

Avifaunal Use of Selected Impoundments
at Four Maritime National Wildlife Areas
May - October, 1978

by

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Introduction

The first artificial impoundments constructed on a National Wildlife Area in Atlantic Canada were at the Paunchy Lake unit of the Tintamarre National Wildlife Area during the winter-spring of 1968-69. Since 1969, three additional impoundments have been constructed and flooded at Tintamarre for a total of seven impoundments on that NWA. Impoundments have also been constructed and flooded on other National Wildlife Areas as follows: Shepody NWA - 8 impoundments; Chignecto (Amherst Pt. and John Lusby) NWA - 5 impoundments and Wallace Bay NWA - 3 impoundments. Those impoundments have all been installed through the cooperative assistance of Ducks Unlimited (Canada).

The only attempt to monitor avifaunal use of these impoundments has been by helicopter waterfowl brood counts. Such counts have provided trends in waterfowl brood production but did not present an overall picture of the use of impoundments by waterfowl and other aquatic birds especially during spring and fall. It was thus decided in the spring of 1978 to monitor avifaunal use of impoundments on NWA's during the spring, summer and autumn of 1978 to provide a basis for comparative counts in future years. This report is an account of what was undertaken and accomplished during May through September by this exercise.

Objectives

The prime objective was to initiate a study which in the long term (5 years or more) would provide documentation of the possible change in bird use intensity with impoundment age. With this in mind, impoundments were selected that as far as possible were either drawn down within the last year or were due for drawdown within the next one or two years. Also impoundments that were easily accessible were selected because of manpower limitations.

Impoundment Selection

Chignecto NWA - John Lusby Marsh Unit. The Burgess impoundment (Fig. 1) was selected here. Flooded in 1975, this impoundment is approximately 56 hectares in size.

Wallace Bay NWA. Impoundment #1 was selected at Wallace (Fig. 2). This 56 hectare impoundment was constructed and flooded in 1973. In the fall of 1977 it was drawn down so that DU could top up the dike. It remained dry for most of the winter of 1977-78. The water level in this impoundment remained fairly low throughout the summer of 1978.

Shepody NWA (Germantown Marsh Unit). Counts were made on Impoundments A and B on the Germantown marsh. (Fig. 3).

Impoundment A is a 22 hectare impoundment which was flooded in 1975. Wild rice was planted in this impoundment by Ducks Unlimited that same year. Most of the water drained from this impoundment due to a leak around the control structure during the late winter and early spring of 1978. The leak was repaired and by late June the water had

reached the near normal level again. Wild rice established in 1975 produced small yields in 1976 and 1977. In 1978, however, an excellent stand of rice of 12 hectares or more was produced. About 4-6 hectares of this impoundment was verti-tilled prior to flooding in 1975.

Impoundment B is a 30 hectare impoundment which was first flooded in 1976. Fifteen small nesting islands were constructed in this impoundment by Ducks Unlimited (Canada) prior to flooding.

Tintamarre NWA. Impoundments 2 and 3 were selected at Tintamarre (Fig. 4).

Impoundment 2 is 12 hectares in size and was first flooded in September, 1969. Manipulation of this impoundment since the initial flooding has been as follows:

It was drained in 1974 and a leak in the dike at the southwest corner of the impoundment was repaired. A small amount of internal ditching was carried out within the impoundment at that time. It was flooded again in the autumn of 1974. During the spring of 1977 impoundment 2 was drawn down again and Ducks Unlimited did some internal ditching and rebuilt the dike along the northwest side of the impoundment. Also new (screw-type) outlet and inlet structures were installed. Approximately five hectares of vegetation were cut with a commercial bush cutter attached to a farm tractor. The impoundment was flooded in early September, 1977.

Impoundment #3 is 10 hectares in size and is the smallest of the Tintamarre impoundments. Prior to flooding in 1970 a partially successful attempt was made to burn some of the dense stands of vegetation within the impoundment. In 1974 this impoundment was drawn down and the following management effected.

- internal ditching was carried out by DU during the early summer to permit complete drawdown.

- in early August two hectares of the impoundment were verti-tilled.

- in September, all accessible cattail stands within the impoundment were sprayed with liquid amitrole T, a herbicide.

- approximately 13 tons of agricultural lime was applied to the impoundment August 1974.

- after reflooding in the autumn of 1974 approximately 500 pounds of wild rice was broadcast sown by hand throughout the impoundment.

In 1977, impoundment 3 was again drawn down and the following work was carried out by DU:

- three of the dikes were topped up by DU, the dike facing Filmores Hole and dike separating impoundment 3 from impoundment 2.

- approximately .75 hectares of vegetation was cut with a bush cutter by CWS.

- two nesting islands were built by DU and new inlet and outlet structures (screw-type) were installed.

- Impoundment 3 was reflooded during early September 1977.

Counts were undertaken at two week intervals on all NWA's surveyed. All birds observed within and flying reasonably low over impoundments (eg. swallows, etc.) were recorded. Further details on each individual count area are as follows:

John Lusby NWA. Each count was begun from inside a small building located near the southwest corner of the Burgess impoundment. This building was situated so that it could be approached and entered from the woods behind it without undue disturbance of the birds within the impoundment. Approximately 12-15 minutes were spent at this location and all visible birds were identified by means of 10 x 40 binoculars and observations recorded in a field notebook. When all observations were complete at this location, the observers then walked the dike of the impoundment and recorded all other bird observations. Beginning time was generally between 7:00 a.m. and 7:45 a.m. and the time required for the total count was generally 40-45 minutes. Figure 1 shows the route and direction walked in doing the John Lusby count.

Wallace Bay NWA. Since the back of impoundment 1 could not be viewed from the shore owing to thick cover, both along the edge of the upland and throughout the impoundment; counts were made from the dike. Counts were made and recorded going up the dike only. The count usually commenced between 7 a.m. and 8 a.m. and was generally completed in a little less than one hour. Figure 2 shows the route taken and the direction in which the observers were moving while recording observations.

Shepody NWA. Figure 3 depicts the route and direction of travel taken in doing the Shepody counts. At all points, especially along the rail bed, where fairly large areas of impoundment were visible, the observers used a 20x spotting scope as well as 10 x 40 binoculars to observe and identify bird species. Generally, the Shepody count was begun between 7:00 a.m. and 7:30 p.m. and took about two hours to complete.

Tintamarre NWA. Figure 4 shows the impoundments and the route and direction of travel while doing the counts at Tintamarre. No length observation stops were required at Tintamarre because only relatively small areas of the impoundments could be viewed at any one time. Also, because of the comparatively short distances of observation only, 10 x 40 binoculars were required for all observations. Generally, the Tintamarre counts started around 7:00 a.m. and were completed by 8:00 a.m., requiring about one hour total count time.

