

## FIGHTING ANIMAL ENEMIES BECOMES A FEDERAL RESPONSIBILITY

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When Arizona became a state, populations of wild ungulates were at their nadir. The state's rangelands were depleted due to overstocking of cattle and sheep along with a series of droughts. The big predators—wolves, mountain lions, and to a lesser extent grizzlies—had switched to feeding on livestock, rather than following their natural prey into oblivion. The high reproductive rate of wolves and the cryptic nature of lions allowed these animals to maintain a sizeable, if not growing, presence, despite being hunted by bounty hunters, ranchmen, and trappers.

Stockmen argued that livestock husbandry could not be an economic success as long as wolves and other predators decimated their herds, and lobbied for government intervention to solve the "problem" (Brown 1983, 1985b, 2009). Although hunters pretty much agreed that wolves, mountain lions, and coyotes had to be reduced or eliminated for game populations to recover, it was the ranchmen who hired most of the bounty hunters and convinced the US Forest Service to hire "forest guards" (forest rangers specifically assigned to the tasks of trapping big predators while guarding the national forests from fire, illegal logging, and open-range grazing).

### Roots of Federal Predator Control

Whatever the desire of its citizens, Arizona had no enabling legislation authorizing the State Game Warden or any other state government agency to perform predator control. As a result, most of the predator killing was done by Forest Service guards and freelance bounty hunters—local men well versed in the art of trapping.

In addition to the sale of the pelt, the primary motivation for hunting predators was a territorial law establishing bounties, which had been carried over to statehood on May 20, 1912. This act prescribed that the county board of supervisors *shall* pay \$10 for *lobes* (wolves) and mountain lions taken within their county; other bounties were discretionary, stating that the county *may* pay \$2 for coyotes, \$1 for bobcats or wildcats, 25 cents for raccoons, and a nickel each for prairie dogs, gophers, and jackrabbits, provided that the hides were presented for inspection in their entirety (both ears in the case of jackrabbits). After an affidavit was signed stating that the animals were taken by the presenter in the county making payment, the hides were marked but not mutilated (to retain their commercial value).

The amounts paid out only hint at the relative damage alleged as being done by the malefactors. Wolves were odious to Western ranchers, who thought it particularly unfair for the national forests to collect grazing fees without providing any protection from these and the other predators found on the lands they administered. Agreeing with this argument, and wanting to build a political constituency for the Department of Agriculture, the US Biological Survey was all too eager to take on the role as the nation's wildlife control agency.

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Jesse Ellison, owner of the Nail Ranch below the Mogollon Rim, with recently taken grizzlies and black bears. Homesteaders and ranchers were heavily involved with predator control for recreational and economic reasons and took far more big predators than did the PARC. (Arizona Historical Society/Tucson, #53899, Folder 1, PC 040)

Vernon Bailey, staff biologist for the Biological Survey, had written a bulletin in 1907 describing the problem with wolves, titled *Wolves in Relation to Stock, Game and the National Forest Reserves*. This publication, accompanied by another, *Directions for the Destruction of Wolves and Coyotes*, described existing conditions and provided a prescription for relief.

The enormous losses suffered by stockmen of the western cattle ranges and the destruction of game on forest reserves, game preserves, and in national parks through the depredations of wolves have led to special investigations by the Biological Survey in cooperation with the Forest Service, to ascertain the best methods for destroying these pests. The results appear in the present report, which includes also field notes on the distribution, abundance, and breeding habits of wolves.

The chief object of the report is to put in the hands of every hunter, trapper, forest ranger, and ranchman directions for trapping, poisoning, and hunting wolves and finding the dens of young. (Bailey 1907)

Needing a constituency to retain the national forests in federal ownership, the Forest Service became an eager proponent of predator control. Nor was the Forest Service's effort limited to producing bulletins. Bailey (1908) reported that in one year Forest Service personnel removed 127 wolves from Arizona's national forests—a number that government hunters would never surpass in the war against predators that was to follow.

Bounties, although popular among the public, presented problems and were inefficiently applied, whether paid by the rancher or the county. Professional hunters were



January catch of one wolf and coyotes by US Forest Service hunter T. B. Bledsoe (lower right) on the Kaibab National Forest, ca. 1914. (Arizona Historical Foundation, Will C. Barnes Collection)

naturally most eager to hunt or trap in those areas where predators were abundant and bounties generous. Should their efforts have the desired results, and predator numbers be reduced, interest and funding would wane. Bounties were also prone to abuse, with hunters seeking out the areas where the most animals were available, even if it meant bringing in hides from Mexico or out of state. Thus, once a notorious stock-killer was taken, or a population of a particular predator reduced in numbers, the tendency was to move on until another stock-killer showed up or the predator population recouped its losses.

