

**PENNSYLVANIA GAME COMMISSION
BUREAU OF WILDLIFE MANAGEMENT
ANNUAL PROJECT REPORT**

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TITLE: Survey and Statistical Support

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TITLE: Game Take, Furtaker, Mentored Youth Hunter, Spring Turkey Hunter, Mentored Youth Spring Turkey Hunter Surveys

PERIOD COVERED: 1 July 2017 to 30 June 2018

COOPERATING AGENCIES: Bureau of Automated Technology Services, Bureau of Administrative Services

WORK LOCATION(S): Harrisburg, Pennsylvania

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ABSTRACT For the Game Take Survey, we conducted a mixed-mode (Internet and mail) survey, mailing survey invitations and questionnaires to a random sample of 2017-18 general hunting license purchasers ($n = 18,000$) stratified by license type to estimate numbers of hunters, harvests, and hunter-days for game species during the 2017-18 hunting seasons. After 4 mailings, 55.4% of recipients responded. Overall, between the 2016-17 and 2017-18 hunting seasons, harvests increased for spring turkey and woodcock, and decreased for fall turkey, rabbit, grouse, squirrel, pheasant, dove, hare, woodchuck, crow, and porcupine. Five-year trends indicate declines in harvest for fall turkey, rabbit, grouse, squirrel, woodchuck, and porcupine. Five-year trends show declines in hunter participation for spring and fall turkey, rabbit, grouse, squirrel, pheasant, woodchuck, crow, and porcupine. We used a mixed-mode approach for the Mentored Youth Hunter Survey, which was sent out to the parent or guardian of 2,500 Mentored Youth permit holders to estimate participation, effort and harvest. The Mentored Youth Hunter Survey was conducted concurrently with the Game Take Survey and received a 52.9% response rate. Squirrel continues to be the most popular small game species hunted by mentored youth, with 30.1% participating. We used a mixed-mode approach to conduct the Furtaker Survey, inviting 8,001 furtaker, junior combination, and senior combination license holders to complete a survey; 56.7% responded. Between the 2016-17 and 2017-18 seasons, the number furbearer harvests increased for red fox, gray fox, coyote, skunk, and opossum; harvests decreased for raccoon, muskrat, mink, beaver, and weasel. Five-year trends for harvests of furbearers indicate no significant trends except for significant declines in raccoon and muskrat. We received 74.9% response to the 2018 Spring Turkey Hunter Survey, which was mailed to 9,419 respondents to the Game Take Survey.

Compared to spring 2017, harvests and hunters increased in spring 2018. The Mentored Youth Spring Turkey Hunter Survey was mailed to 1,169 respondents to the Mentored Youth Hunter Survey and received 63.3% response. In spring 2018, harvests by mentored youth increased, and number of mentored youth hunters decreased compared to spring 2017.

OBJECTIVES

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

METHODS

The Game Take Survey has been formally conducted by the Pennsylvania Game Commission since the 1971-72 hunting season and has experienced many changes over the years (Boyd and Weaver 2011). Minor changes made to 2017-18 Game Take Survey instrument included removing After December 25 Ruffed Grouse season, replacing “#” with “Number”, separating Cottontail Rabbit and Snowshoe Hare, and moving Ring-necked Pheasants to end of Game Birds. During data cleansing, all data regarding pheasants was accepted from Junior resident and Junior combination license types; data were excluded from remaining license types if they did not possess a pheasant permit.

The Mentored Youth Hunter Survey estimated participation, effort, and harvest by Pennsylvania’s 30,000-plus Mentored Youth Hunter Program permit holders. No changes were made to the 2017-18 Mentored Youth Hunter Survey instrument or implementation. The survey was conducted concurrently with the Game Take Survey.

The Furtaker Survey has been conducted since the 1990-91 season. No changes were made to the 2017-18 Furtaker Survey instrument or implementation.

We used Pennsylvania Automated Licensing System data to pre-stratify Game Take sample frames based on license type, e.g. junior, adult, senior, and nonresident, and whether they purchased additional permits or stamps (8 strata). We used optimal allocation methods to estimate number of recipients of each license type based on variances in harvests in previous Game Take surveys (Johnson et al. 2012). We used a similar approach (i.e., optimal allocation) for the Furtaker Survey; strata included junior, adult, senior, and nonresident furtaker license holders and junior and senior combination license holders (6 strata). The Mentored Youth Hunter Survey sample was a random selection of Mentored Youth permit holders.

The Spring Turkey Hunter Survey began as a separate survey in 2012. As in past years, in 2018 our sample frame consisted of 2017-18 Game Take Survey respondents. On Spring Turkey

Hunter Survey instrument (online and paper), images of juvenile and adult turkey tails were added to potentially aid survey respondents determine age of their harvested turkey.

The Mentored Youth Spring Turkey Hunter Survey began as a separate survey in 2013. As in previous years, in 2018 the sample frame consisted of 2017-18 Mentored Youth Hunter Survey respondents. The survey was conducted concurrently with the Spring Turkey Hunter Survey. On Mentored Youth Spring Turkey Hunter survey instrument (online and paper), images of juvenile and adult turkey tails were added.

Survey Implementation

We conducted 4 mailings (an initial invitation for Internet response mailed at the close of small game season, a postcard reminder for Internet response mailed a week later, and 3 follow-up mailings for mail response to nonrespondents, each mailed 4 weeks after previous mailings) of the Game Take Survey. Mailings for the Mentored Youth Hunter Survey were the same as for the Game Take Survey. For the Furtaker Survey, we conducted 4 mailings; an initial mailing for Internet response sent at the close of beaver season, a postcard reminder for Internet response a week later, and 2 follow-up mailings to nonrespondents each sent 4 weeks after previous mailings. Data entry closed on 9 June for Game Take and Mentored Youth Hunter surveys, and on 16 June for the Furtaker Survey. We mailed 18,000 Game Take questionnaires, 2,500 Mentored Youth Hunter questionnaires, and 8,001 Furtaker questionnaires.

