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TITLE: Furbearer Research/Management

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TITLE: Furbearer Population and Harvest Monitoring

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COOPERATING AGENCIES: None

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Abstract: Information from annual Furtaker Surveys has been used to determine trends in the number of furtakers and furbearer harvests since the early 1990s. Furtaker license sales have increased steadily since 1999 and sales during the 2006-2007 harvest season were the highest recorded since 1997. Harvest levels increased for all species except beaver, which were similar to the previous season. Despite moderately increasing and fluctuating pelt values and increasing market demand for wild furs, most furbearer populations in Pennsylvania remain underutilized. Reports of vehicle-caused bobcat mortalities, bobcat sightings, and incidental bobcat captures have been steadily increasing and suggest continued numeric and geographic expansion of bobcat populations. Otter populations are expanding throughout the northeast region and some portions of the Susquehanna drainage. Reports of fisher observations suggest that fisher populations are expanding rapidly proximal to initial release sites and throughout areas of the southcentral and southwest regions.

OBJECTIVES

- 1. To determine trends in the annual harvest of furbearing animals and numbers of trappers.
- 2. To monitor changes in furbearer population distribution and abundance.

METHODS

The annual fur harvest is estimated from the Furtaker Survey conducted in March. Due to budget constraints, this survey was not conducted during 2004 but has been implemented since. Harvest estimates are presented by species and wildlife management unit (WMU). Because combination license holders were extended furtaker privileges during 1999, annual harvest totals for each species were corrected to account for sampling bias during subsequent years. A description of these corrections is provided by Rosenberry (2000).

Average pelt prices of furbearers sold at the Pennsylvania Trapper's Association's (PTA) District fur sales were obtained to monitor trends in pelt value. Pelt vales were averaged among several districts reporting fur sale

results. Approximately 2% of all furbearers harvested in Pennsylvania are sold at these fur sales. Pelt value trends during 1986-2007 were assessed for each furbearer species.

The reported estimates of coyote harvest include only those animals recorded by furtakers and does not account for the incidental harvest recorded in the Game Take Survey. Combined harvest totals are provided by Librandi Mumma (2007). Prior analyses of the beaver harvests results are included in the beaver management plan report (see Job No. 64001) but current harvest levels and pelt prices are reported herein.

Annual questionnaires were mailed to all Wildlife Conservation Officers (WCOs) to collect information on annual captures and sightings of otter and fisher and to record numbers and types of coyote damage complaints during the previous calendar year. These surveys were mailed during April and returned by June. Vehicle-caused mortalities and incidental trapping mortalities for bobcat, otter, and fisher were recorded annually by WCOs using standardized kill report forms.

RESULTS

Fur Harvest

During previous years, combination license holders were extended furtaking privileges, which resulted in reduced furtaker license sales (Table 1). During 1985-2006 furtaker license sales declined (r = -0.59, P < 0.05) (Table 1). However, the numbers of furtaker licenses sold has been increasing steadily since 1999. Future pelt prices, continued trapping device regulation, and international changes in fur demand will continue to affect the number of furtakers in Pennsylvania. Statewide harvest increased significantly for species except beaver. The 2006-2007 beaver harvest was similar to the previous year (Table 2). Although harvests have increased for many terrestrial furbearer species, most populations remain underutilized.

In general, the demand and prices paid for furs has declined since historic high values of the early 1980s. 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. Average pelt values during 2005-2005 were similar but slightly lower than observed during previous seasons for all species except gray fox; no significant shifts in values were observed (Table 2). The estimated muskrat harvest was higher than reported in recent years. This was due to predicted high, but unrealized, muskrat pelt prices.

