PENNSYLVANIA GAME COMMISSION BUREAU OF WILDLIFE MANAGEMENT ANNUAL PROJECT REPORT

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TITLE: Game Take and Furtaker Surveys

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COOPERATING AGENCIES: Bureau of Automated Technology Services, Bureau of

Administrative Services

WORK LOCATION(S): Harrisburg, Pennsylvania

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ABSTRACT: A questionnaire was mailed to a random sample of 2010-11 general hunting license purchasers (17,791 questionnaires mailed) to estimate numbers of hunters, harvests, and hunter-days for small game species during the 2010-11 hunting seasons. After 3 mailings, 57.6% of the questionnaires were returned. Overall, between the 2009-10 and 2010-11 hunting seasons, harvests decreased for 10 of 11 small game species, hunter numbers decreased for 10 species and hunter days decreased for all species. Twenty-seven year trends in harvest and hunter participation indicate a decline for nearly all small game species. A separate questionnaire was mailed to a random sample of furtaker license purchasers (7,018 mailed) to estimate harvest of furbearer species and trapper-days. After 2 mailings, 64.1% of the questionnaires were returned. Overall, the number of hunters and trappers increased for all species between the 2009-10 and 2010-11 seasons, and harvest of 5 species increased. Twenty-seven year trends for harvests of furbearers indicate harvests have declined dramatically for most species. Junior and senior combination license holders are not included in the furtaker sample, thus some furtakers are not included in survey estimates. An estimated 52,822 adult hunters mentored 62,503 youth less than 12 years old in the fourth year of Pennsylvania's Mentored Youth Hunting Program. However the estimated number of mentored youth greatly exceeds the 30,790 mentored youth permits sold in this second year that mentored youth were required to obtain a permit. Mentored youth woodchuck, squirrel, antlered deer, spring gobbler and coyote harvests, hunter days and number of youth mentored are provided. An estimated 10,343 junior license buyers participated in youth hunts. Number of participants and harvests for waterfowl, spring gobbler, pheasant, rabbit and squirrel youth hunts are provided.

OBJECTIVES

- 1. To annually estimate the numbers of animals harvested, participants, and days spent hunting (hunter-days) for small game species.
- 2. To annually estimate the numbers of furbearers harvested, trappers, and hunters during the furbearer seasons.
- 3. To monitor long-term trends in harvests, numbers of hunters and trappers, hunter-days, and harvest per 100 hunter-days.

METHODS

Prior to the 2009-10 hunting season, survey recipients were selected to receive questionnaires based on their license number. General Hunting License numbers ending in either 01 or 51 were chosen for the Game Take Survey, and Furtaker License numbers ending in either 1 or 6 were selected for the Furtaker Survey. These licenses were obtained from the duplicate licenses on file in the License Division of the Bureau of Administrative Services, and from the electronic file of over the counter (OTC) sales. Photocopies of the duplicates and the OTC file were used by the Bureau of Automated Technology Services (BATS) to prepare the mailing list.

Beginning with the 2009-10 hunting season, the Pennsylvania Automated License System (PALS) was fully activated for sale of hunting and Furtaker licenses. Through the PALS system, each hunter or trapper is issued a unique Customer Identification Number (CID) that is assigned to that license holder for life. Because of the transition to the PALS system, the method of selecting participants for the Game Take and Furtaker Surveys had to be modified from previous years. The Game Take Survey was mailed at the close of small game seasons in early March, a month earlier than previous years. Time period for the Furtaker Survey did not change due to the beaver season closing at the end of March. The names and addresses of general hunting license holders and licensed furtakers were selected to receive questionnaires based on their CID. We sorted CIDs into numerical order and selected every 50th hunter for the Game Take Survey, and every 5th license holder with a Furtaker License for the Furtaker Survey. This process was completed by BATS to prepare the mailing list.

Because CIDs are permanently assigned to each individual hunter or trapper, the selection process was modified in the 2010-11 hunting year. A database query was designed that randomly chooses CIDs. Survey timing remained the same as for the 2009-10 survey. This process was again completed by the BATS to prepare the mailing list. BATS and the Bureau of Administrative Services addressed and mailed 17,791 Game Take questionnaires and 7,018 Furtaker questionnaires. In addition to the initial mailing, 2 follow-up mailings were sent to nonrespondents of the Game Take Survey, and 1 follow-up mailing was sent to nonrespondents of the Furtaker Survey.

These surveys reflect major changes of information requested from hunters and trappers from pre-1990 surveys (Boyd 1990). First, information about small game and furbearer species were separated into Game Take and Furtaker surveys, respectively. Second, the Game Take questionnaire

was expanded to include more game species, and the number of days of hunting per species per Wildlife Management Unit (WMU). Third, harvest and hunting effort on shooting preserves were requested separately for ring-necked pheasant, quail, and ducks. Fourth, estimates of coyote harvest included those shot by hunters (Game Take Survey excluding furtaker license buyers) and those trapped or shot by furtakers (Furtaker Survey). Fifth, a cover letter to encourage response was included in all mailings.

