

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

PROJECT CODE NO.: 06610

TITLE: Furbearer Research/Management

JOB CODE NO: 61001

TITLE: Furbearer Population and Harvest Monitoring

PERIOD COVERED: 1 July 2015 to 30 June 2016

WORK LOCATION(S): Statewide

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DATE: 31 August 2016

ABSTRACT Annual Furtaker Survey and Wildlife Conservation Officer (WCO) Furbearer Questionnaire information has been used to determine trends in the number of furtakers and furbearer harvests since 1990 and monitor furbearer population relative abundance, distribution, nuisance levels, and harvest characteristics since 1995. Furtaker license sales increased steadily since 1999. During the 2015-2016 harvest season, 44,506 furtaker licenses were sold, a slight decrease from last year. The estimated statewide furtaker harvest decreased for all furbearers except red foxes and coyotes. Three-year average harvests of raccoons, mink, and muskrats decreased by about 10%. Average pelt values decreased for all furbearer species except fishers. Decreases in 3-year average pelt prices were -35% for mink, -32% for muskrats, -32% for red foxes, -31% for raccoons, -28% for gray foxes, -22% for beavers, -16% for opossums, -15% for bobcats, and -8% for coyotes. Bobcat populations continue to be well established with reported increasing or stable bobcat populations in 75% of WCO districts. Although fisher sighting counts continued to increase slightly, we observed no significant change in fisher status or distribution. Numbers of incidental fisher captures increased in the northcentral, southcentral, and northeast regions, but decreased elsewhere. Otter populations remained stable statewide. River otters occupied 90% of WCO districts this year. Coyote complaints increased from previous years. WCOs in 90 districts (66%) reported coyote complaints. Complaints related to concerns for human safety were most common, comprising 60% of all coyote complaints. Losses of poultry, sheep, and calves to coyote depredation were stable. The beaver population status remained relatively unchanged and secure in most areas, with 86% of WCO districts reporting increasing or stable populations. Beaver damage and nuisance complaints increased by 30% statewide, possibly due to poor water trapping conditions and reduced harvest during the two previous years. Nuisance raccoon, skunk, and fox complaints remained most common among WCOs during 2015. Porcupines were absent from 23% of WCO districts, located mainly in southwestern and southeastern Pennsylvania. Nuisance porcupine complaints remained unchanged from previous years.

OBJECTIVES

1. Determine trends in the annual harvest of furbearing animals and numbers of trappers.
2. Monitor changes in furbearer population distribution and abundance.

METHODS

Fur Harvest

The annual fur harvest was estimated from the Furtaker Survey conducted each April. Due to budget constraints, this survey was not conducted during 2004, but has been implemented in subsequent years. Harvest estimates were presented by species and Wildlife Management Unit (WMU). Combination license holders have been extended furtaker privileges since 1999, but harvest totals for each species did not include them during 1999-2010, representing a sampling bias (Boyd and Weaver 2010). Beginning with the 2011-12 season, junior combination license holders were included in calculating harvest totals. The fur harvest success of both junior and senior combination license holders were included in harvest estimates beginning in 2012 (Johnson 2015).

Average pelt prices of furbearers sold at the Pennsylvania Trappers Association's District fur sales were obtained to monitor trends in pelt value. Pelt values were averaged each year among several districts reporting fur sale results. An estimated minimum 5% of all furbearers harvested in Pennsylvania were sold at these fur sales. Pelt value trends since 1986 were assessed for each furbearer species.

During 1990-2003, the reported estimates of coyote harvest included only those animals recorded by furtakers and did not account for the incidental harvest recorded in the Game Take Survey. Starting in 2005, coyote harvests were combined and represent total take by all hunters and trappers.

To provide all-inclusive furbearer harvest results, harvest totals were included for bobcat, fisher, and river otters. The Furtaker survey does not provide harvest information for these species. Analysis of the bobcat and river otter harvests occurs in annual project reports with job codes 63005 and 70001, respectively.

Wildlife Conservation Officer Furbearer Questionnaire

Questionnaires were electronically mailed annually to all Wildlife Conservation Officers (WCOs) to collect a variety of furbearer information. Accidental captures and sightings of otter and fisher and numbers and types of coyote damage complaints during the previous calendar year were reported by WCOs via this survey. Numbers of beaver complaints received and assessments of beaver, otter, fisher, bobcat, and porcupine populations were also queried. In an effort to monitor the frequency of nuisance complaints of other furbearers, WCOs were asked to record numbers of bobcat, fisher, fox, weasel, river otter, mink, muskrat, raccoon, opossum, and skunk complaints. The 2015-2016 WCO Furbearer Questionnaire (Fig. 1) was distributed electronically on 27 May 2016. Survey data were scheduled for return from the Regional Wildlife Management Supervisors

on 22 June 2016.

Porcupine status and distribution was assessed using the WCO Furbearer Questionnaire. Interest in monitoring porcupine populations stemmed from the 2011 regulation change allowing limited take of this species. Pre- and post-harvest population assessments were valuable in harvest management. Porcupine mortality along highways was measured by asking WCOs to categorize highway accident and shooting frequency within their districts.

Vehicle-caused mortalities and incidental trapping mortalities for bobcat, otter, and fisher were recorded annually by WCOs using standardized kill report forms. Mandatory WCO reporting of these mortalities was a year-round activity. Much of this mortality information is also captured in the annual WCO furbearer survey.

RESULTS

Fur Harvest

In 1985, a furtaker license was created with sales of an estimated 64,000 licenses. Furtaker license sales decreased during the late 1980s, fluctuated between 17,591 and 27,413 during 1990-2005, and steadily increased after 2005 (Table 1). Starting in 1999, combination license holders were extended furtaking privileges, which resulted in initial reduced furtaker license sales. Since 1999, the number of furtaker licenses sold increased steadily ($r = 0.977$, $P < 0.01$) (Table 1). During the 2015-2016 harvest season, 44,534 furtaker licenses were sold. Junior and senior combination license holders numbered 121,767. Variable local pelt values and international changes in fur demand continue to affect the number of furtakers in Pennsylvania.

The estimated statewide furtaker harvest decreased for all furbearers except red foxes and coyotes (Table 2). Three-year average harvests of raccoons, mink, and muskrats decreased by about 10% (Table 2). Species harvest totals by WMU were provided for regional comparison of relative species abundance and harvest intensity (Table 3).

During December 2010, the Pennsylvania Game Commission implemented its first regulated fisher trapping season. This first season was limited to 4 WMUs, 2C, 2D, 2E, and 2F. Furtakers were required to purchase a fisher permit prior to participating in the season and to report their harvest within 48 hours of trapping a fisher. Areas where fisher trapping was allowed expanded with the addition of WMUs 2G and 4D in 2012, WMUs 2H, 3A, 3D, and 4E in 2013, and WMUs 1B, 3B, and 3C. During the 2015 season, 6,564 fisher permits were purchased. Harvest reports for 401 fishers were received among all WMUs open to fisher trapping (Table 3).

Historic low pelt values occurred during the 1989 and 1990 trapping seasons. Fur prices during the 1990s were relatively stable with the lowest values observed during the 1998-1999 season. The demand and prices paid for furs recently decreased sharply for nearly all furbearer species. Average pelt values decreased for all furbearer species during 2015-2016 except fishers (Table 4). Decreases in 3-year average pelt prices were -35% for mink, -32% for muskrats, -32% for red foxes, -31% for raccoons, -28% for gray foxes, -22% for beavers, -16% for opossums, -15% for bobcats, and -8% for coyotes. Fisher and skunk pelt prices increased very slightly with

0.5% and 0.8% increases in 3-year averages, respectively. Reduced pelt prices undoubtedly affected trapper and fur hunter effort, resulting in lower harvest of nearly all furbearers.

Population Monitoring

Bobcats.--We observed little overall change in the statewide status of bobcat populations this year. The number of incidental bobcat captures, as estimated from the annual Furtaker Survey, has been steadily increasing since 1990. Greater than 500 incidental captures have been reported annually since 1995. The 3-year moving average of incidental captures was 1,725, increasing slightly during 1990-2015 ($r = 0.83$, $P < 0.05$) (Table 5). The number of incidental bobcat captures during 2015 decreased from the previous year.

Based on results from the WCO furbearer questionnaire, bobcat populations continue to be well established. WCOs reported increasing or stable bobcat populations in 75% of districts (Fig. 2). Bobcats were absent in 20% of WCO districts in 1995, but were absent in 11% of districts during 2015. Bobcats continue to slowly expand their range in the southeast region. A possible downward trend in bobcat status was reported in the northwest region.

Fishers.--No significant change in fisher status and distribution were observed during the past year. The number of incidental fisher captures reported on the furtakers survey has been increasing steadily during the past decade (Table 6). We estimate that 1,412 fishers were captured and released by Pennsylvania trappers during the 2015-2016 season. The annual number of fisher observations and incidental captures reported to WCOs maintained its trend upward since fishers were reintroduced in 1996 (Table 7). WCOs received 109 reports of fishers that were captured and released by licensed trappers and 1,070 reports of fisher observations. Numbers of accidental captures increased in the northcentral, southcentral, and northeast regions, but decreased elsewhere. Over the past 12 years, 87% of WCOs surveyed reported fisher populations existing within their districts, as compared to only 65% in 2004 (Fig. 3).