Variations in fur prices could also frustrate attempts at predator control, as interest fell off in years and months when fur prices were low or not at their prime. Identification of animals turned in for bounty could also be a problem, and fraud was thought to be common—so much so that Bailey (1909) published a key to help bounty payers differentiate between the scalps and hides of wolves, coyotes, feral dogs, and other animals submitted for payment.

Pleased to have ranchmen as political supporters, the administrators of the Southwest's national forests eagerly joined into cooperative agreements with the states of New Mexico and Arizona to hire forest guards to enforce the laws and remove predatory animals. Wolves and mountain lions were the primary targets, but stockmen also lobbied for the taking of "big bears," i.e., grizzlies and stock-killing black bears. Again, it was reasoned that federal assistance was only fair, as the national forests harbored most of the black bears and nearly all the grizzlies.

Many sportsmen were of like mind with ranchmen when it came to predator control, especially bounties. They needed little urging to join the livestock interests in wanting the federal government to kill the predators that were also killing what game remained. Although forest guards were doing their job in controlling wolves and mountain lions, they had other duties to perform and were not always able to respond with the commitment desired. What was needed, in the minds of the anti-predator forces, was a control program that would concentrate on removing not only predators, but other "noxious animals." Ranchers and forest rangers alike strove to reduce or eliminate prairie dogs, porcupines, and other "varmints" competing with livestock for forage or otherwise damaging the economies of the rural West. The Biological Survey was eager to accomplish this task, provided sufficient appropriations could be found and enough competent hunters hired.

In 1914, J. Stokley Ligon was mapping and poisoning prairie-dog towns near Springerville for Gustav Becker and other ranchers who wanted these animals eliminated. An ardent "conservationist," Ligon had recently taken up the cause against predators and noxious animals—a cause in which he was joined by a young forest ranger named Aldo Leopold (Shaw 2011). The two men stumped Arizona and New Mexico, lecturing ranchers, sportsmen's organizations, and anyone who would listen, on the need for better game laws, more game refuges, and government predator-control. Both men believed predator control was an essential component of game management, and that the agency best able to do the job was the Biological Survey—a federal bureau already in place and charged with eliminating nuisance wildlife (Robinson 2005).

The lobbying efforts were successful. On June 30, 1914, Congress made the Biological Survey responsible for experiments and demonstrations in destroying wolves, prairie dogs, and other animals injurious to agriculture and animal husbandry. A sum of \$125,000 was appropriated for fiscal year 1914-15 and 300 hunters hired to carry out the mission throughout the West. Now was the time, Ligon and Leopold harangued the sportsmen, to throw all their support behind the Biological Survey and insist that the job be finished to the last wolf and lion, lest these "vermin" regain the range (Brown and Carmony 1990). By the close of fiscal year 1916, Western rangelands had been organized into control districts under competent supervisors with a cadre of professional hunters. The inspector for the New Mexico-Arizona district was none other than Stokley Ligon.

#### The PARC Wastes No Time

Ligon wasted no time in getting his district's Predatory Animal and Rodent Control branch organized and functioning, hiring his first trapper in September 1915. Most of the remainder of the year he spent experimenting with predator trappers and lion hunters—some of whom were irresponsible and did more harm than good. Even worse, some achieved poor catch records. Only half the men hired were deemed worth keeping. By June 1916, Ligon had whittled his force down to 24 men, having tried out 332.

A hunter and trapper himself, Ligon used the \$20,000 appropriated for the New Mexico-Arizona district to hire hunters with a reputation, including about a dozen well-known "wolfers." Some of the best of these were former bounty hunters, men such as Jack Hays, Eddie Ligon, and E. E. "Eddy" Anderson of Douglas, Arizona, with Anderson

assigned to work the border country of southeast Arizona and southwest New Mexico. All agreed wolves would be the primary target, as this was the species causing the greatest damage.

New Mexico was emphasized over Arizona, due to this state's better wolf habitat and bigger wolf problems. Arizona was not ignored, however. That year, Eddie Ligon claimed the PARC's first wolves in Arizona in the Cherry-Mingus Mountain region and in the rugged Fossil Creek area. During its first short year of operation, PARC's hunters only took 33 adult wolves and 36 pups and fetuses in the district through the use of traps, poison, and denning<sup>1</sup> (Ligon 1916). Things were just getting started.

Ligon (1916) outlined a battle plan for the following year, again emphasizing the need to take wolves:

While we have not carried on the wolf work so extensively in Arizona as we have in the state of New Mexico, we have done some good service in Arizona and it is with pleasure that I state that it is my . . . estimate that there are not more than 70 adult gray wolves in the State of New Mexico at the present time, and perhaps that same number in Arizona.<sup>2</sup>

Ligon hated professional bounty hunters almost as much as the wolves themselves, as these men not only competed with his government hunters, they tried to undermine the work of his government men with the county boards of supervisors, sheep herders, and small cattle outfits, leaving him to work mostly with the Forest Service and the larger cattle ranches. Like other early-day predator-control inspectors, Ligon sold his program on the basis of continued performance and quality control, and he deeply resented sheep herders and their dogs for purloining government-obtained carcasses and setting off and stealing traps on the government's inventory. His own employees could also be a problem, and he constantly harangued them about not turning in hides for inspection and failing to send in the skulls of porcupines and other catches to the National Museum as requested.

