AN ANALYSIS OF MISSISSIPPI'S FIRST

POST-SEASON GAME HARVEST MAIL SURVEY (1970-71)

By

WILLIAM YOUNG QUISENBERRY III

APPROVED:

Professor of Wildlife and Fisheries and Head of the Department
(Chairman of Supervisory Committee)

Assistant Professor of Wildlife and Fisheries
(Member of Committee)

Associate Professor of Botany
(Minor Professor)

Dean of the School of Forest Resources

Assistant Professor of Wildlife and Fisheries
(Member of Committee)

Dean of the Graduate School

August 1971

ACKNOWLEDGMENTS

I wish to acknowledge the Mississippi Game and Fish Commission for making funds available for this project.

The advice, suggestions, and assistance in other forms of Mr. John L. Given, Jr., Head of the Division of Data Processing, Mississippi Game and Fish Commission, is deeply appreciated. I am also indebted to Mrs. Ann Faries, Mrs. Barbara Bowering, Mrs. Gloria Hales, and Mrs. Dianne Guinn of the Data Processing Division, who assisted in the programming, key punching, and verification of the survey data.

Special thanks are extended to Mr. Harold W. Rimmer, Head of the Accounting Division, Mississippi Game and Fish Commission, and his staff for assistance in the preparation of the questionnaires for mailing.

A note of appreciation is expressed to Dr. Don W. Hayne, Institute of Statistics, North Carolina State University, for his invaluable guidance and constructive criticism. The technical assistance and advice of Mr. Robert E. Mason and Mr. David W. Turner, also associated with the Institute of Statistics, is gratefully acknowledged.

Special thanks are due my graduate committee for their helpful suggestions in reviewing the manuscript. The committee consisted of Dr. Dale H. Arner, Head of the Department of Wildlife and Fisheries and Director of the Thesis; Dr. Wendell J. Lorio, Department of Wildlife and

Fisheries; Dr. J. Ray Watson, Department of Botany; and Mr. Bobby R. Tramel of the United States Department of Interior, Bureau of Sport Fisheries and Wildlife.

W. Y. Q.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

sorted into sub-sample sequence and returned to the computer system with the 5081 cards and the effective sample size (number of questionnaires mailed minus the number returned by the post office as non-deliverable) for each sub-sample was calculated.

Licensees were asked to furnish information concerning number of days afield, and total number harvested for the following species: mourning dove, bobwhite quail, rabbit, squirrel, duck, woodcock, deer, and turkey. In addition, licensees were requested to indicate which of the following species they have hunted or trapped in Mississippi: fox, crow, raccoon, opossum, beaver, bobcat, and geese. An attempt was made to determine general hunting pressure by county and game management district (Figure 5). Recipients were asked if they would purchase a user permit, advocate the establishment of more public hunting areas, and whether or not hunting activity occurred on a state or federal hunting area.

Mississippi utilized the same general game harvest mail survey procedures as do Maryland (Hodil, personal communication 1968, 1971), Tennessee (Legler, personal communication 1971), Alabama (Kelly, 1967, 1968), North Carolina (Barick and Critcher, 1955), Missouri (Sampson, 1965, 1968, 1969), Michigan (Eberhardt, 1961), New Jersey (Smith, 1968; Wright, 1964), New York (Maguire, 1962), and Kentucky (Durell, 1967).

Game and Fish Commission

STATE OF MISSISSIPPI

COMMISSIONERS
R. C. COOK, JR.
CHAIRMAN
LUCEDALE
MARSHALL D. TREPPENDAHL
VICE CHAIRMAN
WOODVILLE
HERSHEL B. HOWELL
WATER VALLEY
J. E. WOLFE
CLEVELAND
TOM W. CLEVELAND
JACKSON

P. O. BOX 451 • PHONE 354-7333 • JACKSON, MISSISSIPPI 39205

JOHN BELL WILLIAMS
GOVERNOR

CHARLES L. SULLIVAN
LIEUTENANT GOVERNOR

BILLY JOE CROSS
EXECUTIVE DIRECTOR

COMMISSIONERS
BILLY R. COVINGTON
MERIDIAN
KIRBY P. FAUCETTE
TUPELO
SAM V. MORSE
GULFPORT
BRENT NICKLE
OXFORD
TOM RIDDELL, JR.
CANTON
L. H. SANDERS
CARTHAGE

Fellow Sportsman:

You have been selected as a representative hunter to furnish us information concerning the 1970-71 hunting season.

Your reply on the enclosed form is very important. For accurate results, this information is needed from everyone receiving a questionnaire. If you did not hunt during 1970-71, please answer question one and return the questionnaire. DO NOT pass the questionnaire on to a friend who did hunt.

The information supplied by you and other selected hunters will assist the Mississippi Game and Fish Commission in managing our game resources and in wisely administering license fee funds. It is necessary that we make periodic checks in order to measure the effectiveness of our regulations and management practices.

Only a limited number of hunters can be contacted so a good response is needed for reliability.

As one of the hunters selected, you are requested to fill in the enclosed questionnaire as accurately as possible and return it in the self-addressed envelope provided.

A prompt reply will be sincerely appreciated.

Yours for better conservation,

Billy Joe Cross

Billy Joe Cross
Executive Director

BJC:nj

Enclosures

Figure 1. Letter of Transmittal - First Mailing

Game and Fish Commission

STATE OF MISSISSIPPI

COMMISSIONERS
R. C. COOK, JR.
CHAIRMAN
LUCEDALE
MARSHALL D. TREPPENDAHL
VICE CHAIRMAN
WOODVILLE
HERSHEL B. HOWELL
WATER VALLEY
J. E. WOLFE
CLEVELAND
TOM W. CLEVELAND
JACKSON

P. O. BOX 451 • PHONE 354-7333 • JACKSON, MISSISSIPPI 39205

JOHN BELL WILLIAMS
GOVERNOR

BILLY JOE CROSS
EXECUTIVE DIRECTOR

CHARLES L. SULLIVAN
LIEUTENANT GOVERNOR

COMMISSIONERS
BILLY R. COVINGTON
MERIDIAN
KIRBY P. FAUCETTE
TUPELO
SAM V. MORSE
GULFPORT
BRENT NICKLE
OXFORD
TOM RIDDELL, JR.
CANTON
L. H. SANDERS
CARTHAGE

Fellow Sportsman:

Recently we mailed you a Hunter Questionnaire and requested that you fill out and return the completed form. In case you have misplaced the original form, or haven't had an opportunity to complete it as yet, we are enclosing a duplicate and request that you take a few minutes to complete and return it in the enclosed stamped envelope.

We need your response to assure a high percentage of returns which are necessary because the number of hunters we are contacting is relatively small.

The information requested from you is for the purpose of managing our game resources. Please fill out the form and return it even if you did not hunt, or were not very successful in your efforts.

Your cooperation will assist us in better directing the management of Mississippi's game resources.

Thank you.

Yours for better conservation,

Billy Joe Cross

Billy Joe Cross
Executive Director

Enclosures

Figure 2. Letter of Transmittal - Second and Third Mailings

STATE OF MISSISSIPPI 1970-71 HUNTER QUESTIONNAIRE

IDENTIFICATION NO. 3-
HAZELWOOD JOHN R
RT 2 BOX 70
WEST POINT MS 39773

INSTRUCTIONS: PLEASE FILL OUT THIS FORM COMPLETELY. REPORT ONLY GAME TAKEN BY YOU. DO NOT REPORT THE KILL OF ANYONE WHO MIGHT HAVE BEEN WITH YOU. IF YOU HUNTED MORE THAN ONE KIND OF GAME ON A PARTICULAR DAY COUNT IT AS A DAY FOR EACH TYPE OF GAME YOU HUNTED. EVEN IF YOU DID NOT HUNT THIS SEASON PLEASE ANSWER THE FIRST QUESTION AND RETURN THIS FORM.

1. DID YOU HUNT ANY GAME DURING THE 1970-71 HUNTING SEASON IN MISSISSIPPI? YES___ NO___

2. DID YOU HUNT MOURNING DOVES? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

3. DID YOU HUNT BOBWHITE QUAIL? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

4. DID YOU HUNT RABBITS? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

5. DID YOU HUNT SQUIRRELS? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

6. DID YOU HUNT DUCKS? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

7. DID YOU HUNT WOODCOCK? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

8. DID YOU HUNT WHITE-TAILED DEER DURING THE.....

(A). ARCHERY SEASON? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

(B). GUN SEASON? YES___ NO___ ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

9. DID YOU HUNT TURKEY LAST SPRING? (APRIL 4, 1970 TO APRIL 26, 1970) YES___ NO___
ON HOW MANY DAYS?____ TOTAL KILL FOR SEASON_____

INSTRUCTIONS: PLEASE LIST THE MISSISSIPPI COUNTIES IN WHICH YOU HUNTED. RECORD THE TOTAL NUMBER OF DAYS HUNTED IN EACH COUNTY.

