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AN ATTEMPT TO EVALUATE WATERFOWL HUNTING CRIPPLING LOSS
ON THE WEST SIDE OF NETLEY MARSH IN SOUTHERN MANITOBA - 1969

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This project was made possible through the
co-operative efforts of individuals from the
Canadian Wildlife Service, Manitoba Game
Branch, Ducks Unlimited (Canada), and the
Manitoba Gun Dog Association.

The impetus for this project developed from a request made by the Manitoba Gun Dog Association to the Manitoba Game Branch and the Canadian Wildlife Service for permission to use dogs to recover crippled birds in the Netley Marsh on the first Sunday following the opening of hunting. Government permission is necessary because under Section 15, Subsection (1) of the Wildlife Act of Manitoba, Sunday hunting is restricted, and under Section 11, Subsection (3) of the Migratory Bird Convention Act, corporations organized for the purpose of training dogs are restricted to possessing no more than 125 carcasses of lawfully killed migratory game birds. However, because of the value of having the co-operation of the Manitoba Gun Dog Association to attempt an experimental recovery of crippled waterfowl, it was agreed by both Government Agencies to provide an exemption from these laws for the period in which the experiment was run.

Unfortunately, the development of this co-operative opportunity became apparent only in the latter part of the week preceding the opening of the waterfowl hunting season. This shortage of lead time precluded organization of an intensive experiment of the type necessary for monitoring all salient factors related to the numbers of birds crippled by hunters in a given area. However, it was decided that the west side of Netley Marsh north of Petersfield would be surveyed as intensively as possible so as to provide background information and experience for future efforts. The objective, therefore, was to conduct a preliminary investigation into the use of trained dogs for determining the extent of waterfowl crippling loss in a hunted marsh area following a six day opening period of the regular hunting season.

Generally crippling loss refers to animals which are killed or injured by hunters and lost or abandoned. However, an indeterminate number

of animals making up part of the crippling loss are subsequently found or shot by other hunters and so appear in the bag (Mosby, 1963). Crippling loss, as used here, consists only of those waterfowl species which are shot and lost or abandoned and do not appear in the hunters bag.

A knowledge of the extent of crippling loss is requisite to managing any game species since it is part of the populations total mortality and therefore a part of its productivity or "yield". It is generally considered that waterfowl crippling losses are higher than in any other class of game, and may often approach or exceed the retrieved kill (Leopold, 1933). Leopold (1933) referring to data he collected as a hunter in the Rio Grande Valley of New Mexico, noted that the average crippling loss for ducks was 13 percent between the years 1919 and 1923. He adds that this percentage is probably as low as is ever attained in that region due to his use of a good retriever. Wing (1965) states that the crippling loss varies between 10 and 75 percent of the total bag depending upon the location and hunter. Seven cripples for every ten birds shot or 41.2 percent is given as a reasonable estimate (Wing, 1965). Henny (1967) contends that "crippling loss may be determined from the literature on the species involved, from records of hunter performance of the U.S. Fish and Wildlife Service at the Migratory Bird Populations Station, Laurel, Maryland, or from field observation". However, much of this information is based on data gathered on other aspects of waterfowl populations and involves indirect determination of crippling loss by making assumptions which greatly limit its accuracy. Field observations are of considerable value for determining crippling loss but this type of data may only be representative of the area and hunting activity from which it was obtained.

There is very little published field observation data which has been gathered in Canada.

Methods:-

Originally it was intended that a number of activities would be attempted to facilitate a comprehensive estimate of crippling loss for separate sections of the west side of Netley Marsh. These activities included:

- 1) Dividing the west shore of Netley Lake into zones (i.e. 7 zones - using section lines commencing 1/2 mile north of Petersfield -- see Diagram 1).
- 2) Conducting daily aerial surveys to record the numbers of hunters vehicles per zone.
- 3) Conducting a number of spy blinds each day to observe hunters in different zones to determine the fate of crippled or dead birds and the nature of the bag.
- 4) Running daily check stations to determine by zone the average number of birds bagged per hunter, the average number of hunters per vehicle, the species composition of the bag, and the length of time that hunters spent in the field hunting.
- 5) Conducting a recovery of crippled birds by zone using trained dog retrievers.

This type of information would have facilitated a comparison of hunting pressure, hunter kill and crippling loss. It would also have facilitated a comparative quantitative assessment of the species, age and sex of the hunter, kill and crippling loss.

