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A survey of waterfowl and
hunting pressure in the Water-
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**A Survey of
WATERFOWL AND HUNTING PRESSURE
in the
WATERLOO AREA**

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**Submitted in partial fulfillment
of the requirements for the degree
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Introduction

For the past several years the total number of waterfowl has been declining with almost alarming rapidity. To make matters still worse the number of hunters continues to increase. These two parts of the problem along with many others definitely need sound thinking, study and action if the continued enjoyment of the great sport of duck hunting and other recreational and esthetic values associated with waterfowl are to persist into the future.

Since about 1935 a great amount of research has been undertaken on waterfowl. In general, it has been quite detailed and great strides have been made toward understanding many of the problems connected with the management of waterfowl. Most of this work, however, has been performed on larger areas - the large marshes, lakes and rivers. A comparatively small amount of attention has been given to the more insignificant areas, for example, the myriad of small marshes scattered throughout the Lake States. Who can say exactly or give a reasonable estimate of the number of waterfowl taken annually from these thousands of seemingly insignificant, yet considered as a whole, very important marshes? It

is the question of this type for which this survey seeks an answer.

Objectives. In general this survey is outlined to determine the results and effects of waterfowl hunting on a given limited area. Most of the questions for which answers are sought are concerned with total hunting pressure. The study area is the Portage Marsh located in the Waterloo State Recreation Area of Jackson County, Michigan.

Principle questions are as follows:

1. What are the species of waterfowl and their comparative numbers using the marsh during the hunting season?
2. What is the bag?
 - a. The total daily and seasonal bag?
 - b. The bag per hunter?
 - c. The species, sex and age of ducks making up the bag?
3. What is the cripple : kill ratio for this area?
How does it compare with other areas?
4. What types of hunting are most commonly practiced in the Portage Marsh? What is the comparative bag for each type of hunting?

5. In what manner does weather influence hunting?
6. Hunter residence? Are most of the hunters from local areas?
7. What is the relation of the sandhill crane to hunting and how is it being affected by the use of the marsh as a public hunting ground?

Procedure. As can be seen most of the information desired applied to the hunter and hunting pressure exerted on the area. It was quite obvious that the best way to get these answers would be to go directly to the hunter and interview him on the spot after the days hunting. This inquiry included all pertinent questions and space for answers applying directly to the hunter and his kill. A sample questionnaire can be found on page 4.

One questionnaire was used for each hunter and the answers were filled in on the spot. Each duck bagged was examined for sex, age and species by the writer and this information was recorded in the proper blanks. The hunter was asked the following questions. How many birds did you cripple and lose? What county are you from? What type of hunting did you engage in (pass, blind, or jump)? The answers were recorded in their proper places along with the date at the top of the form.

WATERLOO WATERFOWL SURVEY
UNIVERSITY OF MICHIGAN

Date: October __, 1947

1. Bag: Species _____ Sex _____ Age _____
* _____ * _____ * _____
* _____ * _____ * _____
* _____ * _____ * _____
* _____ * _____ * _____
2. Cripple or lost dead birds (number) _____
(a) Gauge of gun _____
(b) Dog _____ Breed _____
3. Hunter's residence _____
 City County
4. Type of hunting (blind, jump, etc.) _____
(a) Decoys? _____
5. Remarks: _____

Sample Hunter Questionnaire

In addition to this type of record, day by day notes were kept on the number and species of ducks sighted; weather conditions and their affect on hunting success; total counts of hunters on the marsh; sight records of sandhill cranes; portions of the area used most frequently by waterfowl; and other pertinent events, conditions, and happenings.

Description of the Marsh

The Portage Marsh is located on land owned by the State of Michigan and administered by the State Department of Conservation. It lies in parts of sections 21, 22, 27, 28, Waterloo Township, Jackson County, Michigan.

Physical description. The Portage Marsh is typical of hundreds of medium sized seepage marshes found throughout this section of Michigan and the entire Lake States region. The greatest portion of the marsh centers around the intersection of two small streams (which form the Portage River), one flowing from the northeast, the other from the south. Both of these are quite small and sluggish. At certain points they are completely choked by marsh vegetation and this has made it difficult to determine where the main current flows.