River Otters.--River otter populations continue to slowly expand throughout Pennsylvania. Numbers of incidental otter captures, primarily by beaver trappers, remained stable at 40-61 incidental captures during the past 10 years (Table 7). The majority of these captures occurred in the northeast region. This year, the number of accidentally-trapped otters tripled in the Northeast Region, due partially to trapper focus on this area during and after the regulated season. Favorable water trapping conditions may have also contributed to increased captures. Sustained otter populations continue to exist throughout the Susquehanna River drainage. Based on results of the 1995 WCO furbearer questionnaire, otters occurred in 49% of WCO districts. In 2015, otters occupied 90% of WCO districts (Fig. 4).

Since 2000, the annual hunting and trapping digest has provided trappers with additional information regarding the avoidance of otter while trapping beavers. Reports from WCOs indicate that trappers in high-density otter areas were using these techniques to avoid otter captures.

Coyotes.--Reports of coyote-caused damage to livestock and domestic pets have shown a slow, upward trend since 1993. Numbers of coyote complaints during 2015 increased from previous years. WCOs in 90 districts (66%) reported complaints during the most recent survey period. Complaints related to concerns for human safety were most common, comprising 60% of

all complaints. In addition to concern for human safety, the public also expressed concern for safety of pets, livestock, and wildlife. Losses of poultry, sheep, and calves were stable (Table 8). Poultry and domestic waterfowl depredation remains the most common livestock loss from coyotes.

Beavers.--The overall status of beaver populations remained relatively unchanged in most areas, with 86% of WCO districts reporting increasing or stable populations in 2015 (Fig. 5). WCOs observed decreases in established populations within 3% of districts. Poorly-established populations comprised 10% of WCO districts during 2014. One WCO from the southeast reported beavers absent from this district. On a statewide basis, little change occurred to beaver populations from 2007 to 2015 (Fig. 5).

This year, beaver damage and nuisance complaints increased by 30% statewide, possibly due to poor water trapping conditions and reduced harvest during the 2 previous years. Since 1996 when beaver complaints peaked at 1,140, reports of problem beavers gradually decreased. WCOs received 714 beaver complaints during 2015-2016. WCO districts in the northwest and northeast regions continue to experience relatively high beaver complaint totals (Fig. 6). Greatest increases in complaints occurred in the southwest (92%), northcentral (61%), northeast (31%), and northwest (15%) regions. As the human population grows and beaver populations expand into more urban areas, the public may be less tolerant of beaver activity. Dispatched and relocated beaver numbers increased in the northwest (69%) and northcentral (15%).

Other furbearers.--Statewide nuisance furbearer complaints, excluding coyotes and beavers, did not change significantly for any furbearer species. Raccoon, skunk, and fox complaints were most common during 2015 (Table 9). We will continue to monitor nuisance complaint levels of these furbearers in subsequent years.

Porcupines.--WCO survey responses established baseline information on porcupine population status and distribution. In 2015, porcupines remained absent from 23% of WCO districts, located mainly in southwestern and southeastern Pennsylvania (Fig. 7). We will closely monitor statewide porcupine population changes as regulated harvest methods are proposed and implemented.

Officers responded to 71 nuisance porcupine complaints, which was relatively unchanged from previous years. No porcupines or less than 1 per month were found dead along highways in 48% of WCO districts (Fig. 8). Some officers (20%) reported seeing 1 or more dead porcupines per week.

RECOMMENDATIONS

1. The fur harvest should continue to be reported by species and WMU to monitor area-specific harvest trends.
2. Pelt price information should be collected annually to monitor trends in fur value relative to regional harvest trends.

3. Current methods for monitoring changes in density and distribution of bobcat, otter, and fisher should be continued to detect population trend changes.

4. The PGC should continue educational efforts concerning techniques for avoiding otter captures.

5. Increased numbers of coyote-related complaints should be addressed through educational programs in rural and suburban communities.

6. Muskrat age ratio and reproductive information should be collected every 5 years to monitor fecundity and recruitment unless noticeable changes in population numbers occur. The next year of sampling should be 2017.

LITERATURE CITED

Boyd, R. C., and M. Weaver. 2010. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission. Harrisburg, USA.

Johnson, J. B. 2015. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission. Harrisburg, USA.

Table 1. Number of furtaker and combination (combined hunting and trapping) licenses sold in Pennsylvania.

Year	Furtaker licenses sold	Combination licenses sold
1985	64,000	
1986	44,087	
1987	42,000	
1988	36,000	
1989	29,000	
1990	20,377	
1991	20,251	
1992	20,345	
1993	19,458	
1994	22,376	
1995	21,376	
1996	25,636	
1997	27,413	
1998	25,877	
1999	17,591 ^a	
2000	18,551 ^a	
2001	19,410 ^a	
2002	20,676 ^a	
2003	22,454 ^a	
2004	24,094 ^a	
2005	23,941 ^a	
2006	26,589 ^a	
2007	28,033 ^a	
2008	29,717 ^a	
2009	31,122 ^a	
2010	35,279 ^a	
2011	36,192 ^a	
2012	39,913	104,883
2013	44,591	112,875
2014	45,069	118,434
2015	44,534	121,767

^a Combination license holders were extended furtaker privileges since 1999, but the number who pursue furbearers was not determined until the 2012 season. Therefore, prior to 2012, the number of licenses sold misrepresented to an unknown degree the number of furtakers in Pennsylvania.

Table 2. Annual harvest and percent change (% Δ) of 3-year moving average by species in Pennsylvania since 1990.

Year ^a	Raccoon	% Δ	Red Fox	% Δ	Gray Fox	% Δ	Coyote (furtakers ^b)	% Δ	Coyote (total ^c)	% Δ	Skunk	% Δ	Opossum	% Δ	Weasel	% Δ
1990-91	116,443		32,699		21,683		1,810				9,298		36,574		798	
1991-92	130,608		28,495		30,409		3,719				8,907		37,177		481	
1992-93	124,404		27,611		25,395		4,402				7,221		27,754		343	
1993-94	118,964	0.7	25,862	-7.7	23,839	2.8	6,161	43.8			7,920	-5.4	25,807	-10.6	526	-16.8
1994-95	186,551	15.0	30,649	2.6	33,387	3.7	6,240	17.7			12,620	15.4	29,621	-8.3	723	17.9
1995-96	120,462	-0.9	31,110	4.2	23,518	-2.3	6,662	13.4			9,995	10.0	29,688	2.3	687	21.6
1996-97	214,958	22.5	29,623	4.3	23,307	-0.7	7,959	9.4			11,571	12.0	48,549	26.7	589	3.3
1997-98	194,696	1.6	36,923	6.9	26,043	-9.2	6,685	2.1			12,344	-0.8	60,717	28.8	1,172	22.5
1998-99	195,110	14.1	47,202	16.5	32,922	12.9	11,652	23.4			11,190	3.5	56,287	19.1	662	-1.0
1999-00	107,407	-17.8	36,860	6.4	26,794	4.2	9,508	5.9			6,723	-13.8	33,723	-9.0	429	-6.6
2000-01	108,890	-17.3	33,060	-3.2	24,452	-1.9	10,383	13.3			7,534	-15.9	29,093	-21.0	340	-36.8
2001-02	121,810	-17.8	33,003	-12.1	23,275	-11.5	12,363	2.3			9,245	-7.6	27,192	-24.4	657	-0.3
2002-03	106,485	-0.3	33,007	-3.7	18,805	-10.7	11,444	6.0			7,207	2.1	34,787	1.2	406	-1.6
2003-04	104,781	-1.2	31,592	-1.5	15,956	-12.8	11,697	3.8			9,319	7.4	33,760	5.1	359	1.4
2005-06	106,082	-4.7	40,551	7.7	17,616	-9.8	9,670	-7.6	20,377		9,997	2.9	43,770	17.3	567	-6.3
2006-07	138,640	10.1	45,512	11.9	20,754	3.7	11,879	1.3	21,601		10,687	13.1	48,102	11.9	487	6.1
2007-08	121,466	4.8	52,000	17.3	18,613	4.9	13,360	5.0	28,974		9,818	1.7	41,168	5.9	440	5.7
2008-09	142,808	10.0	44,745	3.0	20,845	5.7	12,776	8.9	23,699	4.7	12,331	7.7	54,273	7.9	504	-4.2
2009-10	112,550	-6.5	37,418	-5.7	13,793	-11.6	13,438	4.1	30,386	11.8	8,314	-7.2	37,270	-7.5	468	-1.3
2010-11	125,423	1.1	54,661	2.0	15,691	-5.5	14,732	3.5	26,658	-2.8	8,935	-2.9	36,188	-3.8	436	-0.3
2011-12	174,858	8.4	68,214	17.2	19,380	-2.9	15,924	7.7	32,202	10.5	13,057	2.5	49,626	-3.6	652	10.5
2012-13	210,146	23.6	67,465	18.7	17,415	7.4	19,470	13.7	40,495	11.3	7,329	-3.3	78,024	33.1	604	8.7
2013-14	197,380	14.1	61,392	3.5	15,700	0.0	16,256	3.0	40,956	14.4	7,733	-4.1	57,138	12.8	110	-19.3
2014-15	203,311	4.9	55,659	-6.4	21,765	4.5	21,149	10.1	31,675	-0.5	13,969	3.2	59,643	5.4	372	-20.5
2015-16	149,098	-10.0	65,158	-1.3	16,609	-1.5	25,344	10.3	38,611	-1.7	6,920	-1.4	36,218	-21.5	216	-35.7

Table 2. cont.

