PRESENT AND HISTORICAL BOBCAT POPULATION TRENDS IN NEW MEXICO AND THE WEST

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ABSTRACT: Bobcat (Lynx rufus) populations throughout the West have reportedly decreased from the high levels of the early sixties. This decrease is also reflected in the annual New Mexico bobcat take of the U.S. Fish and Wildlife Service when based on a bobcat trapped per man-year of effort relationship from 1916 through 1976. Bobcat populations in New Mexico were comparably low from 1916 through 1948. In 1949 through 1950 populations began to increase to triple their highest pre-1948 levels by the late fifties. New Mexico bobcat populations began to decrease in the early sixties to present levels typical before 1948. The same New Mexico bobcat population trends reflected by this data are also reflected throughout the West in the combined bobcat take totals for the U.S. Fish and Wildlife Service in the western states. The bobcat population decrease from the early 1960's was not caused by habitat loss, fur trapping, or predator control. The unprecedented bobcat increase in the early fifties was in direct response to the general reduction of coyote numbers throughout the West by the use of sodium monoflouroacetate (1080) as a coyote control tool. After several years, coyotes began to increase their numbers, and bobcat numbers responded inversely by a decrease of their numbers down to present lower levels. Bobcat, skunk, fox, and badger numbers have all responded inversely to that of coyote numbers due to the coyote's role as an efficient competitor and predator upon these other carnivores.

INTRODUCTION

Bobcats, Lynx rufus, are presently receiving unprecedented attention from state and federal wildlife agencies as well as private wildlife interest groups. This concern has lead to the review of the species by the U.S. Fish and Wildlife Service as a possible candidate as an endangered or threatened species in accordance with the Endangered Species Act of 1973. Proponents for listing bobcats as endangered or threatened surmise that possible habitat loss, fur trapping, and excessive predator control are causing the alleged reduction of the species to what might be considered dangerously low levels.

The Endangered Species Scientific Authority (ESSA), upon preliminary findings, effective November 1, 1977, halted all export of bobcat pelts from the United States by the authority of the Convention of International Trade in Endangered Species of Wild Fauna and Flora (Federal Register, 1977). Their findings were based upon what they considered a lack of information about the species along with the declining bobcat catch of Animal Damage Control (ADC) personnel and the increased trapping pressure indicative of the present high fur prices.

Bobcat furs could only be exported if the ESSA was able to find that the export would not be detrimental to the survival of the bobcat. Most of the necessary information was provided the ESSA and export permits were issued to each state that qualified.

The purpose of this paper is to present data concerning present and historical bobcat population trends in New Mexico and the West. Those factors affecting bobcat populations are also discussed and an explanation for the decline of bobcat populations in the West is given.

BOBCAT POPULATION TRENDS

U.S. Fish and Wildlife Service (USFWS) ADC Division records from 1916 to the present indicate the number of bobcats taken by all methods and also include those animals released (Figure 1). The majority of these were trapped and USFWS trapping efforts do not fluctuate with the price of furs as does that of private fur trappers. Also, most of the bobcats are taken incidental to coyote control or as a preventive measure in areas where a historical problem with bobcats is known to occur. This is an important fact in that if the bobcats taken were strictly tied to the number of complaints received from sheep operators, then the decline of the sheep industry might bias the sample. However, this probably isn't the case since the number of sheep in the 17 western states declined by approximately 43% between 1940 and 1950, stabilized between 1950 and 1960, and then declined again between 1960 and 1975 to about 29% of the 1940 levels (Gee et al., 1977). During the major sheep industry decline of 43% between 1940 and 1960, the bobcat take increased by approximately 68% (Figure 1). Also sheep loss rates to predators are reported to have increased as sheep numbers have declined (Gee et al., 1977a). Considering the above, the USFWS annual catch totals should represent a constant percentage of the populations as has been used by Crowe (1975).

The New Mexico bobcat population trends, as reflected by ADC bobcat take, indicate an unprecedented bobcat increase in the early 1950's (Figure 1). This increase reached its peak in the early 1960's then began a steady downward trend to today's levels, equal to those experienced between 1916 and 1950.

