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A ONE-YEAR SURVEY OF PUBLIC USE ON STATE WILDLIFE MANAGEMENT AREAS IN IOWA

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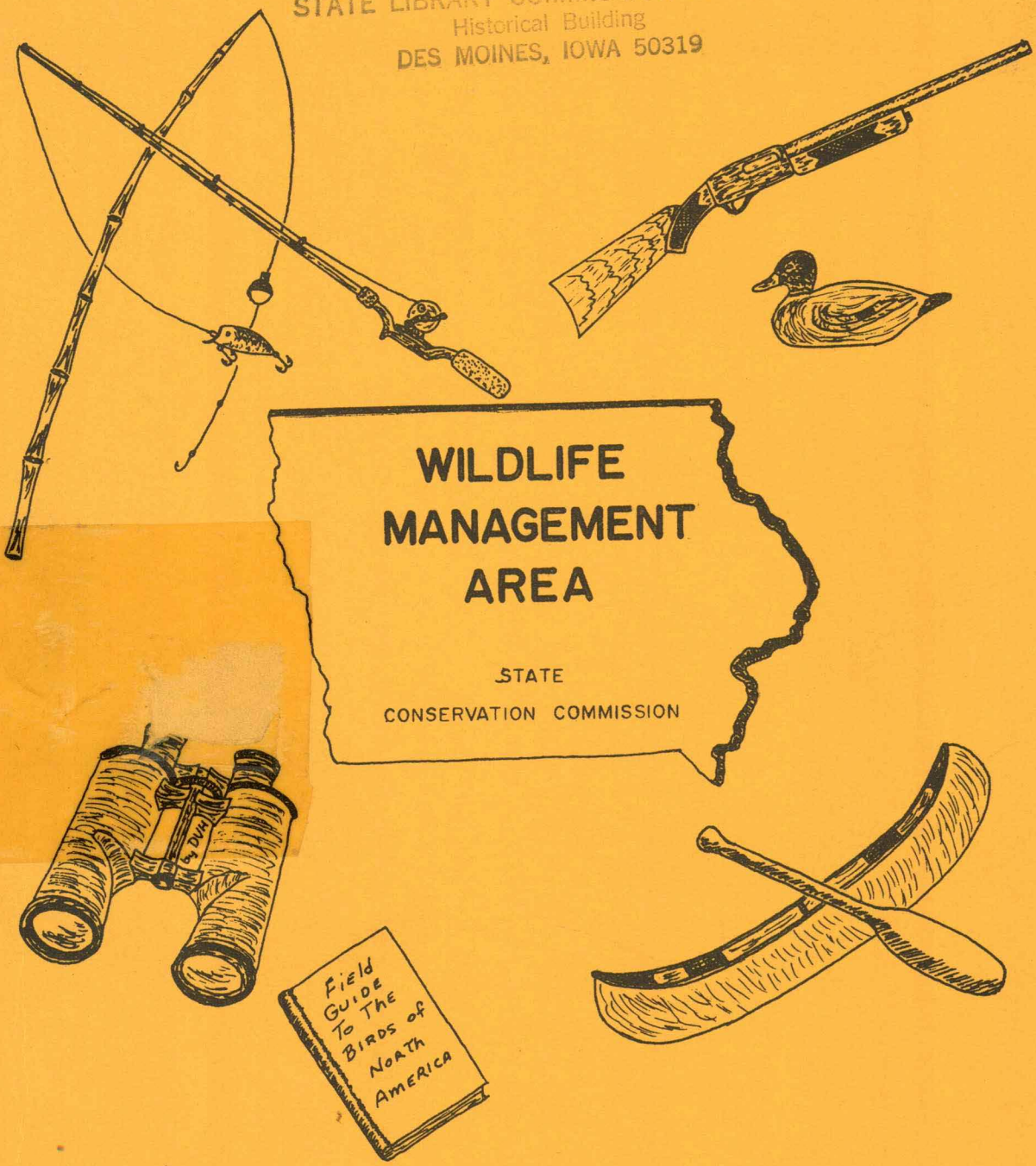

IOWA WILDLIFE RESEARCH BULLETIN NO. 4

A ONE-YEAR SURVEY OF PUBLIC USE ON STATE WILDLIFE MANAGEMENT AREAS IN IOWA

by

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ABSTRACT

A study to estimate the use on state owned wildlife management areas was begun September 13, 1969 and completed September 12, 1970. An estimated 2,240,000 man hours (545,000 visitor days) were spent on the 178 areas involved in the study. About 14% of the hunters hunted on one of the state owned wildlife management areas at least once during the year. This does not include use on any state forests, state parks, or other public areas. Hunters accounted for 42.6% of the hours, fisherman 40.5%, and other activities for 16.9%. Most of the other uses could be classed as nature study, picnicking and relaxing, camping, or boating. Most people (75%) traveled less than 40 miles to use the state owned wildlife management areas. About 75% of the users said that the areas were well managed. The hunters who used the state-owned wildlife management areas reported they did almost half of their total hunting on public land, but only 4.8% of the total hunting by all hunters in the state was on these areas. Over 85% of the hunting was for waterfowl on the state areas, but less than 15% of all hunting in Iowa was for ducks and geese.

TABLE OF CONTENTS

PAGE

INTRODUCTION 1

METHODS 1
- Sampling Design 1
- Sampling Techniques 3
- Analyzing the Data 4

RESULTS AND INTERPRETATION 5
- Amount and Type of Use 5
- Characteristics of Users 8

DISCUSSION AND RECOMMENDATIONS 10
- Comparison With Other Studies 10
- Suggestions for Improving Sample Design 10
- Car Counter Method for Intervening Years 11

LITERATURE CITED 12

ACKNOWLEDGEMENTS 12

APPENDIX A - Instructions and forms used to implement the study 13

APPENDIX B - Description and location of state owned wildlife management areas in the sample 22

APPENDIX C - Detailed results of survey 27

APPENDIX D - Calculations which show that 14% of Iowa's hunters use state-owned wildlife management areas 30

APPENDIX E - An alternative method of stratification with "estimated results" from this study 32

LIST OF TABLES

Table 1 State game areas sampled during use survey, with classification into strata

Table 2 Per cent of cards returned for each stratum during the hunting and non-hunting seasons

Table 3 Total hours of use in Iowa

Table 4 Average number of trips per area

Table 5 Average hours of use per area

Table 6 Relative amounts of hunting and fishing

Table 7 Number of times hunted on state areas and private land

Table 8 Frequency of types of game shot on state-owned wildlife management areas

Table 9 Comparison of the number of state-owned wildlife management areas with the number in the sample for each major type of habitat and use class

Table 10 Percentages of the total number of times various recreational activities other than hunting and fishing were mentioned on post cards returned

Table 11 Sex and age of people using the state-owned wildlife management areas

Table 12 Per cent of users traveling different distances to use state-owned wildlife management areas

Table 13 Per cent of parties and per cent of users in each size of party

Table 14 Length of visits on wildlife management areas (by percentage)

INTRODUCTION

It has become apparent with each passing year that a greater percentage of public use on state-owned wildlife management areas can be attributed to users other than hunters. These areas were, for the most part, purchased by hunters' money, and have been developed and managed from the same sources. Thus there is an ever-increasing likelihood of conflicts of interest arising between the several categories of users interested in Iowa's public hunting lands. Therefore, it was evident to those involved in administering these areas that a quantitative measure of types of use would be helpful, and perhaps soon necessary, in making decisions on how to best manage the considerable acreage involved.

