish water, managed marshes with water control structures in place. No tidal - influenced locations.

RESU

121 ducks banded (6 species)
95 American Black Ducks (see attached)

RECOMMENDATIONS:

This is a continuing-monitoring station.

Table 1. Summary of the age and sex composition of waterfowl band using bait traps in the NB- NS border area, 1992.

Species	Local		Hatch Year		After Hatch Year		Total
	F	M	F	M	F	M	
Mallard	-	-	3	6	-	4	13
Mallard/Black Duck Hybrid	2	1	-	-	-	-	3
American Black Duck	8	10	24	43	8	2	95
American Green-winged Teal	-	-	1	-	-	1	2
Blue-winged Teal	-	-	-	-	-	2	2
Wood Duck	-	-	-	-	-	3	3
Ring-necked Duck	-	1	-	-	1	1	3
Total	10	12	28	49	9	13	121

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: New Brunswick

BANDING STATION TITLE: Canadian Wildlife Service Panther airboat

STARTING DATE: 4 August 1992 ENDING DATE: 13 August 1992

CREW MEMBERS: Bill Barrow, Danny Sears

DESCRIPTION OF CONDITIONS:

Brief nightlighting and fluoroscope exercise near Fredericton, NB along the Saint John River. Very high water and a full moon phase limited success.

RESULTS:

See attached

RECOMMENDATIONS:

Nil

Table 1. Age, sex and species composition of waterfowl banded with the CWS Panther airboat, 1992.

SPECIES	LOCAL		HATCH YEAR		AFTER HATCH YEAR		TOT
	M	F	M	F	M	F	
Mallard	1	3	3	7	2	1	17
Black Duck	10	8	29	26	1	8	82
B.xM. Hyb.	-	-	1	-	-	-	1
Green-w.Teal	-	-	1	1	1	2	5
Blue-w. Teal	-	-	3	1	-	1	5
A. Wigeon	-	-	1	2	-	-	3
N. Pintail	-	3	-	1	-	-	4
W. Duck	2	-	-	-	36	5	43
R.n. Duck	6	9	-	1	2	3	21
Total	19	23	38	39	42	20	181

BLACK DUCK JOINT VENTURE
ANNUAL
BANDING STATION REPORTING FORM

STATE/OR PROVINCE: NB, PEI, Labrador

BANDING STATION TITLE: Dog Work

STARTING DATE: 17 July 1992 ENDING DATE: 21 August 1992

CREW MEMBERS: Bill Barrow

DESCRIPTION OF CONDITIONS:

Using a German wire-haired Pointer several spartina salt marshes were worked for flightless waterfowl. Another unusual spring with a staggered waterfowl hatch reduced the success of this effort.

RESULTS: See attached

RECOMMENDATIONS:

Nil

Age, sex and species composition of waterfowl banded with Dogs in the Atlantic Region, 1992.

SPECIES	LOCAL		HATCH YEAR		AFTER HATCH YEAR		TOT
	M	F	M	F	M	F	
Mallard	2	3	-	-	-	-	5
Black Duck	17	22	-	-	-	-	39
N. Pintail	6	2	-	-	-	-	8
A. Wigeon	3	-	-	-	-	-	3
C. Eider*	-	-	-	-	0	-	0
C. Goose	4	3	-	-	-	-	7
Total	32	30	-	-	0	-	62

BANDING REPORT

1992 Preseason Banding Report by: Eric Derleth, USFWS

Banding Station Location: Woodstock, NB

Coordinates: 460-0673

Starting Date: August 12, 1992 Ending Date: August 30, 1992

Crew Members: Eric Derleth, Faye Blankenship, Randy Druckman

Conditions: Water levels were lower than in 1990, and variable. Twenty-six percent fewer ducks were trapped than in 1991.

Results:

Species	AHY M	AHY F	HYM	HYF	LM	Total
Black Duck	26	72	112	74	27	312
Mallard	12	54	71	70	124	331
Mallard x Black Duck	0	2	8	6	3	19
Northern Pintail	1	0	0	0	0	1
Ringnecked Duck	0	6	0	0	19	25
American Wigeon	21	4	9	0	4	38
Blue-winged Teal	7	4	29	28	2	70
Green-winged Teal	1	3	3	7	0	14
Common goldeneye	0	0	2	1	0	3
Total	69	145	234	186	179	813

Recommendations: Continue station.

Table 1: Density (per 100 square-kms) of total waterfowl observed on study plots in 1990, 1991 and 1992.

	Ontario			Quebec			New Brunswick			Nova Scotia		
Species	1990	1991	1992	1990	1991	1992	1990	1991	1992	1990	1991	1992
Common Merganser	17.09	17.77	24.32	18.30	20.53	16.78	9.68	8.88	4.40	6.80	5.88	7.04
Hooded Merganser	22.09	24.84	28.91	5.17	4.94	3.53	1.80	0.32	0.76	0.80	0.08	0.16
Mallard	19.57	23.27	27.98	2.87	1.59	4.66	0.56	0.20	0.32	0.60	0.32	0.68
Black Duck	18.34	24.80	25.16	27.49	22.67	21.65	27.56	12.76	17.44	26.56	31.00	42.60
Mallard-like Hybrid	0.05	0.16	0.48	0.07	0.00	0.00.	0.00	0.00	0.00	0.00	0.00	0.00
Black Duck-like Hybrid	0.02	0.18	0.32	0.24	0.06	0.01	0.00	0.00	0.00	0.00	0.00	0.00
Mixed Pair (Mallard hen)	0.05	0.09	0.09	0.02	0.05	0.07	0.24	0.00	0.56	0.00	0.00	0.52
Mixed Pair (Mallard male)	0.09	0.14	0.05	0.07	0.29	0.05	0.00	0.24	0.00	0.00	0.08	0.00
Gadwall	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wigeon	0.50	1.07	0.80	0.24	0.17	0.06	2.56	0.56	0.16	0.52	1.48	1.72
Green-winged Teal	5.43	5.77	7.82	13.61	9.94	7.37	12.88	2.40	3.80	7.28	8.16	13.64
Blue-winged Teal	6.11	5.00	6.34	0.93	0.19	0.39	1.24	1.20	0.84	1.52	2.32	2.80
Northern Shoveler	0.00	0.09	0.02	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Northern Pintail	0.07	0.09	0.07	0.48	0.05	0.11	0.08	0.00	0.00	0.00	0.00	0.00
Wood Duck	13.09	11.84	13.82	1.06	0.46	0.40	0.44	0.32	1.04	1.04	0.84	1.92
Greater Scaup	0.36	0.05	3.11	0.14	0.54	1.47	0.00	0.92	0.52	0.00	0.00	0.36
Lesser Scaup	3.18	1.05	0.39	2.48	3.80	2.20	0.52	0.00	0.00	0.00	0.00	0.00
Ringnecked Duck	36.23	30.34	42.34	25.82	20.33	19.57	16.64	12.00	11.52	12.52	14.08	23.88
Common Goldeneye	18.32	18.66	20.02	16.82	16.77	14.67	3.20	5.44	1.88	3.16	1.48	2.44
Barrow's Goldeneye	0.00	0.00	0.00	0.31	0.88	0.76	0.00	0.00	0.00	0.00	0.00	0.00
Bufflehead	7.07	2.98	14.05	2.54	2.31	1.58	0.00	0.00	0.04	0.00	0.32	1.08
Oldsquaw	0.00	0.00	0.00	0.16	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00
Harlequin Duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eider	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	7.04	9.08	7.84
White-winged Scoter	0.00	0.07	0.00	0.01	0.04	1.08	0.00	0.00	0.00	0.00	0.48	0.00
Surf Scoter	0.00	0.05	0.11	1.23	1.05	2.04	0.00	0.00	0.00	0.00	0.00	0.76
Black Scoter	0.00	0.05	0.00	0.14	1.23	2.39	0.16	0.00	0.00	1.88	0.00	0.00

Note: Both Common Merganser and Red-breasted Merganser are included under the Merganser heading.

able 1: Continued

Species	Newfoundland 1990	Newfoundland 1991	Newfoundland 1992	Labrador 1990	Labrador 1991	Labrador 1992	Maine 1990	Maine 1991	Maine 1992	Total 1990	Total 1991	Total 1992
Common Merganser	5.58	6.53	7.68	8.17	8.17	4.33	28.67	18.37	18.59	15.68	15.39	14.95
Hooded Merganser	0.00	0.00	0.00	0.67	0.00	0.00	4.70	4.96	5.63	7.00	7.19	7.60
Mallard	0.11	0.00	0.05	0.00	0.33	0.00	4.48	5.19	5.15	5.47	5.72	7.79
Black Duck	15.58	19.95	13.11	17.17	24.50	13.00	55.33	84.11	49.11	27.77	29.97	26.45
Mallard-like Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.03	0.03	0.09
Black Duck-like Hybrid	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.06	0.07
Mixed Pair (Mallard hen)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.02	0.03	0.18
Mixed Pair (Mallard male)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.17	0.03
Gadwall	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Wigeon	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.52	0.50	0.38
Green-winged Teal	8.89	13.68	7.11	10.33	12.67	7.33	10.63	13.15	4.04	10.52	8.88	7.34
Blue-winged Teal	0.00	0.00	0.00	0.00	0.00	0.00	0.26	0.67	0.07	1.98	1.49	1.76
Northern Shoveler	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.01
Northern Pintail	0.00	0.21	0.00	1.00	3.50	0.00	0.00	0.00	0.00	0.23	0.14	0.05
Wood Duck	0.00	0.00	0.00	0.00	0.00	0.00	3.89	3.30	3.33	3.57	2.96	3.52
Greater Scaup	1.26	0.00	0.74	4.50	0.00	3.67	0.00	0.00	0.00	0.34	0.31	1.38
Lesser Scaup	0.00	0.11	0.00	4.17	1.50	0.00	0.00	0.00	0.00	1.68	1.62	0.87
Ringnecked Duck	33.74	52.74	31.21	14.50	15.67	12.83	19.96	28.85	12.37	25.36	24.23	23.48
Common Goldeneye	15.79	15.21	8.42	40.33	28.00	22.33	9.59	2.19	8.04	13.90	12.67	11.87
Barrow's Goldeneye	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.32	0.28
Bufflehead	0.00	0.11	0.00	0.00	0.00	0.00	18.15	4.00	1.37	4.42	1.93	3.56
Oldsquaw	0.00	0.00	0.00	0.00	0.00	0.00	0.63	0.07	0.22	0.13	0.02	0.03
Harlequin Duck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Eider	0.00	0.00	0.00	0.00	0.00	0.00	8.74	17.85	15.85	1.81	3.10	2.72
White-winged Scoter	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.39
Surf Scoter	0.00	0.00	0.00	12.33	13.33	9.17	3.78	0.00	0.00	1.44	0.74	1.08
Black Scoter	0.00	0.00	0.00	0.00	0.50	0.67	0.00	0.00	0.00	0.05	0.47	0.88

Note: Both Common Merganser and Red-breasted Merganser are included under the Merganser heading.

Table 2: Example of density (per 100 kms) of indicated pairs on study plots in 1990, 1991 and 1992.

	Ontario			Quebec			New Brunswick			Nova Scotia		
Species	1990	1991	1992	1990	1991	1992	1990	1991	1992	1990	1991	1992
Common Merganser	7.48	7.30	8.68	6.77	8.49	6.71	2.44	2.40	1.60	2.20	2.28	3.20
Hooded Merganser	9.28	11.13	12.55	2.17	2.06	1.25	0.20	0.12	0.52	0.08	0.08	0.08
Mallard	9.20	10.39	15.02	1.52	0.99	2.87	0.16	0.16	0.24	0.28	0.16	0.48
Black Duck	9.52	10.63	12.00	14.55	12.80	11.49	9.64	7.12	10.00	13.48	15.32	16.08
Green-winged Teal	2.50	3.04	3.02	3.86	3.93	2.40	0.84	1.04	1.84	2.08	2.52	2.36
Blue-winged Teal	2.48	2.43	2.30	0.08	0.08	0.16	0.20	0.52	0.44	0.52	1.08	0.60
Wood Duck	4.63	4.87	5.41	0.53	0.27	0.14	0.08	0.28	0.52	0.12	0.52	1.04
Ringnecked Duck	7.46	8.80	7.34	4.13	5.88	3.51	1.76	1.88	1.64	2.04	2.04	3.48
Common Goldeneye	4.17	3.96	4.39	2.31	5.28	3.93	0.28	0.24	0.44	0.04	0.04	0.08
Bufflehead	1.09	0.83	2.64	0.86	1.00	0.61	0.00	0.00	0.04	0.00	0.00	0.04

	Newfoundland			Labrador			Maine			Total		
Species	1990	1991	1992	1990	1991	1992	1990	1991	1992	1990	1991	1992
Common Merganser	2.79	2.68	3.32	2.50	2.00	2.67	4.52	5.11	5.11	4.10	4.32	4.47
Hooded Merganser	0.00	0.00	0.00	0.50	0.00	0.00	2.56	2.22	3.19	2.11	2.23	2.51
Mallard	0.05	0.00	0.05	0.00	0.17	0.00	2.33	3.07	2.26	1.93	2.13	2.99
Black Duck	9.89	11.47	7.74	9.83	14.33	7.50	16.00	13.00	12.78	11.84	12.10	11.08
Green-winged Teal	4.37	6.79	4.21	7.17	7.83	3.67	1.19	0.67	1.00	3.14	3.69	2.64
Blue-winged Teal	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.04	0.04	0.48	0.59	0.50
Wood Duck	0.00	0.00	0.00	0.00	0.00	0.00	1.70	1.52	1.78	1.01	1.07	1.27
Ringnecked Duck	11.05	24.37	5.16	5.00	7.00	3.17	1.85	1.93	3.07	4.76	7.41	3.91
Common Goldeneye	4.63	8.00	3.11	9.17	12.67	6.00	0.74	0.59	0.74	3.05	4.40	2.67
Bufflehead	0.00	0.05	0.00	0.00	0.00	0.00	1.78	0.70	0.52	0.53	0.37	0.55

Note: Both Common Merganser and Red-breasted Merganser are included under the Merganser heading.