Results and Discussion

John Lusby NWA

Table I shows the total numbers of Ducks and Geese observed and Table II shows the total numbers of non-waterfowl species observed on the Burgess impoundment 3 May 1978 - 24 August 1978.

Numbers of Black Ducks, Green-winged Teal, Blue-winged Teal, and American Wigeon observed on the Burgess impoundment during the 3 May 1978 - 24 August 1978 period are contained in Appendix A. Appendix A also contains details of the waterfowl broods observed.

In addition to those waterfowl species in Table I, other ducks less common to the area were observed over the count period:

31 May	-	1 male Gadwall
13 June	-	1 pair shoveler
27 July	-	1 female shoveler, 1 female mallard
9 August	-	2 mallards (sex undetermined)

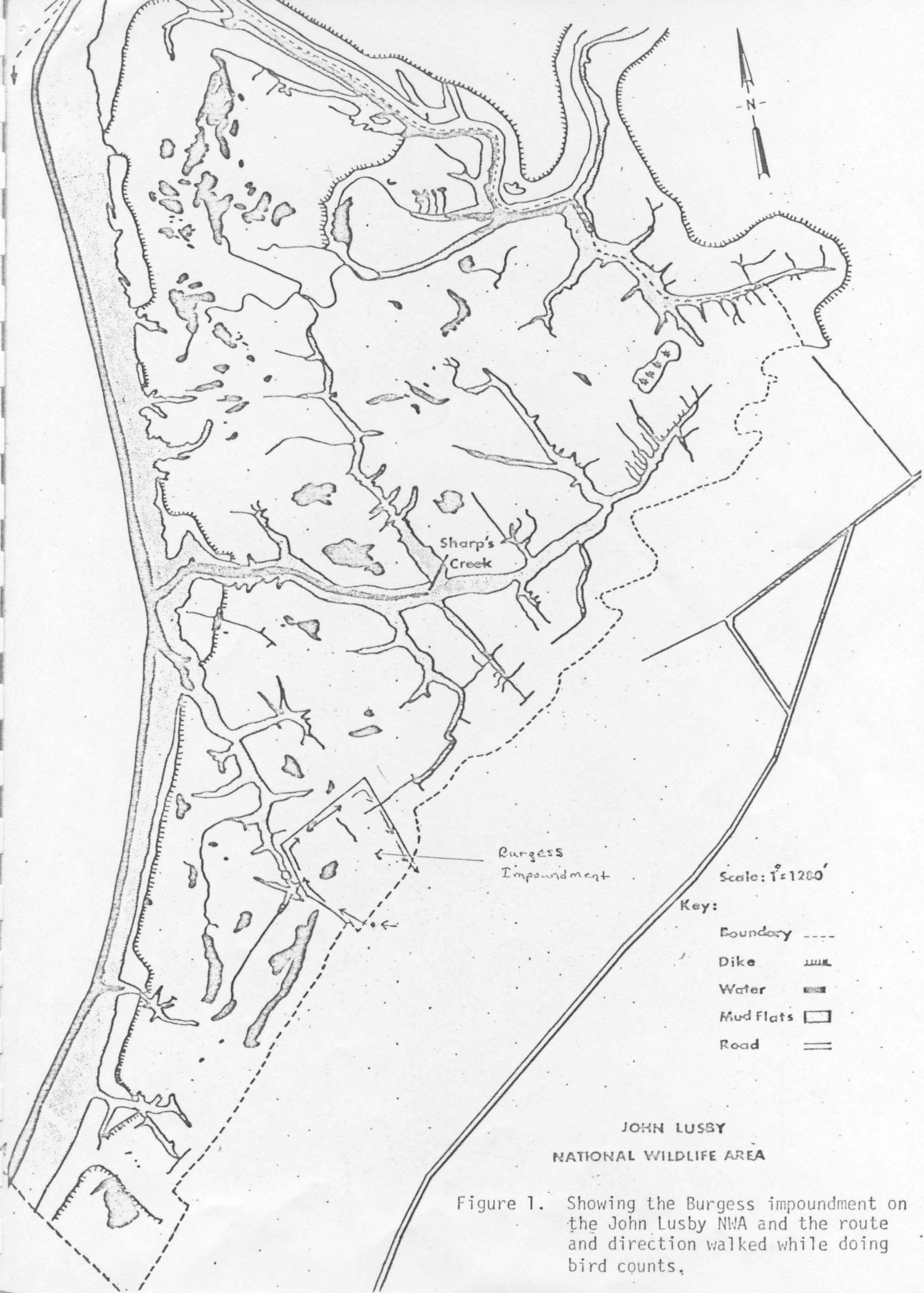


Figure 1. Showing the Burgess impoundment on the John Lusby NWA and the route and direction walked while doing bird counts.