A year-long survey of user activities on a sample of these state areas was conducted so we could estimate type and amount of use. We believe that a rough measure of what was happening would give adequate figures for immediate use and would also serve as the basis for designing a better study at a future date.

METHODS

Sampling design

A study by Palmer (1967) in southern Michigan was used as a prototype for this study. He divided 58 areas into nine strata based on the estimated number of man hours of use. During the later parts of the season these nine strata were combined into four. In Iowa, 178 of the state-owned wildlife management areas were separated into 4 strata based on the estimated numbers of visitor days per year on each area (Table 1). These estimates were made by management personnel responsible for the area.

A "representative" sample from each of the four strata was selected to estimate total hunter usage. No attempt was made to select a random sample because of limitations of personnel and time available for the study. The areas chosen had to be close enough to the home or headquarters of the individual conducting the survey to make them convenient to check, without interfering unduly with other duties.

The field investigator visited the areas on the day selected, following the guidelines in a letter from supervisory personnel (Appendix A). The sample of days selected has some aspects of stratification, but it was recognized that because of the previously mentioned restrictions and the "judgement factors" necessarily involved, it was not likely the days selected could be sufficiently defined to stratify into all categories that might later be needed in the analyses. A few strata that were later deemed important were not included in the original sample. The values for these days were estimated by experienced personnel after studying the values obtained from the sampled days.

Biases were no doubt added by non-random sampling from the strata and by estimating use of some days not sampled. However, we believe that any such biases contributed by these factors are probably smaller than biases and variability inherent in the overall investigation and well within the rather general objectives of this particular study.

Table 1. State Wildlife Areas sampled during use survey, with classification into strata.

Study Areas	Overall Strata (a)	Hunting Strata (b)	Summer Strata (c)
1) Bays Branch	IV	1	1
2) Barringer Slough	IV	IIIC	III
3) Big Marsh	IV	IIIC	III
4) Cone Marsh	III	IIIB	III
5) Dewey's Pasture	II	IIIA	I
6) Diamond Lake	III	IIIB	III
7) Dudgeon Lake	IV	IIIC	I
8) East Twin Lake	III	IIIB	III
9) Eldon Game Area	I	I	III
10) Green Island	IV	IIIC	I
11) Harmon Lake	I	IIIA	III
12) Hendrickson Marsh	II	IV	I
13) Hooper Area	II	I	I
14) La Hart Area	I	IV	I
15) Lakin Slough	III	IIIB	III
16) Mt. Ayr Game Area	III	I	I
17) Nobles Lake	II	IIIA	I
18) Otter Creek	III	IIIB	I
19) Red Rock	IV	V	II
20) Riverton Area	IV	IIIC	III
21) Ryan Lake	I	I	III
22) Swan Lake	I	IIIA	III
23) Sweet Marsh	IV	IIIC	I
24) Twelve-mile Lake	I	IIIA	III
25) Ventura Marsh	III	IIIB	I
26) Williamson Pond	II	II	I

(a)
- I <2,500 estimated visitors per year (estimated prior to study)
- II 2,500 - 5,000 estimated visitors per year (estimated prior to study)
- III 5,000 - 10,000 estimated visitors per year (estimated prior to study)
- IV >10,000 estimated visitors per year (estimated prior to study)

(b)
- I Upland game
- II Forest Game, primarily squirrel
- IIIA Waterfowl with estimated use <5,000 days
- IIIB Waterfowl with estimated use 5,000 - 10,000 days
- IIIC Waterfowl with estimated use >10,000 days
- IV Areas with 2 species about equally important
- V Large Reservoirs

(c)
- I Fishing
- II Boating, camping, etc., in addition to fishing
- III None of above

Sampling technique

The field investigator visited his assigned area three times a day and counted all of the cars parked or driving through the area. However, at least some of the investigators included only those moving cars that they believed were actually using the area for recreation. This was to try to adjust for the general traffic on public roads running adjacent to or through an area. When practical, the investigator left a letter and one or two post cards on the windshield of the car (Appendix 1). During the hunting season one card was to be filled out by hunters and one by non-hunters. During the non-hunting season only the non-hunter post card was left. The poor return of post cards add another possible source of bias to this survey (Table 2).

Analyzing the data

The number of cars counted was compiled for each sample day (3 times) and each area. The number of car hours was then calculated by the formula:

$$\text{Car hours} = \frac{(X_1 + X_2)t_1}{2} + \frac{(X_2 + X_3)t_2}{2} + \frac{(X_3 + X_4)t_3}{2} + \frac{(X_4 + X_5)t_4}{2}$$

where X_1 = the number of cars present at sunrise

X_2 = the number of cars seen on the morning count

X_3 = the number of cars seen on the mid-day count

X_4 = the number of cars seen on the afternoon count

X_5 = the number of cars present at sunset

---

t_1 = the number of hours between sunrise and the end of the morning count

t_2 = the number of hours between the end of the first and second counts

t_3 = the number of hours between the end of the second and third counts

t_4 = the number of hours between the end of the last count and sunset

X_1 and X_5 were assumed equal to 0

This formula, which follows Palmer (1967), may introduce certain inaccuracies under our conditions. It assumes that on the average the cars seen in the morning arrive halfway between sunrise and the end of the first count and that those seen in the afternoow leave halfway between the end of the last count and sunset.

These assumptions ignore variations in use habits. Most squirrel and duck hunters arrive before sunrise and, if they are hunting in the afternoon, may well continue until dark. Pheasant and quail hunters on the other hand can hunt only between 8:00 a.m. and 4:30 p.m.

During the non-hunting season only a few avid birdwatchers and fisherman would arrive before daylight. However , many fisherman, picnickers and other users might stay well after dark. Since only a few of these groups would be expected to arrive during the mid-morning hours, both of these errors would tend to underestimate the number of hours spent on the area.

Table 2. Per cent of cards returned, for each stratum, during the hunting and non-hunting season

	HUNTING SEASON			NON-HUNTING SEASON			
Strata	Cars Seen	% Given Postcards	Percent Returned	Cars Seen	% Given Postcards	No. Cards Returned	Percent Returned
I	295	97	26.2	52	98	28	54.9
II	698	95	15.2	331	85	75	26.6
III	1398	80	23.8	529	73	206	53.3
IV	6799	88	19.3	1906	89	531	31.3
Total	8790	88	19.9	2818	86	840	34.8

Classification of cards returned from the hunting season

Strata	No. Cards Returned	Hunters	Non-Hunters	% Hunters
I	75	55	20	73.3
II	101	79	22	78.2
III	266	219	47	82.3
IV	1089	833	256	76.5
Total	1531	1186	345	77.5

The number of man-hours was calculated by multiplying the number of car-hours by the average number of occupants per car (2.3). The number of occupants per car was calculated from the post cards returned. Since the per cent of post cards returned was small (20% during hunting season, 35% during non-hunting period), the average number of occupants per car may be somewhat biased. However, the 2.3 people per car is the best estimate available. The estimated number of man-hours was used to obtain an average number of man-hours for each type of day and strata. This average was then multiplied by the number of days and number of areas in each group to get an estimated total number of man hours.