New Mexico's bobcat population trend data in Figure 1 is also seen in the USFWS bobcat take for its total western ADC program (Figure 2). Figures 1 and 2 would only be reflective of each other if all of the western bobcat populations were fluctuating in generally the same manner, or if there were like reductions or increases in ADC manpower throughout the West. Some of the criticism of the data in Figures 1 and 2 concerns the fact that manpower changes have occurred in New Mexico and the western ADC program over time. ADC field people declined from about 750 in 1960's to about 400 people at the

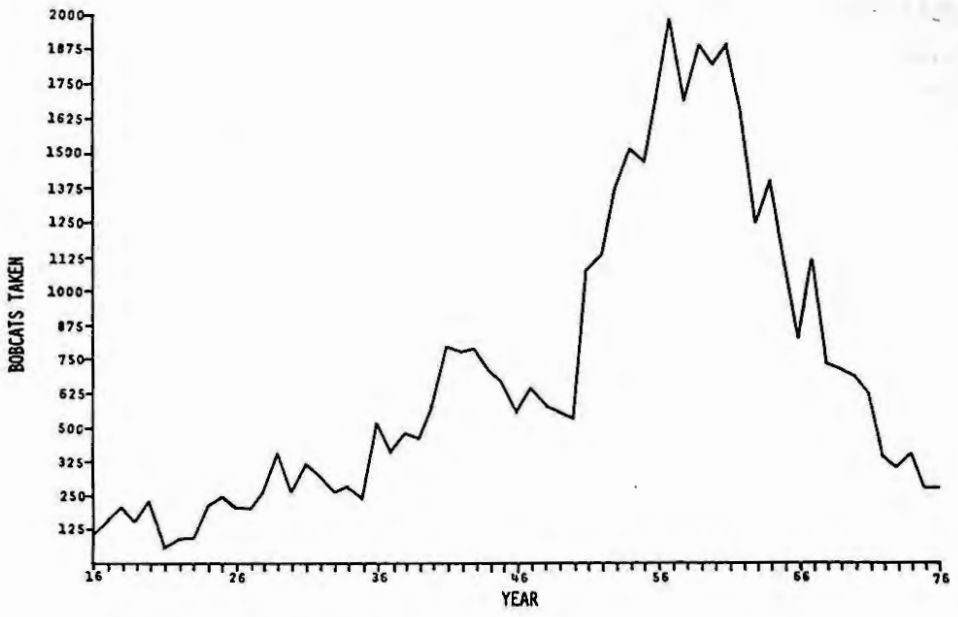

Figure 1. Yearly fluctuations of the bobcat population in New Mexico as reflected by USFWS annual take totals.