During 1990-2000, methods used to survey small game hunters and furtakers remained the same with the following exceptions. The Game Take Survey for 1992 consisted of 2/3 the usual sample size (i.e., every third 01 or 51 license was skipped) and only 2 mailings were conducted, but a telephone survey of nonrespondents was carried out to estimate nonresponse bias. Estimates using the standard estimation techniques (Shope 1985) were similar to those obtained when incorporating nonresponse bias (Diefenbach 1993). Therefore, estimates from the 1992 survey should be comparable to results from other years. In 1996, hunters were asked to report their Canada goose harvest by season (early, regular, late), and their snow goose harvest. This change was implemented to assess the effect of special goose seasons because the regular season was closed for most of the state, and to compare Pennsylvania Game Commission (PGC) estimates to those obtained by the newly implemented Migratory Bird Harvest Information Program. Since the 1998 Game Take Survey, turkey hunters have been asked to report the management unit in which they hunted instead of the county. In 2000, landowner, resident senior lifetime upgrades, and resident senior lifetime renewals were included in the total licenses sold for calculating harvests and participation. This resulted in the addition of licenses to our survey population that otherwise would not have been included. The added senior licenses have existed since 1996 for lifetime renewals and 1999 for lifetime upgrades. Therefore, Game Take Surveys from 1996-99 likely underestimated harvests by about 2-3%. Landowner licenses represent less than 0.5% of license sales and would have had minimal effect on previous survey estimates.

Since 1999, Furtaker Surveys sampled those who purchased a furtaker license but not those who purchased junior and senior combination licenses, which include furtaker privileges. As a result of this licensing change, furtaker harvest and participation estimates beginning in 1999 are biased low compared to pre-1999 estimates. To reduce this bias, a correction factor was used to adjust harvest and participation estimates in the 1999 and 2000 Furtaker Surveys (Rosenberry 2000); however, this correction was discontinued in 2001, (Rosenberry 2001), and furtaker harvest estimates since 1999 are minimum estimates that do not include junior and senior combination licenses.

Beginning in 2003-04, respondents reported harvests by WMUs rather than counties. In addition, the survey form was simplified by reducing the number of possible hunting areas from 4 counties to 2 WMUs. This was done because less than 5% of hunters hunted in the 3rd or 4th county on previous surveys and there are fewer WMUs (22 WMUs vs. 67 counties).

Beginning in 2005-06, respondents reported Canada goose and duck harvests by Canada goose and duck zones, respectively. This change was implemented because Canada goose and duck populations are harvested and managed by zone, not WMU. Respondents also reported dove harvest by seasons (early, mid, and late) instead of just total harvest. In the 2010-2011 survey however,

Canada goose hunting was inadvertently omitted from the survey.

Respondents to the Game Take Survey were post-stratified on the basis of whether or not they had purchased special licenses or stamps, to reduce the effect of nonresponse bias on estimates (see Shope 1985). Prior to the 2010-11 survey, we relied on hunters to indicate these purchases, except for combination license buyers who were identified by a letter in the license number since 2001, and who where identified this year by the combination privilege code indicated in the PALS database. Currently, with the full implementation of PALS, we no longer need to ask respondents if they have purchased special licenses or stamps; that information can be pulled from the database along with their name and address. Nonresponse bias for the Furtaker Survey was not corrected.

Beginning with the 2006-07 Game Take Survey, we requested Special Turkey License and bear archery season information. The Special Turkey License database was compared to the results of the Game Take Survey to confirm that those who had purchased a Special Turkey License reported so on the survey. This is the only electronic license database currently available to compare with Game Take results. Due to concerns identified during the 2007 survey that many Special Turkey License buyers were recording license purchase and hunting information for the wrong spring turkey season, changes were made to the Game Take Survey cover letter and survey instrument to improve accuracy of this information.

Due to concerns about falling response rates for Game Take and Furtaker surveys, several procedures were modified starting with the 2007-08 surveys. All addresses in the mailer files were run through address correction software to delete undeliverable addresses. A post card reminder was mailed 1 week after the first mailing for the 2007-08 surveys, and a post card announcement was mailed to all survey participants 1 week before the first mailing since 2008-09 surveys, with no reminder post card.

We estimated (for each species) total harvest, number of participants, hunter-days, and harvest per 100 hunter-days based on 896,267 General Hunting Licenses sold for the Game Take Survey, and 35,267 Furtaker Licenses sold for the Furtaker Survey. We estimated trends over time using Pearson product-moment correlation coefficients.

In addition to the harvest and participation estimates, bobcat and fisher sightings by archery and firearms deer hunters and spring turkey hunters were added in 2001-02 to the Game Take Survey, to monitor distribution and range of these species. In 2005-06, bobcat and fisher sightings by bear hunters during the regular season were also added. These results are presented in furtaker and bobcat population and management reports. In 2006-07, a section was added for hunters to report how many, and in which WMUs, they saw wild pheasants and bobwhite quail during all hunting seasons. This section was added to help monitor distribution and range of these species.