Year ^a	Bobcat ^e	% Δ	Fisher ^e	% Δ	Muskrat	% Δ	Mink	% Δ	Beaver ^c	% Δ	Otter ^c	% Δ
1990-91					112,358		7,053		3,431			
1991-92					156,014		10,355		4,107			
1992-93					135,533		9,157		4,506			
1993-94					121,657	2.3	7,808	2.8	3,606	1.5		
1994-95					178,145	5.4	10,208	-0.5	9,360	43.0		
1995-96					130,442	-1.2	8,602	-2.0	6,454	11.1		
1996-97					146,013	5.7	9,315	5.7	9,789	31.8		
1997-98					216,066	8.3	14,063	13.7	12,628	12.8		
1998-99					148,205	3.6	12,238	11.4	8,727	7.9		
1999-00					94,215	-10.2	13,774	12.5	8,377	-4.5		
2000-01	58				79,880	-29.7	8,614	-13.6	8,408	-14.2		
2001-02	146				121,994	-8.1	13,214	2.8	10,934	8.7		
2002-03	135				75,340	-6.4	10,069	-10.4	4,538	-13.8		
2003-04	140	24.2			71,368	-3.1	6,494	-6.6	7,874	-2.2		
2004-05	196	11.9			-		-		-			
2005-06	221	18.3			70,995	-19.0	9,335	-13.0	14,283	14.3		
2006-07	258	21.2			121,167	21.1	12,680	10.1	14,210	36.2		
2007-08	356	23.7			121,446	19.0	10,004	12.3	11,542	10.1		
2008-09	487	31.9			74,059	1.0	8,632	-2.2	9,942	-10.8		
2009-10	506	22.5			63,988	-18.1	7,261	-17.3	9,704	-12.6		
2010-11	1,137	57.9	152		58,296	-24.3	8,204	-7.0	9,254	-7.3		
2011-12	969	22.6	126		89,274	7.7	11,855	13.4	18,212	28.6		
2012-13	1,056	21.1	228		93,153	13.8	12,454	19.0	9,712	0.0		
2013-14	1,164	0.9	341	37.4	83,880	10.6	7,856	-1.1	15,134	15.8		
2014-15	1,132	5.1	443	45.6	115,742	9.9	14,532	8.3	17,607	-1.4		
2015-16	1,034	-0.7	401	17.1	66,397	-9.1	8,530	-11.3	16,920	17.0	46	

^a Furtaker survey was not conducted during the 2004-2005 season.^a Furtaker survey was not conducted during the 2004-2005 season.^b Coyote harvest by furtaker license holders only, estimated from the Furtaker Survey.^c Total coyote harvest by hunters and trappers estimated from the Furtaker Survey and the Game Take Survey.^d Beaver harvest was based on mandatory pelt tagging totals until 2004. Harvest was estimated from furtaker surveys beginning with the 2005-2006 season.^e Bobcat, fisher, and river otter harvests were based on mandatory reporting totals.

Table 3. Estimated harvests of furbearers by WMU during the 2015-2016 hunting and trapping seasons.

WMU	Raccoon	Red Fox	Gray Fox	Coyote	Skunk	Opossum	Weasel
1A	10,073	884	41	2,952	45	753	0
1B	13,177	1,351	136	2,147	90	1,322	24
2A	15,153	851	190	2,869	179	2,678	12
2B	4,886	934	312	1,768	15	971	0
2C	10,708	3,403	1,738	3,820	448	3,582	36
2D	8,891	1,284	1,249	885	149	2,293	60
2E	4,463	684	177	707	164	669	0
2F	4,551	884	272	3,538	90	569	12
2G	5,098	1,218	1,793	1,535	583	2,310	0
2H	1,429	167	149	547	45	117	0
3A	3,422	1,234	991	1,397	389	1,339	0
3B	5,486	1,702	1,589	2,065	269	1,841	0
3C	4,939	3,036	1,317	3,519	433	1,289	12
3D	3,211	1,435	421	1,845	239	2,075	0
4A	5,768	984	1,182	903	344	3,247	0
4B	5,557	2,569	883	723	389	1,741	0
4C	5,486	3,220	380	1,715	344	1,272	0
4D	4,093	1,301	1,765	1,246	643	1,975	36
4E	5,486	2,369	761	1,393	643	1,506	12
5A	7,074	6,906	489	775	463	1,523	0
5B	7,480	12,845	109	332	448	1,473	0
5C	6,068	13,278	54	436	224	502	0
5D	1,782	1,234	0	47	0	50	0
Unknown	4,817	1,385	611	1,447	284	1,121	12
Total	149,098	65,158	16,609	38,611	6,920	36,218	216

Table 3. cont.

WMU	Fisher	Muskrat	Mink	Beaver	Otter
1A		7,128	350	2,136	
1B	78	14,376	1,076	5,240	
2A		4,654	875	400	
2B		398	0	267	
2C	43	2,266	471	484	
2D	58	3,149	713	451	
2E	22	1,868	54	484	
2F	46	1,142	188	1,218	
2G	20	1,488	404	451	
2H	8	242	54	184	
3A	10	2,474	457	784	
3B	14	1,401	283	234	
3C	12	796	67	2,253	15
3D	30	675	108	567	31
4A		69	0	133	
4B		3,218	834	250	
4C		398	188	100	
4D	31	1,747	175	167	
4E	29	1,522	309	284	
5A		8,200	794	133	
5B		7,041	579	50	
5C		381	242	267	
5D		329	54	117	
Unknown		1,435	255	266	
Total	401	66,397	8,530	16,920	46

^e Fisher and river otter harvests were based on mandatory reporting totals.

Table 4. Average pelt prices paid and percent change (% Δ) of 3-year moving averages for furbearer species in Pennsylvania.

Trapping season	Average pelt price (\$) ^a											
	Raccoon	% Δ	Red Fox	% Δ	Gray Fox	% Δ	Coyote	% Δ	Skunk	% Δ	Opossum	% Δ
1986-87	19.89		29.15		33.76		31.57		1.00		3.05	
1987-88	9.78		17.20		31.93		13.50				1.99	
1988-89	5.29		15.97		11.58		19.00				1.28	
1989-90	3.40	-47.2	9.30	-31.9	8.79	-32.3	11.60	-31.2	1.92		1.11	-30.7
1990-91	3.35	-34.8	8.83	-19.7	8.43	-44.9	10.01	-7.9	1.00		0.96	-23.5
1991-92	7.12	15.2	13.55	-7.1	12.78	4.2	18.37	-1.6	2.25		2.17	26.6
1992-93	6.77	24.3	12.96	11.6	11.32	8.4	25.40	34.5			1.71	14.2
1993-94	8.54	30.1	15.44	18.7	11.02	8.0	24.15	26.3	2.66		1.88	19.0
1994-95	9.15	9.1	18.73	12.3	11.47	-3.7	24.70	9.3	2.21		1.51	-11.5
1995-96	10.27	14.3	16.30	7.1	9.40	-5.7	13.36	-16.2	3.00		1.74	0.6
1996-97	15.34	24.3	18.05	5.2	11.94	2.9	20.68	-5.6	3.92		1.83	-1.0
1997-98	12.07	8.4	13.18	-10.5	9.65	-5.5	9.72	-25.5			1.41	-2.0
1998-99	6.87	-9.0	9.73	-13.8	4.84	-14.7	6.40	-15.9			0.49	-25.1
1999-00	4.94	-30.3	10.72	-17.9	6.19	-21.8	15.43	-14.3			1.47	-9.7
2000-01	7.42	-19.5	16.58	10.1	8.61	-5.0	16.07	20.1			2.47	31.5
2001-02	8.34	7.6	20.14	28.1	10.05	26.5	17.16	28.4			1.54	23.7
2002-03	9.39	21.5	22.84	25.5	12.81	26.6	22.57	14.7			2.12	11.9
2003-04	10.15	10.9	19.92	5.6	18.74	32.2	25.29	16.5			2.03	-7.2
2005-06	10.11	6.3	16.48	-5.8	18.04	19.2	9.37	-12.0	3.14		2.51	17.0
2006-07	17.50	27.4	20.36	-4.2	26.54	27.7	24.50	3.4	4.50		5.05	44.0
2007-08	12.88	7.2	20.84	1.6	43.84	39.6	20.02	-8.9	4.04		2.45	4.4
2008-09	9.79	-0.8	11.58	-8.5	25.11	8.0	12.37	5.6	4.42	11.0	3.45	9.4
2009-10	11.58	-14.7	10.48	-18.7	20.76	-6.1	17.27	-12.7	4.62	0.9	2.62	-22.2
2010-11	12.38	-1.5	14.63	-14.5	19.59	-27.0	18.40	-3.3	3.62	-3.2	1.99	-5.4
2011-12	12.81	8.9	23.48	32.4	23.87	-1.9	15.52	6.6	3.30	-8.8	2.26	-14.8
2012-13	15.14	9.7	41.34	63.5	29.65	13.8	20.62	6.5	3.05	-13.6	3.23	8.9
2013-14	14.67	5.7	38.07	29.5	25.98	8.7	23.15	8.7	3.36	-2.7	4.09	28.0
2014-15	7.83	-11.7	20.80	-2.6	14.46	-11.8	18.82	5.6	4.28	10.1	2.08	-1.9
2015-16	3.61	-30.6	9.28	-32.0	10.24	-27.7	15.62	-8.0	3.14	0.8	1.69	-16.4