_____COUNTY _____DAYS _____COUNTY _____DAYS

_____COUNTY _____DAYS _____COUNTY _____DAYS

_____COUNTY _____DAYS _____COUNTY _____DAYS

INSTRUCTIONS: PLEASE CIRCLE OTHER SPECIES THAT YOU HAVE HUNTED OR TRAPPED IN MISSISSIPPI.

FOX CROW RACCOON OPPOSSUM BEAVER BOBCAT GEESE _____ OTHER _____ OTHER _____ OTHER

DID YOU HUNT ON A STATE OR FEDERAL HUNTING AREA DURING THE 1970-71 HUNTING SEASON? YES___ NO___

DO YOU BELIEVE MISSISSIPPI SHOULD ESTABLISH MORE HUNTING AREAS? YES___ NO___

IN ADDITION TO A HUNTING LICENSE WOULD YOU PURCHASE A USER PERMIT TO MAKE AVAILABLE ADDITIONAL FACILITIES OR SERVICES ON PUBLIC HUNTING AREAS? YES___ NO___

Figure 3. State of Mississippi 1970-71 Hunter Questionnaire

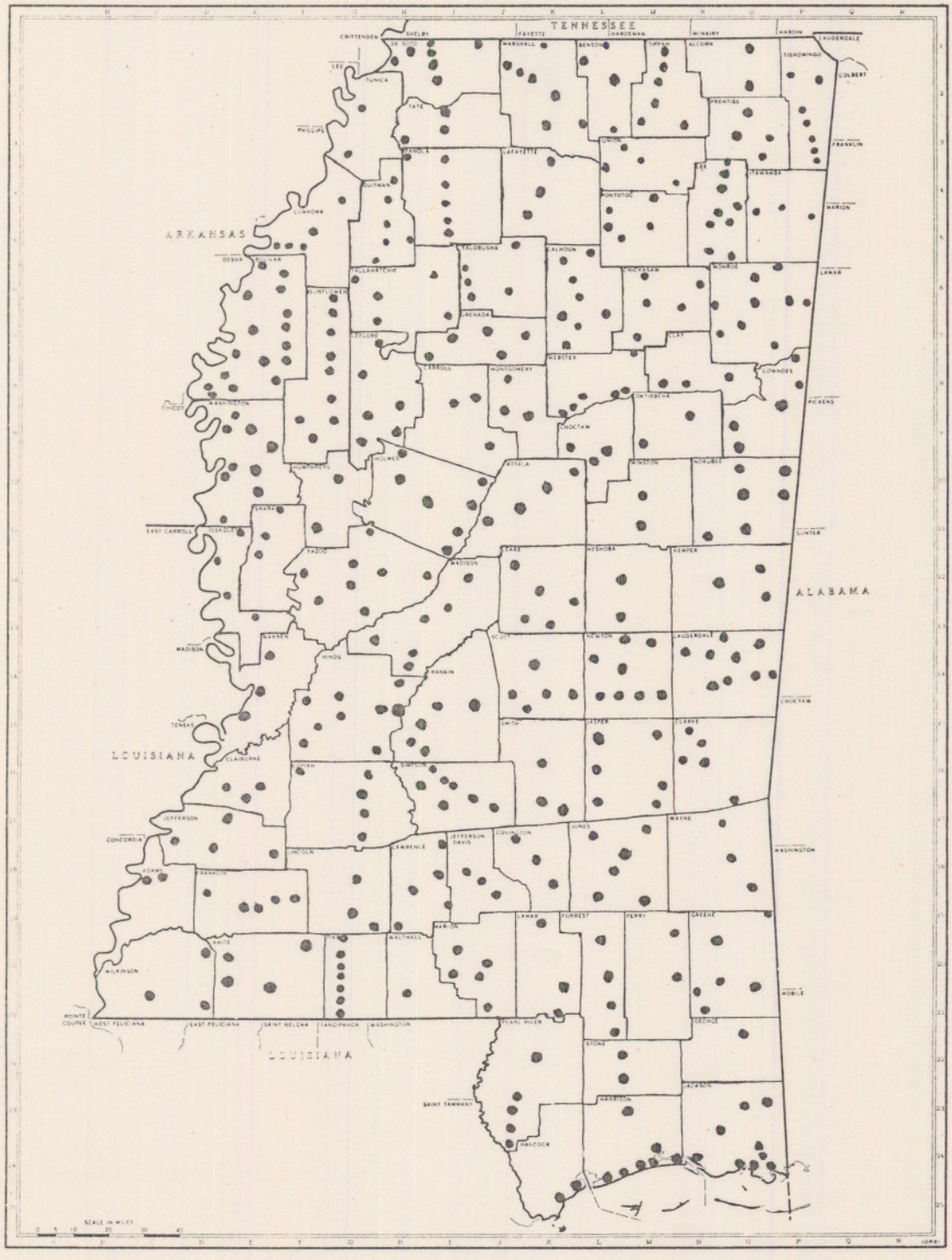

Figure 4. Distribution of the Survey Sample - Communities Represented in the Sample Are Indicated by Dots.

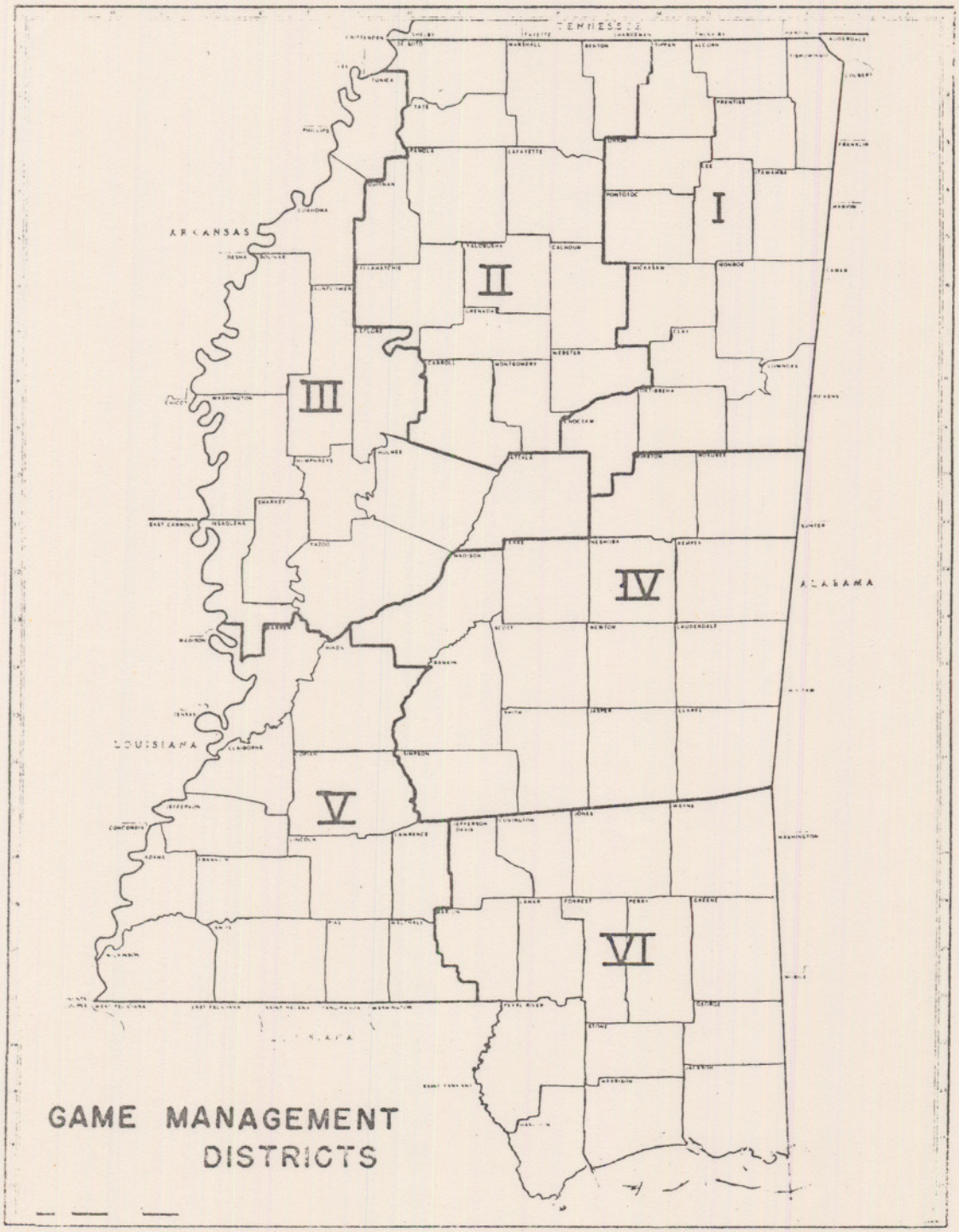

Figure 5. Mississippi Game Management Districts

RESULTS AND DISCUSSION

This analysis is based on the total response from three mailings at two-week intervals each from which 4,142 questionnaires (91.2 percent) were presumed delivered by the post office (402 or 8.8 percent were returned as undeliverable). One thousand eight hundred ninety-one (42 percent) of the selected licensees responded to the first mailing; 922 (20 percent), the second mailing; 394 (09 percent), the third mailing. Nine hundred thirty-five questionnaires (22.6 percent) had not been returned when the survey was terminated.

