Trappers in Wyoming: Opinions on Trends in Mammalian Predator Populations, Motivations for Trapping, and Methodologies

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Abstract

Wyoming trapper numbers have declined 58 percent since the peak in 1979 ($P < 0.001$). In an effort to preserve the collective knowledge of long-term trappers and hunters of furbearers, predators, and trophy game species, i.e., mountain lion (*Felis concolor*) and black bear (*Ursus americanus*) , we surveyed 522 trappers and houndsmen by mail to assess their attitudes and opinions on methodologies used for trapping, motivations for trapping, and population trends for various furbearers, predators, and trophy game species in the state. Most trappers listed recreation (79%) as their primary motivation to trap, but income from fur sales (67%) and reduction of livestock losses (54%) also were important motivators. Steel traps were the primary method of taking furbearers and were used by 89 percent of trappers. Common methods also included snares (48%) and calling and shooting (47%). Predators were taken primarily by calling and shooting (83%), steel traps (79%), and snares (58%). Using hounds (74%) was the most common method used to harvest mountain lions. Mountain lions, coyotes (*Canis latrans*), raccoons (*Procyon lotor*), river otters (*Lutra canadensis*), and black bears were all reported to have increasing population trends during the last two decades. Only two species, jackrabbits (*Lepus* spp.) and lynx (*Lynx Canadensis*), were thought to be decreasing. Our respondents wanted management actions taken to increase all species of Wyoming's fully-protected furbearers, i.e. lynx, wolverine (*Gulo gulo*), river otter, fisher (*Martes pennanti*), gray fox (*Urocyon cinereoargenteus*), and swift fox (*Vulpes velox*) as well as bobcats (*Felis rufus*). They also supported actions that would decrease populations of coyotes, spotted skunks (*Spilogale putorius*), and mountain lions. Trapping and hunting are important pursuits in Wyoming with >30 percent of the population participating in one of these activities. As legislative restrictions further curtail trapping and hunting, other strategies will be required to address management of furbearers, predators, and trophy game species.

Key words: furbearer, human dimensions, mail survey, predator, trapping, trappers, Wyoming

Introduction

Trapper participation is rapidly declining throughout the U.S. and Canada (Siemer et al. 1994, Daigle et al. 1998, Manfredo et al. 1999, Reed 1999). Additionally, hunting of mountain lions (*Felis concolor*) and black bears (*Urus americanus*)—defined as trophy game in Wyoming—also is declining due to increased legislative restrictions in several western states, e.g., outlawing the use of hounds, bait, and spring bear seasons. Many wildlife managers believe that trappers play an important role in regulating nuisance species (Will 1992, Conover 2001), quantifying the economic value of wildlife (Samuel and Bammel 1981, Will 1992), and are a useful source of information to assess population trends for select species (Landwehr 1982, Gotie et al.

1984, Will 1992, Majors et al. 1996). Whereas motivation for trapping participation is complex and not well understood (Todd and Boggess 1987), reasons for declines in trapper numbers are usually attributed to market declines, i.e., low fur prices, increasing public intolerance of trapping and subsequent increased legislative restriction, increased urbanization of youth, and less dependence upon fur products for the fashion and garment industry (Will 1992, Siemer et al. 1994, Daigle et al. 1998). Although fashion trends and demographic shifts are beyond the influence of natural resource managers, regulatory controls are not.

To illustrate the importance that intolerance to trapping and using hounds to pursue bears and mountain lions will have in the future, we only have to examine opinions of wildlife resource managers. Muth et al. (1998) surveyed 4000 members of The Wildlife Society, American Fisheries Society, North American Wildlife Enforcement Officers' Association, and the Society for Conservation Biology and found that 46 and 57 percent, respectively, favored outlawing leg-hold traps for trapping furbearers and the use of dogs for hunting bear. Trappers and houndsmen may soon be forced to abandon their pursuits in light of increased legislation and decreasing demand for their products. For the manager, subsequent problems involved with this abandonment include 1) fewer options for managing potential nuisance species, e.g., beaver (*Castor Canadensis*), coyote (*Canis latrans*), and mountain lion, 2) loss of information needed to effectively manage furbearer and predator populations, e.g., harvest reports, catch per unit effort statistics, and demographic data for species, 3) increased costs associated with management, e.g., increasing nuisance complaints, and 4) loss of positive values associated with harvest programs.