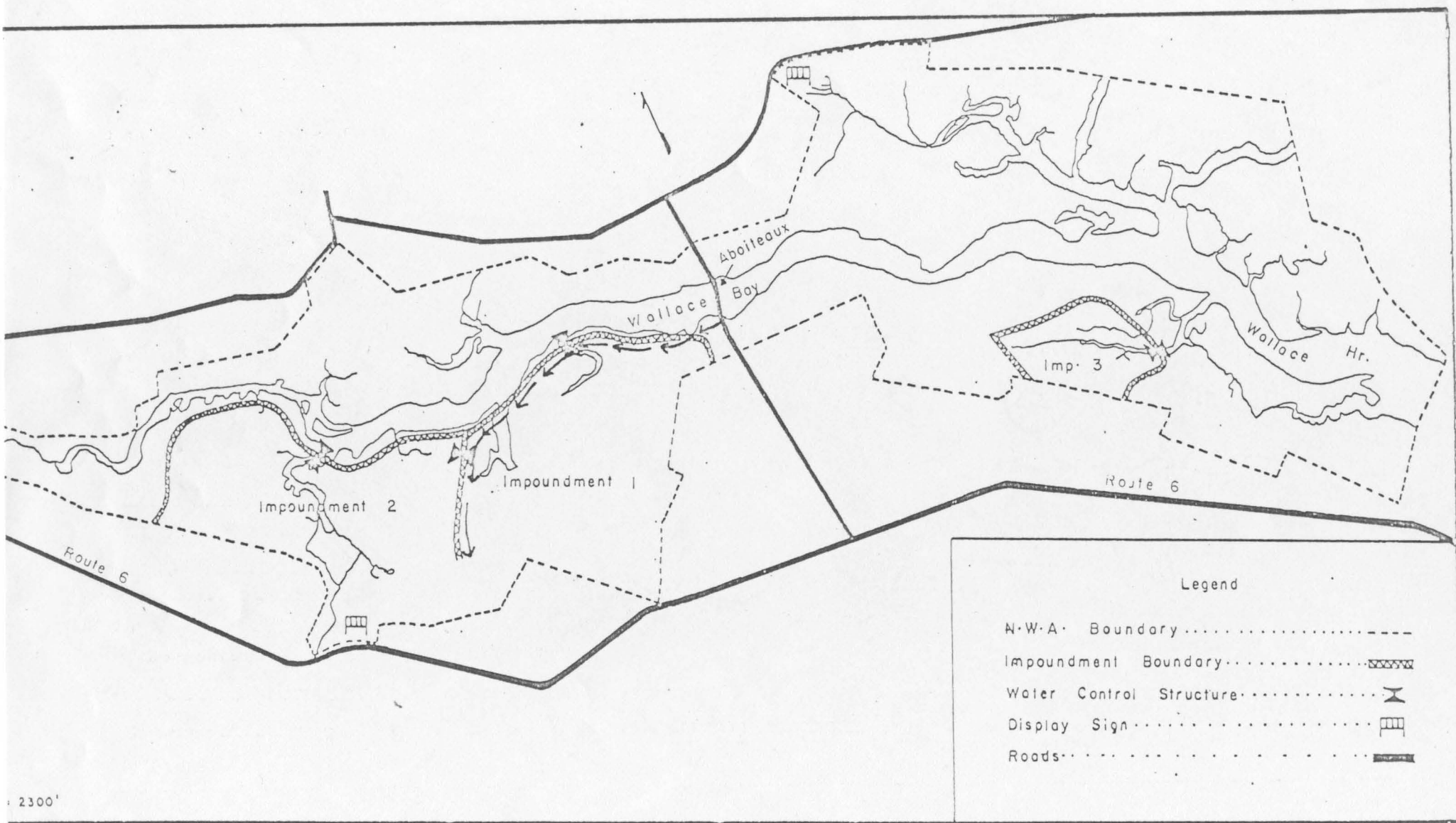


Figure 2. Showing location of Impoundment #1 at Wallace Bay NWA and route and direction walked while doing bird counts.

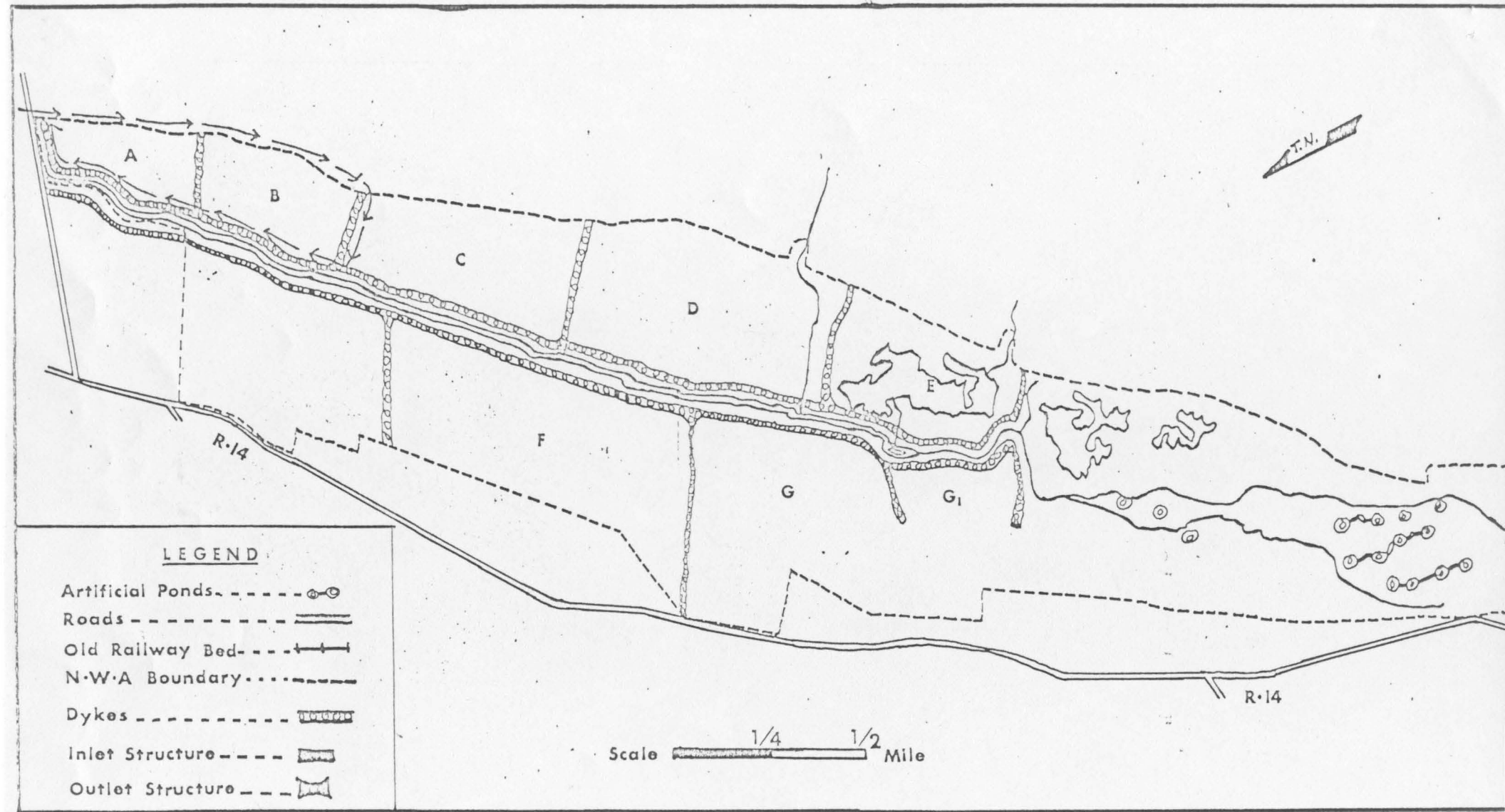
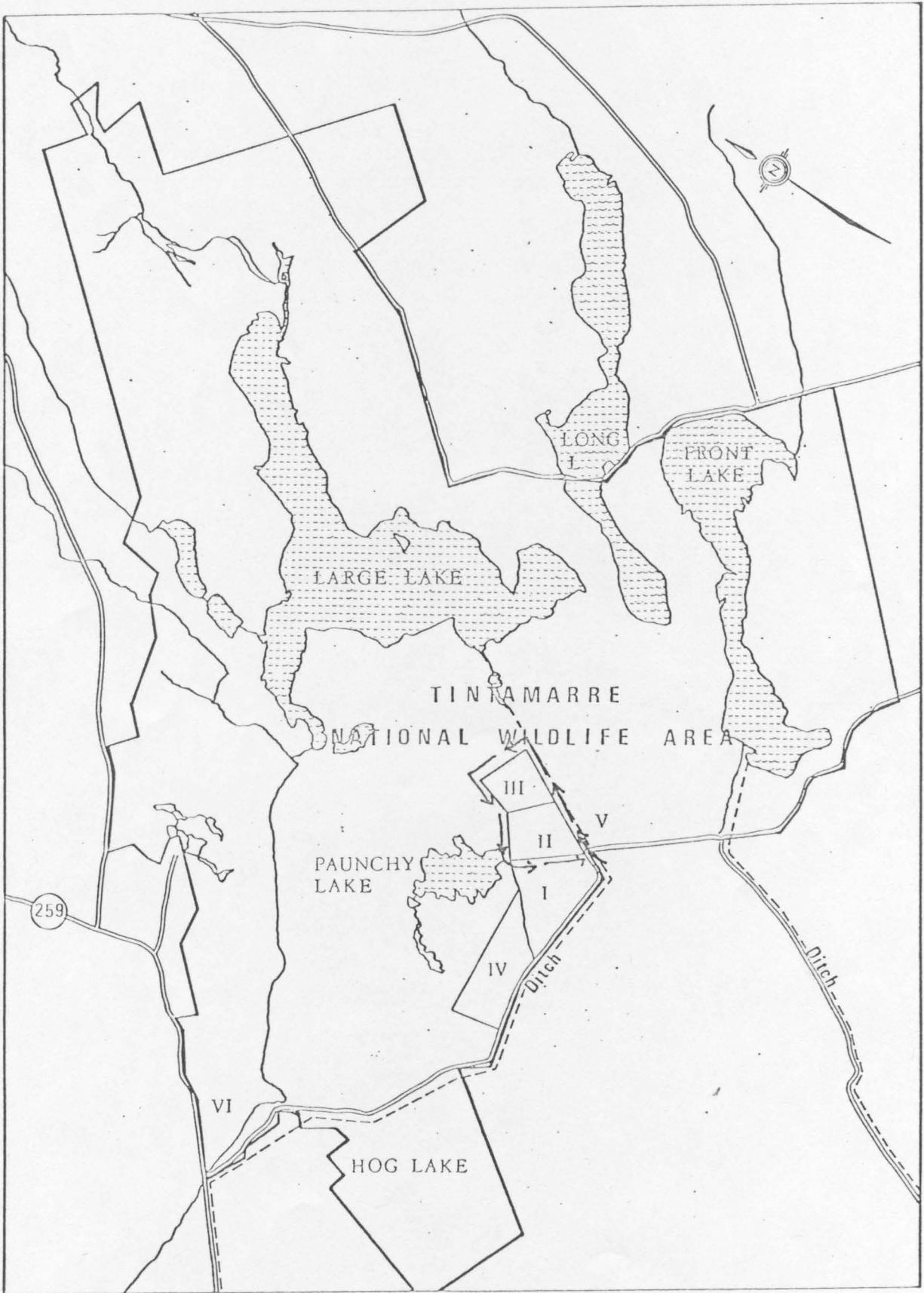


