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MISSISSIPPI MAIL SURVEY OF GAME
HARVEST AND HUNTER EFFORT FOR 1980-81

by

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INTRODUCTION

The importance of game harvest surveys is to provide indices which will monitor changes in kill and hunter effort among seasons to determine trends. Changes in harvest regulations, habitat conditions, game population numbers and the socio-economic environment may be reflected in and monitored by changes in hunting (kill and effort) indices.

Mail surveys to obtain game harvest data result in parameter estimates (e.g. total harvest, average daily kill, average seasonal harvest, total man-days hunting) which contain serious sampling, response and nonresponse biases. As a result, the accuracy of these estimates is unknown. Fillion (1980) provided a good review of these biases and their effect on the estimates.

Although there are public relation benefits from obtaining accurate figures pertaining to hunter harvest and effort, management practices require only indices of kill and effort. Parameter estimates obtained from mail surveys may not be accurate, but assuming all biases remain constant, will provide good indices for trend determination. Further, Wright (1978) noted that until the wildlife profession can develop more accurate methods of estimating population numbers, measures of absolute harvest are relatively meaningless and indices to harvest should be adequate. For consumer purposes, these data (however inaccurate) are often the best available.

Therefore the primary objective of the mail survey for the 1980-81 hunting season was to provide a reliable set of statewide hunting indices for each game species in Mississippi. No attempt was made to identify potential biases and correct for their effect. For dissemination to the public these indices were to also serve as harvest and effort estimators. Secondary objectives were to obtain these indices on a regional basis and to evaluate hunter attitudes and responses on specific issues.

METHODS

An initial sample of 11,529 sportsmen to be mailed a survey questionnaire was selected from the 1980-81 file of licenses sold. The sampling

frame was restricted to only resident holders of Sportsman's (Type 00), All Game Hunting and Fishing (Type 01), Small Game Hunting (Type 02) and Small Game Hunting and Fishing (Type 05) licenses who made their purchase during the 1980-81 fiscal year.

A five percent sample of hunting sales stubs (Types 01, 02 and 05) was drawn from every box of license sales processed by the end of January, 1981. Discontinuing sampling at the end of January expedited the survey mailing as soon as possible after the close of the hunting season in February. The total number of stubs sampled from each box was based on the total stubs in each box and the percent of stubs that were hunting stubs each month. Sampled stubs were chosen at random distances along the box of sales stubs. Names and addresses were recorded and keypunched for each stub sampled. Appendix I provides the stub sampling details.

All Sportsman's license (Type 00) information was maintained in a computer file. To provide a sample comparable to the other license types, only those individuals who made an initial purchase of a Sportsman's license or who renewed their old license between July 1, 1980 and the end of January, 1981 were sampled. A five percent computer generated random sample was made of these hunters. Both stub and Sportsman's license samples were combined into a single computer file for mailing purposes.

The initial mailing consisting of the questionnaire (Figure 1), a cover letter (Figure 2) and a No. 9 postage-paid business reply envelope was mailed in a No. 10 window envelope on March 18, 1981 to the sampled hunters. About three weeks after the initial mailing (April 10, 1981), reminder post cards (Figure 3) were mailed to 7,692 sampled hunters who had not returned their questionnaires by April 7, 1981. The final mailing composed of an identical questionnaire, cover letter (Figure 4) and business reply envelope was mailed about three weeks after the reminder post card mailing (May 4, 1981) to the 6,681 nonrespondents as of April 28, 1981. First mailing questionnaires were given identification numbers from 100,001 to 111,529 while the final mailing was given a 200,000 numbering sequence to differentiate responses between mailings.

Questionnaires returned four weeks after the final mailing (after May 29, 1981) were not considered in the analyses.

Questionnaires were printed on legal size (8 1/2" x 14") ivory color paper in brown ink by the Mississippi Department of Wildlife Conservation. Cover letters and post cards were printed on a continuous form to facilitate computer addressing of sampled hunters. All mailings were pre-sorted by zip codes for reduced postal rates.

Each returned questionnaire was reviewed, edited and directly keypunched. Editing and keypunching instructions are given in Appendix II. Appendix III provides the SAS computer package program (Helwig and Council 1979) written to read, modify and output these data as a single SAS data set with one observation per respondent. Using the identification numbers from both mailings, this SAS data set was compared with the original mailing list to delete the second response of any respondent who answered both questionnaires.

Estimates (and their standard errors) for each species were calculated for the following indices; total kill, average seasonal kill per hunter, proportion of licensed hunters, total licensed hunters, proportion of hunters who were successful, total man-days spent hunting, average days afield per hunter and the average daily kill. These indices were calculated both on a statewide and regional (as shown by the questionnaire, Figure 1) basis. Procedures for calculating these estimated totals, means, proportions and ratios over subpopulations (species and regions) using simple random sampling were adapted from Cochran (1977). Since only a five percent sample of license holders was sent a questionnaire, the finite population correction factor was not utilized in the variance calculations. Appendices IV and V provide the specific calculations and formulas for each estimate on a statewide and regional basis, respectively. The SAS programs performing these calculations are given in Appendices VI (statewide) and VII (regional).

RESULTS

Based on all three mailings, 989 (8.6%) of the 11,529 questionnaires

were returned as non-deliverable by the post office. Therefore 10,540 individuals were assumed to have been contacted to participate in the survey. Of these, 6,085 (57.7%) returned their questionnaires for possible analysis and 4,455 (42.3%) were nonresponses. Based on those questionnaires returned, 5,951 were answered and usable to some extent, 114 were returned after the acceptance deadline (4 weeks after the final mailing) and only 20 were considered completely useless.

Statewide expansions were calculated based on the 255,992 total hunting licenses sold and accounted for by the end of June, 1981. The total sales for each resident hunting license type were as follows: Type 00 = 16,790, Type 01 = 194,273, Type 02 = 23,755 and Type 05 = 21,174. Therefore there existed 255,992 individuals licensed to hunt small game and 211,063 (Types 00 + 01) of these license holders also were eligible to pursue big game (deer and turkey).

Based on the 5,951 usable responses, 94.6 ± 0.3 (SE) percent of all resident license holders actually participated in a hunting activity during the 1980-81 hunting season. Therefore an estimated $242,168 \pm 742$ (SE) licensees actually utilized their license for hunting purposes.

The expanded statewide summaries of total harvest, average daily kill, average seasonal kill, the percent of hunters successful, total man-days, average seasonal days hunting, total hunters and the percent of total licensees that hunted are provided in Table 1 for all game species included in the survey. Table 2 provides the expanded statewide estimates of total harvest and the variability of these estimates (standard errors and 95 percent confidence limits) for all game species surveyed. Tables 3 - 8 summarize small game hunting on a statewide and regional basis. Waterfowl hunting is summarized in Tables 9 - 11. Tables 12 - 15 summarize fox (red and gray), bobcat and coyote hunting. Statewide and regional summaries of deer (buck and doe data from the archery, primitive weapon and gun seasons) and turkey (spring and fall) hunting are provided in Tables 16 - 24. Statewide totals will not necessarily equal the sum of the regional totals. All figures were calculated independently and were the best statistical estimates available.

The analysis of the hunter attitude and opinion questions (Part B of the questionnaire) has been completed. The results will be released either as separate reports or will be available upon request from the Mississippi Department of Wildlife Conservation.

DISCUSSION

For management purposes, it should be reemphasized that the hunting data provided are only indices to harvest and effort, for use in conjunction with past (and future) mail surveys to determine trends. The current survey was conducted similarly to all past surveys and is therefore useful for comparison purposes.

Some differences in past surveys were evident and should be noted. One apparent difference was that the surveys conducted by Quisenberry (1971, 1972, 1973, 1974) for the 1970-71, 1971-72, 1972-73 and 1973-74 hunting seasons, respectively, included a questionnaire with the first reminder mailing. The survey conducted for the 1976-77 hunting season (Gwynn et al. 1977) and the current survey (1980-81) utilized only a post card for the first reminder mailing. It is not known what influence (if any) these different methodologies had on the survey estimates.

Although all individuals who held a hunting license during the 1980-81 hunting season were the population of interest for the 1980-81 survey, a complete list of these individuals could not be readily obtained. Under Mississippi's license structure all licenses expired one year from the date of purchase, but accounting records were kept based on the fiscal year (July 1 - June 30) only. All previous surveys had sampling frames (fiscal year accounting records) that were more similar to the target population of hunters since all hunting licenses were valid for only the fiscal year. Therefore licenses could not be used during two hunting seasons in past surveys, but could have been in the 1980-81 survey. The effect this sampling bias had on the estimates relative to previous surveys is unknown.

The 1981 session of the Mississippi Legislature changed the license

structure back to the previous framework. Starting with the 1981-82 fiscal year all hunting licenses will be valid for the fiscal year only. However, the 1981-82 survey will have the same sampling problem as the 1980-81 survey since there will still be licensees from the 1980-81 fiscal year holding valid licenses during the 1981-82 hunting season. Surveys commencing with the 1982-83 hunting season will again have relatively "clean" sampling frames comparable to the first five surveys.

Good judgement must be exercised when utilizing these indices (Tables 1 - 24) as real numbers and accurate estimates of harvest and effort. Often these data are the best available estimates of actual harvest and effort, but biases do exist. The effect (positive or negative) of these biases is generally unknown. However, in some cases independent estimates are available in addition to the survey estimates and provide some insight into potential biases. For example the June, 1981 accounting records showed 26,376 State Waterfowl Stamps (Type 23) sold and 16,948 Archery-Primitive Firearm Permits (Type 07) sold. The 1980-81 survey resulted in obvious overestimates in the number of duck hunters and archery hunters, 47,878 (Table 9) and 37,699 (Table 16), respectively. These differences in license (stamp and permit) sales and survey estimates may be due to a large number of duck and archery hunters not purchasing stamps and permits as required by law. However, it would be difficult to believe that about 50 percent of all duck and deer hunters had not purchased the proper licenses and then admitted it on the survey. Differential response rates from duck and archery hunters may be the more likely explanation. Apparently these hunter types were more likely to return the survey questionnaire than hunters of other species. This resulted in an abnormally high percentage of duck and bow hunters in the sample of returned questionnaires, which ultimately led to high estimates of the number of these hunter types.

In conclusion, discretion must be used when considering these data as absolute estimates. Assuming the biases remain consistent over time, the best uses of these data are as indices for trend determinations.

RECOMMENDATIONS

It is recommended that this survey be continued on an annual basis with modification of sample size. Based on the 1980-81 survey data, it was determined that little precision in harvest index estimates for the major game species (deer, squirrel, dove and turkey) would be sacrificed with a sample size reduction of two-thirds. Similar confidence in the harvest indices would result by sampling only 3,000-4,000 hunters (instead of 11,000 - 12,000), thereby significantly reducing costs and effort. However species of lesser hunting importance (e.g. woodcock, raccoon, fox) would result in very poor estimates with small sample sizes. It is suggested that a large scale survey (11,000 - 12,000 hunters) be conducted periodically (e.g. every 5 years) to provide an adequate monitoring program for all game species.

All future surveys must be conducted in an identical manner to the 1980-81 survey to maintain uniform biases and provide valid index data for trend determinations. Methodology details have been intentionally provided as a guide for future work to ensure consistency in survey methods. This consistency includes sampling details, questionnaire design and editing procedures. Improvements in survey techniques will occur, but any changes must first be carefully evaluated with respect to changing or introducing biases relative to previous surveys. Any change in bias type or degree will result in the inaccurate evaluation of trends. Benefits in survey efficiency must be weighed against the potential costs of inaccurate trend determinations.

ACKNOWLEDGMENTS

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TABLE 1. Expanded statewide summary of the 1980-81 Mississippi mail survey of game harvest based on 255,992 small game license holders and 211,063 big game license holders.

Species	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Man-days	Average Seasonal Days Hunting	Total Hunters	Percent of Total Licensees ^a
Dove	3,430,483	5.69	25.01	92.6	598,690	4.39	137,696	53.8
Quail	1,504,599	3.22	23.18	88.2	449,740	7.05	65,084	25.4
Woodcock	59,707	1.07	5.25	88.3	53,096	4.96	11,356	4.4
Rabbit	1,125,302	1.46	10.60	91.1	733,747	7.15	106,294	41.5
Squirrel	2,588,061	2.30	15.63	92.1	1,092,168	6.68	165,915	64.8
Raccoon	233,072	0.69	8.16	90.5	303,656	11.59	28,907	11.3
All Ducks	705,831	1.87	14.85	89.9	369,502	7.95	47,878	18.7
Mallard	344,510	0.92	7.22	65.3				
Wood Duck	227,099	0.59	4.76	67.9				
Other	135,507	0.36	2.84	31.9				
Geese	2,237	0.37	1.16	51.1	5,379	2.91	1,936	0.8
Red Fox	5,509	0.06	0.87	58.5	77,027	15.09	6,452	2.5
Gray Fox	5,208	0.06	1.11	51.4	72,659	19.33	4,818	1.9
Bobcat	3,312	0.24	1.15	77.6	11,119	4.61	2,882	1.1
Coyote	5,636	0.10	1.14	76.3	31,821	8.66	4,947	1.9
All Deer	201,677	0.077	1.16	49.4	2,419,079	14.14	173,061	82.0
Buck	158,102	0.061	0.91	45.1				
Doe	43,558	0.016	0.25	15.8				
Archery Deer	17,437	0.045	0.46	28.7	344,643	9.47	37,699	17.9
Buck	9,216	0.024	0.25	17.4				
Doe	8,221	0.022	0.22	16.9				
Primitive Deer	10,551	0.085	0.38	28.6	111,895	4.17	27,669	13.1
Buck	4,367	0.036	0.16	13.9				
Doe	6,184	0.049	0.22	18.6				
Gun Deer	173,612	0.082	1.03	47.8	1,955,112	11.70	169,170	80.2
Buck	144,517	0.069	0.85	44.2				
Doe	29,105	0.013	0.17	11.7				
Turkey	37,875	0.116	0.85	48.3	300,939	6.98	44,573	21.1
Spring '80	34,759	0.113	0.81	47.3	283,932	6.88	42,757	20.3
Fall '80	3,032	0.180	0.62	46.8	16,162	3.49	4,763	2.3

^a Deer and Turkey percentages based on big game license holders; all others based on small game license holders.

TABLE 2. Expanded statewide estimates of total harvest (and the variability of the estimates) for all game species in Mississippi during the 1980-81 hunting season.

Species	Total Harvest	Standard Error		95% Confidence Interval	
		S E	As % of Total ^a	Lower Limit	Upper Limit
Dove	3,430,483	82,147	2.4	3,266,188	3,594,777
Quail	1,504,599	81,835	5.4	1,340,928	1,668,270
Woodcock	59,707	6,725	11.3	46,257	73,158
Rabbit	1,125,302	41,024	3.6	1,043,253	1,207,350
Squirrel	2,588,061	62,253	2.4	2,463,556	2,712,566
Raccoon	233,072	17,034	7.3	199,005	267,140
All Ducks	705,831	37,092	5.3	631,646	780,016
Mallard	344,510	21,475	6.2	301,560	387,461
Wood Duck	227,099	11,540	5.1	204,018	250,179
Other	135,507	13,283	9.8	108,941	162,074
Geese	2,237	557	24.9	1,123	3,351
Red Fox	5,509	701	12.7	4,107	6,911
Gray Fox	5,208	951	18.3	3,305	7,110
Bobcat	3,312	568	17.1	2,177	4,447
Coyote	5,636	760	13.5	4,116	7,156
All Deer	201,677	5,462	2.7	190,752	212,601
Buck	158,102	4,274	2.7	149,554	166,650
Doe	43,558	2,471	5.7	38,616	48,499
Archery Deer	17,437	1,332	7.6	14,773	20,101
Buck	9,216	882	9.6	7,452	10,981
Doe	8,221	725	8.8	6,771	9,671
Primitive Deer	10,551	869	8.2	8,813	12,289
Buck	4,367	479	11.0	3,409	5,326
Doe	6,184	619	10.0	4,946	7,421
Gun Deer	173,612	4,692	2.7	164,229	182,996
Buck	144,517	3,912	2.7	136,693	152,341
Doe	29,105	1,962	6.7	25,180	33,029
Turkey	37,875	1,959	5.2	33,957	41,794
Spring '80	34,759	1,849	5.3	31,060	38,457
Fall '80	3,032	461	15.2	2,111	3,953

^a % = 100 (SE/Total Harvest)

TABLE 3. Expanded statewide and regional summaries of DOVE hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	679,370	6.01	25.39	93.0	111,554	4.21	26,740	19.7
	(SE)	(40,707)	(0.22)	(1.17)	(1.0)	(6,099)	(0.16)	(1,023)	(0.7)
	N	5836	601	610	610	5815	602	3109	3109
2	Estimate	1,520,292	6.03	26.41	94.8	250,621	4.35	57,848	42.6
	(SE)	(59,396)	(0.15)	(0.81)	(0.6)	(8,902)	(0.11)	(1,399)	(0.9)
	N	5836	1302	1312	1317	5815	1308	3109	3109
3	Estimate	214,189	4.76	21.61	94.2	45,255	4.59	9,918	7.3
	(SE)	(21,874)	(0.34)	(1.70)	(1.6)	(4,245)	(0.31)	(645)	(0.5)
	N	5836	223	226	226	5815	224	3109	3109
4	Estimate	745,649	5.48	24.35	90.2	135,546	4.44	30,803	22.7
	(SE)	(44,098)	(0.20)	(1.15)	(1.1)	(6,781)	(0.16)	(1,088)	(0.8)
	N	5836	691	698	701	5815	693	3109	3109
5	Estimate	247,570	5.14	23.81	85.2	48,161	4.66	10,399	7.7
	(SE)	(25,824)	(0.36)	(1.97)	(2.3)	(4,537)	(0.32)	(660)	(0.5)
	N	5836	235	237	237	5815	235	3109	3109
									Percent of Total Licensees
Statewide	Estimate	3,430,483	5.69	25.01	92.6	598,690	4.39	137,696	53.8
	(SE)	(82,147)	(0.10)	(0.52)	(0.5)	(12,505)	(0.07)	(1,655)	(0.6)
	N	5924	3130	3174	3183	5893	3143	5951	5951