Using delivered questionnaires as a base, the 3,207 returns represented a response of 77.42 percent and the usable returns (3,205), a response of 77.38 percent. The usable returns constituted a 1.33 percent sample of Type I and Type II licenses purchased during the 1970-71 season. Table 2 is a summary of the survey mailing and response data.

Of the 3,207 licensees who returned questionnaires, 2,696 (84.12 percent) sought game during the season. Five hundred nine respondents (15.75 percent) did not hunt after purchasing a license. State-wide, an estimated 203,260 (84.52 percent) of Mississippi's 240,479 resident licensed hunters participated in some form of game hunting recreation.

A summary of the survey results is presented in Table 3. Data reveal squirrel to be the most popular game species hunted (62 percent), followed by deer - gun season (50 percent), rabbit (38 percent), mourning dove (35 percent), bobwhite quail (32 percent), duck (15 percent), turkey (10 percent), deer - archery season (05 percent), and woodcock (03 percent). Respondents harvested 30,344 squirrel, 30,052 mourning dove, 29,834 bobwhite quail, 13,867 rabbit, 3,649 duck, 727 woodcock, 527 deer (gun season), 24 deer (archery season), and 94 turkey. Mourning dove hunters were the most successful (96 percent), followed by squirrel (94 percent), bobwhite quail (92 percent), rabbit and woodcock (91 percent), duck (82 percent), turkey (24 percent), deer - gun season (23 percent), and deer - archery season (14 percent).

Information pertaining to each species consists of number hunters, total days afield, total harvest, average daily bag, average season bag, and average days afield for each of the three mailings (Tables 4-13). A summary of mourning dove data is found in Table 4; bobwhite quail, Table 5; rabbit, Table 6; deer - archery season, Table 7; deer - gun season, Table 8; deer - hunters not additive, Table 9; turkey, Table 10; squirrel, Table 11; duck, Table 12; and woodcock, Table 13.

Hunting pressure, based on 2,633 usable responses (82.15 percent), was determined by county (Table 14) and

game management district (Table 15). Results indicated that respondents spent 54,124 days in the field, an average of 4.8 days per hunter. Total hunter response (4,860) would suggest that many licensees hunted in more than one county during the season. Jones, Jackson, Bolivar, Lafayette, Pike, Kemper, Yazoo, Lauderdale, Monroe, Scott, and Warren counties, respectively, absorbed the greatest hunting pressure. Most hunting activity was centered in District VI (19.76 percent), while District III received the least (14.68 percent).

Data from this segment of the survey were not statistically analyzed, and a limited number of usable responses were tabulated. However, a general state-wide pattern of hunting pressure was established and useful, reasonably accurate information can be derived from this data.

Table 16 is a summary of licensees who have hunted or trapped other species in Mississippi, based on 3,205 usable responses. Raccoon was the most popular sought after game as indicated by the sampled hunters (15.28 percent), followed by fox (8.42 percent), crow (8.11 percent), opossum (7.50 percent), bobcat (4.41 percent), beaver (2.28 percent, and geese (1.39 percent). Table 17 points out the expanded estimate of licensees who have hunted or trapped other species in Mississippi. Confidence limits at the 95 percent probability level for this expanded estimate are listed in Table 18.

Two thousand four hundred seventy respondents (77.03 percent) did not hunt on state or federal hunting areas during the season. Hunter sentiment (73.60 percent) would suggest that Mississippi should establish more public hunting areas. One thousand seven hundred seventy-six sampled hunters (55.41 percent) would purchase a user permit, in addition to hunting license, to make available additional facilities or services on public hunting areas.

In regard to the user permit, many hunters expressed confusion and indecision. Comments such as "don't understand the question," "if the price is right," "license costs too much already," "don't know what a user permit is," and "too little information available to make a decision," were not uncommon. In retrospect, this was a poorly constructed question, and the accuracy of this particular data is questionable.

State-wide, an estimated 176,735 licensees (73.49 percent) did not hunt on public land; 63,744 (26.51 percent), did. An estimated 214,499 individuals (89.20 percent) favor the establishment of more public hunting areas in Mississippi; 259,699 (66.41 percent) would purchase a user permit in addition to a hunting license.

An expanded estimate including number of hunters, percentage of licensees, total days afield, total harvest, average daily bag, average season bag, and average days afield for eight game species is presented in Table 19. State-wide, these eight species provided Mississippi hunters

an estimated 4,034,735 days afield with an estimated harvest of 8,017,191 individual items of game. Standard error as applied to estimated number of hunters is tabulated in Table 20; days afield, Table 21; harvest, Table 22. Statewide confidence limits at the 95 percent probability level for estimated number of hunters, total days afield, and total harvest are pointed out in Table 23 and indicate a reasonable degree of high reliability (Drapala, personal interview 1971).

This initial project is a success and should be continued annually for a period of at least five years in order that Mississippi's game resources might be more effectively managed.

SUMMARY

1. Two thousand six hundred thirty-three respondents spent 54,124 days afield, an average of 4.8 days per hunter.
2. Jones, Jackson, Bolivar, Lafayette, Pike, Kemper, Yazoo, Lauderdale, Monroe, Scott, and Warren counties, respectively, absorbed the heaviest hunting pressure. Most hunting activity was centered in District VI (19.76 percent), while District III received the least (14.68 percent).
3. Squirrel was the most popular game sought by the respondents (62 percent), followed by deer - gun season (50 percent), rabbit (38 percent), mourning dove (35 percent), bobwhite quail (32 percent), duck (15 percent), turkey (10 percent), deer - archery season (05 percent), and woodcock (03 percent).
4. Respondents harvested 30,344 squirrel, 30,052 mourning dove, 29,835 bobwhite quail, 13,867 rabbit, 3,649 duck, 727 woodcock, 527 deer (gun season), 24 deer (archery season), and 94 turkey.
5. Mourning dove hunters were the most successful (96 percent), followed by squirrel (94 percent), bobwhite quail (92 percent), rabbit and woodcock (91 percent), duck (82 percent), turkey (24 percent), deer - gun season (23 percent), and deer - archery season (14 percent).

Previously, only two game surveys have been carried out. Leopold (1929) completed the first game survey of Mississippi. No estimated game harvest data were compiled in this publication. Thompson and Redmond (1951) were responsible for an analysis of game harvest during the 1950-51 hunting season (Table 1). Approximately 40 percent of 10,000 licensed hunters received a questionnaire (Hunters' Scorecard). Information supplied by the respondents was not statistically analyzed.

METHODS AND PROCEDURES

Mississippi Game and Fish Commission personnel conducted the state's first post-season game harvest mail survey during 1971. The Institute of Statistics, North Carolina State University, was contracted to complete a statistical analysis of the detail data.

Licensee names and addresses were selected at random from the current files of Type I (combination hunting and fishing) and Type II (hunting only) license stubs. License numbers with the following terminal digits provided by Dr. Don W. Hayne, Institute of Statistics, North Carolina State University, were selected: 017, 018, 019, 020, 409, 410, 411, 412, 593, 594, 595, 596, 797, 798, 799, 800, 909, 910, 911, 912 (Hayne, personal communication 1970). Of 240,479 Type I and Type II licenses purchased during the 1970-71 season, 4,544 individuals (1.89 percent) were selected to participate in the survey. Data supplied by 3,205 respondents (1.33 percent) were included in the analysis.