Ligon was especially conscious of the need to demonstrate cost effectiveness. He calculated the cost of the 3,201 days worked by his 33 hunters as \$8,476.66 during fiscal year 1915-16. This cost was more than offset by the damage purportedly done by the 69 wolves claimed (3 of which he took himself), not to mention the 6 lions, 358 coyotes, 103 bobcats, 27 porcupines,<sup>3</sup> 11 eagles, 7 bears, 94 fox, 50 skunks, and 21 badgers taken that year (Ligon 1916).

Fiscal year 1916-17 saw the PARC expand its efforts in Arizona, particularly in regard to wolf work, which was not only the agency's top priority, but also required the most expertise and dedication. By now, many of the best bounty hunters in the Southwest were working for PARC, including the legendary Ben V. Lilly. The salaried government hunt-

<sup>1</sup> Digging out and killing pups in the den.

<sup>2</sup> With only a few wolves killed in Arizona by PARC hunters, most of the wolves had to have been taken by Forest Service guards, bounty hunters, and fur trappers.

<sup>3</sup> The Forest Service considered porcupines a major source of damage to young ponderosa pine trees and wanted them killed whenever possible. Although Biological Survey biologists such as Mark E. Musgrave and Walter P. Taylor recognized that this overabundance of porcupines was probably due to lion-control, they reasoned that killing porcupines was less costly than the losses that would be incurred from letting up on lions (Brown and Babb 2009).



The Predatory Animal and Rodent Control branch of the Biological Survey counted coyotes among the animal enemies to be reduced. In fiscal year 1915-16, 358 coyotes were reported taken by PARC hunters. (AGFD files)

ers were gaining the respect of the ranchers due to their ability to remain on the range until the job was done.

Most important, larger kills were now being reported. Ligon (1917) predicted wolves would soon be eliminated from both Arizona and New Mexico, where some 40 hunters were now working at a cost of \$14,718.92 (of which \$4,009.33 was spent in Arizona). The year's take in Arizona was 13 wolves, 14 lions, 1 jaguar, 5 bears, 200 coyotes, 41 bobcats, 45 foxes, 22 skunks, 2 raccoons, 18 badgers, and 41 porcupines. There was also progress on the political front. The Arizona State Legislature passed an act in 1917 authorizing counties to assess a property tax, with the monies to be used in cooperation with the Biological Survey to destroy prairie dogs and other noxious rodents.

One species, the grizzly, was already on its way out. C. Hart Merriam (1922), using information supplied by Ligon and other Biological Survey staff, listed grizzlies as extant in Arizona only in the White Mountains region, the rugged wilderness area south of Bill Williams Mountain, two locations below the Mogollon Rim, and in the Catalina and Rincon mountains. These estimates were too generous and already outdated. The last grizzly below the Mogollon Rim in Gila County had been killed in 1915 and grizzlies west of the White Mountains and south of the Gila River were fast disappearing (Brown 1985b). Even the more common black bear was by now reduced in both numbers and distribution, as stockmen and PARC agents considered all bears to be stock-killers at some time or another (Ligon 1917).

All the animals mentioned in Ligon's 1917 report from Arizona appear to have been taken through the use of traps and dogs, but PARC hunters in New Mexico were using

poison baits and other "predicides" against wolves, and a poisoning campaign was being planned for the coming winter in Arizona. While in common use by ranchmen and bounty hunters, poison had not yet been emphasized as a government control-method in Arizona, due to the objections of houndsmen and fur trappers whose lion dogs were susceptible to the poisons then in use. Strychnine and other poisons would prove to be indiscriminate killers, removing not just the target animals but other species with which they shared habitat.

Ligon and the PARC were uncertain about the effectiveness of using poisons on lions and other animals, as the natural history and behaviors of several target species were still unknown.<sup>4</sup> The taxonomy of some species was as yet uncertain, and the Biological Survey requested that the skulls and hides of certain animals taken by PARC agents be turned in for shipment to Washington and the National Museum for scientific description.

### Arizona Gets Involved

In the first years of statehood, Arizona remained relatively uninvolved in predator and rodent control issues, relegating even the payment of bounties to the counties. That the state was leaving control efforts up to the federal government was surprising, given the political strength of the livestock industry and Hunt's strong belief in states' rights when it came to wildlife matters. Whether the reason for the laissez-faire attitude was mostly philosophical or financial is unknown, but neither State Game Warden George Willard nor his fledgling department engaged in either type of control. This would soon change.