Table 4. cont.

Trapping season	Average pelt price (\$) ^a										Otter	% Δ
	Bobcat	% Δ	Fisher	% Δ	Muskrat	% Δ	Mink	% Δ	Beaver	% Δ		
1986-87					4.84		24.19		33.00			
1987-88					5.36		31.11		22.60			
1988-89					2.91		29.45		20.22			
1989-90					1.42	-26.1	22.29	-2.2	17.77	-20.1		
1990-91					1.61	-38.7	19.06	-14.5	9.71	-21.3		
1991-92					2.95	0.7	26.23	-4.5	13.14	-14.8		
1992-93					2.25	13.9	19.95	-3.5	10.63	-17.6		
1993-94					2.88	18.6	18.35	-1.1	19.03	27.8		
1994-95					3.09	1.7	14.08	-18.8	19.94	15.9		
1995-96					3.15	10.9	11.88	-15.4	19.65	18.2		
1996-97					6.03	34.5	19.06	1.6	29.37	17.6		
1997-98					3.44	2.9	11.66	-5.4	21.73	2.6		
1998-99					1.87	-10.1	9.48	-5.6	15.29	-6.2		
1999-00					3.16	-25.3	9.75	-23.2	16.08	-20.0		
2000-01					3.40	-0.5	9.64	-6.5	20.00	-3.3		
2001-02					3.85	23.5	8.47	-3.5	15.86	1.1		
2002-03					3.81	6.2	9.69	-0.2	14.33	-3.4		
2003-04					3.33	-0.6	10.50	3.1	15.84	-8.3		
2005-06					2.89	-8.7	12.84	15.2	16.11	0.5		
2006-07					6.10	22.8	17.42	23.4	17.18	6.2		
2007-08					3.20	-1.1	12.88	5.8	22.14	12.8		
2008-09	26.36				3.96	8.8	10.06	-6.4	18.05	3.5		
2009-10	43.50				7.35	9.4	11.02	-15.9	18.29	1.9		
2010-11	36.83		41.60		6.92	25.6	13.95	3.2	14.90	-12.4		
2011-12	46.52	18.9	36.42		11.00	38.6	19.48	26.9	21.36	6.5		
2012-13	76.12	25.7	52.15		13.38	23.9	24.86	31.1	22.32	7.4	84.00	
2013-14	81.72	28.2	74.00	24.9	12.56	18.0	18.89	8.5	21.26	10.9	67.00	
2014-15	60.64	6.9	51.00	9.0	5.74	-14.2	10.71	-13.9	13.32	-12.4		
2015-16	43.09	-15.1	52.96	0.5	3.10	-32.4	5.60	-35.4	10.09	-21.5	22.00	

^a Average pelt prices paid at PA Trappers Association fur sales. Pelt price information was not collected during 2004-2005.

Table 5. Number of incidental bobcat captures estimated from the annual Furtaker Survey. This survey was not conducted during 2004-2005.

Trapping season	Survey respondents	Furtaker licenses sold^a	Bobcats^b captured and released	Extrapolated bobcat captures	3-year moving average^c (bobcat captures)
1990-1991	2,302	20,377	40	354	
1991-1992	2,361	20,215	24	205	
1992-1993	1,652	20,345	26	320	293
1993-1994	2,175	19,246	16	142	222
1994-1995	2,056	21,905	101	1,076	513
1995-1996	2,181	21,840	46	460	559
1996-1997	2,363	25,636	62	673	736
1997-1998	2,233	27,413	46	565	566
1998-1999	2,466	25,877	108	1,133	790
1999-2000	1,557	17,414	62	693	797
2000-2001	1,681	18,551	52	574	991
2001-2002	1,553	19,410	56	700	656
2002-2003	1,779	20,676	45	523	599
2003-2004	2,204	22,454	68	693	639
2005-2006	2,412	23,941	165	1,638	951
2006-2007	2,436	26,589	175	1,910	1,414
2007-2008	2,994	28,033	235	2,200	1,916
2008-2009	2,622	29,717	274	3,105	2,405
2009-2010	3,186	31,122	235	2,296	2,534
2010-2011	4,421	35,279	221	1,764	2,388
2011-2012	4,080	36,192	212	1,881	1,980
2012-2013	3,223	39,913	105	1,300	1,648
2013-2014	4,439	44,591	175	1,758	1,646
2014-2015	4,720	45,069	189	1,805	1,621
2015-2016	4,443	44,506	161	1,613	1,725

^a Excludes junior and senior combination license holders.

^b Does not include bobcats legally harvested by permit holders.

^c $r = 0.83$, $P < 0.05$

Table 6. Number of incidental fisher captures estimated from the annual Furtaker Survey. This survey was not conducted during 2004-2005.

Trapping season	Survey respondents	Furtaker licenses sold^a	Fishers^b captured and released	Extrapolated fisher captures	3-year moving average^c (fisher captures)
1999-2000	1,557	17,414	5	56	
2000-2001	1,681	18,551	1	11	
2001-2002	1,553	19,410	6	75	47
2002-2003	1,779	20,676	11	128	71
2003-2004	2,204	22,454	10	102	102
2005-2006	2,412	23,941	83	824	351
2006-2007	2,436	26,589	87	950	625
2007-2008	2,994	28,033	105	983	919
2008-2009	2,622	29,717	167	1,893	1,275
2009-2010	3,186	31,122	120	1,172	1,349
2010-2011	4,421	35,279	117	934	1,333
2011-2012	4,080	36,192	163	1,446	1,184
2012-2013	3,223	39,913	118	1,461	1,280
2013-2014	4,439	44,591	104	1,045	1,317
2014-2015	4,720	45,069	92	878	1,128
2015-2016	4,443	44,506	141	1,412	1,112

^a Excludes junior and senior combination license holders.

^b Does not include fishers legally harvested by permit holders.

^c $r = 0.86$, $P < 0.05$

Table 7. Reports of otter and fisher captures and fisher observations estimated from annual Wildlife Conservation Officer (WCO) questionnaires.

Survey Season	No. Districts Reporting	No. Incidental Otter Captures	No. Incidental Fisher Captures	No. Reported Fisher Observations
1995	123	15	-	-
1996	123	15	-	-
1997	123	31	10	60
1998	123	26	9	67
1999	127	30	6	94
2000	123	35	8	82
2001	137	25	6	105
2002	122	27	9	106
2003	133	26	20	206
2004	122	42	31	303
2005	123	50	49	341
2006	118	44	86	385
2007	133	57	132	481
2008	132	47	138	561
2009	125	36	106	615
2010	125	51	101	653
2011	131	59	130	837
2012	131	53	113	808
2013	132	45	94	999
2014	135	40	137	929
2015	136	61	109	1070

Table 8. Types and numbers of coyote-related complaints reported to Wildlife Conservation Officers (WCO).