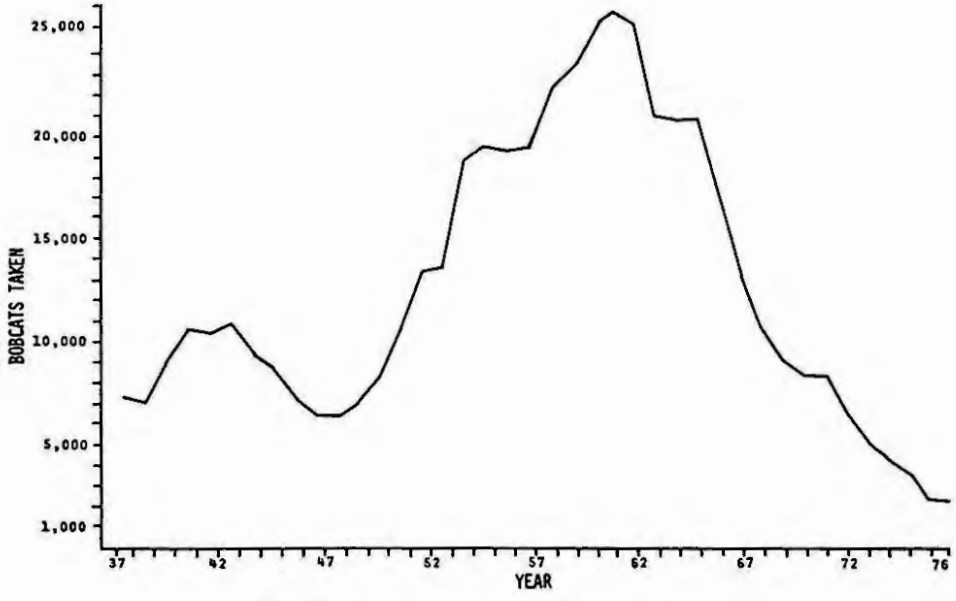

Figure 2. Yearly fluctuations of western bobcat populations as reflected by the combined USFWS annual take totals for the western states.

present (Federal Register, 1977). This nearly two-fold decrease in ADC personnel could have been partially responsible for the approximate eight-fold population decrease of bobcats since the early 1960's. In order to determine the effects of this manpower decrease upon the take of bobcats, a standardization of effort must be utilized.

To correct for the manpower changes, it was found that the number of man-years of effort utilized in the New Mexico, ADC program could be extracted from ADC records available back to the conception of the program in 1916. This information allows a standardization of the USFWS trapping effort in New Mexico which would solve some of the concern about the data in Figures 1 and 2. The number of bobcats trapped, including those animals released per man-year of effort relationship, should depict an even more representative indicator of bobcat population trends. Figure 3 reflects the same population trend as do Figures 1 and 2. These similarities reinforce these data as population trend indicators. This

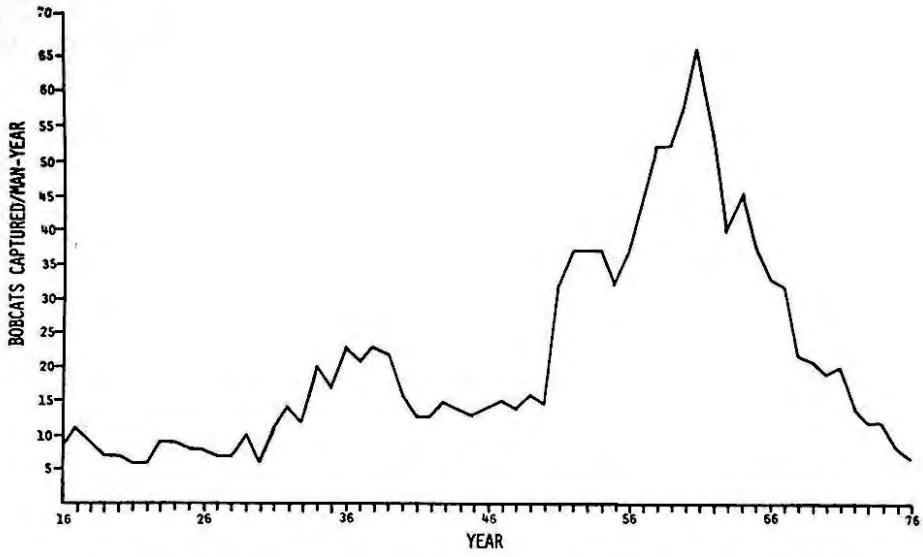

Figure 3. Yearly fluctuations of the bobcat population in New Mexico as reflected by USFWS annual catch totals per man-year of effort.

same standardization method has been used on Utah's ADC bobcat take and the same population trends developed (Cain et al., 1972). This data also indicates that the gradual ADC personnel declines were not great enough to alter the overall accuracy of the information in Figures 1 and 2. Similar methods have been used by Cain et al. (1972) to depict coyote, Canis latrans, population trends.

In 1960, the USFWS began recording the number of trap-years of effort conducted in their ADC programs. This catch/trap-year ratio data, which includes those animals released, also provides a gross index to bobcat population trends (Figure 4). This data also supports Figures 1 through 3 by depicting a high bobcat population level in the early sixties with a steady decline to present levels.