TABLE 4. Expanded statewide and regional summaries of QUAIL hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	158,989	3.26	20.99	89.7	48,394	6.56	7,603	12.0
	(SE)	(25,441)	(0.34)	(2.98)	(2.3)	(6,291)	(0.69)	(566)	(0.9)
	N	5885	169	174	174	5861	169	1454	1454
2	Estimate	833,877	3.46	26.05	89.4	230,222	7.28	32,064	50.8
	(SE)	(63,545)	(0.15)	(1.77)	(1.1)	(13,895)	(0.36)	(1,104)	(1.3)
	N	5885	722	735	735	5861	724	1454	1454
3	Estimate	35,713	2.45	11.40	84.7	14,588	4.77	3,128	5.0
	(SE)	(8,115)	(0.41)	(2.24)	(4.3)	(3,895)	(1.15)	(366)	(0.6)
	N	5885	70	72	72	5861	70	1454	1454
4	Estimate	305,102	2.93	22.55	86.9	104,083	7.71	13,599	21.5
	(SE)	(38,756)	(0.23)	(2.58)	(1.9)	(10,371)	(0.64)	(748)	(1.1)
	N	5885	307	311	312	5861	309	1454	1454
5	Estimate	143,460	3.16	21.42	85.1	43,634	6.66	6,734	10.7
	(SE)	(25,581)	(0.36)	(3.43)	(2.9)	(6,577)	(0.85)	(534)	(0.8)
	N	5885	150	154	154	5861	150	1454	1454
									Percent of Total Licensees
Statewide	Estimate	1,504,599	3.22	23.18	88.2	449,740	7.05	65,084	25.4
	(SE)	(81,835)	(0.11)	(1.15)	(0.8)	(19,389)	(0.26)	(1,445)	(0.6)
	N	5944	1468	1506	1507	5910	1472	5951	5951

TABLE 5. Expanded statewide and regional summaries of WOODCOCK hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	5,604	1.48	4.81	88.9	3,758	3.35	1,164	10.8
	(SE)	(1,795)	(0.41)	(1.26)	(6.2)	(1,194)	(0.85)	(224)	(2.0)
	N	5938	26	27	27	5926	26	251	251
2	Estimate	12,157	0.73	3.44	81.5	16,199	4.81	3,492	32.3
	(SE)	(2,325)	(0.12)	(0.55)	(4.3)	(3,304)	(0.82)	(385)	(3.0)
	N	5938	78	81	81	5926	78	251	251
3	Estimate	4,527	1.41	8.08	84.6	2,981	5.75	560	5.2
	(SE)	(2,014)	(0.52)	(2.93)	(10.4)	(1,323)	(2.03)	(155)	(1.4)
	N	5,938	12	13	13	5926	12	251	251
4	Estimate	15,046	1.13	5.29	90.9	13,175	4.69	2,845	26.3
	(SE)	(2,686)	(0.15)	(0.69)	(3.6)	(2,505)	(0.68)	(348)	(2.8)
	N	5938	65	66	66	5926	65	251	251
5	Estimate	20,219	1.21	7.33	93.8	15,119	6.03	2,759	25.5
	(SE)	(4,982)	(0.23)	(1.57)	(3.0)	(3,036)	(0.93)	(343)	(2.8)
	N	5938	58	64	64	5926	58	251	251
									Percent of Total Licensees
Statewide	Estimate	59,707	1.07	5.25	88.3	53,096	4.96	11,356	4.4
	(SE)	(6,725)	(0.10)	(0.50)	(2.0)	(5,449)	(0.41)	(683)	(0.3)
	N	5951	248	264	264	5935	248	5951	5951

TABLE 6. Expanded statewide and regional summaries of RABBIT hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	203,603	1.69	10.96	91.2	114,240	6.26	18,602	18.3
	(SE)	(16,716)	(0.11)	(0.74)	(1.4)	(10,361)	(0.48)	(874)	(0.8)
	N	5761	405	418	419	5685	405	2300	2300
2	Estimate	398,318	1.45	10.72	90.8	263,782	7.30	36,893	36.2
	(SE)	(26,565)	(0.07)	(0.62)	(1.0)	(16,450)	(0.39)	(1,183)	(1.0)
	N	5761	797	824	825	5685	802	2300	2300
3	Estimate	113,310	1.55	11.14	92.6	68,220	6.95	10,187	10.0
	(SE)	(18,036)	(0.20)	(1.62)	(1.7)	(7,680)	(0.63)	(658)	(0.6)
	N	5761	218	229	230	5685	218	2300	2300
4	Estimate	258,063	1.42	10.17	91.8	177,461	7.17	25,555	25.1
	(SE)	(20,352)	(0.09)	(0.69)	(1.1)	(11,494)	(0.36)	(1,009)	(0.9)
	N	5761	548	571	572	5685	550	2300	2300
5	Estimate	105,534	1.36	10.02	88.6	77,135	7.51	10,541	10.3
	(SE)	(11,756)	(0.11)	(0.92)	(2.1)	(7,641)	(0.56)	(669)	(0.6)
	N	5761	228	237	237	5685	228	2300	2300
									Percent of Total Licensees
Statewide	Estimate	1,125,302	1.46	10.60	91.1	733,747	7.15	106,294	41.5
	(SE)	(41,024)	(0.04)	(0.35)	(0.6)	(24,006)	(0.20)	(1,635)	(0.6)
	N	5924	2324	2444	2448	5811	2331	5951	5951

TABLE 7. Expanded statewide and regional summaries of SQUIRREL hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	354,085	2.27	14.10	92.0	152,695	6.13	25,099	15.4
	(SE)	(25,012)	(0.11)	(0.82)	(1.1)	(10,708)	(0.35)	(1,006)	(0.6)
	N	5710	548	560	561	5633	548	3638	3638
2	Estimate	968,959	2.39	15.78	93.2	402,643	6.55	61,497	37.9
	(SE)	(42,285)	(0.08)	(0.58)	(0.7)	(14,976)	(0.19)	(1,445)	(0.8)
	N	5710	1349	1370	1371	5633	1353	3638	3638
3	Estimate	435,366	2.69	21.07	95.9	153,195	7.64	20,633	12.7
	(SE)	(29,001)	(0.12)	(1.04)	(0.9)	(10,155)	(0.37)	(921)	(0.6)
	N	5710	441	461	462	5633	441	3638	3638
4	Estimate	626,396	2.21	15.72	91.7	272,261	6.89	40,150	24.7
	(SE)	(36,074)	(0.09)	(0.76)	(0.9)	(13,974)	(0.28)	(1,230)	(0.7)
	N	5710	866	889	892	5633	869	3638	3638
5	Estimate	166,641	1.82	11.20	82.8	89,618	6.09	14,917	9.2
	(SE)	(17,902)	(0.15)	(1.05)	(2.1)	(7,532)	(0.39)	(792)	(0.5)
	N	5710	323	332	332	5633	324	3638	3638
									Percent of Total Licensees
Statewide	Estimate	2,588,061	2.30	15.63	92.1	1,092,168	6.68	165,915	64.8
	(SE)	(62,253)	(0.05)	(0.34)	(0.4)	(23,344)	(0.13)	(1,585)	(0.6)
	N	5922	3685	3828	3834	5788	3694	5951	5951

TABLE 8. Expanded statewide and regional summaries of RACCOON hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	40,639	0.73	7.61	89.4	47,971	9.46	5,379	19.9
	(SE)	(7,137)	(0.06)	(1.16)	(2.8)	(8,011)	(1.32)	(478)	(1.6)
	N	5896	116	123	123	5854	116	622	622
2	Estimate	79,021	0.62	9.24	86.8	113,259	14.23	8,590	31.8
	(SE)	(9,856)	(0.07)	(0.96)	(2.4)	(15,329)	(1.63)	(600)	(1.9)
	N	5896	182	197	197	5854	182	622	622
3	Estimate	33,258	0.80	9.82	92.4	40,056	12.90	3,427	12.7
	(SE)	(7,776)	(0.13)	(2.03)	(3.0)	(8,409)	(2.26)	(383)	(1.3)
	N	5896	70	78	79	5854	71	622	622
4	Estimate	48,454	0.66	7.43	92.1	66,425	10.77	6,594	24.4
	(SE)	(7,373)	(0.07)	(0.96)	(2.2)	(9,494)	(1.26)	(528)	(1.7)
	N	5896	141	150	151	5854	141	622	622
5	Estimate	22,925	0.82	7.88	97.0	27,375	9.94	2,907	10.8
	(SE)	(5,772)	(0.17)	(1.75)	(2.1)	(5,756)	(1.69)	(353)	(1.2)
	N	5896	63	67	67	5854	63	622	622
									Percent of Total Licensees
Statewide	Estimate	233,072	0.69	8.16	90.5	303,656	11.59	28,907	11.3
	(SE)	(17,034)	(0.04)	(0.52)	(1.1)	(22,020)	(0.71)	(1,050)	(0.4)
	N	5942	600	663	666	5881	602	5951	5951

TABLE 9. Expanded statewide and regional summaries of ALL DUCK hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	377,325	2.25	21.74	91.2	167,838	9.78	17,388	38.1
	(SE)	(30,874)	(0.10)	(1.44)	(1.4)	(11,231)	(0.45)	(839)	(1.5)
	N	5878	391	398	399	5863	393	1051	1051
2	Estimate	176,250	1.55	11.97	89.1	110,771	7.60	14,867	32.5
	(SE)	(16,359)	(0.08)	(0.92)	(1.7)	(8,480)	(0.42)	(780)	(1.4)
	N	5878	331	338	341	5863	334	1051	1051
3	Estimate	51,216	1.76	10.69	90.1	26,154	5.60	4,825	10.6
	(SE)	(8,743)	(0.15)	(1.53)	(2.8)	(3,539)	(0.54)	(454)	(0.9)
	N	5878	106	110	111	5863	107	1051	1051
4	Estimate	43,899	1.22	7.25	89.2	35,890	5.96	6,173	13.5
	(SE)	(6,011)	(0.10)	(0.79)	(2.6)	(4,088)	(0.46)	(512)	(1.1)
	N	5878	135	139	139	5863	138	1051	1051
5	Estimate	22,429	1.22	9.36	87.3	18,294	7.91	2,434	5.3
	(SE)	(4,876)	(0.24)	(1.62)	(4.5)	(3,570)	(1.11)	(324)	(0.7)
	N	5878	53	55	55	5863	53	1051	1051
									Percent of Total Licensees
Statewide	Estimate	705,831	1.87	14.85	89.9	369,502	7.95	47,878	18.7
	(SE)	(37,092)	(0.06)	(0.67)	(0.9)	(15,134)	(0.24)	(1,294)	(0.5)
	N	5940	1064	1102	1107	5911	1073	5951	5951

TABLE 10. Expanded statewide and regional summaries of MALLARD, WOOD DUCK, and OTHER DUCK hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	MALLARDS				WOOD DUCKS				OTHER DUCKS			
		Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters
1	Estimate	217,339	1.30	12.52	80.5	77,933	0.46	4.49	66.9	83,605	0.50	4.82	43.9
	(SE)	(18,927)	(0.07)	(0.91)	(2.0)	(6,367)	(0.03)	(0.30)	(2.4)	(11,483)	(0.06)	(0.62)	(2.5)
	N	5881	391	398	399	5883	392	399	399	5885	392	399	399
2	Estimate	77,873	0.68	5.26	66.0	70,971	0.62	4.80	65.5	27,274	0.24	1.84	30.7
	(SE)	(8,725)	(0.05)	(0.52)	(2.6)	(6,939)	(0.04)	(0.40)	(2.6)	(4,279)	(0.03)	(0.27)	(2.5)
	N	5881	333	340	341	5883	332	340	342	5885	334	341	342
3	Estimate	18,413	0.69	3.85	51.4	26,935	0.90	5.63	80.2	5,829	0.18	1.22	18.0
	(SE)	(3,868)	(0.11)	(0.72)	(4.8)	(4,556)	(0.08)	(0.79)	(3.8)	(2,461)	(0.07)	(0.50)	(3.7)
	N	5881	106	110	111	5883	106	110	111	5885	106	110	111
4	Estimate	6,181	0.17	1.01	35.7	34,637	0.95	5.65	74.5	3,045	0.08	0.49	12.0
	(SE)	(1,095)	(0.03)	(0.16)	(4.1)	(4,798)	(0.08)	(0.63)	(3.7)	(1,132)	(0.03)	(0.18)	(2.7)
	N	5881	136	140	140	5883	137	141	141	5885	138	142	142
5	Estimate	5,180	0.28	2.16	47.3	10,095	0.54	4.22	60.0	7,134	0.39	2.98	36.4
	(SE)	(1,713)	(0.10)	(0.66)	(6.8)	(2,525)	(0.12)	(0.90)	(6.7)	(2,436)	(0.13)	(0.94)	(6.5)
	N	5881	53	55	55	5883	53	55	55	5885	53	55	55
Statewide	Estimate	344,510	0.92	7.22	65.3	227,099	0.59	4.76	67.9	135,507	0.36	2.84	31.9
	(SE)	(21,475)	(0.04)	(0.41)	(1.4)	(11,540)	(0.02)	(0.20)	(1.4)	(13,283)	(0.03)	(0.27)	(1.4)
	N	5943	1067	1105	1108	5945	1068	1107	1110	5947	1071	1109	1111

TABLE 11. Expanded statewide and regional summaries of GOOSE hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	258	0.29	0.75	37.5	904	2.63	344	18.6
	(SE)	(161)	(0.22)	(0.41)	(18.3)	(473)	(1.08)	(122)	(6.0)
	N	5949	8	8	8	5948	8	43	43
2	Estimate	1,033	0.25	0.86	50.0	3,960	3.41	1,205	65.1
	(SE)	(304)	(0.08)	(0.20)	(9.6)	(995)	(0.56)	(227)	(7.4)
	N	5949	27	28	28	5948	27	43	43
3	Estimate	258	2.00	3.00	50.0	129	1.50	86	4.7
	(SE)	(258)	(1.33)	(3.00)	(50.0)	(96)	(0.50)	(61)	(3.2)
	N	5949	2	2	2	5948	2	43	43
4	Estimate	172	1.33	2.00	50.0	129	1.50	86	4.7
	(SE)	(172)	(1.78)	(2.00)	(50.0)	(96)	(0.50)	(61)	(3.2)
	N	5949	2	2	2	5948	2	43	43
5	Estimate	258	1.20	2.00	66.7	215	1.67	129	7.0
	(SE)	(219)	(1.15)	(1.53)	(33.3)	(129)	(0.33)	(75)	(3.9)
	N	5949	3	3	3	5948	3	43	43
									Percent of Total Licensees
Statewide	Estimate	2,237	0.37	1.16	51.1	5,379	2.91	1,936	0.8
	(SE)	(557)	(0.10)	(0.23)	(7.5)	(1,118)	(0.42)	(288)	(0.1)
	N	5951	43	45	45	5949	43	5951	5951

TABLE 12. Expanded statewide and regional summaries of RED FOX hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	519	0.16	1.00	66.7	2,426	6.22	519	9.7
	(SE)	(220)	(0.06)	(0.33)	(14.2)	(1,190)	(2.37)	(150)	(2.7)
	N	5924	9	12	12	5908	9	124	124
2	Estimate	2,420	0.11	1.02	70.9	19,022	8.61	2,420	45.2
	(SE)	(460)	(0.04)	(0.14)	(6.2)	(6,230)	(2.58)	(322)	(4.5)
	N	5924	51	55	55	5908	51	124	124
3	Estimate	605	0.02	0.93	60.0	18,545	38.91	648	12.1
	(SE)	(220)	(0.02)	(0.25)	(13.1)	(13,354)	(26.69)	(167)	(2.9)
	N	5924	11	15	15	5908	11	124	124
4	Estimate	1,080	0.05	0.81	54.8	18,588	16.50	1,339	25.0
	(SE)	(320)	(0.03)	(0.19)	(9.1)	(8,287)	(6.74)	(240)	(3.9)
	N	5924	26	31	31	5908	26	124	124
5	Estimate	302	0.05	0.70	40.0	5,806	13.40	432	8.1
	(SE)	(167)	(0.04)	(0.34)	(16.3)	(3,641)	(7.65)	(137)	(2.5)
	N	5924	10	10	10	5908	10	124	124
									Percent of Total Licensees
Statewide	Estimate	5,509	0.06	0.87	58.5	77,027	15.09	6,452	2.5
	(SE)	(701)	(0.02)	(0.09)	(4.1)	(18,209)	(3.31)	(520)	(0.2)
	N	5948	117	147	147	5919	118	5951	5951

TABLE 13. Expanded statewide and regional summaries of GRAY FOX hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	130	0.12	0.60	60.0	1,125	6.50	216	5.4
	(SE)	(75)	(0.08)	(0.24)	(24.5)	(885)	(4.56)	(96)	(2.4)
	N	5929	4	5	5	5916	4	92	92
2	Estimate	2,979	0.12	1.68	68.3	17,871	12.15	1,813	45.7
	(SE)	(799)	(0.05)	(0.37)	(7.4)	(6,156)	(3.69)	(279)	(5.2)
	N	5929	34	41	41	5916	34	92	92
3	Estimate	604	0.08	1.40	70.0	4,760	13.75	432	10.9
	(SE)	(259)	(0.05)	(0.43)	(15.3)	(2,890)	(7.26)	(136)	(3.3)
	N	5929	8	10	10	5916	8	92	92
4	Estimate	864	0.03	0.91	36.4	31,631	38.47	950	23.9
	(SE)	(386)	(0.02)	(0.37)	(10.5)	(15,407)	(16.99)	(202)	(4.5)
	N	5929	19	22	22	5916	19	92	92
5	Estimate	216	0.03	0.42	41.7	8,222	15.83	561	14.1
	(SE)	(97)	(0.02)	(0.15)	(14.9)	(4,143)	(6.83)	(155)	(3.7)
	N	5929	11	12	12	5916	12	92	92
									Percent of Total Licensees
Statewide	Estimate	5,208	0.06	1.11	51.4	72,659	19.33	4,818	1.9
	(SE)	(951)	(0.02)	(0.17)	(4.8)	(18,010)	(4.35)	(451)	(0.2)
	N	5948	86	109	109	5926	87	5951	5951

TABLE 14. Expanded statewide and regional summaries of BOBCAT hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	603	0.39	1.27	100.0	1,423	3.30	474	17.7
	(SE)	(192)	(0.20)	(0.14)	(0.0)	(889)	(1.87)	(143)	(4.9)
	N	5946	10	11	11	5937	10	62	62
2	Estimate	1,335	0.21	1.41	72.7	5,605	6.84	947	35.5
	(SE)	(441)	(0.05)	(0.36)	(9.7)	(2,203)	(2.24)	(202)	(6.1)
	N	5946	19	22	22	5937	19	62	62
3	Estimate	344	0.67	1.14	85.7	259	1.20	301	11.3
	(SE)	(161)	(0.28)	(0.34)	(14.3)	(122)	(0.20)	(114)	(4.1)
	N	5946	5	7	7	5937	5	62	62
4	Estimate	603	0.18	0.93	73.3	2,630	5.08	646	24.2
	(SE)	(202)	(0.08)	(0.21)	(11.8)	(1,225)	(1.94)	(167)	(5.5)
	N	5946	12	15	15	5937	12	62	62
5	Estimate	215	0.25	0.71	71.4	862	2.86	301	11.3
	(SE)	(96)	(0.13)	(0.18)	(18.4)	(435)	(1.03)	(114)	(4.1)
	N	5946	7	7	7	5937	7	62	62
									Percent of Total Licensees
Statewide	Estimate	3,312	0.24	1.15	77.6	11,119	4.61	2,882	1.1
	(SE)	(568)	(0.04)	(0.14)	(5.1)	(2,715)	(0.95)	(350)	(0.1)
	N	5951	56	67	67	5940	56	5951	5951