For the Spring Turkey Hunter and Mentored Youth Spring Turkey Hunter surveys, we conducted 4 mailings beginning 31 May. For both surveys, we mailed an initial invitation for Internet response, a reminder postcard the following week, and 2 follow-up mailings for mail response to nonrespondents were sent 4 weeks after previous mailings. We mailed 9,419 questionnaires for the Spring Turkey Hunter Survey and 1,169 questionnaires for the Mentored Youth Spring Turkey Hunter Survey. Data entry closed on 11 August.

Data Analysis

All harvest survey data were passed through an extensive cleansing process, which corrected for maximum allowable days of hunting and trapping, maximum allowable harvests, seasons allowed in certain Wildlife Management Units, and checking that the respondents' privilege codes (i.e., licenses purchased) allowed for the hunting and taking of certain species.

For each species, we estimated total harvest, number of participants, hunter-days, and harvest per 100 hunter-days based on 853,070 general hunting licenses sold for the Game Take Survey and Spring Turkey Hunter Survey, 29,786 permits sold for the Mentored Youth Hunter Survey, and 43,258 furtaker licenses and 125,016 junior and senior combination licenses sold for the Furtaker Survey. Deer and bear harvests are measured through other official reporting methods and are not reported here. We calculated percent change in harvest, participation, effort and harvest per unit of effort between 2016-17 and 2017-18 seasons. Because analyzing trend data that includes information from the 1980s will likely result in negative trends for many species for the foreseeable future, we analyzed data from the past 5 years (2013-14 through 2017-18) using Spearman rho correlation coefficients (P values ≤ 0.05 were considered significant).

RESULTS

For the Game Take, Mentored Youth Hunter, and Furtaker surveys, we received responses from 9,609 (4,504 Internet, 5,105 mail), 1,271 (519 Internet, 752 mail), and 4,492 (2,028 Internet, 2,464 mail) survey recipients, respectively. The response rates, after adjusting for undeliverable questionnaires, were 55.4% (46.7% Internet, 53.1% mail) for the Game Take Survey, 52.9% (40.8% Internet, 59.2% mail) for the Mentored Youth Hunter Survey, and 56.7% (45.1% Internet, 54.9% mail) for the Furtaker Survey. The Game Take Survey response rate was 0.7 percentage points higher than in 2016-17. The Mentored Youth Hunter Survey response rate was 2.4 percentage points lower than the 2016-17 survey. The Furtaker Survey response rate was 0.5 percentage points lower than the 2016-17 survey. Of the 288 junior combination license holders that responded to the Furtaker Survey, 28 (9.7%) indicated hunting or trapping for furbearers. Of the 361 senior combination license holders that responded to the Furtaker Survey, 23 (6.4%) indicated hunting or trapping for furbearers.

For the Spring Turkey Hunter and Mentored Youth Spring Turkey Hunter surveys, 6,993 (2,640 Internet, 4,353 mail) and 734 (281 Internet, 453 mail) responses were processed, respectively. Overall response rates after adjusting for undeliverable questionnaires were 77.9% (37.8% Internet, 62.2% mail) for the Spring Turkey Hunter Survey and 63.3% (38.3% Internet, 61.7% mail) for the Mentored Youth Spring Turkey Hunter Survey.

Annual Changes

Compared to the 2016-17 season, harvests decreased for all seasons or species of game included in Game Take Survey in 2017-18, except spring turkey and woodcock (Table 1). The number of hunters decreased for all seasons or species of game except spring turkey, woodcock and dove (Table 2). Number of hunter-days increased for 4 of 12 seasons or species, including woodcock, dove, crow, and woodchuck (Table 3). Harvest per 100 hunter-days (a standardized measure of hunter success) increased for spring turkey, grouse, squirrel, and pheasant (Table 4).

The numbers of hunters and trappers of furbearers decreased for 7 of 10 species; trappers of skunk, weasel, and opossum increased (Table 5). Furbearer harvests increased for 5 of 10 species, including red fox, gray fox, coyote, skunk, and opossum (Table 6). Furbearer trapper and hunter days decreased for all but coyote (Table 7). Number of trapnights (number of days \times average number of traps set) increased for 5 of 10 species, including red fox, gray fox, coyote, skunk, and opossum (Table 8). Harvest per 100 hunter and trapper days increased for all species except muskrat and mink (Table 9). Harvest per 100 trapnights increased for all species except muskrat and mink (Table 10).

Junior license buyers' participation decreased for spring turkey, pheasant, rabbit, and squirrel junior hunts compared to the previous season (Table 11). Estimated harvests during junior hunts decreased for spring turkey, pheasant, squirrel, and rabbit (Table 12).

Of 1,271 mentored youth permit holder respondents, 89.5% reported hunting in the 2017-18 license year. Compared to the 2016-17 license year, mentored youth participation increased for woodchuck, coyote, rabbit, and dove, and decreased for spring and fall turkey, and squirrel (Table 13). Estimated harvests by mentored youth increased for spring turkey, coyote, squirrel, rabbit, and dove, and decreased for fall turkey and woodchuck (Table 14). Estimated number of hunter

days among mentored youth decreased for fall and spring turkey, and coyote, and increased for squirrel, woodchuck, rabbit, and dove (Table 15).

Long-term Trends

Over the past 5 years, harvests have significantly declined ($P < 0.05$) for fall turkey, rabbit, grouse, squirrel, woodchuck, and porcupine, and remained stable spring turkey, pheasant, woodcock, hare, and crow (Table 1). Numbers of hunters significantly declined for fall turkey, rabbit, grouse, spring turkey, squirrel, pheasant, woodchuck, crow, and porcupine, and remained stable for woodcock, and hare (Table 2). Hunter-days significantly declined for spring turkey, fall turkey, rabbit, grouse, squirrel, pheasant, and porcupine, and remained stable for woodcock, hare, woodchuck, and crow (Table 3). Harvest per 100 hunter days significantly increased for pheasant and spring turkey, and remained stable for all other species covered by the Game Take Survey (Table 4).