The initial mailing of questionnaires was made March 15, 1971, after the close of bobwhite quail season. Two regular follow-up mailings to non-respondents were made on March 31, 1971 (2,359), and April 16, 1971 (1,491). The survey was terminated May 4, 1971.

Selected hunters received a letter of transmittal (Figures 1 and 2), questionnaire form (Figure 3), and a self-addressed, postage-paid business reply envelope in a printed bulk mail permit window envelope. First class mail was used in all mailings.

Although no deliberate attempt to equalize geographic distribution was made, licensees residing in each of Mississippi's 82 counties were represented in the randomized sample (Figure 4). Communities represented in the sample are indicated by dots.

An IBM 360-20 computer system was utilized during the study. The name and address of each licensee was punched into a standard general purpose card. An identification number assigned to each licensee was created at the same time a master name and address tape file was written onto magnetic tape. Identification numbers were punched into the alphabetically arranged cards and printed on the questionnaire forms as a means of separating respondents from non-respondents and delivered from undelivered forms for subsequent mailings. Separation was accomplished by punching identification numbers of respondents on finder cards and machine-matching with the address cards to remove respondents from the address card deck (Sampson, 1965).

The continuous printed questionnaires were designed as three-part color-coded forms (first mailing, white; second mailing, green; third mailing, pink), and all were machine printed at one time.

Responses were edited to determine credibility and were coded to facilitate key punching and verification. Forms containing any valid data were considered usable by the writer. Questionnaires returned by a family member indicating that the selected licensee had moved, was in military service, had deceased, etc., were considered undelivered rather than unusable.

Usable responses were delivered to the key punch operator who recorded only the identification number in general purpose cards. The cards were sorted into ascending sequence and matched against the master name and address file to be updated and to determine which questionnaires were to be included as valid input for detail data. Valid questionnaires were returned to the key punch operator who recorded the detail data in general purpose cards. At the close of each mailing the identification numbers as recorded on the updated master file were sorted to determine which questionnaires should be included in the next mailing. Identification numbers of undelivered questionnaires were key punched so that the master file could be updated as they were returned. Deletion cards for undelivered questionnaires were held until the close of the third mailing.

At the close of the third mailing, the original master file was returned to the computer system and the number of respondents in each of five sub-samples was calculated and punched into 5081 cards. Undelivered deletion cards were

LIST OF TABLES (Continued)

INTRODUCTION

Wildlife regulatory agencies have for some time been approaching a system of adjustable regulations which vary with the status of the species, often on an annual basis. This system requires periodic estimates of relative population levels and harvests over extensive areas. These estimates can be obtained only through sampling surveys. Within the last several years considerable attention has been focused on such surveys throughout the Southeastern United States. As a result, call counts, road counts, bag counts, and other sampling techniques were developed (Overton, 1955).

Although specific objectives and techniques for obtaining the desired information have varied, the primary purpose has been to obtain basic data upon which improved wildlife management practices can be based. Barick and Critcher (1955) suggest five functions of the game survey that supply these basic data:

(1) The determination of the relative importance of individual game species as reflected by the amount of hunter-effort and the annual kill.
(2) The determination of hunter-success which is, to some degree, an index to availability and relative abundance.
(3) The correlation of annual trends in kills, hunter-success, and hunter-effort with annual variations in natural factors, such as weather and food supplies.

(4) In a similar manner, an evaluation and correlation of the effects of natural catastrophes, such as floods, fires, and hurricanes.
(5) Correlations between kills and annual changes in hunting seasons and bag limits.

Fluctuations in harvest from one year to the next should be the primary concern of the game harvest analysis. These fluctuations may reflect a change in the population level or they may be largely a function of other factors, such as weather, seasonal availability, hunting pressure influenced by some outside force, or the survey technique itself. Therefore, the nature and cause of these fluctuations must be carefully analyzed (Barick and Critcher, 1955).

Mail surveys have assumed an important role in the present administration of game and fish, primarily because they are the most inexpensive method of obtaining information that may be evaluated with existing statistical techniques (Overton, 1955). These surveys, however, may lead to bias.

Several important sources of bias are present. Of these, sampling error, response error, and non-response bias are the most common. It is felt that such biases are more serious and more difficult to isolate and correct in the field of game harvest surveys than in some other types of surveys (Hiltunen, 1952; Barick and Critcher, 1955; Martinson and Whitesell, 1964; Hayne, personal communication 1968).

Sampling error results when the sample of contacts is not representative of the subject of interest and is probably minimal when proper sampling techniques are used (Chapman, et al., 1959). Response errors in mail questionnaire surveys of hunters have been recognized as one of the major problems in that method of obtaining hunting statistics (Hiltunen, 1952; Atwood, 1956; Cronan, 1960; Hayne, 1964).

Hiltunen (1952), Overton (1955), Martinson and Whitesell (1964), and Hayne (1964) among others, have found that hunters tend to report more hunting activity and better success than they actually experienced with the response errors thus incurred resulting in a positive bias affecting the data collected.

"Prestige Bias" and "Memory Bias" are the two most apparent response errors (Overton, 1955; Atwood, 1956; Cronan, 1960). Prestige bias is the term applied to the hesitancy to admit to poor success. Memory bias presumably occurs when a respondent guesses his seasonal kill. Few people remember exactly how much game they killed, and the greater the time lapse between the event and the estimate, the greater the bias is likely to be. Too, there is a natural tendency to suppress information on game taken illegally.

Non-response bias is due to the tendency for the more successful persons to answer the questionnaire more readily than the less successful ones. This phenomenon has been

suspected by many biologists and demonstrated by Hayne (1964) and Martinson and Whitesell (1964) among others.

Confidence intervals are an objective measure of reliability employed to ascertain the degree of confidence with respect to the accuracy of game harvest estimates. Narrowing the spread of confidence intervals would enable one to place more reliance on the data derived. Much greater faith could be placed on an estimate if confidence intervals could be held to not more than 10 percent of the computed kill (Barick and Critcher, 1955; Drapala, personal interview 1971). Further research in testing and evaluating confidence intervals as they apply to this type of survey is needed.

It may be stated that "although the game harvest mail survey shows much promise as a valuable game management tool, much work still needs to be done in the way of refining the technique. This refinement should be aimed at evaluating and compensating for biases and improving the confidence intervals, which, in turn, may be expected to produce more accurate data on kill fluctuations and population levels" (Barick and Critcher, 1955).

The purpose of the 1970-71 game harvest mail survey is to compile the first statistically reliable estimate of Mississippi's annual game harvest. It is also the first survey of its kind conducted in the state.

6. In regard to other species hunted or trapped in Mississippi, raccoon was sought by 15.28 percent of the sampled hunters, followed by fox (8.42 percent), crow (8.11 percent), opossum (7.50 percent), bobcat (4.41 percent), beaver (2.28 percent), and geese (1.39 percent).
7. State-wide, an estimated 203,260 (84.52 percent) of Mississippi's 240,479 resident licensed hunters participated in some form of game hunting recreation.
8. An expanded state-wide estimate of total number hunters, total days afield, and total harvest respectively for each kind of game follows: mourning dove 81,904 - 357,394 - 2,213,530; bobwhite quail 75,411 - 639,427 - 2,173,500; rabbit 91,442 - 702,804 - 1,059,120; deer (archery season) 10,296 - 62,543 - 1,608; deer (gun season) 118,935 - 853,984 - 35,886; deer by either bow or gun (hunters not additive) 119,939 - 911,803 - 37,353; turkey 22,548 - 103,165 - 6,355; squirrel 151,046 - 1,134,180 - 2,298,120; duck 33,217 - 159,080 - 254,236; woodcock 6,844 - 26,839 - 54,862.
9. State-wide, these eight species provided Mississippi hunters an estimated 4,034,735 days afield with an estimated harvest of 8,017,191 individual items of game.
10. Confidence intervals at the 95 percent probability level were computed state-wide for number of licensees

hunting each species, total days afield, and total harvest and indicate a reasonable degree of high reliability.

11. An estimated 89.20 percent of Mississippi hunters favor the establishment of more public hunting areas in the state; most did not hunt on state or federally controlled land (73.49 percent); 66.41 percent would purchase a user permit, in addition to a hunting license, to make available additional facilities or services on public hunting areas.