Figure 1:

Sample Distribution for Helicopter Plots

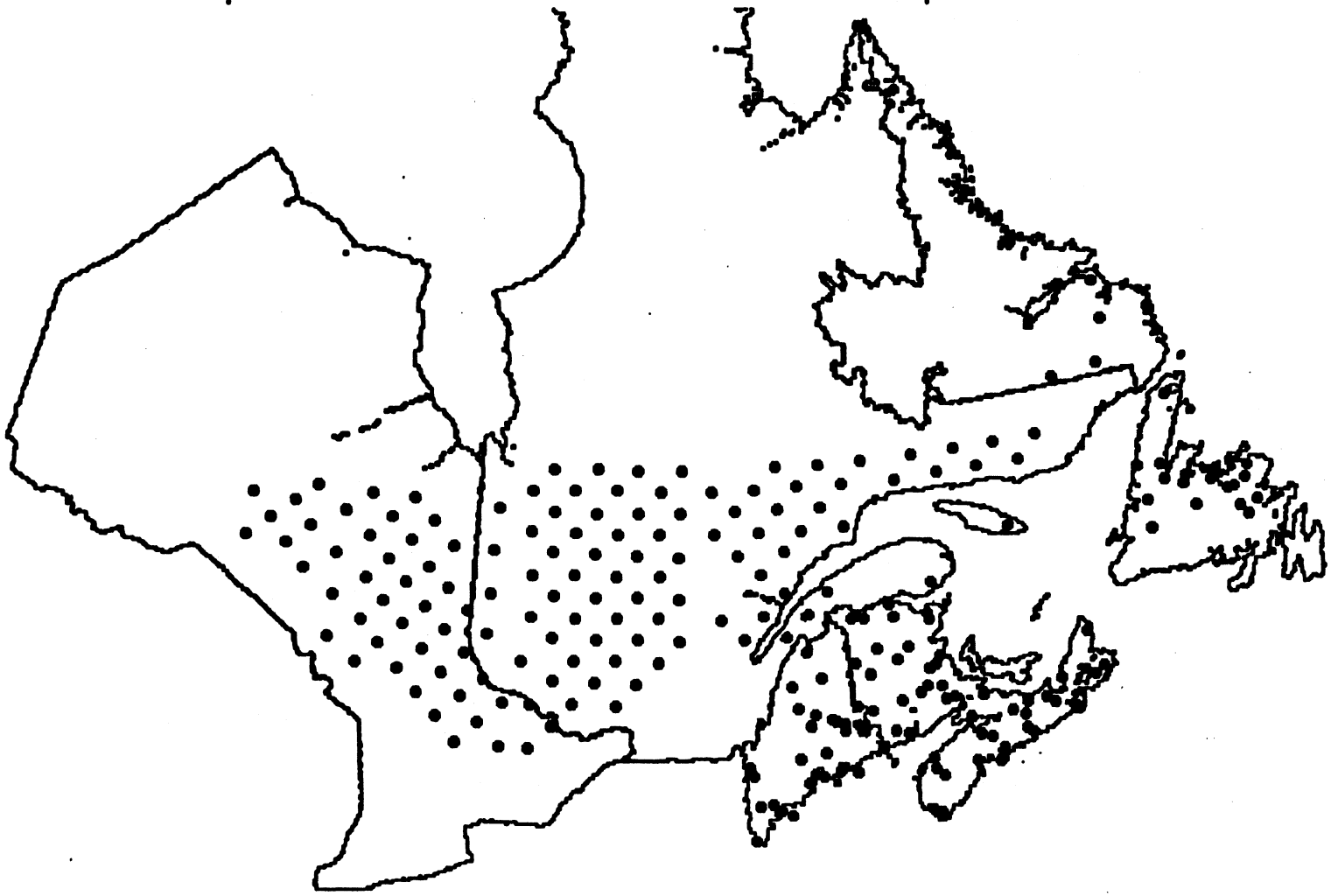


Figure 2:

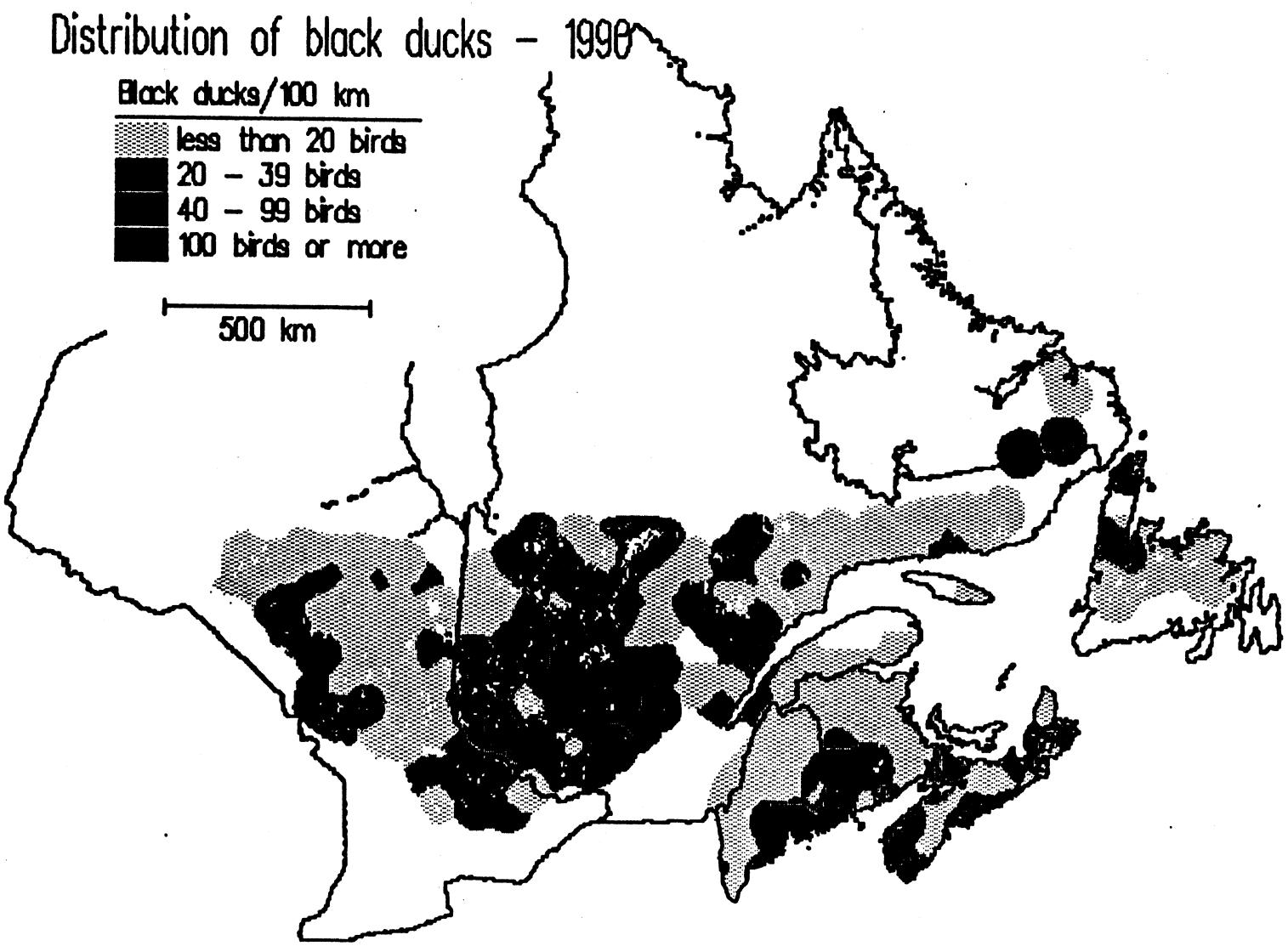

Distribution of black ducks – 1990
Black ducks/100 km
less than 20 birds
20 – 39 birds
40 – 99 birds
100 birds or more
500 km

Figure 3:

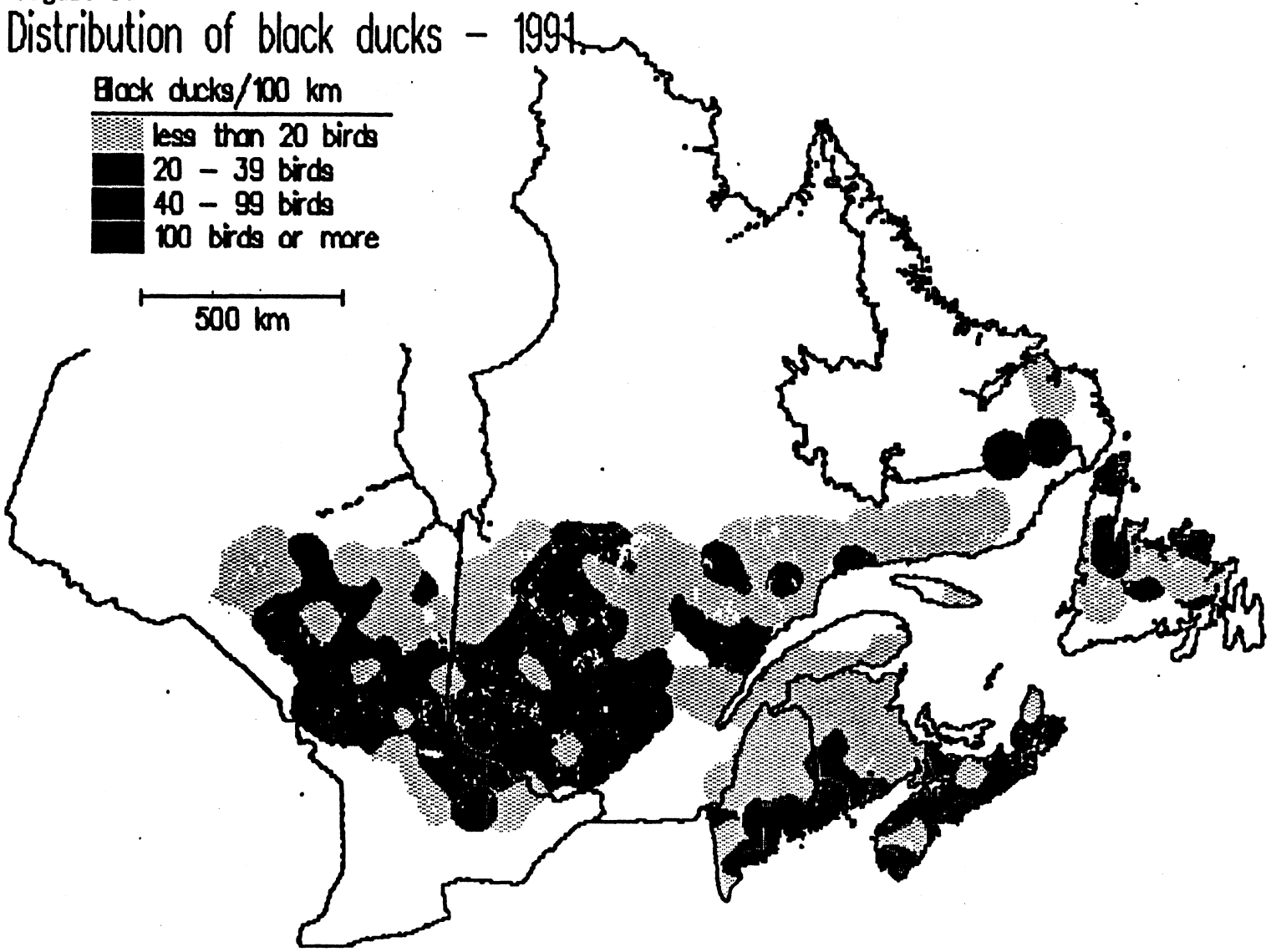
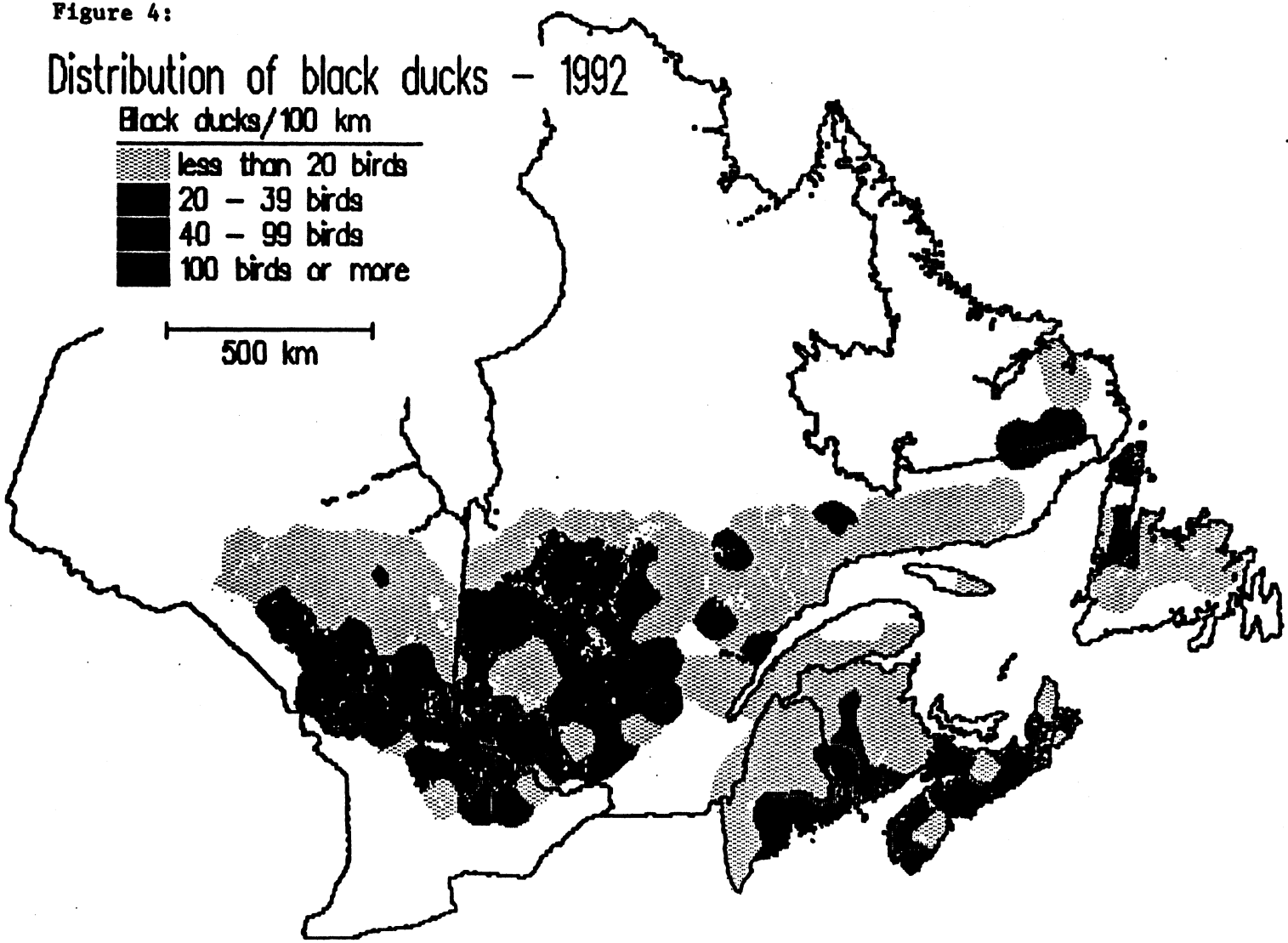

Distribution of black ducks - 1991
Black ducks/100 km
less than 20 birds
20 - 39 birds
40 - 99 birds
100 birds or more
500 km

Figure 4:


Distribution of black ducks - 1992
Black ducks/100 km
less than 20 birds
20 - 39 birds
40 - 99 birds
100 birds or more
500 km

Appendix B

(7-23-92)

TITLE: Waterfowl Breeding Population Survey for Michigan, Minnesota, and Wisconsin

STRATA SURVEYED: Michigan (statewide), Minnesota (northeast), and Wisconsin (northern)

DATA SUPPLIED BY: Michigan Department of Natural Resources
Minnesota Department of Natural Resources
Wisconsin Department of Natural Resources
U. S. Fish and Wildlife Service

Fixed-wing Aerial Crews
Michigan Pilot: M. Teale, Hanson Flying Service, Alma
Michigan Observers: Rex Ainslie, Earl Flegler, Jerry Martz, Al Stewart, Bob Odom, Bob Bissonnette, Greg Soulliere, and Craig Albright (all DNR)
Minnesota Pilot/Observer: D. Erickson, Minnesota DNR, Enforcement Division
Minnesota Observer: F. Swendsen, Minnesota DNR, Wildlife Section
Wisconsin Pilot: L. Waskow
Wisconsin Observers: T. Andryk and C. Kilian, Wisconsin DNR

Helicopter Crews
Michigan Pilot: A. Davis, Kirk Leasing, Gary, IN
Michigan Observers: Ernie Kafcas, Tom Nederveld, and Jerry Martz (all DNR)
Minnesota Pilot: M. Matherly, Cascade Helicopters
Minnesota Observers: J. Piehl and J. Mattson, USFWS

Ground Crew-Wisconsin
M. Rowe, H. Halvorsen, G. Dahl, M. Randall, T. Bahti, J. Huff, M. Gappi, and L. Tesky (all Wisconsin DNR)
R. Parisien and J. Denomie, Great Lakes Indian Fish and Wildlife Commission

ABSTRACT

This report presents results of the 1992 Lake States breeding waterfowl survey, partially funded by the Black Duck Joint Venture. The 1992 survey of Michigan (statewide), Minnesota (northeast) and Wisconsin (northern) is the second year of experimental fixed wing surveys at the western extreme of historic black duck breeding range. Almost 4,600 lineal miles of fixed wing transects were flown within the 101,000 square miles of Lake States strata. Helicopter versus fixed wing visibility corrections were obtained in Michigan and Minnesota and ground crew versus fixed wing in Wisconsin. The 1992 Lake states breeding waterfowl population estimate with visibility corrections was 999,700 ducks, including 585,409 mallards and 17,331 black ducks. The overall Lake States duck breeding population estimate for 1992 is up 44 percent over 1991. Unseasonably cool temperatures probably contributed to a delayed onset of nesting. However, the larger duck breeding population should yield better production than 1991.