TABLE 15. Expanded statewide and regional summaries of COYOTE hunting in Mississippi during the, 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	776	0.33	1.13	81.3	2,120	3.50	689	15.2
	(SE)	(236)	(0.14)	(0.20)	(10.1)	(972)	(1.35)	(172)	(3.5)
	N	5940	14	16	16	5916	14	105	105
2	Estimate	2,844	0.20	1.05	77.4	8,741	4.21	2,715	60.0
	(SE)	(463)	(0.05)	(0.11)	(5.4)	(2,392)	(0.99)	(340)	(4.8)
	N	5950	48	62	62	5916	48	105	105
3	Estimate	819	0.01	1.36	64.3	17,352	36.45	603	13.3
	(SE)	(454)	(0.01)	(0.68)	(13.3)	(13,391)	(27.16)	(161)	(3.3)
	N	5940	11	14	14	5916	11	105	105
4	Estimate	603	0.23	1.17	75.0	1,298	4.29	517	11.4
	(SE)	(220)	(0.18)	(0.27)	(13.1)	(830)	(2.39)	(149)	(3.1)
	N	5940	7	12	12	5916	7	105	105
5	Estimate	0	-	-	-	0	-	0	0.0
	(SE)	(0)	-	-	-	(0)	-	(0)	(0.0)
	N	5940	-	-	-	5916	-	105	105
									Percent of Total Licensees
Statewide	Estimate	5,636	0.10	1.14	76.3	31,821	8.66	4,947	1.9
	(SE)	(760)	(0.05)	(0.11)	(4.0)	(13,726)	(3.64)	(457)	(0.2)
	N	5950	85	114	114	5921	85	5951	5951

TABLE 16. Expanded statewide and regional summaries of ARCHERY DEER hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	3,484	0.050	0.45	31.5	69,713	9.01	7,790	21.3
	(SE)	(549)	(0.007)	(0.06)	(3.5)	(6,751)	(0.57)	(571)	(1.4)
	N	4847	177	178	178	4826	177	840	840
2	Estimate	5,443	0.042	0.44	26.5	117,690	9.71	12,359	33.8
	(SE)	(769)	(0.005)	(0.06)	(2.6)	(9,240)	(0.51)	(712)	(1.6)
	N	4847	276	283	283	4826	277	840	840
3	Estimate	2,830	0.053	0.49	28.6	48,895	8.67	5,788	15.8
	(SE)	(561)	(0.009)	(0.09)	(3.9)	(5,521)	(0.63)	(495)	(1.3)
	N	4847	129	133	133	4826	129	840	840
4	Estimate	2,961	0.038	0.42	23.6	69,625	10.21	7,006	19.2
	(SE)	(627)	(0.008)	(0.08)	(3.4)	(7,563)	(0.77)	(543)	(1.4)
	N	4847	156	161	161	4826	156	840	840
5	Estimate	1,437	0.036	0.40	28.0	34,157	10.14	3,612	9.9
	(SE)	(322)	(0.008)	(0.08)	(5.0)	(5,268)	(1.07)	(393)	(1.0)
	N	4847	77	82	82	4826	77	840	840
									Percent of Total Licensees ^a
Statewide	Estimate	17,437	0.045	0.46	28.7	344,643	9.47	37,699	17.9
	(SE)	(1,332)	(0.003)	(0.03)	(1.5)	(15,099)	(0.29)	(1,157)	(0.5)
	N	4878	835	868	868	4846	836	4882	4882

^a Calculated as a percent of big game license holders only.

TABLE 17. Expanded statewide and regional summaries of ARCHERY BUCK and DOE hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	BUCKS				DOES			
		Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters
1	Estimate	1,698	0.024	0.22	17.4	1,785	0.026	0.23	19.7
	(SE)	(339)	(0.004)	(0.04)	(2.9)	(322)	(0.004)	(0.04)	(3.0)
	N	4847	177	178	178	4847	177	178	178
2	Estimate	2,787	0.021	0.23	14.8	2,656	0.020	0.22	17.0
	(SE)	(506)	(0.004)	(0.04)	(2.1)	(414)	(0.003)	(0.03)	(2.2)
	N	4847	276	283	283	4847	276	283	283
3	Estimate	1,350	0.025	0.23	16.5	1,481	0.028	0.26	18.0
	(SE)	(345)	(0.006)	(0.06)	(3.2)	(331)	(0.005)	(0.05)	(3.3)
	N	4847	129	133	133	4847	129	133	133
4	Estimate	1,829	0.024	0.26	17.4	1,132	0.014	0.16	11.8
	(SE)	(430)	(0.005)	(0.06)	(3.0)	(275)	(0.003)	(0.04)	(2.6)
	N	4847	156	161	161	4847	156	161	161
5	Estimate	610	0.017	0.17	15.9	827	0.019	0.23	19.5
	(SE)	(174)	(0.005)	(0.05)	(4.1)	(217)	(0.005)	(0.06)	(4.4)
	N	4847	77	82	82	4847	77	82	82
Statewide	Estimate	9,216	0.024	0.25	17.4	8,821	0.022	0.22	16.9
	(SE)	(882)	(0.002)	(0.02)	(1.3)	(725)	(0.002)	(0.02)	(1.3)
	N	4878	835	868	868	4878	835	868	868

TABLE 18. Expanded statewide and regional summaries of PRIMITIVE WEAPON DEER hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	2,041	0.096	0.39	31.4	20,483	3.98	5,254	19.5
	(SE)	(354)	(0.014)	(0.06)	(4.2)	(2,250)	(0.25)	(472)	(1.6)
	N	4860	118	121	121	4843	118	619	619
2	Estimate	3,995	0.097	0.42	30.1	36,085	3.85	9,509	35.4
	(SE)	(583)	(0.011)	(0.05)	(3.1)	(2,934)	(0.18)	(628)	(1.9)
	N	4860	215	219	219	4843	215	619	619
3	Estimate	2,171	0.104	0.49	34.0	20,178	4.68	4,472	16.6
	(SE)	(397)	(0.015)	(0.08)	(4.7)	(2,403)	(0.31)	(436)	(1.5)
	N	4860	99	103	103	4843	99	619	619
4	Estimate	1,259	0.048	0.25	19.1	22,706	4.65	4,993	18.6
	(SE)	(304)	(0.010)	(0.06)	(3.7)	(2,608)	(0.31)	(460)	(1.6)
	N	4860	112	115	115	4843	112	619	619
5	Estimate	651	0.068	0.25	22.0	8,934	3.66	2,605	9.7
	(SE)	(189)	(0.019)	(0.07)	(5.4)	(1,385)	(0.30)	(334)	(1.2)
	N	4860	56	59	59	4843	56	619	619
									Percent of Total Licensees ^a
Statewide	Estimate	10,551	0.085	0.38	28.6	111,895	4.18	27,669	13.1
	(SE)	(869)	(0.006)	(0.03)	(1.8)	(5,215)	(0.11)	(1,020)	(0.5)
	N	4881	617	639	639	4859	617	4882	4882

^a Calculated as a percent of big game license holders only.

TABLE 19. Expanded statewide and regional summaries of PRIMITIVE WEAPON BUCK and DOE hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	BUCKS				DOES			
		Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters
1	Estimate	695	0.034	0.13	13.2	1,346	0.062	0.26	21.5
	(SE)	(173)	(0.008)	(0.03)	(3.1)	(277)	(0.012)	(0.05)	(3.7)
	N	4860	118	121	121	4860	118	121	121
2	Estimate	1,433	0.036	0.15	12.8	2,562	0.060	0.27	20.5
	(SE)	(284)	(0.007)	(0.03)	(2.3)	(444)	(0.008)	(0.04)	(2.7)
	N	4860	215	219	219	4860	215	219	219
3	Estimate	1,086	0.052	0.24	20.4	1,086	0.052	0.24	22.3
	(SE)	(249)	(0.011)	(0.05)	(4.0)	(233)	(0.009)	(0.05)	(4.1)
	N	4860	99	103	103	4860	99	103	103
4	Estimate	738	0.029	0.15	12.2	521	0.019	0.10	9.6
	(SE)	(208)	(0.008)	(0.04)	(3.1)	(162)	(0.006)	(0.03)	(2.8)
	N	4860	112	115	115	4860	112	115	115
5	Estimate	304	0.029	0.12	11.9	347	0.039	0.14	13.6
	(SE)	(115)	(0.012)	(0.04)	(4.2)	(123)	(0.013)	(0.04)	(4.5)
	N	4860	56	59	59	4860	56	59	59
Statewide	Estimate	4,367	0.036	0.16	13.9	6,184	0.049	0.22	18.6
	(SE)	(479)	(0.004)	(0.02)	(1.4)	(619)	(0.004)	(0.02)	(1.5)
	N	4881	617	639	639	4881	617	639	639

TABLE 20. Expanded statewide and regional summaries of REGULAR GUN DEER hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	26,973	0.084	0.98	47.6	307,767	11.18	27,514	16.4
	(SE)	(1,952)	(0.005)	(0.06)	(2.0)	(15,132)	(0.34)	(1,036)	(0.6)
	N	4695	590	611	611	4531	591	3741	3741
2	Estimate	67,702	0.080	1.04	46.4	750,622	11.70	65,067	38.8
	(SE)	(3,467)	(0.003)	(0.05)	(1.3)	(22,780)	(0.24)	(1,420)	(0.8)
	N	4695	1373	1447	1448	4531	1377	3741	3741
3	Estimate	28,951	0.094	1.23	55.2	290,019	12.55	23,437	14.0
	(SE)	(2,094)	(0.005)	(0.07)	(2.2)	(14,940)	(0.37)	(966)	(0.6)
	N	4695	496	522	522	4531	496	3741	3741
4	Estimate	36,368	0.083	0.97	45.8	415,418	11.33	37,194	22.2
	(SE)	(2,340)	(0.004)	(0.05)	(1.7)	(17,378)	(0.30)	(1,172)	(0.7)
	N	4695	785	826	827	4531	787	3741	3741
5	Estimate	10,969	0.060	0.77	43.5	184,185	12.88	14,250	8.5
	(SE)	(1,073)	(0.005)	(0.06)	(2.8)	(12,778)	(0.54)	(772)	(0.5)
	N	4695	306	316	317	4531	307	3741	3741
									Percent of Total Licensees ^a
Statewide	Estimate	173,612	0.082	1.03	47.8	1,955,112	11.70	169,170	80.2
	(SE)	(4,692)	(0.002)	(0.03)	(0.8)	(27,955)	(0.14)	(1,205)	(0.6)
	N	4858	3673	3889	3894	4651	3682	4882	4882

^a Calculated as a percent of big game license holders only.

TABLE 21. Expanded statewide and regional summaries of REGULAR GUN BUCK and DOE hunting in Mississippi during the 1980-81 hunting season.

Region	Statistic	BUCKS				DOES			
		Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters
1	Estimate	21,533	0.067	0.78	43.4	5,433	0.017	0.20	13.6
	(SE)	(1,592)	(0.004)	(0.05)	(2.0)	(678)	(0.002)	(0.02)	(1.4)
	N	4695	590	611	611	4701	591	612	612
2	Estimate	55,474	0.068	0.85	42.9	12,212	0.012	0.19	11.3
	(SE)	(2,780)	(0.003)	(0.04)	(1.3)	(1,552)	(0.001)	(0.02)	(0.8)
	N	4695	1373	1447	1448	4701	1375	1449	1449
3	Estimate	24,321	0.080	1.04	50.0	4,624	0.014	0.20	16.7
	(SE)	(1,854)	(0.005)	(0.07)	(2.2)	(529)	(0.002)	(0.02)	(1.6)
	N	4695	496	522	522	4701	496	522	522
4	Estimate	31,378	0.071	0.84	43.3	4,984	0.011	0.13	10.1
	(SE)	(2,076)	(0.004)	(0.05)	(1.7)	(651)	(0.001)	(0.02)	(1.0)
	N	4695	785	826	827	4701	786	828	828
5	Estimate	9,800	0.054	0.69	41.0	1,167	0.007	0.08	7.6
	(SE)	(981)	(0.004)	(0.06)	(2.8)	(245)	(0.001)	(0.02)	(1.5)
	N	4695	306	316	317	4701	307	317	317
Statewide	Estimate	144,517	0.069	0.85	44.2	29,105	0.013	0.17	11.7
	(SE)	(3,912)	(0.002)	(0.02)	(0.8)	(1,962)	(0.001)	(0.01)	(0.5)
	N	4859	3673	3890	3894	4866	3678	3897	3897

TABLE 22. Expanded statewide and regional summaries of SPRING TURKEY hunting in Mississippi during 1980 hunting season.

Region	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	3,230	0.125	0.70	43.4	24,144	5.29	4,623	11.2
	(SE)	(529)	(0.016)	(0.09)	(4.8)	(3,105)	(0.45)	(444)	(1.0)
	N	4835	104	106	106	4808	104	946	946
2	Estimate	6,941	0.110	0.72	41.9	60,360	6.43	9,727	23.6
	(SE)	(873)	(0.010)	(0.08)	(3.3)	(5,690)	(0.43)	(636)	(1.4)
	N	4835	213	221	222	4808	214	946	946
3	Estimate	8,425	0.116	0.97	51.3	65,277	7.70	8,680	21.0
	(SE)	(976)	(0.010)	(0.09)	(3.6)	(6,575)	(0.56)	(603)	(1.3)
	N	4835	193	199	199	4808	193	946	946
4	Estimate	13,140	0.122	0.92	54.5	99,474	7.26	14,045	34.0
	(SE)	(1,180)	(0.008)	(0.07)	(2.8)	(7,572)	(0.38)	(756)	(1.5)
	N	4835	311	321	321	4808	312	946	946
5	Estimate	2,706	0.084	0.66	42.6	30,817	7.71	4,144	10.0
	(SE)	(477)	(0.011)	(0.10)	(5.1)	(4,574)	(0.82)	(421)	(1.0)
	N	4835	91	94	94	4808	91	946	946
									Percent of Total Licensees ^a
Statewide	Estimate	34,759	0.113	0.81	47.3	283,932	6.88	42,757	20.3
	(SE)	(1,849)	(0.005)	(0.04)	(1.6)	(12,267)	(0.22)	(1,214)	(0.6)
	N	4876	945	983	984	4840	947	4882	4882

^a Calculated as a percent of big game license holders only.

TABLE 23. Expanded statewide and regional summaries of FALL TURKEY hunting in Mississippi during the 1980 hunting season.

Region ^a	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent Hunters Per Region
1	Estimate	2,039	0.250	0.77	54.1	8,160	3.08	2,647	61.0
	(SE)	(394)	(0.039)	(0.11)	(6.4)	(1,256)	(0.27)	(337)	(4.9)
	N	4864	61	61	61	4863	61	100	100
3	Estimate	608	0.077	0.36	30.8	7,292	4.42	1,692	39.0
	(SE)	(184)	(0.023)	(0.09)	(7.5)	(1,572)	(0.64)	(270)	(4.9)
	N	4864	38	39	39	4863	38	100	100
									Percent of Total Licensees ^b
Statewide	Estimate	3,032	0.180	0.62	46.8	16,162	3.49	4,763	2.3
	(SE)	(461)	(0.026)	(0.08)	(4.8)	(2,023)	(0.28)	(449)	(0.2)
	N	4873	107	109	109	4871	107	4874	4874

^a Fall turkey hunting was legal only in regions 1 and 3.

^b Calculated as a percent of big game license holders only.

TABLE 24. Expanded statewide summaries of ALL DEER, BUCK and DOE hunting (combining all harvest methods) during the 1980-81 hunting season and ALL TURKEY hunting (combining spring and fall data) during the 1980 calendar year in Mississippi

Species	Statistic	Total Harvest	Average Daily Kill	Average Seasonal Harvest	Percent Successful Hunters	Total Mandays	Average Seasonal Days Hunting	Total Hunters	Percent of Total Licensees ^a
Deer	Estimate	201,677	0.077	1.16	49.4	2,419,079	14.14	173,061	82.0
	(SE)	(5,462)	(0.002)	(0.03)	(0.8)	(37,541)	(0.20)	(1,161)	(0.5)
	N	4857	3750	3978	3983	4638	3759	4882	4882
Buck	Estimate	158,102	0.061	0.91	45.1				
	(SE)	(4,274)	(0.002)	(0.02)	(0.8)				
	N	4858	3750	3979	3983				
Doe	Estimate	43,558	0.016	0.25	15.8				
	(SE)	(2,471)	(0.001)	(0.01)	(0.6)				
	N	4865	3755	3986	3986				
Turkey	Estimate	37,875	0.116	0.85	48.3	300,939	6.98	44,573	21.1
	(SE)	(1,959)	(0.005)	(0.04)	(1.6)	(12,693)	(0.22)	(1,233)	(0.6)
	N	4876	987	1025	1026	4840	989	4882	4882

^a Calculated as a percent of big game license holders only.

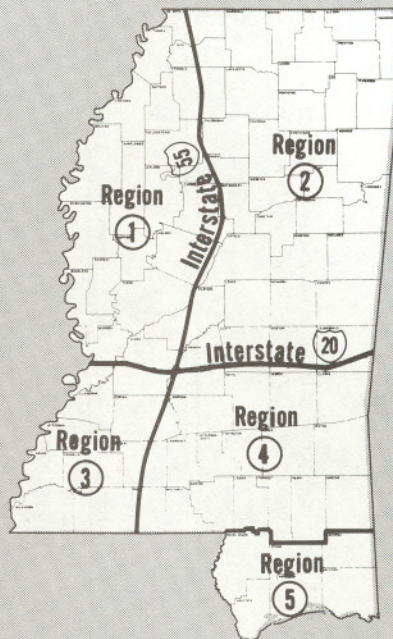


1980-81 MISSISSIPPI HUNTER QUESTIONNAIRE

A. Please fill in the blocks below for each game species you hunted during the 1980-81 hunting season (even if you were unsuccessful). 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. Report only game taken by you. Your answers will be kept confidential.

	SPECIES	TOTAL KILL	TOTAL DAYS HUNTED	REGION HUNTED MOST
1	Dove			
2	Quail			
3	Woodcock			
4	Rabbit			
5	Squirrel			
6	Raccoon			
		Bucks	Does	
7	Deer (archery)			
8	Deer (prim. weapon)			
9	Deer (gun)			
10	Turkey (Spring 80)			
11	Turkey (Fall 80)			
		Mallard	Wood	Other
12	Ducks			
13	Geese			
14	Red Fox			
15	Gray Fox			
16	Bobcat			
17	Coyote			

Determine REGION HUNTED MOST from map.