ABSTRACT

William Young Quisenberry, III, Master of Science, 1971

Major: Wildlife Ecology, Department of Wildlife and Fisheries

Title of Thesis: An Analysis of Mississippi's First Post-Season Game Harvest Mail Survey (1970-71)

Directed by: Dr. Dale H. Arner

Pages in Thesis: 51 Words in Abstract: 287

ABSTRACT

Mississippi's first post-season game harvest mail survey was conducted during 1971. Names and addresses of 4,544 licensees were selected at random from the current file of 240,479 resident hunting and combination hunting and fishing license stubs. An initial mailing with two follow-up mailings were used and consisted of a questionnaire, letter of transmittal, and business reply envelope. Data were programmed, compiled, key punched, and verified by personnel of the Data Processing Department, Mississippi Game and Fish Commission. Detail cards were mailed to the Institute of Statistics, North Carolina State University, where a statistical analysis was conducted.

General hunting pressure (number hunters and percent of hunting activity) by county and game management district was determined. State-wide, an estimated 203,260 licensees participated in some form of game hunting activity.

An expanded state-wide estimate of total number hunters, total days afield, and total harvest, respectively, for eight game species follows: mourning dove 81,904 - 357,394 - 2,213,530; bobwhite quail 75,411 - 639,427 - 2,173,500; rabbit 91,442 - 702,804 - 1,059,120; deer (archery season) 10,296 - 62,543 - 1,608; deer (gun season) 118,935 - 853,984 - 35,886; deer by either bow or gun (hunters not additive) 119,939 - 911,803 - 37,353; turkey 22,548 - 103,165 - 6,355; squirrel 151,046 - 1,134,180 - 2,298,120; duck 33,217 - 159,080 - 254,236; woodcock 6,844 - 26,839 - 54,862.

Confidence intervals at 95 percent probability level were computed state-wide for number of licensees hunting each species, total days afield, and total harvest, and they indicate a reasonable degree of high reliability.

Mississippi hunters favor the establishment of more public hunting areas in the state (89.20 percent); most did not hunt on state or federally controlled land (73.49 percent); 66.41 percent would purchase a user permit, in addition to a hunting licenase, to make available additional facilities or services on public hunting areas.

APPENDIX

Table 1. State-Wide Game Kill, 1950-51 Season

Species	Percentage Licensees Hunting	Number Hunters	Average No. Times Hunted	Average Kill Per Hunt	Average Kill Per Season	Estimated Harvest
Deer*	6.00	11,283			.12	1,370
Turkey	1.35	2,557	3.40	.028	.097	249
Quail	47.12	89,056	7.15	3.32	23.80	2,119,532
Squirrel	79.83	150,878	7.23	2.21	16.03	2,418,574
Rabbit	47.15	89,113	6.44	1.57	10.14	900,360
Raccoon	16.20	30,693	6.15	1.10	6.80	208,712
Opossum	23.06	43,583	5.16	1.71	8.86	386,145
Dove	21.58	40,786	3.25	3.93	12.82	522,876
Duck	8.97	16,226	4.75	2.35	11.23	182,217

*Estimates based on Wardens' reports on deer kill and deer camp permit holders reports.

Table 2. 1970-71 Survey Mailing and Response Data

First Mailing	Number	Total Percent
Total Mailed	4,544	100.0%
Undelivered	331	7.2%
Delivered	4,213	92.8%
Returned	1,854	44.0%
Usable	1,854	100.0%
Not Usable	0	
Not Returned	2,359	55.9%
Second Mailing	**Number**	**Total Percent**
Total Mailed	2,359	100.0%
Undelivered	50	2.2%
Delivered	2,309	97.8%
Returned	922	39.9%
Usable	922	100.0%
Not Usable	0	
Not Returned	1,387	60.1%
Third Mailing	**Number**	**Total Percent**
Total Mailed	1,491	100.0%
Undelivered	21	1.4%
Delivered	1,116	98.6%
Returned	394	35.0%
Usable	392	99.9%
Not Usable	2	0.5%
Not Returned	722	64.7%
Total	**Number**	**Total Percent**
Total Mailed	4,544	100.0%
Undelivered	402	8.8%
Delivered	4,142	91.2%
Returned	3,207	77.4%
Usable	3,205	77.3%
Not Usable	02	0.062%
Not Returned	935	22.6%

Table 3. Summary 1970-71 Mississippi Post-Season Game Harvest Mail Survey

Total Number Usable Replies: 3,205

(Number Who Actually Hunted: 2,697)

Species	Total Hunters	Percent Successful Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield	Percentage of Licensees Who Hunted
Mourning Dove	1,115	96%	5,056	30,052	5.95	26.95	4.54	35%
Quail	1,048	92%	8,437	29,834	3.54	28.47	8.05	32%
Rabbit	1,203	91%	9,190	13,867	1.51	11.53	7.64	38%
Deer-Archery	150	14%	953	24	0.025	0.16	6.35	05%
Deer-Gun	1,607	23%	11,525	527	0.046	0.33	7.17	50%
Turkey	315	24%	1,455	94	0.065	0.30	4.62	10%
Squirrel	1,998	94%	14,808	30,344	2.05	15.19	7.41	62%
Duck	480	82%	2,283	3,649	1.60	7.60	4.76	15%
Woodcock	100	91%	407	727	1.79	7.27	4.07	03%

Table 4. Summary Dove Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	685	3,310	19,456	5.88	28.40	4.83
Second	309	1,216	7,286	5.99	23.58	3.94
Third	121	530	3,310	6.25	27.36	4.38
Total	1,115	5,056	30,052	5.94	26.95	4.54

Table 5. Summary Bobwhite Quail Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	630	5,487	18,613	3.39	29.57	8.75
Second	302	1,916	7,582	3.96	25.11	6.34
Third	116	1,034	3,639	3.52	31.37	8.91
Total	1,048	8,437	29,834	3.54	28.47	8.05

Table 6. Summary Rabbit Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	690	5,351	8,015	1.50	11.67	7.76
Second	357	2,454	3,955	1.61	11.08	6.87
Third	156	1,385	1,897	1.37	12.16	8.88
Total	1,203	9,190	13,867	1.51	11.53	7.64

Table 7. Summary Deer (Archery Season) Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	101	675	17	0.025	0.17	6.68
Second	33	179	4	0.022	0.03	5.42
Third	16	99	3	0.030	0.19	6.19
Total	150	953	24	0.025	0.16	6.35

Table 8. Summary Deer (Gun Season) Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	966	7,168	361	0.050	0.37	7.42
Second	439	2,998	109	0.036	0.25	6.83
Third	202	1,359	57	0.042	0.28	6.73
Total	1,607	11,525	527	0.045	0.33	7.17

Table 9. Summary Deer Bow and Gun (Hunters not additive) Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	972	7,807	376	0.048	0.39	8.03
Second	444	3,150	113	0.036	0.25	7.09
Third	203	1,449	60	0.041	0.30	7.24
Total	1,619	12,406	549	0.044	0.34	7.66

Table 10. Summary Turkey Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	202	944	67	0.071	0.33	4.67
Second	85	358	20	0.065	0.24	4.21
Third	28	153	7	0.027	0.25	5.46
Total	315	1,455	94	0.065	0.30	4.62

Table 11. Summary Squirrel Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	1,166	8,766	17,903	2.04	15.35	7.52
Second	595	3,979	8,312	2.09	13.97	6.68
Third	237	2,063	4,129	2.00	17.42	8.70
Total	1,998	14,808	30,344	2.05	15.19	7.41

Table 12. Summary Duck Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	319	1,500	2,414	1.61	7.57	4.70
Second	110	525	894	1.70	8.13	4.77
Third	51	258	341	1.32	6.70	5.06
Total	480	2,283	3,649	1.60	7.60	4.76

Table 13. Summary Woodcock Harvest Mail Survey 1970-71

Based on 3,205 Usable Responses

Mailing	Number Hunters	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
First	69	291	435	1.49	6.30	4.22
Second	26	88	242	2.75	9.31	3.38
Third	5	28	50	1.79	10.00	5.60
Total	100	407	727	1.79	7.27	4.07