Population Monitoring

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 has increased significantly during 1990-2005 ($r=0.77,\,P<0.05$)(Table 4). The number of incidental bobcat captures during 2006 was significantly higher than reported during previous years. Annual numbers of statewide vehicle-caused bobcat mortalities (i.e., roadkills) have also increased significantly ($r=0.98,\,P<0.01$); the greatest number of vehicle-caused bobcat mortalities (N = 119) was recorded during 2000 (Table 5). These indices suggest continued numeric and geographic expansion of bobcat counties. The greatest numbers of vehicle-caused mortalities have been reported from high-density populations in the northcentral and southwestern counties.

Since 2001, the Pennsylvania Game Commission (PGC) included questions concerning bobcat sightings on the annual Game Take Survey, which is sent to

approximately 2% of general hunting license buyers each year (Rosenberry 2001). An annual sighting index (number of observations divided by effort * 100) has been developed to detect changes in observation rates (Table 6). The 2006 sighting index was the highest reported since these questions were implemented.

The annual number of fisher observations and incidental captures reported to WCOs has been increasing steadily since fishers were reintroduced in 1996. (Table 7). WCOs received 86 reports of fishers that were captured and released by licensed trappers and 385 reports of fisher observations. The geographic distribution of these reports suggests that fisher populations are rapidly expanding from the reintroduction areas in northern regions and naturally expanding into regions of southwestern and southcentral Pennsylvania.

Numbers of incidental otter captures, primarily by beaver trappers, have also increased during recent years with greater than 25 incidental captures reported annually since 1996 (Table 7). The majority of these captures occur in the Northeast Region, but recent reports indicate continued population expansion throughout the Susquehanna drainage. Since 2000, the annual hunting and trapping digest has provided trappers with additional information regarding the avoidance of otter while trapping beaver. Preliminary reports from WCOs indicate that trappers in high-density otter areas are using these techniques to avoid otter captures. Despite these efforts, during the 2005-2006 season, 44 incidental otter captures were reported. As otter populations continue to expand, more intensive monitoring will be required.

Reports of coyote-caused damage to livestock and domestic pets have been relatively stable since 1993. Numbers of complaints and losses due to coyotes during 2006 were similar to reports from previous years. Complaints related to concerns for human safety have increased significantly. Losses of calves, sheep and poultry have increased during recent years(Table 8). Reports of coyotes killing domestic dogs and cats are increasing, particularly in the southwest and southeast regions. Seventy-five WCO districts reported complaints during the most recent survey period. The majority of coyote complaints received by WCOs are people expressing concern for pets, livestock, wildlife, or human safety issues.

RECOMMENDATIONS

- 1. The fur harvest should continue to be reported by species and WMU to monitor area-specific harvest trends. Pelt price information should also be collected annually to monitor trends in fur value relative to regional harvest trends.
- 2. Current methods for monitoring changes in density and distribution of bobcat, otter, and fisher should be continued, and for otter, intensified to better understand population trends.
- 3. The Game Take Survey should continue to query general license buyers regarding bobcat, fisher, and coyote observations.
- 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.

LITERATURE CITED

- Librandi Mumma, T. M. 2007. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission. Harrisburg, Pennsylvania, USA.
- Rosenberry, C. S. 2000. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission. Harrisburg, Pennsylvania, USA.
- Rosenberry, C. S. 2003. Game Take and Furtaker Surveys. Annual Job Report 11101. Pennsylvania Game Commission. Harrisburg, Pennsylvania, USA.

Table 1. Number of furtaker licenses sold in Pennsylvania.

Table 1. Number of	Turtaker licenses	sold in Pennsylvania.	
Year		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	
2000		18,551	
2001		19,410	
2002		20,676	
2003		22,454	
2004		24,094	
2005		23,941	
2006		26,589	

Table 2. Annual harvest and average pelt price paid for furbearer species in Pennsylvania (1992-present).