The topography surrounding the marsh is rolling and quite hilly. The marsh itself has a number of hill-like islands and peninsulas standing well above the water level. These were built up by and during periods of glaciation in the past. The soil in these hills and other upland areas surrounding the marsh is quite sandy and porous and in general of little agricultural value.

Vegetation. If only the marsh and immediately hor-



Calamagrostis grass which grows in the drier parts of the
marsh.

dering uplands are considered, most of the survey area can be fitted into four general ecological types. In the main these types are derived from Samuel A. Graham's* system of ecological classification and are as follows.

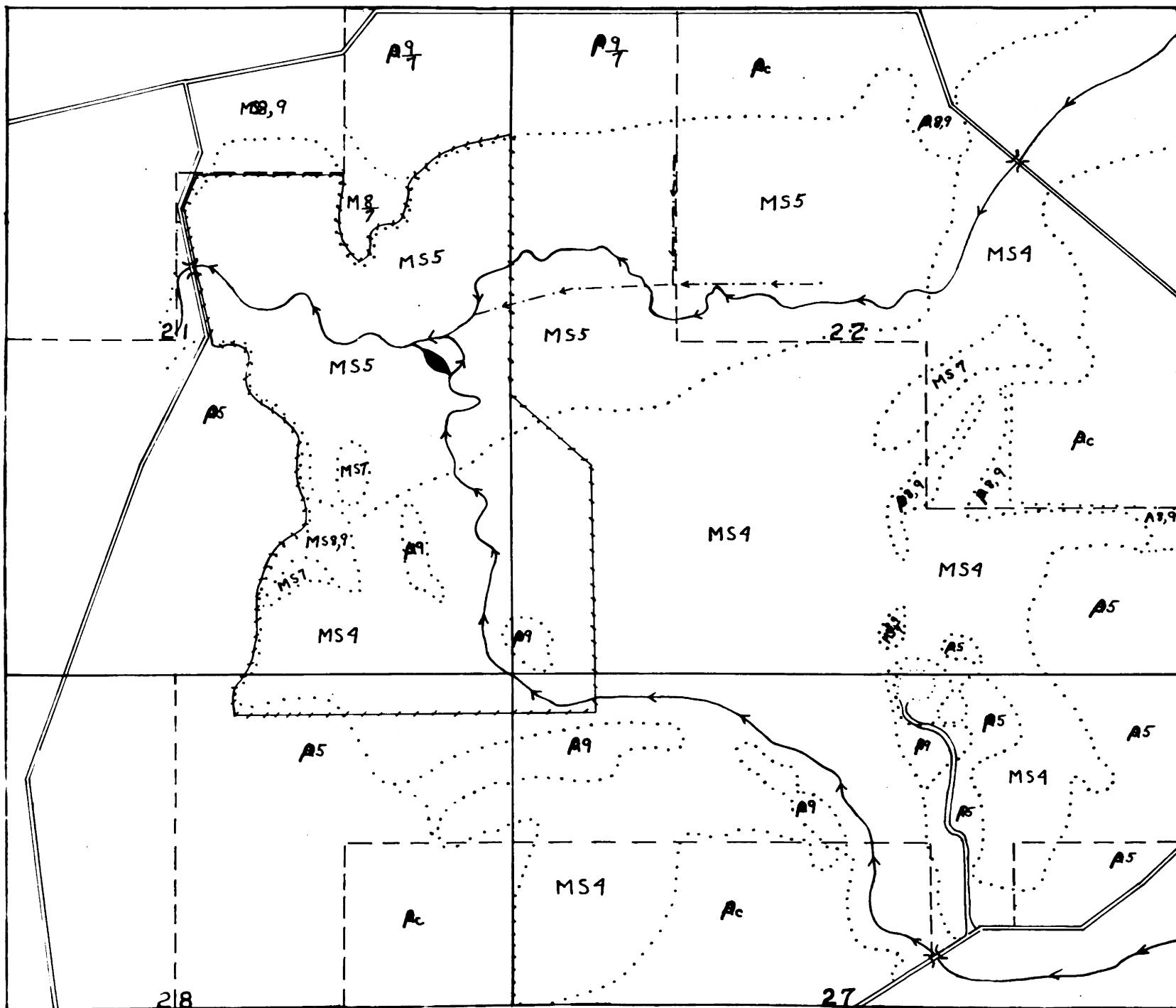
Oak Upland Type. As the designation indicates this type is made up in the main of oaks. Here the red oak (Quercus rubra) and white oak (Quercus alba) are the dominating tree species. Closely associated with the oaks is the American elm (Ulmus americana) which ordinarily is found in the more moist areas. Other species of minor importance are the aspen (Populus tremuloides), shagbark hickory (Carya ovata), and black cherry (Prunus serotina).