Trapper numbers in Wyoming have declined 58 percent ($r^2 = 0.699$, $P < 0.0001$) since 1979 when trapper numbers peaked (Fig. 1). Lion and black bear hunter numbers have steadily increased during the same period although black bear hunting has recently declined due to increased restrictions regarding baiting. Concurrent with trapper declines, mean trapper age has risen to the point where many trappers are retiring from trapping or dying (Wyoming Game and Fish Department, Cheyenne, WY, unpubl. rep.). Since trappers are explicitly tied to their resource, many wildlife managers feel that trappers are a good source of qualitative data regarding animal populations (Landwehr 1982, Gotie et al. 1984, Will 1992, Majors et al. 1996), especially over long term, e.g. 10-50 years.

Across the United States, and the West in particular, there is a tendency to blame reduced game populations, e.g., mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra Americana*), and sage grouse (*Centrocercus urophasianus*), on increasing predator populations (Ballard et al. 2001). Thus, long-term trends in predator populations could be useful to develop cause and effect hypotheses as well as to assist with management objectives for both furbearers and predators and their prey. Long-term population trends for predators, furbearers, and trophy game (Table 1) are limited in Wyoming; the only data that exist since 1978 are harvest reports (Wyoming Game and Fish Department 1978-1998). Since trapper and houndsmen success is inherently tied to population trends, we felt that these individuals would be a good source of information for long-term trends in furbearer and predator populations. Houndsmen are those individuals that use hounds in the pursuit of mountain lions, black bears, and bobcats although use of hounds for bear hunting is currently illegal.

Our objectives were to 1) develop long-term population trend data (>20 yrs) for select furbearers, predators, and trophy game species in Wyoming, 2) determine what trappers and houndsmen felt should be the future population trends for certain species, 3) quantify the importance of various methods and motivations for hunting and trapping predators, furbearers, and trophy game, 4) collect specific information regarding incidental take of

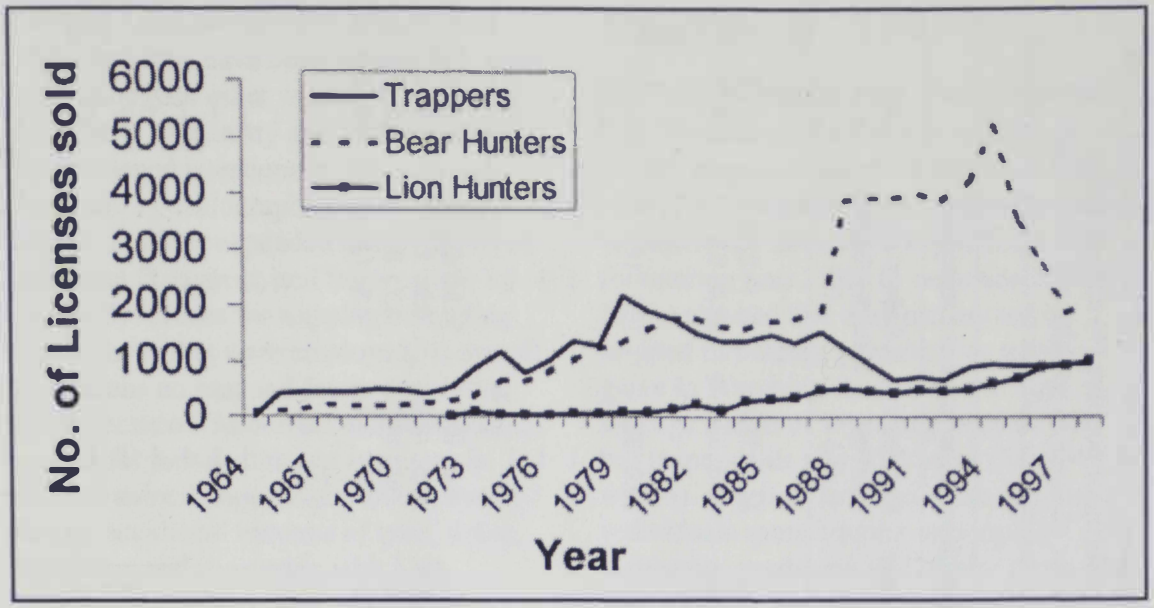

Fig. 1. Total number of resident trapping, black bear, and mountain lion hnting licernses sold in Wtyoming since 1964, the first year licenses were required for trapping and black bear hunting. Mountain lions were classfied as predators (unlimited harvest) prior to 1973.

lynx (*Lynx Canadensis*), fisher (*Martes pennanti*), wolverine (*Gulo gulo*), and river otter (*Lutra canadensis*), and 5) survey the "long-term" trappers and houndsmen in Wyoming before their knowledge, attitudes, and opinions are lost.