Five-year trends in junior hunt participation remained stable for pheasant and rabbit, and significantly declined for spring turkey and squirrel (Table 11). Five-year trends in junior hunt harvests remained stable for spring turkey, pheasant, squirrel, and rabbit (Table 12).

Five-year trends in mentored youth participation decreased significantly for spring turkey, fall turkey, squirrel, and woodchuck, and remained stable for coyote (Table 13). Five-year trends in harvests by mentored youth decreased significantly for fall turkey, squirrel, and woodchuck, and remained stable for spring turkey and coyote (Table 14). Five-year trends in mentored youth hunter-days significantly decreased for spring turkey, fall turkey, and squirrel, and remained stable for woodchuck and coyote (Table 15).

Five-year trends in numbers of hunters and trappers decreased for raccoon, red fox, gray fox, coyote, and muskrat, and remained stable for mink, beaver, skunk, weasel, and opossum (Table 5). Furbearer harvests remained stable, except for raccoon and muskrat, which declined significantly the past 5 years (Table 6). Trapper and hunter-days declined significantly the past 5 years for raccoon, red fox, gray fox, coyote, muskrat, skunk, and opossum, and remained stable for mink, beaver, and weasel (Table 7). Trapnights declined significantly for raccoon, gray fox, muskrat, mink, skunk, and opossum, and remained stable for red fox, coyote, beaver and weasel, fox, skunk, and opossum (Table 8). Five-year trends in harvests per 100 trapper and hunter-days remained stable, except weasel, which increased significantly (Table 9). Harvests per 100 trapnights remained stable the past 5 years, except for red fox and weasel, which increased significantly (Table 10).

RECOMMENDATIONS

1. The Game Take, Mentored Youth Hunter, Furtaker, Spring Turkey Hunter, and Mentored Youth Spring Turkey Hunter surveys are the best source for harvest and participant data for many species; thus, we recommend continuing these surveys.

2. Continue to evaluate cover letters, survey instruments, survey schedule, and data cleansing protocols to improve response rates and data accuracy.

LITERATURE CITED

Boyd, R. C., and M. Weaver. 2011. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission, Harrisburg, USA.

Johnson, J. B., Boyd, R. C., and M. Weaver. 2012. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission, Harrisburg, USA.

Table 1. Harvest, by species, 1996-2018, Pennsylvania. Survey was not conducted in 2004.

Year	Spring Turkey	Fall Turkey	Rabbit	Grouse	Squirrel	Pheasant ^a	Woodcock	Dove	Hare	Woodchuck	Crow	Porcupine
1996	33,726	35,787	807,072	218,256	1,442,560	215,502	26,846	603,114	1,582	1,149,995	275,541	–
1997	30,956	37,398	827,520	187,770	1,352,038	219,864	23,878	506,677	1,432	1,251,145	184,944	–
1998	32,661	33,628	911,003	183,468	1,331,051	216,669	31,602	562,348	2,507	1,204,582	247,047	–
1999	37,806	40,718	715,862	177,355	1,236,108	211,257	25,704	519,116	2,412	1,117,970	209,273	–
2000	43,815	44,865	770,841	145,525	1,276,009	233,537	31,199	478,602	1,747	1,191,114	219,773	–
2001	49,186	48,008	701,551	159,610	1,276,603	244,282	32,504	460,971	4,584	1,187,114	195,273	–
2002	41,147	37,346	602,234	118,577	1,002,309	205,696	31,167	462,538	1,369	1,267,265	217,068	–
2003	42,876	31,100	588,310	106,587	1,063,996	234,196	42,434	500,980	1,908	1,171,888	207,707	–
2005	32,593	25,171	428,414	58,596	646,033	175,676	37,792	409,769	1,522	892,391	188,460	–
2006	37,845 ^b	24,481	409,350	89,145	784,741	141,775	39,782	384,625	1,310	910,654	222,382	–
2007	36,294 ^b	25,369	418,139	82,020	674,991	168,094	26,924	416,844	685	840,523	182,320	–
2008	40,483 ^b	24,288	463,935	108,693	708,898	110,331	41,556	409,837	783	993,207	183,203	–
2009	42,478 ^b	20,934	419,721	75,997	635,193	151,737	15,171	316,930	1,525	710,411	268,711	–
2010	31,908 ^b	15,884	341,288	66,385	530,125	103,366	25,247	181,533	1,030	684,927	96,831	–
2011	31,769 ^b	14,300	289,547	52,243	690,141	116,828	–	–	510	821,965	182,659	10,096
2012	35,621 ^c	14,074	254,328	52,289	643,382	198,704	8,420	–	690	844,515	289,833	13,596
2013	34,156 ^c	16,273	230,849	40,308	573,538	220,752	7,116	–	620	959,879	140,997	15,213
2014	39,513 ^c	18,013	230,417	34,848	467,888	177,068	8,691	226,083	601	560,120	261,374	12,400
2015	39,934 ^c	14,861	177,588	28,434	460,311	205,366	7,293	129,112	738	491,503	65,028	7,867
2016	34,512 ^c	10,708	209,488	22,581	397,658	221,588	6,684	148,254	2,015	535,404	123,601	7,117
2017	36,970 ^c	9,168	83,314	18,393	364,565	120,459	8,183	136,342	53	472,174	100,411	4,314
2018	39,080 ^c	–	–	–	–	–	–	–	–	–	–	–
% change ^d	7.1%	-14.4%	-60.2%	-18.5%	-8.3%	-45.6%	22.4%	-8.0%	-97.4%	-11.8%	-18.8%	-39.4%
ρ^e	-0.500	-0.900	-0.900	-1.000	-1.000	-0.300	0.000	–	-0.100	-0.900	-0.600	-1.000
<i>P</i>	0.391	0.037	0.037	<0.001	<0.001	0.624	1.000	–	0.873	0.037	0.285	<0.001

^a Estimates exclude harvests on shooting preserves.