Table 14. County Summary of Hunting Pressure

Based on 2,633 Usable Responses

County	Total Man Days Hunted	Total Hunter Response	Percent Hunting Pressure
Adams	883	58	1.63%
Alcorn	214	20	.39%
Amite	699	68	1.29%
Attala	494	46	.91%
Benton	583	78	1.07%
Bolivar	1,125	86	2.07%
Calhoun	678	47	1.25%
Carroll	445	51	.82%
Chickasaw	635	64	1.17%
Choctaw	467	42	.86%
Claiborne	564	54	1.04%
Clarke	511	56	.94%
Clay	900	58	1.66%
Coahoma	238	26	.43%
Copiah	600	68	1.10%
Covington	490	49	.90%
DeSoto	811	42	1.49%
Forrest	862	88	1.59%
Franklin	673	49	1.24%
George	629	57	1.16%
Greene	702	71	1.29%
Grenada	473	47	.87%
Hancock	475	37	.87%
Harrison	854	76	1.57%
Hinds	943	107	1.74%
Holmes	635	57	1.17%
Humphreys	233	33	.43%
Issaquena	692	72	1.27%
Itawamba	622	56	1.14%
Jackson	1,175	94	2.17%
Jasper	615	64	1.13%
Jefferson	455	38	.84%
Jefferson Davis	326	37	.60%
Jones	1,242	101	2.29%
Kemper	1,033	82	1.90%
Lafayette	1,068	110	1.97%
Lamar	477	52	.88%
Lauderdale	1,016	80	1.87%
Lawrence	270	35	.49%
Leake	560	42	1.03%
Lee	770	72	1.42%
Leflore	793	71	1.46%

Table 14. County Summary of Hunting Pressure (Continued)

Based on 2,633 Usable Responses

County	Total Man Days Hunted	Total Hunter Response	Percent Hunting Pressure
Lincoln	532	40	.98%
Lowndes	753	42	1.39%
Madison	624	78	1.15%
Marion	939	53	1.73%
Marshall	730	87	1.34%
Monroe	993	71	1.83%
Montgomery	782	53	1.44%
Neshoba	437	46	.80%
Newton	695	53	1.28%
Noxubee	629	81	1.16%
Oktibbeha	228	43	.42%
Panola	833	65	1.53%
Pearl River	640	54	1.18%
Perry	699	71	1.29%
Pike	1,048	81	1.93%
Pontotoc	533	65	.98%
Prentiss	587	46	1.08%
Quitman	311	23	.57%
Rankin	658	79	1.21%
Scott	982	89	1.81%
Sharkey	714	69	1.31%
Simpson	632	52	1.16%
Smith	813	56	1.50%
Stone	634	77	1.17%
Sunflower	957	73	1.76%
Tallahatchie	369	39	.68%
Tate	578	42	1.06%
Tippah	532	53	.98%
Tishomingo	647	46	1.19%
Tunica	348	24	.64%
Union	587	56	1.08%
Walthall	616	43	1.13%
Warren	982	94	1.81%
Washington	697	74	1.28%
Wayne	537	57	.99%
Webster	500	42	.92%
Wilkinson	398	34	.73%
Winston	376	43	.69%
Yalobusha	622	47	1.14%
Yazoo	1,022	78	1.88%
	54,124	4,860	100.00%

Table 15. District Summary of Hunting Pressure

Based on 2,633 Usable Responses

Game Management District	Total Man Days Hunted	Total Hunter Response	Percent Hunting Pressure
District I	8,468	734	15.64%
District II	8,783	773	16.22%
District III	7,948	709	14.68%
District IV	9,581	901	17.70%
District V	8,663	769	16.00%
District VI	10,681	974	19.76%
Total	54,124	4,860	100.00%

Table 16. Licensees Who Have Hunted or Trapped Other Species in Mississippi

Usable Responses: 3,205

Species	Respondents Who Hunted or Trapped	Percent	Respondents Who Did Not Hunt or Trap	Percent
Fox	270	8.42%	2,935	91.56%
Crow	260	8.11%	2,945	91.89%
Raccoon	494	15.28%	2,711	84.56%
Opossum	240	7.50%	2,965	92.51%
Beaver	73	2.28%	3,132	97.72%
Bobcat	146	4.41%	3,059	95.44%
Geese	39	1.22%	3,166	98.78%
Other	45	1.39%	3,160	98.59%

Table 17. Licensees Who Have Hunted or Trapped Other Species in Mississippi

Expanded Summary

Total Licensees: 240,479

Species	Estimated Hunters	Standard Error	
Fox	19,907	1,574	7.9%
Crow	18,326	1,561	8.5%
Raccoon	36,737	2,321	6.3%
Opossum	17,820	1,909	0.7%
Beaver	4,909	644	3.1%
Bobcat	10,790	882	8.2%
Geese	2,692	480	7.8%
Other	3,090	472	5.3%

Table 18. Confidence Limits at 95% Probability Level

Expanded Estimate of Licensees Who Have Hunted Or Trapped Other Species in Mississippi (Variation From the Mean)

Species	Estimated Hunters
Fox	19,907 ± 3,085
Crow	18,326 ± 3,059
Raccoon	36,737 ± 4,549
Opossum	17,820 ± 3,741
Beaver	4,909 ± 1,262
Bobcat	10,790 ± 1,728
Geese	2,692 ± 940
Other	3,090 ± 925

Table 19. Expanded Summary 1970-71 Mississippi Post-Season Game Harvest Mail Survey

Total Licensees: 240,479

Species	Total Hunters	Percent of Total Permittees	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
Mourning Dove	81,904	34.06	357,394	2,133,530	5.97	26.05	4.36
Quail	75,411	31.36	639,427	2,173,500	3.40	28.82	8.48
Rabbit	91,442	38.02	702,847	1,059,120	1.51	11.58	7.69
Deer - Archery Season	10,296	4.28	62,543	1,608	0.026	0.16	6.07
Deer - Gun Season	118,935	49.46	853,984	35,886	0.042	0.30	7.18
Deer - Bow or Gun (Hunters not additive)	119,939	49.88	911,803	37,353	0.041	0.31	7.60
Turkey	22,548	9.38	103,165	6,355	0.062	0.28	4.58
Squirrel	151,046	62.81	1,134,180	2,298,120	2.03	15.21	7.51
Duck	33,217	13.81	159,080	254,236	1.60	7.65	4.79
Woodcock	6,844	2.85	26,839	54,862	2.04	8.02	3.92

Table 20. Mississippi Post-Season Game Harvest Mail Survey 1970-71

Expanded Estimate of Total Hunters

Species	Total Number of Hunters	Standard Error	
Mourning Dove	81,904	3,697	4.5%
Quail	75,411	2,619	3.5%
Rabbit	91,442	3,070	3.4%
Deer - Archery Season	10,296	883	8.6%
Deer - Gun Season	118,935	2,412	2.0%
Deer by Either Bow or Gun (Hunters not additive)	119,939	2,494	2.1%
Turkey	22,548	839	3.7%
Squirrel	151,046	3,678	2.4%
Duck	33,217	2,422	7.3%
Woodcock	6,844	932	13.6%

Table 21. Mississippi Post-Season Game Harvest Mail Survey 1970-71

Expanded Estimate of Total Days Afield

Species	Total Days Afield	Standard Error	
Mourning Dove	357,394	18,816	5.3%
Quail	639,427	41,119	6.4%
Rabbit	702,847	39,920	5.7%
Deer - Archery Season	62,543	2,671	4.3%
Deer - Gun Season	853,984	13,898	1.6%
Deer by Either Bow or Gun (Hunters not additive)	911,803	13,601	1.5%
Turkey	103,165	7,683	7.4%
Squirrel	1,134,180	34,455	3.0%
Duck	159,080	17,560	11.0%
Woodcock	26,839	4,400	16.4%

Table 22. Mississippi Post-Season Game Harvest Mail Survey 1970-71

Expanded Estimate of Total Harvest

Species	Total Harvest	Standard Error	
Mourning Dove	2,133,530	155,345	7.3%
Quail	2,173,500	124,347	5.7%
Rabbit	1,059,120	46,341	4.4%
Deer - Archery Season	1,608	372	2.3%
Deer - Gun Season	35,886	2,318	6.5%
Deer by Either Bow or Gun (Hunters not additive)	37,353	1,895	5.1%
Turkey	6,355	841	13.2%
Squirrel	2,298,120	33,697	1.5%
Duck	254,236	32,014	12.6%
Woodcock	54,862	8,333	15.2%

Table 23. Confidence Limits at 95% Probability Level

Expanded Estimate of Total Hunters, Total Days Afield, Total Harvest
(Variation from the Mean)

Species	Number of Hunters	Total Days Afield	Total Harvest
Mourning Dove	81,904 ± 7,246	357,394 ± 36,879	2,213,530 ± 304,476
Quail	75,411 ± 5,133	639,427 ± 80,593	2,173,500 ± 243,720
Rabbit	91,442 ± 6,017	702,804 ± 78,243	1,059,120 ± 90,828
Deer (Archery Season)	10,296 ± 1,731	62,543 ± 5,235	1,608 ± 729
Deer (Gun Season)	118,935 ± 4,727	853,984 ± 27,240	35,886 ± 4,543
Deer by Either Bow or Gun (Hunters not additive)	119,939 ± 4,888	911,803 ± 26,658	37,353 ± 3,714
Turkey	22,548 ± 1,644	103,165 ± 15,059	6,355 ± 1,648
Squirrel	151,046 ± 7,209	1,134,180 ± 67,532	2,298,120 ± 66,046
Duck	33,217 ± 4,747	159,080 ± 34,418	254,236 ± 62,747
Woodcock	6,844 ± 1,827	26,839 ± 8,624	54,862 ± 16,333

LITERATURE CITED

Atwood, E. L. 1956. Validity of mail survey data on bagged water-fowl. J. Wildl. Mgmt., 20 (1): 1-16.