Only a small portion of this activity was attempted due to the limited number of professional co-operators available on such short notice

and because of the limited experience in the Netley Marsh area on the part of those who did offer their services. However, some information was gathered through making an aerial survey, running check stations and by using trained dog retrievers to recover crippled birds.

The aerial survey was conducted at 4:30 P.M. on September 29, 1969 using a Cessna 172 and flying at 1000 feet and it took one hour. Two counts of hunter vehicles were made by making two passes over the marsh area. All vehicles within $1\frac{1}{2}$ miles of the marsh were counted and assigned to the nearest zone except those near buildings which were judged to be owned by permanent residents of the area. Vehicles parked on the section lines bounding two zones were allotted evenly to each zone.

The check stations were operated between 3:30 P.M. and 9:30 P.M. on October 4, 1969, north of Petersfield (see Diagram 1 for locations). Hunters were asked to indicate the number of hours hunted and by referring to a small map whether or not they hunted inside or outside the study area. The number of hunters and the total number of waterfowl identified as to species, age and sex were recorded for each vehicle checked.

On October 5, 1969, between 12:00 P.M. and 5:30 P.M., sixteen trained retrievers and their handlers covered the marsh area within the zone to which they were assigned (i.e. two or three dogs per zone). All birds were retrieved and brought in for complete identification as to species, age and sex, except those which were left in the field because of their advanced state of decomposition.

Results:-

The aerial survey of September 29, 1969 was considered to be of limited value in determining the amount and distribution of hunting pressure.

While it was quite easy to get a good count of the vehicles in the area at the time of the survey, much was unknown about it's significance with respect to hunting. The following limitations were recognized:

- 1) The distribution of vehicles appeared dependent on access and probably did not represent hunter distribution.
- 2) There was a turnover of vehicles and hunters through the day which could not be accounted for by a single aerial survey or for that matter, any type of aerial coverage.
- 3) There were a number of small hunting lodges in the area which were not distinguishable from resident homes. This bias would tend to promote a low count of hunter vehicles.
- 4) Conservation officers familiar with the area advised that many hunters with lodges traditionally stay over the full weekend and do not necessarily hunt during all of that time.
- 5) Many hunters use the access available in the study area to launch boats but hunt elsewhere in the marsh.

The results of the aerial count of hunter vehicles are given in Table 1. Only one set of figures are given since both counts yielded the same results. Because of the limited use of the aerial survey for this particular marsh, additional surveys were not made, but local conservation officers indicated that there were between 25 and 200 hunter vehicles per day between the opening of the season and the day of the recovery. September 29th (opening day) and October 4th (Saturday) were reportedly the days of greatest hunter use. However, no attempt is made here to develop an estimate of total hunting pressure in light of the limited amount and quality of data available. Any attempt to do so would be highly speculative.

The species composition data from the bag checks made on November 4th and the dog recovery of cripples made on November 5th at Netley Marsh are given in Table 2. The bag check data are grouped further as to the area of hunting (i.e. inside or outside study area). While these data are interesting, they are probably of limited accuracy due to one or more of the following:

- 1) Bag checks should have been run all day on each day of hunting concurrent with field observations of hunters to fully evaluate the nature of the bag. The present data represent an unknown portion of the actual kill.
- 2) The selectivity of hunters either voluntary or involuntary when retrieving dead or wounded waterfowl is unknown but one might expect the large and better known species to be retrieved more frequently.
- 3) The selectivity of dogs when retrieving waterfowl is unknown. It is likely that dog recovery is further complicated by the possibility of different species having different escape capacities due to differing behaviour, scent, colouration, size, or locations when felled.
- 4) The relative selectivities of predators and scavengers for crippled waterfowl are unknown, as to, are the relative rates of decomposition for various waterfowl under varying field conditions. Both these factors have an unknown effect on the ratio at which birds are retrieved, particularly by dogs.

However, it is interesting to note two major points regarding the comparison of species composition of the hunters bags and the dog recovery. In all cases, mallards make up greater than 40 percent of the birds identified and the combined bag for hunters inside and outside the study area has the same high proportion of mallards as were recovered by the dogs. Secondly, bag checks of hunters inside and outside the study area yielded a greater variety of "lesser" species particularly diving ducks than did the dog recovery.

However, in light of the recognized limitations and comparability of these techniques for indicating either the bag or crippling loss it is doubtful one can derive a meaningful interpretation of these and other less obvious differences and therefore, these data are not discussed further.