Figure 3. Showing location of Impoundments A and B at Shepody NWA and route & direction walked while doing bird counts



SCALE: 1:35,500

960 0 960 1920 2880 ft

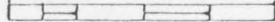


Fig.4. Showing impoundments 2 and 3 on Tintamarre NWA and the route and direction walked while doing bird counts.

Table I. Total numbers of Ducks and Geese observed on the Burgess
 Impoundment May 3, 1978 - August 24, 1978

Species	Date									
	May			June		July		August		
	3rd	17th	31st	13th	30th	12th	27th	9th	24th	
Black Duck	23	28	26	8	-	20	48	170	110	
Pintail	24	4	14	3	17	6	9	59	35	
Green-winged Teal	90	15	5	13	9	46	32	65	50	
Blue-winged Teal	6	2	3	3	-	-	-	155	115	
Canada Goose	33	-	-	1	1	1	-	-	-	
Red breasted Merganser	38	19	-	-	-	-	-	-	-	
American Wigeon	-	-	4	20	45	51	24	18	15	
Total	214	68	52	45	72	124	113	467	325	

Table II Total numbers of non-waterfowl bird species observed on the Burgess Impoundment May 3, 1978 - August 24, 1978.

Species	Date								
	May			June		July		August	
	3rd	17th	31st	13th	30th	12th	27th	9th	24th
Gr. Yellowlegs	1	2	2	1		11	29	3	
Herring Gull			22		2				
Spotted Sandpiper						2		1	
Lesser Yellowlegs						60			
Unid, peeps						75			
Cliff Swallow						1			
Tree Swallow						4			
Semipalmated Sandpiper							25	10	2
Gt. Blue Heron							1	2	
Common Snipe								1	1
Pectoral Sandpiper								1	
Least Sandpiper								1	1
Sharp-tailed Sparrow								4	
Belted Kingfisher									2
Total	1	2	24	1	2	153	55	23	6

In commenting on the data in Table I, it should first of all be pointed out that in this table, as with the remainder of the "total waterfowl observed" tables in this report, the total number by species includes all broods observed as well as all adult birds. Brood data for individual species is dealt with in the Appendices at the back of this report. Also, it should be noted that waterfowl bait-banding was carried out in this impoundment during the latter part of July and throughout August. The impoundment was first baited with cracked corn on July 27.

Without previous comparable data it is difficult to make much meaningful comment on the information presented in Table I. The sudden increase in numbers of waterfowl on the impoundment between July 27 and August 9 is likely partially due to the bait in the area. It would be interesting to see what happens on this impoundment during a year that the impoundment is not baited. The build-up of American Wigeon numbers to a peak of 51 on July 12 and the gradual tapering off of these numbers throughout the summer does not fit the pattern of the build-up and decline in numbers of other waterfowl species on the impoundment. There seems to be no immediate answers for this apparent discrepancy. A final curiosity was a lone Canada Goose that remained on the impoundment until July 12.

The only apparent outstanding feature of the data in the non-waterfowl table (Table II) is that so few non-waterfowl species or numbers were observed on impoundments up until after June 30th.

Wallace Bay NWA. Table III is a summary of the waterfowl species observed on Impoundment 1, May 2/78 - Sept. 20/78.

Table IV is a summary of non-waterfowl species observed on Impoundment #1, May 2/78 - Sept. 20/78.

Appendix B contains information on numbers of Black Duck§; Green-winged Teal and Blue-winged Teal observed at Impoundment #1, Wallace Bay NWA. The appendix also contains detailed information on waterfowl broods observed there.