Methods

We define furbearers, predators, and trophy game under the regulations set forth by the Wyoming Game and Fish (WGF) Commission (Table 1). Furbearers are those species that primarily are harvested for their fur value, have strict harvest regulations, and are primarily taken by trapping methods. Predators are those species considered pests within the state, regardless of their biological or economical importance, and their take is not restricted. Predators, e.g., coyote and red fox (*Vulpes vulpes*), primarily are taken through trapping, but several species are aerial hunted; all are hunted using firearms. Trophy game species in Wyoming include grizzly bears (*Ursos arctos*), black bears, and mountain lions. State or federal laws regulate their take, and only black bears and mountain lions currently may be hunted. Although we were not interested in grizzly bears that have ongoing status and management programs, we were interested in trends for several protected nongame species that may be taken incidental to legal trapping (Table 1) but for which there is no open season.

We surveyed 522 individuals using a 6-page, 14-question mail survey (Appendix A). We derived our survey list from WGFD's list of licensed trappers (n = 466) and houndsmen (n = 86) during 1996-1998. Some overlap occurred between the two groups, so we censored 30 houndsmen that also possessed trapping licenses. We further restricted our mailing list to only include trappers and houndsmen that had been residents for ≥10 years and had purchased a trapping and/or trophy game (black bear or mountain lion) license during 1996 and 1997. After receiving a completed survey we further restricted our sample to include only those people that had hunted or trapped furbearers, predators, and trophy game species for >10 years. Since our two groups overlapped, and we feel that members from both of these groups have developed opinions on wildlife numbers, we lumped their responses and treated them equally.

Mail surveys can be a useful technique to identify trends in furbearer populations

Table 1. Past trends, future-desired trends, and reasons listed for changes in past populations for each species. Past trends and future-desired trends are listed as the percentage of respondents indicating that there has been or should be a negative (-), neutral (0), or positive (+) change in the population in which *n* is the total number of respondensts/305 that expressed an opinion. Reasons given for changes in populations (increases : decreases) are percentages of respondents listing that reason for the increase or decrease. Percentages do not sum to 100 due to rounding error (trend data) or because >1 selection could be made (reasons for increases or decreases).

	Trend				Reasons given for increases or decreases				
Species	Past trend (%) - : 0 : +	*n*	Future-desired trend (%) - : 0 : +	*n*	Habitat (%)	Density of prey (%)	Regulated harvest (%)	Federal or state regulations (%)	*n* + : -
Trophy Game									
Mountain Lion	3.6 : 9.2 : 87.5	258	51.2 : 33.2 : 14.8	263	26.6 : 11.1	33.0 : 11.1	61.5 : 77.7	42.1 : 22.2	221 : 9
Black Bear	10.8 : 31.9 : 56.8	221	20.0 : 52.3 : 27.7	227	27.5 : 21.7	8.1 : 13.0	40.3 : 30.4	22.6 : 6.1	124 : 23
Furbearers									
Bobcat	47.0 : 28.0 : 24.3	277	3.5 : 39.7 : 56.8	265	26.5 : 23.6	30.9 : 29.9	30.9 : 33.1	16.2 : 14.9	68 : 127
Badger	12.9 : 58.1 : 28.6	248	29.5 : 58.1 : 12.4	240	—[a]	—	—	—	—
Beaver	20.9 : 39.6 : 38.7	232	23.3 : 58.2 : 18.5	240	—	—	—	—	—
Pine marten	20.2 : 66.2 : 13.4	91	1.2 : 48.8 : 50.0	167	—	—	—	—	—
Mink	31.9 : 51.9 : 15.2	142	36.2 : 26.8 : 36.9	195	—	—	—	—	—
Predators									
Coyote	3.2 : 21.5 : 74.9	287	64.4 : 31.4 : 4.2	269	33.1 : 50.0	44.8 : 30.0	6.6 : 10.0	16.5 : 10.0	212 : 10
Red fox	15.2 : 26.8 : 47.5	270	39.9 : 45.2 : 14.9	257	34.0 : 36.6	41.2 : 41.5	6.5 : 2.4	8.5 : 7.3	153 : 41
Raccoon	4.6 : 28.8 : 65.8	249	45.1 : 44.3 : 10.7	252	42.3 : 33.3	21.5 : 25.0	3.7 : 16.7	3.7 : 8.3	163 : 12
Jackrabbit	57.9 : 33.2 : 8.9	244	11.2 : 49.7 : 42.1	231	22.7 : 35.8	13.6 : 13.9	0.0 : 4.4	4.5 : 1.5	22 : 137
Protected (no open season)									
River otter	11.5 : 28.9 : 57.7	55	5.2 : 38.3 : 59.2	160	—	—	—	—	—
Pine marten	20.2 : 66.2 : 13.4	91	1.2 : 48.8 : 50.0	167	—	—	—	—	—
Mink	31.9 : 51.9 : 15.2	142	36.2 : 26.8 : 36.9	195	—	—	—	—	—
Wolverine	30.0 : 43.3 : 26.7	31	4.9 : 31.0 : 64.1	147	—	—	—	—	—
Pine marten	20.2 : 66.2 : 13.4	91	1.2 : 48.8 : 50.0	167	—	—	—	—	—
Mink	31.9 : 51.9 : 15.2	142	36.2 : 26.8 : 36.9	195	—	—	—	—	—
Spotted skunk	10.1 : 43.4 : 45.5	103	52.4 : 35.9 : 11.6	170	—	—	—	—	—