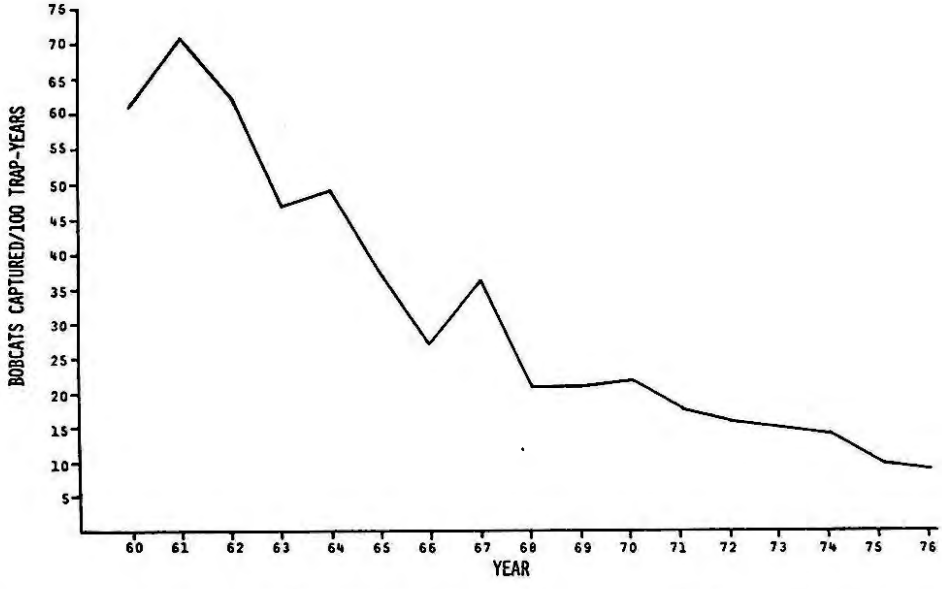

Figure 4. Yearly fluctuations of the bobcat population in New Mexico as reflected USFWS annual catch totals per 100 trap-years of effort.

Linhart and Robinson (1972) reported on some standardized trapping studies conducted in sustained coyote control areas in New Mexico, Colorado, and Wyoming. These studies have been conducted once every ten years since 1940 in order to obtain gross indices to bobcat and other non-target species populations that may have been affected by coyote control operations. The combined results for all the sample areas depict the same general bobcat population trends as do Figures 1 through 4.

POSSIBLE BOBCAT POPULATION LIMITING FACTORS

The recent concern about bobcats has been connected with its present population decline. However, taking the previous data in perspective, the dramatic bobcat population increases in the early 1950's may be the most important factor in determining the reason for the bobcat's decline and if their present populations should be considered threatened or at just normal levels. Some of the suggested reasons for the bobcat's decline are discussed below in relation to the previous data.

Habitat Loss

Wildlife habitat loss is the single most important adversity facing our wildlife populations. It has, of course, affected specific bobcat populations, but it probably isn't the major factor in the bobcat's decline. This is true because they have also declined in areas of good habitat and the decline has been relatively rapid. Also, if Figures 1 through 4 depict actual population trends, then the lack or abundance of habitat didn't have much to do with the bobcat's increase or decline. This can be seen in the population trends from 1916 through the early fifties in that populations were maintained at lower levels even when more habitat should have been available.

Fur Trapping

Fur trapping is receiving excessive criticism as the reason for the bobcat's decline. However, the information presented in Figures 1 through 4 does not support this conclusion. There was a drop in the fur market at about the same time as the bobcat's big increase which began around 1950. However, drops in the fur market also occurred during previous periods from 1916 through 1950, especially during the war years, and a significant bobcat increase did not develop. Also, fur trapping did not start the decline of bobcat populations. This is because as Figures 1 through 4 indicate, the decline of the bobcat began in the early sixties and it wasn't until the late sixties before the fur market began a come back and not until the middle of the 1970's that unusually high fur prices were being received. Also, the incentive for trapping in one state as compared to another, varies due to the better fur conditions and desirable fur colorations from one area to another.