^b Spring turkey harvest estimate does not include second spring turkey harvests from special turkey license holders.

^c Spring turkey harvest estimate includes junior, regular, and second spring turkey data.

^d Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^e Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey.

Table 2. Hunters, by species, 1996-2018, Pennsylvania. Survey was not conducted in 2004.

Year	Spring Turkey	Fall Turkey	Rabbit	Grouse	Squirrel	Pheasant ^a	Woodcock	Dove	Hare	Woodchuck	Crow	Porcupine
1996	241,613	250,377	280,351	214,272	279,259	171,275	14,464	65,808	5,011	101,576	30,087	–
1997	233,287	249,934	261,115	197,994	267,051	148,900	13,374	60,178	3,723	104,561	30,696	–
1998	194,819 ^b	199,696 ^b	242,509	183,511	252,738	158,497	12,907	57,579	5,506	92,517	31,390	–
1999	237,984	244,638	221,179	174,576	238,887	142,142	12,212	49,551	4,379	90,853	29,131	–
2000	231,860	230,448	229,906	162,073	238,540	149,260	12,977	52,496	3,666	99,294	29,371	–
2001	230,115	228,564	213,295	161,186	231,436	146,751	14,411	51,144	4,930	99,787	33,343	–
2002	218,931	217,099	195,078	149,106	201,694	123,879	12,652	50,883	3,818	91,149	28,470	–
2003	246,820	211,967	181,426	134,115	199,922	130,676	15,321	46,580	5,091	92,986	27,591	–
2005	247,304	203,982	149,647	112,210	166,476	105,508	13,615	41,328	5,033	71,682	23,380	–
2006	245,024	182,233	145,712	105,282	174,151	96,590	11,978	40,145	5,211	80,522	26,880	–
2007	223,808	162,323	135,956	96,429	154,653	90,548	12,574	40,166	3,030	75,554	23,228	–
2008	216,551	152,294	137,842	102,139	171,786	86,052	11,709	39,780	2,890	80,116	25,706	–
2009	228,903	156,752	139,772	104,228	157,907	91,549	9,935	37,895	4,703	69,407	31,519	–
2010	237,037	163,433	125,537	91,003	150,309	71,579	8,223	25,490	2,756	71,618	20,835	–
2011	221,321	144,734	109,369	79,687	165,927	88,307	–	–	4,039	87,549	25,290	7,775
2012	209,664	119,493	94,761	67,544	150,036	87,341	5,058	–	2,237	99,191	25,817	6,597
2013	206,829	193,507	91,628	66,113	145,992	92,091	6,706	–	2,410	109,559	25,271	8,666
2014	209,556	196,459	74,528	50,925	120,538	80,280	4,469	21,429	4,796	68,088	17,741	6,128
2015	198,690	152,094	73,286	49,726	117,277	86,349	5,872	17,169	3,434	63,463	13,352	6,209
2016	193,804	125,211	62,378	40,094	100,482	74,953	4,402	16,218	3,014	62,628	13,844	5,011
2017	160,892	118,976	45,565	32,693	95,252	35,738	5,977	16,395	1,248	56,948	11,523	2,695
2018	163,487	–	–	–	–	–	–	–	–	–	–	–
% change ^c	1.6%	-5.0%	-27.0%	-18.5%	-5.2%	-52.3%	35.8%	1.1%	-58.6%	-9.1%	-16.8%	-46.2%
ρ^d	-0.900	-0.900	-1.000	-1.000	-1.000	-0.900	-0.300	–	-0.400	-1.000	-0.900	-0.900
<i>P</i>	0.037	0.037	<0.001	<0.001	<0.001	0.037	0.624	–	0.505	<0.001	0.037	0.037

^a Estimates exclude number of hunters on shooting preserves.

^b Low values may have been caused by inadvertently excluding Turkey Management Area map on 1998-99 survey instructions. See 1998-99 annual report.

^c Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^d Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey.

Table 3. Hunter-days, by species, 1996-2018, Pennsylvania. Survey was not conducted in 2004.