For the 2010-11 Game Take Survey, we asked questions pertaining to wildlife protection activities, mentored youth program, and youth hunt participation. We asked mentors if they mentored youth and how many youth they mentored. For each species, respondents reported numbers of youth mentored, harvests, and days of hunting effort by mentored youth. Surveys from junior hunters were excluded from analysis because only adults are allowed to mentor a youth. If respondents indicated

they participated in the mentored youth program, and they did not provide information on the number of youth mentored, their results were not used.

Participation and harvests for each species were assessed for youth hunts. Participation in the youth pheasant hunt has been assessed since the 2003-04 Game Take Survey, youth waterfowl and spring gobbler hunts have been assessed since 2005-06, and youth squirrel hunts have been assessed since 2006-07. A junior rabbit hunting season was added in 2010-11. Only junior resident hunter participation is assessed because there is currently no way to distinguish between non-resident junior, adult, and senior licenses. Estimates for youth hunt participation and harvests have been expanded to statewide estimates using the purchaser/nonpurchaser adjustment since 2006-07. Previous reports just summarized raw numbers from respondents.

RESULTS

For the Game Take and Furtaker surveys, 9,380 and 4,421 useable returned questionnaires were processed, respectively. The response rates, after adjusting for undeliverable questionnaires, were 57.6% for the Game Take Survey and 64.1% for the Furtaker Survey,

The Game Take Survey has not been a reliable procedure for estimating harvests and hunter days of hunters pursuing a 2^{nd} gobbler (Boyd and Weaver 2010). Hence, these data are not included in this report. A more reliable technique and results are provided in the wild turkey productivity and harvest trends report.

Annual Changes

Compared to the 2009–2010 season, harvests of 10 of 11 small game species decreased in the 2010–2011 season (Table 1). Geese were inadvertently omitted from the 2010-11 survey, so results for Canada Geese are not available this year. The number of hunters decreased for 10 small game species and hunter-days decreased for all species (Tables 2 and 3). Spring turkey hunters increased, while harvest and hunter-days decreased. Fall turkey also had an increase in the number of hunters and a decrease for both harvest and hunter-days.

Harvest per 100 hunter-days increased for 6 of 11 small game species (Table 4).

The number of hunters/trappers of furbearers increased for all 9 species (Table 5), and harvests increased for 5 species (Table 6).

Twenty-seven Year Trends

Harvests have declined (P < 0.05) for nearly all species except for spring turkey and crow. Trends for quail (P = 0.14), ducks (P = 0.41) and fall turkey (P = 0.44) were not significant (Table 1). Number of hunters has declined for nearly all seasons and species (P < 0.01) except spring turkey and quail whose change in numbers were not significant (Table 2). Geese were not included in the trend analysis because they were inadvertently omitted from the survey instrument this year.

Since 1990, numbers of hunters and trappers for 4 of 9 furbearer species have remained stable, the number of hunters and trappers pursuing raccoons has declined (P < 0.01), and the

number of hunters and trappers pursuing red fox, skunk, weasel and coyote has increased (P < 0.05) (Table 5). The harvest of almost all furbearers for which we have 1983-2010 data has declined (P < 0.05). Since 1990, coyote harvests have increased (P < 0.01) and weasel harvests have varied with no consistent change (P = 0.41) (Table 6).

Survey Questions

We included three questions concerning wildlife protection activities, mentored youth program, and youth hunts. The sampling error for these questions is a maximum of $\pm 1\%$.

Seven percent of hunters reported being checked by a WCO during the 2010-10 hunting seasons.

Concerning the mentored youth program, we asked hunters if they mentored any youth; how many youth they mentored; how many youth were mentored while hunting woodchucks, squirrels, antlered deer, spring gobblers, and coyotes; how many days each species was hunted; and how many of each species were harvested. Statewide, 52,822 hunters mentored 62,503 youth, of which 10,313 mentored youth harvested 18,022 woodchucks during 37,722 days hunting; 22,426 mentored youth harvested 33,081 squirrels during 57,826 days hunting; 36,250 mentored youth harvested 5,141 antlered deer during 99,846 days hunting; 15,727 mentored youth harvested 2,208 spring gobblers during 29,217 days hunting; and 3,099 mentored youth harvested 883 coyotes during 10,671 days hunting. Interestingly only 30,790 mentored youth permits were sold in this second year that mentored youth were required to obtain a permit. It is possible for mentored youth to be mentored by more than one adult, which would result in an overestimate of mentored youth through this process. It is also possible that some mentored youth are not purchasing the required permit.

The final question assessed resident junior hunter participation in the Youth Waterfowl, Spring Gobbler, Pheasant, Rabbit, and Squirrel hunts. Overall resident junior license buyers' participation in the youth hunts increased from last year to 10,343 participants. Five-year trends show no discernable or consistent increases or decreases ($P \ge 0.26$) in junior license holder participation or harvest (Table 7, 8).