As shown by Table 1, the bobcat catch in New Mexico is not out of line as to that taken historically. This is especially true when considering the take and population trends of the 1940's compared to that of today. The bobcat would hardly have been considered to be endangered at that time and properly so.

Excluding urban areas, all of New Mexico is considered to be bobcat habitat. Also, in many areas of public and private land in New Mexico bobcat trapping is not allowed. The number of fur trappers in New Mexico could not effectively cover the many square miles of habitat in the state. This is even assuming that each trapper was an effective and full-time bobcat and fur trapper.

In the 1975 and 1976 fur seasons, the number of bobcat trappers doubled in New Mexico (Table 1) but the bobcat take did not double, which might indicate undue trapping pressure on a decreasing population. However, an increase in the number of coyote trappers did not increase their take in proportion to that of the plentiful coyote either. This leads to the conclusion that there are many novice, part-time fur trappers in the field.

Another reason which reflects that fur trapping is not the major limiting factor in bobcat population is the fact that badger, skunk, and fox populations in New Mexico show like trends to that of the bobcat. These carnivorous species include Taxidea taxus, Mephitis mephitis, Mephitis macroura, Spilogale gracilis, Conepatus mesoleucus, Vulpes vulpes, Vulpes velox, and Vulpes macrotis. With the varied markets for the specific species, it is doubtful that all of these species are receiving the same amount of trapping pressure now or in the past.

Predator Control

As shown in Table 1, the number of bobcats removed by ADC personnel does not compare in numbers to those removed by private fur trappers, and even the combined numbers are acceptable considering New Mexico's present bobcat population. The effect of predator control upon bobcats is not a direct factor in the decline of the bobcat today. However, it may be a very important indirect factor in the increase and decrease of the bobcat populations in the West through the reduction of coyote numbers.

In relating to their population model for coyotes, Connolly and Longhurst (1975) point out that in most situations, the removing of less than 75 percent of the coyotes in a population would merely stimulate reproduction and no sustained population decline could be realized. The principles of population dynamics which apply to coyotes also applies to other animals. Through natural compensations such as increased birth rate and reduced natural mortality, the effects of removing individual bobcats from a specific population would not present a problem with the population.

Table 1. Bobcat fur harvest and Animal Damage Control recovery for New Mexico.

New Mexico

Season	State Harvest	Trappers	Price per Pelt	ADC Recovery
1940	3,403			582
1941	5,151			783
1942	7,292			775
1943	3,989			785
1944	4,000			701
1945	5,276			655
1946	4,500			562
1947	4,000			641
1948	4,000			579
1949	3,000			561
1950	3,600			533
1951	3,500			1067
1952	3,000			1222
1953	2,500			1352
1954	1,379			1504
1955	2,075			1469
1956	1,000			1691
1957	209			1989
1958	663			1690
1959	319			1885
1960	367			1817
1961	638			1873
1962	732			1631
1963				1240
1964	200			1388
1965				1128
1966	1,500		$ 12.00	839
1967				1109
1968				742
1969	300		$ 13.59	715
1970	1,589		$ 13.59	686
1971				619
1972				403
1973	3,137	274	$ 51.39	355
1974	1,945	350	$ 48.16	406
1975	3,100	430		283
1976	5,077	857	$130.87	276

The major coyote control tools utilized historically throughout the West were steel leg-hold traps, 1080, strychnine, coyote getters, M-44's, and aerial hunting. To examine the effects of predator control in removing enough bobcats to adversely affect their population is to examine the effectiveness and nonselectiveness of each of the control tools used in predator management.