Shrub Transition Type. This type is most frequently found separating the oak upland type from the marsh proper. Around the outer edge of most of the islands and peninsulas in the marsh this is the dominant vegetation. Principle species making up this type are red-ozier dogwood (Cornus stolonifera) and paniced dogwood (Cornus paniculata) and swamp rose (Rosa carolina).

Calamagrostis grass type. This is mapped as part of the marsh proper and in general is found in the drier, northern portions. Blue joint grass (Calamagrostis canadensis) makes up roughly ninety per cent of the vegetation in this type. Other less common species present

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*Professor of Economic Zoology, School of For. & Con.
University of Michigan.

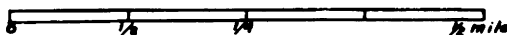


PORTAGE MARSH

Located in

Sections 21, 22, 27, 28, Waterloo Twp., Jackson Co., Mich.

Scale



Ecological Types and Symbols by S. A. Graham

Legend

Section Line	—————	Type Line
Boundary State land	- - - - -	Bridge	———X———
Sanctuary Boundary	- · - · - ·	Pond, Lake	◐
Drainage Ditch	———>———	Parous Soil	———P———
Road	=====	Seepage Marsh	———MS———
Stream	———>———	Cropped Land	———C———



Loren S. Loomis
Jan. 20, 1948



The cattail (Typha latifolia) common through most of
the marsh.

are the swamp milkweed (Asclepias incarnata) and swamp dock (Rumex verticillatus).

Marsh type. The marsh proper compared to the Calamagrostis type above has more water in it. Consequently different vegetation is found. In the fall of the year the Calamagrostis type may not have more than two or three inches of water over it while the marsh proper will vary from six inches to two feet of water. Principle species found here are the cattail (Typha latifolia) which makes up between thirty-five and fifty per cent of the vegetative cover, several sedges (Cyperus sp. and Carex sp.), swamp loosestrife (Decodon verticillatus), duckweeds (Lemna triscula, Lemna minor and Spirodela polyrrhiza), and wild rice (Zizania aquatica).

Ducks Utilizing the Marsh

In this survey one of the foremost questions for which an answer was sought was that of the species of waterfowl found in the marsh and the immediate surrounding area.

Two methods were used in getting this information. The general questionnaire with space to record each duck shot, was used to get information directly from the hunter. The second method was that of keeping and using sight records. This method, however, does not have the quality of an exact figure and in fact, is nothing more than an index or a set of rough figures which can somewhat support or substantiate the figures obtained from the interview questionnaire.

Summation of all the data collected from hunter bags proved to be somewhat surprising. Year after year according to many authorities the black duck is considered to be the most abundant of all species in this region. However, according to bag counts of 188 hunters it was a poor second to the mallard. Actual figures place the mallard at 47 compared to 27 of the black duck. These two species make up 80% of the recorded kill with blue-winged teal (7), green-winged teal (5), pintail (5),

and baldpate (1) making up the remaining twenty per cent.

Sight records clearly show that the mallard and black duck were much more common than all others, but these same figures would indicate that the black and mallard were about equal in number instead of the mallard being decidedly more numerous as the bag records indicate. Naturally sight records do not have the accuracy which characterize actual bag counts, but sight observations over the entire season definitely indicate that the two species were about equal in total numbers despite the fact this method is open to considerable error.

As for the remaining four species, the ratio of the number shot to the number sighted compares favorably, excepting the baldpate. Possibly this birds unusual wariness* accounts for the fact that only one was bagged. Nevertheless, they were seen time after time in the company of mallards and blacks particularly during the first two weeks of the season.