RECOMMENDATIONS

- 1. The Game Take and Furtaker surveys are the best source for harvest and participant data; thus, we recommend continuing these surveys.
- 2. The special Spring Turkey license database has allowed a comparison of results from the Game Take Survey to a known complete database. The timing of the survey appears to have an effect on the accuracy of spring turkey data. Conducting a separate spring turkey hunter survey immediately after the close of spring turkey season should be considered.
- 3. Continue to evaluate cover letters, survey instruments and methodologies to improve response rates.
 - 4. Major changes to the Game Take and Furtaker surveys need to be addressed now that the

Game Commission's wildlife biometrician position has been filled, and PALS is in place.

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Table 1. Harvest, by species, 1984-2010, Pennsylvania. Survey was not conducted in 2004.

Year	Spring Turkey	Fall Turkey	Rabbits	Grouse	Squirrel	Pheasant ^a	Woodcock	Quail ^a	Dove	Geese	Ducks ^a	Hare	Woodchuck	Crow
1984	9,723	15,844	1,939,399	475,960	2,256,311	rneasant	170,296	Quan	1,402,180	64,452	Ducks	13,989	Woodchuck	Clow
1985	14,197	18,217	2,137,737	511,271	2,428,683		170,290		1,443,109	56,233		14,749		
1985	16,155	26,763	2,092,910	536,553	2,833,061		165,685		1,531,868	69,748		13,189		
1980	14,674	28,346	1,764,744	484,016	2,364,596		175,124		1,374,110	68,541		14,412		
1988	14,659	22,515	1,704,744	523,271	2,304,390		165,590		1,520,322	49,573		8,488		
1989	17,154		1,696,712	410,371	2,313,133				1,320,322	78,821		7,595		
		21,669			, ,	202 276	143,502	7 970			09.026		1 200 647	255 402
1990	17,472	25,527	1,672,360	353,647	2,044,264	302,276	50,918	7,879	1,022,402	72,901	98,026	3,615	1,299,647	355,492
1991	16,606	31,979	1,462,270	293,891	1,632,108	269,065	53,183	3,005	968,421	69,127	87,478	3,579	1,304,020	257,009
1992	18,180	21,468	1,488,850	254,539	1,761,285	261,541	51,246	1,236	734,707	78,883	93,687	3,961	1,157,090	185,192
1993	24,068	30,477	1,160,939	272,690	1,585,368	250,149	52,959	4,837	735,089	84,251	133,354	2,114	1,274,166	191,639
1994	28,558	39,094	1,025,319	304,162	1,826,618	236,698	29,654	2,902	669,459	102,979	128,164	3,352	1,284,819	247,219
1995	36,401	49,748	1,010,938	315,197	1,599,104	250,930	28,624	1,204	670,791	64,382	156,511	2,997	1,225,101	295,962
1996	33,726	35,787	807,072	218,256	1,442,560	215,502	26,846	3,387	603,114	96,910	151,142	1,582	1,149,995	275,541
1997	30,956	37,398	827,520	187,770	1,352,038	219,864	23,878	1,766	506,677	115,506	188,034	1,432	1,251,145	184,944
1998	32,661	33,628	911,003	183,468	1,331,051	216,669	31,602	241	562,348	131,831	146,050	2,507	1,204,582	247,047
1999	37,806	40,718	715,862	177,355	1,236,108	211,257	25,704	3,938	519,116	128,385	164,328	2,412	1,117,970	209,273
2000	43,815	44,865	770,841	145,525	1,276,009	233,537	31,199	4,373	478,602	194,480	185,185	1,747	1,191,114	219,773
2001	49,186	48,008	701,551	159,610	1,276,603	244,282	32,504	4,276	460,971	197,767	143,907	4,584	1,187,114	195,273
2002	41,147	37,346	602,234	118,577	1,002,309	205,696	31,167	1,064	462,538	173,391	169,828	1,369	1,267,265	217,068
2003	42,876	31,100	588,310	106,587	1,063,996	234,196	42,434	2,059	500,980	228,310	191,132	1,908	1,171,888	207,707
2005	32,593	25,171	428,414	58,596	646,033	175,676	37,792	2,891	409,769	208,704	163,065	1,522	892,391	188,460
2006	37,845 ^b	24,481	409,350	89,145	784,741	141,775	39,782	1,228	384,625	181,708	159,388	1,310	910,654	222,382
2007	36,294 ^b	25,369	418,139	82,020	674,991	168,094	26,924	4,507	416,844	188,266	138,860	685	840,523	182,320
2008	40,483	24,288	463,935	108,693	708,898	110,331	41,556	1,097	409,837	212,158	135,234	783	993,207	183,203
2009	42,478	20,934	419,721	75,997	635,193	151,737	15,171	3,452	316,930	195,105	137,974	1,525	710,411	268,711
2010	31,908	15,884	341,288	66,385	530,125	103,366	25,247	311	181,533	_d	71,766	1,030	684,927	96,831
r^c	0.860	0.156	-0.965	-0.951	-0.967	-0.905	-0.790	-0.338	-0.926	_d	0.196	-0.812	-0.850	0.537
P	< 0.01	0.44	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.14	< 0.01	_d	0.41	< 0.01	< 0.01	< 0.05

^a Estimates exclude harvest on shooting preserves.

^b Spring turkey harvest estimate does not include 2nd gobbler harvests from Special Turkey License holders.