Barick, Frank B., and T. Stuart Critcher. 1955. Statistical game kill surveys--some observations on five years of operation. 9th Ann. Meeting, S. E. Assn. Game and Fish Comm's. 43-47.

Chapman, D. G., W. S. Overton, and A. L. Finkner. 1959. Methods of estimating dove kill. Mimeo Series No. 264, Institute of Statistics, North Carolina State College, Raleigh. 48 pp.

Cronan, J. M. 1960. Prestige and memory bias in hunter kill surveys. Paper presented at the Northeast Wildl. Conf., Providence, R. I., January 1960.

Durell, James S. 1967. A brief study of hunters and the owners of the land on which they hunt. Proc. 21st Ann. Conf. S. E. Assn. Game and Fish Comm's. 81-87.

Eberhardt, Lee. 1961. Estimating the kill of game animals by licensed hunters. American Statistical Association Journal. June 1961: 396-397.

Hayne, D. W. 1964. Investigation of mail survey reporting by water-fowl hunters. Report prepared for U. S. Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife, Patuxent Wildlife Research Center. Institute of Statistics, N. C. S., Raleigh. 24 pp.

Hiltunen, Eero. 1952. On the reliability of the hunting license statistics. Suomen Riista. 7: 72-81.

Kelly, William F. 1967. Statewide game harvest 1966-67. P-R Proj. W-34-15, Work Plan No. 2, Job No. 2-B. Alabama Dept. Conservation. Unpubl.

_____. 1968. Statewide game harvest 1967-68. P-R Proj. W-34-16, Work Plan No. 2, Job No. 2-B. Alabama Dept. Conservation. Unpubl.

Leopold, Aldo. 1929. Report on a game survey of Mississippi. Submitted to the Game Restoration Committee, Sporting Arms and Ammunition Manufacturer's Institute. February 1, 1929.

Table 2. 1971-72 Survey Mailing and Response Data

First Mailing	Number	Total Percent
Mailed	6003	100.00
Undelivered	235	3.91
Delivered	5768	96.08
Returned	1943	33.68
Usable	1927	33.40
Not usable	16	0.27
Not returned	3825	66.31
Second Mailing	**Number**	**Total Percent**
Mailed	3825	100.00
Undelivered	55	1.43
Delivered	3770	98.56
Returned	1364	36.18
Usable	1352	35.86
Not usable	12	0.31
Not returned	2406	63.81
Third Mailing	**Number**	**Total Percent**
Mailed	2406	100.00
Undelivered	30	1.24
Delivered	2376	98.75
Returned	555	23.35
Usable	547	23.02
Not usable	8	0.33
Not returned	1821	76.64
Survey Total	**Number**	**Total Percent**
Mailed	6003	100.00
Undelivered	320	5.33
Delivered	5683	94.67
Returned	3862	67.95
Usable	3826	67.32
Not usable	36	0.63
Not returned	1821	32.05

TABLE 3. SUMMARY 1971 - 72 MISSISSIPPI MAIL SURVEY OF GAME HARVEST

TOTAL NUMBER RESPONDENTS: 3826

SPECIES	TOTAL HUNTERS	PERCENT SUCCESSFUL HUNTERS	TOTAL DAYS AFIELD	TOTAL HARVEST	AVERAGE DAILY BAG	AVERAGE SEASON BAG	AVERAGE DAYS AFIELD	PERCENTAGE OF LICENSEES WHO HUNTED
Dove	1,304	97	6,510	38,541	5.92	29.56	4.99	35
Quail	1,031	93	9,328	31,727	3.40	30.77	9.05	28
Rabbit	1,368	93	10,482	18,586	1.77	13.59	7.66	37
Squirrel	2,388	96	19,500	44,771	2.30	18.75	8.17	64
Turkey	370	28	1,705	148	0.09	0.40	4.61	10
Woodcock	87	97	348	430	1.24	4.94	4.00	2
Deer - Archery	216	15	1,411	39	0.03	0.18	6.53	6
Deer - Gun	1,727	24	12,464	580	0.05	0.34	7.22	46
Mallard Duck	408	79	1,874	2,500	1.33	6.13	4.59	11
Wood Duck	275	87	1,045	1,458	1.40	5.30	3.80	7
Other Duck	77	83	267	488	1.83	6.34	3.47	2

Table 1. Expanded Summary 1971 - 72 Mississippi Mail Survey of Game Harvest Based on 249,502 Combination Hunting and Fishing and Hunting Only Licenses Sold

Species	Total Hunters	Percent of Total Permittees	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
Mourning Dove	74,255	29.76	367,337	2,132,800	5.81	28.72	4.94
Quail	63,008	25.25	563,221	1,830,530	3.25	29.05	8.94
Rabbit	88,202	35.35	688,192	1,291,138	1.88	14.64	7.80
Squirrel	155,484	62.31	1,273,910	2,858,620	2.24	18.39	8.19
Turkey	21,125	8.46	95,121	9,103	0.10	0.43	4.50
Woodcock	4,893	1.96	20,360	33,758	1.66	6.90	4.16
Deer Archery Season	11,122	4.45	73,403	1,681	0.02	0.15	6.60
Deer Gun Season	106,039	42.50	729,539	32,966	0.05	0.31	6.88
Mallard Duck	23,205	9.30	118,995	132,356	1.11	5.70	5.13
Wood Duck	15,863	6.35	59,671	91,112	1.53	5.74	3.76
Other Ducks	4,226	1.69	17,658	32,264	1.83	7.63	4.18

Table 4. Mississippi Mail Survey of Game Harvest
1971 - 72
Expanded Estimate of Total Hunters

Species	Total Number of Hunters	Standard Error	
Mourning Dove	74,255	4,292	5.7%
Quail	63,008	2,861	4.5%
Rabbit	88,202	4,245	4.8%
Squirrel	155,484	4,877	3.1%
Turkey	21,125	1,884	8.9%
Woodcock	4,893	676	13.8%
Deer - Archery Season	11,112	467	4.2%
Deer - Gun Season	106,039	2,323	2.1%
Mallard Duck	23,205	1,557	6.7%
Wood Duck	15,863	1,116	7.0%
Other Duck	4,226	681	16.1%

Table 5. Mississippi Mail Survey of Game Harvest
1971 - 72
Expanded Estimate of Total Days Afield

Species	Total Days Afield	Standard Error	
Mourning Dove	367,337	18,411	5.0%
Quail	563,221	42,058	7.4%
Rabbit	688,192	63,796	9.2%
Squirrel	1,273,910	78,856	6.1%
Turkey	95,121	10,043	10.5%
Woodcock	20,360	8,144	40.0%
Deer - Archery Season	73,403	7,437	10.1%
Deer - Gun Season	729,539	14,278	1.9%
Mallard Duck	118,995	26,027	21.8%
Wood Duck	59,671	9,307	15.5%
Other Duck	17,658	4,017	22.7%

Table 6. Mississippi Mail Survey of Game Harvest
1971 - 72
Expanded Estimate of Total Harvest

Species	Total Harvest	Standard Error	
Mourning Dove	2,132,800	168,078	7.8%
Quail	1,830,530	61,776	3.3%
Rabbit	1,291,380	184,333	14.2%
Squirrel	2,858,620	175,517	6.1%
Turkey	9,103	824	9.0%
Woodcock	33,758	13,739	40.7%
Deer - Archery Season	1,681	289	17.1%
Deer - Gun Season	32,966	2,698	8.1%
Mallard Duck	132,356	9,309	7.0%
Wood Duck	91,112	17,003	18.6%
Other Duck	32,264	9,591	29.7%

Table 7. Confidence Limits at 95% Probability Level

Expanded Estimate of Total Hunters, Total Days Afield, Total Harvest
(Variation from the Mean)