	Survey year										
	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Proportion of WCO districts reporting coyote complaints (%)	66	64	44	54	62	50	59	61	58	58	66
Complaint nature/ species affected											
Cattle	18	24	9	12	12	11	13	13	17	16	11
Sheep	43	29	19	22	29	20	19	26	23	23	24
Goats	5	3	4	7	4	5	4	8	5	5	10
Poultry	24	11	19	16	14	21	24	25	20	35	34
Dogs	12	19	8	9	17	8	12	9	5	15	17
Cats	25	38	28	19	25	29	27	24	17	25	27
Afraid of Coyotes	263	199	155	171	219	193	258	229	221	249	337
Deer	73	36	61	74	39	53	53	65	37	50	63
Turkeys	31	12	12	21	17	14	23	18	15	17	29
Other	32	36	36	32	17	31	48	18	33	26	11
Total Complaints	526	407	351	383	393	385	481	435	393	461	563
Coyote-caused mortalities											
Cows	2	0	1	1	0	1	0	0	2	2	1
Calves	10	27	7	9	8	7	7	10	12	11	5
Sheep	30	47	28	47	57	25	22	49	41	44	24
Goats	0	2	3	4	3	4	5	6	5	3	7
Poultry	51	71	93	132	76	97	68	106	77	68	74
Dogs	3	3	1	2	1	1	7	3	0	4	6
Cats	16	33	15	34	19	18	53	28	25	23	19
Rabbits	8	12	2	8	16	6	7	5	7	22	4
Deer	13	10	8	10	7	6	8	6	11	18	13
Other	2	1	1	0	1	0	1	0	1	0	1
Total Depredation	135	206	159	247	188	165	178	213	181	195	154

Table 9. Frequency of furbearer complaints received by Wildlife Conservation Officers.

Species	2009	2010	2011	2012	2013	2014	2015
Bobcat	50	37	52	75	63	62	65
Fisher	23	14	32	52	44	36	52
Fox	235	219	261	301	257	267	312
Weasel	17	12	22	20	26	20	20
River Otter	7	10	19	10	18	11	15
Mink	27	10	24	13	21	26	24
Muskrat	73	126	68	73	61	58	43
Raccoon	763	960	820	942	837	761	705
Opossum	139	121	97	117	90	74	91
Skunk	488	510	426	471	326	272	338
Coyote	393	386	481	435	393	461	65
Beaver	506	521	567	454	488	549	52

2015-2016 Furbearer Questionnaire											
<p>All questions pertain to furbearer information within your district during May 2015 to April 2016. If you are new to this district or cannot answer these questions, please electronically submit this form anyway (leaving unknown answers blank) or forward it to the WCO who previously occupied or covered your district. Please do not answer "many" or "a lot" to questions asking "How many?" Give us your best estimates. Please note that these types of questions will be asked annually.</p>											
<p>Navigating: Click on the blue boxes to enter text or numbers. Click on the option circles (O) to select your response. To advance, click on the next entry field.</p>											
<p>District No. <input style="width: 100px;" type="text"/> <small>(enter district number without hyphens; hyphens will automatically be inserted)</small></p> <p>WCO Name <input style="width: 150px;" type="text"/></p>	<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 70%; padding: 5px;">WMU</th> <th style="width: 30%; padding: 5px;">Number of beaver complaints</th> </tr> </thead> <tbody> <tr><td style="height: 20px;"></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td></tr> <tr><td style="height: 20px;"></td><td></td></tr> </tbody> </table> <p>Beavers</p> <p>1. How many beaver complaints were serviced within each WMU in your district? →</p> <p>2. How many problem beavers did you trap and transfer to a new location? <input style="width: 60px;" type="text"/></p> <p>3. How many problem beavers did you dispatch/euthanize? <input style="width: 60px;" type="text"/></p> <p>4. How would you describe beaver populations in your district?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Beaver populations are present each year and are ...</i></p> <p>----- <i>or</i> -----</p> <p><i>Beaver populations are <u>not</u> present each year and are ...</i></p> </div> <div style="width: 50%; border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> increasing <input type="radio"/> decreasing <input type="radio"/> stable </div> <hr style="border: 0; border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> poorly established <input type="radio"/> absent </div> </div> </div> <p>River Otters</p> <p>5. How many river otters were accidentally caught by trappers within your district? <input style="width: 60px;" type="text"/></p> <p>6. How would you describe river otter populations in your district?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Otter populations are present each year and are ...</i></p> <p>----- <i>or</i> -----</p> <p><i>Otter populations are <u>not</u> present each year and are ...</i></p> </div> <div style="width: 50%; border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> increasing <input type="radio"/> decreasing <input type="radio"/> stable </div> <hr style="border: 0; border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> poorly established <input type="radio"/> absent </div> </div> </div> <p>Fishers</p> <p>7. How many reliable reports of fishers have you received in your district? <input style="width: 60px;" type="text"/></p> <p>8. How many fishers were accidentally caught by trappers in your district? <input style="width: 60px;" type="text"/></p> <p>9. How would you describe fisher populations in your district?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Fisher populations are present each year and are ...</i></p> <p>----- <i>or</i> -----</p> <p><i>Fisher populations are <u>not</u> present each year and are ...</i></p> </div> <div style="width: 50%; border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> increasing <input type="radio"/> decreasing <input type="radio"/> stable </div> <hr style="border: 0; border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> poorly established <input type="radio"/> absent </div> </div> </div> <p>Bobcats</p> <p>10. How would you describe bobcat populations in your district?</p> <div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><i>Bobcat populations are present each year and are ...</i></p> <p>----- <i>or</i> -----</p> <p><i>Bobcat populations are <u>not</u> present each year and are ...</i></p> </div> <div style="width: 50%; border: 1px solid black; padding: 5px;"> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> increasing <input type="radio"/> decreasing <input type="radio"/> stable </div> <hr style="border: 0; border-top: 1px dashed black;"/> <div style="display: flex; justify-content: space-around;"> <input type="radio"/> poorly established <input type="radio"/> absent </div> </div> </div>	WMU	Number of beaver complaints								
WMU	Number of beaver complaints										

Figure 1. Wildlife Conservation Officer Furbearer Questionnaire used for the 2015-16 survey period (page 1).

Coyotes

11. Did you receive any coyote-related complaints during this period?

☐ Yes ☐ No

If you received coyote complaints, please record the type and number of complaints and animals killed.

Omit any complaints that the Bureau of Dog Law Enforcement (PA Dept of Agriculture) serviced.

Number of Coyote **Complaints**:

<input type="text"/>	Cattle
<input type="text"/>	Sheep
<input type="text"/>	Goats
<input type="text"/>	Poultry/Waterfowl
<input type="text"/>	Attacked Dogs
<input type="text"/>	Attacked Cats
<input type="text"/>	Afraid of Coyotes
<input type="text"/>	Chased/Attacked Deer
<input type="text"/>	Chased/Attacked Wild Turkey
<input type="text"/>	Other ... <input type="text"/>

Number of **Animals Killed** by Coyotes:

<input type="text"/>	Cows
<input type="text"/>	Calves
<input type="text"/>	Sheep/Lambs
<input type="text"/>	Goats
<input type="text"/>	Poultry/Waterfowl
<input type="text"/>	Dogs
<input type="text"/>	Cats
<input type="text"/>	Rabbits
<input type="text"/>	Deer
<input type="text"/>	Other ... <input type="text"/>

Nuisance Complaints

12. If you received nuisance complaints concerning other furbearer species, how many occurred in your district?

<input type="text"/>	Bobcat
<input type="text"/>	Fisher
<input type="text"/>	Fox
<input type="text"/>	Weasel
<input type="text"/>	River Otter
<input type="text"/>	Mink
<input type="text"/>	Muskrat
<input type="text"/>	Raccoon
<input type="text"/>	Opossum
<input type="text"/>	Skunk
<input type="text"/>	Other ... <input type="text"/>

Other Mammals - Porcupines13. How many porcupine complaints did you receive in your district during the past year? 14. Excluding the winter months, approximately how many dead porcupines did you see on average along roadways within your district?
(unique/individual porcupines, not counted more than once)

- ☐ none
☐ less than one each month
☐ 1-3 each month
☐ 1-6 each week
☐ one or more each day

15. How would you describe porcupine populations in your district?

Porcupine populations are present each year and are ...

☐ increasing ☐ decreasing ☐ stable

----- or -----

Porcupine populations are not present each year and are ...☐ poorly established ☐ absent

16. Are you aware of anyone residing in your district who uses or buys porcupine ...

(check appropriate boxes for a "yes" response)

☐ quills
☐ claws
☐ teeth/skull
☐ meat
☐ other parts

Thank you for your cooperation and assistance!

Please return this questionnaire to your regional wildlife management supervisor
and other appropriate supervisors as an email attachment.

Figure 1 (cont.).