^c Pearson product-moment correlation coefficient from data collected from 1983-2010

^d No data for geese, inadvertently omitted from the survey.

Table 2. Hunters, by species, 1984-2010, Pennsylvania. Survey was not conducted in 2004.

- -7	Spring	Fall						O 118	-		D 1 8	**		a
Year	Turkey	Turkey	Rabbits	Grouse	Squirrel	Pheasant ^a	Woodcock	Quail ^a	Dove	Geese	Ducks ^a	Hare	Woodchuck	Crow
1984	209,717	322,347	626,892	419,367	525,670		120,643		162,779	66,406		27,133		
1985	214,331	298,055	619,220	423,393	528,599		100,270		150,904	62,742		25,141		
1986	246,039	336,225	612,424	442,897	552,336		110,886		166,139	65,087		27,557		
1987	206,039	282,761	516,281	374,741	472,250		96,936		137,402	50,804		19,573		
1988	226,008	300,055	528,615	390,192	472,841		93,110		143,981	53,475		21,873		
1989	224,138	296,139	497,463	365,211	464,434		87,053		131,321	43,603		17,568		
1990	191,442	234,911	436,961	299,534	369,848	274,957	30,045	5,378	93,532	33,509	28,443	7,831	123,204	39,579
1991	179,202	252,210	405,004	292,418	348,868	254,051	24,681	3,279	86,377	36,032	29,247	7,601	118,257	39,014
1992	186,738	212,104	373,800	254,724	329,726	217,189	25,916	1,444	76,998	38,301	29,263	6,156	114,515	34,442
1993	201,060	222,780	347,129	242,398	311,103	198,657	23,452	2,657	73,462	41,577	35,782	5,801	109,576	34,648
1994	224,405	244,095	335,715	259,727	326,271	205,384	19,401	1,323	74,589	40,106	34,097	7,236	117,251	37,841
1995	239,521	261,395	297,570	239,014	293,852	182,224	15,702	1,451	67,754	28,715	30,274	5,949	113,127	36,782
1996	241,613	250,377	280,351	214,272	279,259	171,275	14,464	1,184	65,808	31,119	32,434	5,011	101,576	30,087
1997	233,287	249,934	261,115	197,994	267,051	148,900	13,374	1,009	60,178	30,574	32,180	3,723	104,561	30,696
1998	194,819 ^b	199,696 ^b	242,509	183,511	252,738	158,497	12,907	1,116	57,579	32,871	34,103	5,506	92,517	31,390
1999	237,984	244,638	221,179	174,576	238,887	142,142	12,212	1,550	49,551	33,734	31,503	4,379	90,853	29,131
2000	231,860	230,448	229,906	162,073	238,540	149,260	12,977	1,870	52,496	35,628	31,998	3,666	99,294	29,371
2001	230,115	228,564	213,295	161,186	231,436	146,751	14,411	2,029	51,144	38,292	31,893	4,930	99,787	33,343
2002	218,931	217,099	195,078	149,106	201,694	123,879	12,652	1,342	50,883	41,240	32,328	3,818	91,149	28,470
2003	246,820	211,967	181,426	134,115	199,922	130,676	15,321	3,518	46,580	44,467	34,173	5,091	92,986	27,591
2005	247,304	203,982	149,647	112,210	166,476	105,508	13,615	3,222	41,328	37,426	26,673	5,033	71,682	23,380
2006	245,024	182,233	145,712	105,282	174,151	96,590	11,978	3,322	40,145	35,226	27,628	5,211	80,522	26,880
2007	223,808	162,323	135,956	96,429	154,653	90,548	12,574	3,112	40,166	34,803	27,136	3,030	75,554	23,228
2008	216,551	152,294	137,842	102,139	171,786	86,052	11,709	2,396	39,780	33,814	27,654	2,890	80,116	25,706
2009	228,903	156,752	139,772	104,228	157,907	91,549	9,935	4,412	37,895	31,732	25,870	4,703	69,407	31,519
2010	237,037	163,433	125,537	91,003	150,309	71,579	8,223	3,499	25,490	_d	19,160	2,756	71,618	20,835
r^c	0.269	-0.909	-0.959	-0.970	-0.957	-0.964	-0.811	0.250	-0.918	_d	-0.567	-0.817	-0.956	-0.857
P	0.18	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.29	< 0.01	_d	< 0.01	< 0.01	< 0.01	< 0.01

^a Estimates exclude number of hunters on shooting preserves.

^b Cautionary note: these low values may have been caused by inadvertently not including the TMA map on the 1998-1999 survey instructions. See 1998-1999 annual report

^c Pearson product-moment correlation coefficient from data collected from 1983-2010. ^d No data for geese, inadvertently omitted from the survey.

Table 3. Hunter-days, by species, 1990-2010, Pennsylvania. Survey was not conducted in 2004.