BACKGROUND AND METHODS

This was the second year for the experimental fixed-wing survey in the Lake States for Michigan and Minnesota, although Wisconsin has been conducting fixed-wing surveys on a statewide basis for 19 years. Fixed-wing survey flights were conducted using a Cessna 172 in Michigan, a Piper Super-Cub in Minnesota and a Cessna 185 in Wisconsin. Fixed-wing/helicopter comparisons were conducted in Michigan and Minnesota for the first time in 1992 to help establish species visibility corrections. Bell 206 Jet Ranger helicopters were used in both Michigan and Minnesota. Wisconsin has been conducting air/ground checks for 19 years.

The survey strata encompassed in this report are on the western extreme of the historic range of the black duck and encompasses northeastern Minnesota, northern Wisconsin, and all of Michigan. Surveyed areas are shown in Figures 1-3, and the survey coverage is shown in Table 1. Partial funding for this effort was made available from the Black Duck Joint Venture.

The procedures followed in conducting the survey are contained in the Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys (USFWS/CWS revised 1987).

Air/ground Comparisons

A total of ten air/ground comparisons were run in Wisconsin. All comparisons were on operational transect lines and each was 10 to 15.5 miles in length.

Fixed-wing/helicopter Comparisons

In Michigan seven helicopter/fixed-wing segments were flown in the southern farm/urban region within one day of the fixed-wing coverage. Each segment was 18 miles long by 0.25 miles wide. Similarly in Minnesota, ten helicopter fixed wing segments were flown based on segments in 1991. Segments selected were based on high numbers of waterfowl observed in 1991. In Minnesota, ten helicopter/fixed-wing segments were flown based on the number of waterfowl observed per segment in 1991, and which also provided the best geographic distribution.

Weather and Habitat Conditions

The arrival of spring in the surveyed area of the Lakes States was later in 1992 than in 1991. Generally, temperatures were below normal, but precipitation was variable among the three strata.

In Michigan, spring water conditions were normal in the southern part of the state, with precipitation being received during the survey period. Northern forested habitats received significant early April snowfall, and ice breakup on larger lakes was delayed. Temperatures were below normal much of the spring, and there is evidence that the onset of nesting for Canada geese and mallards was delayed 10 to 14 days.

Minnesota reported that ice-out was late on many northeastern Minnesota lakes, and many larger lakes still had ice in early May. Precipitation between April 1 and May 18, 1992 was normal to above normal for most of the survey area,

except the far northwest portion. Wetland conditions during the survey were described as normal to above normal. Pond numbers were recorded for the first time by the fixed-wing observer in 1992.

Wisconsin reported that January-April precipitation was only three percent below the statewide long-term mean. However, it was drier during April and May, with precipitation 20 percent below the statewide long-term mean for these months. This varied geographically, with precipitation 33 percent below normal in the northeast (Rhinelander station) and 18 percent above normal in the northwest (Hayward station).

BREEDING POPULATION ESTIMATES

The 1992 Lakes States waterfowl breeding population estimate was 999,700 ducks, including 585,409 mallards and 17,331 black ducks. There were 147,816 blue-winged teal and a minimum of 71,755 wood ducks. There were also 56,314 ringnecks tallied, 39,982 scaup, and 28,257 mergansers. Michigan reported 100,436 breeding Canada geese and Wisconsin 5,912, but the Wisconsin survey missed major breeding concentrations which are clumped and therefore is an underestimate. Minnesota reported 2,804 Canada geese (unadjusted for visibility). A total of 72,036 coots was estimated.

Visibilty factors utilized to obtain these estimates are shown in Table 3. Helicopter/fixed-wing visibility rates in Michigan were only sufficient to provide data for mallards (2.98) and Canada geese (2.96). A visibility rate of 34.5 was calculated for wood ducks in Michigan, based on 138 breeders seen from helicopter, but only four breeders observed from the fixed-wing aircraft. The visability rate used for wood ducks in Michigan for 1992 was the average of the long-term air/ground values for Minnesota and Wisconsin. The remainder of the species visibility values applied were obtained from USFWS (J. Goldsberry).

Minnesota calculated a visibilty rate for mallards of 3.92 from helicopter/fixed-wing comparisons and 1.29 for ring-necked ducks. Minnesota also chose to use a blue-winged teal visibilty rate of 5.25 obtained from the Minnesota survey. Average visibility rates (1988-1992) from the Minnesota May Waterfowl Breeding Population Survey of prairie/transition areas were used for wood ducks and hooded mergansers. The remainder of the species visibility values applied were provided by USFWS (J. Goldsberry).

In Wisconsin, pooled strata data yielded an air/ground visibility ratio of 1.447 for mallards and 2.490 for blue-winged teal. Data were insufficient for all other species, so the 1992 air/ground data were pooled with the prior years (two to five) to yield the correction ratios shown in Table 3. It should be noted that Wisconsin data in this report has already been submitted for inclusion in the USFWS STATUS REPORT. Wisconsin has been contributing to that report for 19 years.

It is not possible to make comparisons of the 1992 Lake States survey with that of 1991 using the visibility corrections in this report, since comparable data was not obtained in Michigan and Minnesota in 1991. However, the expanded fixed-wing estimates (without visibility adjustments) for all three strata states for both years are presented in Table 4. Based on these data, the overall Lake States duck breeding population estimate for 1992 is up 44 percent over 1991.

This includes a 47 percent increase for mallards and 19 percent increase for blue-winged teal. Wisconsin reports that its mallard estimate is 130 percent above the long-term average.

Since this Lake States survey is new, little can be said about whether the increases over 1991 are significant or just reflect a normal fluctuation. Several years of information will be required to establish long-term averages.

CONCLUSIONS

Generally speaking, habitat conditions throughout the Lake States strata were normal this spring, but temperatures were unseasonably cool. This probably contributed to a delayed migration and onset of nesting. However, the larger duck breeding population should yield production better than 1991.

GFM/sam
7/23/92

(BRDWF92)

TABLE 1. LAKE STATES SURVEY DESIGN FOR MICHIGAN, MINNESOTA, AND WISCONSIN

April/May 1992*

STRATUM	MICHIGAN (statewide)	MINNESOTA (northeast)	WISCONSIN (northern)	TOTAL
Survey Design				
Square miles in stratum	55,948	19,590	25,410	100,948
" " " sample	684	270	195	1,149
Lineal miles in sample	2,736	1,080	780	4,596
No. of transects in sample	22	14	26	62
No. of segments in sample	152	60	10	238
Expansion factor	81.795	72.556	130.308	87.857
Current Year Coverage				
Survey Dates	4/20-5/9	5/14-28	5/5-13	---
Square miles in stratum	55,948	19,590	25,410	100,948
" " " sample	684	265.5	195	1144.5
Lineal " " "	2,736	1,062	780	4,578
No. of transects in sample	22	14	26	62
No. of segments in sample	152	59	10	237
Expansion factor	81.795	73.785	130.308	88.203

*Historic Black Duck Range - In Michigan the statewide survey encompasses two sub-strata (northern forests A & B and southern farm/urban). In Minnesota the single stratum is the forested northeast. In Wisconsin the survey encompasses two forested sub-strata (northern high density and northern low density).

GFM/sam
7/23/92

(SURVEY)

TABLE 2. STATUS OF LAKE STATES WATERFOWL BREEDING POPULATION ESTIMATED BY SPECIES AND STRATUM*

SPECIES	LAKE STATES STRATUM (1992) MICHIGAN	MINNESOTA	WISCONSIN	TOTAL
DUCKS				
Dabblers				
Mallard	371,188	89,960	124,261	585,409
Black Duck	13,787	850	2,694	17,331
Gadwall	1,467	0	0	1,467
Wigeon	5,726	0	0	5,726
G-W Teal	8,678	626	2,296	11,600
B-W Teal	93,382	15,498	38,936	147,816
Shoveler	1,260	0	0	1,260
Pintail	0	0	0	0
Wood Duck	23,942	2,965	44,848	71,755
SUBTOTAL	519,430	109,899	213,035	842,364
DIVERS				
Redhead	375	0	0	375
Canvasback	0	0	0	0
Scaup	27,331	0	12,651	39,982
Ringneck	42,992	6,187	7,135	56,314
Goldeneye	5,249	1,559	0	6,808
Bufflehead	19,462	0	5,564	25,026
Ruddy Duck	0	0	574	574
SUBTOTAL	95,409	7,746	25,924	129,079
MISCELLANEOUS				
Oldsquaw	0	0	0	0
Eider	0	0	0	0
Scoter	0	0	0	0
Merganser	14,574	2,555	11,128**	28,257
SUBTOTAL	14,574	2,555	11,128	28,257
TOTAL DUCKS	629,413	120,200	250,087	999,700
Canada Geese	100,436	-	5,912	-
Coots	72,036	0	0	72,036

*Adjusted for visibility bias
**8,036 = red-breasted merganser
1,546 = hooded merganser
1,546 = common merganser

GFM/sam
7/23/92
(BREEDPOP)

TABLE 3. 1992 VISIBILITY RATES, LAKE STATES, WATERFOWL BREEDING POPULATION SURVEY

SPECIES	VISIBILITY RATES MICHIGAN[1]	MINNESOTA[2]	WISCONSIN[3]
Mallard	2.98	3.92	1.447
Black Duck	2.88	2.88	3.900
Gadwall	3.04	---	---
Wigeon	5.71	---	---
G-W Teal	4.23	4.23	2.967
B-W Teal	10.31	5.25	2.490
Shoveler	3.48	---	---
Pintail	2.65	---	---
Redhead	3.11	---	---
Canvasback	2.58	---	---
Scaup	1.98	---	2.967
Ringneck	3.83	1.29	2.967
Goldeneye	3.61	3.61	---
Bufflehead	2.21	---	2.967
Oldsquaw	---	---	---
Scoters	---	---	---
Ruddy Duck	5.94	---	2.967
Mergansers	1.05	4.33	2.967
Wood Duck	3.41	2.87	2.967
Coot	4.71	---	---
Canada Geese	2.96	---	1.910

[1]Visibility rates for the mallard, and Canada geese are unique to Michigan and were obtained by fixed wing versus helicopter comparisons. All other rates supplied by USFWS, except wood ducks is the mean of Minnesota and Wisconsin, i.e. long-term comparisons of fixed-wing versus ground crew comparisons.

[2]Visibility rates for the mallard, ring-necked duck and blue-winged teal are unique to Minnesota and were obtained by fixed wing versus helicopter comparisons. Average visiblity rates (1988-92) from Minnesota's May survey of prairie/transition areas was used for wood ducks and hooded mergansers. All other rates were supplied by USFWS.

[3]The visibility rates for Wisconsin were obtained by fixed wing versus ground crew comparisons; 1992 data used for mallards and blue-winged teal, 1990-92 data used for other ducks, 1988-92 data used for Canada geese.

7/23/92 (VISIBILT)

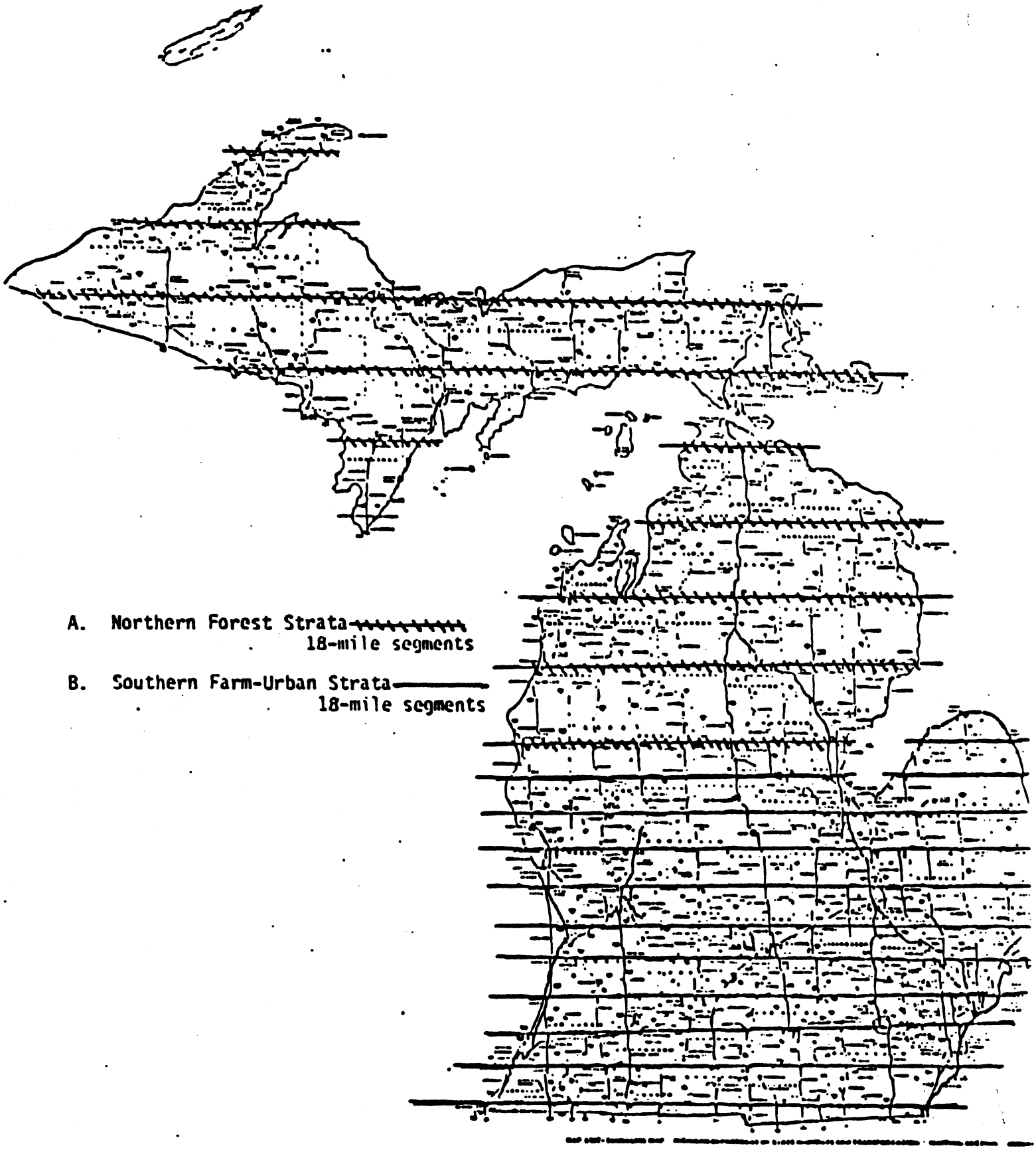
TABLE 4. A COMPARISON OF LAKE STATES WATERFOWL BREEDING POPULATION ESTIMATES BY SPECIES AND STRATUM BETWEEN 1992 AND 1991 WITHOUT ADJUSTMENTS FOR VISIBILITY BIAS