Year	Spring Turkey	Fall Turkey	Rabbit	Grouse	Squirrel	Pheasant ^a	Woodcock	Dove	Hare	Woodchuck	Crow	Porcupine
1996	1,103,556	867,072	1,641,774	1,130,129	1,568,102	733,806	51,493	280,603	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	237,910	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	261,442	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	207,743	6,864	1,151,067	173,186	–
2000	995,472	780,297	1,295,397	817,545	1,254,598	652,602	56,098	230,991	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	217,529	10,837	1,280,855	250,869	–
2002	964,575	770,899	1,043,657	723,845	1,069,972	520,372	52,222	209,960	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	210,869	11,206	1,103,755	237,168	–
2005	1,038,280	684,865	896,931	597,139	922,347	465,017	66,675	215,773	8,955	903,986	158,723	–
2006	937,023 ^c	534,136	860,909	582,271	923,826	445,757	69,440	197,412	10,957	986,407	169,039	–
2007	894,393 ^c	522,911	825,125	537,558	858,443	405,715	69,846	185,568	6,764	958,838	177,617	–
2008	896,165 ^c	486,591	791,313	581,668	893,693	369,914	65,497	184,800	5,067	1,049,157	169,391	–
2009	1,034,804 ^c	529,427	815,945	521,708	855,046	386,842	45,099	178,587	9,103	800,482	195,430	–
2010	925,561 ^c	457,435	658,703	414,499	726,177	303,398	34,052	97,021	5,541	747,656	96,950	–
2011	936,638 ^c	443,254	552,686	350,151	791,481	384,125	–	–	7,869	871,846	157,061	31,460
2012	1,027,644 ^d	400,325	493,894	311,957	789,836	389,694	29,747	–	4,369	977,518	172,359	31,642
2013	1,046,179 ^d	692,712	449,083	307,317	712,877	428,048	40,617	–	4,197	1,157,077	139,799	28,069
2014	970,701 ^d	647,436	367,444	257,353	650,653	393,848	25,283	96,297	8,146	725,799	101,754	50,168
2015	887,536 ^d	561,467	357,584	247,438	544,958	394,141	23,928	66,271	5,732	673,495	91,573	19,114
2016	894,444 ^d	453,303	328,691	186,094	511,605	366,614	15,085	67,973	7,869	676,867	81,859	14,116
2017	741,072 ^d	434,112	200,116	138,806	452,669	186,907	29,057	75,050	2,008	678,183	101,741	9,450
2018	731,052 ^d	–	–	–	–	–	–	–	–	–	–	–
% change ^e	-17.1%	-4.2%	-39.1%	-25.4%	-11.5%	-49.0%	92.6%	10.4%	-74.5%	0.2%	24.3%	-33.1%
ρ^f	-0.900	-1.000	-1.000	-1.000	-1.000	-0.900	-0.400	–	-0.300	-0.600	-0.700	-0.900
<i>P</i>	0.037	<0.001	<0.001	<0.001	<0.001	0.037	0.505	–	0.624	0.285	0.188	0.037

^a Estimates exclude effort on shooting preserves.

^b These low values may have been caused by excluding the Turkey Management Area map on the 1998-1999 survey instructions. See 1998-99 annual report.

^c Spring turkey effort does not include data from special turkey license holders pursuing a second spring turkey.

^d Spring turkey effort includes junior, regular, and second spring turkey data.

^e Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^f Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey.

Table 4. Harvest per 100 hunter-days, by species, 1996-2018 Pennsylvania. Survey was not conducted in 2004.

Year	Spring Turkey	Fall Turkey	Rabbit	Grouse	Squirrel	Pheasant ^a	Woodcock	Dove	Hare	Woodchuck	Crow	Porcupine
1996	3.1	4.1	49.2	19.3	92.0	29.4	52.1	214.9	17.1	92.3	147.5	–
1997	3.0	4.5	54.2	18.4	92.5	33.9	49.2	213.0	20.9	100.8	103.5	–
1998	3.7	4.9	60.0	18.5	93.5	27.9	57.1	215.1	21.2	88.6	110.8	–
1999	3.7	5.0	56.4	20.1	94.6	34.9	54.5	249.9	35.1	97.1	120.8	–
2000	4.4	5.7	59.5	17.8	101.7	35.8	55.6	207.2	32.6	99.5	139.2	–
2001	4.8	6.0	53.2	17.8	93.1	34.2	49.0	211.9	42.3	92.7	77.8	–
2002	4.3	4.8	57.7	16.4	93.7	39.5	59.7	220.3	15.6	107.5	131.9	–
2003	4.0	4.1	55.6	15.2	101.3	39.3	56.1	237.6	17.0	106.2	87.6	–
2005	3.1	3.7	47.8	9.8	70.0	37.8	56.7	189.9	17.0	98.7	118.7	–
2006	4.0	4.6	47.5	15.3	84.9	31.8	57.3	194.8	12.0	92.3	131.6	–
2007	4.1	4.9	50.7	15.3	78.6	41.4	38.5	224.6	10.1	87.7	102.6	–
2008	4.5	5.0	58.6	18.7	79.3	29.8	63.4	221.8	15.5	94.7	108.2	–
2009	4.1	4.0	51.4	14.6	74.3	39.2	33.6	177.5	16.8	88.7	137.5	–
2010	3.4	3.5	51.8	16.0	73.0	34.1	74.1	187.1	18.6	91.6	99.9	–
2011	3.4	3.2	52.4	14.9	87.2	30.4	–	–	6.5	94.3	116.3	32.1
2012	3.5	3.5	51.5	16.8	81.5	51.0	28.3	–	15.8	86.4	168.2	43.0
2013	3.3	2.3	51.4	13.1	80.5	51.6	17.5	–	14.8	83.0	100.9	54.2
2014	4.1	2.8	62.7	13.5	71.9	45.0	34.4	234.8	7.4	77.2	256.9	24.7
2015	4.5	2.6	49.7	11.5	84.5	52.1	30.5	194.8	12.9	73.0	71.0	41.2
2016	3.9	2.4	63.7	12.1	77.7	60.4	44.3	218.1	25.6	79.1	151.0	50.4
2017	5.0	2.1	41.6	13.3	80.5	64.4	28.2	181.7	2.6	69.6	98.7	45.7
2018	5.3	–	–	–	–	–	–	–	–	–	–	–
% change ^b	7.2%	-10.6%	-34.7%	9.2%	3.6%	6.6%	-36.4%	-16.7%	-89.7%	-12.0%	-34.6%	-9.5%
ρ^c	0.900	-0.400	-0.300	-0.100	0.300	0.900	0.300	–	-0.300	-0.700	-0.300	-0.100
<i>P</i>	0.037	0.505	0.624	0.873	0.624	0.037	0.624	–	0.624	0.188	0.624	0.873

^a Estimates exclude effort on shooting preserves.

^b Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^c Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey.

Table 5. Number of furbearer hunters and trappers, by species, 1996-2017, Pennsylvania. Survey was not conducted in 2004.