	Spring	Fall												
Year	Turkey	Turkey	Rabbits	Grouse	Squirrel	Pheasant ^a	Woodcock	Quail ^a	Dove	Geese	Ducks ^a	Hare	Woodchuck	Crow
1990	861,086	872,815	2,901,567	1,764,129	2,345,050	1,287,702	133,947	24,493	475,402	171,436	141,441	15,632	1,228,548	223,525
1991	781,499	851,155	2,474,017	1,580,574	2,004,826	1,115,902	119,238	13,630	409,149	167,342	132,775	15,397	1,341,605	227,527
1992	799,621	696,705	2,210,784	1,331,444	1,814,807	902,308	97,699	3,228	329,087	188,303	135,656	11,650	1,191,725	170,185
1993	843,987	753,896	1,926,331	1,246,856	1,721,261	859,018	94,588	16,683	326,265	202,644	174,023	11,882	1,338,167	201,412
1994	1,003,939	857,959	2,104,454	1,438,808	1,919,013	937,974	73,958	4,455	340,661	217,021	163,690	15,208	1,294,150	209,854
1995	1,084,725	865,565	1,769,363	1,281,923	1,630,631	844,056	62,819	6,022	295,114	128,611	165,196	11,712	1,253,239	193,952
1996	1,103,556	867,072	1,641,774	1,130,129	1,568,102	733,806	51,493	5,061	280,603	165,523	168,834	9,230	1,246,439	186,781
1997	1,019,546	834,253	1,525,740	1,022,603	1,462,230	648,985	48,577	2,837	237,910	214,269	199,017	6,849	1,241,112	178,724
1998	881,026 ^b	691,787 ^b	1,517,673	994,150	1,422,957	775,398	55,343	6,704	261,442	212,538	188,694	11,805	1,359,595	222,980
1999	1,023,988	807,292	1,268,639	882,167	1,306,098	605,034	47,142	5,004	207,743	230,635	189,306	6,864	1,151,067	173,186
2000	995,472	780,297	1,295,397	817,545	1,254,598	652,602	56,098	8,906	230,991	259,153	202,279	5,351	1,196,679	157,828
2001	1,025,011	800,113	1,319,445	894,983	1,371,514	714,970	66,333	8,355	217,529	284,517	183,880	10,837	1,280,855	250,869
2002	964,575	770,899	1,043,657	723,845	1,069,972	520,372	52,222	9,638	209,960	277,528	210,663	8,761	1,178,530	164,521
2003	1,069,299	757,304	1,058,453	700,729	1,049,995	595,908	75,627	13,834	210,869	331,784	226,495	11,206	1,103,755	237,168
2005	1,038,280	684,865	896,931	597,139	922,347	465,017	66,675	12,086	215,773	255,605	176,006	8,955	903,986	158,723
2006	937,023 ^c	534,136	860,909	582,271	923,826	445,757	69,440	14,696	197,412	238,934	173,266	10,957	986,407	169,039
2007	894,393°	522,911	825,125	537,558	858,443	405,715	69,846	10,625	185,568	231,659	166,757	6,764	958,838	177,617
2008	896,165	486,591	791,313	581,668	893,693	369,914	65,497	10,047	184,800	238,906	164,849	5,067	1,049,157	169,391
2009	1,034,804	529,427	815,945	521,708	855,046	386,842	45,099	20,502	178,587	247,165	170,544	9,103	800,482	195,430
2010	925,561	457,435	658,703	414,499	726,177	303,398	34,052	12,235	97,021	_e	102,579	5,541	747,656	96,950
r^{d}	0.28	-0.826	-0.953	-0.965	-0.967	-0.946	-0.646	0.155	-0.908	_e	0.110	-0.694	-0.844	-0.480
P	0.24	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.51	< 0.01	_e	0.64	< 0.01	< 0.01	< 0.05

^a Estimates exclude effort on shooting preserves.

^b Cautionary note: these low values may have been caused by inadvertently not including the TMA map on the 1998-1999 survey instructions. See 1998-1999 annual report.

^c Spring turkey effort does not include data from Special Turkey License holders pursuing a 2nd gobbler.

^d Pearson product-moment correlation coefficient from data collected from 1990-2010.

^e No data for geese, inadvertently omitted from the survey.

Table 4. Harvest per 100 hunter-days, by species, 1990-2010, Pennsylvania. Survey was not conducted in 2004.