—[a] Sample sizes were < 40 for these species so reasons for declines or increases are not reported.

(Hoinville and Jowell 1978, Majors et al. 1996), and they have been successfully used in Wyoming for other wildlife issues (Berg et al. 1983, McKinstry and Anderson 1999). We developed questions to focus on each objective: 1) demographics of the survey sample, 2) effort expended in the pursuit of predators, furbearers, and trophy game by county, 3) reasons for trapping or hunting and methods that were employed, 4) overall perceptions on past and future population trends for select furbearers and predators, 5) reasons for past declines or increases in selected animal populations, and 6) specific data on accidental harvests of lynx, fisher, wolverine, and river otter, which are protected under Wyoming law and cannot legally be taken.

Our survey methods generally follow those recommended by Dillman (2000) and Filion (1978, 1980) and included 1) using agency (WGFD) sponsorship with the first cover letter and University of Wyoming sponsorship with the second letter (Fox et al. 1988, Gendall et al. 1995, Faria and Dickinson 1996), 2) a promise of anonymity for all respondents (Filion 1978, Faria and Dickinson 1996), 3) use of both altruistic and egoistic appeals (Filion 1978, Gendall et al. 1995) to motivate our respondents, 4) use of first-class postage for both the outgoing survey and the return envelope (Filion 1978, Fox et al. 1988), 5) highly structured closed questions with either dichotomous (yes, no), multiple choice, or check list answers (Filion 1978, Fox et al. 1988), 6) a "reward" consisting of reporting the results of the survey to both the Wyoming Trappers Association and *The Trapper and Predator Caller*, a national magazine for trappers (Fox et al. 1988, Faria and Dickinson 1992, Green 1996), and 7) a follow-up survey, mailed 3 weeks later, for non-respondents (Hammitt and McDonald 1982, Fox et al. 1988, Dillman 2000). Recognizing the importance of non-response bias, we attempted to identify and quantify it by randomly sampling 10 percent of non-respondents using a telephone survey and questions designed to identify reasons for non-response.

Results

Survey Returns and Nonresponse

We received 313 of 522 surveys for an overall response rate of 60 percent. Thirty-nine (7.5%) surveys were undeliverable due to incorrect addresses or expiration of the forwarding time. Of 313 respondents, 305 (97%) claimed that they had hunted or trapped furbearers, predators, or trophy game in Wyoming for >10 years. The average length of Wyoming residency for our respondents was 43.2 years (SD=14.7, n=303). Average length of time that these individuals spent hunting or trapping furbearers, predators, and trophy game was 23.1 (SD=16.3, n =273), 26.0 (SD=13.2, n=285), and 16.5 (SD = 13.5, n=200) years, respectively. The number of trappers and trophy game hunters actively trapping or hunting within each decade was skewed toward the last three decades but the sample included trappers and houndsmen in each decade (Table 2).

We attempted to contact 21 individuals for which we did not receive a response. We could not locate correct phone numbers for 24 percent of the non-respondents, another 48 percent could not be located after we made three attempts to contact them (mid AM, early PM, and mid PM), and 14 percent indicated that they had only purchased a trapping license to trap single nuisance species, e.g., beaver and badger (*Taxidea taxus*). The remaining 14 percent said that they had never received the original or follow-up survey. After back checking the license database with their correct address, we found errors in the address information in the database, probably due to transcription errors from the original license information obtained from license agents.

Motivations for Trapping and Methods

Seventy-nine percent (n=241) of respondents reported that recreation was a major factor in motivating them to trap or hunt predators, furbearers, and trophy game. Other factors included money from the sale

Table 2. Number of participants/305 who hunted or trapped furbearers, predators, and trophy game in each decade.