From a final tabulation of one-hundred and eighty-eight hunters' bags the species are rated in this way; mallard, 51%; black duck, 29%; blue-winged teal, 8%; green-winged teal, 5.5%; pintail, 5.5%; and baldpate, 1%.

*Kortright, Francis H.

Table 1

Species	Male	Female	Juvenile	Adult	Total
Blue-winged teal	3	4	5	2	7
Black duck	14	13	14	13	27
Mallard	26	21	23	24	47
Green-winged teal	1	4	5	0	5
Pintail	3	2	5	0	5
Baldpate	0	1	1	0	1
Total	47	45	53	39	92

HUNTER BAG

Sex and Age by Species

The Bag

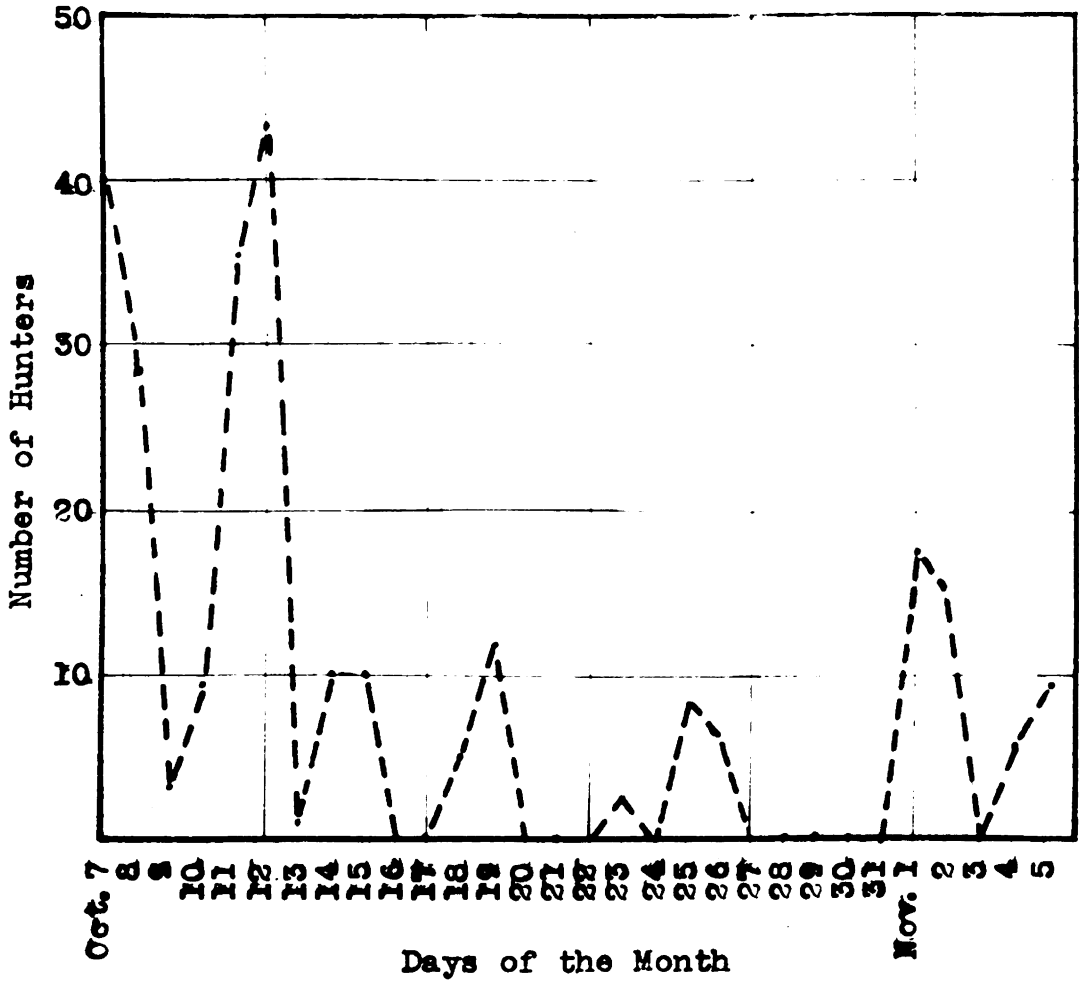
Total bag. The number of ducks taken on the Portage Marsh was determined in the following way. 188 of an estimated 259 hunters using the marsh were interviewed and their kill was found to total 92 ducks. We may assume that the hunters not interviewed were as successful as those interviewed. Therefore by employing the following algebraic equation which uses the ratios 92/188 (ducks killed by 188 hunters) and X/259 (ducks killed by 259 hunters)

$$188 X = 92 \times 259 \quad X = \text{total kill}$$

the total kill was found to be 127 ducks. No geese were taken.