The variance of the estimate was calculated by the formula:

$$\text{Var.} = \frac{W_h S_h^2}{n_h}$$

Where $W_h = \frac{N_h}{N}$

S_h^2 = variance of the observations within h^{th} stratum

N_h = total number in the h stratum

n_h = the number in the sample from the h stratum

N = the total number in all of the strata

Confidence intervals were assigned using normal theory with infinite degrees of freedom.

RESULTS AND INTERPRETATION

Amount and Type of Use

The State Conservation Commission furnished opportunity for about 2.25 million hours of recreation on the state owned wildlife management areas (Table 3). The average number of trips (Table 4) and average number of hours spent on the areas (Table 5) will be useful in establishing priorities for future development. The number of trips was calculated using an average of 4.6 hours per hunting trip and 3.8 hours per non-hunting trip. These averages were obtained from the post cards.

The wildlife management areas furnish about equal amounts of fishing and hunting and substantial amounts of other recreation (Table 6). Our best estimate of the total amount of hunting in Iowa is 15 million hours each year. Thus our state-owned areas produce about 6 per cent of the total hunting in Iowa. However, when the hunters were asked to estimate what per cent of their hunting was on state land, the average estimate was almost half. (Table 7). If we assume that the hunters on the state areas are "average" hunters, this calculations shows that about 14 per cent of the hunters use the state-owned public hunting areas (Appendix D). Another question which must be answered is what kinds of hunting do we have on state-owned areas. Table 8 shows that over 85% of the hunting on these areas is for waterfowl. Since Iowa had about 2.9 million hours of waterfowl hunting in 1969-70, this indicates that about 30% of the total waterfowl hunting in the state was on these state areas. Since the two most heavily used areas in the state were not included in this survey (i.e., Lake Odessa and Forney Lake), the total per cent of waterfowl hunting on the state-owned areas must be more than 30%. However, these figures should be viewed with some skepticism since waterfowl areas were more heavily represented in the sample than other types of areas (Table 9).

Table 3. Total Hours of Public Use of State Wildlife Management Areas in Iowa for One Year

	I	II	III	IV	Total	95% C I
Hunters	99,179	215,380	263,525	376,453	954,536	
Non-hunters						148,559
Fall & Winter	28,795	62,529	56,675	115,643	263,612	
Spring & Fall	58,368	212,530	222,616	530,246	1,021,754	134,164
Total for Year	184,306	490,439	542,815	1,022,336	2,239.896	282,723

Table 4. Average Number of Trips Per Area

	I	II	III	IV
Fall & Winter	371	1,342	2,109	4,279
Spring & Summer	205	1,243	1,775	5,581
Total	576	2,585	3,884	9,860

Table 5. Average Hours of Use Per Area

	I	II	III	IV
Fall & Winter	1,706	6,176	9,703	19,683
Spring & Summer	778	4,722	6,746	21,210
Total	2,484	10,896	16,449	40,893

Table 6. Relative Amounts of Hunting And Fishing

	Total Hours	% Hours	No. Trips	% Trips
Hunters	954,536	42.6	207,507	38
Fishermen	906,820	40.5	240,052	44
Others	378,575	16.9	96,203	18

Table 7. Number of Times Hunted on State Areas and Private Land

Strata	State-owned	Private	% Hunting on state land
I	882	781	53.0
II	906	932	49.3
III	2675	2899	48.0
IV	5965	7184	45.4
Total	10,428	11,796	46.9

Table 8. Frequency of types of game reported shot on state-owned-hunting areas

	STATE GAME AREA		TOTAL STATEWIDE	
	% Hunting Effort	% Game Killed	% Hunting Effort	% Killed
Small game	11.2	13.7	79	97.7
Waterfowl	87.1	86.2	10	2.2
Other	1.7	0.1	11	0.1

Table 9. Comparison of the number of state-owned-hunting areas with the number in the sample for each major type of habitat and use class

	Code (from Table 1)	State	Sample	% in Sample
Upland game	I	37	5	14%
Squirrel	II*	31	1	3%
Waterfowl-small	III (a)	55	5	9%
Watefowl-medium	III (b)	28	6	21%
Waterfowl-large	III (c)	15	6	40%
More than 1 type	IV	9	2	22%
Reservoir	V	3	1	33%
		178	26	15%

* These are mostly small, relatively insignificant areas

The other uses on state-owned areas in addition to hunting and fishing are shown in Table 10. Birdwatching, picnicking, sightseeing and camping are the most common of these other uses.

Table 10. Percentages of the total number of times various recreational activities other than hunting and fishing were mentioned on postcards returned

Activity	Number of times mentioned	Per cent of total times mentioned
Bird-watching	57	22%
Picnicing	35	14%
Sightseeing	31	12%
Camping	27	11%
Hunting, etc. (Non-game)	19	7%
Boating, Canoeing	17	7%
Relaxing	15	6%
Target shooting	5	2%
Hiking	14	5%
Working dogs	9	3%
Nature study	9	3%
Trapping	6	2%
Photography	6	2%
Berry or nutpicking, mushrooming	6	2%
Swimming	4	2%
Snowmobiles, ATV	2	1%
Rock Collecting	1	1%

Characteristics of Users

The hunters who use public hunting areas are more likely to be less than 40 years old than other hunters (Table 11). The average hunter on the state-owned areas drove about 30 miles (Table 12) to get to the area. He usually hunted with one or two other people (Table 13) and hunted for about 4.5 hours (Table 14).

The non-hunter was more than twice as likely to live within 10 miles of the public hunting area as was the hunter (Table 12). The non-hunter was much more likely to come with a group of more than 4 other people (Table 13) but he stayed only about 3.8 hours on the average (Table 14).