A. Strychnine: For many years, strychnine hand-placed baits were a major coyote control tool (Fig. 5) in New Mexico and the West. Strychnine is an effective toxicant for many carnivorous species when placed in the center of a bait made from hamburger, lard, or tallow (Anderson, 1969). However, as reported by Young (1958), it was extremely rare that a bobcat could be induced to take a poison bait. This is due both to its natural behavior of killing prey and also relying on its hearing and sight senses rather than its poor sense of smell. The use of strychnine was terminated in 1972 due to the lack of a Federal registration for that use and also Presidential Executive Order 11643.

B. Traps: Steel leg-hold traps are the single most effective method of fur harvesting or removing problem bobcats throughout the West. This method accounts for the majority of the animals harvested by private trappers or taken by Animal Damage Control personnel. When using traps, bobcats can be released unharmed if they are not a target species.

C. Coyote Getters/M-44's: The coyote getter was a device which expelled sodium cyanide into the animals mouth by a .38-caliber blank shell. It was replaced by the humane, safe, and selective M-44 device which expells sodium cyanide mechanically by a plunger thrust by a spring upon activation. Very rarely does a bobcat pull either of these devices. In fact, no bobcats have been taken in New Mexico by USFWS personnel with the M-44.

D. Aerial Hunting: Very few bobcats are ever taken by aerial coyote hunting operations in New Mexico, and only then, when bobcat damage is occurring. Aerial hunting for bobcats is not too effective since bobcats usually occupy areas of dense cover like that of the pinon-juniper areas of New Mexico.

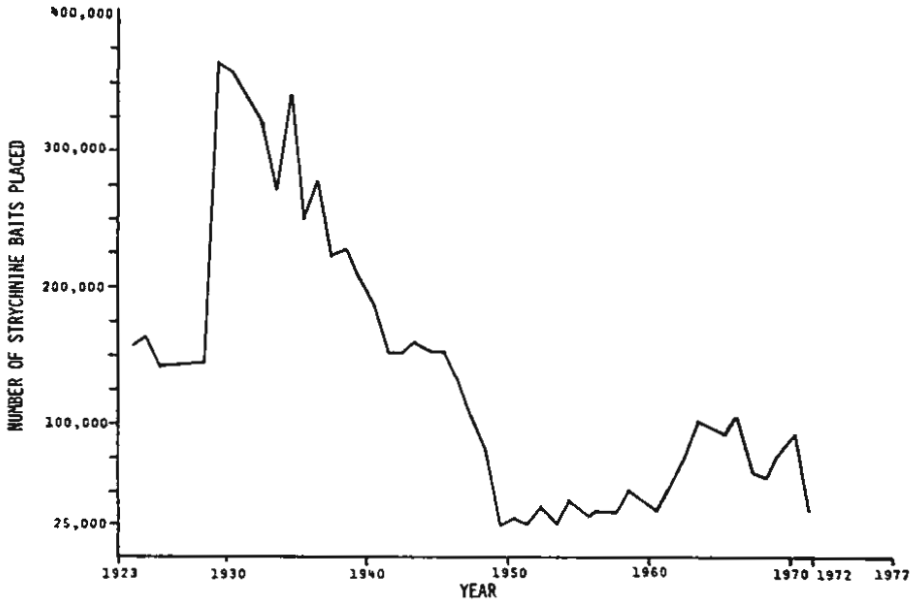

Figure 5. Annual number of strychnine baits placed in New Mexico.

E. 1080: The laboratory number 1080 depicts a very effective and selective predacide called sodium monoflouroacetate. An amount of 1.6 grams of this toxicant was placed in 100-pound animal carcasses, usually burro, horses, or sheep, and distributed at a rate not to exceed an average of one per township in a control unit. As with strychnine, bobcats rarely were affected by this toxicant either because of their failure to utilize the bait or failure to consume a lethal dose of this nonaccumulative canine selective predacide. At this dosage, a 22-pound bobcat must consume 6.6 ounces of 1080 treated bait in order to obtain a lethal dose. The use of this toxicant was discontinued in 1972 due to lack of a Federal registration for this specific use and Presidential Executive Order 11643.