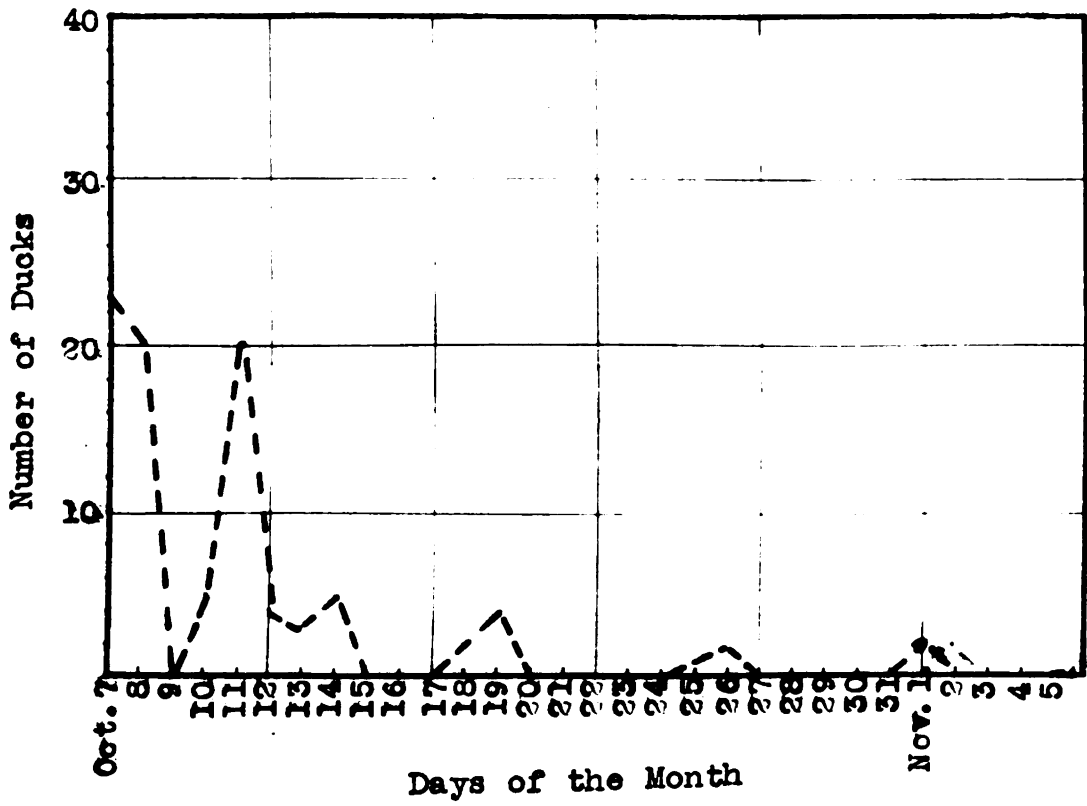
Average daily bag. The open season began at noon on October 7 and ran continuously to and including November 7, 1947. This provided a total of $29\frac{1}{2}$ days of hunting. For purposes here the opening one-half day will be considered as a whole. By using 30 days as a total and dividing it into 127, the number of ducks shot, the average daily kill is found to be 4.23 ducks. Tables giving exact kill per day by the interviewed hunters and the bag by specie, sex and age are found on pages 14 and

Fig. 1



ESTIMATED TOTAL NUMBER OF HUNTERS

Fig. 2



RECORDED KILL

17.

Average bag per hunter day. The average bag per hunter day was found by using the total number of ducks shot (127) and dividing this by the total number of hunters hunting (259). This gave an answer of .49 ducks per hunter day.