Table 11. Sex and age of people using the state-owned-public-hunting areas

	Sex	Non-hunters	Hunters
	Male	68.6%	98.4%
	Female	31.4%	1.6%
Age (years)		Non-hunters	Hunters	All licensed hunters*
<-10		12%	1%	<.1%
11-20		17%	21%	14.3%
21-30		14%	30%	23.3%
31-40		13%	22%	18.5%
41-50		13%	13%	16.6%
51-60		14%	9%	14.8%
61-70		12%	4%	9.4%
71-85		5%	1%	3.1%

*From sample of 1971 Hunting Licenses

Table 12. Per cent of users traveling different distances to use state-owned wildlife area

Distance (miles)	Hunter (%)	Non-hunters(%)
0-10	17	36
11-20	21	17
21-30	24	17
31-40	13	9
41-60	13	9
61-80	3	4
81-100	2	3
100+	7	5

Table 13. Per cent of parties and per cent of users in each size of party

	HUNTERS		NON-HUNTERS	
Party size	% of Parties	% of People	% of Parties	% of People
1	25	10.7	22	8.1
2	40	34.2	38	28.1
3	20	25.6	14	15.6
4	10	17.1	12	17.8
5	2	4.3	7	13.0
6	2	5.1	4	8.9
7	0.5	1.5		2.6
8 or more	0.5	1.5	2	5.9

Table 14. Length of visits on public-hunting areas (by percentages)

Time in Hours	Hunters (%)	Non-hunters (%)
1-2	17	24
3-4	37	39
5-6	24	19
7-8	22	8
	$\bar{x}$ = 4.6 hrs.	$\bar{x}$ = 3.8 hrs.
In days (camped overnight)		
1		5
2		3
3		2

DISCUSSION AND RECOMMENDATIONS

Comparison With Other Studies

One of the most obvious facts confirmed from this study of Iowa's wildlife management areas is that most are waterfowl-oriented areas. This is only part of the picture, however. Michigan biologists found that waterfowl areas furnished 14 times as much hunting per unit area during the duck season as did upland game areas. Another factor which must be reckoned with is that some of the best, and in some areas about the only, waterfowl hunting available in much of Iowa is on the state-owned hunting areas. Still another factor to be considered is that these waterfowl areas furnish many hours of fishing to Iowa residents. Moreover, some of the "other" uses (i.e., swimming, boating, and canoeing) are restricted to aquatic areas, and many other types of game are found associated with these primarily waterfowl areas.

The method used by Palmer (1967), and adapted for this investigation, for estimating hunter use was checked against known use on Rose Lake Wildlife Experiment Station in Michigan (Gordineer, 1957). The estimate by the car count method was 12% less than that actually counted at the check station. If this correction factor applies to our Iowa study, we could then say there were over 600,000 visitor days of use on our state game areas during a 1-year period, totaling over $2\frac{1}{2}$ million visitor hours.

Suggestions for improving sample design

One of the major prerequisites of any good sampling scheme is to have a well-defined population from which to sample. Therefore, the first task in repeating this type of study would be to assemble a complete list of all areas of interest, listing as many descriptive characteristics for each as possible. These areas should then be divided into strata defined by characteristics which are believed to be closely correlated to the primary objectives of the study. A combination of habitat and estimated hunting use may give the best set of criteria for determining the strata. This latter stratification in combination with a temporal stratification based on what seasons are open should give a smaller estimate of the variance within a strata. Primarily forest, or squirrel hunting, areas were not well represented in our study. This emphasizes the value of randomly assigning the sample within the strata, which should be done if and when this study is repeated, even if it does result in some extra travel and inconvenience for the personnel involved.

A possible stratification scheme using habitat and expected use of the area with results that would have been obtained in this study is presented in Appendix E. However, the confidence intervals are wider using this "improved" sampling scheme than with the stratification actually used in this study. Confidence interval width is not the only criterion that should be used in selecting stratification schemes, especially when the confidence intervals are less than about 15 per cent.

If the sampling scheme is impractical for some areas, these areas should be placed in a group to be sampled some other way. In fact, it is probably unrealistic to try to sample all of the state-owned hunting areas by a single method, particularly if we include state forests and huge areas associated with major reservoirs. For example, it was concluded that the present technique was unsatisfactory for the Red Rock Reservoir public hunting area during 1969-70. However, other investigators indicated that this technique worked quite well for their areas. Differences

in road patterns between given areas could make different sampling techniques advisable.

Another improvement in the sample design would be to divide the year into two or three time periods and use different stratifications and new samples for each period. Thus in Iowa we might have one strata for forested areas, another for upland game areas, and two or three for waterfowl areas. During the summer we could have a strata for major boating areas, one or two for primarily fishing areas, and one for areas with little or no water. A third stratification for March through May could separate waterfowl migration areas from mushroom hunting areas and areas of good spring fishing. No logical reason exists for using the same sample size during all of these periods.

Another obvious problem in this study was the poor return of postcards. Palmer (1967) was able to get 73% of the postcards back by sending reminders to people who failed to send in the original card. This required recording the auto license number and checking out the registration to obtain names and addresses of non-respondents— a very time consuming procedure. This method would probably work equally well in Iowa. A possible modification is to eliminate the postcard survey and substitute user interviews for it. Since fewer than 2000 usable postcards were returned during this study, only a small percentage of the users would need to be interviewed to give a better sample than the current one.

This interviewing scheme would require that some method of randomly selecting the people to be interviewed must be developed. One way would be to record auto license numbers, as mentioned earlier, and select a certain per cent to be interviewed after the count is completed. The people should then be contacted at their home within a few days, either in person or by telephone.

Car counter method for intervening years

Some preliminary efforts have been made to use car counters on certain key state game areas, but the data collected were too spotty and inadequate to assemble in any systematic manner. Since it would be impossible to repeat every year a detailed survey of the type described in this study, it would be necessary to develop some kind of an annual index of use, such as could be provided by car counters. With proper sampling design, an estimate of the percentage change in public use could thus be obtained. This could then be applied to the statistics from the preceding detailed survey, which would then have to be run only once every 10 years or so. It would, of course, be necessary to have acceptable car count data collected during the same year the intensive survey was being run. This would give the base line from which adjustments could be made. The problems associated with maintaining car counters during the winter might limit their use to frost-free periods. A simple count of cars in selected parking lots might be a better index to use during the winter months.

LITERATURE CITED

Gordinier, E. J. 1957. Yield and Public Use of Michigan State Game Areas. Trans. of the 22 nd N. A. Wildlife Conference. 404-412.

Palmer, W. L. 1967. An Analysis of The Public Use of Southern Michigan Game and Recreation Areas. Michigan Dept. of Conservation. Res. & Dev. Report: 88 pp.

ACKNOWLEDGEMENTS

Ms. Linda Hagen (Iowa State University) did most of the compiling of the raw data collected by biologists and technicians from the Biology and Game Sections. Special appreciation is due to these field personnel, whose willingness to spend the necessary time collecting data on weekends and holidays made this project possible.

APPENDIX A

Instructions and Forms used to Implement the Study

TO: Assigned Game & Biology Section Personnel DATE: September 5, 1969

FROM: Gene Klonglan, Asst. Supt. of Biology

SUBJECT: Explanation and Instruction for Conducting Game Area Use Survey

BACKGROUND

Most of you are already familiar with the fact that a survey has been requested for measuring the amount of use given State Game Areas by the public. This survey is to be conducted from September 13, 1969 to September 12, 1970 - a full calendar year. The procedures to be followed are patterned in general after a similar, but more intensive, survey made in Michigan, with several modifications to suit our particular objectives. Basically, the method revolves around the counting three times a day of the number of cars on assigned areas on a selected sample of days during the year, plus the leaving of a postcard questionnaire on each car tallied. From the data thus obtained, it will be possible to calculate the total use given our state hunting areas by the public, and to break this down into several pertinent aspects.