Year	Raccoon	Red Fox	Gray Fox	Coyote^a	Muskrat	Mink	Beaver^b	Skunk	Weasel	Opossum
1996	12,951	10,007	8,361	21,937	6,478	3,703	–	3,443	942	6,140
1997	13,750	10,330	8,553	24,526	7,363	4,434	–	3,473	1,125	6,386
1998	12,794	9,982	8,594	30,016	5,900	3,512	–	2,948	733	5,558
1999 ^c	7,555	6,996	6,061	28,265	3,230	2,152	–	1,718	392	2,653
2000 ^c	6,996	7,280	6,353	28,270	3,121	2,026	–	1,750	509	2,870
2001 ^c	7,935	8,234	6,938	36,249	3,997	2,587	–	2,036	619	3,180
2002 ^c	7,295	8,022	6,494	28,535	3,287	2,433	–	2,116	676	3,434
2003 ^c	7,292	6,998	5,547	29,048	3,362	2,305	–	2,132	453	3,585
2005 ^c	8,434	9,583	7,358	35,010	3,815	2,997	2,475	2,813	714	4,479
2006 ^c	10,606	11,331	8,264	36,175	5,630	4,194	3,445	3,603	1,325	5,669
2007 ^c	10,131	10,628	7,811	37,792	4,272	3,674	3,112	3,484	1,447	5,307
2008 ^c	11,498	12,426	9,561	40,982	4,687	3,617	3,090	4,143	1,466	6,344
2009 ^c	8,702	6,651	3,953	40,648	3,261	2,147	1,810	2,587	203	4,482
2010 ^c	11,609	13,635	9,455	43,162	4,539	4,093	2,943	3,891	1,655	6,012
2011 ^d	16,479	17,934	11,360	55,810	6,451	4,925	3,431	4,500	922	7,654
2012	18,522	21,612	13,087	72,863	6,200	4,768	2,757	3,230	515	6,828
2013	20,205	22,210	13,652	77,702	7,443	4,813	3,040	3,897	414	8,560
2014	22,743	21,743	13,730	52,822	8,739	6,704	4,618	4,675	2,121	8,772
2015	17,196	19,313	11,462	55,954	5,219	3,870	4,515	3,166	873	6,124
2016	14,191	19,012	10,809	50,777	3,648	3,962	2,638	2,770	547	4,267
2017	13,536	16,971	10,587	48,453	3,614	2,617	2,131	2,821	619	5,741
% change ^e	-4.6%	-10.7%	-2.1%	-4.6%	-0.9%	-33.9%	-19.2%	1.8%	13.2%	34.5%
ρ^f	-0.900	-1.000	-0.900	-0.900	-0.900	-0.800	-0.700	-0.800	0.100	-0.800
<i>P</i>	0.037	<0.001	0.037	0.037	0.037	0.104	0.188	0.104	0.873	0.104

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

^b Official estimates using Furtaker Survey data began in 2005-06.

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

^d Estimates are minimum estimates that do not account for senior combination licenses.

^e Percent change from 2016 to 2017.

^f Spearman rho correlation coefficient from data collected from 2013-2017.

Table 6. Furbearer harvests, by species, 1996-2017, Pennsylvania. Survey was not conducted in 2004.

Year	Raccoon	Red Fox	Gray Fox	Coyote ^a	Muskrat	Mink	Beaver ^b	Skunk	Weasel	Opossum
1996	214,958	29,623	23,307	7,957	146,013	9,315	–	11,571	589	48,549
1997	194,696	36,923	26,043	6,685	216,066	14,063	–	12,344	1,172	60,717
1998	195,110	47,202	32,922	11,652	148,202	12,238	–	11,190	662	56,287
1999 ^c	96,270	34,297	21,762	8,797	88,426	12,512	–	6,853	336	28,950
2000 ^c	97,509	30,893	20,096	10,160	79,933	7,980	–	7,248	313	25,062
2001 ^c	121,810	33,003	23,275	12,363	121,994	13,214	–	9,245	815	27,192
2002 ^c	106,485	33,007	18,805	11,444	75,340	10,069	–	7,207	406	34,787
2003 ^c	104,781	31,592	15,956	11,697	71,368	6,494	–	9,319	359	33,760
2005 ^c	106,082	40,551	17,616	20,377	70,995	9,335	14,283	9,977	567	43,720
2006 ^c	138,640	45,512	20,754	21,601	121,167	12,680	14,210	10,687	487	48,102
2007 ^c	121,446	52,000	18,613	28,974	72,174	10,004	11,542	9,818	813	41,168
2008 ^c	142,808	44,745	20,845	23,699	74,059	8,632	9,942	12,331	504	54,273
2009 ^c	112,550	37,418	13,793	30,386	63,988	7,261	9,704	8,314	468	37,270
2010 ^c	125,423	54,661	15,691	26,658	58,296	8,204	9,254	8,935	436	36,188
2011 ^d	174,858	68,214	19,380	32,202	89,274	11,855	18,212	13,057	652	49,626
2012	210,146	67,465	17,415	40,109	93,153	12,454	9,712	7,329	604	78,024
2013	197,380	61,392	15,700	40,956	83,880	7,856	15,134	7,733	110	57,138
2014	203,311	55,659	21,765	31,675	115,742	14,532	17,607	13,969	372	59,643
2015	149,098	65,158	16,609	38,611	66,397	8,530	16,920	6,920	216	36,218
2016	92,013	47,442	10,725	25,793	43,436	7,801	7,888	6,133	278	22,518
2017	89,440	65,513	13,974	44,440	24,792	4,263	7,417	7,467	277	27,329
% change ^e	-2.8%	38.1%	30.3%	72.3%	-42.9%	-45.4%	-6.0%	21.8%	-0.4%	21.4%
ρ^f	-0.900	0.300	-0.600	0.100	-0.900	-0.700	-0.700	-0.600	0.300	-0.800
<i>P</i>	0.037	0.624	0.285	0.873	0.037	0.188	0.188	0.285	0.624	0.104

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

^b Official estimates using Furtaker Survey data began in 2005-06.