	Decade								
	1910	1920	1930	1940	1950	1960	1970	1980	1990
No. of participants	1	3	12	20	65	154	233	257	275

of furs (66.7%), a way to help reduce livestock losses (54.4%), a means to reduce populations of nuisance species (primarily coyotes and beaver; 40.1%), a component of the respondent's work (32.4%), and provision of food (8.3%).

Steel traps, including both leg-holds and Conibears, were the most popular method for harvesting furbearers (89% of trappers used them), but many also used snares (48%) and calling and shooting (47%) (Table 3). Calling and shooting (83%), steel traps (79%), and snares (58%), were all important methods for taking predators. Trophy game species were primarily killed using hounds (74%) and calling and shooting (28%).

Past Trends and Future-Desired Trends

Although >125 respondents commented on past and future trends for all species (Table 1), we received <40 responses on reasons why the past trends have occurred for pine marten, river otter, lynx, fisher, wolverine, swift fox, and gray fox. Due to the low response rate for these species, we excluded them from that portion of the analyses. Respondents reported several species to be increasing, which included mountain lion, coyote, red fox, raccoon, river otter, and black bear (Table 1). Changes in regulations and harvest governing the take of mountain lions and black bears were the principal reasons given for a perceived increase in these two species (Table 1) although respondents also felt habitat was important for increases in black bears. Respondents reported an increase in the density of prey as the primary reason coyote numbers may have increased, and changes in habitat were the main responses given for perceived increases in raccoons (*Procyon lotor*). Only jackrabbits (*Lepus* spp.) and lynx were thought to be decreasing. Change in habitat was listed as the primary reason for the decrease in these species, although respondents also believed that changes in federal or state regulations negatively impacted lynx populations.

Most respondents wanted to see coyote, spotted skunk (*Spilogale putorius*), and

Table 3. Percentage (%) of total respondents (n = 305) reporting the use of certain methods to take furbearers, predators, and trophy game. Percentages sum to > 100 since respondents could select > 1 method for each species group.

Species group	Steel trap[a]	Snares	Aircraft[b]	Calling and shooting	Denning[c]	Pursuit with dogs[b]	Box traps	Poisons[b]
Furbearers	89.0	48.4	3.9	47.2	3.5	20.5	11.8	0.4
Predators	78.6	57.5	20.4	82.9	33.9	27.9	19.3	19.6
Trophy Game	6.1	5.2	0.9	27.8	4.3	73.9	1.7	0

[a] Includes leg-hold traps and Conibear traps

[b] Some methods may currently be illegal for certain species, but may have been a legal method of take in the past (e.g. aircraft for lions, pursuit with dogs for bears, and poisons for lions, bears and predators).

[c] Consists of removing adults and young from den and killing them

mountain lion populations reduced (Table 1). Interestingly, most trappers (> 60% for each species) wanted to see increasing populations of all the protected nongame species (except spotted skunk), which include lynx, wolverine, river otter, fisher, gray fox (*Urocyon cinereoargenteus*), and swift fox (*Vulpes velox*). They also wanted to see increased populations of bobcat, a furbearer of substantial economic value.

Discussion

Response Rates and Recall Bias

Other researchers believe response rates approaching 60 percent adequate to identify opinions in populations of fairly homogeneous publics (Hammitt and McDonald 1982, Dolsen and Machlis 1991). Although our response rate was adequate, we realize that non-response bias may have affected our survey. However, our survey of non-respondents indicated that they did not respond due to 1) not receiving the survey, or 2) feeling that the survey did not pertain to them since they had purchased their license to trap only a few nuisance animals. We may have improved our response rate through use of a cash incentive or a donation to the Wyoming Trapper's Association for each survey returned (Filion 1978, Faria and Dickinson 1992, Green 1996).

Atwood (1956), in one of the best known studies on response errors and recall bias and later supported by others, (MacDonald and Dillman 1968, Wright 1978, Mazurkiewicz et al. 1996) showed that waterfowl harvests were exaggerated by as much as 168 percent in follow-up mail surveys when compared to check station results. Sen (1973) examined recall bias across two periods (2 and 4 months) within the same season and found that lengthening the recall period from two 2-month periods to a single 4-month period resulted in higher estimates of waterfowl harvests (+13%) and hunting days (+46%). Internal-forward telescoping, i.e., for a specific time interval respondents may tend to report events closer to the time of questioning than in reality (Filion 1980) also could have been a factor in our survey. There seems to be a tendency for people to remember "the good ol' days" regardless of the actual facts. However, our results seemingly contradict remembrance of better years past since most respondents felt that predator and furbearer populations were increasing. Our respondents also reported declines for several species, including jackrabbits, which, interestingly, are classified as a predator in Wyoming and are not considered of special importance by many people within the state (M. McKinstry, personal observations). We realize that our respondents may have biased their results depending upon success rates and or local population trends in species that were not indicative of statewide trends. However, we felt that soliciting opinions throughout the state and by giving equal weight to each opinion minimized the bias. Regardless of actual trends in population levels, perceived trends can be important to wildlife managers and are often used as another piece of information to make decisions.