F. Predator Control Effects Upon Bobcats: As suggested above, the use of strychnine, 1080, coyote getters, M-44's, traps, and aerial hunting in ADC operations have not either alone, nor collectively, adversely affected the bobcat populations of the West. Also, ADC operations are conducted only on a small percentage of the land in New Mexico that could be worked. This is also true of other western ADC operations. In fact, in the 17 western states there are 17.5 million acres of land in national parks, monuments, and wildlife refuges where no predator control is allowed (Johnson and Gartner, 1975). Also, it has been reported that only about 10-25% of the land area in the western United States is under control at any one time (Balser, 1974). As better information becomes available, it will probably reflect even much smaller percentages of land under control operations, especially operations on Federal lands. There is a direct relationship with the use of 1080 as a coyote management tool and the direct increase of bobcats, as well as fox, skunks, and badgers. The use of 1080 began in 1948 with the highest use in 1950 in New Mexico (Fig. 6). The effectiveness of this tool in reducing general coyote numbers had not been surpassed as indicated by accounts in the records of the USFWS, Linhart and Robinson's (1972) trap/catch population indices, Figures 1 through 4, and also the knowledge of ADC field personnel.

Figure 7 illustrates the number of coyotes trapped per man-year of effort by ADC personnel in New Mexico. This trend data is less reliable than that of the bobcat data since the coyote is the target species in most cases and is much more affected by control operations than non-target species. This is especially true with the use of strychnine and the even slower acting canine selective 1080, in that coyotes taken by these methods were usually not accounted for since they would travel away from the bait stations before dying. However, even with the above in mind, Figure 7 does show an impressive decrease in coyote numbers with the initial use of 1080. This same decrease occurred in six other western states examined, and it was also shown that a relationship existed between the degree of coyote population decline and the number of 1080 stations used (Cain et al., 1972).

With the introduction of 1080 and the resultant general decline of coyote numbers, the bobcat increased its numbers to unprecedented rates due to less competition for food resources from coyotes and also a commonly overlooked factor in bobcat/coyote relationships, that of direct predation of coyotes upon bobcat adults and young. As reported by ADC field personnel and FWS records, the depressing effect of 1080 on the coyote population in New Mexico lasted for several years. Some of the theories as to why coyotes later increased includes coyotes becoming "wise" to the 1080 control method, that the initial high use of more compound 1080 bait stations was much more effective than the lowered sustained use of these stations as it was usually administered, and that 1080 selected against carrion eating coyotes in favor of those that didn't consume carrion. These noncarrion eaters were not affected by the use of 1080, and thus increased in numbers passing their dislike to carrion on to their offspring.

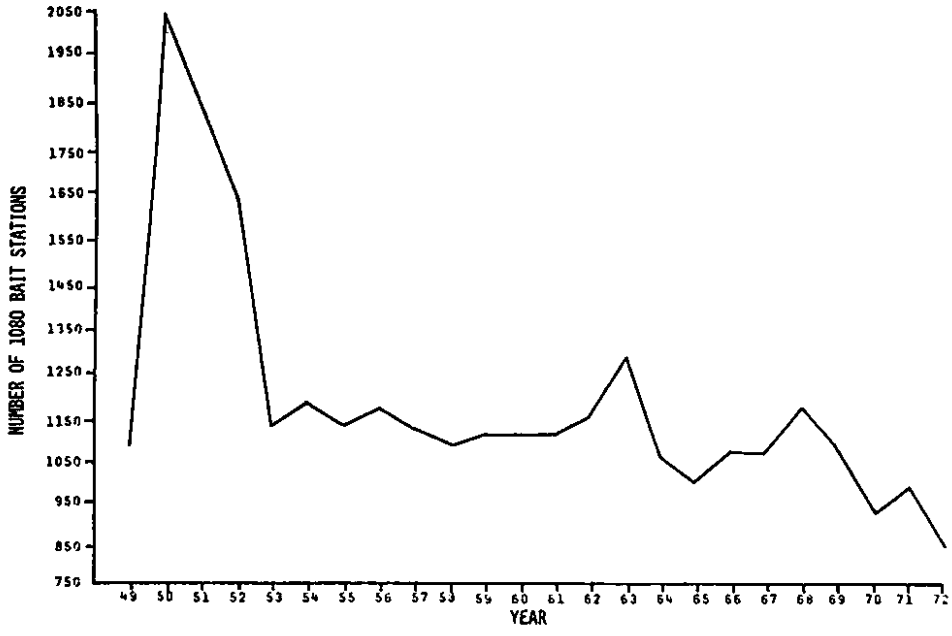

Figure 6. Annual number of 1080 bait stations placed in New Mexico.