SPECIES	LAKE STATES STRATUM (1992) MICHIGAN	MINNESOTA	WISCONSIN	1992 TOTAL	1991 TOTAL	% CHANGE 1991
DUCKS						
Dabblers						
Mallard	124,559	22,949	85,875	233,383	159,384	+47
Black Duck	4,787	295	908	5,990	--	--
Gadwall	483	0	0	483	--	--
Widgeon	1,002	0	0	1,002	--	--
G-W Teal	2,051	148	774	2,973	--	--
B-W Teal	9,058	2,952	15,637	27,647	23,191	+19
Shoveler	362	0	0	362	--	--
Pintail	0	0	0	0	--	--
Wood Duck	7,016	1,033	15,116	23,165	--	--
SUBTOTAL	149,318	27,377	118,310	295,005	--	--
DIVERS						
Redhead	121	0	0	121	--	--
Canvasback	0	0	0	0	--	--
Scaup	13,804	0	4,264	18,068	--	--
Ringneck	11,225	4,796	2,405	18,426	--	--
Goldeneye	1,454	443	0	1,897	--	--
Bufflehead	8,806	0	1,875	10,681	--	--
Ruddy Duck	0	0	193	193	--	--
SUBTOTAL	35,410	5,239	8,737	49,386	--	--
MISCELLANEOUS						
Oldsquaw	0	0	0	0	--	--
Eider	0	0	0	0	--	--
Scoter	0	0	0	0	--	--
Merganser	13,881	590	3,750*	18,221	--	--
SUBTOTAL	13,881	590	3,750	18,221	--	--
TOTAL DUCKS	198,609	33,206	130,797	362,612	253,304	+44
Canada Geese	33,932	2,804	3,095	39,831	--	--
American Coot	15,294	0	0	15,294	--	--

*2,708 = red-breasted merganser
521 = hooded merganser
521 = common merganser

GFM/sam
7/21/92
(WFBREED)

Fig. 1. Fixed-Wing Aircraft Routes for the 1992 Michigan Breeding Waterfowl Survey



Black Duck Survey Results

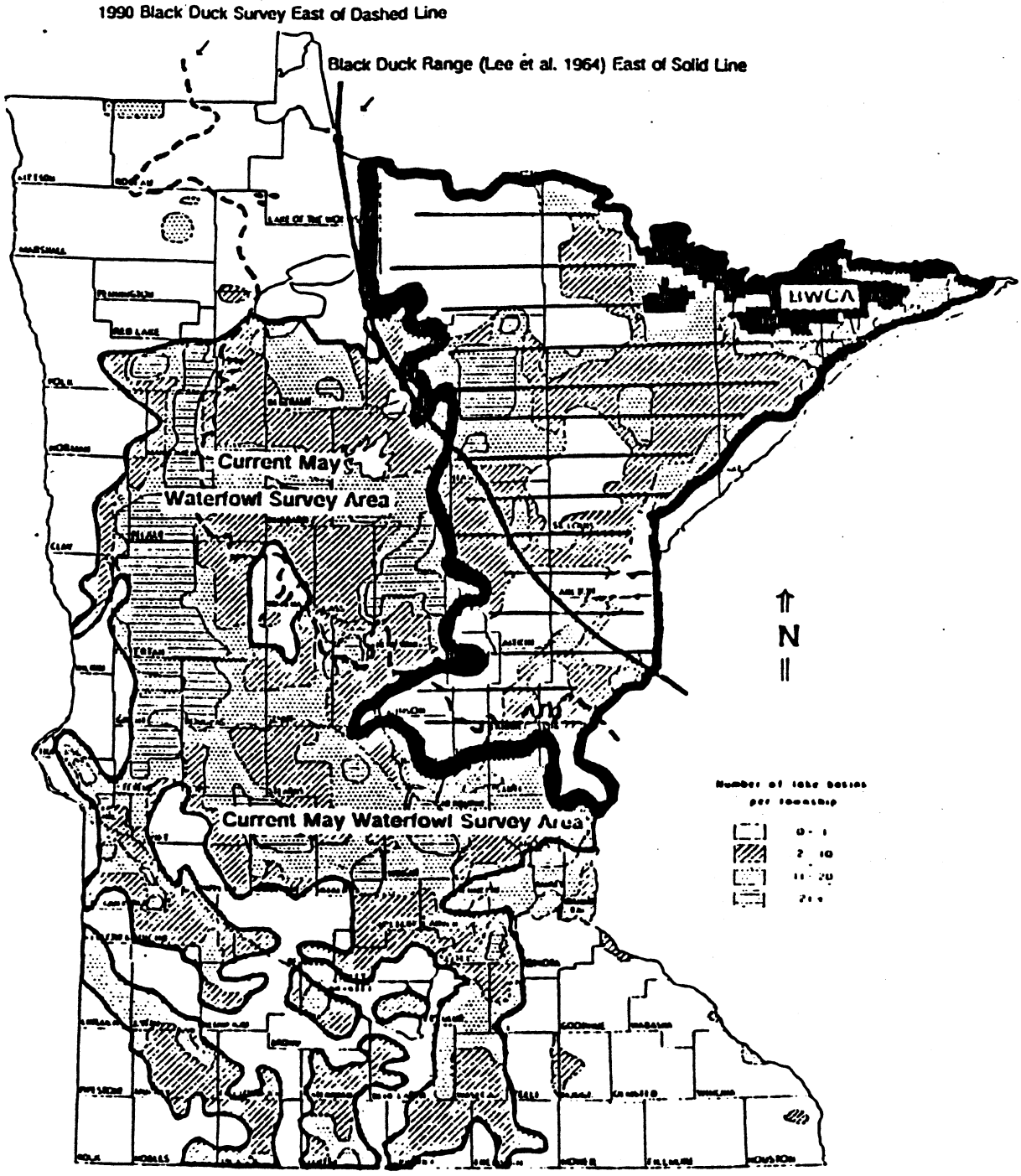


Fig. 2. Approximate location of transects for 1992 Black Duck Breeding Ponulation Survey. Area surveyed is located within the heavy solid line, excluding the Boundary Waters Canoe Area.

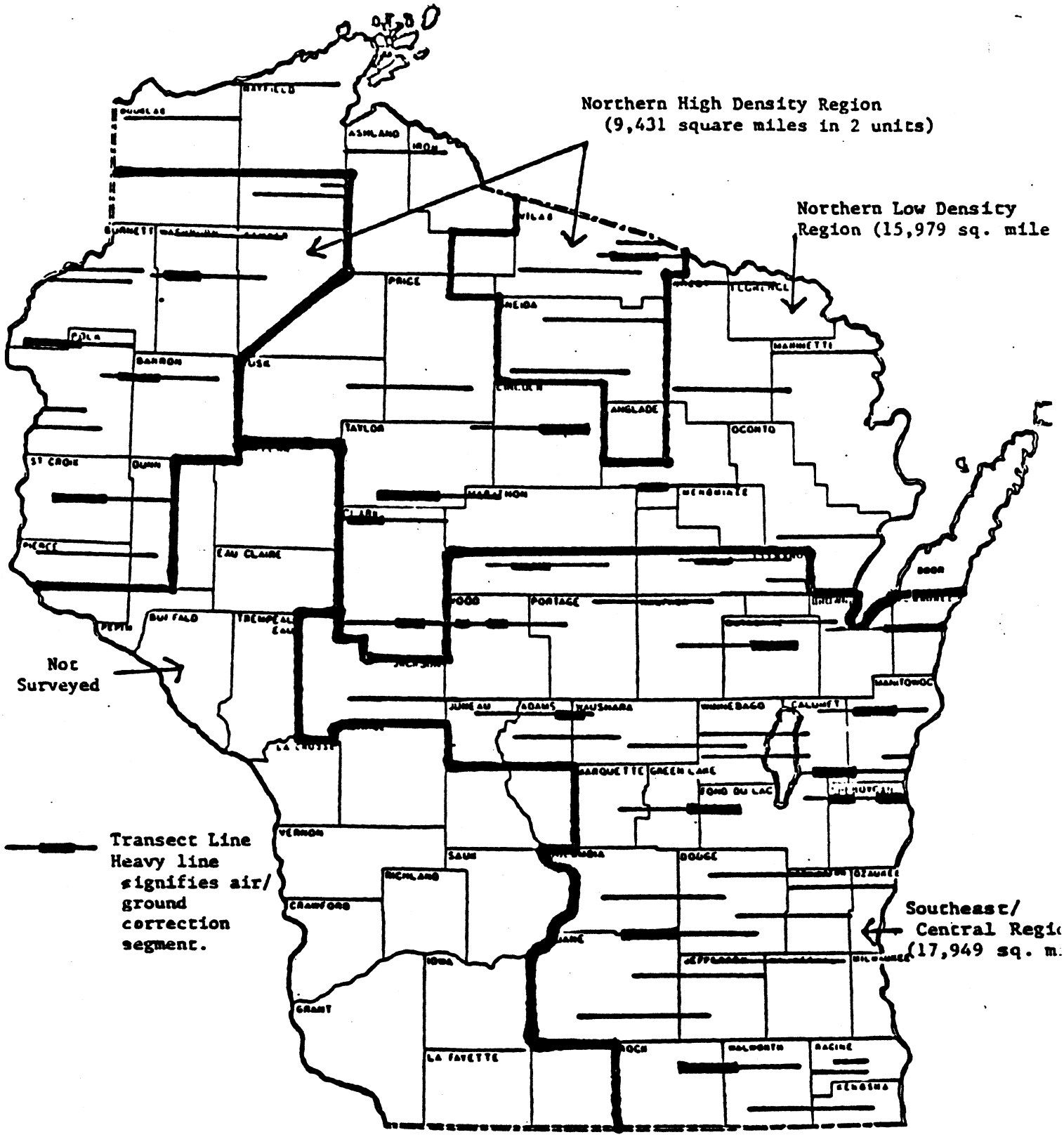


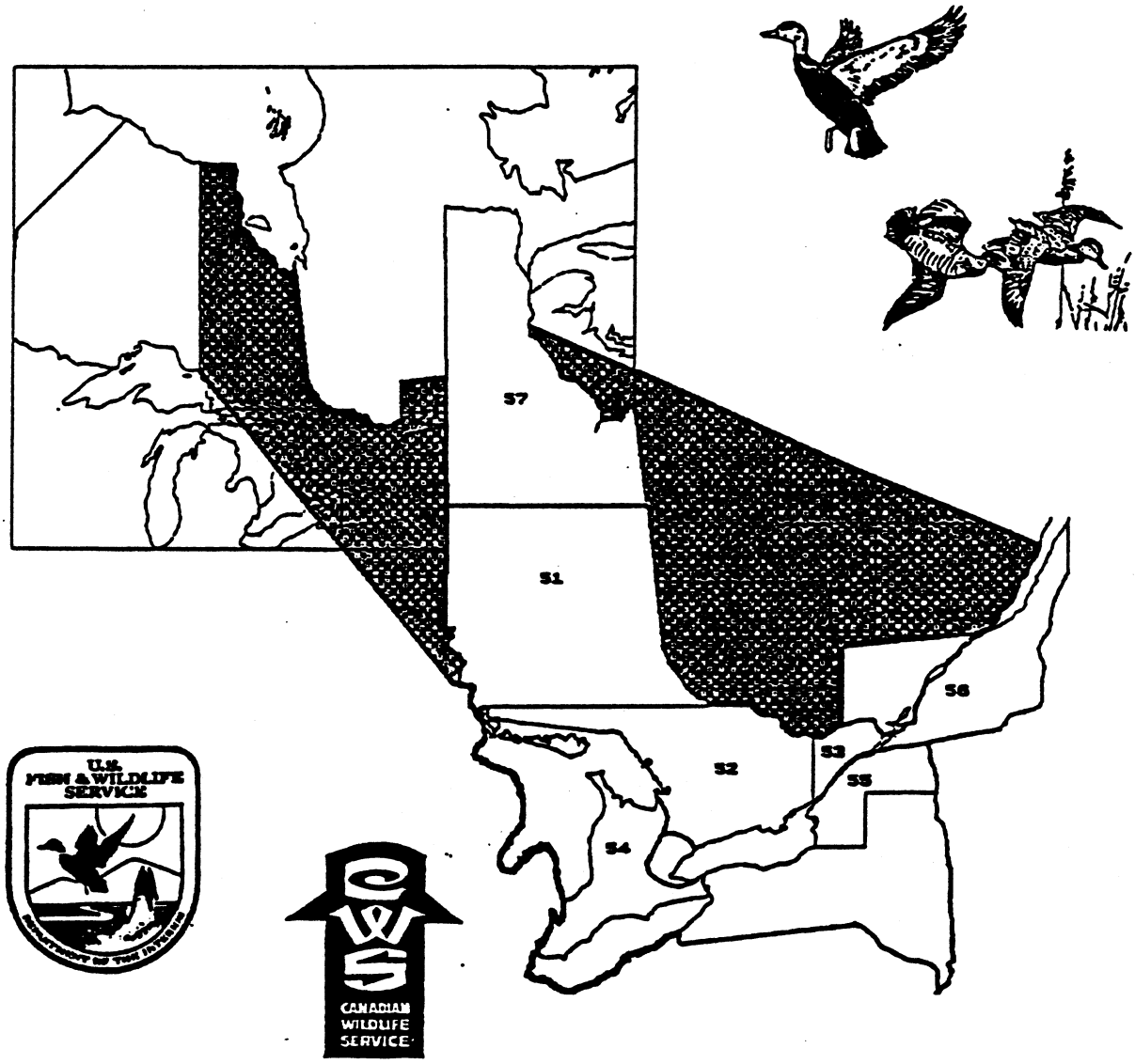
Fig. 3. Transect Lines and Regions Surveyed during the 1992 Wisconsin Breeding Waterfowl Study.

Appendix C

WATERFOWL BREEDING POPULATION SURVEY

ONTARIO, QUEBEC, AND NEW YORK

MAY 1992



The data presented in this report are preliminary. Final estimates are available from the U. S. Fish and Wildlife Service, Office of Migratory Bird Management, Patuxent Wildlife Research Center, Laurel, Maryland 20708-9619

TITLE Waterfowl Breeding Population Survey for Ontario, Quebec and New York .