Species	Number of Hunters	Total Days Afield	Total Harvest
Mourning Dove	74,255 ± 8,412	367,337 ± 36,085	2,132,800 ± 329,432
Quail	63,008 ± 5,607	563,221 ± 82.453	1,830,530 ± 121,080
Rabbit	88,202 ± 8,320	688,192 ± 125,040	1,291,380 ± 361,292
Squirrel	155,484 ± 9,558	1,273,910 ± 154,557	2,858,620 ± 344,013
Turkey	21,125 ± 3,692	95,121 ± 19,723	9,103 ± 1,615
Woodcock	4,893 ± 1,324	20,360 ± 15,962	33,758 ± 26,928
Deer - Archery Season	11,112 ± 915	73,403 ± 14,576	1,681 ± 566
Deer - Gun Season	106,039 ± 4,553	729,539 ± 27,984	32,966 ± 5,288
Mallard Duck	23,205 ± 3,051	118,995 ± 51,091	132,356 ± 18,245
Wood Duck	15,863 ± 2,187	59,671 ± 18,241	91,112 ± 33,331
Other Duck	4,226 ± 1,334	17,658 ± 7,971	32,264 ± 18,798

Tabl

Unit	Total Hunters	Percent Hunters Per Unit
1	4,377	6.94
2	849	1.34
3	15,160	24.06
4	8,527	13.53
5	19,646	31.18
6	14,686	23.30
Statewide Total	63,008	25.25

Table 8. Expanded Summary Mourning Dove Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	12,338	16.62	68,014	396,326	5.83	32.12	5.51
2	2,104	2.83	13,453	55,168	4.10	26.22	6.39
3	17,067	22.98	82,026	485,953	5.92	28.47	4.81
4	8,677	11.69	53,881	286,267	5.31	32.99	6.21
5	18,008	24.25	85,635	586,256	6.85	32.56	4.76
6	16,221	21.84	69,437	364,325	5.25	22.46	4.28
Statewide Total	74,255	29.76	367,337	2,132,800	5.81	28.72	4.94

Table 10. Expanded Summary Rabbit Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	11,786	13.36	90,746	170,941	1.88	14.50	7.70
2	3,967	4.50	36,003	50,907	1.41	12.83	9.08
3	22,116	25.07	166,935	320,316	1.92	14.48	7.55
4	8,899	10.08	78,183	153,288	1.96	17.23	8.79
5	23,403	26.53	182,204	422,457	2.32	18.05	7.79
6	18,229	20.67	123,178	172,482	1.40	9.46	6.76
Statewide Total	88,202	35.35	688,192	1,291,380	1.88	14.64	7.80

Table 11. Expanded Summary Squirrel Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	15,264	9.81	91,621	209,050	2.28	13.70	6.00
2	10,904	7.01	90,500	242,478	2.68	22.24	8.30
3	33,062	21.26	264,837	585,163	2.21	17.70	8.01
4	12,239	7.87	88,446	198,530	2.24	16.22	7.23
5	42,344	27.23	346,637	800,302	2.31	18.90	8.19
6	41,668	26.80	348,536	783,761	2.25	18.81	8.36
Statewide Total	155,484	62.31	1,273,910	2,858,620	2.24	18.39	8.19

Table 12. Expanded Summary Turkey Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	2,709	12.82	8,309	1,326	0.16	0.49	3.07
2	1,965	9.30	10,640	623	0.06	0.32	5.41
3	3,560	16.85	18,400	2,707	0.15	0.76	5.17
4	789	3.73	2,567	159	0.06	0.20	3.25
5	3,594	17.01	13,787	1,994	0.14	0.55	3.84
6	9,054	42.85	43,669	2,670	0.06	0.29	4.82
Statewide Total	21,125	8.46	95,121	9,103	0.10	0.43	4.50

Table 13. Expanded Summary Woodcock Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	525	10.72	2,701	2,129	0.79	4.06	5.14
2	225	4.59	515	655	1.27	2.91	2.29
3	1,380	28.20	3,758	6,838	1.82	4.96	2.72
4	629	12.85	1,403	2,413	1.72	3.84	2.23
5	918	18.76	3,510	3,459	0.99	3.77	3.82
6	1,539	31.45	8,473	12,969	1.53	8.43	5.51
Statewide Total	4,893	1.96	20,360	33,758	1.66	6.90	4.16

Table 14. Expanded Summary Deer Harvest (Archery Season)

by Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Averag Days Afield
1	1,370	12.31	16,038	334	0.02	0.24	11.71
2	2,002	18.00	13,845	582	0.04	0.29	6.92
3	2,056	18.48	14,251	398	0.03	0.19	6.9
4	1,287	11.57	9,252	296	0.03	0.23	7.1
5	2,478	22.28	11,345	329	0.03	0.13	4.5
6	2,472	22.22	17,418	368	0.02	0.15	7.0
Statewide Total	11,122	4.45	73,403	1,681	0.02	0.15	6.6

Table 15. Expanded Summary Deer Harvest (Gun Season)

By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	12,139	11.44	72,556	4,358	0.06	0.36	5.98
2	13,018	12.27	99,782	7,616	0.08	0.59	7.66
3	14,656	13.82	99,422	4,209	0.04	0.29	6.78
4	10,280	9.69	72,497	3,429	0.05	0.33	7.05
5	28,220	26.61	166,311	7,537	0.05	0.27	5.89
6	27,722	26.14	210,615	6,272	0.03	0.23	7.60
Statewide Total	106,039	42.50	729,539	32,966	0.05	0.31	6.88

Table 16. Expanded Summary Mallard Duck Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	6,806	29.32	31,075	58,232	1.87	8.56	4.57
2	2,753	11.86	10,265	15,115	1.47	5.49	3.73
3	4,922	21.21	46,399	30,303	0.65	6.16	9.43
4	2,078	8.95	7,761	7,590	0.98	3.65	3.73
5	4,243	18.28	14,445	20,768	1.44	4.89	3.40
6	3,002	12.93	11,750	7,686	0.65	2.56	3.91
Statewide Total	23,205	9.30	118,995	132,356	1.11	5.70	5.13

Table 17. Expanded Summary Wood Duck Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	3,296	20.77	14,268	23,532	1.65	7.14	4.33
2	1,911	12.04	7,024	8,560	1.22	4.48	3.68
3	3,586	22.60	16,746	30,442	1.82	8.49	4.67
4	1,852	11.67	5,047	8,884	1.76	4.80	2.73
5	3,377	21.28	13,132	18,331	1.40	5.43	3.39
6	2,522	15.89	8,470	9,178	1.08	3.64	3.36
Statewide Total	15,863	6.35	59,671	91,112	1.53	5.74	3.76

Table 18. Expanded Summary Other Duck Harvest By Management Unit (1971 - 72)

Unit	Total Hunters	Percent Hunters Per Unit	Total Days Afield	Total Harvest	Average Daily Bag	Average Season Bag	Average Days Afield
1	1,261	29.83	4,288	7,720	1.80	6.12	3.40
2	504	11.92	1,004	2,147	2.14	4.26	1.99
3	946	22.38	3,070	7,503	2.44	7.93	3.25
4	264	6.24	559	344	0.62	1.30	2.12
5	787	18.62	7,063	11,528	1.63	14.65	8.97
6	969	22.92	3,927	7,038	1.79	7.26	4.05
Statewide Total	4,226	1.69	17,658	32,264	1.83	7.63	4.18

Table 19. Hunting Pressure By Management Unit

All Species Inclusive (1971 - 72)

Unit	Total Hunters	Total Days Afield	Total Harvest
1	71,821 (12.5%)	420,623 (10.5%)	933,593 (10.9%)
2	40,202 (7.0%)	295,331 (7.4%)	414,066 (4.8%)
3	118,511 (20.7%)	849,945 (21.4%)	1,915,148 (22.9%)
4	55,521 (9.7%)	388,265 (9.7%)	907,102 (10.6%)
5	147,018 (25.7%)	1,046,509 (26.3%)	2,545,905 (29.9%)
6	138,084 (24.1%)	970,621 (24.4%)	1,777,417 (20.9%)

Table 21. Economic Value of Harvested Game Species by Resident Licensed Hunters Derived From 1971-72 Mississippi Mail Survey of Game Harvest

Species	Estimated Total Expenditures	Estimated Statewide Harvest	Estimated Cost Per Animal Harvested
Mourning Dove	$ 2,020,478.55	2,132,800	$ .94
Quail	3,005,481.60	1,830,530	1.64
Rabbit	1,946,706.42	1,291,138	1.50
Squirrel	3,762,712.80	2,858,620	1.31
Turkey	582,838.75	9,103	64.02
Woodcock	51,816.87	33,758	1.53
Deer	10,145,154.24	34,647	292.80
Duck	1,309,445.44	255,732	5.12