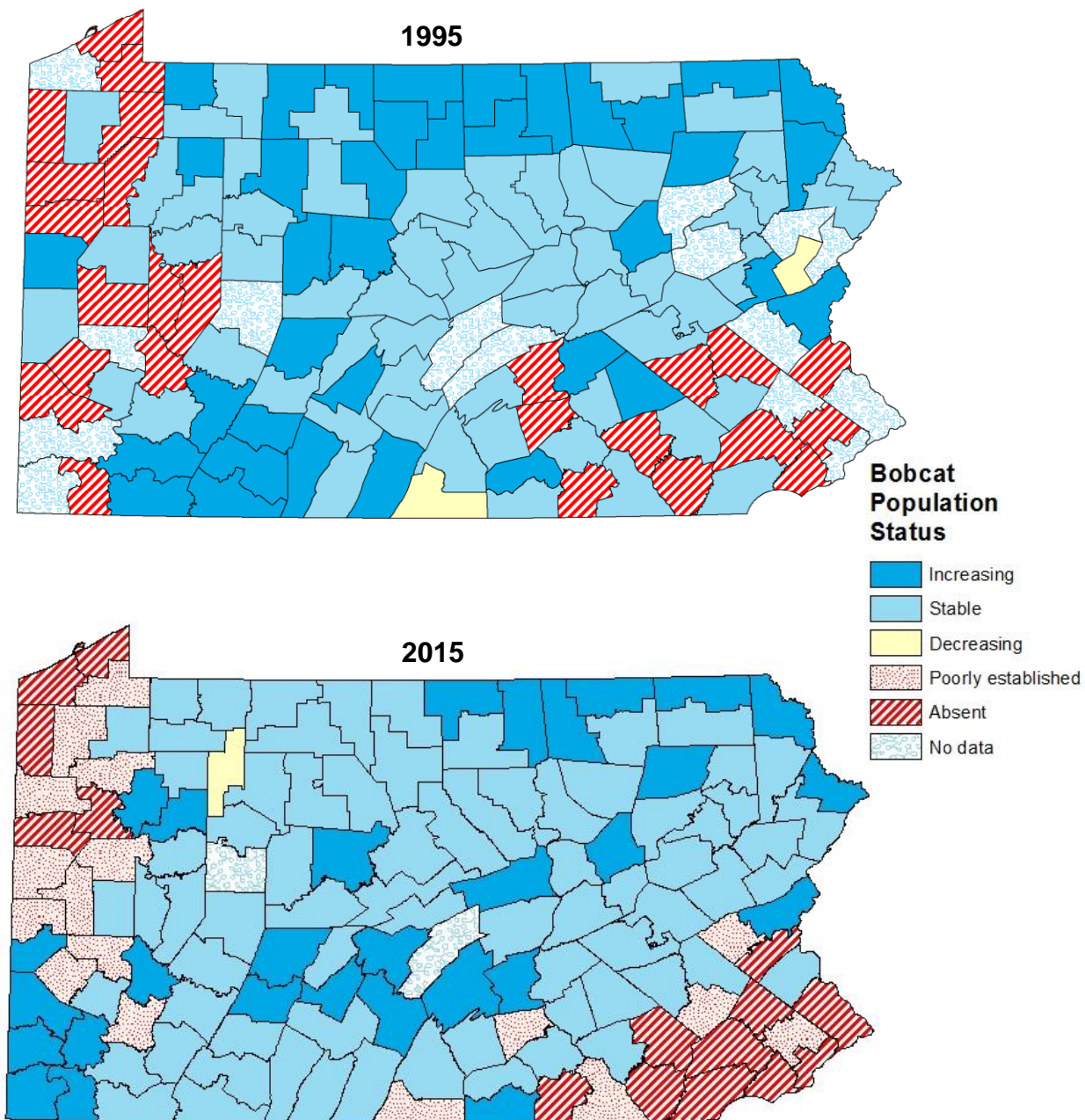


Figure 2. Bobcat population status and distribution based on Wildlife Conservation Officer observations during 1995 and 2015.

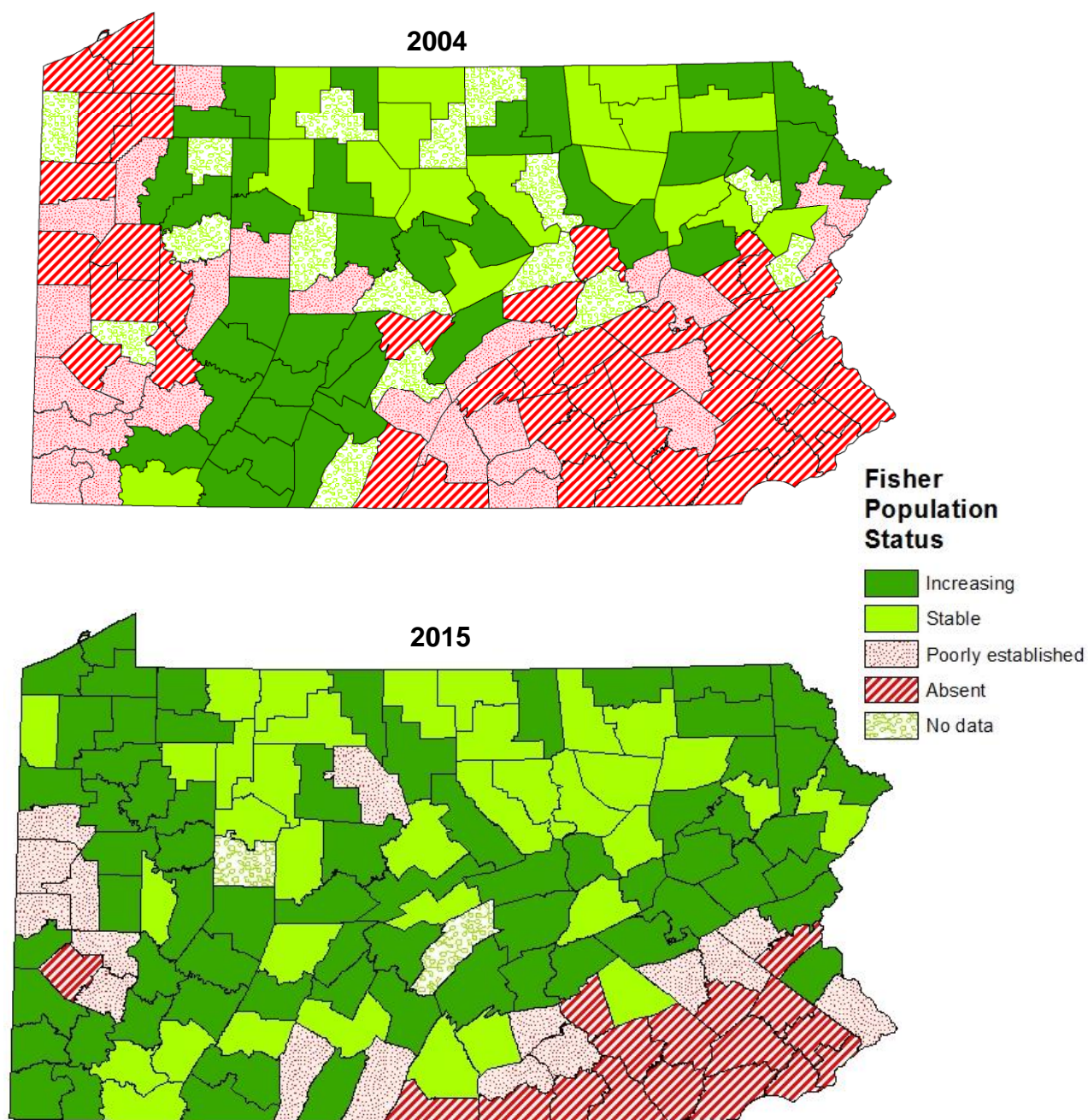


Figure 3. Fisher population status based on Wildlife Conservation Officer observations during 2004 and 2015.