									Species									
	Racco	on	Red F	'ox	Gray	Fox	Соуо	te	Muskr	at	Min	k	Skur	ık	Oposs	um	Beav	er
Season	Harvest	Pelt\$	Harvest	Pelt\$	Harvest :	Pelt\$	Harvest	Pelt\$	Harvest	Pelt\$	Harvest 1	Pelt\$	Harvest :	Pelt\$ H	larvest	Pelt\$ ^H	Harvest 1	Pelt\$
92-93	124,404	6.77	27,611	12.96	25,395	11.32	4,402	25.40	135,533	2.25	9,157	19.95	7,221	NA	27,754	1.71	4,506	10.63
93-94	118,964	8.54	25,862	15.44	23,839	11.02	6,161	24.15	121,657	2.88	7,808	18.35	7,920	2.66	25,807	1.88	3,606	19.03
94-95	186,551	9.15	30,649	18.73	33,387	11.47	6,240	24.70	178,145	3.09	10,208	14.08	12,620	2.21	29,621	1.51	9,360	19.94
95-96	120,462	10.27	31,110	16.30	23,518	9.4	6,662	13.36	130,442	3.15	8,602	11.88	9,995	3.00	29,688	1.74	6,454	19.65
96-97	214,958	15.34	29,623	18.05	23,307	11.94	7,959	20.68	146,013	6.03	9,315	19.06	11,571	3.92	48,549	1.83	9,789	29.37
97-98	194,696	12.07	36,923	13.18	26,043	9.65	6,685	9.72	216,066	3.44	14,063	11.66	12,344	NA	60,717	1.41	12,628	21.73
98-99	195,110	6.87	47,202	9.73	32,922	4.84	11,652	6.40	148,205	1.87	12,238	9.48	11,190	NA	56,287	0.49	8,727	15.29
99-00	107,407	4.94	36,860	10.72	26,794	6.19	9,586	15.43	94,215	3.16	13,774	9.75	6,723	NA	33,723	1.47	8,377	16.08
00-01	108,890	7.42	33,060	16.58	24,452	8.61	10,383	16.07	79,880	3.40	8,614	9.64	7,534	NA	29,093	2.47	8,408	20.00
01-02	121,810	8.34	33,003	20.14	23,275	10.05	12,363	17.16	121,994	3.85	13,214	8.47	9,245	NA	27,192	1.54	10,934	15.86
02-03	106,485	9.39	33,007	22.84	18,805	12.81	11,444	22.57	75,340	3.81	10,069	9.69	7,207	NA	34,787	2.12	4,538	14.33
03-04	104,781	10.15	31,592	19.92	15,956	18.74	11,697	25.29	71,368	3.33	6,494	10.5	9,319	NA	33,760	2.03	7,874	15.84
04-05	NA	10.11	NA	16.48	NA	18.04	NA	9.37	NA	2.89	NA	12.84	NA	3.14	NA	2.51	NA	16.11
05-06	106,082	17.50	40,551	20.36	17,616	26.54	9,670	24.50	70,995	6.10	9,335	17.42	9,997	4.50	43,770	5.05	14,283	17.18
06-07	138,640	12.88	45,512	20.84	20,754	43.84	11,879	20.02	121,167	3.20	12,680	12.88	10,687	4.04	48,102	2.45	14,210	22.14

Table 3. Estimated harvests of furbearers by WMU during the 2006-2007 hunting and Trapping seasons.