When America entered World War I in 1917, an increased demand for beef caused a rise in cattle prices. Ligon and his stock-raising constituency were quick to use the war to intensify their battle against predators. Any and all cattle losses meant dollars taken away from the war effort, and exaggerated claims of the damage wreaked by predatory animals were repeated in speeches throughout the Southwest. Ligon and the PARC used large dollar figures for estimated losses to justify increasingly greater appropriations to fund their efforts, and although game proponents such as Aldo Leopold may not have agreed with the statistics, they supported greater expenditures to hunt down predators. More control was obviously needed, and killing predators and rodents cost money—money needed to field personnel and outfit them with traps and poison. With the economics based on an "estimated" basis rather than a more objective cost-benefit analysis, it was hoped that what Congress and the state legislatures did not provide in the way of appropriations, state and livestock cooperators would.

In 1917, the legislature authorized counties to levy a tax of 1/4 mil (1/20 of a cent) on all real personal property for a prairie-dog fund to be used solely for destroying noxious rodents. Once a county tax was levied, that county would hire agents to distribute poisons to cooperating ranchers and farmers, who would coordinate their work with state and federal officials. The program would be activated once 100 landowners had petitioned

<sup>4</sup> Lilly, for example, told Ligon (1917) that mountain lions could raise two litters of young per year and Musgrave requested seeing porcupines mating in the "missionary position." (Taylor 1935a)

to participate. Only landowners in counties not paying a bounty on the animals to be poisoned were eligible. This legislation became moot when the legislature appropriated \$25,000 on June 18, 1918, for the destruction of both predators and rodents on the condition that Congress appropriate a like amount to the PARC.

### PARC's Influence Grows

The war year of 1917-18 was important to the PARC in Arizona. Although Ligon (1918) complained of the difficulty of hiring and retaining competent men during wartime, and continued to stress the problem of some ranchmen's favoring bounty hunters over his PARC personnel, he was increasingly satisfied with the progress being made in the numbers of animals destroyed. His district's take for the year included 111 wolves (30 in Arizona), 42 lions, 6 bears, 1,310 coyotes, 215 bobcats, 192 foxes, 97 skunks, 13 raccoons, 72 porcupines, 85 badgers, 2 peccaries, 2 wild dogs, and 2 black-footed ferrets—the Biological Survey's totem animal (Ligon 1918). Ligon considered the wolf in Arizona to now be so reduced in numbers as to cause no serious financial losses. He thought that much progress had also been made in controlling lions and "big bears" despite there being only three good houndsmen still working in Arizona (Lilly, J. Ramsey Patterson, and T. T. Loveless).

Ligon now sought to incorporate two major changes in his district's operations. First, the New Mexico-Arizona district would support the parent agency's new program of using methods other than trapping to kill coyotes—now the number one cause of financial loss. Second, the district would conduct research studies to better determine the amount of damage being done by the smaller species.

Given his new directives, Ligon wanted the PARC to be divided into a field inspection branch that would do the actual control work, and a scientific research branch that would determine how to best alleviate losses to domestic stock. Interestingly, his plans made no mention of the Arizona Game and Fish Department or the need for predator control for game-management purposes. That his was an effective political strategy was made clear when the legislature voted to make Arizona a "Survey Cooperator" through the participation of both the state's cattlegrowers and woolgrowers associations.

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Although bears and lions remained problem animals in certain areas, the wolf was now considered eliminated. Ligon thought coyote control to be the biggest challenge facing the PARC in Arizona. This challenge required a poison campaign, as soon as some hurried experiments were conducted in poisoning coyotes and bobcats in New Mexico and on certain sheep ranges northwest of Phoenix. Ligon (1918) therefore set about making plans for a major coyote-poisoning campaign in northern Arizona during the winter of 1918-19. Assured of good cooperation from the Forest Service and Arizona's ranching community, Ligon directed PARC agent Mark E. Musgrave to embark on a winter campaign.

Ligon (1918) was concerned that the public might pressure his men against killing bears and fur-bearing animals, as these species were deemed to have value. He therefore cautioned against the political consequences if the PARC failed to pursue bears.

As the wolves and lions are killed out in certain districts, much light is thrown on the case against bears as predatory animals. Guilt is now being placed on them, where in years gone by it was generally supposed that bear did little killing of domestic stock. They are becoming more destructive to cattle in recent years. The dry seasons have probably added to their killing, since the shortage of feed has created a demand for range everywhere, even in the highest and most heavily forested regions—the home of the big bears—thus throwing the helpless stock into the very haunts of the animals.