The plan to be followed is necessarily based on several statistical principles aimed at making the final estimates as precise as possible. Since we must rely on both a sample of areas and a sample of days, it is important that a typical cross-section of types of areas and days be taken to ensure that the expanded results obtained will be typcial and reasonably accurate. The first step in arriving at the sampling design used was to have the district game managers estimate to the best of their ability for all areas the average number of visitors per day for each quarter of the year, and thus ultimately a total for the entire year for each area. These totals were then categorized throughout their entire range. These categories were finally grouped into four strata, or levels of usage, for sampling purposes.

Each of these four groups will be treated separately in expanding the data obtained. This means adequate samples must be obtained from each of the four groups. For this reason, it is not always possible for each Unit to have its most important area, or areas, included. The rate of sampling is, however, much higher for the large area group, because errors here would in expansion become quite significant, and could actually cancel out many smaller areas entirely. After it was determined how many areas must be checked in each group, the selection of areas was made to give a good cross-section of all areas in that group and at the same time to minimize the travel distance for those involved in this assignment. A brief explanatory tabular accounting of the above is appended to help make it more clear.

ASSIGNMENTS

Attached is the list of personnel and area assignments for this project. The Unit Manager is, of course, responsible for seeing that both areas in his Unit are checked at the proper time. One area was chosen to be close to his headquarters and the other to be close to his permanent foreman when possible. He may delegate other help to assist on some days when work schedules make such appropriate, provided such help has been thoroughly briefed on the field procedures to be followed. The same applies to the District Game Foreman and Biology personnel listed. They are responsible for seeing that the sampling schedule is followed for their area, but may use assistants when necessary and such can be arranged.

SCHEDULE

The schedule of daily checks to be followed throughout the year is also listed separately. You will note that there is a fair amount of leeway in most cases, i.e., you are not pinned down to an exact calendar day. Thus you should be able to work these days in without too much interference with work schedules or, in the case of weekends and holidays, your personal plans. It is, of course, unfortunate that so many weekends and holidays must be sampled, but I am sure you all recognize that these are often peak use periods and it is imperative that they be included. With 27 men (areas) involved in the study, their selection of actual days should tend to be somewhat randomized each period, thus satisfying for the most part one of the statistical assumptions that must be considered. In those instances where at the last minute it becomes absolutely impossible to make the check on the assigned day, pick a day as nearly comparable as you can. It is important that such be kept to a minimum, however.

FIELD PROCEDURE

Since there is considerable use of most Game Areas by people other than hunters, it is necessary to aim our survey at both the hunting and non-hunting groups. Hence it is necessary to have separate postcard questionnaires and letters designed for each group. During that part of the year in which hunting might take place, it will be necessary to distribute both types of postcards and the appropriate letter during the survey. The hunting period has been designated as September 13 through February 28. From March 1 through September 12, it will be necessary to use only the non-hunting use card and letter. Specific instructions are as follows:

1. Make three trips around your assigned area on each scheduled day. These trips should be made during early to mid-morning, mid-day, and late afternoon to evening. Use your best judgment in picking the actual time to start each round, so as to try to sample a period with typical activity for that time of year. Do your best to cover all possible roads, trails, parking places, etc. in the area.

2. Record on the form provided the number of cars present on the area on each round, including both parked cars and those that may be moving at the time you pass through. On the second and third stops to be sure to record all cars on the area, even though you may have tallied them earlier in the day. This is necessary in order to compute car-hours of use.

3. On each car leave the letter and postcard to be used during that time of year. From September 13 - February 28, leave both the hunter use (tan) and non-hunter use (white) postcards with the appropriate letter (one that refers to two cards). From March 1 - September 12 next year use the non-hunting use card and the letter that goes with it. In the case of moving cars, if it is convenient to flag them down and hand out a card, do so. However, do not go far out of your way to chase down such cars. When handing the material directly to the people in the car, it will probably be necessary to give them only the appropriate card, if you can easily determine if they are hunting or not, and also give them a brief explanation of why the survey is being done. Same would be true for parked cars if the people concerned are at the car when you stop. For those times it is raining, or looks like it might do so before the car occupants return, provide yourself with some cheap plastic sacks (baggies, or the like) in which you can put the letter and cards before placing them on the windshield.

4. There may be some use on certain areas, particularly during the summer, which will not be from parked cars - such as large groups of Boy Scouts or other organizations, snowmobiles, motorcycles, horseback riders, etc. In such cases you should estimate this type of use for that check day and include such comment on your data record for that day.

OTHER INSTRUCTIONS

As each data sheet is filled, mail to me (Gene Klonglan, Wildlife Research Station, Boone, Iowa, 50036). Since there is room for 3 days records on each sheet, this means I will be getting them about monthly, on the average, and can thus make several preliminary analyses to see if the survey is working properly.

I am sure there will be questions that will crop up during the survey. In a project of this scope there are bound to be a few unforeseen or unavoidable "bugs" to iron out. If you come up with such, let me know and we will try to come up with a solution.

It was necessary to make an estimate of the total number of postcards to order and letters to run off, and then to distribute these to each of you according to the rough use estimates made for each area. Since it is quite possible our estimates are not too accurate, you may find you have far too many, or too few, cards and letters. If you find you are using them up at a rate that makes it appear you may run out before the year is over, let me know well in advance. Same is true if it appears you will have a big surplus. Hopefully we can make any needed adjustments within the current supply. If necessary, additional cards can be ordered, but we must allow a couple of months for printing them. Thus do not wait until the last minute to let us know you are running low.

With respect to the weekend this survey is to start (September 13 - 14), which begins this year's hunting season (teal, rabbits, squirrel), you are reminded of the instruction included in the spy blind assignment letter (which you should have received by now) to devote one day to this survey and the other to the spy blind on that weekend.

Your cooperation and efforts in making this survey a success will be well appreciated by all concerned, I am sure. The need for quantitative data that can be supported becomes ever more urgent in this "computer age." We must have such information if we are to uphold and defend our programs when they are evaluated or compared with other potential uses in which our areas might become involved, or to modify and improve our own programs. Good luck!