WMU	Raccoon	Red Fox	Gray Fox	Coyote	Muskrat	Mink	Skunk	Opossum	Beaver	Weasels
1A	14702	1487	477	618	14008	455	141	2813	2285	0
1B	11027	901	119	391	12416	1180	618	3541	2664	65
2A	11276	1173	596	532	4929	238	163	956	292	11
2B	5887	869	358	325	4193	97	206	999	292	43
2C	15017	3724	3696	1595	9491	693	1181	4171	715	11
2D	7525	966	1387	564	3564	152	639	2683	379	32
2E	4554	706	2102	250	3846	260	585	1868	542	11
2F	4554	434	488	911	1268	130	314	4236	628	76
2G	4640	619	1962	1486	2297	552	672	2759	574	0
3A	2407	945	564	358	1333	401	293	1911	531	11
3B	2776	380	574	1041	1105	217	184	1835	942	22
3C	3741	326	347	749	7595	1169	336	1673	1841	32
3D	1778	619	585	532	878	390	130	793	801	0
4A	3545	977	2785	228	3911	498	748	1184	130	43
4B	5248	1303	379	141	5200	725	314	1520	119	0
4C	4901	1303	217	380	1289	639	574	2389	87	22
4D	4369	1455	1506	358	9599	866	954	2455	238	22
4E	3665	793	520	445	9317	693	466	2520	141	11
5A	5052	6254	943	141	8494	1440	390	1434	184	32
5B	9357	11302	293	174	8700	1148	1377	2976	303	0
5C	6202	7556	87	336	3564	509	260	956	184	0
5D	542	489	0	11	195	0	0	109	76	0
Unknown	5877	934	769	315	3976	227	141	2324	260	43
Total	138640	45512	20754	11879	121167	12680	10686	48102	14210	487

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		No.	No. Bobcats ^a	Extrapolated	
	No. Survey	Furtaker	Captured and	No. Bobcat	Average ^b (No.
Trapping	Respondents	Licenses	Released	Captures	Bobcat Captures)
1990-1991	2,302	20,377	40	354	
1991-1992	2,361	20,215	24	205	293
1992-1993	1,652	20,345	26	320	222
1993-1994	2,175	19,246	16	142	513
1994-1995	2,056	21,905	101	1,076	559
1995-1996	2,181	21,840	46	460	736
1996-1997	2,363	25,636	62	673	566
1997-1998	2,233	27,413	46	565	790
1998-1999	2,466	25,877	108	1,133	797
1999-2000	1,557	17,414	62	693	991
2000-2001	1,681	18,551	52	574	656
2001-2002	1,553	19,410	56	700	599
2002-2003	1,779	20,676	45	523	639
2003-2004	2,204	22,454	68	693	951
2005-2006	2,412	23,941	165	1,638	1,414
2006-2007	2,436	26,589	175	1,910	

 $^{^{\}rm a}$ Does not include bobcats legally harvested by permit holders. $^{\rm b}$ r = 0.64, P < 0.05

Table 5. Numbers and geographic distribution of vehicle-caused bobcat mortalities during 1985-2006.

	No. Reported		No. New	
	Bobcat	No. Counties with	County	3-Year Moving
Year	Roadkills	Roadkills	Records	Average
1985	2	2	0	_
1986	15	2	7	12.0
1987	19	8	3	15.3
1988	12	5	4	15.7
1989	16	6	1	18.7
1990	28	7	5	26.3
1991	35	11	1	34.0
1992	39	13	5	44.0
1993	58	19	1	42.7
1994	31	14	1	48.7
1995	57	17	2	45.7
1996	49	15	0	59.0
1997	71	19	5	59.0
1998	57	18	3	71.3
1999	86	24	3	87.3
2000	119	29	3	102.7
2001	103	28	0	109.7
2002	107	28	0	107.0
2003	111	27	0	108.7
2004	108	27	0	106.7
2005	101	28	0	106.0
2006	109	27	0	

Table 6. Reports of bobcat and fisher sightings by county from the annual Game Take Survey, 2001-2005. Furtaker Survey was not conducted in 2004.