Compared to the State of Michigan as a whole (about one duck per hunter day) the preceding figures seem low. It was believed before the survey was begun that the total would be higher, and at the present time few definite reasons of explanation can be offered for the unexpected, low figures. Many hunters were of the opinion that the general warm weather prevalent during most of the season materially reduced the bag. In addition the inaccessability of the marsh probably somewhat limited the kill by preventing many hunters from reaching ideal areas. In as much as this is the first study of this area there is little that can be said in the way of comparison with the past.

As is shown by figures 1 and 2 most of the hunting took place on the first two days of the season and thereafter on Saturdays and Sundays.

Cripple : Kill Ratio

As the total number of ducks declines and the army of hunters continues to increase, each duck crippled and lost is going to mean a greater loss both to the hunter and the general duck population. Consequently a considerable amount of time and effort have gone into the determination of an accurate cripple : kill ratio for the study area.

At the start of the hunting season it was expected that the crippling ratio would be quite high. There were several reasons for this and among these was the fact that the marsh was very difficult to move around in, making retrieving by either dogs or men quite difficult. Also working against the hunter was the dense cover of vegetation which offered the wounded duck easy hiding and escape. Frequently hunters emerged from the marsh complaining about the difficulty encountered in finding fallen birds.

The following information was obtained by questioning each hunter about birds crippled and lost, or birds shot dead and lost, and recording his answer on the individual questionnaire.

When hunting was over at the season's end and the figures totaled, some forty-seven birds had been lost for one reason or another by 188 interviewed hunters. With a fairly accurate estimate giving 259 as the total number of hunters using the marsh, this figure is raised to 65 ducks lost by using the same ratio to the figure 259 as that which applied to 188. It can be assumed then the total loss was about 65 ducks.

Using the above figure (65) and computing the total bag (127) in the same manner as the loss above we see the cripple and loss :kill ratio is 65 : 127, or reduced, slightly over one bird lost for every two bagged, or 51%.

The above figures are open to error from the following sources (1) It is impossible to say how many ducks flew beyond the sight of the hunter, fell and died, and for this reason were not reported. (2) Although the writer was impressed with the cooperative manner in which most hunters answered this question of loss, there still was doubt in the mind of some hunters in regard to what they did or did not hit. (3) Some injured ducks were no doubt picked up by other hunters and therefore could not be listed as loss. Considering all points of

the problem, however, the above figure does have reasonable accuracy and does point out the situation in the Portage Marsh.

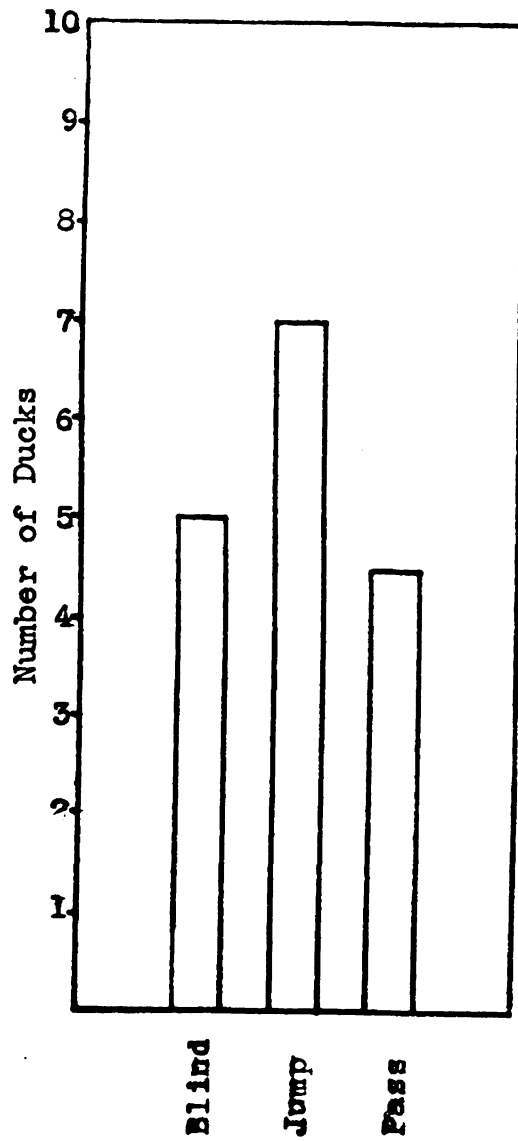
Hunting Practices

Types of hunting practices on any area such as the Portage Marsh are limited due to the difficulty encountered in navigating this type of marsh.