Trapping Participation

Despite societal, biological, economical, and ecological benefits from trapping, most citizens in the U.S. do not support trapping (Andelt et al. 1999). An opinion poll on trapping in Wyoming has not been done, and while the results would undoubtedly be different from Colorado due to our proportionally higher rural population, Colorado's citizens banned recreational and commercial leg-hold traps, snares, and poisons by a margin of 52 to 48 percent in 1996 (Cockrell 1999, Manfredo et al. 1999). Trapping in Wyoming is increasingly under criticism, especially in communities, e.g., Jackson and Cody, where people are more likely to have moved from outside of the region and where they have a greater opportunity to observe wildlife in park-like settings (Reed 1999). Many states are undergoing dramatic changes in trapping regulations and face severe restrictions, if not outright banning, of trapping methods (Andelt et al. 1999, Cockrell 1999). Coupled with reductions in

fur prices, demographic shifts in human populations (e.g., greater urbanization of population), less reliance on wild furs, and alternative choices for recreation, many trappers are quitting or reducing their efforts (Armstrong and Rossi 2000, Batcheller et al. 2000). Additionally, young people are not being recruited to the ranks of trappers in numbers that they once were. With decreasing trappers and increasing legislative restrictions, wildlife managers will face increasing problems with nuisance wildlife, reduced alternatives for dealing with endangered species-both capturing endangered species and reducing predation risks for endangered species, and a lack of biological data, e.g., age and sex of bobcats, from trapping harvests that can be used for demographic information to make management decisions (Armstrong and Rossi 2000, Conover 2001).

While Wyoming has never had a large number of trappers, they have contributed significantly in managing nuisance animals and providing information useful in managing furbearers, predators, and trophy game. Wildlife managers will need to consider these changes in trapping and hunting participation in order to effectively deal with management concerns of these species.

Species' Trends

Many members of the public and biologists within WGFD feel that several species of predators have been increasing over the last several decades. Notable among these have been coyotes, mountain lions, and avian predators, e.g., golden eagles (*Aquila chrysaetos*). Our respondents also felt that mountain lions, coyotes, red foxes, river otters, raccoons, and black bears have increased during the time that they have trapped or hunted them. Since our questions were not specific to a certain time period we do not have information on the time span over which these increases are thought to have taken place. Instead, our data represented trends from when the respondent first formulated a position on population data for these species. If the opinion was first formed when they began trapping and hunting these species, it is an average of 22.5 years ago.

The majority of respondents indicated that they would like to see increases in populations of all protected species with the exception of spotted skunks. They also felt that furbearer populations should be maintained at current levels. Since many trappers are motivated by monetary gain, and increasing populations of some species might mean increased trapping opportunities, it is interesting that many would like to see greater populations of protected species and stable populations for those that they harvest. This may emphasize the fact that many of them enjoy the recreational and aesthetic aspects of trapping and do not trap simply to earn money, which has been supported by others (Siemer et al. 1994, Daigle et al. 1998). Additionally, several trappers also commented that when animals are numerous and fur prices are high more people are drawn to trapping and these people are often untrained and unscrupulous. Our respondents may be separating themselves from these unethical behaviors, regardless of the monetary losses.

With the exception of mountain lions, black bears, and in some areas beavers, the species covered in our survey are not actively managed within Wyoming. These managed species have specific harvest quotas, and in the case of beaver have active introduction programs (McKinstry 2001, McKinstry et al. 2001). Forest management programs consider lynx, wolverine, pine marten (*Martes americana*) and fisher, but no programs address introductions, habitat improvement, or even extensive monitoring. Gray fox, swift fox, river otter, and spotted skunk are all protected from harvest but are only periodically or incidentally monitored. Furbearers are covered under harvest regulations set by the WGFD, but in reality few changes are made to manage their populations. Predators are not protected and may be taken throughout the year and by many different methods. As trapper

numbers decrease and managing predators and furbearers becomes more contentious, biologists in Wyoming will need to consider alternative practices for managing these species including longer seasons for the few remaining trappers, incentives for trappers that might include economic or social motivations, greater emphasis on damage management and research to find solutions to damage and conflict issues, and active programs to monitor these animal's populations and demographics.