Public Use Survey - State Game Areas

Schedule of Daily Checks During Year

Month	Week Days (MTWT = 3, F-4)	Weekend Days (½ Sat., ½ Sun.)	Long Holiday Weekends (any of days involved)	Total Days For Months
January	1 (Fri.)	1 (Sat.)	----------	2
February	1 (Wed.-before rabbit season ends)	1 (Sun. - before rabbit season ends)	----------	2
March	1 (Thurs.)	1 (Sat.)	----------	2
April	1 (Mon.)	1 (Sun.)	----------	2
May	(1 (Tues.)	1 (Sat.)	1 (Mem. Day-3 day period)	3
June	1 (Thurs.)	1 (Sun.)	----------	2
July	1 (Wed.)	1 (Sat.)	1 (4th-July-3 day period)	3
August	1 (Mon.)	1 (Sun.)	----------	2
September	2 (Thurs. during teal season) (Fri.-after teal season)	1 (13 or 14-rabbit, squirrel & teal opening)	1 Lab. Day-3 day period)	4
October	2 (Mon. early in month Wed. late in month)	2 (4 or 5-goose opening) (25 or 26-quail & duck)	----------	4
November	2 (Fri. 1st week pheasant season) (Tues. before Thanksgiving)	1 (8 or 9-pheasant opening)	1 (Thanksgiving-4 day period)	4
December	2 (Fri. before 20th) (Tues. after 20th)	1 (6 or 7 - deer opening)	1 (Xmas - 4 day period)	4
Total	16	13	5	34

STATE CONSERVATION COMMISSION

STATE OFFICE BUILDING
300 FOURTH STREET
DES MOINES, IOWA 50319

Dear Sir:

This letter and self-addressed postcard have been left on your car by a field representative of the State Conservation Commission. We are trying to find out how much your State Game Areas (Public Hunting Areas) are serving the public for purposes other than hunting -- such as fishing, camping, boating, picnicing, hiking, bird-watching, sight-seeing, etc. You can help us by filling in the postcard and mailing it on your way home - or as soon as you can.

Information from this survey will aid us in managing your State Game Areas in the best interest of the public. For the survey to be accurate, we need the help of everyone contacted. Please fill in and mail the card no matter how short a time you may have been on the area. If you have filled one out at some earlier time, please fill this one out too, since each days' information is needed. Thank you for your cooperation.

Sincerely,

Fish and Game Division
State Conservation Commission

STATE CONSERVATION COMMISSION

STATE OFFICE BUILDING
300 FOURTH STREET
DES MOINES, IOWA 50319

Dear Sir:

This letter and two self-addressed postcards have been left on your car by a field representative of the State Conservation Commission. We are trying to find out how much your State Game Areas (Public Hunting Areas) are serving the people of Iowa. Please fill out the appropriate postcard - note that one is to be used by hunters, the other by those using the area for some purpose other than hunting (such as fishing, camping, boating, picnicing, hiking, bird-watching, sight-seeing, etc.). Drop it in a mail box on the way home, or as soon as you can.

Information received from this survey will help us evaluate the many game management practices being carried out on these areas, and will aid us in managing your State Game Areas in the best interest of the public.

For this survey to be accurate, we need the help of everyone contacted. Please fill in and mail the card even though you may not have taken any game, if hunting (or fish, if fishing, etc.). If you have filled one out at some earlier time, please fill this one out too, since each day's information is needed. Thank you for your cooperation.

Sincerely,

Fish and Game Division
State Conservation Commission

STATE PUBLIC HUNTING AREA HUNTER USE SURVEY

Name of Area _____ Date of hunt _____

Number hunters in party _____ Length of hunt in hours _____

Check type of game hunting: Small Game _____ Waterfowl _____ Other _____

No. bagged by party: Pheasant _____ Ducks _____

Rabbit _____ Geese _____

Squirrel _____ Quail _____

Other (write in) _____

No. miles from your home to Area _____, distance for others in your party if much different from yours _____

Ages of members of party _____, Sex (M,F) _____

Estimate: No. times hunted on State Areas each year _____

No. times hunted on private land each year _____

What do you think of State Public Hunting Areas as place to hunt?

Excellent _____ Good _____ Fair _____ Poor _____

Your comments on above _____

STATE PUBLIC HUNTING AREA NON-HUNTING USE SURVEY

Name of Area _____ Date of Visit _____

How many people were in this car today? _____

Ages of these people _____, Sex (M, F) _____

How long were you on this area today (in hours)? _____

How were you using this Area today? (if hunting, fill in other card instead of this one) _____

No. miles from your home to Area _____, distance for others in group if much different from yours _____

Estimate no. times your family (group) visits State Game Areas during the year for: Hunting _____ Other Reasons _____

What do you think of State Public Hunting Areas as places to visit?

Excellent _____ Good _____ Fair _____ Poor _____

Your Comments on above _____

Materials left whenever possible with autos observed on state game areas during designated counting periods: hunter and non-hunter postcard forms.

GAME AREA USE SURVEY

FIELD DATA FORM

AREA: _____ CHECKER _____ DATE _____

WEATHER: _____

_____

Round of Area	Starting Time	Ending Time	Number of cars tallied	Your Comments
1.				
2.				
3.				

AREA: _____ CHECKER _____ DATE _____

WEATHER: _____

_____

Round of Area	Starting Time	Ending Time	Number of cars tallied	Your Comments
1.				
2.				
3.				

AREA _____ CHECKER _____ DATE _____

WEATHER _____

_____

Round of Area	Starting Time	Ending Time	Number of cars tallied	Your Comments
1.				
2.				
3.				

APPENDIX B

Description and Location of State Game Areas in the Sample

APPENDIX B State Game Areas in the Survey

Area	Strata	County No.	County	Description of Area	Principal Game
Bays Branch (797 acres)	4	39	Guthrie	1/3 marsh, 2/3 upland	Waterfowl, Pheasant, Rabbit, Furbearers
Barringer Slough (1,071 acres)	4	21	Clay	Marshy prairie	Waterfowl, Pheasant, Rabbit, Furbearers
Big Marsh (2,813 acres)	4	12	Butler	1/4 marsh, 3/4 timber prairie	Waterfowl, Pheasant, Rabbit, Furbearers, Deer
Cone Marsh (621 acres)	3	58	Louisa	3/4 marsh, 1/4 upland	Waterfowl, Pheasant, Rabbit
Dewey's Pasture (401 acres)	2	21	Clay	Marshy prairie	Duck, Pheasant, Rabbit, Furbearers
Diamond Lake (563 acres)	3	30	Dickinson	1/2 lake, 1/2 open timber	Waterfowl, Pheasant, Furbearers, Rabbit
Dudgeon Lake (1,171 acres)	4	6	Benton	1/4 water, 3/4 open timber, borders Cedar River	Duck, Pheasant, Deer, Quail, Rabbit, Furbearers
East Twin Lake (493 acres)	3	41	Hancock	2/3 lake-marsh, 1/3 open timber, prairie	Waterfowl, Pheasant, Deer, Rabbit, Squirrel, Furbearers
Eldon Game Area (703 acres)	1	26	Davis	Upland and open timber	Quail, Squirrel, Deer, Coon
Green Island (2,722 acres)	4	49	Jackson	Shallow lake and marsh	Waterfowl, Deer, Furbearers
Harmon Lake (483 acres)	1	95	Winnebago	1/2 marsh, 1/2 open prairie	Waterfowl, Pheasant, Rabbit, Furbearers