				Вс	obcats	Fishers				
			Effort	No.	No.	No.	No.			
Year	Season	N (%)	days	observed	counties SIª	observed	counties	SIª		
2001	Spring Gobbler Hunters	2,785 (24.8)	12,735	200	38 1.57	90	17	0.71		
	Firearms Deer Hunters	8,628 (76.9)	40,254	585	56 1.45	152	38	0.38		
	Archery Deer Hunters	3,237 (28.8)	36,439	407	54 1.12	134	37	0.37		
	All Hunters	11,221 (100.0)	89,428	1,192	63 1.33	376	42	0.42		
2002	Spring Gobbler Hunters	2,423 (24.8)	10,952	205	37 1.87	43	19	0.39		
	Firearms Deer Hunters	7,176 (73.3)	33,412	465	57 1.39	170	38	0.51		
	Archery Deer Hunters	2,816 (28.8)	31,396	266	49 0.85	95	29	0.30		
	All Hunters	9,777 (100.0)	75,760	936	61 1.24	308	43	0.41		
2003 ^b	Spring Gobbler Hunters	2,728 (27.3)	12,147	131	1.08	49		0.40		
	Firearms Deer Hunters	7,388 (73.8)	34,133	367	1.08	95		0.28		
	Archery Deer Hunters	2,923 (29.2)	27,137	265	0.97	63		0.23		
	All Hunters	10,005 (100.0)	73,417	763	1.04	207		0.28		
2005	Spring Gobbler Hunters	2,845 (21.7)	12,327	163	1.32	104		0.84		
	Firearms Deer Hunters	7,213 (55.0)	35,011	316	0.90	107		0.31		
	Archery Deer Hunters	3,065 (23.4)	28,674	442	1.54	125		0.44		
	All Hunters	13,123 (100.0)	76,012	921	1.21	336		0.44		
2006	Spring Gobbler Hunters	2,580 (20.7)	10,243	481	4.70	121		1.18		
	Firearms Deer Hunters	6,865 (55.0)	32,609	707	2.17	230		0.71		
	Archery Deer Hunters	3,025 (24.3)	32,065	109	0.34	109		0.34		
	All Hunters	12,470 (100.0)	74,917	1,297	1.73	460		0.61		

^a SI = Sighting Index = Observations/Effort * 100 ^b Sighting are reported by WMU, not county beginning in 2003.

Table 7. Reports of otter and fisher captures and fisher observations estimated from annual questionnaires of WCOs, 1994-2006.

Survey Season	No. Districts Reporting		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

Table 8. Types and numbers of coyote-related complaints reported to WCOs, 1995-2006.

	Survey Period											
Survey Results	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
No. districts with complaints	42	44	60	47	63	61	58	58	58	64	80	75
Nature of Complaints												
Concern for Cattle	8	19	27	8	12	11	11	11	11	16	18	24
Concern for Sheep	37	24	43	22	23	26	17	15	30	23	43	29
Concern for Goats Concern for	3	5	8	3	4	1	1	1	4	3	5	3
Poultry	16	5	13	12	17	14	15	15	15	25	24	11
Concern for Dogs	7	9	17	12	11	22	12	12	10	19	12	19
Concern for Cats	13	7	15	19	13	29	23	22	24	77	25	38
Afraid of Coyotes	71	86	114	69	114	126	114	115	98	316	263	199
Concern for Deer Concern for	89	52	41	49	47	57	29	28	50	87	73	36
Turkeys	23	13	10	14	10	18	6	5	13	37	31	12
Other	4	1	15	31	0	0	7	8	26	0	32	36
Total	271	221	303	239	251	304	235	232	281	603	526	407
Coyote-caused Mortalities												
Cows	0	3	1	0	0	1	0	0	0	0	2	0
Calves	2	8	9	3	7	8	5	5	4	13	10	27
Sheep	82	100	251	60	81	91	21	21	31	37	30	47
Goats	3	0	9	6	3	0	1	1	6	0	0	2
Poultry	112	27	51	43	52	44	49	48	66	85	51	71
Dogs	0	6	6	3	6	17	5	6	3	4	3	3
Cats	24	11	14	14	5	30	21	21	14	73	16	33
Rabbits	12	9	4	2	2	3	2	2	8	5	8	12
Deer		10	3	5	5	9	10	10	12	17	13	10
Other	17	1	0	0	3	3	0	0	0	2	2	1
Total	252	175	348	136	164	206	114	114	140	236	135	206