Table III. Total number of waterfowl observed on Impoundment #1, Wallace Bay NWA, May 2/78 - Sept. 20/78

Species	Dates								
	May			June	July		August	September	
	2nd	16th	30th	27th	14th	26th	23rd	6th	20th
Blue-winged Teal	6	9	11	18	3	50	87	202	48
Ring-necked Duck	8	5	3	1	1	7	-	-	2
Green-winged Teal	9	6	8	17	39	30	-	1	6
Black Duck	4	8	7	30	15	48	211	18	5
Common Merganser	12								
American Coot	1					2		2	
Shoveler	-	2	1		1		1		
American Wigeon			2		5	13	2	5	
Wood Duck			3	1		2			
Pied-billed Grebe				14	23	13	2		4
Pintail				7					
Total*	40	30	36	68	87	165	303	228	65

* Numbers include young of the year plus the brood hen

Table IV. Total numbers of non-waterfowl species observed on Impoundment #1, Wallace Bay NWA - May 2/78 - Sept. 20/78

Species	Dates								
	May			June	July		August	September	
	2nd	16th	30th	27th	14th	26th	23rd	6th	20th
Red-winged Blackbird	23	51	27	11	5	6	1		
Sharp-shinned hawk	1								
Belted Kingfisher	1	1			5	5	1		1
Marsh Hawk	1						1	1	
Swamp Sparrow	2								
Yellow-rumped Warbler		1							
Common Grackle		5	3	5					
Common Snipe		2	1	2	3	9		3	
Greater Yellowlegs		1			5	13	1		
American Bittern		1	1	2	2		1		1
Spotted Sandpiper			3	2					
American Robin			1	2					
Yellow Warbler			1		1			1	
Killdeer			1	2	2	1			
Tree Swallow			2			5	4		
Common Tern				1	1	1			
Common Flicker					1				
Solitary Sandpiper					1				
Lesser Yellowlegs					1	1			
Short-billed Dowitcher					5				
Least Sandpiper					8				
Barn Swallow						2		106	
Common Crow							5		
Semipalmated Sandpiper							3		
Sora							1		
Bald Eagle							1		
TOTAL	28	62	40	27	40	43	19	111	2

Again, without comparable data from previous years, it is difficult to make meaningful comment on the information presented in Table III. The seemingly high number (303) of waterfowl on August 23 is largely explained by a single flock of Black Ducks (125) present in the impoundment on that date.

There appears to be nothing worthy of comment in Table IV except that the high number of non-waterfowl species (26) comes as somewhat of a surprise.

Shepody NWA. Table V and Table VI are summaries of waterfowl species observed on Impoundments A and B respectively for the period May 5, 1978 to September 22, 1978.

Information on non-waterfowl species observed on Impoundments A and B for the period May 5, 1978 to September 22, 1978 is contained in Table VII and Table VIII respectively.

Appendix C contains information on numbers of Black Ducks, Blue-winged Teal and Green-winged Teal observed on Impoundments A and B during the period May 5, 1978 to September 22, 1978. That appendix also contains waterfowl brood data for both impoundments.

Table V. Total numbers of waterfowl observed on Impoundment A, Shepody NWA -
May 5, 1978 to September 22, 1978

Species	Dates									
	May		June			July		August	September	
	5th	19th	1st	16th	29th	13th	28th	25th	8th	22nd
Black duck	4	1	2	-	1	-	4	46	11	29
Blue-winged teal	23	18	2	2	1	7	-	122	242	63
Shoveler	1	-	-	-	-	-	-			
Green-winged teal	5	-	-	-	-	-	-	23		
Ring-necked duck	6	2	-	-	-	9	30	21	2	
Wood duck	1	-	-	1	-	-	-	3	12	12
Pied-billed grebe	-	-	-	-	4	-	1	7	2	1
Pintail								2	1	
Mallard										3
TOTAL	40	21	4	3	6	16	35	224	270	108

Table VI. Total numbers of waterfowl observed on Impoundment B, Shepody NWA.
May 5, 1978 to September 22, 1978

Species	Dates									
	May		June			July		August	September	
	5th	19th	1st	16th	29th	13th	28th	25th	8th	22nd
Blue-winged teal	21	19	35	36	26	25	39	150	75	62
Green-winged teal	8	-	6	9	49	24	62	18	42	-
Black duck	13	28	30	35	58	43	101	19	11	29
Greater scaup	2	2	-	-	-	-	-	-	-	-
Pied-billed grebe	1	-	-	-	1	5	1	1	3	1
Shoveler	1	-	1	-	1	-	1	-	-	-
Ring-necked duck	-	2	1	1	3	30	27	12	-	-
Pintail	-	-	2	1	-	-	-	-	-	-
American wigeon	-	-	1	-	-	-	-	-	-	-
Wood duck	-	-		1	1	3	1	-	1	12
Mallard									2	3
TOTAL	46	51	76	83	139	130	232	200	134	107

Table VII. Total numbers of non-waterfowl species observed on Impoundment A, Shepody NWA - May 5, 1978 to September 22, 1978

Species	Dates									
	May		June			July		August	September	
	5th	19th	1st	16th	29th	13th	28th	25th	8th	22nd
Red-winged Blackbird	3	6	5	7	5	10	350	-	500	300
Louisiana heron	1									
Belted kingfisher	1									
Common crow	2									
Yellow-rumped warbler	1									
Woodcock	1									
Greater yellowlegs		1								
Tree swallow		3	10							
Bank swallow			34	1			50			
American bittern					1		25	2	2	
Short-billed dowitcher							35			
Semipalmated sandpiper							25			
Common grackle							15			
Eastern kingbird							1			
Great blue heron								2	1	
Marsh hawk									1	
Crow										1
TOTAL	9	10	49	8	6	10	503	4	505	300

Table VIII. Total numbers of non-waterfowl species observed on Impoundment B, Shepody
 NWA - May 5, 1978 to September 22, 1978

Species	Dates									
	May		June			July		August	September	
	5th	19th	1st	16th	29th	13th	28th	25th	8th	22nd
Savannah sparrow	1									
American bittern	1			1	2			7	2	
Red-winged Blackbird	3	6	12	8						
Rusty blackbird	2M									
Common snipe	1		1		6	3	2	2		
Sparrow hawk	1									
Barn swallow		6	5							
Bobolink		1								
Rose-breasted grosbeak		1								
Parula warbler		1								
Tree swallow			73							
Bank swallow			300				10			
Sharp-shinned hawk			1							
Spotted sandpiper				1		1				
Common grackle				2						
Belted kingfisher					1					
Greater yellowlegs						15		1		3
Killdeer						1				
Short-billed dowitcher						15	109	3	10	
Great blue heron							2	2		
Nighthawk								1		
Lesser yellowlegs										1
TOTAL	9	15	392	12	9	35	123	16	12	4

There is a considerable difference between the numbers of waterfowl observed in impoundment A (Table V) and impoundment B (Table VI) before July 28. The sudden increase in the numbers of ducks using impoundment A during late July and onward is no doubt due to the excellent wild rice crop in that impoundment. From the brood data in Appendices C7 and C8 it is obvious that brood production was far higher in impoundment B than in impoundment A during 1978. On July 28, for example, only three broods were observed on impoundment A, whereas 16 broods were observed on impoundment B. The most obvious factors contributing to this difference were:

- prior to the emergence of wild rice in early August, much of impoundment A was open water and thus had little brood cover whereas impoundment B contained about a 50-50 water-vegetation interspersion ratio throughout the early and mid-summer period.