In Arizona quite a lot of killing has been reported from the White Mountains and Blue Range, and the southern part of the State and in the central portion south of Williams. . . . We are working after these cattle-killers and expect to have the guilty animals destroyed by the end of the year.

To fail to listen to the requests from ranchmen for protection against bears would have a serious weakening effect on our organization. Destructive animals of whatever species, should be controlled. There is no danger of bears being eliminated so long as we have our parks and wild northern woods. Even our reluctance in killing the smaller bears creates discord between our methods and the interest of the ranchmen.

Ligon was an astute observer. He knew bear depredations were increasing because there were now more livestock on the range and thus a more intense use of forage. Green grass and other herbaceous plants were important spring foods for bears coming out of hibernation—a food supply in increasingly short supply due to heavy livestock grazing. That more cattle and sheep were now on the range necessitated the bears' turning to livestock as a source of spring protein in lieu of the depleted amount of grass (Brown 1985b).

During fiscal year 1918-19, New Mexico and Arizona were split into separate PARC districts. Musgrave was appointed inspector in Arizona and Ligon remained New Mexico inspector. Musgrave was one of Ligon's field men and, like other early PARC administrators such as Stanley Young and Ligon himself, familiar with field conditions. Musgrave was also astute when it came to public relations, fostering working relationships with stockmen, sportsmen, politicians, and even Governor Hunt himself. A speaker at every sportsmen's and stockmen's convention, Musgrave spoke and wrote articles about the "enemy animals" he sought to eliminate and represented himself as a federal game expert—an exalted position in those days of untrained wildlife biologists, and a role secondary only to that given to the Biological Survey's chief, Dr. Edward W. Nelson and its senior biologist, Edward Goldman.

Musgrave, moreover, was an effective and demanding supervisor, keeping his 10-20 or more field men both informed and in line with monthly newsletters. These newsletters kept tabs on the catches of his men and encouraged competition by listing those achieving kills worth 15 points or more on an "honor roll." Those not making the list for more than a few months were "let go" and replaced by new men. Getting on the monthly honor roll



Stakley Ligon (smaller man on right) and two of his hunters, Ben Lilly (left) and Jack Thompson (center) in 1920. Ligon prided himself on getting the best and most notorious hunters for the PARC. (US Biological Survey, courtesy of J. E. Hawley)

was not that difficult, as a single wolf or lion was worth 15 points, killing a bear earned 10 points, and coyotes and bobcats were each worth one point. Foxes were worth half a point, and the value of feral dogs varied on the location and the amount of damage being done. By the mid-1920s, Musgrave's newsletters also sported the letterhead, "Remember our slogan, 'Bring them in regardless of how'" in reference to the PARC's desire to get hunters to wean themselves off traps and dogs and turn to strychnine and other poisons.

Given the widespread belief that predators were holding down game numbers, it is somewhat surprising that predator control was not even mentioned in State Game Warden Willard's (1914) report to Governor Hunt describing game conditions at the time of statehood. There is no evidence Willard and his deputies ever recommended predator control or supported a predator-control program. Nor does Willard mention a need to support the federal government in its attempts at conducting predator control for stockmen. One is left with the impression that both Willard and Hunt were content to let the stockmen and the legislature handle the predator issue while the department concentrated on its public education program to encourage wildlife appreciation and enforce the game laws. Thus, both men appear to have been willing to let the federal government usurp states' rights when it came to the issue of controlling "bad animals," despite the demand by sportsmen that something be done to bring back the game. This acceptance of federal responsibility for varmints would cease, if only temporarily, with the election of 1918.

### Arizona Becomes More Active

The election for governor in November 1918 was close and contested. The declared winner, Tom Campbell, replaced Willard with Joe Prochaska—a "hands-on" State Game Warden with a vested interest in predator control in that he was a professional predator hunter himself. Prochaska immediately instituted a "statewide trapping campaign" against predatory animals using paid volunteers—a program facilitated on March 19, 1919, when a bill requiring trappers to have a state trapping license became law without the governor's signature.

Prochaska's (1921) campaign in 1919 consisted of paying 217 licensed fur trappers \$150 a month, with the provision that each trapper would turn over to the state the hides of the animals taken. If the trapper brought in pelts worth more money in the fur market than his salary, the trapper received the excess amount. Fur prices being high in 1919, none of the trappers failed to make his \$150 minimum, each earning from \$165 to \$242 a month with a total take of 21 wolves, 12 lions, 9 bears, 1,310 coyotes, 714 bobcats, 414 foxes, 809 skunks, 32 badgers, and 21 raccoons.<sup>5</sup> Coyote pelts were then bringing in \$10 apiece and bobcats \$6, while wolves were worth \$7.50 with a \$10 bounty, skunks were worth \$5.50, foxes \$4.50, badgers \$4.50, and raccoons \$3.50. Lions were turned in for bounty or sold for their trophy value.