As an aid to those persons receiving this report, particularly in case they wish to elaborate the results further, the age and sex ratios for ducks identified from bag checks and dog recoveries are given in Table 3. These data are not discussed here for similar reasons as indicated regarding data presented in Table 2.

A comparison of bag check data from the Delta, Libau and Netley Marshes is given in Table 4 to facilitate some understanding of the effort and success of hunters in each area for the dates shown. It is believed that the data for the Netley and Libau Marshes are relatively comparative since the methods and the distribution of check stations involved are conducive to a representative sample for each. The data from the Petersfield (Netley Marsh) check stations may not have afforded a representative sample, but it is believed that methods were similar to those used at the other check stations.

If these data are comparative, it is clear that hunters in the Netley-Libau Marsh have a lower success (i.e. birds/hunter) and extend more effort (i.e. hours/bird) than do hunters in the Delta Marsh. Moreover, the success and effort per hunter would appear lower for hunters of the Netley area than those of the Libau area of the Netley-Libau Marshes. It is believed that the apparent decline of hunter success and increase in effort during the first week of hunting reflects most the difference in weather conditions on those days that the checks were made. Prior to October 4th, there were several days of strong northwest winds with rain coincident to many birds leaving the large marsh areas. This weather condition was particularly detrimental to the hunting opportunity at the Netley-Libau Marshes where near record inundation resulted, causing access problems and an apparent decline in waterfowl populations.

Data on the condition and type of injury noted for birds recovered by dogs on October 5th are given in Table 5. Some of the limitations that may be inherent in this type of data have already been described (page 6). However, it is believed that the data given in Table 5 may indicate that waterfowl with wing injuries are more apt to remain alive for an indeterminate period than are those with other types of injury. Further research is considered necessary before a definite conclusion can be made on this aspect.

Conclusions:-

I believe that there is no way in which the data gathered during the course of this experiment can be used to predict crippling loss. The low credibility of the techniques used and the lack of comparativeness of data resulting from them are considered to be the main limiting factors.

The real value of this effort was that experience was gained regarding various techniques and interpretations.

In light of this experience the following recommendations are made for future experiments where dogs are used to evaluate crippling loss.

- 1) Choose a small marsh area which could be monitored effectively for hunter use by both air and ground checks. In southern Manitoba examples of such areas are St. Andrews Bog, Grants Lake, and medium sized potholes in till areas receiving regular hunter use.
- 2) Conduct hunter observations on each day of the experimental period.
- 3) Reduce the experimental period to as few days as possible (preferably one day of hunting) to reduce decomposition, depredation and scavenger losses of crippled birds.

The problem of bias associated with the recovery of various species of waterfowl by dogs requires evaluation. Perhaps an estimate of the extent of this bias can be derived from future experiments where hunter observation and dog recovery data can be compared in a quantitative and qualitative manner.