- the average depth of water in impoundment A appeared to be somewhat greater than the average depth of water in impoundment B. This greater depth might lead to less desirable invertebrate production than would the more shallow water in impoundment B.

- impoundment A was first flooded in 1975, one year before impoundment B which was flooded in 1976.

Tintamarre NWA. Tables IX and X contain waterfowl observations from Impoundments 2 and 3 respectively for the period May 1, 1978 to October 10, 1978.

Information on non-waterfowl species observed during the same period within impoundment 2 is presented in Table XI and that for impoundment 3 in Table XII.

Appendix D contains information on numbers of Black duck, Blue-winged teal, Green-winged teal and Ring-necked ducks observed on impoundments 2 and 3 during the period May 1, 1978 to October 10, 1978.

Table IX. Total numbers of waterfowl observed on impoundment 2, Tintamarre NWA - May 1, 1978 to October 10, 1978

Species	Dates									
	May			June		July		August	Sept.	Oct.
	1st	15th	29th	12th	26th	10th	26th	21st	18th	10th
Ring-necked duck	24	-	7	7	5	25	10	2	-	-
Canada goose	1	1	-						-	-
Green-winged teal	26		6	1	20	8	6		-	2
Blue-winged teal	8	5	6	1	15	4	17	64	2	-
Pintail	2	1	1	4	12	40	57	13	-	-
Shoveler		2	3	4	1			2	-	-
American wigeon		4	2	2					-	-
Black duck		1	3	4	4		19	19	-	2
Wood duck					1		1	1	-	-
Pied-billed grebe						1			-	-
TOTAL	61	14	28	23	58	78	110	101	2	4

Table X. Total numbers of waterfowl observed on impoundment 3, Tintamarre NWA, May 1, 1978 to October 10, 1978

Species	Dates									
	May			June		July		August	Sept.	Oct.
	1st	15th	29th	12th	26th	10th	26th	21st	18th	10th
Pintail	4		4	3		10	31			-
Black duck	4		1	4	11	5		9	2	-
Green-winged teal	19	9	10	6		13	6			-
Blue-winged teal	4	7	4	11	19	38	70	23	17	-
Ring-necked duck		2			3				1	-
American wigeon			1	1	2	12	3	1		-
TOTAL	35	18	20	25	35	78	110	33	20	Nil

Table XI. Total numbers of non-waterfowl species observed on impoundment 2, Tintamarre NWA - May 1, 1978 to October 10, 1978

Species	Dates									
	May			June		July		August	Sept.	Oct.
	1st	15th	29th	12th	26th	10th	26th	21st	18th	10th
Red-winged blackbird	3	5	12	7	15	6	1			
Barn swallow		60					1	1		
Tree swallow		70								
Common grackle		2								
Yellow-rumped warbler		1								
Greater yellowlegs						2	1			
Common snipe			1	3		1	4			
Sora								1		
Least sandpiper			7							
American bittern					4		1	1		
Pied-billed grebe						1				
Belted kingfisher							1			
Marsh hawk								1	1	
Short-billed dowitcher								2		
TOTAL	3	138	20	10	19	10	9	6	1	Nil

Table XII. Total numbers of non-waterfowl species observed on impoundment 3, Tintamarre NWA - May 1, 1978 to October 10, 1978

Species	Dates									
	May			June		July		August	Sept.	Oct.
	1st	15th	29th	12th	26th	10th	26th	21st	18th	10th
Red-winged blackbird	1	6	6	5	14	2	2	1		
Spotted sandpiper		1	1		1	1				
Tree swallow			3	1						
Killdeer			1		2					
Greater yellowlegs			1							
Common snipe					1	1				
Sora					1		1			
Common crow								1		
American robin								1		
Yellowthroat								1		
Great blue heron									1	
TOTAL	1	7	12	6	19	4	3	4	1	

Again, without previous data for comparison, it is difficult to comment extensively. The sharp drop in numbers shown in Tables IX and X between August 21st and September 8th is no doubt in part due to the fact that bait-trapping was being carried out on three adjacent impoundments, #1, #4, and #5.

I did not expect high brood numbers as shown in Appendices D8 and D9. That may be partially attributed to the cookie cutter working in the Paunchy Lake basin at that time which might have concentrated broods in the impoundments.

Recommendation

Our initial objectives of attempting to correlate intensity of waterfowl use with impoundment age and identifying non-waterfowl bird species within impoundments can, I believe, be met by conducting counts on individual impoundments at two or even three year intervals. Avifaunal counts should be continued in 1979 but on different impoundments on each of the National Wildlife Areas surveyed in 1978.

Avifaunal counts should be continued in 1979 as follows:

- (1) Shepody NWA - Impoundment C
- (2) Tintamarre NWA - Impoundment 6
- (3) John Lusby NWA - Impoundment 1
- (4) Wallace Bay NWA - Impoundment 2

More comprehensive records of water levels, water-vegetation interspersions, etc., should also be kept during the 1979 counts.

APPENDIX A

John Lusby N.W.A.

May 3/78 - August 24/78

- Appendix A1 - Numbers of Black Ducks observed on the Burgess Impoundment
- Appendix A2 - Numbers of Green-winged Teal observed on the Burgess Impoundment
- Appendix A3 - Numbers of Blue-winged Teal observed on the Burgess Impoundment
- Appendix A4 - Numbers of American Wigeon observed on the Burgess Impoundment
- Appendix A5 - Waterfowl brood data from the Burgess Impoundment

Note: Total numbers in Appendices A1-A4 include numbers of young and the brood females for each brood.

Appendix A1 - Black Duck

Date	Pairs	Singles	Groups	No. of Broods	Total
May 3	11	1	-	-	23
May 17	3	2	20	-	28
May 31	3	-	20	-	26
June 13	2	1	3	-	8
June 30	-	-	-	-	-
July 12	-	4	17	-	21
July 27	1	-	46	2*	68
August 9	-	-	170	-	170
August 24	-	-	110	-	110

*Size and age of broods observed were 8-IIa and 10 III+. Both were observed on July 27th.

Appendix A2 - Green-winged Teal

Date	Pairs	Singles	Groups	No. of Broods	Total
May 3	45	-	-	-	90
May 17	4	-	7	-	15
May 31	-	-	5	-	5
June 13	2	1	8	-	13
June 30	-	-	9	-	9
July 12	-	2	44	1*	55
July 27	-	-	32	1	40 baiting commenced
August 9	-	-	65	-	65
August 24	-	-	50	-	50

*Size and age of broods observed were 8-Ib and 7IIb observed on July 12 and July 27 respectively.