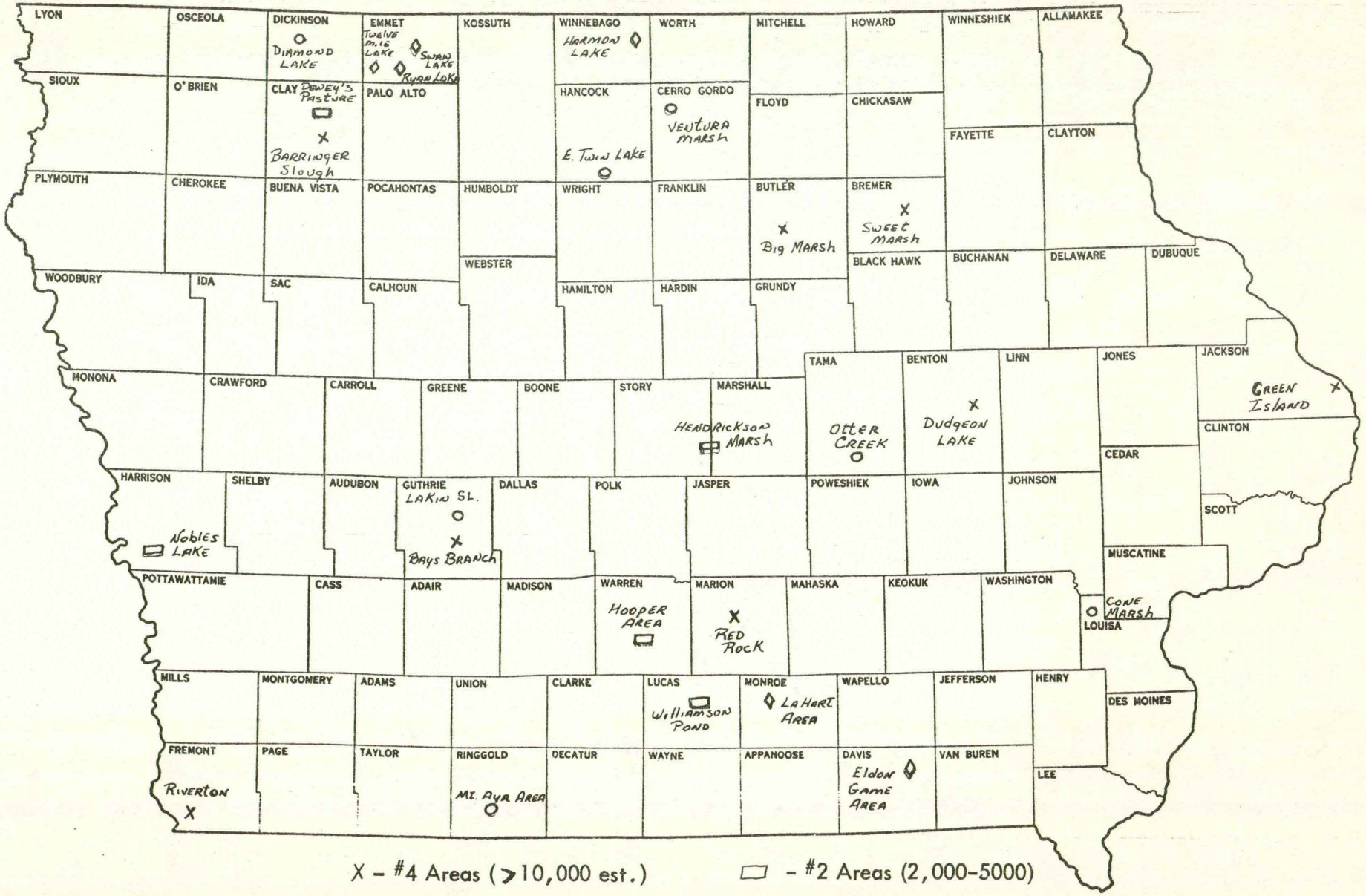
Contined APPENDIX B

Area	Strata	County No.	County	Description of Area	Principal Game
Hendrickson (601 acres)	2	85-64	Story and Marshall	Marsh and upland	Waterfowl, Pheasant, Rabbits, Furbearers
Hooper (323 acres)	2	91	Warren	Upland, timber	Quail, Squirrel, Rabbit Deer
Le Hart (166 acres)	1	68	Monroe	1/5 shallow lake 4/5 open timber	Waterfowl, Squirrel, Rabbit Quail, Deer, Furbearers
Lakin Slough (300 acres)	3	39	Guthrie	1/2 shallow marsh 1/2 prairie	Waterfowl, Pheasant, Rabbit, Furbearers
Mt. Ayr (1,158 acres)	3	80	Ringgold	Upland timber, marsh, prairie, ponds	Quail, Pheasant, Squirrel Rabbit, Deer, Furbearers
Nobles Lake (289 acres)	2	43	Harrison	Shallow lake-marsh, timber	Waterfowl, Pheasant, Rabbit, Deer, Quail, Furbearers
Otter Creek (2,496 acres)	3	86	Tama	Marsh and bottomland	Waterfowl, Pheasant, Deer, Squirrel, Furbearers
Red Rock	4	63	Marion	Manmade reservoir	Waterfowl, Pheasant, Quail, Deer, Squirrel, Furbearers
Riverton (941 acres)	4	36	Fremont	Shallow Marsh	Waterfowl, Deer, Furbearers
Ryan Lake (366 acres)	1	32	Emmet	1/3 open timber, 2/3 prairie	Pheasant, Squirrel, Rabbit, Partridge, Furbearers
Swan Lake (380 acres)	1	30	Dickinson	9/10 lake marsh, 1/10 upland timber	Pheasant, Rabbits, Waterfowl, Deer, Furbearers
Sweet Marsh (1,879 acres)	4	9	Bremer	1/2 marsh, 1/2 open timber, prairie	Waterfowl, Pheasant, Rabbit, Squirrel, Deer, Furbearers

Continued - APPENDIX B

Area	Strata	County No.	County	Description of Area	Principal Game
Twelve Mile (290 acres)	1	32	Emmet	Shallow lake bordered by timber	Waterfowl, Pheasant, Rabbit, Squirrel, Furbearers
Ventura Marsh (752 acres)	3	17	Cerro Gordo	9/10 marsh, 1/10 prairie	Waterfowl, Pheasant, Furbearers
Williamson Pond (126 acres)	2	59	Lucas	1/4 water, 3/4 timber	Squirrel, Quail, Rabbit, Furbearers

APPENDIX B - Continued. Distribution of State Game Areas to be Sampled During Public Use Survey (Sept. 13, 1969 - Sept. 18, 1970)
(based on number visitors estimated per year on all areas)



APPENDIX C

Estimated Number of Man-hours Spent on State-owned Game Areas
During Specific Intervals During
September 13, 1969 - September 12, 1970 Period