Conclusions

Our survey was useful in identifying perceived population trends in certain species that are not available using more traditional techniques. It also highlighted the importance of recreation and fur prices as motivators for trapping and reliance on steel traps for taking furbearers and predators in Wyoming. Use of hounds also was identified as the primary technique for harvesting mountain lions. A majority of trappers and houndsmen wanted to see increasing populations of fully protected species, bobcats, and jackrabbits; stable populations for most furbearers and black bears; and decreasing populations of mountain lions and predators. Wyoming, like many other states (Armstrong and Rossi 2000) is experiencing a severe decline in people who participate in trapping and hunting furbearers and predators. With reductions in agency budgets, increasing demands for other activities, and growing intolerance of trapping and predator control, programs aimed at furbearer and predator management will increasingly become more difficult to justify and fund. In the future wildlife managers in Wyoming will need to develop alternative methods for managing furbearers, predators and trophy game species that are not tied to regulated harvests.

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Appendix A. Questionnaire used for mail survey of trappers and houndsmen in Wyoming.

MAMMALIAN PREDATOR SURVEY

1) Have you ever trapped or hunted furbearing, predatory, or trophy game species in Wyoming? (Please refer to Table 1 for a list of furbearing, predatory, or trophy game species.)

❑ **YES** ❑ **NO**

List of furbearing, predatory, and trophy game species that are referenced in this survey. Species categorization does not necessarily follow Wyoming Game and Fish Department designations.

Furbearers	**Predators**	**Trophy Game**
Beaver	Coyote	Mountain Lion
Muskrat	Red Fox	Black Bear
Pine Marten	Porcupine	
Mink	Black-tailed Jackrabbit	
Badger	White-tailed jackrabbit	
River Otter	Western Spotted Skunk	
Mink	Eastern Spotted Skunk	
Bobcat	Raccoon	
Lynx	Gray Wolf	
Wolverine	Gray Fox	
Fisher	Swift Fox	

If you have <u>not</u> trapped or hunted furbearers, predators, or trophy game species in Wyoming please stop here and mail in the survey.

~Thank you

2) How many years have you been a resident of Wyoming?_____years

3) Please indicate the number of years you trapped or hunted furbearing, predatory, or trophy game in Wyoming.

I trapped or hunted **furbearing** species for _____ years.
I trapped or hunted **predatory** species for _____years.
I trapped or hunted **trophy game** species for _____years.

4) Please indicate which counties and decades you trapped or hunted furbearing, predatory, or trophy game species in Wyoming (Follow the example provided in first line; please enter county name and place an "X" in the appropriate box).

County Name	1910-1919	1920-1929	1930-1939	1940-1949	1950-1959	1960-1969	1970-1979	1980-1989	1990-1998
Carbon					X	X	X	X	X

5) Please check all categories that describe why you participated in trapping or hunting furbearing, predatory, and trophy game species in Wyoming.

- ❑ **It was part of my work**
- ❑ **I did it for the money from fur sales**
- ❑ **I did it for recreation**
- ❑ **I did it to reduce livestock losses**
- ❑ **I did it to reduce populations of certain species (please list species)**

_____

- ❑ **I wanted the meat for consumption**
- ❑ **Other, please specify**

_____

6) Please check all methods that you have used to trap or hunt furbearing, predatory, and trophy game species in Wyoming.

	Furbearers	Predators	Trophy game
Steel and Snap traps (e.g. leg-hold, conibear traps).....	❑	❑	❑
Snares.....	❑	❑	❑
Shooting from aircraft.....	❑	❑	❑
Calling and shooting.....	❑	❑	❑
Denning.....	❑	❑	❑
Hunting dogs.....	❑	❑	❑
Box traps (e.g. culvert, Hancock traps, etc.).....	❑	❑	❑
Poisons (e.g. M-44's, 1080, arsenic, etc).....	❑	❑	❑
Other (please specify) _____	❑	❑	❑

7) Please indicate each decade that you attempted to trap or hunt the following furbearing, predatory, or trophy game species in Wyoming. (Please place an "X" in each box that applies.)