B. Please answer the following questions.

1. Morning hunting of doves was permitted this past season. Are you in favor of continuing dove hunting during the morning hours in future seasons? (check one)

☐ 1 Yes
☐ 2 No
☐ 3 Not sure

2. If you hunted doves answer the following questions:

- a. When did you hunt doves? (check one)

☐ 1 morning only
☐ 2 afternoon only
☐ 3 both morning and afternoon

- b. Rank the following items which make dove hunting enjoyable for you. Place a one (1) in the box by the item which you think is most enjoyable; place a two (2) beside the next most enjoyable; and so on through six (6) for the least enjoyable aspect. Do not give two items the same number and fill all boxes.

like dove meat
 enjoying the companionship of your hunting group
 skill and challenge involved in the hunt
 getting away from it all
 good exercise, good for your health
 getting outdoors to enjoy nature

- c. If you were dissatisfied with the all-day dove shoot, was it **mostly** because: (check one)

☐ 1 don't like to get up so early
☐ 2 ruined the companionship and sociable aspect of the hunt
☐ 3 hunting pressure was too great
☐ 4 don't like to break tradition
☐ 5 other: (specify) _____

3. Where adequate turkey populations exist, would you be in favor of a limited fall turkey season in Mississippi? (check one)

☐ 1 Yes
☐ 2 No
☐ 3 Not sure

4. Did you hunt specifically for fox? (check one)

☐ 1 Yes
☐ 2 No

5. Were you checked by a Conservation Officer while hunting during the 1980-81 hunting season? (check one)

☐ 1 Yes
☐ 2 No

6. Did you encounter any problems in purchasing a hunting and fishing license? (check one)

☐ 1 Yes (explain: _____)
☐ 2 No

7. Is there a hunter (under 16, over 65, disabled) in your household who was exempt from purchasing a hunting license this past season? (check one)

☐ 1 Yes
☐ 2 No

8. If you fished during the 1980 calendar year, how many times did you fish in each of the following?

times: reservoir
 times: pond
 times: stream
 times: saltwater
 times: lake

9. Your age: _____ yrs.

Fig. 1. Questionnaire used for the 1980-81 mail survey of game harvest and hunter effort in Mississippi.



MISSISSIPPI DEPARTMENT OF WILDLIFE CONSERVATION

P. O. Box 451 • Phone: (601) 961-5300 • Jackson, MS 39205

Richard K. Yancey, Executive Director

Dear Sportsman:

We need your help! The Department of Wildlife Conservation is surveying Mississippi hunters to obtain information concerning the 1980-81 hunting season and last spring's (1980) turkey season. You have been selected as a representative hunter to participate in the survey.

The purpose of this survey is to obtain reasonable estimates of game harvest, hunter effort and hunter opinions for the season just completed. Information supplied by you and other selected hunters will assist us in managing our game resources for the greatest public benefit.

For meaningful results, information is needed from everyone receiving a questionnaire since only a limited number of sportsmen can be contacted. Please fill in the enclosed questionnaire as accurately as possible (even if you did not hunt) and return it in the self-addressed, postage-paid envelope.

Our records are often difficult to read and we apologize if your name or address has been misspelled. A prompt reply will be sincerely appreciated.

Yours for better conservation,

A handwritten signature in cursive script that reads "Richard K. Yancey".

Richard K. Yancey
Executive Director

RKY:be

Enclosure

Fig. 2. Cover letter mailed with the initial mailing of the 1980-81 survey of game harvest and hunter effort in Mississippi.

MISSISSIPPI DEPARTMENT
OF WILDLIFE CONSERVATION
P.O. Box 451 / Jackson, MS 39205

Dear Sportsman:

Recently we mailed you a questionnaire on your hunting experiences. If you have not yet answered the questionnaire, will you please do so today? If you have already returned the questionnaire, disregard this notice and we thank you very much for your cooperation.

Your response is important. It is the only way we have of estimating the harvest, effort and opinions of hunters in Mississippi for management purposes.

Sincerely,

Richard K. Yancey
Richard K. Yancey
Executive Director

Fig. 3. Post card used as the first reminder mailing to nonrespondents during the 1980-81 survey of game harvest and hunter effort in Mississippi.



MISSISSIPPI DEPARTMENT OF WILDLIFE CONSERVATION

P. O. Box 451 • Phone: (601) 961-5300 • Jackson, MS 39205

Richard K. Yancey, Executive Director

Dear Sportsman:

The Department of Wildlife Conservation is striving to provide quality hunting for Mississippi sportsmen. While not wanting to impose, we are depending on you to help us evaluate hunting activity and success for the 1980-81 hunting season and last spring's (1980) turkey season.

Another copy of the questionnaire is enclosed which we hope you will complete and return as soon as possible in the enclosed self-addressed, postage-paid envelope. If you have already returned the questionnaire please disregard this notice.

Remember, you can be of assistance even if you did not hunt or were not successful in your efforts. Your cooperation is needed and will be sincerely appreciated.

Sincerely for better conservation,

Richard K. Yancey
Richard K. Yancey
Executive Director

RKY:be

Enclosure

Fig. 4. Cover letter mailed with the second (and final) reminder mailing to nonrespondents during the 1980-81 survey of game harvest and hunter efforts in Mississippi.

Appendix I. Detailed methods for sampling hunting license sales stubs.

A five percent sample of licensed resident hunters was selected from the monthly license sales returned to the Accounting Division of the MDWC. Since the total number of all stubs (nonresident, fishing, etc., combined with resident hunting) and resident hunt stubs had to be known prior to sampling, the county analysis for each month had to first be completed.

The totals presented by the county analyses are cumulative totals for the fiscal year and are readily corrected to provide total sales for individual months. Additionally not all license types contained in the county analysis are represented by the typical stub of an IBM card in the boxes of license sales. Therefore the total stubs each month is the total given on the printout minus the following license types; Sportsmen's (Type 00), State Trappers (Type 20), State Waterfowl Stamp (Type 23), Commercial License (Type 33) and Commercial Tag (Type 99).

As an example based on the county analysis, 2,695 hunt stubs represented a five percent sample of all hunt stubs (53,895) for November, 1980 sales. These 2,695 stubs accounted for 3.69 percent of all stubs (72,989) processed in November. Therefore, a five percent sample of hunting license stubs was accomplished by sampling 3.69 percent of all stubs for November, 1980 sales.

Assuming all stub types were distributed uniformly among all boxes of license sales each month, a five percent sample of hunt stubs (or 3.69 percent of all the stubs in November, 1980) was drawn from every box. The total number of stubs per box was estimated by measuring the total length (mm) of cards in each box (5.68 stubs per 1 mm of length). Work sheets with these conversions and calculations were used to aid in determining the number of stubs sampled per box.

Random distances (mm) were chosen along the box of sales stubs to determine the stub to be sampled. If the selected stub was not the type

Appendix I. Detailed methods for sampling hunting license sales stubs
(continued).

of concern (01, 02 or 05), illegible, not filled in or incomplete, the neighboring stubs were examined until a usable stub was found. Examination proceeded one stub at a time from the original sample point towards the front of the box if the random distance was odd or towards the rear of the box if the distance was even. If either the front or the rear of the box was reached before encountering a usable stub, another random distance was selected. Sampling continued in this manner until the appropriate number of sampled stubs per box was reached. Random numbers were generated using the UNIFORM function of SAS (Helwig and Council 1979).

Licensee information was recorded from each sampled stub and converted to a computer file to be concatenated with the Sportsman's License sample file. To maintain accounting integrity, sampled stubs were returned to the exact box they were drawn from.

Appendix II. Editing and keypunching instructions for returned questionnaires.

To utilize the computer programs reading and analyzing harvest data for future surveys, the exact questionnaire (for Part A) must be used, edited and keypunched in the same manner as the 1980-81 survey. Therefore the following are sets of instructions for editing and keypunching the returned questionnaires (as shown in Fig. 1).

Editing

Part A

- (1) Make all corrections in red.
- (2) For every species the respondent indicated he hunted (whether he was successful or not), circle the species code to the left of the species name. This will help the keypunchers find the data to be punched.
- (3) Editing of total kill, total days hunted and region hunted most is only necessary for those rows with the species code circled.
- (4) Total kill:
 - (a) Fill in 998 if respondent indicated that he was successful, but did not provide the exact number.
 - (b) Fill in 999 if respondent did not indicate any information concerning his success, but you have reason to believe he may have been successful and that it is doubtful he killed no individuals of that species. This code was rarely used.
 - (c) Otherwise total kill should be zero or a positive integer.
 - (d) If a range in kill was given (e.g. 20-30), it was edited to contain the mid-range (e.g. 25).
- (5) Total days hunted:
 - (a) Often kill was filled in while days hunted was left blank. Obviously the respondent hunted. Therefore fill in 999 indicating that he hunted, but the number of days was unknown.
 - (b) Otherwise total days hunted should contain a positive integer (the species code should not be circled if total days hunted was zero).

Appendix II. Editing and keypunching instructions for returned questionnaires
(continued).

- (c) If a range was given, it was edited to contain the mid-range.
- (6) Region hunted most:
 - (a) This is the only column which may be left blank if it was not answered.
 - (b) If the respondent filled in a county or city, replace it with the correct region number.
 - (c) If they indicated more than one region, at random circle one to keep and cross out the other(s). If it is obvious which region was hunted most, then keep that one and do no random selection.
- (7) The date (month, day, year) of return was stamped in the lower right corner of each questionnaire (e.g. 032081).

Part B.

For future surveys, Part B will contain different sets of questions. Editing should be performed to facilitate ease of keypunching and programming for analysis, and will vary depending on the questions and their format.

Keypunching

General

- (1) A red pen was used to edit returns. Always punch (or don't punch) as indicated by the red marking.
- (2) When data are missing, skip to the next column(s) on the computer card which are to contain data.
- (3) In punching numeric data (to be read by a SAS INPUT statement), the information may go anywhere in the columns indicated. Leading zeros may be included. Trailing zeros are not to be used since they change the value of the number.

Appendix II. Editing and keypunching instructions for returned questionnaires (continued).

Part A

- (1) Punch only lines from the questionnaire which have the species code circled in red.
- (2) Every species circled in red is punched on an individual card (e.g. if a respondent hunted dove, rabbit and ducks, he would have had three cards of information punched for Part A).
- (3) Layout:
 - (a) All columns are numeric except column seven which is alpha.
 - (b) To be punched on every card:

<u>Input Data</u>	<u>Columns</u>
- ID Number (from upper right corner of questionnaire)	1- 6
- Part (which will always be coded as A)	7
- Species Code (from the circled numbers to the left of the species name)	8- 9
- Harvest Data (kill, days, region): exact columns depends on species being punched	
- If species code is 1-6, 10-11 or 13-17, then:	
Total kill	10-12
Total days hunted	13-15
Region hunted most	16-18
- If species code is 7-9, then:	
Buck kill	10-12
Doe kill	13-15
Total days hunted	16-18
Region hunted most	19-21

Appendix II. Editing and keypunching instructions for returned questionnaires
(continued).

<u>Input Data</u>	<u>Columns</u>
- If species code is 12, then:	
Mallard kill	10-12
Wood kill	13-15
Other kill	16-18
Total days hunted	19-21
Region hunted most	22-24

Part B

- (1) All of Part B was punched to a single card.
- (2) Punch the number which corresponds to the checked box for each question, or for some questions the number the respondent wrote in the box.
- (3) Layout:
 - (a) All columns are numeric except column seven which is alpha.
 - (b) To be punched on every card:

<u>Input Data</u>	<u>Columns</u>
- ID number	1-6
- Part (which will always be coded as B)	7
- Question #1	8
- Question #2a	9
- Question #2b	10-15
- Question #2c	16
- Question #3	17
- Question #4	18
- Question #5	19
- Question #6	20
- Question #7	21

Appendix II. Editing and keypunching instructions for returned questionnaires
(continued).

<u>Input Data</u>	<u>Columns</u>
- Question #8	22-24
	25-27
	28-30
	31-33
	34-36
- Question #9	37-38
- Date (from lower right corner of questionnaire)	39-44

Note: Since the questions in Part B will change with future surveys, so will the layout. However by keeping ID number and Part in the same columns with each survey, the SAS program reading the data (Appendix III) will work with only minor changes in the INPUT statement to accommodate a different format of questions.

Appendix III. The SAS computer program which reads the original data punched from the survey questionnaire and outputs it as a SAS data set.

```

//GPGM001 JOB (G00,5309),STEFFEN,CLASS=1,MSGLEVEL=1,MSGCLASS=A          00000010
// EXEC ERSAS,OPTIONS='PAGESIZE=60 WORK=AREA'                            00000020
//IN DD DSN=GFTS01.DSTEMP.DATA,UNIT=DISK,DISP=OLD                       00000030
//IN1 DD DSN=GFTS01.FILE1.DATA,UNIT=DISK,DISP=OLD                       00000040
//IN2 DD DSN=GFTS01.FILE2.DATA,UNIT=DISK,DISP=OLD                       00000050
//AREA DD DSN=GFTS01.XXXXXX.DATA,UNIT=DISK,DISP=(,CATLG),              00000060
//                                     SPACE=(CYL,(100,50))                00000070
//OUT DD DSN=GFTS01.FINAL.DATA,UNIT=DISK,DISP=(,CATLG),                 00000080
//                                     SPACE=(CYL,(50,10),RLSE)             00000090
*****00000100
*   THE FOLLOWING PROGRAM READS DATA AS PUNCHED FROM THE 1980-81      00000110
*   HUNTER HARVEST SURVEY. IT READS BOTH PARTS A & B, MERGES THEM      00000120
*   TOGETHER WITH THE APPROPRIATE ID NUMBERS, LICENSE TYPES, RACES     00000130
*   AND AGES FROM THE MAILING FILES AND OUTPUTS A SAS DATA SET WITH   00000140
*   ONE OBSERVATION PER RESPONDENT.                                     00000150
*****00000160
*   THIS PROGRAM IS STORED AS DATA IN THE GF PANVALET LIBRARY          00000170
*   (GF.SOURCE.LIBRARY) WITH THE NAME "GPGM001".                     00000180
*****00000190
*   THE INPUT FILES ARE AS FOLLOWS:                                    00000200
*   (1) IN = OS FILE RESULTING FROM ORIGINAL QUESTIONNAIRE             00000210
*   KEYPUNCHING.                                                       00000220
*   (2) IN1 = OS FILE OF ORIGINAL MAILING LIST OF HUNTERS WITH         00000230
*   ID NUMBERS(ID) IN THE 100,000 SEQUENCE.                            00000240
*   (3) IN2 = OS FILE OF THE FINAL REMINDER MAILING LIST OF HUNTERS    00000250
*   WITH THEIR ORIGINAL ID NUMBERS(100,000) AND THEIR                  00000260
*   FINAL ID NUMBERS (ID2) IN THE 200,000 SEQUENCE.                    00000270
*****00000280
*   THE OUTPUT FILES ARE AS FOLLOWS:                                    00000290
*   (1) AREA = DESIGNATED SAS WORK SPACE.                              00000300
*   (2) OUT = FINAL SAS DATA SET WITH ONE OBSERVATION OF ALL          00000310
*   QUESTIONNAIRE DATA PER RESPONDENT.                                00000320
*****00000330
OPTIONS CHARCODE;                                                       00000340
DATA MOST (KEEP=ID SP KILL DAYS REG)                                     00000350
  DEER (KEEP=ID SP KILL1 KILL2 DAYS REG)                                00000360
  DUCK (KEEP=ID SP KILL1 KILL2 KILL3 DAYS REG)                          00000370
  PARTB(KEEP= Q1 Q2A Q2B1-Q2B6 Q2C Q3-Q7 Q81-Q85 AGER MO DAY YR ID); 00000380
INFILE IN;                                                              00000390
INPUT ID 1-6 PART $ 7 @;                                                00000400
  IF PART = 'B' THEN INPUT Q1 8 Q2A 9 @ 10 (Q2B1-Q2B6) (1.) Q2C 16    00000410
    @ 17 (Q3-Q7) (1.) @ 22 (Q81-Q85) (3.) AGER 37-38 MO 39-40 DAY      00000420
    41-42 YR 43-44;                                                    00000430
  IF PART = 'B' THEN OUTPUT PARTB;                                     00000440
  IF PART = 'B' THEN RETURN;                                           00000450
  IF PART='A' THEN INPUT SP 8-9 @;                                       00000460
  IF SP NE 7 AND SP NE 8 AND SP NE 9 AND SP NE 12 THEN INPUT KILL      00000470
    10-12 DAYS 13-15 REG 16-18;                                         00000480
  IF SP NE 7 AND SP NE 8 AND SP NE 9 AND SP NE 12 THEN OUTPUT MOST;    00000490
  IF SP = 7 OR SP = 8 OR SP = 9 THEN INPUT KILL1 10-12 KILL2           00000500
    13-15 DAYS 16-18 REG 19-21;                                         00000510
  IF SP=7 OR SP=8 OR SP=9 THEN OUTPUT DEER;                             00000520
  IF SP=12 THEN INPUT KILL1 10-12 KILL2 13-15 KILL3 16-18 DAYS         00000530
    19-21 REG 22-24;                                                    00000540
  IF SP = 12 THEN OUTPUT DUCK;                                           00000550
*****00000560
*   THE FOLLOWING REARRANGES ORIGINAL INPUT OF DEER AND DUCK DATA     00000570
*****00000580
DATA DEER1; SET DEER;                                                  00000590

```



```

SP = SP*10; KILL = KILL1; OUTPUT; 00000600
SP = SP+1; KILL = KILL2; OUTPUT; 00000610
DROP KILL1 KILL2; 00000620
DATA DUCK1; SET DUCK; 00000630
SP = SP*10; KILL = KILL1; OUTPUT; 00000640
SP = SP+1; KILL = KILL2; OUTPUT; 00000650
SP = SP+1; KILL = KILL3; OUTPUT; 00000660
DROP KILL1-KILL3; 00000670
***** 00000680
* DATA ALL CONTAINS ALL THE INITIAL INPUT DATA 00000690
*****; 00000700
DATA ALL; SET MOST DEER1 DUCK1; 00000710
PROC SORT; BY SP; 00000720
***** 00000730
* THE FOLLOWING STMTS REARRANGE ENTIRE DATASET TO ONE OBS/RESPONDENT 00000740
*****; 00000750
DATA SPECIES; 00000760
INPUT SP 1-3 SPECIES $ 4-11; 00000770
CARDS; 00000780
1 DOVE 00000790
2 QUAIL 00000800
3 WOCK 00000810
4 RAB 00000820
5 SQRL 00000830
6 RAC 00000840
70 ABUCK 00000850
71 ADOE 00000860
80 PBUCK 00000870
81 PDOE 00000880
90 GBUCK 00000890
91 GDOE 00000900
10 TKSP 00000910
11 TKFL 00000920
120MALL 00000930
121WOOD 00000940
122OTHD 00000950
13 GOS 00000960
14 RFOX 00000970
15 GFOX 00000980
16 CAT 00000990
17 COY 00001000
PROC SORT; BY SP; 00001010
DATA TOG; MERGE ALL SPECIES; BY SP; 00001020
PROC SORT; BY ID; 00001030
PROC TRANSPOSE OUT=ONE (RENAME = (?-NAME?- = TYPE)); 00001040
BY ID; 00001050
VAR KILL DAYS REG; 00001060
ID SPECIES; 00001070
DATA ONE; SET ONE; 00001080
IF ID = . THEN DELETE; 00001090
PROC SORT DATA = ONE; BY ID TYPE; 00001100
PROC DATASETS DDNAME=AREA; 00001110
SAVE ONE PARTB; 00001120
PROC TRANSPOSE DATA=ONE OUT=TWO (RENAME=(COL1=NUMBER ?-NAME?-=SPECIES)); 00001130
BY ID TYPE; 00001140
VAR DOVE QUAIL WOCK RAB SQRL RAC ABUCK ADOE PBUCK PDOE GBUCK GDOE 00001150
TKSP TKFL MALL WOOD OTHD GOS RFOX GFOX CAT COY; 00001160
PROC TRANSPOSE OUT=THREE (DROP=?-NAME?- COL8 COL10 COL12 COL15 COL16 00001170
COL52 COL54 COL56 COL60 COL61 RENAME = (COL1=DOVEDAY COL2=QUADAY 00001180