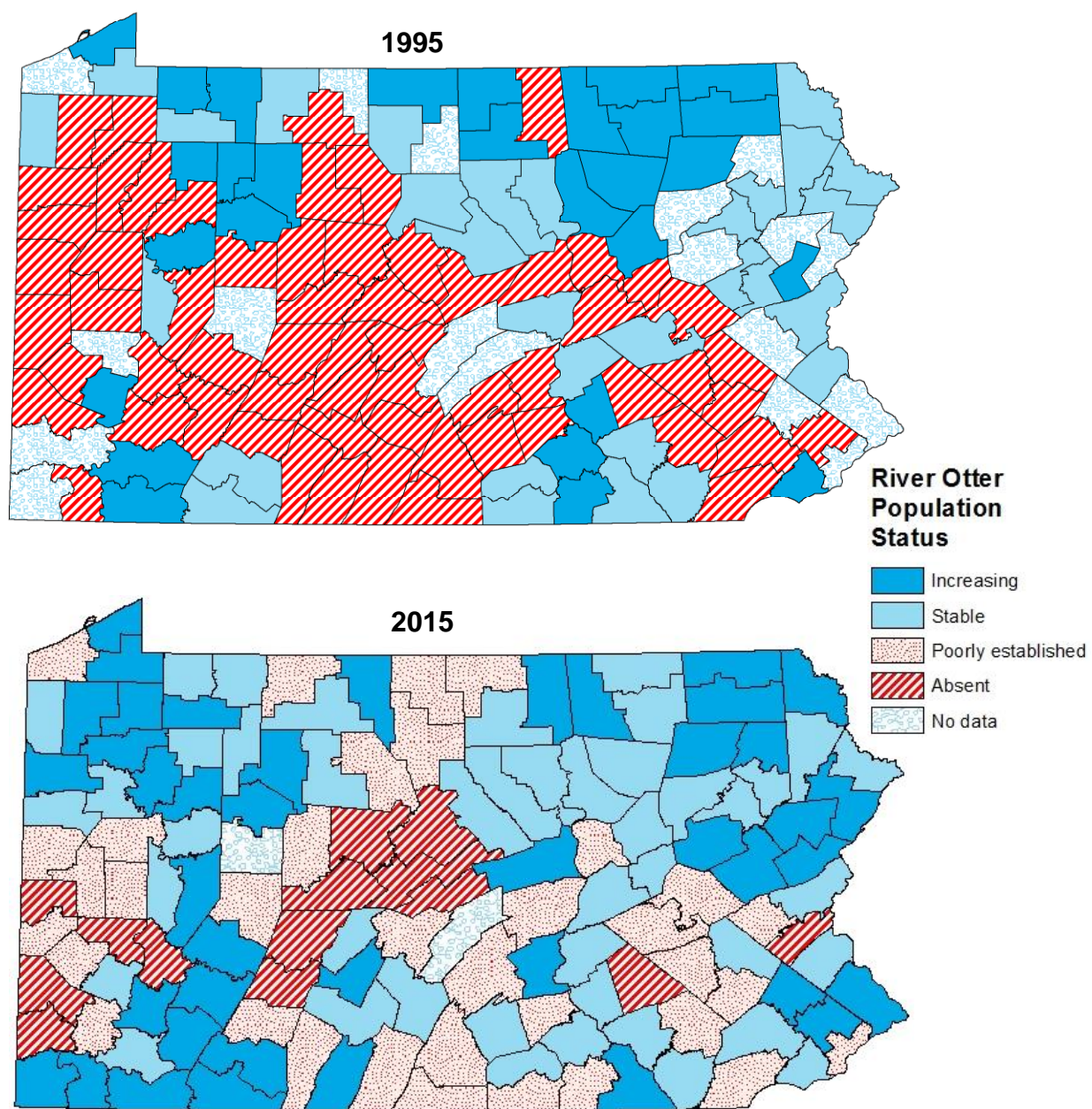


Figure 4. River otter population status based on Wildlife Conservation Officer observations during 1995 and 2015.

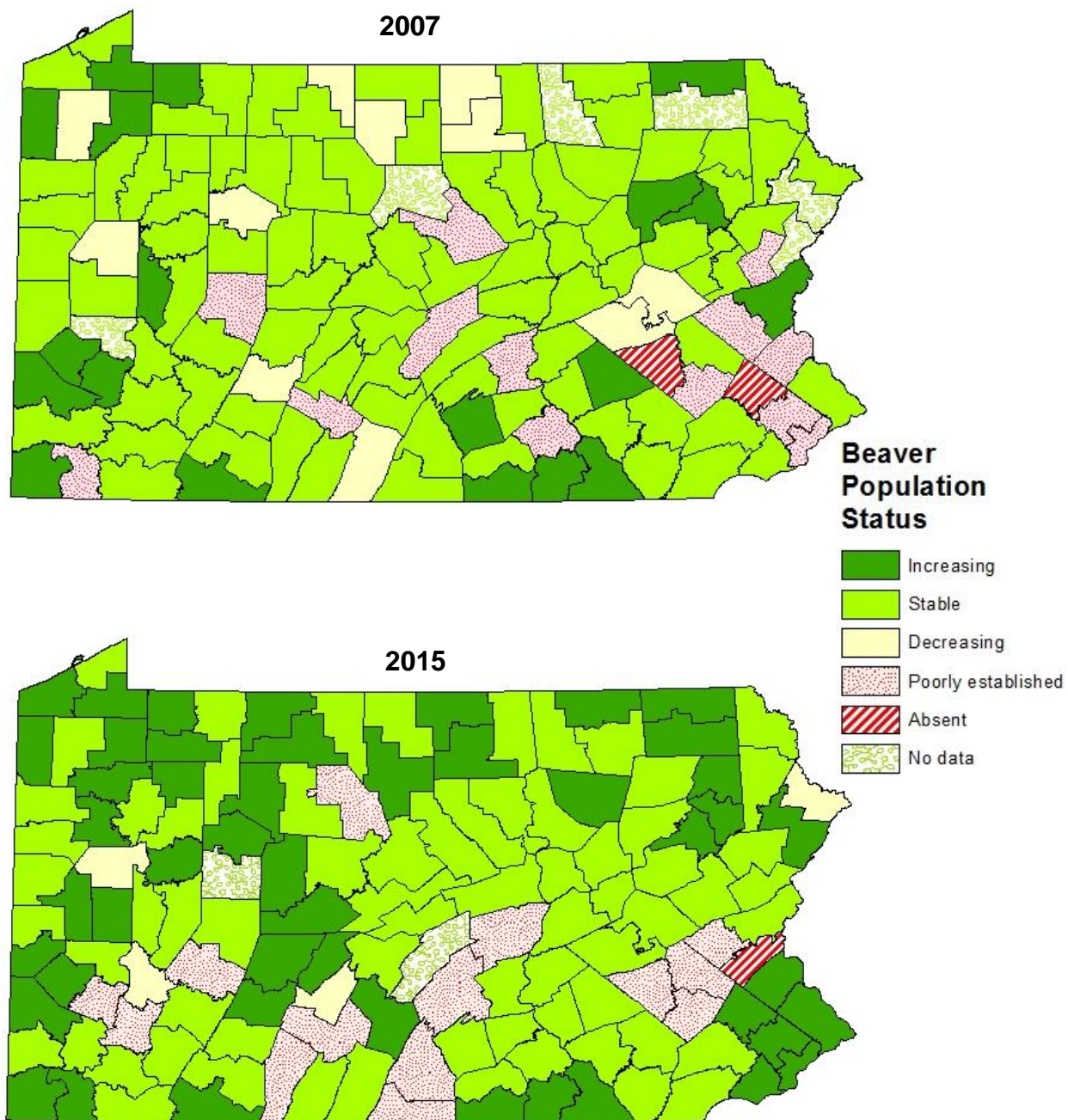


Figure 5. Beaver population status based on Wildlife Conservation Officer observations during 2007 and 2015.

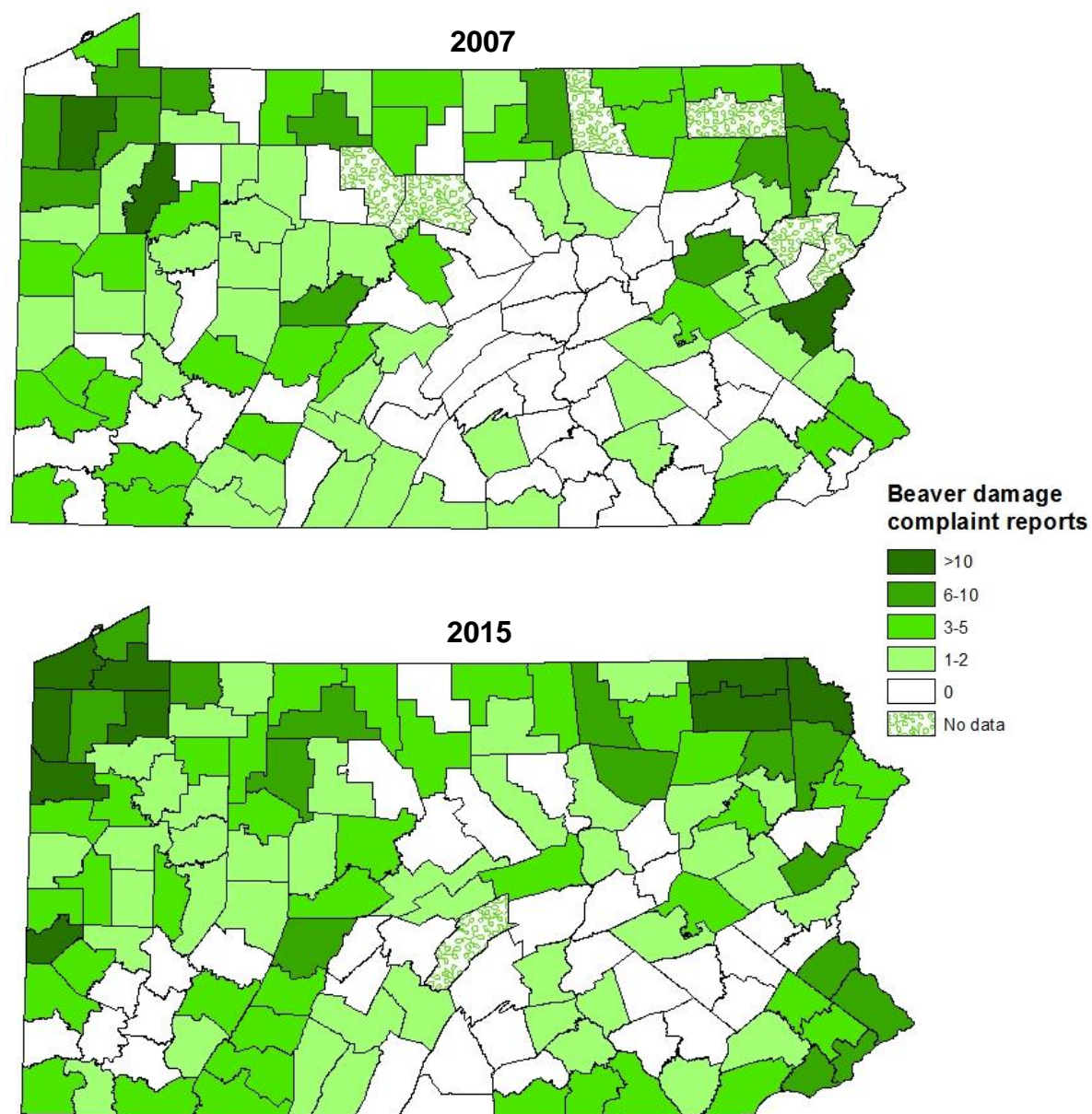


Figure 6. Distribution and frequency of beaver complaints reported to Wildlife Conservation Officers during 2007 and 2015.