Fur prices were so good that the next year, 1920, saw the number of participating licensed trappers increase to 632. The average trapper earned around \$200 a month, a very good living during the economic depression following World War I.

Although only 267 trapping licenses were sold in 1921, the fur market having fallen, Prochaska was able to resume and expand his anti-predator campaign with the purchase of a pair of lion hounds. With Stelza Tillman, he took eight lions on the elk range south of Winslow on the Sitgreaves National Forest. Lions were apparently also numerous in the Galiuro Mountains that year, as Deputy Warden Owsley A. Reneer of Thatcher took 21 of these cats in that range. All in all, the take by Prochaska and his deputies that year included 16 wolves, 40 lions, 692 coyotes, 65 bobcats, 53 foxes, and 21 bears.

These numbers allowed Prochaska to make a favorable comparison between the state's effort that year and the federal government's take of 26 wolves, 16 lions, 408 coyotes, 27 bobcats, 89 foxes, and 7 bears. Prochaska was also able to point out that even though it had cost \$2,123 more to field the state's trappers than the federal government's PARC agents, his trappers had contributed \$3,000 to the Game and Fish Fund through their purchase of trapper's licenses. All in all, Prochaska calculated that predator control was a profitable enterprise for the state, in that it only cost about \$100 for every wolf, lion, and bear taken—an amount much less than the damage that these animals would do if left unchecked. The comparison was moot—Hunt was re-elected in 1922, putting an end to the state's predator-control effort for the time being.

<sup>5</sup> Small game and poultry were then considered to be as seriously impacted by predators as livestock and big game.

### Gaining Control Amid Shifting Conditions

There was by now some nascent opposition to the federal program, none yet substantial. Fur trappers objected to the federal government's use of poisons and the take of valuable pelts. Houndsmen were also prone to consider bears as big game animals; sportsmen would hire houndsmen for their services to engage in some sport while attempting to obtain a bear rug. Ligon (1919), with his nose ever to the wind, appeared to change his stance on bears while wanting his agency to do the management:

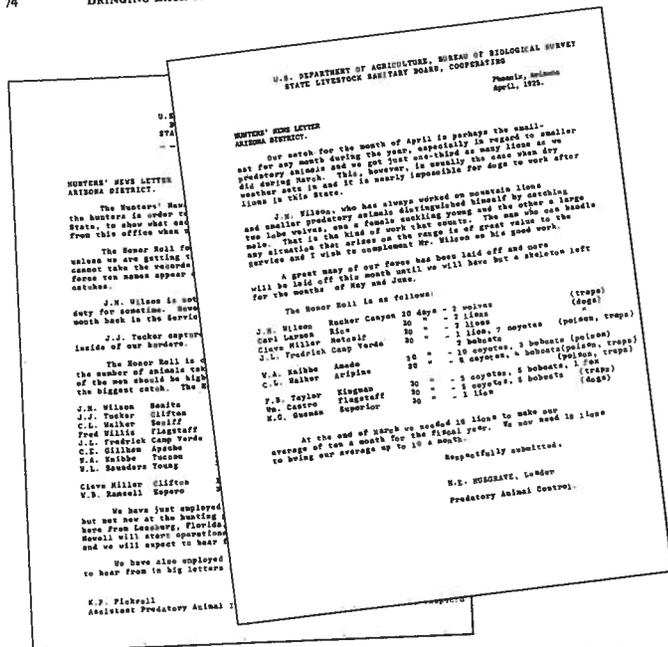
The smaller bears need protection the same as deer and turkey, leaving the matter of control of individuals in the hands of Government forces that will operate under permit or agreement.

Musgrave's (1919) forces also let up on bears, if only temporarily; only four bears were reported taken by PARC forces in Arizona during fiscal year 1918-19, as the Biological Survey increasingly turned to poisons as a means of destroying coyotes and prairie dogs. Initial results appeared promising, despite the new tools' requiring greater preparation and supervision. Prairie dogs were successfully eliminated from Cochise County by 1921 and coyote populations had been lowered through the use of strychnine (Musgrave 1920, 1921; Hoffmeister 1984). Bears, in hibernation when most of the poison was applied, were relatively immune to this type of control, necessitating the trailing, trapping, and shooting of 18 bears<sup>6</sup> by the PARC in fiscal year 1920-21. Musgrave (1921) explained why:

Owing to the extreme dry condition of the ranges in Arizona this year bear have done more damage than they have ever done before and we have found it necessary to kill them off. Along the Blue Range and around the head of Friscoe and Blue River they have been exceptionally bad, and Mr. Charles Miller was detailed to the work of killing off the most destructive of them. He has succeeded in getting six adult bear in the last two months.