STRATA SURVEYED 51, 52, 53, 54, 55, 56, 57

DATES April 29 - May 20, 1992

DATA SUPPLIED BY United States Fish and Wildlife Service
Canadian Wildlife Service

Aerial Crew

Pilot/Observer	J. R. Goldsberry, USFWS
Observer	P. Poulos, USFWS

Helicopter Crew

Crew Members	G. Cullington
	E. Derleth

ABSTRACT

In conjunction with the Black Duck Joint Venture, fixed-wing aerial waterfowl breeding population surveys were conducted in northern New York, northern and southern Ontario, and southwestern Quebec for the third year. Fixed-wing\helicopter comparisons were conducted for the second consecutive year in northern Ontario to obtain visibility rates for black ducks. Visibility rates were also established for mallards. In 1992, as in 1991, visability rates for black ducks and mallards were very similar and fell within the long-term visibility rate range established in western Canada, U. S. prairie and Alaska for mallards.

REVISIONS TO THE MAY BREEDING WATERFOWL SURVEY

Several revisions to the analytical procedures for the May Breeding Waterfowl Survey were implemented this year. These revisions resulted in more accurate and precise population estimates. As a result of these revisions, population estimates of some species changed. Also, for the first time, measures of precision are available for all estimates.

In 1984 the Office of Migratory Bird Management (MBMO) contracted Dr. David C. Bowden, a statistician at the Statistical Laboratory, Colorado State University, to review the May Survey. Dr. Bowden's review dealt primarily with the problem of visibility bias and he recommended a number of changes in the survey. During 1989-90 another review of the survey was conducted by the Population Assessment Section, Branch of Operations, Office of Migratory Bird Management. In this review, questions about the survey posed by Dr. Bowden were answered and decisions were made for changes in the survey.

Each year the ground and air counts on the air/ground transects of the survey are used to estimate visibility correction factors (VCFs). Usually there is adequate data to reliably estimate a VCF for the major species (i.e., mallard, pintail, blue-winged teal). However, in some areas, and with some species, too few ducks are seen to reliably estimate a VCF. When this occurs, the Standard Operating Procedure (SOP) requires the use of data from previous years to aid in the estimation. In the past, average VCFs from prairie portions of the survey during 1961-1973 were used. This approach was not used this year. Instead 1992 data, along with data from the most recent past, was used to calculate a VCF. This is a better approach because the most recent, and therefore, the most relevant data have been used to calculate the VCF.

Additional aspects of the survey were also addressed this year. Recent experimental helicopter work has supplied information on VCFs for boreal forest regions of Canada and Alaska and for tundra areas in Alaska. In previous years average VCF values from the prairie and parkland areas of the survey were used in these areas. The new VCFs, for the most part, are lower values than those used historically. This has resulted in population estimates being lower than historical values. The northern pintail is an example of a species with lower population estimates resulting from declines in VCFs in Alaska boreal forest and tundra areas.

MBMO's review of the survey is nearing completion. Results of the review will be distributed as a USFWS Biological Report. The May Breeding Waterfowl Survey must remain dynamic to take advantage of improvements in both survey design and analytical techniques. CWS and USFWS, in cooperation with other federal, provincial, and state entities, are in the process of implementing a number of other improvements. CWS and its Canadian partners are expanding the number of air/ground transects with the hope of improving monitoring capabilities for the Prairie Habitat Joint Venture under the North American Waterfowl Management Plan. MBMO biologists have and will be expanding the number of air/ground transects in the Dakotas and Montana to calculate more precise VCFs. MBMO is cooperating with Flyway Technical Committees to upgrade or initiate surveys in areas currently not part of the Survey. Experimental surveys in eastern Canada, as part of the Black Duck Joint Venture, have been initiated. Surveys by states in the Pacific Flyway have been upgraded and new surveys have begun or will be initiated soon. It is the hope of CWS and USFWS that a better understanding of continental duck populations will result from these efforts.

Due to the above revisions, the reader should be aware that data and tables contained herein should not be compared to tables from previous issues of the Waterfowl Breeding Population Survey reports.

METHODS

The procedures followed in conducting the survey are contained in the Standard Operating Procedures for Aerial Waterfowl Breeding Ground Population and Habitat Surveys, Section III, revised April 1987. This was the third year for the experimental survey area. The survey area covered was the same as in 1991 plus an additional stratum (57) which was flown on the south and west side of James Bay.

Fixed-wing/helicopter comparisons: In 1992 fixed-wing/helicopter comparisons were flown on six transects in stratum 51. There were sufficient numbers to provide visibility corrections for three species. Visability rates were established for other species by the same methods as used in western Canada, U. S. prairie and Alaska using the long-term average for bush, prairie and parkland (see Table 3). The survey was initiated on April 29 and completed on May 20, 1992. There was about a week delay in the start of the survey due to a late, cold spring. The pilot/observer and observer were the same as in 1990 and 1991.

Survey flights were conducted using a Cessna 206 aircraft. In addition, a Bell 206 Jet Ranger Helicopter was used to obtain visibility corrections in stratum 51.

WEATHER AND HABITAT CONDITIONS

In the east, more or less precipitation enhances or degrades the quality of the habitat but is not a limiting factor as it is in the west. Temperature does affect nest initiation, and a long, cold winter and a cold spring delay the development of the nesting and brood habitat and delays nest initiation. The following is a general review of last year's weather as it might affect waterfowl nesting in 1992:

June 1991 was warm and dry across Ontario, New York, and Quebec, bringing to a close a warm, dry spring. The Province of Ontario was warmer and drier than normal in July 1991. A series of large thunderstorms moved across northern Ontario, causing much destruction to forest. Quebec and New York were also warmer and drier than normal.

August 1991 continued warm and dry across Ontario and New York with temperature records being broken that dated back to the 1850s. Quebec, although warm, was also wet with the area around Trois-Rivieres setting a monthly precipitation record.

September 1991 in Quebec remained dry but was cooler than normal. Cooler and wetter than normal conditions returned to Ontario and New York after eight months of above average temperatures and below normal precipitation.

October 1991 remained cool and wet throughout Ontario, Quebec, and New York. The month was one of the wettest since the 1970s.

November 1991 was colder than normal throughout Ontario, Quebec, and New York. Abundant precipitation fell throughout the area.

December 1991 - February 1992 was mild in Ontario and New York and colder than normal in Quebec. Precipitation in Ontario and New York was low during the beginning of the period but was near normal figures by the end of the period. Precipitation was above normal in Quebec.

March - April 1992 had winter coditions throughout the period in Ontario, New York, and Quebec. Temperatures remained below normal in all areas. Precipitation was above normal in Ontario and New York and near normal in Quebec.

In general, the warm, dry spring and summer of 1991 was followed by a wet, cool fall. Winter was normal but extended well into spring. The result was good habitat conditions. This resulted in a late but rapid initiation of the nesting effort by waterfowl.

BREEDING POPULATION ESTIMATES

The 1992 data indicates a breeding population of 1,452,500 for all species of ducks in northern New York, southern and northern Ontario, and southern Quebec (strata 51-56). Breeding populations of ducks were +36.2% above 1991 and +34.9% above the previous two-year mean. Although a new stratum (57) was flown, data was excluded from the 1992 totals for comparability with 1990 and 1991. Both dabbling and diving ducks show increases from 1991 of +33.9% and +41.5% and from the two-year mean, +25.8% and +46.2% respectively. Miscellaneous species also show an increase of +32.9% and +52.1% from 1991 and the two-year mean. Canada geese show a decline of -84.4% from 1991 and -78.2% from the two-year mean. Pond counts show a -53.0% decline from 1991 and a -52.1% decline from the two-year mean (Table 1).

Since this is a new survey area, little can be said about whether the increases and declines are significant or just reflect normal fluctuations. Several years will be required in order to establish long-term averages where speculation might be made.

Habitat conditions were good to excellent throughout the area even though there was a decline in pond numbers. This decline reflects the dry spring and summer of 1991 and fact that there was not as much sheet water and temporary ponds in the spring of 1992.

Although the season was late and nesting delayed, the early nesters such as mallards and black ducks were well into incubation as evidence by large groups of flocked drakes. Because of the late start of the survey, species that in the past had been staging during the early part of the survey had moved through the survey area. This may explain the declines in gadwall, widgeon, green-winged teal, shoveler, redhead, canvasback, bufflehead, ruddy ducks, and coot.

Canada geese numbers declined much for the same reason, however, an attempt was made by the observers to count only obviously nesting geese. The breeding figure for Canada geese probably now represents a more true picture of actual nesting geese in southern Ontario, northern New York, and Quebec.

CONCLUSIONS

Conditions throughout the survey area ranged from good to excellent. Waterfowl populations although hampered by a late spring appeared to accelerate nesting once conditions were right. This, coupled with no major weather disruptions to the nesting effort should yield good production this year.

Table 1. Status of waterfowl breeding population estimates by species and stratum with comparisons against the previous year (estimates in thousands).[a]

	Stratum (1992)										% Change	
Species/Ponds	51	52	53	54	55	56	57	1992 Total[b]	1991 Total	2-Year Mean	from 1991	2-Year Mean
Ducks												
Dabblers												
Mallard	96.9	74.0	21.5	65.9	41.9	61.4	48.5	361.7	189.5	174.2	90.9%	107.6%
Am. black duck	86.9	23.5	2.7	3.5	2.2	41.7	14.4	160.6	125.9	112.9	27.5%	42.2%
Gadwall	1.3	1.0	0.0	0.4	0.5	1.8	0.0	4.9	7.4	8.4	-33.6%	-41.6%
Am. wigeon	9.5	1.8	1.1	0.0	0.0	4.4	1.7	16.8	49.5	41.6	-66.1%	-59.7%
Am. green-winged teal	88.0	43.8	2.4	4.8	6.5	11.0	16.2	156.7	154.7	153.8	1.3%	1.9%
Blue-winged teal	34.3	16.2	3.9	24.4	6.3	6.0	0.0	91.1	60.4	123.2	50.8%	-26.1%
N. shoveler	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	-100.0%	-100.0%
N. pintail	0.0	0.0	0.0	0.0	0.0	2.0	5.5	2.0	3.4	14.5	-40.6%	-85.9%
Subtotal	317.0	160.3	31.6	99.0	57.4	128.3	86.2	793.8	592.9	630.8	33.9%	25.8%
Divers												
Redhead	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.7	3.6	3.3	-81.3%	-79.8%
Canvasback	0.0	0.0	0.0	1.5	0.0	0.0	0.0	1.5	4.5	3.9	-66.8%	-62.1%
Scaups	7.8	10.0	0.0	9.1	0.6	1.1	13.1	28.6	14.8	26.2	93.0%	9.3%
Ring-necked duck	145.9	72.8	0.0	24.7	2.6	5.9	8.5	251.9	104.4	100.4	141.3%	151.0%
Goldeneyes	66.1	30.6	0.0	0.0	13.9	2.1	4.2	112.7	64.7	48.9	74.2%	130.4%
Bufflehead	23.9	45.8	0.0	11.9	1.0	2.6	3.3	85.2	135.8	139.9	-37.3%	-39.1%
Ruddy duck	0.0	0.0	0.0	0.0	0.0	0.0	7.6	0.0	12.0	6.0	-100.0%	-100.0%
Subtotal	243.8	159.1	0.0	47.8	18.1	11.7	36.6	480.5	339.7	328.6	41.5%	46.2%
Miscellaneous												
Oldsquaw	0.0	0.0	0.0	0.0	0.0	0.0	1.1	0.0	0.0	5.1	--	-100.0%
Eiders	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
Scoters	2.1	0.0	0.0	0.0	0.0	0.9	17.6	3.0	7.3	4.7	-59.4%	-37.4%
Mergansers	91.4	63.8	1.8	5.2	3.6	9.5	0.0	175.2	126.8	107.3	38.2%	63.3%
Subtotal	93.5	63.8	1.8	5.2	3.6	10.4	18.7	178.2	134.1	117.2	32.9%	52.1%
Total Ducks	654.3	383.3	33.4	152.0	79.1	150.4	141.5	1452.5	1066.8	1076.6	36.2%	34.9%
Canada Goose	6.5	3.8	78.4	8.2	0.6	29.9	19.4	126.5	811.9	579.8	-84.4%	-78.2%
Am. coot	0.0	1.5	0.0	1.0	0.0	3.6	0.0	6.1	19.0	10.8	-67.8%	-43.2%
Ponds	332.2	169.3	12.3	35.9	21.4	63.3	0.0	634.4	1349.4	1324.2	-53.0%	-52.1%

[a]Adjusted for visibility bias.

[b]Stratum 57 excluded from 1992 totals for comparability with previous years' data

Table 2. Survey design for Ontario, Quebec, and New York, May, 1992.

STRATUM	51	52	53	54	55	56	57
Survey Design							
Square miles in stratum	78,680	28,266	4,259	12,245	4,149	21,721	27,136
Square miles in sample	369	180	54	189	54	234	270
Lineal miles in sample	1,476	720	216	756	216	936	1,080
Number of transects in sample	6	4	4	10	4	9	6
Number of segments in sample	82	40	12	42	12	52	60
Expansion factor	213.2598	157.0333	78.8704	64.7894	76.8333	92.8248	100.5037
Current Year Coverage							
Square miles in stratum	78,680	28,266	4.259	12,245	4,149	21,721	27,136
Square miles in sample	319.5	180	54	171	54	225	186
Lineal miles in sample	1,278	720	216	684	216	900	738
Number of transects in sample	6	4	4	9	4	9	4
Number of segments in sample	71	40	12	38	12	50	41
Expansion factor	246.2598	157.0333	78.8704	71.6082	76.8333	96.5378	147.0786

This is a preliminary survey design subject to review. Data is based on information obtained from a small scale map.

Table 3. Visibility Rates

Species	Visibility Rate	Calculation	
		1992[a]	1992 + Past Years[b]
Mallard	2.84	X	
Am. black duck	2.88	X	
Gadwall	3.04		X
Am. Widgeon	5.71		X
Am. green-winged teal	4.23		X
Blue-winged teal	10.31		X
N. shoveler	3.48		X
N. pintail	2.65		X
Redhead	3.11		X
Canvasback	2.58		X
Scaups	1.98		X
Ring-necked duck	3.83	X	
Goldeneyes	3.61		X
Bufflehead	2.21		X
Oldsquaw	1.93		X
Eiders	3.58		X
Scoters	1.27		X
Ruddy duck	5.94		X
Mergansers	1.05		X
Am. coot	4.71		X
Ponds	1.0		X

[a]Rate calculated using 1991 data

[b]Rate calculated from 1991 and recent past years

1992 PRESEASON WATERFOWL BANDING IN QUEBEC

Black Duck Joint Venture - Atlantic Flyway Council
Pierre Dupuis
Canadian Wildlife Service, Quebec Region
1992-09-17

FUNDING

Atlantic Flyway Council	60,0 US$
Canadian Wildlife Service	10,0 CAN$
Private contributions	9,0 CAN$

(local agencies: nature center, outfitter, individual).

BANDING STRATEGY

To maintain current bandings in traditional stations.

To commence the developpment of a network of stations out of traditionnal waterfowling areas where traditional bandings occur.

To investigate potential for banding operation in boreal Quebec.

STATIONS OPERATED IN 1992

NE Quebec	Baie Johan Beetz (first year ever \ preseason).
CENTRAL Quebec	St.Lawrence estuary south shore, Isle Verte (dog search).
	St.Lavrence est. north shore, Escoumins.
	Lake Saint-Jean.
Southern Québec	Lake Saint-Pierre, south sh., Sorel area.
	Lake Saint-Pierre, north sh., Dupas Island area.
	Eastern Townships, Lake Boivin Nature Center.

RESULTS

Overall, less ducks were attracted and banded, per effort unit.