	Spring	Fall												
Year	Turkey	Turkey	Rabbits	Grouse	Squirrel	Pheasant ^a	Woodcock	Quail ^a	Dove	Geese	Ducks ^a	Hare	Woodchuck	Crow
1990	2.0	2.9	57.6	20.0	87.2	23.5	38.0	32.2	215.1	42.5	69.3	23.1	105.8	159.0
1991	2.1	3.8	59.1	18.6	81.4	24.1	44.6	22.0	236.7	41.3	65.9	23.2	97.2	113.0
1992	2.3	3.1	67.3	19.1	97.1	29.0	52.5	38.3	223.3	41.9	69.1	34.0	97.1	108.8
1993	2.9	4.0	60.3	21.9	92.1	29.1	56.0	29.0	225.3	41.6	76.6	17.8	95.2	95.1
1994	2.8	4.6	48.7	21.1	85.2	25.2	40.1	65.1	196.5	47.5	78.3	22.0	99.3	117.8
1995	3.4	5.7	57.1	24.6	98.1	29.7	45.6	20.0	227.3	50.1	96.8	25.6	97.8	152.6
1996	3.1	4.1	49.2	19.3	92.0	29.4	52.1	66.9	214.9	55.3	89.5	17.1	92.3	147.5
1997	3.0	4.5	54.2	18.4	92.5	33.9	49.2	62.2	213.0	53.9	94.5	20.9	100.8	103.5
1998	3.7	4.9	60.0	18.5	93.5	27.9	57.1	3.6	215.1	66.9	77.4	21.2	88.6	110.8
1999	3.7	5.0	56.4	20.1	94.6	34.9	54.5	78.7	249.9	55.7	86.8	35.1	97.1	120.8
2000	4.4	5.7	59.5	17.8	101.7	35.8	55.6	49.1	207.2	75.0	91.5	32.6	99.5	139.2
2001	4.8	6.0	53.2	17.8	93.1	34.2	49.0	51.2	211.9	67.2	78.3	42.3	92.7	77.8
2002	4.3	4.8	57.7	16.4	93.7	39.5	59.7	11.0	220.3	62.5	80.6	15.6	107.5	131.9
2003	4.0	4.1	55.6	15.2	101.3	39.3	56.1	14.9	237.6	68.8	84.4	17.0	106.2	87.6
2005	3.1	3.7	47.8	9.8	70.0	37.8	56.7	23.9	189.9	81.7	92.6	17.0	98.7	118.7
2006	4.0	4.6	47.5	15.3	84.9	31.8	57.3	8.4	194.8	76.0	92.0	12.0	92.3	131.6
2007	4.1	4.9	50.7	15.3	78.6	41.4	38.5	42.4	224.6	81.3	83.3	10.1	87.7	102.6
2008	4.5	5.0	58.6	18.7	79.3	29.8	63.4	10.9	221.8	88.8	82.0	15.5	94.7	108.2
2009	4.1	4.0	51.4	14.6	74.3	39.2	33.6	16.8	177.5	78.9	80.9	16.8	88.7	137.5
2010	3.4	3.5	51.8	16.0	73.0	34.1	74.1	2.5	187.1	_ ^c	70.0	18.6	91.6	99.9
r^{b}	0.719	0.229	-0.516	-0.580	-0.561	0.726	0.317	-0.302	-0.267	_ ^c	0.272	-0.430	-0.101	0.073
P	< 0.01	0.33	< 0.05	< 0.01	< 0.05	< 0.01	0.17	0.20	0.25	_c	0.25	0.06	0.67	0.76

^a Estimates exclude effort on shooting preserves.

^b Pearson product-moment correlation coefficient from data collected from 1990-2010.

^c No data for geese, inadvertently omitted from the survey.

 $Table \ 5. \ Furbearer \ hunters \ and \ trappers, \ by \ species, \ 1990-2010, \ Pennsylvania. \ Survey \ was \ not \ conducted \ in \ 2004.$

			Red	Gray					
Year	Raccoon	Muskrat	Fox	Fox	Opossum	Skunk	Mink	Coyote ^a	Weasel
1990	9,676	4,147	7,941	6,542	3,653	1,914	2,560	7,782	508
1991	9,921	4,865	7,827	6,613	3,915	2,264	2,726	12,184	422
1992	9,525	4,419	7,019	6,263	3,793	2,208	2,539	13,643	452
1993	8,195	4,227	6,790	6,089	3,369	1,967	2,465	14,260	387
1994	7,066	5,570	8,319	7,515	4,267	3,071	3,212	20,597	784
1995	9,718	4,465	8,080	6,908	3,989	2,643	2,879	20,413	853
1996	12,951	6,478	10,007	8,361	6,140	3,443	3,703	21,937	942
1997	13,750	7,363	10,330	8,553	6,386	3,473	4,434	24,526	1,125
1998	12,794	5,900	9,982	8,594	5,558	2,948	3,512	30,016	733
1999 ^b	7,555	3,230	6,996	6,061	2,653	1,718	2,152	28,265	392
2000^{b}	6,996	3,121	7,280	6,353	2,870	1,750	2,026	28,270	509
2001^{b}	7,935	3,997	8,234	6,938	3,180	2,036	2,587	36,249	619
2002^{b}	7,295	3,287	8,022	6,494	3,434	2,116	2,433	28,535	676
2003^{b}	7,292	3,362	6,998	5,547	3,585	2,132	2,305	29,048	453
2005^{b}	8,434	3,815	9,583	7,358	4,479	2,813	2,997	35,010	714
2006^{b}	10,606	5,630	11,331	8,264	5,669	3,603	4,194	36,175	1,325
2007	10,131	4,272	10,628	7,811	5,307	3,484	3,674	37,792	1,447
2008	11,498	4,687	12,426	9,561	6,344	4,143	3,617	40,982	1,466
2009	8,702	3,261	6,651	3,953	4,482	2,587	2,147	40,648	203
2010	11,609	4,539	13,635	9,455	6,012	3,891	4,093	43,162	1,655
r^{c}	-0.674	-0.254	0.523	0.201	0.377	0.492	0.257	0.965	0.502
P	< 0.01	0.28	< 0.05	0.39	0.10	< 0.05	0.27	< 0.01	< 0.05

^a Combines estimates from Game Take Survey and Furtaker Survey, but does not include mentored youth harvest.