Appendix A3 - Blue-winged Teal

Date	Pairs	Singles	Groups	Broods	Total
May 3	3	-	-	-	6
May 17	1	-	-	-	2
May 31	1	1	-	-	3
June 13	-	1	2	-	3
June 30	-	-	-	-	-
July 12	-	-	-	-	-
July 27	-	-	-	-	-
Aug. 9	-	-	155	-	155
Aug. 24	-	-	115	-	115

Appendix A4 - American Wigeon

Date	Pairs	Singles	Groups	Broods	Total
May 3	-	-	-	-	-
May 17	-	-	-	-	-
May 31	2	-	-	-	4
June 13	4	-	12	-	16
June 30	-	-	45	-	45
July 12	-	-	51	-	51
July 27	-	-	24	-	24
Aug. 9	-	-	18	-	18
Aug. 24	-	-	15	-	15

Appendix A5 - Age and size of waterfowl broods observed on the Burgess Impoundment - May 3/78 - Aug. 24/78

Date	Black Duck	G.w. Teal	Total no. of broods
July 12		8 Ib	1
July 27	8IIa, 10 III+	7 IIb	3
Total no. of broods	2	2	4

APPENDIX B

Wallace Bay N.W.A.

May 2/78 - Sept. 20/78

- Appendix B1 - Numbers of Black Ducks observed as pairs, singles, groups and broods on Impoundment 1
- Appendix B2 - Numbers of Green-winged Teal observed as pairs, singles, groups and broods on Impoundment 1
- Appendix B3 - Numbers of Blue-winged Teal observed as pairs, singles, groups and broods on Impoundment 1
- Appendix B4 - Age and size of waterfowl broods observed on Impoundment 1

Appendix B1 -- Black Duck.

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 2	1	2	-	-	4
May 16	1	2	4	-	8
May 30	3	1	-	-	7
June 14	-	-	-	-	-
June 27	-	4	-	4	30
July 14	1	3	10	-	14
July 26	2	4	-	5	48
August 23	1	1	208	-	211
September 6	2	4	19	-	27
September 20	-	2	3	-	5

Appendix B2 -- Green-winged Teal.

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 2	2	1	4	-	9
May 16	2	2	-	-	6
May 30	2	1	3	-	8
June 14	-	-	2	-	2
June 27	2	4	8	-	16
July 14	5	2	27	-	39
July 26	3	3	19	1	30
August 23	-	-	-	-	-
September 6	1	-	-	-	2
September 20	1	4	-	-	6

Appendix B3 - Blue-winged Teal

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 2	3	-	-	-	6
May 16	2	1	4	-	9
May 30	3	2	3	-	11
June 14	-	2	-	-	2
June 27	3	2	7	-	15
July 14	1	4	3	4	50
July 26	3	5	5	4	50
August 23	1	3	33	7	87
September 6	1	1	187	2	202
September 20	2	1	42	-	47

*Numbers in "No. of Brood" column are actual numbers of broods observed. Numbers in "Total" column include total numbers of young as well as the brood female.

Appendix B4 - Waterfowl broods

Species	Dates				
	June 27	July 14	July 26	Aug. 23	Sept. 6
Black Duck	8 Ia, 11 IIa 4IIa		4III, 12Ib, 6Ic 9 Ic, 4 IIC		
Pintail	6 Ia				
B.w. Teal		9Ic, 8IIa 12IIa, 8Ib	2Ib, 8Ic 9IIC, 11 Ib	5IIb, 5IIB, 4III, 6III 7IIB, 7Ia, 6 IIB, 5IIa	
Pied-billed grebes		5, 4*			
G.w. Teal			1 Ib		
American Wigeon			10 IIa		
Ringed-neck Duck			6 Ia		
Total number of broods	4	6*	12	6	2

* Grebe broods are not subject to same aging technique as duck species

Appendix C

Shepody N.W.A.

May 5, 1978 - September 22, 1978

- Appendix C1 - Numbers of Black ducks observed as pairs, singles, groups and broods on Impoundment A
- Appendix C2 - Numbers of Black ducks observed as pairs, singles, groups and broods on Impoundment B
- Appendix C3 - Numbers of Blue-winged teal observed as pairs, singles, groups and broods on Impoundment A
- Appendix C4 - Numbers of Blue-winged teal observed as pairs, singles, groups and broods on Impoundment B
- Appendix C5 - Numbers of Green-winged teal observed as pairs, singles, groups and broods on Impoundment A
- Appendix C6 - Numbers of Green-winged teal observed as pairs, singles, groups and broods on Impoundment B
- Appendix C7 - Age and size of waterfowl broods observed on Impoundment A
- Appendix C8 - Age and size of waterfowl broods observed on Impoundment B

Appendix C1 - Black Ducks, Impoundment A

Date	Pairs	Singles	Groups	No. of Broods	Total
May 5	-	2	21	-	23
May 19	2	1	3	-	8
June 1	-	2	-	-	2
June 16	-	2	-	-	2
June 29	-	1	-	-	1
July 13	-	-	-	-	-
July 28					
August 25	3	4	102	-	112
September 8	-	2	202	-	204
September 22	-	-	62	-	62

Appendix C2 - Black Ducks - Impoundment B

Date	Pairs	Singles	Groups	No. of Broods	Total
May 5	6	-	7	-	19
May 19	-	1	-	-	1
June 1	5	1	19	0	30
June 16	5	3	22	-	35
June 29	3	1	16	5	58
July 13	-	2	26	2	43
July 28	4	4	23	9	101
August 25	3	3	10	-	19
September 8	-	2	9	-	11
September 22	-	1	12	-	13

Appendix C3 - Blue-winged teal, Impoundment A

Date	Pairs	Singles	Groups	No. of Broods	Total
May 5	-	2	21	-	23
May 19	2	1	3	-	8
June 1	-	2	-	-	2
June 16	-	2	-	-	2
June 29	-	1	-	-	1
July 13	-	-	-	1	7
July 28					
August 25	3	4	102	-	112
September 8	-	2	202	-	204
September 22	-	-	62	-	62

Appendix C4 - Blue-winged teal, Impoundment B

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 5	8	2	3	-	21
May 19	7	5	-	-	19
June 1	5	5	20	-	35
June 16	3	7	23	-	39
June 29	1	2	14	1	26
July 13	1	1	-	2	26
July 28	-	1	12	-	39
August 25	1	2	148	-	152
September 8	-	2	73	-	75
September 22	-	-	89	-	89

Appendix C5 - Green-winged Teal, Impoundment A

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 5	1	3	-	-	5
May 19	-	-	-	-	-
June 1	-	-	-	-	-
June 16	-	-	-	-	-
June 29	-	-	-	-	-
June 13	-	1	15	1	24
July 28	-	-	-	-	-
August 25	3	1	16	-	23
September 8	-	-	-	-	-
September 22	-	-	-	-	-

Appendix C6 - Green-winged Teal, Impoundment B

Date	Pairs	Singles	Groups	No. of Broods*	Total
May 5	4	-	-	-	8
May 19	-	-	-	-	-
June 1	1	4	-	-	4
June 16	-	3	-	-	3
June 29	-	4	20	2	49
July 13	-	1	15	1	24
July 28	3	2	37	2	62
August 25	-	1	17	-	18
September 8	-	1	42	-	43
September 22	-	-	16	-	16

*Number of broods only. But total young and brood hens included in total numbers of birds in last column of each table.