- ex. The mid-July dog search in the St.Lawrence estuary gave poor results (1 brood found in 2-days work).
- ex. Class 2-B broods were unusually common on all trapping areas on August 20-25 period.
- clues for rather limited success of duck breeding were gathererd for most areas.
- because of opening season dates, most of trapping effort ended around September 9 (except in Baie Johan Beets: Sept. 19).

Station	abdu	mall	vodu	total
Baie J. Beetz	156	3	5	313
Escoumins	218	6	1	293
Isle Verte	0	0	0	0
Lake St.Jean	279	41	1	378
Sorel area	62	384	77	588
Boivin N.Center	0	9	19	51
Dupas Island	55	184	32	354
Thurso	102	299	125	548 (re-opening)

(all preliminary compilation) (total 2 525)

Final BDJV forms are being prepared to be send to Kathy Dickson in coming days.

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: TOTAL OF QUEBEC
STARTING DATE: July 1 ENDING DATE: Sept. 10 Field operation
CREW MEMBRES:

DESCRIPTION OF CONDITIONS:

RESULTS:

ACU	L			HY			AHY		U	TOTAL
	Male	Femelle	U	Male	Femelle	U	Male	Femelle		
1320	12	18		364	207		168	153		922
1326				17	16		24	10		67
1330	1	1		341	250		205	108		906
1350	1			1						2
1370				1	1					2
1390	2	2		113	85		74	94		370
1400	3	3		5	9		2	2		24
1420		1			1					2
1430	1	2		13	11		1	7		35
1440	13	15		42	35		136	17		258
1460		1		1	1					3
1500										0
TOTAL	33	43	0	898	616	0	610	391	0	2591

RECOMMENDATIONS:

OMNR BANDING STATION: THUNDER BAY DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	103	68	171	130	116	246	417
Black Duck	22	10	32	106	18	124	156
Mallard X Black				3		3	3
Blue-winged Teal		2	2		1	1	3
Pintail	6		6	1	1	2	8
Green-winged Teal	4	3	7	3		3	10
Hooded Merganser				1		1	1
Wigeon	1	2	3				3
Ring-necked Duck		2	2		1	1	3
Common Goldeneye		1	1				1
Shoveler	1		1				1
					TOTAL		606

OMNR BANDING STATION: TIMMINS DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	176	175	351	106	101	207	558
Black Duck	53	46	99	38	26	64	163
Mallard X Black	6	6	12	2	1	3	15
Blue-winged Teal	1	1	2		1	1	3
Green-winged Teal	34	29	63	14	12	26	89
Pintail		2	2		1	1	3
Ring-necked Duck		1	1				1
Hooded Merganser	3	1	4				4
					TOTAL		836

OMNR BANDING STATION: GOGAMA AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	29	19	48	4	11	15	63
Black Duck	38	32	70		7	7	77
Mallard X Black	1		1	1		1	2
Green-winged Teal	1		1	1		1	2
Wood Duck				9		9	9
Wigeon	1	3	4				4
Ring-necked Duck	1	5	6		2	2	8
					TOTAL		165

OMNR BANDING STATION: KIRKLAND LAKE DISTRICT

YEAR: 1992

SIX BANDING SITES COMBINED

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	451	424	875	33	82	115	990
Black Duck	96	111	207	4	23	27	234
Mallard X Black	6	3	9	1	1	2	11
Blue-winged Teal	69	66	135	10	16	26	161
Green-winged Teal	17	23	40	4	4	8	48
Wood Duck		2	2	2		2	4
Shoveler		1	1				1
Lesser Scaup	1		1				1
Common Goldeneye		1	1				1
					TOTAL		1451

OMNR BANDING STATION: TEMAGAMI DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	6	3	9	2	10	12	21
Black Duck	87	122	209	22	21	43	252
Mallard X Black		1	1				1
Wood Duck		1	1		1	1	2
					TOTAL		276

OMNR BANDING STATION: BLIND RIVER AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	17	28	45	15	10	25	73 (3 unknowns)
Black Duck	7	4	11	6	6	12	23
Wood Duck	1		1	33	2	35	36
						TOTAL	132

OMNR BANDING STATION: COCHRANE DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	113	62	175	13	36	49	224
Black Duck	9	14	23				23
Mallard X Black	8	4	12	5	3	8	20
Blue-winged Teal	3	3	6		3	3	9
Wood Duck				5		5	5
					TOTAL		281

OMNR BANDING STATION: NORTH BAY DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	85	98	183	4	20	24	207
Black Duck	34	36	70	3	3	6	77 (1 unknown)
Mallard X Black	9	3	12				12
Green-winged Teal	1		1	1		1	2
Wood Duck	3	2	5	4	1	5	10
					TOTAL		308

BANDING REPORT

1992 Preseason Banding Report by: Fred Roetker, USFWS

Banding Station Location: Nikip Lake, Ontario

Coordinates: 525-0914
525-0915
525-0931

Starting Date: August 19, 1992 Ending Date: September 10, 1992

Crew Members: Fred Roetker, Bobby Gentry, and Steve Bierle

Conditions: High water and late staging.

Results:

Species	AHY M	AHY F	HYM	HYF	LM	LF	Total
Black Duck							15
Mallard							405
Mallard x Black Duck							3
Wood Duck							0
Northern Pintail							17
Ringnecked Duck							0
American Wigeon							22
Blue-winged Teal							94
Green-winged Teal							32
Total							588

Recommendations: Continue the station. Logistics are worked out for this location. A road exists to within 32 miles. Equipment is stored here and future results should be similar to past years. Also, expand trapping effort to other staging sites as identified by reconnaissance flights undertaken during the past two years.

BANDING REPORT

1992 Preseason Banding Report by: MICHIGAN Summary

Banding Station Location: Statewide

Coordinates: Manuscong Bay, Lake Cadillac, Little Mud Lake Flooding, Houghton Lake Flats Flooding, Fish Point, St. Charles, Muskegon S.G.A., Lapee S.G.A., Allagan S.G.A.

Starting Date: April 1992 Ending Date: September 1992

Crew Members: G. Soulliere, T. Havard, R. Owen, M. Engler, D. Fenton, D. Pavlovich, A. Karr, J. Goodheart, T. Wolters, M. Bailey, J. Schafer, R. Barney

Conditions:

Results:

Species	AHYM	AHYF	HYM	HYF	Other	Total
Black Duck					99	99
Mallard	12	49	26	16	581	684
Mallard x Black Duck					2	2
Wood Duck	100	98	53	35	475	761
Northern Pintail		1				1
Ringnecked Duck						
American Wigeon						
Blue-winged Teal	3	24	2	9	24	38
Green-winged Teal		1			6	7
Total	112	162	81	61	1187	1603

Recommendations:

BANDING REPORT

1992 Preseason Banding Report by: WISCONSIN State

Banding Station Location: northern 1/3 of the state

Coordinates:

Starting Date: Ending Date:

Crew Members:

Conditions:

Results:

Species	AHYM	AHYF	HYM	HYF	LM	LF	Total
Black Duck	12	7	7	3			29
Mallard	329	339	606	674			1948
Mallard x Black Duck							
Wood Duck	174	25	27	20	6	8	260
Northern Pintail	4	2	1	7			14
Ringnecked Duck							
American Wigeon	1			2			3
Blue-winged Teal	3	3	4	5			15
Green-winged Teal	11	2	3	5			21
Total							2290

Recommendations:

Appendix H

SUMMARIES OF RESEARCH PROJECTS IN 1992

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV91-1

Project Title: Increasing mallards, decreasing black ducks: the role of reproductive success, competition and interspecific pair formation.

Investigator(s): Mark Petrie, Ronald Drobney, Daniel Sears

Objectives: 1) compare the reproductive success of mallards and black ducks breeding sympatrically in midwestern New Brunswick,
2) compare survival rates of mallard and black duck females during the breeding period.

General Description of Study:

During 1992, mallard and black duck females were captured in the prelaying period and fitted with abdominally implanted radiotransmitters. Marked birds of both species provided information on clutch size, nest success and duckling survival. Durvival estimates of mallard and black duck females were also calculated for the breeding period.

Report of Progress:

A total of 15 mallard and 16 black duck females were captured and fitted with radiotransmitters in 1992. No difference in clutch size, nest success or adult female survival was detected between the species.

Partners: 1) New Brunswick Department of Natural Resources, Wetlands and Coastal Habitat Program (NBDNR)
2) University of Missouri-Columbia

Funding Received in 1992 and in previous years:

1990: BDJV 15 K
NBDNR 15 K
1991: BDJV 15 K
NBDNR 15 K
1992: BDJV 23.8 K
NBDNR 20 K

Beginning Date: May 1990 Ending Date: August 1994

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV92- 2

Project Title: Characterization of breeding habitats for the American Black Duck using LANDSAT TM satellite images.

Investigator(s): Daniel Bordage and Nathalie Plante (CWS-Quebec)

Objectives: To develop large scale characterization of boreal forest habitats and to elaborate models of habitat use by breeding Black Duck. Characterization and models will be used to locate high potential sites for breeding and to evaluate impacts of large scale projects such as hydro-electric development and forest cutting. Habitat maps and models of habitat use will help analysis of results of the breeding pair survey monitoring program.

General Description of the Study: The study area for the Black Duck Joint Venture breeding pair monitoring encompass 535 000 km^2 of boreal forest in Quebec. With such large territory and low densities of birds (15 pairs/100 km^2), satellite images to characterize habitats proved to be an efficient tool. By combining habitats characterized by remote sensing and data from survey program we can develop statistical models of habitat use by Black Duck. These models permit estimation of the probability of observing Black Duck pairs considering habitats for every square kilometer of the satellite image. Simulations could then be made by modifying water area (impoundment impacts) and forest cover (clear cutting) to estimate new probabilities of observing birds. Different maps and databases are also produced: habitat identification and distribution; potential for breeding; distribution of birds resulting from models.

Report of Progress (for ongoing work): The Centre d'applications et de recherches en télédétection (Université de Sherbrooke) characterized one LANDSAT image that permitted some preliminary analysis. Nine out of 20 habitat variables related to Black Duck pairs were selected by the preliminary model. Of particular interest we found that coniferous forest is positively concerned with the presence of breeding pairs and that recent forest cutting (<= 5 years old) is related with absence of pairs. These results identify potential impacts of the forest industry on breeding Black Duck. Two other images are currently under analysis with special emphasis on forest habitats. The three images combined encompass approximately 90 000 km^2 of boreal forest.

Partners: Eastern Habitat Joint Venture.

Funding received in 1992/93 and previous years: $43 000 from BDJV and $15 000 from EHJV in 1992/93; $21 000 from BDJV in 1991/92.

Beginning Date: November 1991

Ending Date: 1997

Annual Progress Report for 1992/93

Project Number: BDJV92-3
Project Title: 'The effects of timing and duration of drawdown on impoundment productivity'.
Investigator: Alan R. Hanson, Canadian Wildlife Service, Sackville N.B.

Objective: To test the following null hypotheses:

1) Drawdown of impoundments built on Acadian Soils has no effect on either primary productivity, invertebrate abundance, or the number of Black Ducks using the impoundment.

2) The timing and duration of drawdown has no effect on either primary productivity, invertebrate abundance, or the number of Black Ducks using the impoundment.

3) The timing and duration of drawdown has no effect on vegetation distribution and abundance.

4) There is no relationship between primary productivity, invertebrate abundance, and vegetation distribution and abundance, and the number of Black Ducks using an impoundment.

General Description of Study:
Beginning in 1990, data has been collected on the water chemistry, hydrology, algal primary productivity, vegetation, macroinvertebrates, avifauna, fish and muskrats of nine study impoundments in the upper Bay of Fundy. Three impoundments were drawndown in October 1990 (13 month drawdown) while three others were drawndown in August 1991 (three month drawdown); all were refilled beginning November 15, 1991. The effects of drawdown on impoundments will be assessed by comparing parameters of productivity postdrawdown to predrawdown, and to control impoundments that were not drawdown.

Report of Progress:
Data collection on the water chemistry, hydrology, algal primary productivity, vegetation, macroinvertebrates, avifauna, fish and muskrats of nine study impoundments in the upper Bay of Fundy continued in 1992, the first year post-drawdown. Analysis of data collected to date, although preliminary, indicates large scale differences in Black Duck presence and production on the study impoundments. Analysis during the winter of 1992-93 will try to determine which habitat parameters are responsible for differences in the number of Black Ducks using and being produced on a given impoundment.

Partners: Canadian Wildlife Service, Environment Canada, Institute for Wetlands and Waterfowl Research, Ducks Unlimited Canada, New Brunswick Department of Natural Resources and Energy.
Funding Received in 1992/93: 12,200 Previous Years: 0
Beginning Date: May, 1990
Ending Date: December, 1995

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV92-4

Project Title: The fate of phosphorous in lakes following fertilizer addition.

Investigator(s): M. Brylinsky

Objectives: To make measurements of sediment phosphorous concentration in lakes subjected to artificial fertilization for enhancement of waterfowl production.

General Description of the Study: As part of a study to evaluate the impact and feasibility of artificial fertilization for rehabilitation and enhancement of waterfowl production of acidified wetlands, eight acid-stressed lakes located within the Tobeatic Wildlife Management Area in southwestern Nova Scotia have been monitored for a number of physical, chemical and biological parameters between 1990-1992. Data collected during 1990 is being used as baseline data. In the spring of 1991, four of the lakes were subjected to artificial fertilization with phosphorous and nitrogen and the resulting changes in nutrient levels and biological productivity are being compared to that of the unfertilized systems.

Report of Progress (for ongoing work): The 1992 field season was terminated in mid-November. A total of 52 sediment samples have been collected and analyzed for total, organic and inorganic phosphorous. Comparison of the fertilized and unfertilized sites suggests that very little of the added fertilizer has been retained within the sediments and it appears that the sediments are not acting as nutrient traps or storage areas for the fertilizer.

Partners: Black Duck Joint Venture, Canadian Wildlife Service, Ducks Unlimited Canada, Eastern Habitat Joint Venture, Nova Scotia Department of Natural Resources, Wildlife Habitat Canada

Funding received in 1992/93 and previous years: $5,000 (CDN)

Beginning Date: 1 June 1992

Ending Date: 30 November 1992

ANNUAL PROGRESS REPORT 1992/1993

Project number: BDJV92-5

Project title: Mallard and American black duck resistance to a blood parasite and the implications for hybridization.

Investigators: Dave Shutler and C. Davison Ankney (University of Western Ontario), Darrell Dennis (Canadian Wildlife Service, London)

Objectives: To test whether mallards are more susceptible than black ducks to the parasite Leucocytozoon, and to test whether mallards from areas where Leucocytozoon is endemic are less susceptible to the parasite than mallards that have had no historical exposure to the parasite.