^b Cautionary note: Estimates are minimum estimates that do not account for combination licenses.

^c Pearson product-moment correlation coefficient from data collected from 1990-2010.

Table 6. Furbearer harvests, by species, 1983-2010, Pennsylvania. Survey was not conducted in 2004.

			Red	Gray					
Year	Raccoon	Muskrat	Fox	Fox	Opossum	Skunk	Mink	Coyote ^{a,b}	Weasela
1983	449,499	575,530	88,643	64,754	339,436	86,769	13,089		
1984	495,106	621,111	75,532	66,975	339,294	72,050	23,627		
1985	557,989	362,074	68,074	40,476	237,493	48,847	13,932		
1986	426,625	440,880	95,330	46,387	210,953	39,064	16,008		
1987	443,934	346,558	74,590	56,944	217,552	39,632	18,513		
1988	247,743	230,058	52,778	23,102	105,881	16,371	12,914		
1989	155,761	141,577	43,525	28,818	80,660	20,409	9,669		
1990	116,443	112,358	32,699	21,653	36,574	9,298	7,053	1,810	798
1991	130,608	156,014	28,495	30,409	37,177	8,907	10,355	3,719	481
1992	124,404	135,533	27,611	25,395	27,754	7,221	9,157	4,402	343
1993	118,964	121,657	25,862	23,839	25,807	7,920	7,808	6,161	526
1994	186,551	178,145	30,649	34,691	29,621	12,620	10,208	6,240	723
1995	120,462	130,442	31,110	23,518	29,688	9,995	8,602	6,662	687
1996	214,958	146,013	29,623	23,307	48,549	11,571	9,315	7,957	589
1997	194,696	216,066	36,923	26,043	60,717	12,344	14,063	6,685	1,172
1998	195,110	148,202	47,202	32,922	56,287	11,190	12,238	11,652	662
1999 ^c	96,270	88,426	34,297	21,762	28,950	6,853	12,512	8,797	336
2000^{c}	97,509	79,933	30,893	20,096	25,062	7,248	7,980	10,160	313
2001 ^c	121,810	121,994	33,003	23,275	27,192	9,245	13,214	12,363	815
2002^{c}	106,485	75,340	33,007	18,805	34,787	7,207	10,069	11,444	406
2003 ^c	104,781	71,368	31,592	15,956	33,760	9,319	6,494	11,697	359
2005^{c}	106,082	70,995	40,551	17,616	43,720	9,977	9,335	20,377	567
2006^{c}	138,640	121,167	45,512	20,754	48,102	10,687	12,680	21,601	487
2007	121,446	72,174	52,000	18,613	41,168	9,818	10,004	28,974	813
2008	142,808	74,059	44,745	20,845	54,273	12,331	8,632	23,699	504
2009	112,550	63,988	37,418	13,793	37,270	8,314	7,261	30,386	468
2010	125,423	58,296	54,661	15,691	36,188	8,935	8,204	26,658	436
r^{d}	-0.714	-0.772	-0.467	-0.769	-0.683	-0.664	-0.539	0.942	-0.195
P	< 0.01	< 0.01	< 0.05	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	0.41

^a No data are available prior to 1990.

^b Combines estimates from the Game Take and Furtaker surveys, but does not include mentored youth harvest.

^c Cautionary note: Estimates are minimum estimates that do not account for combination licenses.

^d Pearson product-moment correlation coefficient from data collected from 1983-2010.

Table 7. Resident junior license holder participation for Youth Hunts, 2006-2010.

Year	Waterfowl	Spring Gobbler	Pheasant	Squirrel	R abbit ^a
2006	1,171	8,976	5,660	7,652	
2007	254	5,911	3,874	6,165	
2008	682	7,354	5,272	8,941	
2009	417	1,876	2,003	4,713	
2010	800	8,096	5,048	7,850	4,371
r^{b}	-0.258	-0.329	-0.330	-0.102	-
P	0.68	0.59	0.587	0.871	-

^a The Youth Rabbit Hunt began in the 2010 hunting season.

Table 8. Resident junior license holder harvest for Youth Hunts, 2006-2010.

			Spring			
Year	Ducks	Geese	Gobbler	Pheasant	Squirrel	Rabbit ^a
2006	766	153	613	3,218	12,259	
2007	508	888	1,650	5,964	18,101	
2008	409	0	1,638	3,412	29,143	
2009	1,355	313	1,772	3,671	17,453	
2010	554	185	1,478	4,617	22,625	5,325
r^{b}	0.177	-0.236	0.625	0.070	0.501	-
P	0.78	0.70	0.26	0.91	0.39	-

^a The Youth Rabbit Hunt began in the 2010 hunting season.

^b Pearson product-moment correlation coefficient from data collected from 2006-2010.

^b Pearson product-moment correlation coefficient from data collected from 2006-2010.