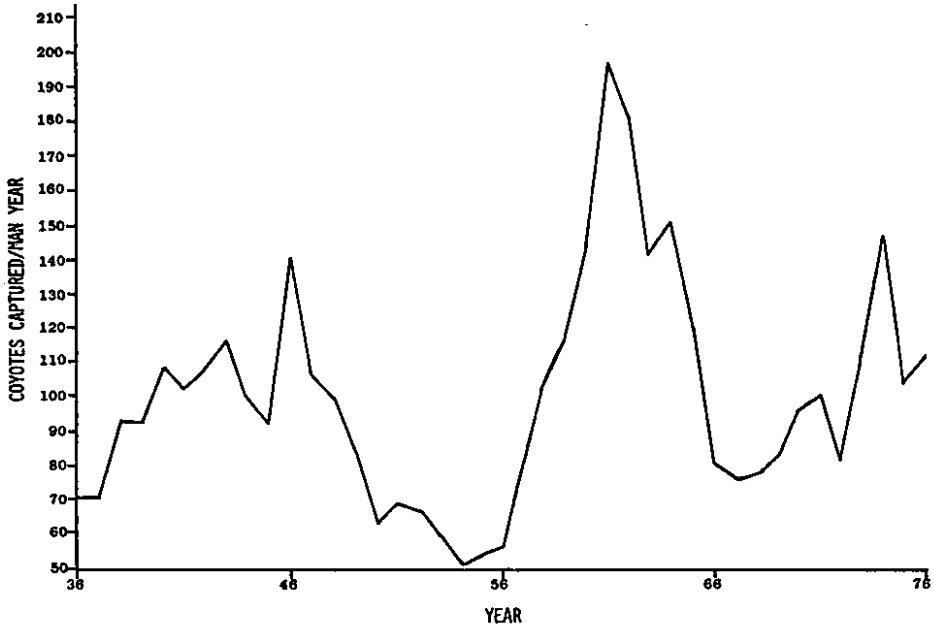

Figure 7. Yearly fluctuations of the coyote population in New Mexico as reflected by USFWS catch totals.

BOBCAT STATUS

The material presented depicts a decrease of bobcat numbers from their high levels of the 1960's. This observation alone might indicate bobcats were in trouble. However, the total data present a very different picture. Over the period from 1916 to the present, the current bobcat population trends seem to be more normal than that of its preceding high levels in the early 1960's.

The dramatic increase of the bobcat in the late fifties and their later decrease is keyed more to the direct reduction of coyote numbers by the use of 1080 than anything else. The same population response developed in fox, skunks, and badgers (Nunley, 1977). These responses to coyote numbers are probably in direct reaction to food competition and more so to predator-prey relationships of coyotes

preying upon other carnivores. Also, since the same bobcat population trends were West-wide, these trends cannot be said to have been caused by natural cycles in response to food supplies. It is highly unlikely that the same environmental conditions would occur West-wide and produce the same reactions from all of the bobcat populations.

It is my conclusion that coyote numbers are a major limiting factor upon bobcat populations with predation playing a significant role. In order for bobcats to return to their once probably man-induced high, general coyote numbers will have to be reduced. The use of 1080 was the only predacide giving adequate general coyote population reductions for prophylactic control purposes. No mechanical control means can equal 1080's success in prophylactic control.

Bobcat populations seem to be in line with those levels prior to the use of 1080 and they were in no danger at that time, nor should they be considered so at this time.

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