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

^d Estimates are minimum estimates that do not account for senior combination licenses.

^e Percent change from 2016 to 2017.

^f Spearman rho correlation coefficient from data collected from 2013-2017.

Table 7. Trapper and hunter-days, by species, Pennsylvania, 2011–2017.

Year	Raccoon	Red Fox	Gray Fox	Coyote^a	Muskrat	Mink	Beaver	Skunk	Weasel	Opossum
2011	400,069	341,727	212,973	548,199	99,573	77,945	58,183	126,782	13,607	183,064
2012	464,587	400,790	232,433	633,720	113,017	86,481	45,326	87,537	6,359	200,074
2013	496,975	445,502	295,069	760,680	120,638	79,553	56,535	126,021	10,441	207,971
2014	605,431	517,322	280,812	654,710	153,955	110,109	48,460	110,922	36,688	192,439
2015	386,946	369,323	224,958	618,874	77,966	62,082	65,848	87,602	16,941	157,933
2016	338,815	334,740	191,015	526,827	64,980	73,013	36,096	87,701	15,055	127,381
2017	297,478	309,676	179,151	533,893	47,007	42,671	29,458	72,480	5,810	120,974
% change ^b	-12.2%	-7.5%	-6.2%	1.3%	-27.7%	-41.6%	-18.4%	-17.4%	-61.4%	-5.0%
ρ^c	-0.900	-0.900	-1.000	-0.900	-0.900	-0.800	-0.700	-0.900	-0.400	-1.000
<i>P</i>	0.037	0.037	<0.001	0.037	0.037	0.104	0.188	0.037	0.505	<0.001

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

^b Percent change from 2016 to 2017.

^c Spearman rho correlation coefficient from data collected from 2013-2017.

Table 8. Trapper and hunter-trapnights, by species, Pennsylvania, 2011–2017.

Year	Raccoon	Red Fox	Gray Fox	Coyote	Muskrat	Mink	Beaver	Skunk	Weasel	Opossum
2011	4,304,682	3,172,214	2,092,789	2,251,668	1,564,493	900,813	362,569	2,014,271	106,017	2,535,478
2012	5,612,477	4,515,979	3,126,389	3,315,267	1,715,728	1,132,920	281,608	2,125,119	52,867	3,453,916
2013	5,452,366	4,001,064	3,025,750	2,283,318	2,046,237	988,938	279,180	1,838,158	84,398	2,996,779
2014	6,949,545	6,491,493	2,996,622	3,480,519	4,034,427	3,210,350	305,372	1,421,235	262,017	2,960,580
2015	3,827,802	3,841,077	2,333,542	3,232,886	1,350,908	986,187	322,362	1,250,551	100,764	2,142,796
2016	2,885,093	2,713,501	1,581,073	2,381,213	841,651	758,910	161,502	1,021,459	85,451	1,506,421
2017	2,572,318	3,068,868	2,014,701	2,721,939	582,145	415,384	135,711	1,129,536	41,996	1,528,342
% change ^a	-10.8%	13.1%	27.4%	14.3%	-30.8%	-45.3%	-16.0%	10.6%	-50.9%	1.5%
ρ^b	-0.900	-0.800	-0.900	0.100	-0.900	-0.900	-0.600	-0.900	-0.400	-0.900
<i>P</i>	0.037	0.104	0.037	0.873	0.037	0.037	0.285	0.037	0.505	0.037

^a Percent change from 2016 to 2017.

^b Spearman rho correlation coefficient from data collected from 2013-2017.

Table 9. Harvest per 100 trapper and hunter-days, by species, Pennsylvania, 2011–2016.

Year	Raccoon	Red Fox	Gray Fox	Coyote^a	Muskrat	Mink	Beaver	Skunk	Weasel	Opossum
2011	43.7	20.0	9.1	5.9	89.7	15.2	31.3	10.3	4.8	27.1
2012	45.2	16.8	7.5	6.3	82.4	14.4	21.4	8.4	9.5	39.0
2013	39.7	13.8	5.3	5.4	69.5	9.9	26.8	6.1	1.1	27.5
2014	33.6	10.8	7.8	4.8	75.2	13.2	36.3	12.6	1.0	31.0
2015	38.5	17.6	7.4	6.2	85.2	13.7	25.7	7.9	1.3	22.9
2016	27.2	14.2	5.6	4.9	66.8	10.7	21.9	7.0	1.8	17.7
2017	30.1	21.2	7.8	8.3	52.7	10.0	25.2	10.3	4.8	22.6
% change ^b	10.7%	49.3%	38.9%	70.0%	-21.1%	-6.5%	15.2%	47.3%	158.2%	27.8%
ρ^c	-0.800	0.800	0.600	0.500	-0.600	0.100	-0.800	0.300	0.900	-0.800
<i>P</i>	0.104	0.104	0.285	0.391	0.285	0.873	0.104	0.624	0.037	0.104

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

^b Percent change from 2016 to 2017.

^c Spearman rho correlation coefficient from data collected from 2013-2017.

Table 10. Harvest per 100 trapnights (number of days × average number of traps), by species, Pennsylvania, 2011–2017.