General Description of Study: A 1960's study implicated the blood parasite Leucocytozoon simondi as a potential barrier to eastward range expansion by mallards (Anas platyrhynchos). However, since that study was published, mallards have continued to replace black ducks (A. rubripes) in eastern North America. This suggests that mallards have acquired resistance to the parasite, either from natural selection that has purged individuals with non-resistant genes (the gene elimination hypothesis) or from introgressive hybridization with more resistant black ducks (the gene acquisition hypothesis). To test these two hypotheses, we obtained black duck and mallard eggs from areas where the parasite is endemic (northern Ontario) and mallard eggs from an area where the parasite is not found (Saskatchewan). Adults raised from these eggs were bred so as to produce pure and hybrid ducklings in both geographic and species terms. The genetic makeup of this duckling population thus exhibited the full potential range of gene acquisition and gene elimination. In summer 1992, when they were between 2 and 9 d of age, ducklings were exposed in two separate locations in northern Ontario to the black fly vectors of Leucocytozoon

Report of Progress: Fifty-four of 89 ducklings (61%) exposed to black flies in 1992 developed high Leucocytozoon parasitemias, but no ducklings died or became sick. As predicted, Saskatchewan ducklings were more likely than Ontario ducklings to develop high parasitemias. Also as predicted, mallard ducklings were more likely than black duck ducklings to develop high parasitemias. These results support both the gene elimination and gene acquisition hypotheses. Only 40% of ducklings exposed after 6 July developed high parasitemias, as compared to 67% for earlier exposure periods, suggesting a potential advantage to late hatching. Thirty-six of 43 ducklings (84%) exposed on a "natural" lake in Algonquin Park developed intense parasitemias, whereas only 18 of 46 ducklings (39%) exposed on a "cottage lake" outside the Park developed high parasitemias. Black fly biologists stated that black flies in 1992 hatched later, less synchronously, and less prolifically than is normal. Thus, ducklings may have acquired fewer parasites than they would have in a normal year.

Partners: NSERCC, University of Western Ontario (UWO)

Funding ($) Received in 1992/1993 and Previous Years:

1991:	NSERCC	19,333 in fellowship + 2,000 from Ankney's operating grant
	BDJV:	6,000
	UWO:	1,000
1992:	NSERCC	29,000 in fellowship + 6,000 from Ankney's operating grant
	BDJV	22,000
	UWO:	1,000

Beginning Date: April 1991 Ending Date: December 1993

ANNUAL PROGRESS REPORT 1992/93

Project Number: BDJV92- 6

Project Title:

Effects of reduced calcium and elevated cadmium intake on the behaviour of captive American black ducks

Investigator(s): Thea M. Silver and Thomas D. Nudds

Objectives:

To test the hypothesis that cadmium intake on acidic ponds may affect black duck survival by feeding captive black ducks diets with levels of cadmium and calcium altered to reflect those available on acidic versus circumneutral wetlands and examining whether cadmium accumulates in tissues (breast, liver, kidney) and whether, at these levels, generalized behaviours are affected.

General Description of Study:

4 groups of black ducks were fed diets containing 1) control (background Cd, 2.3% Ca) 2) 4ppm Cd 3) 0.23% Ca 4) 4ppm Cd, 0.23% Ca for 3 months in 1991 and 1992 to coincide with times that birds would be present on acidic wetlands on the breeding ground. Behaviours were monitored throughout the summers both when birds were receiving experimental diets and when birds were receiving commercial feed. Following behavioural data collection, birds were euthanized and samples of breast muscle, liver, and kidney were analyzed for cadmium.

Report of Progress:

Data collection ended in October 1992 and preliminary results are presented below:

Cadmium accumulation in kidneys and liver differed significantly between groups of birds fed different diets and low calcium appeared to facilitate cadmium uptake in kidneys and liver. Birds which had received low calcium and cadmium accumulated 75ppm and 11ppm cadmium in their kidneys and livers respectively whereas birds which had received adequate calcium and cadmium accumulated 45ppm and 3.5ppm respectively. Concentrations of cadmium in breast muscle were low (0.003-0.27ppm) and did not differ significantly among groups.

Cadmium intake had no effect on occurrences of 'consumptive' behaviour (feeding and drinking) or comfort movements in either 1991 or 1992. In both years, birds receiving low calcium and elevated cadmium had significantly more occurrences of locomotor behaviour (walking, running, swimming) than controls when birds were receiving experimental diets. This relationship was not seen when birds were off experimental diets. These results are consistent with other studies using rats and fish that have also found hyperactivity in response to low level cadmium intake.

We anticipate that a final report will be available in Spring 1993.

Partners: World Wildlife Fund Canada, NSERC

Funding received in 1992/93 and previous years: 1992/93: $7125.00, 1990/91: $2500.00

Beginning Date: September 1990 Ending Date: March 1993

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV91

Project Title: Productivity of sympatrically breeding black ducks and mallards on wetlands of forested and agricultural landscapes in Maine.

Investigator(s): Jerry R. Longcore, Daniel G. McAuley, Lewis Boobar, USFWS

Objectives:

1) to determine brood production of sympatrically breeding mallards and black duck females in an agricultural landscape and to estimate recruitment (i.e. number of females recruited to the fall population per females in the spring population),
2) to determine production of black duck females in a boreal forest landscape,
3) to evaluate other components of recruitment (i.e. nest success, hen success, brood and duckling survival, average brood size at fledging) and survival of females,
4) to characterize brood-rearing wetlands by water chemistry, wetland morphology, vegetation and invertebrate diversity and biomass within the two landscapes.

General Description of Study:

Brood production of radio-marked and unmarked black ducks and mallards will be determined in an agricultural landscape. For further comparison brood production of black duck females in a boreal forest landscape will be determined. Characteristics of brood-rearing wetlands will be related to production.

Report of Progress:

Study planning has been completed. A holding facility was partly constructed for decoy ducks. Decoy black ducks are being held in Maine and decoy mallards are on order for April. Transmitters have been ordered. The Graduate Assistant has finished one semester and recruitment of field assistants has begun.

Partners: 1) Maine Department of Inland Fisheries and Wildlife
2) Canadian Wildlife Service, Atlantic Region

Annual funding level:

$107,000 (US Dollars) - Research Work Order

Beginning Date: April 1993 Ending Date: December 1996

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV91

Project Title: Survival of juvenile female black ducks and mallards during staging and migration to Atlantic coast wintering areas.

Investigator(s): J.R. Longcore, D.G. McAuley, USFWS

Objectives: 1) to determine habitat use by HY female and male black ducks and female mallards,2) to determine survival rates while ducks are congregating on staging areas before hunting, after hunting commences, and then during migration to wintering areas on the Atlantic coast,3) to relate the influence of habitat use on survival.

General Description of Study: Ducks were radio-marked at the north shore (Escoumins) and south shore (Kamouraska) of the ST. Lawrence River, Quebec, at Missisquoi NWR, VT and at Amherst, NS in August-September, 1990 and 1991. Thirty-five to 45 HY ducks of each sex (males were marked in Quebec only at Escoumins in 1990) were banded at each location and tracked, many through December each year. Habitats were classified by wetland type and ownership when possible. Cause of duck deaths and duck condition were determined for each duck that died. Questionnaires to hunters documented deaths and condition of ducks and habitat used. Hunter bag checks were conducted in Vermont and Quebec.

Report of Progress: Analysis of data has continued. Data associated with the Missisquoi NWR were summarized and the Graduate Assistant has completed analysis on differential habitat use between species, sexes, months and years as related to water levels and weather. All mortality data were summarized and are now being used to further develop the Kaplan-Meier product-limit estimator and to calculate survival rates by species, sex, location and years, which is nearly completed. Causes of duck deaths have been verified from necropsy and x-ray examination of carcasses. Amounts of lipid were determined in ulna and amounts of lead were determined in tibia and liver. Some additional data on survival of ducks have been obtained from Bird Banding Laboratory reports of our radio-marked ducks being shot after study years.

Partners: Canadian Wildlife Service (Quebec and Atlantic Regions), University of Quebec at Montreal

Annual funding level: $168,000 (US dollars (RWO + PWRC funds)

Beginning Date: August 1990 Ending Date: December 1991

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV91

Project Title: Mallard-Black duck interactions: role of wintering habitat.

Investigator(s): R. Field and C.J. Sanderson, USFWS

Objectives: 1) to determine the extent of difference and overlap in habitat use for wintering mallards and black ducks in 3 coastal wetland areas of MA, 2) to document late winter courtship behavior between mallards and black ducks, according to types of coastal wetland habitat, time of season, and flock size and composition, 3) to provide information to managers on features and management of habitat that could influence the number of mallards and black ducks.

General Description of Study: Three study sites were used: Outer Cape Cod, Plymouth-Duxbury-Kingston area, and Parker River NWR. Data were collected from December, 1990-March 1991 and December 1991-present. In each study area, we made behavioral observations of mallards and black ducks in the following habitat types: salt marshes, fresh and brackish water ponds, and rivers. The National Wetland Inventory Classification was used to define habitat types. Once weekly we observed black ducks and mallards from sunrise to sunset to determine diurnal distribution of courtship. We made observations six days a week for 3 hours during the morning when courtship was most likely. The habitat type for each day's observations was randomly selected. In addition to behavior we noted weather conditions, ice formation, tidal stage, disturbances, and number of black ducks and mallards.We observed as many flock sizes and species ratios in each habitat type as possible; however, the availability of mixed flocks was a limiting factor. During aerial surveys we recorded distribution and numbers of black ducks and mallards.

Report of Progress: Data from the first and second field season have been entered into Excel and SAS. During the 1991-1992 field season we recorded 4,334 five-minute observations for female black ducks and female mallards in four habitat types. Courtship was recorded during 590 five-minute periods. We recorded courtship by all black duck groups 361 times. Courtship was observed for groups containing both black ducks and mallards 37 times. Courtship was recorded by groups containing black ducks and mallards in all four habitat types; salt marsh (5), bay (12), pond (19) and river (1). Data analyses continue.

Partners:

Annual funding level: $29,203 (US dollars)

Beginning Date: August 1990 Ending Date: May 1993

ANNUAL PROGRESS REPORT FOR 1992/93

Project Number: BDJV92

Project Title: Cooperative breeding success and productivity of American black ducks and mallards.

Investigator(s): B.K. Williams and D.E. Capen, USFWS

Objectives:

1) to determine if nest and hen success, brood and duckling survival, and habitat use are different for sympatrically breeding black ducks and mallards,
2) to determine if productivity estimates can be related to wetland characteristics (e.g., size, type, water conditions).

General Description of Study: To capture, radio-mark and monitor about 30 each of female black ducks and mallards to determine comparative productivity of young. Brood-rearing habitats will be characterized by morphometric, vegetational, and water conditions and classified by criteria of Cowardin et al. (1979). The study will be completed in two field seasons in wetlands of the Lake Champlain basin and vicinity.

Report of Progress: Study planning has been completed. Some transmitters have been ordered.

Partners:

Annual funding level: $125,882 sought (US dollars) ($38,000 BDJV funds)

Beginning Date: April 1993 (delayed because of inadequate funds)

Ending Date: December 1995

Quebec

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Baie Johan Beetz
STARTING DATE: Agust 17 ENDING DATE: Sept. 10 (Field operation)
CREW MEMBRES: Marcel Bourque, Fondation Les oiseleurs

DESCRIPTION OF CONDITIONS:

RESULTS:

AOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320					2	1		3
1326			1		4			5
1330			29	39	88	35		191
1350								0
1370			1	1				2
1390			72	64	24	42		202
1400								0
1430						2		2
1440					5			5
1500								0
TOTAL	0	0	103	104	123	80	0	410

RECOMMENDATIONS:

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: ESCOUMINS
STARTING DATE: August 19 ENDING DATE: Sept. 10 (Field operation)
CREW MEMBRES: Mario Paquin, Fondation Les oiseleurs du Québec
Shirley Orichefsky, Fondation Les oiseleurs du Québec
Gaetan Couture, Fondation Les oiseleurs du Québec

DESCRIPTION OF CONDITIONS:

RESULTS:

AOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320			3	1	2			6
1326			1	1	2			4
1330			94	95	17	12		218
1350								0
1370								0
1390			22	11	18	10		61
1400			1					1
1430			1	1				2
1440					1			1
1500								0
TOTAL	0	0	122	109	40	22	0	293

RECOMMENDATIONS:

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Ile Dupas, Lac St-Pierre
STARTING DATE: August 3 ENDING DATE: Sept. 10 (Field operation)
CREW MEMBRES: Gaeten Couture, Fondation Les oiseleurs du Québec
Roger Gladu, Pourvoirie Lac St-Pierre

DESCRIPTION OF CONDITIONS:

RESULTS:

AOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320	9	12	19	22	60	59		181
1326				1	3	1		5
1330		1	22	11	7	13		54
1350	1							1
1370								0
1390	1	1	6	1	11	30		50
1400	3	3	3	3		1		13
1420		1						1
1430		1	3	2		4		10
1440	4	5	4	6	10	3		32
1460			1					1
1500								0
TOTAL	18	24	58	46	91	111	0	348

RECOMMENDATIONS:

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Pointe Racine, Lac St-Jean
STARTING DATE: August 10 ENDING DATE: Sept. 10 (Field operation)
CREW MEMBRES: Chantal Berthiaume, Fondation Les oiseleurs du Québec
Jean François Rousseau, Fondation Les oiseleurs du Québec
Gaetan Couture, Fondation Les oiseleurs du Québec

DESCRIPTION OF CONDITIONS:

RESULTS:

ACOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320			24	7	5	5		41
1326			8	6	13	6		33
1330			127	70	53	29		279
1350								0
1370								0
1390			7	4	6	2		19
1400								0
1420								0
1430			1	3		1		5
1440					1			1
1460								0
1500								0
TOTAL	0	0	167	90	78	43	0	378

RECOMMENDATIONS:

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Baie Lavallière, Lac St-Pierre
STARTING DATE: August 3 ENDING DATE: Sept. 12 (Field operation)
CREW MEMBRES: Paul Messier, Fondation Les oiseleurs du Québec
André Côté, Fondation Les oiseleurs du Québec

DESCRIPTION OF CONDITIONS:

RESULTS:

AOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320	1	3	182	96	53	49		384
1326			2	1		2		5
1330	1		31	14	10	6		62
1350			1					1
1370								0
1390			2	3	8	5		18
1400			1					1
1420				1				1
1430			8	4	1			13
1440	7	4	20	8	32	4		75
1460		1		1				2
1500								0
TOTAL	9	8	247	128	104	66	0	562

RECOMMENDATIONS:

Quebec

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Thurso, Outaouais
STARTING DATE: August 03 ENDING DATE: Sept. 4 (Field operation)
CREW MEMBRES: Réjean Deschêne, Fondation Les oiseleurs du Québec
Dany Gendron, Fondation Les oiseleurs du Québec
Nicolas Lalande, Fondation Les oiseleurs du Québec

DESCRIPTION OF CONDITIONS:

RESULTS:

ACOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320			134	81	46	37		298
1326			5	7	2	1		15
1330			38	21	30	13		102
1350								0
1370								0
1390			3					3
1400				3				3
1420								0
1430				1				1
1440	1	1	15	20	83	5		125
1460								0
1500								0
TOTAL	1	1	195	133	161	56	0	547

RECOMMENDATIONS:

BLACK DUCK JOINT VENTURE

ANNUAL BANDING STATION REPORTING FORM
1992

STATE / OR PROVINCE: Quebec
BANDING STATION TITLE: Lac Boivin, Granby
STARTING DATE: August 3 ENDING DATE: Sept. 10(Field operation)
CREW MEMBRES: Mario Paquin, Fondation Les oiseleurs du Québec
Mario Fortin, Centre d'interprétation du Lac Boivin
Jean René Paillé, Centre d'interprétation du Lac Boivi

DESCRIPTION OF CONDITIONS:

RESULTS:

AOU	L		HY		AHY		U	TOTAL
	Male	Femelle	Male	Femelle	Male	Femelle		
1320	2	3	2			2		9
1326								0
1330								0
1350								0
1370								0
1390	1	1	1	2	7	5		17
1400				3	2	1		6
1430								0
1440	1	5	3	1	4	5		19
1500								0
TOTAL	4	9	6	6	13	13	0	51