Ligon and Musgrave's lobbying efforts were also paying off. On June 8, 1919, the legislature appropriated \$25,000 for predator and rodent control, to be spent under the supervision of the Biological Survey. In 1919, the legislature passed emergency legislation making Arizona a partner with the Biological Survey and appropriated \$50,000 for fiscal years 1919 and 1920, to be matched and distributed to the Survey through the Arizona Livestock Sanitary Board (for predators) and the University of Arizona Extension Service (for rodents and jackrabbits). Pelts from animals taken would continue to be auctioned by the Survey, and in 1921, the bounty law in Arizona was revised to make all county bounty payments discretionary. That year too, with Cochise County declared to be prairie-dog free, the PARC launched an intensive cooperative program with the Agricultural Extension Service, ranchers, and farmers to target Graham County as the next theatre of operations to be declared free of black-tailed prairie dogs.

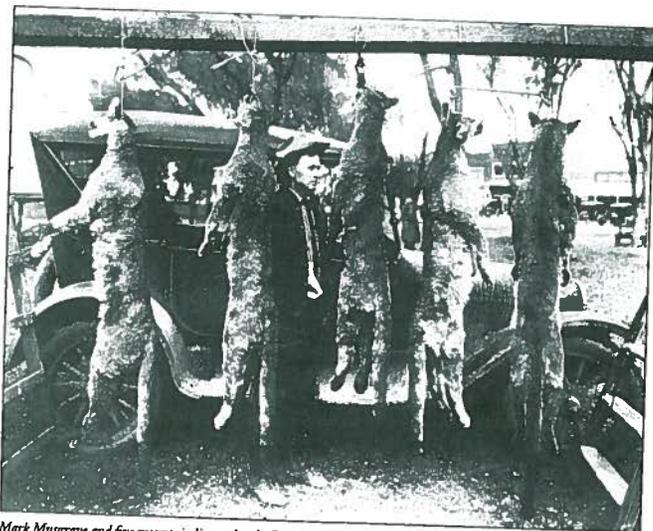
<sup>6</sup> None of these may have been grizzlies—the species is not given.



Two examples of Musgrave's monthly newsletters, which were sent out to his predator-control personnel in Arizona. Thirty was the expected number of work days per month, and men not making the honor roll were soon dropped. (AGFD files)

What followed was a time of government austerity. In the country's postwar recession, Arizona's cotton boom collapsed. On March 18, 1921, the legislature halved the state's annual appropriation to PARC to \$25,000 for fiscal years 1922 and 1923. This resulted in the legislature's having to allocate a special appropriation to pay PARC's claim for monies already spent in the state and not covered by \$12,576 in matching funds. These amounts were substantial: This same legislature only appropriated \$19,430 for the Game and Fish Fund for fiscal year 1922, an amount that had to cover salaries, hatchery construction, and all other game and fish activities.

Fearing other cuts might be proposed during the postwar recession, Musgrave asked ranchers to state their losses in writing as a means to justify future appropriations. Four hundred and forty-five stockmen and farmers reported \$378,151 in livestock losses, with a 2%-10% loss in their calf, colt, and lamb crops attributed to predators. Using the 2% figure, Musgrave calculated the annual loss in Arizona from predatory animals at more



Mark Musgrave and five mountain lions taken by PARC personnel, ca. 1923. At least two of the cats appear to be juveniles. Some of the takes by early PARC hunters were impressive, with several men killing more than 100 lions during their career with the US Biological Survey. (US Biological Survey)

than \$1.5 million, with similar losses from rodents and lagomorphs based on "widely accepted" estimates (Musgrave 1919, 1920, 1921).

In May 1922, PARC hunter Ramsey Patterson and his friend Jimmy Norman killed the last grizzly west of the White Mountains—an old male in the Bear Canyon-Government Canyon area of the Sycamore-Yavapai Game Refuge (Brown 1985b).

Thirty bears were taken by PARC hunters and their state cooperators in New Mexico and Arizona in 1922-23 (Brown 1985b). Musgrave's (1923) newsletters to his field men, while attesting to the agency's desire to downplay bears, continued to include them as PARC targets along with wolves and lions, provided his hunters made sure any bears taken were indeed stock-killers—a fine point that was often ignored. Bears continued to be worth 10 points toward the 15 points required to get on the "honor roll"—only five points fewer than the 15 points earned for a wolf or lion. Ten points earned was an important incentive, as government hunters who did not produce were dropped from the rolls—pronto.