Part 1: Hunting Season Date*	Days	Strata (number of areas) I (75)	II (45)	III (33)	IV (25)
Sept. 13, 14	(2)	18,492	13,165	20,038	18,814
Weekdays Sept. 13-Oct.3	(15)	7,866	24,343	26,686	34,880
Weekends Sept.20,21,27,28	(4)**	11,040	14,904	14,572	18,584
Oct. 4, 5	(2)	3,919	5,697	10,201	13,570
Weekdays Oct.6-Oct.24	(15)	6,552	30,926	30,907	21,321
Weekends Oct.6-Oct.24	(4)**	5,520	9,936	15,787	18,400
Oct. 25, 26	(2)	22,190	28,963	36,765	87,497
Weekdays Oct.27-Nov.7	(10)	0	29,808	43,961	71,438
Weekend Nov. 1, 2	(2)**	20,700	24,840	30,360	78,200
Nov. 8, 9	(2)	3,612	11,012	15,241	13,156
Weekdays Nov.10-Dec.5	(18)	9,597	31,547	28,690	52,889
Weekends Nov.10-Dec.5	(4)**	4,140	13,248	13,358	20,240
Nov. 27-30	(4)	2,429	5,498	3,643	4,766
Dec. 6, 7, 8	(3)	3,271	5,061	4,600	5,477
Weekdays Dec. 9-22	(11)	3,416	2,163	3,507	3,701
Weekends Dec. 9-22	(4)**	1,380	3,312	4,250	4,600
Dec. 23 - Jan. 1 1970	(10)	2,194	7,821	4,900	3,977
Weekdays Jan.	(21)	0	9,824	2,792	8,486
Weekends Jan.	(8)	1,656	1,103	4,532	5,551
Weekdays Feb.	(20)	0	2,484	2,089	6,550
Weekends Feb.	(8)	0	2,252	3,320	0
Totals for Hunting Season	169	12,974	277,910	320,199	492,097

Total for all strata during entire hunting season
1,218,178 ± 148,559
(i.e., 95% confidence interval = 12.2%)

* Major hunting 1969 - 70

Squirrel	Sept. 13 - Dec. 31
Early Teal	Sept. 13 - Sept. 21
Rabbit	Sept. 13 - Feb. 15
Goose	Oct. 4 - Dec. 12
Duck	Oct. 25 - Nov. 23
Quail	Oct. 25 - Jan. 31
Pheasant	Nov. 8 - Dec. 31
Deer	Dec. 6, 7, 8

** No data were available for these days so an "average" was estimated and used for projection.

APPENDIX C

Continued

Part 2: Non-hunting Season

Date	Days	Strata (number of areas) I (75)	II (45)	III (33)	IV (25)
Weekdays Mar. 1-Apr. 17	(45)	4,347	23,805	2,656	31,327
Weekends Mar. 1-Apr. 17	(16)	2,225	5,548	5,666	14,216
Weekdays Apr. - May 28	(29)	13,347	14,407	28,561	68,748
Weekends Apr. 19-Mem. Day	(12)	14,184	21,924	65,334	113,712
Mem. Day May 29,30,31	(3)	1,691	4,813	16,333	28,428
Weekdays June 1 - July 2	(25)	0	29,330	16,751	58,817
Weekends June	(8)	6,994	23,979	15,889	51,934
July 3, 4, 5	(3)	961	6,179	7,586	16,042
Weekdays July 6-Sept. 4	(45)	8,073	35,248	28,881	79,819
Weekends July - Aug.	(16)	3,864	28,264	29,330	49,507
Labor Day Sept. 5, 6, 7	(3)	656	7,998	4,111	13,090
Sept. 8 - 12	(5)**	0	1,035	1,518	4,600
Non-hunting Season Totals		58,368	212,530	222,615	530,240

Total for all strata during non-hunting season

$1,021,754 \pm 134,164$
(i.e., 95% confidence Interval = 13.3%)

** No data were available for this period so an average was estimated and used for protection.

Part 3: Days not sampled but used in the stratification. (Values for these days were estimated by experienced personnel after studying the other results).

Dates	Description
September 20, 21, 27, 28	Second and third weekends of squirrel season.
October 11, 12, 18, 19	Second and third weekends of goose season.
November 1, 2	Second weekend of quail and duck season.
November 15, 16, 22, 23	Second and third weekend of pheasant season.
December 13, 14, 20, 21	December weekends.

APPENDIX D

Calculations Which Show That 14% of Iowa's Hunters Use State-owned Public Hunting Areas

APPENDIX D

960,000 = hours of hunting on public hunting areas.

15,000,000 = total hours of hunting in Iowa.

46.9 = per cent of time hunters using state areas hunt on state land.

X = total hours of hunting by hunters who use state areas.

$$.469\,X = 960{,}000$$

$$X = 2{,}046{,}908$$

Y = proportion of total hunting in the state done by hunters who hunt on state-owned areas.

$$Y = \frac{2{,}046{,}908}{15{,}000{,}000} = .136$$

APPENDIX E

An Alternative Method of Stratification With "Estimated" Results From This Study

APPENDIX E

Period

	Strata (see Table 1 - Hunting Strata)					
	I	II***	III a	III b	III c	IV
Sept. 13-14	11,766		19,674	17,580	12,321	5,049
Weekdays	26,596		12,267	25,200	25,110	6,980
Sept. weekends	* 9,620		6,960	10,000	15,000	6,600
Oct. 4-5	8,584		4,547	7,865	10,200	693
Weekdays	22,256		6,351	29,363	16,500	8,993
Weekends	* 5,920		4,640	14,500	13,200	5,286
Oct. 25, 26	15,791		35,821	34,300	71,640	10,296
Weekdays	21,904		29,754	40,550	58,020	2,200**
Weekends	*11,100		23,200	17,500	45,000	4,406
Nov. 8-9	14,474		3,271	12,485	7,122	3,762
Weekdays	18,648		33,408	43,200	23,652	3,960**
Weekends	*18,500		10,440	20,000	10,800	6,600
Thanksgiving	4,884		4,466	1,620	3,312	3,049
Dec. 6, 7, 8	7,748		2,401	1,710	4,635	660**
Weekdays	* 4,070		2,784	1,500	1,200	1,100
Weekends	* 2,220		3,573	2,750	2,244	5,324
Christmas	9,139		1,102	3,775	2,475	2,860
Jan. weekdays	4,196		0	1,223	7,371	0
Weekends	6,305		0	2,360	3,936	440
Feb. weekdays	3,108		1,392	0	5,544	660
Weekends	4,706		0	428	510	1,496
	231,635		206,051	287,909	339,852	80,402

Estimated total

1,259,532 $\pm$ 211,975 i.e., 15.83%

* No data were available for these periods. The numbers used are the estimates of experienced personnel after studying the data available.

** Insufficient data were available and the figures were estimated as described above.

*** Insufficient data for Class II areas were available so these areas were prorated at the same rate as Class III a Areas.

APPENDIX E

Continued.

Date	AGE CLASS I	II*	III
Weekdays Mar. 1 - Apr. 17	61,056		45,670
Weekends	24,576		32,379
Weekdays Apr. 1 - Mem. Day	94,916		34,106
Weekends	154,337		43,305
Memorial day	48,056		9,538
Weekdays June	100,224		46,104
Weekends	89,344		26,781
July 4, 5, 6	27,418		10,765
July - Aug. Weekdays	180,230		59,257
July - Aug. Weekends	101,212		20,547
Labor Day	25,592		2,448
	906,961		330,900

Total 1,237,861 $\pm$ 294,840

i.e., + 23.82%

* In this classification the Class II areas are those with significant amounts of camping, boating, swimming, etc. None was included in the sample for this study.

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