RECOMMENDATIONS:

SUMMARY OF DUCKS BANDED BY THE MINISTRY OF NATURAL RESOURCES AND THE CANADIAN WILDLIFE SERVICE IN ONTARIO IN 1992

SPECIES	MNR	CWS	TOTALS
Mallard	7,662	1,571	9,233
Black Duck	1,528	31	1,559
Mallard X Black	107	10	117
Blue-Winged Teal	289	1,151	1,440
Green-Winged Teal	206	70	276
Wood Duck	331	319	650
Northern Pintail	43	10	53
American Wigeon	10	4	14
Ring-Necked Duck	13		13
Common Goldeneye	2		2
Northern Shoveler	2		2
Hooded Merganser	5		5
Lesser Scaup	1		1
Redhead		1	1
TOTAL	10,199	3,167	13,366

Appendix D

Table 1. Black Duck results from the PEI surveys, 1984-1992

Year	1984		1985		1986		1987		1988		1989		1990		1991		1992	
Count	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)	64	62	53	74	76	79	74	66	62	67	78	79	76	73	71	73	70	63
No. of indicated pairs	220	138	113	116	165	90	131	83	105	95	136	80	167	115	154[m]	118	165[s]	86[s]
Total birds observed	465	284	207	195	363	163	240	203	293	255	279	174	656	234	469	283	459	287
Ave. no. indicated pr. per wetland	3.4	2.2	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
No. of wetlands surveyed for broods (both surveys 3, 4)	27		33		33		28		30		22		25		29		25	
Min. no. Bl. Duck broods	41		38		34		48		39		27		29		48		26	
Ave. no. broods* per wetland	1.4		1.2		1.2		1.6		1.3		1.2		1.2		1.6		1.0	

* corrected for missing data
[s] 1 Blk-Mal. pair included
[m] Blk+Hyb. pair and 1 Blk + Mal. pair included

Appendix E

1992 Breeding Pair Surveys in Southern Ontario

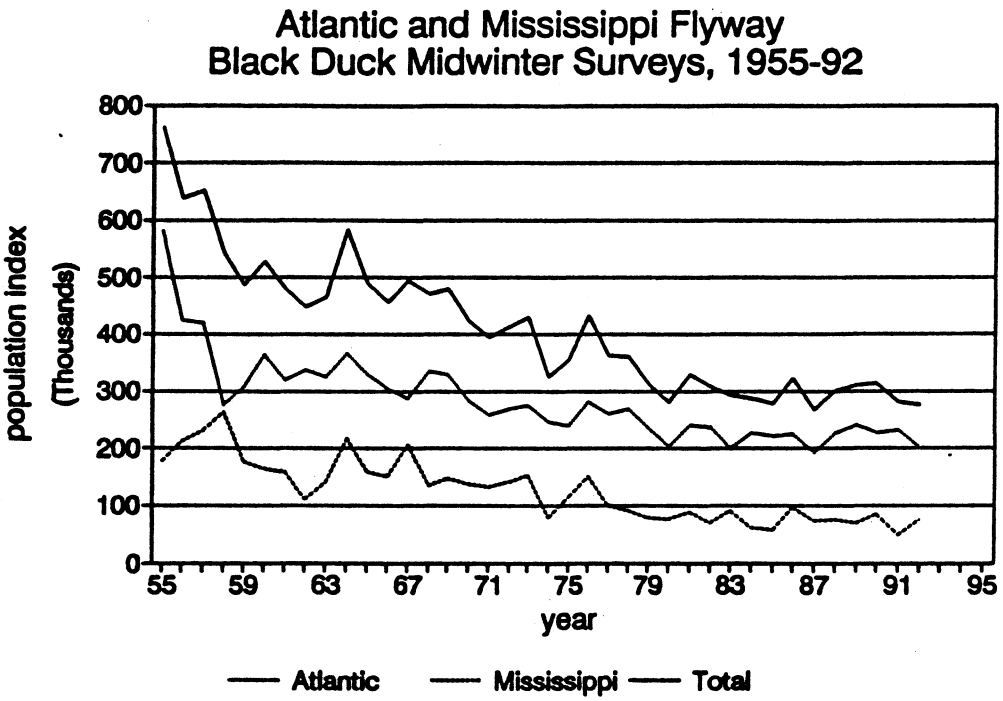
The information below represents the number of indicated breeding pairs counted in 1992 on 330 survey plots in southern Ontario. The data from the 1985 and 1987 surveys are also provided for comparison with the current year. This survey has been conducted in each of 9 years since its inception in 1971.

	1985	1987	1992
Mallard	351	366	331
Black Duck	22	17	33
Mallard x Black Duck (mixed pairs)	2	0	1
Green-winged Teal	11	12	26
Blue-winged Teal	56	48	33
Wood Duck	81	97	103
Canada Geese	20	34	56

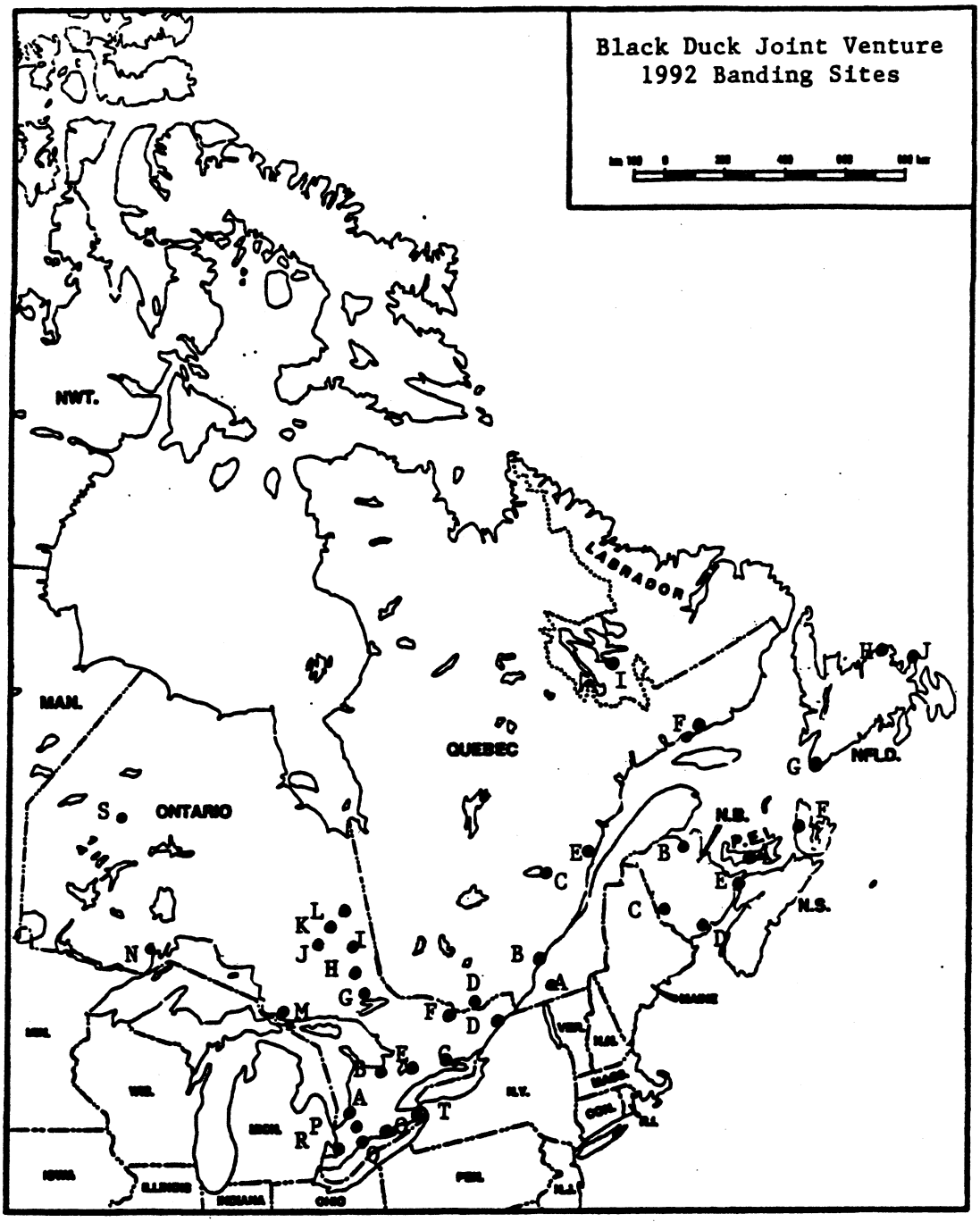
This year is the first since 1971 that the number of estimated pairs of Black Duck pairs increased. There was some concern that the survey may have been conducted slightly too early in 1992. This meant that ducks moving through the area would been counted as part of the local breeding population. However, if that were true, and the number of Black Ducks was overestimated as a result, one would expect that the number of Mallards would also have been high. Instead, the number of Mallards declined for the first time since 1971.

This survey is coordinated and undertaken by the Ontario Region of the Canadian Wildlife Service located in London, Ontario.

Appendix F


Atlantic and Mississippi Flyway
Black Duck Midwinter Surveys, 1955-92
population index
(Thousands)
800
700
600
500
400
300
200
100
0
55
59
63
67
71
75
79
83
87
91
95
year
Atlantic
Mississippi
Total

Appendix G



Ontario

A	Wingham	K	Timmins
B	Huronia	L	Cochrane
C	Napanee	M	Blind River
D	Cornwall	N	Thunder Bay
E	Minden	O	Long Point
F	Pembroke	P	Oxford + Komoka
G	North Bay	Q	Aylmer
H	Temagami	R	Lake St. Clair
I	Kirkland Lake	S	Nikip Lake
J	Gogama	T	Niagara

Quebec

A	Granby
B	Lac St. Pierre
C	Lac St. Jean
D	Thurso
E	Escoumins
F	Baie John Beetz

Atlantic Region

A	PEI
B	Bathurst, NB
C	Woodstock, NB
D	St. John River, NB
E	NS/NB Border Marsh
F	Cape Breton, NS
G	Codroy, NF
H	Carmanville, NF
I	Baikie Lake, NF
J	Bonavista Pen., NF

1982 COOPERATIVE FLYWAY DUCK BANDING IN ONTARIO
BY THE MINISTRY OF NATURAL RESOURCES

SPECIES

MNR District/Area	Mallard	Black Duck	Mall X Bld	B-W Teal	G-W Teal	Wood Duck	N. Pintail	Am. Wigeon	R.N. Duck	Common Goldeneye	N. Shoveler	H. Merg.	L. Scaup	Totals
Niagara	94	5												99
Wingham	2361	39	10	85	28	130	18							2671
Midhurst	1013	81	14	2	1	53	1							1165
Napanee	328	9	3	2	3	7								352
Cornwall	1193	312	12	21	23	70	13	3	1					1648
Minden	27	11	1											39
Pembroke	93	66	3	3		5								170
North Bay	207	77	12		2	10								308
Temagami	21	252	1			2								276
Kirkland Lake	990	234	11	161	48	4				1	1		1	1451
Gogama	63	77	2		2	9		4	8					165
Timmins	558	163	15	3	89		3		1			4		836
Cochrane	224	23	20	9		5								281
Blind River	73	23				36								132
Thunder Bay	417	156	3	3	10		8	3	3	1	1	1		606
Totals	7662	1528	107	289	206	331	43	10	13	2	2	5	1	10,199

Ontario

SUMMARY OF DUCKS BANDED BY THE CANADIAN WILDLIFE SERVICE IN SOUTHWESTERN ONTARIO IN 1992

	OXFORD COUNTY & KOMOKA AREA	AYLMER WMA	LAKE ST.CLAIR	BIG CREEK LONG PT.	TOTALS
MALLARD	392	206	488	485	1571
BLACK DUCK	6	6	7	12	31
MALLARD X BLACK	3		4	3	10
PINTAIL			1	9	10
BLUE-WINGED TEAL	62	1	500	588	1151
GREEN-WINGED TEAL	13		12	45	70
WOOD DUCK	106	1	3	209	319
AMERICAN WIGEON	2		2		4
REDHEAD			1		1
TOTALS	584	214	1018	1351	3167

OMNR BANDING STATION: NIAGARA AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	38	34	72	13	9	22	94
Black Duck	2	3	5				5
					TOTAL		99

OMNR BANDING STATION: MIDHURST DISTRICT

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	201	162	363	313	337	650	1013
Black Duck	28	11	39	30	12	42	81
Mallard X Black	2	1	3	6	5	11	14
Blue-winged Teal				1	1	2	2
Pintail				1		1	1
Green-winged Teal							1 unknown
Wood Duck	4	6	10	34	9	43	53
					TOTAL		1165

OMNR BANDING STATION: AYLMER DISTRICT *

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	122	58	180	19	7	26	206
Black Duck	4	2	6				6
Blue-winged Teal		1	1				1
Green-winged Teal	1		1				1
					TOTAL		214

* Done by the Canadian Wildlife Service

OMNR BANDING STATION: WINGHAM AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	1140	646	1786	351	224	575	2361
Black Duck	12	2	14	20	5	25	39
Mallard X Duck	1	2	3	2	5	7	10
Blue-winged Teal	32	27	59	6	20	26	85
Pintail	10	3	13	2	3	5	18
Green-winged Teal	14	5	19	5	4	9	28
Wood Duck	28	13	41	66	23	89	130
					TOTAL		2671

OMNR BANDING STATION: NAPANEE AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	66	105	171	97	60	157	328
Black Duck	4		4	3	2	5	9
Mallard X Black	1		1	1	1	2	3
Blue-winged Teal		1	1	1		1	2
Green-winged Teal		1	1	2		2	3
Wood Duck		3	3	3	1	4	7
					TOTAL		352

OMNR BANDING STATION: CORNWALL AREA

YEAR: 1992

LOCATION 1): UPPER CANADA MIGRATORY BIRD SANCTUARY

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	258	239	497	210	172	382	879
Black Duck	19	36	55	47	28	75	130
Mallard X Black	3	1	4	3		3	7
Pintail	1	3	4	4	5	9	13
Green-winged Teal	3	3	6	5	1	6	12
Wood Duck	7	9	16	6	8	14	30
Ring-necked Duck	1		1				1
Wigeon	1	2	3				3
Blue-winged Teal	8	8	16	3	1	4	20
					TOTAL		1095

OMNR BANDING STATION: CORNWALL AREA

YEAR: 1992

LOCATION 2): CHARLOTTENBURGH TOWNSHIP

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	4	3	7				7
Black Duck	4	1	5		1	1	6
Green-winged Teal	3	2	5	5	1	6	11
Wood Duck		1	1	6	1	7	8
					TOTAL		32

OMNR BANDING STATION: CORNWALL AREA

YEAR: 1992

LOCATION 3): CARILLON PROVINCIAL PARK

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	137	84	221	40	46	86	307
Black Duck	77	64	141	15	20	35	176
Mallard X Black	1	3	4	1		1	5
Blue-winged Teal		1	1				1
Wood Duck	15	6	21	7	4	11	32
					TOTAL		521

OMNR BANDING STATION: MINDEN AREA

YEAR: 1992

	Hatch Year			After Hatch Year			
SPECIES	M	F	T	M	F	T	TOTAL
Mallard	13	8	21	6		6	27
Black Duck	3	7	10		1	1	11
Mallard X Black				1		1	1
					TOTAL		39