At the present time the marsh is at a stage where the general water level is not high enough to permit leisure boat travel. In fact, only the lightest type of canoe or kayak can be maneuvered with any ease at all. Entrance by boat could be made from the west side quite easily by paddling up the small stream which leaves the marsh at this point. However this is not permitted by the State Department of Conservation because the hunter must pass through the Wildlife Sanctuary maintained in this part of the marsh. The opposite entrance of this stream (into the marsh) lies on privately owned land and is posted against hunting. The only way left to the hunter is the "back-breaking" method of poling or pushing his craft through the muck and cattails. Few have tried this the second time.

Even though there isn't enough water to transport a boat over the major part of the marsh there is still enough, along with the general aspect of the muck and cattails to make it quite difficult for the man who goes

Fig. 3



SUCCESS BY HUNTING METHOD

Number of Ducks Bagged per Ten Hunters

in on foot. Hunters have been seen so mired and exhausted in some of the more difficult areas that it took them one-half an hour to travel a distance of roughly one-hundred yards. In spite of this over three-fourths of the hunters traveled the marsh in this way.

The area north of the stream (Calamagrostis type) was the best suited to jump shooting on foot because it had a firm bottom and in general was not as wet as the remainder of the marsh. In other parts of the marsh jump shooting was virtually impossible because of conditions described previously. Most hunters merely attempted to get out into the marsh as far as possible and sit or squat down for pass shooting. Only in the north end were many hunters attempting jump shooting.

Most hunters were quick to see that jump shooting made duck hunting a drudgery, so naturally they chose the more easy pass shooting or occasionally shooting from a blind.

Actual figures brought this out with only fifteen per cent of all hunters trying the jump method. Sixty-seven per cent of the hunters used the pass method and the remaining eighteen per cent the blind.

Definition of pass, jump, and blind shooting was left up to the individual hunter.

Hunter Residence

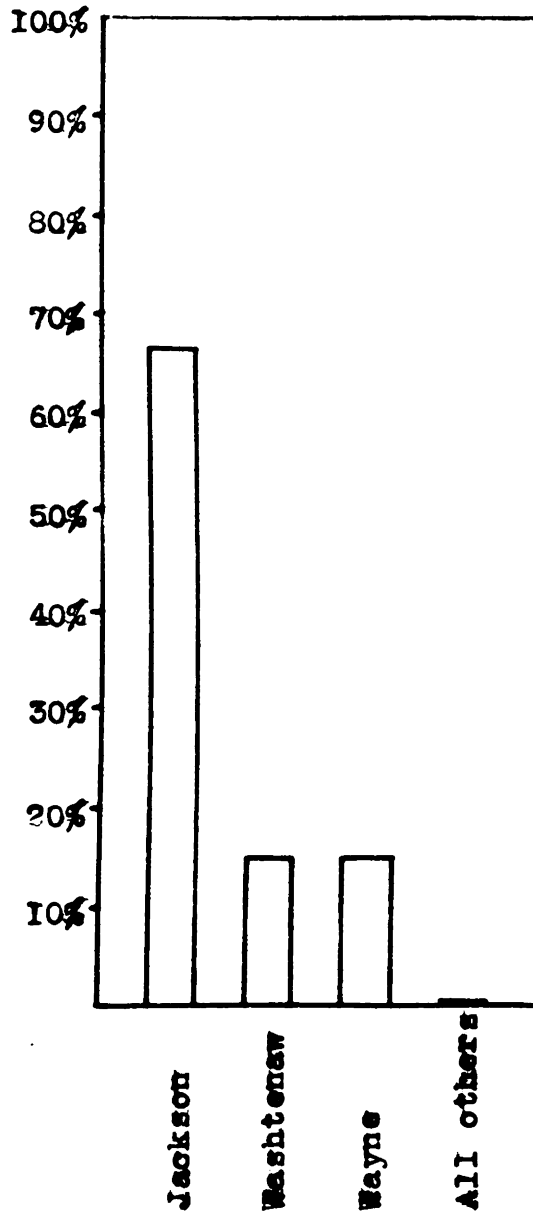
Considering the type of survey being conducted it seemed quite proper that information as to hunter residence be determined with the idea in mind of correlating it with total hunting pressure on the area. The information was obtained by asking, "What county are you from?" and this was recorded on the questionnaire. No effort was made to learn the city or town of the hunters residence.