DIAGRAM 1

LAKE WINNIPEG

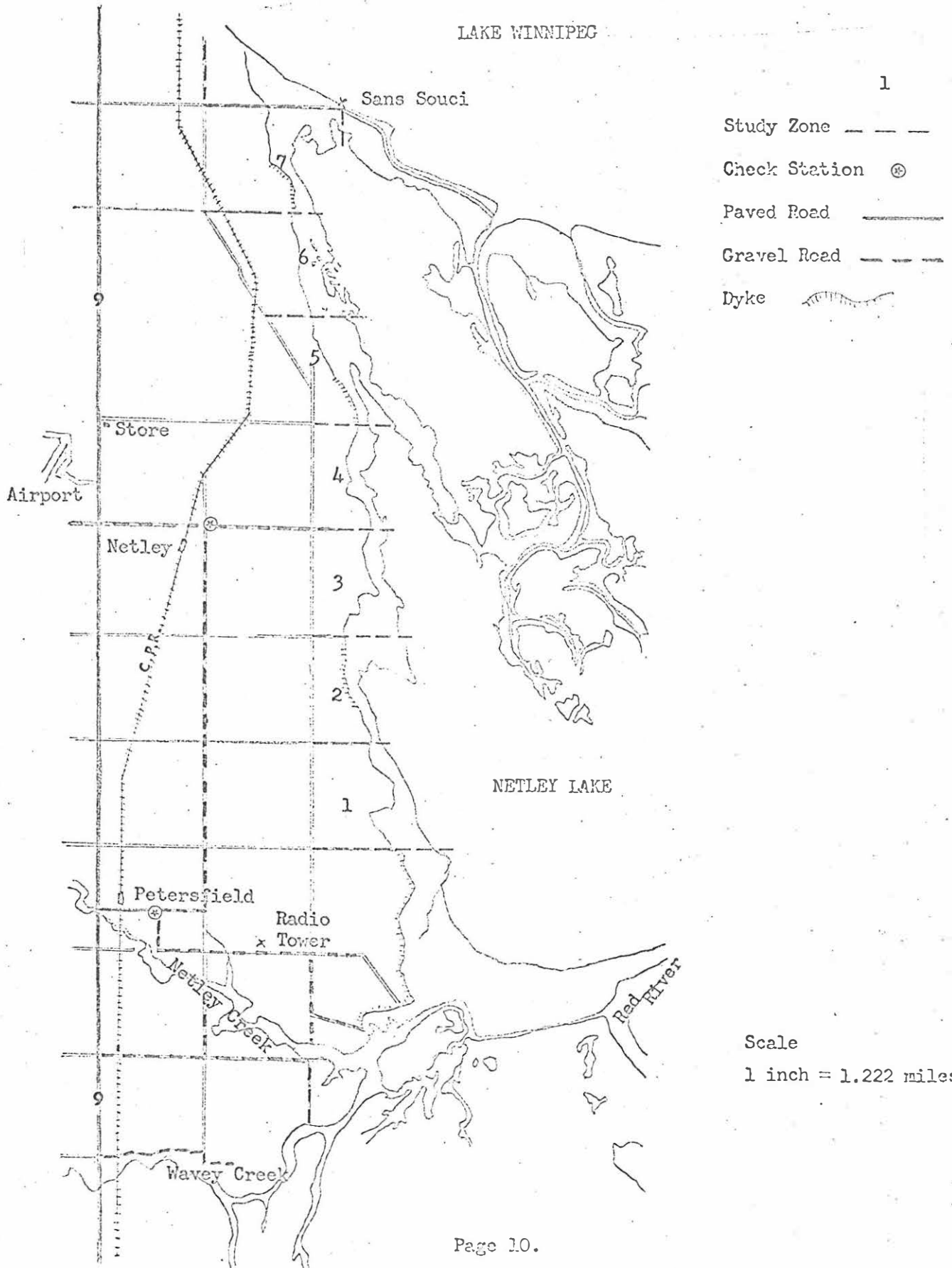


TABLE 1. Aerial Count of Hunter Vehicles by Zone in the Study Area on September 29, 1969, at 4:30 P.M.

Zone	1	2	3	4	5	6	7	Total
Vehicles Counted	8	11	5	26	32	50	30	162

TABLE 2. Species Composition of the Bag Checks (October 4th) and the Dog Recovery (October 5th) at Netley Marsh.

Species	Bag Check				Dog Recovery			
	Inside Study Area		Outside Study Area		Total		Inside Study Area	
	#	%	#	%	#	%	#	%
Mallard	44	42.4	48	67.6	62	59.6	25	59.5
Shoveler	3	9.1	2	2.8	5	4.8	5	11.9
Green-winged teal	1	3.0	4	5.7	5	4.8	5	11.9
Pintail	3	9.1	2	2.8	5	4.8	3	7.1
Widgeon	1	3.0	-	-	1	1.0	2	4.8
Blue-winged teal	3	9.1	4	5.6	7	6.7	1	2.4
Gadwall	1	3.0	3	4.2	4	3.8	-	-
Redhead	1	3.0	4	5.7	5	4.8	1	2.4
Ring-necked duck	1	3.0	1	1.4	2	1.9	-	-
Greater scaup	2	6.1	-	-	2	1.9	-	-
Common goldeneye	-	-	2	2.8	2	1.9	-	-
Bufflehead	3	9.1	-	-	3	2.9	-	-
Ruddy duck	-	-	1	1.4	1	1.0	-	-
Total Ducks	33	99.9	71	100.0	104	99.9	42	100.0
Snow Geese	1	-	-	-	1	-	-	-
Coot	3	-	-	-	3	-	1	-
Hunters Checked	<u>51</u>		<u>76</u>		<u>127</u>		Dogs used = 16	
Vehicles Checked	<u>24</u>		<u>35</u>		<u>59</u>			

Coot left in field 2
 Unidentified ducks left
 in field 19
 Canada Geese left in
 field 2

TABLE 3. Age and Sex Ratios for Ducks Identified from Bag Checks (October 4, 1969) and from Dog Recoveries (October 5, 1969) at Netley Marsh.