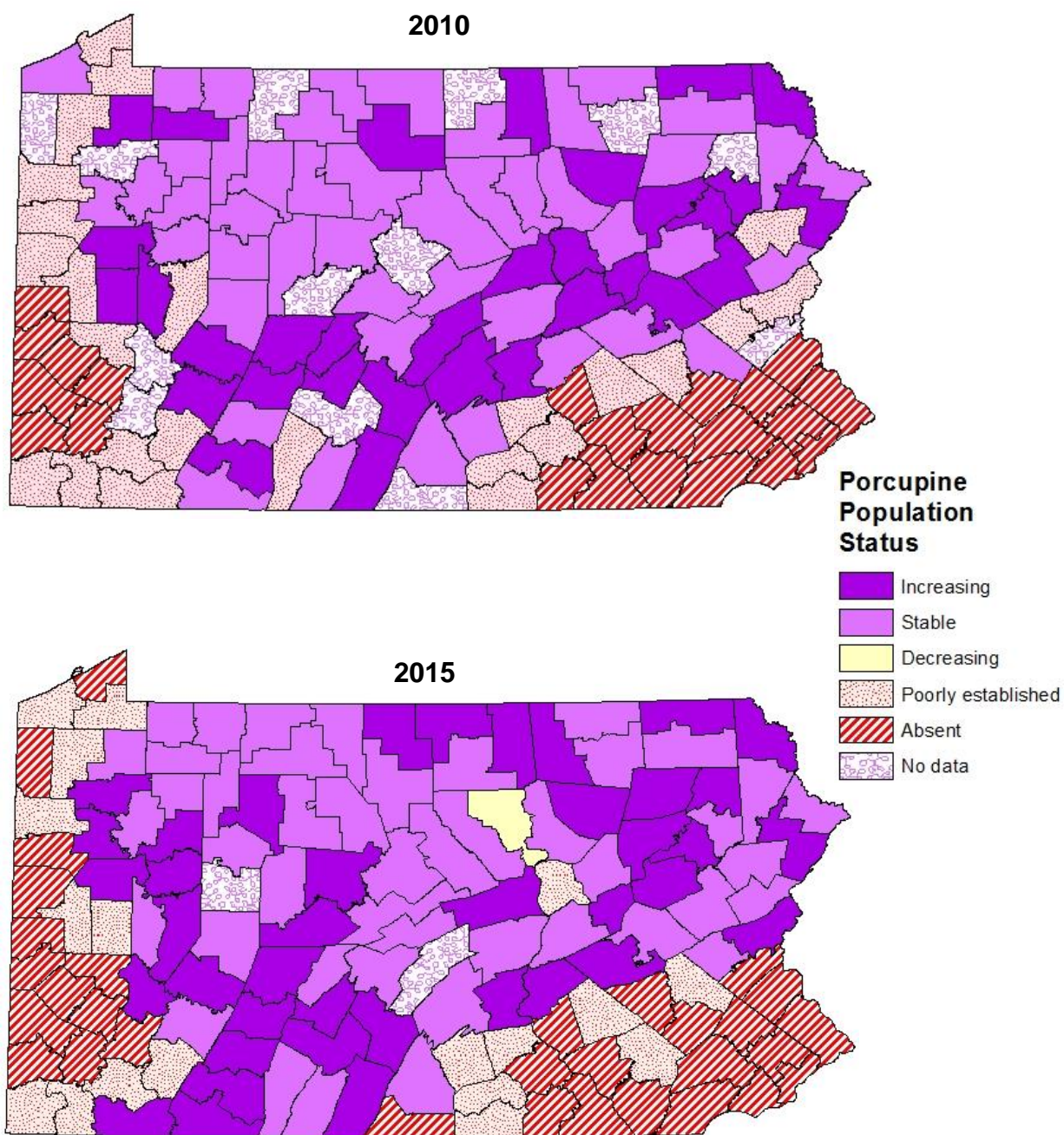


Figure 7. Porcupine population status based on Wildlife Conservation Officer observations during 2010 and 2015.

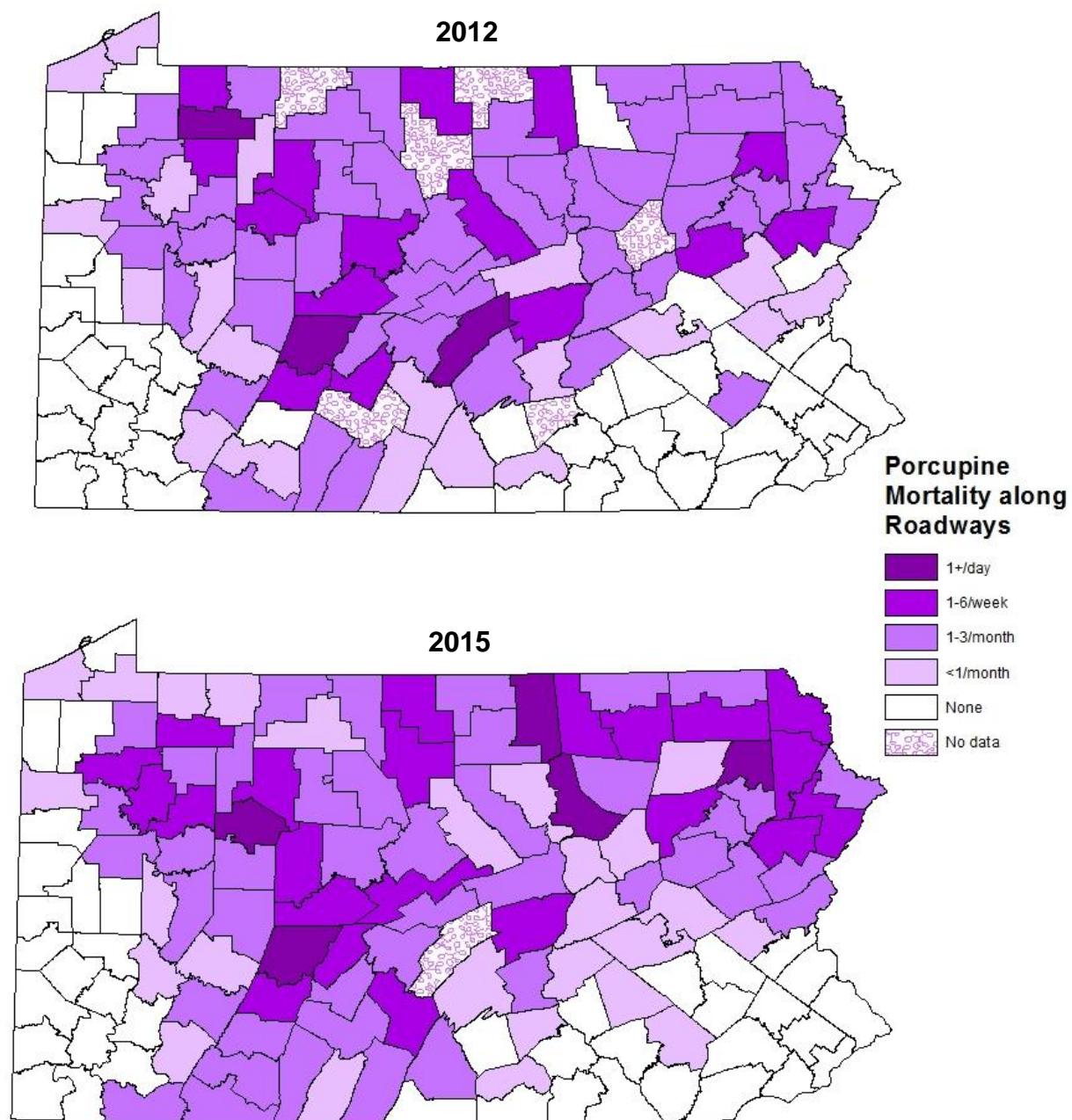


Figure 8. Wildlife Conservation Officer rates of porcupine mortality observation along roadways during 2012 and 2015.