```



```

COL3=WDCKDAY COL4=RABDAY COL5=SQRDAY COL6=RACDAY COL7=ARCHDAY      00001190
COL9=PRIMDAY COL11=GUNDAY COL13=TKSPDAY COL14=TKFLDAY COL17=DUCKDAY 00001200
COL18=GOSDAY COL19=RFOXDAY COL20=GFOXDAY COL21=CATDAY COL22=COYDAY 00001210
COL23=DOVEKILL COL24=QUAKILL                                     00001220
COL25=WDCKILL COL26=RABKILL COL27=SQRKILL COL28=RACKILL           00001230
COL29=ABUCKILL                                                  00001240
COL30=ADOEKILL                                                  00001250
COL31=PBUCKILL                                                  00001260
COL32=PDOEKILL                                                  00001270
COL33=GBUCKILL                                                  00001280
COL34=GDOEKILL                                                  00001290
COL35=TKSPKILL                                                  00001300
COL36=TKFLKILL                                                  00001310
COL37=MALLKILL                                                  00001320
COL38=WOODKILL                                                  00001330
COL39=OTHDKILL                                                  00001340
COL40=GOSKILL                                                  00001350
COL41=RFOXKILL                                                  00001360
COL42=GFOXKILL                                                  00001370
COL43=CATKILL                                                  00001380
COL44=COYKILL                                                  00001390
COL45=DOVEREG COL46=QUAREG                                     00001400
COL47=WDCKREG COL48=RABREG COL49=SQRREG COL50=RACREG COL51=ARCHREG 00001410
COL53=PRIMREG COL55=GUNREG COL57=TKSPREG COL58=TKFLREG COL59=DUCKREG 00001420
COL62=GOSREG COL63=RFOXREG COL64=GFOXREG COL65=CATREG COL66=COYREG); 00001430
  BY ID;
  VAR NUMBER;
DATA FOUR; SET THREE;
*****
*      THIS ARRAY REPLACES MISSING VALUES WITH ZEROS
*****;
ARRAY ALL
  DOVEKILL DOVEDAY DOVEREG QUAKILL QUADAY QUAREG WDCKILL WDCKDAY
  WDCKREG RABKILL RABDAY RABREG SQRKILL SQRDAY SQRREG RACKILL
  RACDAY RACREG ABUCKILL ADOEKILL ARCHDAY ARCHREG PBUCKILL PDOEKILL
  PRIMDAY PRIMREG GRUCKILL GDOEKILL GUNDAY GUNREG
  TKSPKILL TKSPDAY TKSPREG TKFLKILL TKFLDAY
  TKFLREG MALLKILL WOODKILL OTHDKILL DUCKDAY DUCKREG
  GOSKILL GOSDAY GOSREG RFOXKILL RFOXDAY RFOXREG GFOXKILL
  GFOXDAY GFOXREG CATKILL CATDAY CATREG COYKILL COYDAY COYREG;
DO OVER ALL;
  IF ALL = . THEN ALL = 0;
END;
*****
*      THIS ARRAY IS SINCE REGION CAN NOT BE ZERO, THEREFORE IS MISSING
*****;
ARRAY REGION DOVEREG QUAREG WDCKREG RABREG SQRREG RACREG ARCHREG
  PRIMREG GUNREG TKSPREG TKFLREG DUCKREG GOSREG RFOXREG GFOXREG CATREG
  COYREG;
DO OVER REGION;
  IF REGION = 0 THEN REGION = .;
END;
*****
*      NOTE: IF DAYS =999 THEN HUNTER HUNTED THAT SPECIES BUT UNKNOWN
*      HOW MANY TIMES
*      IF KILL = 999 THEN IT WAS NOT KNOWN HOW MANY ANIMALS OF
*      EACH SPECIES WAS KILLED OR EVEN IF HE WAS SUCCESSFUL
*      IF KILL = 998 THEN HUNTER WAS SUCCESSFUL IN TAKING AT
*      AT LEAST ONE ANIMAL OF THE SPECIES, BUT NOT KNOWN

```



```

*          HOW MANY                                00001780
*****; 00001790
ARRAY DAYKILL DOVEDAY QUADAY WDCKDAY RABDAY SQRLDAY RACDAY ARCHDAY 00001800
PRIMDAY GUNDAY TKSPDAY TKFLDAY DUCKDAY GOSDAY RFOXDAY GFOXDAY 00001810
CATDAY COYDAY DOVEKILL QUAKILL WDCKILL RABKILL SQRLKILL RACKILL 00001820
ABUCKILL ADOEKILL PBUCKILL PDOEKILL GBUCKILL GDOEKILL TKSPKILL 00001830
TKFLKILL MALLKILL WOODKILL OTHDKILL GOSKILL RFOXKILL GFOXKILL 00001840
CATKILL COYKILL; 00001850
DO OVER DAYKILL; 00001860
IF DAYKILL=999 THEN DAYKILL=.; 00001870
END; 00001880
*****00001890
*          GENERATING OTHER TOTALS FOR DEER, DUCKS AND TURKEYS 00001900
*****; 00001910
ARCHKILL=ABUCKILL+ADOEKILL; 00001920
PRIMKILL=PBUCKILL+PDOEKILL; 00001930
GUNKILL=GBUCKILL+GDOEKILL; 00001940
BUCKILL=ABUCKILL+PBUCKILL+GBUCKILL; 00001950
DOEKILL=ADOEKILL+PDOEKILL+GDOEKILL; 00001960
IF ABUCKILL=998 OR ADOEKILL=998 THEN ARCHKILL=998; 00001970
IF ARCHKILL=. AND ABUCKILL GT 0 THEN ARCHKILL=998; 00001980
IF ARCHKILL=. AND ADOEKILL GT 0 THEN ARCHKILL=998; 00001990
IF PBUCKILL=998 OR PDOEKILL=998 THEN PRIMKILL=998; 00002000
IF PRIMKILL=. AND PBUCKILL GT 0 THEN PRIMKILL=998; 00002010
IF PRIMKILL=. AND PDOEKILL GT 0 THEN PRIMKILL=998; 00002020
IF GBUCKILL=998 OR GDOEKILL=998 THEN GUNKILL=998; 00002030
IF GUNKILL=. AND GBUCKILL GT 0 THEN GUNKILL=998; 00002040
IF GUNKILL=. AND GDOEKILL GT 0 THEN GUNKILL=998; 00002050
IF ABUCKILL=998 OR PBUCKILL=998 OR GBUCKILL=998 THEN BUCKILL=998; 00002060
IF BUCKILL=. AND ABUCKILL GT 0 THEN BUCKILL=998; 00002070
IF BUCKILL=. AND PBUCKILL GT 0 THEN BUCKILL=998; 00002080
IF BUCKILL=. AND GBUCKILL GT 0 THEN BUCKILL=998; 00002090
IF ADOEKILL=998 OR PDOEKILL=998 OR GDOEKILL=998 THEN DOEKILL=998; 00002100
IF DOEKILL=. AND ADOEKILL GT 0 THEN DOEKILL=998; 00002110
IF DOEKILL=. AND PDOEKILL GT 0 THEN DOEKILL=998; 00002120
IF DOEKILL=. AND GDOEKILL GT 0 THEN DOEKILL=998; 00002130
TURKILL=TKSPKILL+TKFLKILL; 00002140
IF TKSPKILL=998 OR TKFLKILL=998 THEN TURKILL=998; 00002150
IF TURKILL=. AND TKSPKILL GT 0 THEN TURKILL=998; 00002160
IF TURKILL=. AND TKFLKILL GT 0 THEN TURKILL=998; 00002170
DUCKILL=MALLKILL + WOODKILL + OTHDKILL; 00002180
IF MALLKILL=998 OR WOODKILL=998 OR OTHDKILL=998 THEN DUCKILL=998; 00002190
IF DUCKILL=. AND MALLKILL GT 0 THEN DUCKILL=998; 00002200
IF DUCKILL=. AND WOODKILL GT 0 THEN DUCKILL=998; 00002210
IF DUCKILL=. AND OTHDKILL GT 0 THEN DUCKILL=998; 00002220
DEERKILL=BUCKILL+DOEKILL; 00002230
IF BUCKILL=998 OR DOEKILL=998 THEN DEERKILL=998; 00002240
IF DEERKILL=. AND BUCKILL GT 0 THEN DEERKILL=998; 00002250
IF DEERKILL=. AND DOEKILL GT 0 THEN DEERKILL=998; 00002260
DEERDAY = ARCHDAY+PRIMDAY+GUNDAY; 00002270
TURKDAY = TKSPDAY+TKFLDAY; 00002280
ARRAY KILLDAY DOVEDAY QUADAY WDCKDAY RABDAY SQRLDAY RACDAY ARCHDAY 00002290
PRIMDAY GUNDAY TKSPDAY TKFLDAY DUCKDAY GOSDAY RFOXDAY GFOXDAY 00002300
CATDAY COYDAY DOVEKILL QUAKILL WDCKILL RABKILL SQRLKILL RACKILL 00002310
ABUCKILL ADOEKILL PBUCKILL PDOEKILL GBUCKILL GDOEKILL TKSPKILL 00002320
TKFLKILL MALLKILL WOODKILL OTHDKILL GOSKILL RFOXKILL GFOXKILL 00002330
CATKILL COYKILL ARCHKILL PRIMKILL GUNKILL DOEKILL BUCKILL 00002340
TURKILL DUCKILL DEERDAY TURKDAY DEERKILL; 00002350
DO OVER KILLDAY; 00002360

```



```

IF KILLDAY=. THEN KILLDAY=999;                                00002370
END;                                                            00002380
*****00002390
* DATA FIVE IS TO "CLEAN-UP" PART B DATA                    00002400
*****00002410
DATA FIVE; SET PARTB;                                         00002420
  ARRAY FISH Q81-Q85;                                         00002430
  DO OVER FISH;                                               00002440
    IF FISH=. THEN FISH =0;                                   00002450
  END;                                                         00002460
PROC SORT; BY ID;                                             00002470
*****00002480
* DATA SIX IS ALL ORIGINAL QUESTIONNAIRE DATA IN REARRANGED FORM 00002490
*****00002500
DATA SIX; MERGE FOUR FIVE; BY ID;                             00002510
  DUMMY = 1;                                                  00002520
*****00002530
* THE FOLLOWING STMTS ARE TO MERGE WITH ORIGINAL MAILING FILES 00002540
* TO OBTAIN LICENSE TYPES, RACES AND AGES. ALSO DUPLICATE RETURNS 00002550
* ARE DELETED. THE FINAL SAVED SAS DATA SET IS OUTPUTTED.    00002560
*****00002570
DATA SEVEN; SET SIX;                                          00002580
  IF ID GE 200000;                                             00002590
  ID2=ID;                                                       00002600
  DROP ID;                                                      00002610
DATA EIGHT;                                                    00002620
  INFILE IN2;                                                  00002630
  INPUT ID2 91-96 AGE 97-98 RACE 99 TYPE 100 ID 101-106;      00002640
  PROC SORT; BY ID2;                                           00002650
DATA NINE; MERGE SEVEN EIGHT; BY ID2;                         00002660
  IF DUMMY = . THEN DELETE;                                    00002670
DATA TEN; SET SIX;                                             00002680
  IF ID LT 200000;                                             00002690
DATA ELEVEN;                                                    00002700
  INFILE IN1;                                                  00002710
  INPUT ID 91-96 AGE 97-98 RACE 99 TYPE 100;                  00002720
  PROC SORT; BY ID;                                           00002730
DATA TWELVE; MERGE TEN ELEVEN; BY ID;                         00002740
  IF DUMMY = . THEN DELETE;                                    00002750
DATA THIRTEEN; SET NINE TWELVE;                               00002760
  PROC SORT; BY ID ID2;                                        00002770
DATA OUT.FINAL; SET THIRTEEN; BY ID;                          00002780
  IF FIRST.ID;                                                 00002790
  DROP DUMMY ID2;                                              00002800
PROC CONTENTS DIRECTORY HISTORY POSITION;                      00002810
/*                                                            00002820
//                                                            00002830

```


Appendix IV. The statistical formulas used for the specific statewide calculations of estimates and standard errors.

Depending on the species type (big game or small game), the calculations resulting from the following formulas will vary slightly.

When calculating big game indices:

- (1) Consider only the sample of respondents who hold a big game license (Type 00 and Type 01). All small game only license holders should have no effort or kill for big game.
- (2) N = total number of licensed big game hunters (from accounting records)
= Type 00 + Type 01
= 211,063 (June 1981 figure for 1980-81 sales).
- (3) n = number of sampled big game licensees who provided usable responses.

When calculating small game indices:

- (1) Consider all respondents (Type 00, Type 01, Type 02 and Type 05). All license holders were eligible to hunt small game.
- (2) N = total number of licensed small game hunters (from accounting records)
= Type 00 + Type 01 + Type 02 + Type 05
= 255,992 (June 1981 figure for 1980-81 sales)
- (3) n = number of sampled small game licensees who provided usable responses (i.e. all usable responses).

In the following formulas, N and n will always be defined as above (depending on whether the calculations are for big game or small game or as otherwise specified).

(1) Total Harvest and Total Man-Days Hunting for Each Species

Although we are only concerned with the subpopulation of hunters who hunted each species, the calculations are identical to those based on all hunters. (Cochran 1977:22,26)

(a) $\hat{Y}$ = estimate of total kill (or man-days).

$$= N\bar{y}$$

where, N = total number of licensed hunters

$\bar{y}$ = sample mean (kill or days) for all hunters

$$= \frac{\sum_{i=1}^n y_i}{n}$$

where, y_i = kill (or man-days) for the i^{th} hunter ($i = 1, 2 \dots n$).

n = number of sampled hunters who provided usable responses.

Note: If a hunter did not hunt a particular species then $y_i = 0$

$$(b) \hat{S}_Y = \text{standard error of the total kill (or man-days)} \\ = N (S_{\bar{y}})$$

where, $S_{\bar{y}}$ = standard error of the mean kill (man-days) per hunter.

$$= \sqrt{\frac{S^2}{n}}$$

$$\text{where, } S_{\bar{y}}^2 = \frac{S^2}{n}$$

where, S^2 = sample variance

$$= \frac{\sum_{i=1}^n (y_i - \bar{y})^2}{n-1}$$

(2) Average Seasonal kill and Man-Days Per Hunter of Each Species

Calculating the average kill and man-days of effort for the subpopulation of hunters of each species. (Cochran 1977:34)

(a) $\bar{y}_j$ = estimate of the average kill (man-days) per hunter of each species

= estimate of mean kill (man-days) over the subpopulation of species specific hunters

$$= \frac{\sum_{k=1}^{n_j} y_{jk}}{n_j}$$

Appendix IV. The statistical formulas used for the specific statewide calculations of estimates and standard errors. (Continued)

where, y_{jk} = kill (days) per K^{th} hunter of the j^{th} subpopulation (species)

$K = 1, 2, \dots, n_j$

n_j = sample number of hunters of the j^{th} species who provided a usable response

(b) $S_{\bar{y}_j}$ = standard error of the mean kill (man-days) per hunter of the j^{th} species

$$= \sqrt{S_{\bar{y}_j}^2}$$

$$\text{where, } S_{\bar{y}_j}^2 = \frac{S_j^2}{n_j}$$

where, S_j^2 = sample variance of hunters of the j^{th} species

$$= \frac{\sum_{k=1}^{n_j} (y_{jk} - \bar{y}_j)^2}{n_j - 1}$$

(3) Percent of Licensed Hunters who Hunted Each Species

Calculating a proportion of licensed hunters. (Cochran 1977:50,52)

(a) $\hat{P}$ = estimate of the proportion of licensed hunters who hunted each species

= sample estimate = p

$$= \frac{a}{n}$$

where, a = sample number of licensees who hunted each species

(b) $S_{\hat{p}}$ = standard error of the proportion of licensed hunters who hunted each species

$$= \sqrt{S_{\hat{p}}^2}$$

$$\text{where, } S_{\hat{p}}^2 = \frac{p(1 - p)}{n-1}$$

(4) Total Hunters of Each Species

Calculating a total number who hunted each species.
(Cochran 1977: 50,52)

(a) $\hat{A}$ = estimate of total number of licensees hunting each species

$$= N \hat{P}$$

$$= N p$$

where, $\hat{P}$ and p are defined by (3 a)

(b) $S_{\hat{A}}$ = standard error of the total number of licensees hunting each species

$$= N (S_{\hat{p}})$$

where, $S_{\hat{p}}$ is defined by (3 b)

(5) Percent Successful Hunters for Each Species

Calculating the proportion successful over the subpopulation of species specific hunters. (Cochran 1977:63)

- (a) p_1 = estimate of the proportion of hunters who were successful in each subpopulation of species specific hunters.

$$= \frac{a_1}{n_1}$$

where, a_1 = sample number of successful hunters of each species

n_1 = sample number of hunters of each species

- (b) S_{p_1} = standard error of the proportion of successful hunters of each species

$$= \sqrt{\frac{p_1 (1 - p_1)}{n_1 - 1}}$$

(6) Total Number of Successful Hunters of Each Species

Calculating the total number of successful hunters over the subpopulation of species specific hunters. (Cochran 1977:63)

(a) $\hat{A}_1$ = estimate of total number of successful hunters based on the subpopulation of hunters who hunted each species

$$= \frac{Na_1}{n}$$

where, a_1 is defined by (5a)

(b) $s(\hat{A}_1)$ = standard error of the total number of successful hunters

$$= \sqrt{V(\hat{A}_1)}$$

$$\text{where, } V(\hat{A}_1) = \frac{N^2 p(1-p)}{n-1}$$

$$\text{where, } p = \frac{a_1}{n}$$

(7) Average Daily Kill

Calculating the kill per unit effort by hunters of each species.
Ratio estimator over the subpopulation of hunters of each species.
(Cochran 1977:35, 153)

(a) $\hat{R}_j$ = estimate of the kill per day for hunters of each species.