Species	Bag Check		Dog	Bag Check		Dog
	Outside Study Area	Inside Study Area	Recovery Inside Study Area	Outside Study Area	Inside Study Area	Recovery Inside Study Area
	Adult	Adult	Adult	Male/Female	Male/Female	Male/Female
	Immature	Immature	Immature			
Mallard	$\frac{20}{28} = \frac{1}{1.4}$	$\frac{3}{11} = \frac{1}{3.7}$	$\frac{10}{15} = \frac{1}{1.5}$	$\frac{24}{24} = 1:1$	$\frac{10}{4} = 2.5:1$	$\frac{11}{14} = 0.8:1$
Shoveler	$\frac{0}{2}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{0}$	$\frac{2}{1}$	$\frac{1}{4}$
Green-winged teal	$\frac{0}{4}$	$\frac{0}{1}$	$\frac{2}{3}$	$\frac{0}{4}$	$\frac{1}{0}$	$\frac{1}{4}$
Pintail	$\frac{1}{1}$	$\frac{1}{2}$	$\frac{0}{3}$	$\frac{0}{2}$	$\frac{2}{1}$	$\frac{1}{2}$
Widgeon	-	$\frac{0}{1}$	$\frac{0}{2}$	-	$\frac{0}{1}$	$\frac{1}{1}$
Blue-winged teal	$\frac{2}{2}$	$\frac{1}{2}$	$\frac{0}{1}$	$\frac{4}{0}$	$\frac{1}{2}$	unknown
Gadwall	$\frac{0}{3}$	$\frac{0}{1}$	-	$\frac{1}{2}$	$\frac{1}{0}$	-
Redhead	$\frac{0}{4}$	$\frac{0}{1}$	$\frac{0}{1}$	$\frac{1}{3}$	$\frac{0}{1}$	$\frac{1}{0}$
Ring-necked duck	$\frac{0}{1}$	$\frac{0}{1}$	-	$\frac{0}{1}$	$\frac{1}{0}$	-
Greater scaup	-	$\frac{1}{1}$	-	-	$\frac{1}{1}$	-
Common goldeneye	$\frac{0}{2}$	-	-	$\frac{0}{2}$	-	-
Bufflehead	-	$\frac{0}{3}$	-	-	$\frac{3}{0}$	-
Ruddy duck	$\frac{0}{1}$	-	-	$\frac{1}{0}$	-	-
Snow Goose	-	$\frac{0}{1}$	-	-	$\frac{1}{0}$	-

TABLE 4. A Comparison of Bag Check Data from the Delta, Libau, and Netley Marshes for the date's shown.

Location	Delta Marsh		Libau Marsh		Petersfield (Netley)
	Sept. 29/69	Oct. 4/69	Sept. 29/69	Oct. 4/69	Oct. 4/69
Hunters checked	346	253	362	189	127
Total Bag	950	282	655	89	108
Total Hrs. Hunted	1532	1502	1593	1132	792 *
Birds/Hunter	2.5	1.1	1.8	0.5	0.8
Hrs./Bird	1.6	5.3	2.4	12.7	7.3

Data from the Netley and Libau Marshes provided by the Manitoba Game Branch.

* Only 108 hunters sampled for hours hunted - extrapolated to total.

TABLE 5. The Condition and Type of Injury noted for Birds recovered by dogs at Netley Marsh on October 5, 1969.

Major Injury Species	D E A D			A L I V E			Total . Retrieved #	* Left in field #				
	Wing #	%	Other #	Total %	Wing #	%			Other #	%		
Mallard	3	12	12	48	60	7	28	3	12	40	25	19
Shoveler	-	-	4	80	80	1	20	-	-	20	5	-
Green-winged teal	2	40	1	20	60	1	20	1	20	40	5	-
Coot	-	-	1	100	100	-	-	-	-	-	1	2
Pintail	-	-	3	100	100	-	-	-	-	-	3	-
Widgeon	1	50	-	-	50	1	50	-	-	50	2	-
Blue-winged teal	-	-	1	100	100	-	-	-	-	-	1	-
Redhead	-	-	1	100	100	-	-	-	-	-	1	-
Canada Goose	-	-	-	-	-	-	-	-	-	-	-	2
TOTALS	6	13.9	23	53.5	67.4	10	23.3	4	9.3	32.6	43	23

* Birds were badly decomposed and identification doubtful.

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