Appendix C7 - Waterfowl Broods - Impoundment A

Species	Dates		
	June 29	July 13	July 28
Blue-winged teal		6Ib	
Ring-necked Duck		6Ib	6Ic, 10IIb, 6Ic
Total Broods		2	2
Total No. of ducks (young and brood hens)		14	25

Appendix C8 - Waterfowl Broods - Impoundment B

Species	Dates		
	June 29	July 13	July 28
Green-winged teal	10Ia, 11Ib	7Ic	7Ic, 8IIa
Blue-winged teal	7Ia	8IIa, 13IIa	12IIb, 7IIc, 4III
Black duck	6Ib, 4Ib, 8IIc 6IIc, 6Ia	6IIb, 7IIc	8Ia, 10III, 8III, 2III, 6IIb 2IIb, 8IIa, 7IIc, 6IIa
Ring-necked duck		11Ib, 16Ib	10Ic, 8IIa
Total Broods	7	7	16
Total No. of ducks (young and brood hens)	66	75	129

APPENDIX D

Tintamarre N.W.A.

May 1/78 - Oct. 10/78

- Appendix D1 - Numbers of black ducks observed as pairs, singles, groups and broods on Impoundment #2.
- Appendix D2 - Numbers of blue-winged teal observed as pairs, singles, groups and broods on Impoundment #2.
- Appendix D3 - Numbers of green-winged teal observed as pairs, singles, groups and broods on Impoundment #2.
- Appendix D4 - Number of ring-necked ducks observed as pairs, singles, groups and broods on Impoundment #2.
- Appendix D5 - Numbers of black duck observed as pairs, singles, groups and broods on Impoundment #3.
- Appendix D6 - Numbers of blue-winged teal observed as pairs, singles, groups and broods on Impoundment #3.
- Appendix D7 - Numbers of green-winged teal observed as pairs, singles, groups and broods on Impoundment #3.
- Appendix D8 - Age and size of waterfowl broods observed on Impoundment #2.
- Appendix D9 - Age and size of waterfowl broods observed on Impoundment #3.

Appendix D1 - Black Duck - Impoundment #2

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	-	-	-	-	-
May 15	-	1	-	-	1
May 29	1	1	-	-	3
June 12	-	-	-	1	4
June 26	-	-	4	-	4
July 10	-	-	-	-	-
July 26	1	2	-	2	19
August 21	-	3	13	-	18
September 18	-	-	-	-	-
October 10	1	-	-	-	2

Appendix D2 - Blue-winged Teal - Impoundment #2

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	4	-	-	-	8
May 15	2	1	-	-	5
May 29	-	2	4	-	6
June 12	-	1	-	-	1
June 26	-	-	14	-	14
July 10	-	-	4	-	4
July 26	-	2	5	2	17
August 21	-	6	58	-	64
September 18	1	-	-	-	2
October 10	-	-	-	-	-

Appendix D3 - Green-winged Teal - Impoundment #2

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	1	-	23	-	25
May 15	-	-	-	-	-
May 29	3	-	-	-	6
June 12	-	1	-	-	1
June 26	1	-	18	-	20
July 10	-	1	-	1	8
July 26	-	1	5	-	6
August 21	-	-	-	-	-
September 18	-	-	-	-	-
October 10	1	-	-	-	2

Appendix D4 - Ring-necked Duck - Impoundment #2

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	12	-	-	-	24
May 15	-	-	-	-	-
May 29	1	-	3	-	4
June 12	-	2	5	-	7
June 26	-	1	2	1	6
July 10	-	-	16	1	25
July 26	-	1	-	1	10
August 21	-	-	2	-	2
September 18	-	-	-	-	-
October 10	-	-	-	-	-

Appendix D5 - Black Ducks - Impoundment #3

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	2	-	-	-	4
May 15	-	-	-	-	-
May 29	-	1	-	-	1
June 12	-	1	-	-	1
June 26	-	1	-	1	11
July 10	-	1	-	1	5
July 26	1	1	-	1	9
August 21	-	2	-	-	2
September 18	-	2	-	-	2
October 10	-	-	-	-	-

Appendix D6 - Blue-winged Teal - Impoundment #3

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	2	-	-	-	4
May 15	3	1	-	-	7
May 29	2	-	-	-	4
June 12	1	6	3	-	11
June 26	-	1	6	1	19
July 10	-	2	2	3	38
July 26	1	-	2	7	72
August 21	-	6	17	-	23
September 18	1	-	15	-	17
October 10	-	-	-	-	-

*Numbers in "No. of broods" column are actual numbers of broods observed. Numbers in "Total" column include total numbers of young as well as the brood females.

Appendix D7 - Green-winged Teal - Impoundment #3

Date	Pairs	Singles	Groups	No. of Broods*	Total*
May 1	5	-	9	-	19
May 15	1	1	6	-	10
May 29	1	-	8	-	10
June 12	-	2	4	-	6
June 26	-	-	-	-	-
July 10	-	1	3	1	13
July 26	-	2	-	1	5
August 21	-	-	-	-	-
September 18	-	-	-	-	-
October 10	1	-	-	-	2

Appendix D8 - Broods Impoundment #2

Species	Dates			
	June 12	June 26	July 10	July 26
Black duck	3Ia			4Ic, 9Ib
Ring-necked duck		2Ib	8Ib	8Ic
Pintail			16Ic, 13Ib	9III+
Green-winged teal			6IIa	
Blue-winged teal				5Ia, 3Ic
Total nos. of broods		1	4	6
Total nos. of young + brood hens		3	47	44

Appendix D9 - Broods Impoundment #3 ✓

Species	Dates		
	June 26	July 10	July 26
Blue-winged Teal	11Ib	7Ic, 13Ia; 11Ib	11III, 10IIc, 11IIa, 5IIb, 4IIc, 7III, 11III
Black duck	9Ib	3IIa	5III
Pintail		9Ia	3III+, 8Ic, 7Ic
Green-winged Teal		8Ib	2Ib
American Wigeon		11Ib	2IIb
Total nos. of broods	2	7	13
Total nos. of young + brood hens	22	69	99

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October, 1978.--Sackville, NB: CWS, 1979.

Hounsell, R G