= ratio estimate over the j^{th} subpopulation of species specific hunters (e.g. dove hunters).

$$= \frac{\bar{y}_j}{\bar{x}_j}$$

where, $\bar{y}_j$ = sample mean of the average seasonal kill per hunter

$$= \frac{\sum_{k=1}^{n_j} y_{jk}}{n_j}$$

$\bar{x}_j$ = sample mean of the average days hunted by each hunter

$$= \frac{\sum_{k=1}^{n_j} x_{jk}}{n_j}$$

where, n_j = sample size of the number of hunters hunting each species reporting both kill and days

y_{jk} = kill for the k^{th} hunter of the j^{th} species

x_{jk} = days hunted for the k^{th} hunter of the j^{th} species

Appendix IV. The statistical formulas used for the specific statewide calculations of estimates and standard errors. (Continued)

(b) $S_{\hat{R}_j}$ = standard error of the ratio estimate

$$= \sqrt{V(\hat{R}_j)}$$

$$\text{where, } V(\hat{R}_j) = \frac{\sum_{k=1}^{n_j} (y_{jk} - \hat{R}_j x_{jk})^2}{n_j \bar{x}_j^2 (n_j - 1)}$$

Appendix V. The statistical formulas used for the specific regional calculations of estimates and standard errors.

The introductory comments from Appendix IV for calculating big game and small game indices also apply to these regional calculations. Values of N and n are as defined by Appendix IV unless otherwise noted.

Individuals who hunted and did not record region were not considered in the calculations. Regional summaries could not be directly calculated for all deer hunting, doe hunting, buck hunting and turkey hunting indices. A hunter may have hunted deer during the different seasons (archery, primitive weapon, gun) in different regions and he may have hunted turkey during the spring and fall in different regions. It is therefore difficult to assign a single region to all of a hunter's deer and turkey hunting activities.

(1) Total Harvest and Total Man-Days Hunting for Each Species in Each Region

Calculating the total harvest (man-days) over the subpopulation of species specific hunters in the j^{th} region. (Cochran 1977:35-36)

$$\begin{aligned} \text{(a) } \hat{Y}_j &= \text{estimate of total kill (or man-days) in the } j^{\text{th}} \text{ region} \\ &= N \bar{y}' \end{aligned}$$

where, $\bar{y}' =$ a sample mean for all hunters

$$= \frac{\sum_{i=1}^n y_i'}{n}$$

$$\text{where, } y_i' = \begin{cases} y_i, & \text{if hunter hunted in the } j^{\text{th}} \\ & \text{region} \\ 0, & \text{otherwise} \end{cases}$$

where, $y_i =$ kill (or days) for
the i^{th} hunter

Appendix V. The statistical formulas used for the specific regional calculations of estimates and standard errors. (Continued)

(b) $S(\hat{Y}_j)$ = standard error of the total kill (or man-days) in j^{th} region.

$$= \frac{Ns'}{\sqrt{n}}$$

where, S' = standard deviation of the y'_i

$$= \sqrt{\frac{\sum_{i=1}^n (y'_i - \bar{y}')^2}{n-1}}$$

(2) Average Seasonal Kill and Man-Days Per Hunter of Each Species in Each Region

Calculating the average kill and man-days of effort for the subpopulation of hunters of each species in each region.

(Cochran 1977:34)

(a) $\bar{y}_j$ = estimate of the average kill (man-days) per hunter of the j^{th} subpopulation of a species - region combination

$$= \frac{\sum_{k=1}^{n_j} y_{jk}}{n_j}$$

where, y_{jk} = kill (days) per k^{th} hunter of the j^{th} species - region combination (subpopulation)

k = 1, 2, n_j

n_j = sample number of hunters in the j^{th} subpopulation who provided usable responses

Appendix V. The statistical formulas used for the specific regional calculations of estimates and standard errors. (Continued)

(b) $s_{\bar{y}_j}$ = standard error of the mean kill (man-days) per hunter of the j^{th} subpopulation

$$= \sqrt{S_{\bar{y}_j}^2}$$

$$\text{where, } S_{\bar{y}_j}^2 = \frac{S_j^2}{n_j}$$

where, S_j^2 = sample variance of hunters in the j^{th} subpopulation

$$= \frac{\sum_{k=1}^{n_j} (y_{jk} - \bar{y}_j)^2}{n_j - 1}$$

(3) Percent of Hunters Hunting in Each Region for a Specific Species

Calculating the proportion of the subpopulation of species specific hunters who hunted that species in a specific region.

(Cochran 1977:63)

(a) p_1 = estimate of the proportion of the subpopulation of species specific hunters who hunted that species in a specific region

$$= \frac{a_1}{n_1}$$

where, a_1 = sample number of hunters who hunted a particular species in a specific region

n_1 = sample number of licensees who hunted the particular species

(b) S_{p_1} = standard error of the proportion of the subpopulation of species specific hunters who hunted that species in a specific region

$$= \sqrt{\frac{p_1 (1 - p_1)}{n_1 - 1}}$$

(4) Total Number of Hunters in Each Region for a Specific Species

Calculating the total number of species specific hunters in each region from the subpopulation of species specific hunters.

(Cochran 1977:63)

(a) $\hat{A}_1$ = estimate of the total number of species specific hunters in each region based on the subpopulation of all hunters of that species

$$= \frac{Na_1}{n}$$

where, a_1 is defined by (3a)

(b) $S(\hat{A}_1)$ = standard error of the total number of species specific hunters in each region based on the subpopulation of hunters of that species

$$= \sqrt{V(\hat{A}_1)}$$

$$\text{where, } V(\hat{A}_1) = \frac{N^2 p(1 - p)}{n - 1}$$

$$\text{where, } p = \frac{a_1}{n}$$

(5) Percent Successful Hunters in Each Region for Each Species

Calculating the percent successful hunters in each region over the subpopulation of species specific hunters in that region.

(Cochran 1977:63). The formulas are identical to those found in (3).

The individual variables will be redefined as follows:

(a) p_1 = estimate of the percent successful hunters in each region over the subpopulation of species specific hunters in that region

a_1 = sample number of successful hunters in each region for a specific species

n_1 = sample number of licensees who hunted the particular species in each region

(b) S_{p_1} = standard error of the percent successful hunters in each region over the subpopulation of species specific hunters in that region

(6) Total Number of Successful Hunters in Each Region for Each Species

Calculating the total number of successful hunters in each region based on the subpopulation of species specific hunters in that region. (Cochran 1977:63). The formulas are identical to those found in (4). The individual variables will be redefined as follows:

(a) $\hat{A}_1$ = estimate of the total number of successful species specific hunters in each region

a_1 is defined by (5a)

(b) $S(\hat{A}_1)$ = standard error of the total number of successful species specific hunters in each region

(7) Average Daily Kill in Each Region

Calculating the kill per unit effort by hunters of each species in each region. Ratio estimator over the subpopulation of hunters of each species in each region. (Cochran 1977:35, 153)

(a) $\hat{R}_j$ = estimate of the kill per day for hunters of each species in each region
 = ratio estimate over the j^{th} subpopulation of species specific hunters in a particular region (e.g. dove hunters in region 2)

$$= \frac{\bar{y}_j}{\bar{x}_j}$$

where, $\bar{y}_j$ = sample mean of the average kill per hunter in the j^{th} species - region combination

$$= \frac{\sum_{k=1}^{n_j} y_{jk}}{n_j}$$

$\bar{x}_j$ = sample mean of the average days hunted by each hunter

$$= \frac{\sum_{k=1}^{n_j} x_{jk}}{n_j}$$

Appendix V. The statistical formulas used for the specific regional calculations of estimates and standard errors. (Continued)

(7) (a) - Continued

where, n_j = sample size of the number of hunters hunting the particular species in the particular region of interest, and reporting both kill and days

y_{jk} = kill for the k^{th} hunter in the j^{th} species - region combination

x_{jk} = days hunted for the k^{th} hunter in the j^{th} species - region combination

(b) $s_{\hat{R}_j}$ = standard error of the ratio estimate

$$= \sqrt{V(\hat{R}_j)}$$

$$\text{where, } V(\hat{R}_j) = \frac{\sum_{k=1}^{n_j} (y_{jk} - \hat{R}_j x_{jk})^2}{n_j \bar{x}_j^2 (n_j - 1)}$$


```
//GFPGM017 JOB (GFOO,5309),STEFFEN,CLASS=I,MSGLEVEL=1,MSGCLASS=A      00000010
// EXEC ERSAS,OPTIONS='PAGESIZE=60 TIME=MAX WORK=AREA'                  00000020
//IN DD DSN=GFTS01.DSTEMP.DATA,UNIT=DISK,DISP=OLD                      00000030
//AREA DD DSN=GFTS01.WORK.DATA,UNIT=DISK,DISP=(,CATLG),                00000040
//      SPACE=(CYL,(50,20),RLSE)                                       00000050
*****00000060
* THE FOLLOWING PROGRAM PERFORMS STATISTICAL CALCULATIONS (ESTIMATES,00000070
* STANDARD ERRORS, CONFIDENCE LIMITS AND SAMPLE SIZES) FOR THE        00000080
* STATEWIDE HUNTER HARVEST AND EFFORT INDICES.                        00000090
*****00000100
* THIS PROGRAM IS STORED AS DATA IN THE GF PANVALET LIBRARY          00000110
* (GF.SOURCE.LIBRARY) WITH THE NAME "GPGM017".                      00000120
*****00000130
* THE INPUT FILE IS AS FOLLOWS:                                       00000140
* (1) IN = SAS DATA SET CREATED BY THE JOB NAME "GFPGM001".          00000150
*****00000160
* THE OUTPUT FILE IS AS FOLLOWS:                                       00000170
* (1) AREA = DESIGNATED SAS WORK SPACE.                                00000180
*****00000190
OPTIONS MACROGEN;                                                       00000200
*****00000210
* MACRO POP = TOTAL NUMBER OF SMALL GAME HUNTERS (= TYPES 00 + 01    00000220
*      + 02 + 05)                                                       00000230
* MACRO POP1 = TOTAL NUMBER OF BIG GAME HUNTERS (= TYPES 00 + 01)    00000240
*****00000250
MACRO POP 255992 %                                                       00000260
MACRO POP1 211063 %                                                       00000270
DATA HUNT; SET IN.YR8081;                                                 00000280
*****00000290
* DATA SPECIES INPUTS NAMES FOR SPECIES CODES.                      00000300
*****00000310
DATA SPECIES;                                                            00000320
  INPUT SP 1-2 SPECIES $ 3-16;                                           00000330
  CARDS;                                                                  00000340
1 DOVE                                                                    00000350
2 QUAIL                                                                    00000360
3 WOODCOCK                                                                00000370
4 RABBIT                                                                  00000380
5 SQUIRREL                                                                00000390
6 RACCOON                                                                00000400
7 MALLARD                                                                00000410
8 WOOD DUCK                                                                00000420
9 OTHER DUCKS                                                            00000430
10ALL DUCKS                                                              00000440
11GEESE                                                                  00000450
12RED FOX                                                                00000460
13GRAY FOX                                                                00000470
14BOBCAT                                                                00000480
15COYOTE                                                                00000490
16ARCHERY BUCK                                                            00000500
17ARCHERY DOE                                                            00000510
18ARCHERY DEER                                                            00000520
19PRIMITIVE BUCK                                                         00000530
20PRIMITIVE DOE                                                         00000540
21PRIMITIVE DEER                                                         00000550
22GUN BUCK                                                                00000560
23GUN DOE                                                                00000570
24GUN DEER                                                                00000580
25TOTAL BUCK                                                             00000590
```



```

26TOTAL DOE                                00000600
27TOTAL DEER                                00000610
28SPRING TURKEY                             00000620
29FALL TURKEY                                00000630
30TOTAL TURKEY                              00000640
PROC SORT; BY SP;                          00000650
*****00000660
* THE FOLLOWING RESTRUCTURES THE SAS DATA SET FOR CALCULATIONS. 00000670
*****00000680
DATA HUNT; SET HUNT;
  SP=1; KILL=DOVEKILL; DAYS=DOVEDAY; REGION=DOVEREG; OUTPUT; 00000690
  SP=2; KILL=QUACKILL; DAYS=QUADAY; REGION=QUAREG; OUTPUT; 00000700
  SP=3; KILL=WDCKILL; DAYS=WDCKDAY; REGION=WDCKREG; OUTPUT; 00000710
  SP=4; KILL=RABKILL; DAYS=RABDAY; REGION=RABREG; OUTPUT; 00000720
  SP=5; KILL=SQRLKILL; DAYS=SQRLDAY; REGION=SQRLREG; OUTPUT; 00000730
  SP=6; KILL=RACKILL; DAYS=RACDAY; REGION=RACREG; OUTPUT; 00000740
  SP=7; KILL=MALLKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000750
  SP=8; KILL=WOODKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000760
  SP=9; KILL=OTHDKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000770
  SP=10; KILL=DUCKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000780
  SP=11; KILL=GOSKILL; DAYS=GOSDAY; REGION=GOSREG; OUTPUT; 00000790
  SP=12; KILL=RFOXKILL; DAYS=RFOXDAY; REGION=RFOXREG; OUTPUT; 00000800
  SP=13; KILL=GFOXKILL; DAYS=GFOXDAY; REGION=GFOXREG; OUTPUT; 00000810
  SP=14; KILL=CATKILL; DAYS=CATDAY; REGION=CATREG; OUTPUT; 00000820
  SP=15; KILL=COYKILL; DAYS=COYDAY; REGION=COYREG; OUTPUT; 00000830
  SP=16; KILL=ABUCKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000840
  SP=17; KILL=ADOEKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000850
  SP=18; KILL=ARCHKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000860
  SP=19; KILL=PBUCKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000870
  SP=20; KILL=PDOEKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000880
  SP=21; KILL=PRIMKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000890
  SP=22; KILL=GBUCKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000900
  SP=23; KILL=GDOEKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000910
  SP=24; KILL=GUNKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000920
  SP=25; KILL=BUCKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000930
  SP=26; KILL=DOEKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000940
  SP=27; KILL=DEERKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000950
  SP=28; KILL=TKSPKILL; DAYS=TKSPDAY; REGION=TKSPREG; OUTPUT; 00000960
  SP=29; KILL=TKFLKILL; DAYS=TKFLDAY; REGION=TKFLREG; OUTPUT; 00000970
  SP=30; KILL=TURKILL; DAYS=TURKDAY; REGION=.; OUTPUT; 00000980
KEEP SP KILL DAYS REGION TYPE;              00000990
*****0001000
* THE FOLLOWING DELETES ANY REPORTED FALL TURKEY KILL FROM THE 00010010
* ILLEGAL REGIONS. 00010020
*****00010030
DATA HUNT; SET HUNT; 00010040
  IF SP=29 AND REGION = 2 THEN DELETE; 00010050
  IF SP= 29 AND REGION = 4 THEN DELETE; 00010060
  IF SP = 29 AND REGION = 5 THEN DELETE; 00010070
*****00010080
* THE FOLLOWING CALCULATES TOTAL HARVEST ESTIMATES. 00010090
*****0001100
DATA SMALL; SET HUNT; 00011010
  IF SP LE 15; 00011020
  IF KILL=999 OR KILL=998 THEN DELETE; 00011030
PROC SORT; BY SP; 00011040
PROC MEANS NOPRINT; BY SP; 00011050
  OUTPUT OUT=STOTAL N=N MEAN=AVG STDERR=STDERR; 00011060
  VAR KILL; 00011070
  00011080

```



```

DATA STOTAL; SET STOTAL;                                00001190
  TOTAL=POP*AVG;                                          00001200
  STDERRT=POP*STDERR;                                    00001210
DATA BIG; SET HUNT;                                      00001220
  IF SP GE 16;                                           00001230
  IF TYPE=0 OR TYPE=1;                                   00001240
  IF KILL=999 OR KILL=998 THEN DELETE;                   00001250
  PROC SORT; BY SP;                                      00001260
  PROC MEANS NOPRINT; BY SP;                             00001270
  OUTPUT OUT=BTOTAL N=N MEAN=AVG STDERR=STDERR;          00001280
  VAR KILL;                                              00001290
DATA BTOTAL; SET BTOTAL;                                00001300
  TOTAL=POP1*AVG;                                        00001310
  STDERRT=POP1*STDERR;                                   00001320
DATA TOTAL; SET STOTAL BTOTAL;                          00001330
  LOWER = TOTAL - (2*STDERRT);                          00001340
  UPPER = TOTAL + (2*STDERRT);                          00001350
DATA TOTAL1; MERGE TOTAL SPECIES; BY SP;                00001360
  KEEP SPECIES N TOTAL STDERRT LOWER UPPER;             00001370
  PROC PRINT;                                           00001380
  ID SPECIES N TOTAL STDERRT LOWER UPPER;               00001390
  TITLE '1980-1981 STATEWIDE HARVEST ESTIMATES';        00001400
*****00001410
* CALCULATING AVERAGE SEASONAL HARVEST PER HUNTER.      00001420
*****00001430
DATA SMALL; SET HUNT;                                    00001440
  IF SP LE 15;                                           00001450
  IF DAYS NE 0;                                           00001460
  IF KILL=999 OR KILL=998 THEN DELETE;                   00001470
  PROC SORT; BY SP;                                      00001480
  PROC MEANS NOPRINT; BY SP;                             00001490
  OUTPUT OUT=SAVG N=N MEAN=AVG STDERR=STDERRA;          00001500
  VAR KILL;                                              00001510
DATA BIG; SET HUNT;                                      00001520
  IF SP GE 16;                                           00001530
  IF TYPE=0 OR TYPE=1;                                   00001540
  IF DAYS NE 0;                                           00001550
  IF KILL=999 OR KILL=998 THEN DELETE;                   00001560
  PROC SORT; BY SP;                                      00001570
  PROC MEANS NOPRINT; BY SP;                             00001580
  OUTPUT OUT=BAVG N=N MEAN=AVG STDERR=STDERRA;          00001590
  VAR KILL;                                              00001600
DATA AVGKILL; SET SAVG BAVG;                             00001610
DATA AVGKILL1; MERGE AVGKILL SPECIES; BY SP;           00001620
  LOWER = AVG - (2*STDERRA);                            00001630
  UPPER = AVG + (2*STDERRA);                            00001640
  KEEP SPECIES N AVG STDERRA LOWER UPPER;               00001650
  PROC PRINT;                                           00001660
  ID SPECIES N AVG STDERRA LOWER UPPER;                 00001670
  TITLE '1980-1981 AVERAGE SEASONAL HARVEST PER HUNTER'; 00001680
*****00001690
* CALCULATING TOTAL HUNTERS AND PROPORTION OF HUNTERS OF EACH SPECIES. 00001700
*****00001710
DATA SMALL; SET HUNT;                                    00001720
  IF SP LE 15;                                           00001730
  IF DAYS NE 0 THEN DAYS=1;                              00001740
  PROC SORT; BY SP;                                      00001750
  PROC MEANS NOPRINT; BY SP;                             00001760
  OUTPUT OUT=SPROP N=N SUM=NUMH;                        00001770