As might be expected Jackson County furnished the great majority of hunters. Sixty-seven per cent of the total hunting the marsh came from this local area.

Washtenaw and Wayne counties supplied most of the remaining thirty-three per cent with sixteen per cent giving each county as the home. The only other counties represented were Lenawee and McComb and these provided only one per cent of the total.

No out of state hunters used the marsh.

Fig. 4



HUNTER RESIDENCE

The Sandhill Crane

The sandhill crane, in lieu of its precarious position of the past relative to declining numbers, and to the fact that it uses the Portage Marsh and much of the Waterloo region for breeding and other purposes of life function, deserves some mention in this paper.

Certainly, even though this beautiful bird is not hunted, some of its numbers do fall to the guns of non-discriminating would be "goose shooters". It is quite easy to see how the inexperienced hunter mistaking the long, outstretched necks, the measured beat of the wings, and formation flight for that of geese and begin blasting away before giving a second look or thought. On the other hand to the ardent, experienced hunter it is a simple matter to distinguish the sandhill long before he ever sights it by the loud, ringing, trill-like call. If the call is not enough the long legs held straight out to the rear will clinch the decision before the birds get within gun range.

The record in this connection however speaks very well for the hunters using the Portage Marsh. At the beginning of the duck season according to Department of Conservation estimates some twenty-three cranes were liv-



One method of protecting the sandhill crane.

ing in the marsh and surrounding area. Shortly before the southern migration began twenty-two were observed by the author. It is believed this number safely left the Waterloo area. As seems apparent, only one crane fell to the hunters gun, this on the first day of the season.

In my opinion both the hunters and the Department of Conservation should be congratulated on this fine record. On a number of occasions groups of cranes were observed flying low over the marsh and very seldom or never was a shot fired in their direction - this with between ten to forty hunters in the area. The Department of Conservation was very active in carrying out a plan for educating the hunter and thereby providing indirect protection to the cranes. Large signs warning against shooting the crane and giving a silhouette drawing of the bird with a printed description were placed at all vantage points around the marsh. The State Biologist for the area and Conservation Officers were quite active in spreading information by personal contact with hunters regarding the sandhill crane and were determined to the utmost to enforce the regulations protecting it.

Considering the relative few number of ducks taken it might be well however to close the marsh completely and give the crane more protection. This would not stop all hunting though because much of the marsh is privately owned and here hunting would go on just the same.as before.

In conclusion I can see no need for any change in the regulations, policies or methods regarding protection of the sandhill crane. The situation appears to be well in hand with all parties concerned cooperating.

Summary

Species using the marsh. Bag counts indicated the mallard and black duck to be using the marsh in the largest numbers. Also present but less common were the blue-winged teal, green-winged teal, pintail, and baldpate. Actual bag counts resulted as follows: mallard, 47; black duck, 27; blue-winged teal, 7; green-winged teal, 5; pintail, 5; and baldpate, 1. Sight records compared favorable in total numbers, and the baldpate seemed to be more abundant than bag records indicated.

The bag. The total kill on the marsh for the entire season was 127 ducks. The average bag per hunter day was found to be .49 ducks. The average daily kill for the entire marsh proved to be only 4.23 ducks.

Cripple ; kill ratio. The cripple : kill ratio was 65 : 127, slightly over one bird lost for every two bagged or 51% of the retrieved kill.

Hunting practices. 67% of all the hunters used the pass method of hunting; 18%, the blind; and 15% attempted jump shooting. The pass method resulted in the bagging of 4.5 ducks per 10 hunters; the blind, 5 ducks per 10 hunters; and jump shooting 7 ducks per 10 hunters.

Hunter residence. Jackson County furnished 67% of all the hunters using the marsh. Washtenaw and Wayne each had 16% and all other counties 1%.

Sandhill crane. There seems to be no need for change in the regulations, policies and methods regarding protection of the sandhill crane. As near as the writer could determine only one bird of twenty-three frequenting the area was killed by hunters.

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