	DECADE								
Species	1910-1919 ☐	1920-1929 ☐	1930-1939 ☐	1940-1949 ☐	1950-1959 ☐	1960-1969 ☐	1970-1979 ☐	1980-1989 ☐	1990-1998 ☐
Mountain lion.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Black Bear.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Lynx.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Bobcat.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Coyote.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Red fox.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Swift fox.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Badger.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Raccoon.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Spotted skunk.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Wolverine.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Beaver.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Marten.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Fisher.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Mink.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
River otter.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Gray fox.....	☐	☐	☐	☐	☐	☐	☐	☐	☐
Jackrabbit.....	☐	☐	☐	☐	☐	☐	☐	☐	☐

8) **During the past 30 years (1968-98), do you feel the populations of the species listed below have increased, decreased, or remained stable in the areas you generally trapped or hunted these species. (Please mark one answer by putting an "X" in the appropriate box for each species.)**

Species	Increased	Decreased	Remained table	No opinion
Mountain lion	❑	❑	❑	❑
Black bear	❑	❑	❑	❑
Lynx	❑	❑	❑	❑
Bobcat	❑	❑	❑	❑
Coyote	❑	❑	❑	❑
Red fox	❑	❑	❑	❑
Swift fox	❑	❑	❑	❑
Badger	❑	❑	❑	❑
Raccoon	❑	❑	❑	❑
Spotted skunk	❑	❑	❑	❑
Wolverine	❑	❑	❑	❑
Beaver	❑	❑	❑	❑
Marten	❑	❑	❑	❑
Fisher	❑	❑	❑	❑
Mink	❑	❑	❑	❑
River otter	❑	❑	❑	❑
Gray fox	❑	❑	❑	❑
Jackrabbit	❑	❑	❑	❑

9) Please check all factors that you feel have contributed to increases or decreases in these species over the last 30 years?

Habitat refers to both quality and quantity of habitat available to the animal; density of prey refers to the quantity of food available to the animal; regulated harvest refers to trapping or hunting season regulations established by the Game & Fish Department; and federal or state regulations refer to federal or state laws that affected how these animals could be harvested.

Mountain lion: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Black bear: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Lynx: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Bobcat: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Coyote: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Red fox: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Swift fox: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Raccoon: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Wolverine: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Pine Marten: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Fisher: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

River otter ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Gray fox ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

Jackrabbit: ❑ habitat, ❑ density of prey, ❑ regulated harvest, ❑ federal or state regulations, ❑ other please specify_____.

10) Would you like the populations of the species listed below to increase, decrease, or remain the same in the county(s) you generally trap or hunt furbearing, predatory, or trophy game species.

Species	Increase ⩛	Decrease ⩛	Remain stable ⩛	No opinion ⩛
Mountain lion	❑	❑	❑	❑
Black bear	❑	❑	❑	❑
Lynx	❑	❑	❑	❑
Bobcat	❑	❑	❑	❑
Coyote	❑	❑	❑	❑
Red fox	❑	❑	❑	❑
Swift fox	❑	❑	❑	❑
Badger	❑	❑	❑	❑
Raccoon	❑	❑	❑	❑
Spotted skunk	❑	❑	❑	❑
Wolverine	❑	❑	❑	❑
Beaver	❑	❑	❑	❑
Marten	❑	❑	❑	❑
Fisher	❑	❑	❑	❑
Mink	❑	❑	❑	❑
River otter	❑	❑	❑	❑
Gray fox	❑	❑	❑	❑
Jackrabbit	❑	❑	❑	❑

11) Have you ever intentionally or accidentally harvested a:

Fisher	❑ YES	❑ NO
Wolverine	❑ YES	❑ NO
Lynx	❑ YES	❑ NO
River Otter	❑ YES	❑ NO

12) If you answered yes to any part of question 11, please indicate the year, county, and drainage where you harvested a fisher, wolverine, lynx, or river otter.

SPECIES	YEAR AND LOCATION OF HARVEST		
	YEAR	COUNTY	DRAINAGE
FISHER			
RIVER OTTER			
LYNX			
WOLVERINE			

13) Do you have records or diary of your trapping or hunting activities ?

❑ YES ❑ NO

14) If records exist, would you be willing to allow the Game & Fish Department to review these records for information on trends in these species numbers and distribution?

❑ YES ❑ NO

15) Please list the names and addresses of other people that could provide information on long-term trends in furbearing, predatory, or trophy game populations.

Name:_____

Address:_____

City, State, Zip:_____

Name:_____

Address:_____

City, State, Zip:_____

Thank you for completing the survey. If you have any further comments please write them in below. When finished please return the survey in the self addressed envelope and drop in any mailbox.

Additional comments:_____

_____

_____

_____

_____

_____