```



```

VAR DAYS;
DATA SPROP; SET SPROP;
  PL=NUMH/N;
  Q=1-PL;
  STDERRPL=SQRT(PL*Q/(N-1));
  TOTALH=POP*PL;
  STDERRTH=POP*STDERRPL;
DATA BIG; SET HUNT;
  IF TYPE=0 OR TYPE=1;
  IF SP GE 16;
  IF DAYS NE 0 THEN DAYS=1;
  PROC SORT; BY SP;
  PROC MEANS NOPRINT; BY SP;
    OUTPUT OUT=BPROP N=N SUM=NUMH;
    VAR DAYS;
DATA BPROP; SET BPROP;
  PL=NUMH/N;
  Q=1-PL;
  STDERRPL=SQRT(PL*Q/(N-1));
  TOTALH=POP1*PL;
  STDERRTH=POP1*STDERRPL;
DATA PROP; SET SPROP BPROP;
DATA PROP1; MERGE PROP SPECIES; BY SP;
  LOWERPL = PL - (2*STDERRPL);
  UPPERPL = PL + (2*STDERRPL);
  LOWERTH = TOTALH - (2*STDERRTH);
  UPPERTH = TOTALH + (2*STDERRTH);
  KEEP SPECIES N PL STDERRPL LOWERPL UPPERPL TOTALH STDERRTH LOWERTH
  UPPERTH;
  PROC PRINT;
  ID SPECIES N PL STDERRPL LOWERPL UPPERPL TOTALH STDERRTH LOWERTH
  UPPERTH;
  TITLE '1980-1981 PROPORTION OF LICENSED HUNTERS AND TOTAL HUNTERS';
*****
* CALCULATING PERCENT AND TOTAL SUCCESSFUL HUNTERS.
*****;
DATA; SET HUNT;
  IF SP LE 15;
  IF KILL=999 THEN DELETE;
  PROC SORT; BY SP;
  PROC MEANS NOPRINT; BY SP;
    OUTPUT OUT=SAMPLE N=SAMPLE;
    VAR KILL;
DATA; SET HUNT;
  IF SP GE 16;
  IF KILL = 999 THEN DELETE;
  IF TYPE=0 OR TYPE=1;
  PROC SORT; BY SP;
  PROC MEANS NOPRINT; BY SP;
    OUTPUT OUT=SAMPLE1 N=SAMPLE;
    VAR KILL;
DATA RETURN; SET SAMPLE SAMPLE1;
DATA SMALL; SET HUNT;
  IF SP LE 15;
  IF DAYS NE 0;
  IF KILL=999 THEN DELETE;
  IF KILL NE 0 THEN KILL=1;
  PROC SORT; BY SP;
  PROC MEANS NOPRINT; BY SP;

```



```

        OUTPUT OUT=SSUC N=N SUM=NUMS;                                00002370
        VAR KILL;                                                    00002380
DATA SSUC; SET SSUC;                                                00002390
        PS=NUMS/N;                                                  00002400
        STDERRPS=SQRT(PS*(1-PS)/(N-1));                             00002410
DATA BIG; SET HUNT;                                                00002420
        IF SP GE 16;                                                00002430
        IF TYPE=0 OR TYPE=1;                                         00002440
        IF DAYS NE 0;                                                00002450
        IF KILL=999 THEN DELETE;                                     00002460
        IF KILL NE 0 THEN KILL=1;                                    00002470
        PROC SORT; BY SP;                                           00002480
        PROC MEANS NOPRINT; BY SP;                                   00002490
        OUTPUT OUT=BSUC N=N SUM=NUMS;                               00002500
        VAR KILL;                                                    00002510
DATA BSUC; SET BSUC;                                               00002520
        PS=NUMS/N;                                                  00002530
        STDERRPS=SQRT(PS*(1-PS)/(N-1));                             00002540
DATA SUCCESS; SET SSUC BSUC;                                       00002550
DATA SUCCESS1; MERGE SUCCESS RETURN; BY SP;                        00002560
DATA SUCCESS2; MERGE SUCCESS1 SPECIES; BY SP;                      00002570
        IF SP LE 15 THEN TOTALS=POP*NUMS/SAMPLE;                  00002580
        IF SP GE 16 THEN TOTALS=POP1*NUMS/SAMPLE;                 00002590
        P=NUMS/SAMPLE;                                              00002600
        Q=1-P;                                                      00002610
        IF SP LE 15 THEN STDERRTS=POP*(SQRT(P*Q/(SAMPLE-1)));      00002620
        IF SP GE 16 THEN STDERRTS=POP1*(SQRT(P*Q/(SAMPLE-1)));    00002630
        LOWERPS = PS - (2*STDERRPS);                                00002640
        UPPERPS = PS + (2*STDERRPS);                                00002650
        LOWERTS = TOTALS - (2*STDERRTS);                            00002660
        UPPERTS = TOTALS + (2*STDERRTS);                            00002670
        KEEP SPECIES N PS STDERRPS LOWERPS UPPERPS TOTALS STDERRTS LOWERTS 00002680
        UPPERTS;                                                    00002690
        PROC PRINT;                                                 00002700
        ID SPECIES N PS STDERRPS LOWERPS UPPERPS TOTALS STDERRTS LOWERTS 00002710
        UPPERTS;                                                    00002720
        TITLE '1980-1981 PERCENT AND TOTAL SUCCESSFUL HUNTERS';    00002730
*****00002740
* CALCULATING TOTAL MAN-DAYS SPENT HUNTING EACH SPECIES.          00002750
*****00002760
DATA SMALL; SET HUNT;                                              00002770
        IF SP LE 15;                                                00002780
        IF DAYS NE 999;                                             00002790
        PROC SORT; BY SP;                                           00002800
        PROC MEANS NOPRINT; BY SP;                                   00002810
        OUTPUT OUT=SDTOTAL N=N MEAN=AVG STDERR=STDERR;             00002820
        VAR DAYS;                                                  00002830
DATA SDTOTAL; SET SDTOTAL;                                         00002840
        TOTALDAY=POP*AVG;                                           00002850
        STDERRTD=POP*STDERR;                                         00002860
DATA BIG; SET HUNT;                                                00002870
        IF SP GE 16;                                                00002880
        IF TYPE=0 OR TYPE=1;                                         00002890
        IF DAYS NE 999;                                             00002900
        PROC SORT; BY SP;                                           00002910
        PROC MEANS NOPRINT; BY SP;                                   00002920
        OUTPUT OUT=BDTOTAL N=N MEAN=AVG STDERR=STDERR;             00002930
        VAR DAYS;                                                  00002940
DATA BDTOTAL; SET BDTOTAL;                                         00002950

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```

TOTALDAY=POP1*AVG;                                00002960
STDERRTD=POP1*STDERR;                              00002970
DATA TOTALDAY; SET SDTOTAL ROTOTAL;                 00002980
DATA TOTALDY1; MERGE TOTALDAY SPECIES; BY SP;       00002990
  LOWER = TOTALDAY - (2*STDERRTD);                 00003000
  UPPER = TOTALDAY + (2*STDERRTD);                 00003010
  KEEP SPECIES N TOTALDAY STDERRTD LOWER UPPER;    00003020
PROC PRINT;                                         00003030
  ID SPECIES N TOTALDAY STDERRTD LOWER UPPER;      00003040
  TITLE '1980-1981 TOTAL MAN-DAYS HUNTING EACH SPECIES'; 00003050
*****
* CALCULATING AVERAGE SEASONAL DAYS HUNTING PER HUNTER. 00003070
*****; 00003080
DATA SMALL; SET HUNT;                              00003090
  IF DAYS=999 THEN DELETE;                         00003100
  IF DAYS=0 THEN DELETE;                           00003110
  IF SP LE 15;                                     00003120
PROC SORT; BY SP;                                  00003130
PROC MEANS NOPRINT; BY SP;                         00003140
  OUTPUT OUT=SAVGD N=N MEAN=AVGDAY STDERR=STDERRAD; 00003150
  VAR DAYS;                                        00003160
DATA BIG; SET HUNT;                                00003170
  IF TYPE=0 OR TYPE=1;                             00003180
  IF DAYS=999 THEN DELETE;                         00003190
  IF DAYS=0 THEN DELETE;                           00003200
  IF SP GE 16;                                     00003210
PROC SORT; BY SP;                                  00003220
PROC MEANS NOPRINT; BY SP;                         00003230
  OUTPUT OUT=BAVGD N=N MEAN=AVGDAY STDERR=STDERRAD; 00003240
  VAR DAYS;                                        00003250
DATA AVGDAY; SET SAVGD BAVGD;                      00003260
DATA AVGDAY1; MERGE AVGDAY SPECIES;                00003270
  BY SP;                                           00003280
  LOWER = AVGDAY - (2*STDERRAD);                   00003290
  UPPER = AVGDAY + (2*STDERRAD);                   00003300
  KEEP SPECIES N AVGDAY STDERRAD LOWER UPPER;     00003310
PROC PRINT;                                       00003320
  ID SPECIES N AVGDAY STDERRAD LOWER UPPER;       00003330
  TITLE '1980-1981 AVERAGE SEASONAL NUMBER OF DAYS HUNTING PER HUNTER'; 00003340
*****
* CALCULATING HARVEST PER DAY RATIOS FOR EACH SPECIES. 00003360
*****; 00003370
DATA SMALL; SET HUNT;                              00003380
  IF SP LE 15;                                     00003390
  IF DAYS=0 THEN DELETE;                           00003400
  IF DAYS=999 THEN DELETE;                         00003410
  IF KILL=998 OR KILL=999 THEN DELETE;             00003420
PROC SORT; BY SP;                                  00003430
PROC MEANS NOPRINT; BY SP;                         00003440
  OUTPUT OUT=SRATIO N=N ND MEAN=AVGKILL AVGDAYS;   00003450
  VAR KILL DAYS;                                  00003460
DATA SRATIO; SET SRATIO;                           00003470
  RATIO=AVGKILL/AVGDAYS;                           00003480
  KEEP RATIO AVGDAYS N SP;                         00003490
DATA SMALL1 (KEEP=KILL DAYS RATIO SP SS); MERGE SMALL SRATIO; BY SP; 00003500
  SS=KILL-(RATIO*DAYS);                           00003510
PROC MEANS NOPRINT; BY SP;                         00003520
  OUTPUT OUT=SS USS=SS;                            00003530
  VAR SS;                                          00003540

```

DATA SRATIO1; MERGE SRATIO SS; BY SP;	00003550
VRATIO=SS/(N*AVGDAYS*AVGDAYS*(N-1));	00003560
STDERRR=SQRT(VRATIO);	00003570
DATA BIG; SET HUNT;	00003580
IF TYPE=0 OR TYPE=1;	00003590
IF SP GE 16;	00003600
IF DAYS=0 THEN DELETE;	00003610
IF DAYS=999 THEN DELETE;	00003620
IF KILL=998 OR KILL=999 THEN DELETE;	00003630
PROC SORT; BY SP;	00003640
PROC MEANS NOPRINT; BY SP;	00003650
OUTPUT OUT=BRATIO N=N NO MEAN=AVGKILL AVGDAYS;	00003660
VAR KILL DAYS;	00003670
DATA BRATIO; SET BRATIO;	00003680
RATIO=AVGKILL/AVGDAYS;	00003690
KEEP RATIO AVGDAYS N SP;	00003700
DATA BIG1 (KEEP=KILL DAYS RATIO SP SS); MERGE BIG BRATIO; BY SP;	00003710
SS=KILL-(RATIO*DAYS);	00003720
PROC MEANS NOPRINT; BY SP;	00003730
OUTPUT OUT=SS USS=SS;	00003740
VAR SS;	00003750
DATA BRATIO1; MERGE BRATIO SS; BY SP;	00003760
VRATIO=SS/(N*AVGDAYS*AVGDAYS*(N-1));	00003770
STDERRR=SQRT(VRATIO);	00003780
DATA RATIO; SET SRATIO1 BRATIO1;	00003790
DATA RATIO1; MERGE RATIO SPECIES; BY SP;	00003800
LOWER = RATIO - (2*STDERRR);	00003810
UPPER = RATIO + (2*STDERRR);	00003820
KEEP SPECIES N RATIO STDERRR LOWER UPPER;	00003830
PROC PRINT;	00003840
ID SPECIES N RATIO STDERRR LOWER UPPER;	00003850
TITLE '1980-1981 HARVEST PER DAY RATIOS';	00003860
//	00003870

```
//GFPGM019 JOB (GF00,5309),STEFFEN,CLASS=I,MSGLEVEL=1,MSGCLASS=A,PRTY=0 00000010
// EXEC ERSAS,OPTIONS='PAGESIZE=60 TIME=MAX WORK=AREA' 00000020
//IN DD DSN=GFTS01.DSTEMP.DATA,UNIT=DISK,DISP=OLD 00000030
//AREA DD DSN=GFTS01.WORK.DATA,UNIT=DISK,DISP=(,CATLG), 00000040
// SPACE=(CYL,(50,20),RLSE) 00000050
*****00000060
* THE FOLLOWING PROGRAM PERFORMS STATISTICAL CALCULATIONS (ESTIMATES,00000070
* STANDARD ERRORS AND SAMPLE SIZES) FOR THE REGIONAL HUNTER HARVEST AND00000080
* EFFORT INDICES. 00000090
*****00000100
* THIS PROGRAM IS STORED AS DATA IN THE GF PANVALET LIBRARY 00000110
* (GF.SOURCE.LIBRARY) WITH THE NAME "GPGM019". 00000120
*****00000130
* THE INPUT FILE IS AS FOLLOWS: 00000140
* (1) IN = SAS DATA SET CREATED BY THE JOB NAME "GFPGM001". 00000150
*****00000160
* THE OUTPUT FILE IS AS FOLLOWS: 00000170
* (1) AREA = DESIGNATED SAS WORK SPACE. 00000180
*****00000190
* MACRO POP = TOTAL NUMBER OF SMALL GAME HUNTERS (= TYPES 00 + 01 00000200
* + 02 + 05). 00000210
* MACRO POP1 = TOTAL NUMBER OF BIG GAME HUNTERS (= TYPES 00 + 01). 00000220
*****00000221
MACRO POP 255992 % 00000230
MACRO POP1 211063 % 00000240
DATA HUNT; SET IN.YR8081; 00000250
*****00000260
* DATA SPECIES INPUTS NAMES FOR SPECIES CODES. 00000270
*****00000280
DATA SPECIES; 00000290
INPUT SP 1-2 SPECIES $ 3-16; 00000300
CARDS; 00000310
1 DOVE 00000320
2 QUAIL 00000330
3 WOODCOCK 00000340
4 RABBIT 00000350
5 SQUIRREL 00000360
6 RACCOON 00000370
7 MALLARD 00000380
8 WOOD DUCK 00000390
9 OTHER DUCKS 00000400
10ALL DUCKS 00000410
11GEESE 00000420
12RED FOX 00000430
13GRAY FOX 00000440
14BOBCAT 00000450
15COYOTE 00000460
16ARCHERY BUCK 00000470
17ARCHERY DOE 00000480
18ARCHERY DEER 00000490
19PRIMITIVE BUCK 00000500
20PRIMITIVE DOF 00000510
21PRIMITIVE DEER 00000520
22GUN BUCK 00000530
23GUN DOE 00000540
24GUN DEER 00000550
28SPRING TURKEY 00000560
29FALL TURKEY 00000570
PROC SORT; BY SP; 00000580
```



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*****00000590
* THE FOLLOWING RESTRUCTURES THE SAS DATA SET FOR CALCULATIONS. 00000600
*****;00000610
DATA HUNT; SET HUNT; 00000620
  SP=1; KILL=DOVEKILL; DAYS=DOVEDAY; REGION=DOVEREG; OUTPUT; 00000630
  SP=2; KILL=QUAKILL; DAYS=QUADAY; REGION=QUAREG; OUTPUT; 00000640
  SP=3; KILL=WDCKILL; DAYS=WDCKDAY; REGION=WDCKREG; OUTPUT; 00000650
  SP=4; KILL=RABKILL; DAYS=RABDAY; REGION=RABREG; OUTPUT; 00000660
  SP=5; KILL=SQRKILL; DAYS=SQRDAY; REGION=SQRREG; OUTPUT; 00000670
  SP=6; KILL=RACKILL; DAYS=RACDAY; REGION=RACREG; OUTPUT; 00000680
  SP=7; KILL=MALLKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000690
  SP=8; KILL=WOODKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000700
  SP=9; KILL=OTHDKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000710
  SP=10; KILL=DUCKKILL; DAYS=DUCKDAY; REGION=DUCKREG; OUTPUT; 00000720
  SP=11; KILL=GOSKILL; DAYS=GOSDAY; REGION=GOSREG; OUTPUT; 00000730
  SP=12; KILL=RFOXKILL; DAYS=RFOXDAY; REGION=RFOXREG; OUTPUT; 00000740
  SP=13; KILL=GFOXKILL; DAYS=GFOXDAY; REGION=GFOXREG; OUTPUT; 00000750
  SP=14; KILL=CATKILL; DAYS=CATDAY; REGION=CATREG; OUTPUT; 00000760
  SP=15; KILL=COYKILL; DAYS=COYDAY; REGION=COYREG; OUTPUT; 00000770
  SP=16; KILL=ABUCKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000780
  SP=17; KILL=ADOEKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000790
  SP=18; KILL=ARCHKILL; DAYS=ARCHDAY; REGION=ARCHREG; OUTPUT; 00000800
  SP=19; KILL=PBUCKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000810
  SP=20; KILL=PDOEKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000820
  SP=21; KILL=PRIMKILL; DAYS=PRIMDAY; REGION=PRIMREG; OUTPUT; 00000830
  SP=22; KILL=GBUCKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000840
  SP=23; KILL=GDOEKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000850
  SP=24; KILL=GUNKILL; DAYS=GUNDAY; REGION=GUNREG; OUTPUT; 00000860
  SP=25; KILL=BUCKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000870
  SP=26; KILL=DOEKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000880
  SP=27; KILL=DEERKILL; DAYS=DEERDAY; REGION=.; OUTPUT; 00000890
  SP=28; KILL=TKSPKILL; DAYS=TKSPDAY; REGION=TKSPREG; OUTPUT; 00000900
  SP=29; KILL=TKFLKILL; DAYS=TKFLDAY; REGION=TKFLREG; OUTPUT; 00000910
  SP=30; KILL=TRUKILL; DAYS=TRUKDAY; REGION=.; OUTPUT; 00000920
KEEP SP KILL DAYS REGION TYPE; 00000930
*****00000940
* THE FOLLOWING FURTHER MODIFIES THE SAS DATA SET. 00000950
*****;00000960
DATA HUNT; SET HUNT; 00000970
  IF REGION= . AND DAYS NE 0 THEN DELETE; 00000980
  IF SP=25 OR SP=26 OR SP=27 OR SP=30 THEN DELETE; 00000990
  IF SP=29 AND REGION=2 THEN DELETE; 00001000
  IF SP=29 AND REGION=4 THEN DELETE; 00001010
  IF SP=29 AND REGION=5 THEN DELETE; 00001020
*****00001030
* LINES 1100 THRU 4030 REPRESENT THE MACRO NAMED 'GO'. THE MACRO 00001040
* IS TO BE ITERATED FIVE TIMES, ONCE FOR EACH REGION. NESTED WITHIN 00001050
* THIS MACRO IS THE MACRO NAME 'DO'. THE VALUE OF 'DO' REPRESENTS 00001060
* THE REGION WHICH IS BEING CALCULATED. THE VALUE OF 'DO' IS CHANGED 00001070
* WITH EACH RUN OF THE PROGRAM 'GO' (I.E. 1, 2, 3, 4, OR 5). 00001080
*****;00001090
MACRO GO 00001100
*****00001110
* THE FOLLOWING CALCULATES TOTAL HARVEST ESTIMATES FOR EACH REGION. 00001120
*****;00001130
DATA SMALL; SET HUNT; 00001140
  IF SP LE 15; 00001150
  IF KILL=999 OR KILL=998 THEN DELETE; 00001160
  IF REGION NE DO THEN KILL = 0; 00001170