Year	Raccoon	Red Fox	Gray Fox	Coyote^a	Muskrat	Mink	Beaver	Skunk	Weasel	Opossum
2011	4.1	2.2	0.9	0.7	5.7	1.3	5.0	0.6	0.6	2.0
2012	3.7	1.5	0.6	0.6	5.4	1.1	3.4	0.3	1.1	2.3
2013	3.6	1.5	0.5	1.8	4.1	0.8	5.4	0.4	0.1	1.9
2014	2.9	0.9	0.7	0.9	2.9	0.5	5.8	1.0	0.1	2.0
2015	3.9	1.7	0.7	1.2	4.9	0.9	5.2	0.6	0.2	1.7
2016	3.2	1.7	0.7	1.1	5.2	1.0	4.9	0.6	0.3	1.5
2017	3.5	2.1	0.7	1.6	4.3	1.0	5.5	0.7	0.7	1.8
% change ^b	9.0%	22.1%	2.3%	50.7%	-17.5%	-0.2%	11.9%	10.1%	102.7%	19.6%
ρ^c	-0.100	0.900	0.100	-0.100	0.600	0.800	-0.200	0.400	1.000	-0.600
<i>P</i>	0.873	0.037	0.873	0.873	0.285	0.104	0.747	0.505	<0.001	0.285

^a Uses data from Furtaker Survey only.

^b Percent change from 2016 to 2017.

^c Spearman rho correlation coefficient from data collected from 2013-2017.

Table 11. Estimated number of resident junior license holders participating in junior hunts, Pennsylvania, 2006–2018.

Year	Spring Turkey	Pheasant	Squirrel	Rabbit
2006	8,976	5,660	7,652	–
2007	5,911	3,874	6,165	–
2008	7,354	5,272	8,941	–
2009	1,876	2,003	4,713	–
2010	8,096	5,048	7,850	4,371
2011	12,710	4,778	7,873	2,649
2012	9,841	3,891	8,439	1,800
2013	10,302	4,069	9,534	2,597
2014	12,758	6,741	8,881	2,614
2015	14,015	4,829	6,876	1,470
2016	12,503	3,610	6,602	1,506
2017	9,630	3,481	4,805	901
2018	6,154	–	–	–
% change ^a	-36.1%	-3.6%	-27.2%	-40.2%
ρ^b	-0.900	-0.700	-1.000	-0.800
<i>P</i>	0.037	0.188	<1.000	0.104

^a Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^b Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey

Table 12. Estimated number of harvests by resident junior license holders during junior hunts, Pennsylvania, 2006–2018.

Year	Spring Turkey	Pheasant	Squirrel	Rabbit
2006	613	3,218	12,259	–
2007	1,650	5,964	18,101	–
2008	1,638	3,412	29,143	–
2009	1,772	3,671	17,453	–
2010	1,478	4,617	22,625	5,325
2011	1,588	3,201	14,921	1,588
2012	2,638	7,042	14,984	900
2013	1,153	5,816	11,785	2,527
2014	1,690	6,587	14,357	1,657
2015	2,025	5,816	13,147	617
2016	1,479	5,362	13,815	1,141
2017	2,288	4,054	10,033	795
2018	1,398	–	–	–
% change ^a	-38.9%	-24.4%	-27.4%	-30.3%
ρ^b	-0.300	-0.821	-0.300	-0.700
<i>P</i>	0.624	0.089	0.624	0.188

^a Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

^b Spearman rho correlation coefficient from data collected from 2013-2017, and 2014-2018 for spring turkey.

Table 13. Estimated number of participating mentored youth permit holders, Pennsylvania, 2012–2018.

Year	Spring turkey	Fall turkey	Squirrel	Woodchuck	Coyote	Rabbit	Dove
2012	8,183	3,628	13,506	3,231	1,827	–	–
2013	11,233	5,581	13,585	2,974	1,441	–	–
2014	10,847	7,137	12,946	2,407	969	–	–
2015	9,348	4,239	11,346	1,990	698	1,680	0
2016	8,404	3,060	10,795	1,519	522	1,700	91
2017	7,292	2,625	8,976	1,664	1,008	1,805	118
2018	7,224	–	–	–	–	–	–
% change ^a	-0.9%	-14.2%	-16.9%	9.5%	93.1%	6.2%	29.7%
ρ^b	-1.000	-0.900	-0.900	-0.900	-0.400	–	–
<i>P</i>	<0.001	0.037	0.037	0.037	0.505	–	–

^a Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

Table 14. Estimated harvests by mentored youth permit holders, Pennsylvania, 2012–2018.

Year	Spring turkey	Fall turkey	Squirrel	Woodchuck	Coyote	Rabbit	Dove
2012	1,299	265	27,808	9,164	106	–	–
2013	1,587	481	29,525	10,475	92	–	–
2014	1,748	277	22,047	4,399	56	–	–
2015	1,247	156	21,967	5,996	52	905	0
2016	1,445	136	14,301	3,287	114	1,474	182
2017	1,125	94	17,647	3,047	1,219	2,203	352
2018	1,218	–	–	–	–	–	–
% change ^a	8.3%	-30.9%	23.4%	-7.3%	969.3%	49.5%	93.4%
ρ^b	-0.800	-1.000	-0.900	-0.900	0.600	–	–
<i>P</i>	0.104	<0.001	0.037	0.037	0.285	–	–

^a Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.

Table 15. Estimated days hunted by mentored youth permit holders, Pennsylvania, 2012–2017.

Year	Spring turkey	Fall turkey	Squirrel	Woodchuck	Coyote	Rabbit	Dove
2012	23,015	8,581	56,859	17,929	6,807	–	–
2013	37,857	15,117	61,222	9,984	5,649	–	–
2014	31,994	15,436	52,861	16,210	13,250	–	–
2015	29,098	11,397	43,624	15,403	2,792	6,823	0
2016	24,643	6,981	33,565	8,817	6,324	6,324	227
2017	19,160	6,515	40,239	9,281	4,125	7,172	329
2018	17,937	–	–	–	–	–	–
% change ^a	-6.4%	-6.7%	19.9%	5.3%	-34.8%	13.4%	44.9%
ρ^b	-1.000	-0.900	-0.900	-0.600	-0.300	–	–
<i>P</i>	<0.001	0.037	0.037	0.285	0.624	–	–

^a Percent change from 2016 to 2017 except spring turkey percent change is from 2017 to 2018.