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```

PROC SORT; BY SP;                                00001180
PROC MEANS NOPRINT; BY SP;                        00001190
  OUTPUT OUT=STOTAL N=N MEAN=AVG STDERR=STDERR;    00001200
  VAR KILL;                                       00001210
DATA STOTAL; SET STOTAL;                          00001220
  TOTAL=POP*AVG;                                00001230
  STDERRT=POP*STDERR;                            00001240
DATA BIG; SET HUNT;                               00001250
  IF SP GE 16;                                   00001260
  IF TYPE=0 OR TYPE=1;                           00001270
  IF KILL=999 OR KILL=998 THEN DELETE;            00001280
  IF REGION NE DO THEN KILL = 0;                 00001290
PROC SORT; BY SP;                                00001300
PROC MEANS NOPRINT; BY SP;                        00001310
  OUTPUT OUT=BTOTAL N=N MEAN=AVG STDERR=STDERR;    00001320
  VAR KILL;                                       00001330
DATA BTOTAL; SET BTOTAL;                          00001340
  TOTAL=POP1*AVG;                                00001350
  STDERRT=POP1*STDERR;                            00001360
DATA TOTAL; SET STOTAL BTOTAL;                    00001370
DATA TOTAL1; MERGE TOTAL SPECIES; BY SP;          00001380
  KEEP SPECIES N TOTAL STDERRT;                  00001390
PROC PRINT;                                       00001400
  ID SPECIES N TOTAL STDERRT;                     00001410
  TITLE 1980-1981 HARVEST ESTIMATES FOR REGION DO; 00001420
*****00001430
*   CALCULATING AVERAGE SEASONAL HARVEST PER HUNTER. 00001440
*****00001450
DATA SMALL; SET HUNT;                             00001460
  IF SP LE 15;                                   00001470
  IF DAYS NE 0;                                   00001480
  IF KILL=999 OR KILL=998 THEN DELETE;            00001490
  IF REGION = DO;                                00001500
PROC SORT; BY SP;                                00001510
PROC MEANS NOPRINT; BY SP;                        00001520
  OUTPUT OUT=SAVG N=N MEAN=AVG STDERR=STDERRA;    00001530
  VAR KILL;                                       00001540
DATA BIG; SET HUNT;                               00001550
  IF SP GE 16;                                   00001560
  IF TYPE=0 OR TYPE=1;                           00001570
  IF DAYS NE 0;                                   00001580
  IF KILL=999 OR KILL=998 THEN DELETE;            00001590
  IF REGION = DO;                                00001600
PROC SORT; BY SP;                                00001610
PROC MEANS NOPRINT; BY SP;                        00001620
  OUTPUT OUT=BAVG N=N MEAN=AVG STDERR=STDERRA;    00001630
  VAR KILL;                                       00001640
DATA AVGKILL; SET SAVG BAVG;                       00001650
DATA AVGKILL1; MERGE AVGKILL SPECIES; BY SP;      00001660
  KEEP SPECIES N AVG STDERRA;                     00001670
PROC PRINT;                                       00001680
  ID SPECIES N AVG STDERRA;                       00001690
  TITLE 1980-1981 AVERAGE SEASONAL HARVEST PER HUNTER IN REGION DO; 00001700
*****00001710
*   CALCULATING TOTAL HUNTERS AND THE PROPORTION OF ALL HUNTERS OF EACH 00001720
*   SPECIES BY REGION.                           00001730
*****00001740
DATA SMALL; SET HUNT;                             00001750
  IF SP LE 15;                                   00001760

```



```

IF DAYS NE 0;
IF REGION = DO THEN DAYS=1;
ELSE DAYS=0;
PROC SORT; BY SP;
PROC MEANS NOPRINT; BY SP;
OUTPUT OUT=SPROP N=N SUM=NUMH;
VAR DAYS;
DATA SPROP; SET SPROP;
PL=NUMH/N;
Q=1-PL;
STDERRPL=SQRT(PL*Q/(N-1));
DATA BIG; SET HUNT;
IF TYPE=0 OR TYPE=1;
IF SP GE 16;
IF DAYS NE 0;
IF REGION = DO THEN DAYS=1;
ELSE DAYS=0;
PROC SORT; BY SP;
PROC MEANS NOPRINT; BY SP;
OUTPUT OUT=BPROP N=N SUM=NUMH;
VAR DAYS;
DATA BPROP; SET BPROP;
PL=NUMH/N;
Q=1-PL;
STDERRPL=SQRT(PL*Q/(N-1));
DATA; SET HUNT;
IF SP LE 15;
PROC SORT; BY SP;
PROC MEANS NOPRINT; BY SP;
OUTPUT OUT=SAMPLE N=SAMPLE;
VAR DAYS;
DATA; SET HUNT;
IF SP GE 16;
IF TYPE = 0 OR TYPE = 1;
PROC SORT; BY SP;
PROC MEANS NOPRINT; BY SP;
OUTPUT OUT=SAMPLE1 N=SAMPLE;
VAR DAYS;
DATA RETURN; SET SAMPLE SAMPLE1;
DATA PROP; SET SPROP BPROP;
DATA PROP1; MERGE PROP RETURN; BY SP;
DATA PROP2; MERGE PROP1 SPECIES; BY SP;
IF SP LE 15 THEN TOTALH = POP*NUMH/SAMPLE;
IF SP GE 16 THEN TOTALH = POP1*NUMH/SAMPLE;
P=NUMH/SAMPLE;
Q=1-P;
IF SP LE 15 THEN STDERRTH = POP*(SQRT(P*Q/(SAMPLE-1)));
IF SP GE 16 THEN STDERRTH = POP1*(SQRT(P*Q/(SAMPLE-1)));
KEEP SPECIES N PL STDERRPL TOTALH STDERRTH;
PROC PRINT;
ID SPECIES N PL STDERRPL TOTALH STDERRTH;
TITLE1 1980-1981 PROPORTION OF LICENSED HUNTERS AND TOTAL HUNTERS;
TITLE2 FOR REGION DO;
*****00002300
* CALCULATING PERCENT AND TOTAL SUCCESSFUL HUNTERS PER REGION. 00002310
*****00002320
DATA; SET HUNT; 00002330
IF SP LE 15; 00002340
IF KILL=999 THEN DELETE; 00002350

```



```

PROC SORT; BY SP;                                00002360
PROC MEANS NOPRINT; BY SP;                        00002370
  OUTPUT OUT=SAMPLE N=SAMPLE;                     00002380
  VAR KILL;                                        00002390
DATA; SET HUNT;                                  00002400
  IF SP GE 16;                                    00002410
  IF KILL = 999 THEN DELETE;                      00002420
  IF TYPE=0 OR TYPE=1;                            00002430
  PROC SORT; BY SP;                               00002440
  PROC MEANS NOPRINT; BY SP;                      00002450
  OUTPUT OUT=SAMPLE1 N=SAMPLE;                    00002460
  VAR KILL;                                        00002470
DATA RETURN; SET SAMPLE SAMPLE1;                 00002480
DATA SMALL; SET HUNT;                            00002490
  IF SP LE 15;                                    00002500
  IF DAYS NE 0;                                    00002510
  IF KILL=999 THEN DELETE;                        00002520
  IF KILL NE 0 THEN KILL=1;                       00002530
  IF REGION = DO;                                 00002540
  PROC SORT; BY SP;                               00002550
  PROC MEANS NOPRINT; BY SP;                      00002560
  OUTPUT OUT=SSUC N=N SUM=NUMS;                   00002570
  VAR KILL;                                        00002580
DATA SSUC; SET SSUC;                             00002590
  PS=NUMS/N;                                       00002600
  STDERRPS=SQRT(PS*(1-PS)/(N-1));                 00002610
DATA BIG; SET HUNT;                              00002620
  IF SP GE 16;                                    00002630
  IF TYPE=0 OR TYPE=1;                            00002640
  IF DAYS NE 0;                                    00002650
  IF KILL=999 THEN DELETE;                        00002660
  IF KILL NE 0 THEN KILL=1;                       00002670
  IF REGION = DO;                                 00002680
  PROC SORT; BY SP;                               00002690
  PROC MEANS NOPRINT; BY SP;                      00002700
  OUTPUT OUT=BSUC N=N SUM=NUMS;                   00002710
  VAR KILL;                                        00002720
DATA BSUC; SET BSUC;                             00002730
  PS=NUMS/N;                                       00002740
  STDERRPS=SQRT(PS*(1-PS)/(N-1));                 00002750
DATA SUCCESS; SET SSUC BSUC;                     00002760
DATA SUCCESS1; MERGE SUCCESS RETURN; BY SP;       00002770
DATA SUCCESS2; MERGE SUCCESS1 SPECIES; BY SP;     00002780
  IF SP LE 15 THEN TOTALS=POP*NUMS/SAMPLE;        00002790
  IF SP GE 16 THEN TOTALS=POP1*NUMS/SAMPLE;        00002800
  P=NUMS/SAMPLE;                                  00002810
  Q=1-P;                                           00002820
  IF SP LE 15 THEN STDERRTS=POP*(SQRT(P*Q/(SAMPLE-1))); 00002830
  IF SP GE 16 THEN STDERRTS=POP1*(SQRT(P*Q/(SAMPLE-1))); 00002840
  KEEP SPECIES N PS STDERRPS TOTALS STDERRTS;      00002850
  PROC PRINT;                                      00002860
  ID SPECIES N PS STDERRPS TOTALS STDERRTS;        00002870
  TITLE 1980-1981 PERCENT AND TOTAL SUCCESSFUL HUNTERS FOR REGION DO; 00002880
*****00002890
* CALCULATING TOTAL MAN-DAYS SPENT HUNTING EACH SPECIES PER REGION. 00002900
*****00002910
DATA SMALL; SET HUNT;                            00002920
  IF SP LE 15;                                    00002930
  IF DAYS NE 999;                                 00002940

```



```

IF REGION NE DO THEN DAYS = 0; 00002950
PROC SORT; BY SP; 00002960
PROC MEANS NOPRINT; BY SP; 00002970
  OUTPUT OUT=SDTOTAL N=N MEAN=AVG STDERR=STDERR; 00002980
  VAR DAYS; 00002990
DATA SDTOTAL; SET SDTOTAL; 00003000
  TOTALDAY=POP*AVG; 00003010
  SDERRTD=POP*STDERR; 00003020
DATA BIG; SET HUNT; 00003030
  IF SP GE 16; 00003040
  IF TYPE=0 OR TYPE=1; 00003050
  IF DAYS NE 999; 00003060
  IF REGION NE DO THEN DAYS = 0; 00003070
PROC SORT; BY SP; 00003080
PROC MEANS NOPRINT; BY SP; 00003090
  OUTPUT OUT=BDTOTAL N=N MEAN=AVG STDERR=STDERR; 00003100
  VAR DAYS; 00003110
DATA BDTOTAL; SET BDTOTAL; 00003120
  TOTALDAY=POP1*AVG; 00003130
  SDERRTD=POP1*STDERR; 00003140
DATA TOTALDAY; SET SDTOTAL BDTOTAL; 00003150
DATA TOTALDY1; MERGE TOTALDAY SPECIES; BY SP; 00003160
  KEEP SPECIES N TOTALDAY SDERRTD; 00003170
PROC PRINT; 00003180
  ID SPECIES N TOTALDAY SDERRTD; 00003190
  TITLE 1980-1981 TOTAL MAN-DAYS HUNTING EACH SPECIES FOR REGION DO; 00003200
***** 00003210
* CALCULATING AVERAGE SEASONAL DAYS HUNTING PER HUNTER. 00003220
*****; 00003230
DATA SMALL; SET HUNT; 00003240
  IF DAYS=999 THEN DELETE; 00003250
  IF DAYS=0 THEN DELETE; 00003260
  IF SP LE 15; 00003270
  IF REGION = DO; 00003280
PROC SORT; BY SP; 00003290
PROC MEANS NOPRINT; BY SP; 00003300
  OUTPUT OUT=SAVGD N=N MEAN=AVGDAY STDERR=STDERRAD; 00003310
  VAR DAYS; 00003320
DATA BIG; SET HUNT; 00003330
  IF TYPE=0 OR TYPE=1; 00003340
  IF DAYS=999 THEN DELETE; 00003350
  IF DAYS=0 THEN DELETE; 00003360
  IF SP GE 16; 00003370
  IF REGION = DO; 00003380
PROC SORT; BY SP; 00003390
PROC MEANS NOPRINT; BY SP; 00003400
  OUTPUT OUT=BAVGD N=N MEAN=AVGDAY STDERR=STDERRAD; 00003410
  VAR DAYS; 00003420
DATA AVGDAY; SET SAVGD BAVGD; 00003430
DATA AVGDAY1; MERGE AVGDAY SPECIES; 00003440
  BY SP; 00003450
  KEEP SPECIES N AVGDAY STDERRAD; 00003460
PROC PRINT; 00003470
  ID SPECIES N AVGDAY STDERRAD; 00003480
  TITLE1 1980-1981 AVERAGE SEASONAL NUMBER OF DAYS HUNTING PER HUNTER; 00003490
  TITLE2 FOR REGION DO; 00003500
***** 00003510
* CALCULATING HARVEST PER DAY RATIOS FOR EACH SPECIES. 00003520
*****; 00003530

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DATA SMALL; SET HUNT;                                00003540
  IF SP LE 15;                                         00003550
  IF DAYS=0 THEN DELETE;                               00003560
  IF DAYS=999 THEN DELETE;                             00003570
  IF KILL=998 OR KILL=999 THEN DELETE;                 00003580
  IF REGION = DO;                                       00003590
  PROC SORT; BY SP;                                     00003600
  PROC MEANS NOPRINT; BY SP;                           00003610
    OUTPUT OUT=SRATIO N=N ND MEAN=AVGKILL AVGDAYS;     00003620
  VAR KILL DAYS;                                         00003630
DATA SRATIO; SET SRATIO;                               00003640
  RATIO=AVGKILL/AVGDAYS;                               00003650
  KEEP RATIO AVGDAYS N SP;                             00003660
DATA SMALL1 (KEEP=KILL DAYS RATIO SP SS); MERGE SMALL SRATIO; BY SP; 00003670
  SS=KILL-(RATIO*DAYS);                                00003680
  PROC MEANS NOPRINT; BY SP;                           00003690
    OUTPUT OUT=SS USS=SS;                              00003700
  VAR SS;                                                00003710
DATA SRATIO1; MERGE SRATIO SS; BY SP;                 00003720
  VRATIO=SS/(N*AVGDAYS*AVGDAYS*(N-1));               00003730
  STDERRR=SQRT(VRATIO);                                00003740
DATA BIG; SET HUNT;                                    00003750
  IF TYPE=0 OR TYPE=1;                                 00003760
  IF SP GE 16;                                          00003770
  IF DAYS=0 THEN DELETE;                               00003780
  IF DAYS=999 THEN DELETE;                             00003790
  IF KILL=998 OR KILL=999 THEN DELETE;                 00003800
  IF REGION = DO;                                       00003810
  PROC SORT; BY SP;                                     00003820
  PROC MEANS NOPRINT; BY SP;                           00003830
    OUTPUT OUT=BRATIO N=N ND MEAN=AVGKILL AVGDAYS;     00003840
  VAR KILL DAYS;                                         00003850
DATA BRATIO; SET BRATIO;                               00003860
  RATIO=AVGKILL/AVGDAYS;                               00003870
  KEEP RATIO AVGDAYS N SP;                             00003880
DATA BIG1 (KEEP=KILL DAYS RATIO SP SS); MERGE BIG BRATIO; BY SP; 00003890
  SS=KILL-(RATIO*DAYS);                                00003900
  PROC MEANS NOPRINT; BY SP;                           00003910
    OUTPUT OUT=SS USS=SS;                              00003920
  VAR SS;                                                00003930
DATA BRATIO1; MERGE BRATIO SS; BY SP;                 00003940
  VRATIO=SS/(N*AVGDAYS*AVGDAYS*(N-1));               00003950
  STDERRR=SQRT(VRATIO);                                00003960
DATA RATIO; SET SRATIO1 PRATIO1;                     00003970
DATA RATIO1; MERGE RATIO SPECIES; BY SP;              00003980
  KEEP SPECIES N RATIO STDERRR;                       00003990
  PROC PRINT;                                           00004000
    ID SPECIES N RATIO STDERRR;                        00004010
  TITLE 1980-1981 HARVEST PER DAY RATIOS FOR REGION DO; 00004020
%                                                       00004030
*****00004040
*   THE FINAL STATEMENTS INITIALIZE THE MACRO WORD 'DO' AND RUN THE 00004050
*   PROGRAM . 'DO' IS REINITIALIZED FOR EACH RUN OF THE PROGRAM. 00004060
*****00004070
MACRO DO 1 %                                           00004080
GO                                                       00004090
MACRO DO 2 %                                           00004100
GO                                                       00004110
MACRO DO 3 %                                           00004120
GO                                                       00004130
MACRO DO 4 %                                           00004140
GO                                                       00004150
MACRO DO 5 %                                           00004160
GO                                                       00004170
//                                                       00004180

```