Musgrave had vigorously carried out the wolf campaign since starting his tenure in 1919, when he made a special effort to kill wolves, hybrids, and a pack of wild dogs ranging along the Arizona-New Mexico border. Musgrave's (1919) opinion was that "wolves are

not numerous in this State, but are scattered over a very large area, and there are a great many individuals that cover a big range and are very shy." To eliminate these resident individuals, he initiated a wolf-trapping program that concentrated on the watersheds of the Black River, Eagle Creek, and Bonita Creek in the White Mountains and along Blue River. This program, while time-consuming, was eventually successful, and by 1925 his men were working to remove the last wolves on the Apache Indian reservations. For his part, Ligon (1919) still believed the wolves in Arizona and New Mexico were no longer a serious menace, but added that "trapping the remaining wolves is going to be a long, drawn out process."

Musgrave's (1919) men reported taking eight wolves in the White Mountains that year, with another 15 along the Arizona-Sonora border. "When operations stopped in May, there were few or no wolves left on this side of the border," PARC personnel having claimed more than 60 of these animals in fiscal year 1919-20—an all-time record. Clearly, predator numbers were as difficult to arrive at then as now. But the pressure was on. Another 58 wolves were reported taken in Arizona during the next two years, some of them with strychnine (Musgrave 1921, 1922).

Again, Musgrave pushed his men to expand their use of poison. Some of his hunters, particularly the houndsmen, remained reluctant to use this tool, not only for fear their dogs might be killed, but because such kills could not always be retrieved for credit—an important incentive instilled by Musgrave himself. Just the same, some 13 million acres of Arizona grazing land were treated with poison in fiscal year 1922-23. Of the 37 wolves reported taken by PARC hunters that year, 14 were described as being killed with poison (Musgrave 1923). Stockmen reported finding another six to eight wolf carcasses on their ranges, presumably the result of poison; there were undoubtedly others, and this does not include the coyotes, foxes, porcupines, prairie dogs, and other animals killed in this manner.

That Musgrave was making progress was borne out in 1924, when the number of wolves taken in Arizona fell to 22 adults and seven pups—most of them south of the Mogollon Rim and along the border. Declarations were again made that the time of resident wolves in Arizona was at an end when the only lobos reported by PARC hunters the next year were 31 unverified "wolves" claimed by agent Charles E. Gillham (Musgrave 1925). Ranchers reported only three additional wolves taken across the state in 1925, and hopes again ran high that the wolf had been eliminated from Arizona. But then, after a lull in 1925 and 1926, another 16 wolves were reported taken in Arizona by PARC hunters and cooperators (Brown 1983). Although 14 of these animals were close enough to the Mexico or New Mexico borders to be considered transients, the locations of the other two indicated that a few wolves were still present on the Apache reservations and centered in the vicinity of Black River.

In January 1926, Musgrave had 16 hunters afield who took 19 lions (all with dogs), 2 wolves, and 105 coyotes (93 with poison). His goal was for his men to collectively take 10 lions a month or 120 a year, and he threatened to let go those who were below average in performance.

By 1928, Musgrave was able to list only five wolves among the toll of 1,643 major predators taken by his hunters and cooperators. Nonetheless, these numbers represented only a fraction of the actual toll, in that more than 10 million acres of Arizona's grazing lands were treated that year with poison (probably strychnine). The best news for the PARC inspector was that no claims were made of wolves killing livestock and only seven wolves were thought to have entered Arizona during the year, five of which had been destroyed (Musgrave 1928).

Lions were also now regarded as being under control: Musgrave's goal of having his houndsmen kill 10 lions a month was paying off. Indeed, some of his houndsmen, such as Albert F. Jones, M. G. Gusman, and Ramsey Patterson, had attained prodigious records, each taking hundreds of lions. The PARC's agents now hoped to concentrate on experiments to eliminate the more persistent predators and rodents through the use of new predacides and new poisoning techniques (Robinson 2005).

Bears remained a thorny problem. Though the PARC was claiming a more relaxed stock-killer policy and the Forest Service thought bear populations were increasing, Musgrave's (1924) hunters took a record number of bears in 1924—some with poison. Such killing was increasingly unpopular with sportsmen, who favored the sport hunting of bears using professional guides—a pastime encouraged by PARC administrators, but viewed with ambivalence by some of Musgrave's agents and disregarded by stockmen:

Bear are increasing in the State of Arizona. There are perhaps three times as many here now on the range as there were in 1918. Consequently it is becoming necessary for us to pay more attention to the stock-killing bear. In one place near Blue River and about forty miles north of Clifton stockmen located five bear in a canyon and found that they had been slaughtering stock. Cleve Miller was notified and cleaned up the entire bunch on one day. (Musgrave 1924)

Bears posed other problems. Both Musgrave and Ligon (1924) considered poison an indispensable tool for killing predators as well as rodents, and reported that "poison has come to stay." The principal poison at that time was strychnine, rolled in tissue and sandwiched between pork fat strips or in tallow. Carcasses of animals that had died of natural causes made the best poison stations. Designed to take coyotes, bait stations were not selective, and often bait was taken by any carnivorous or omnivorous animal that came along, be it a coyote or otter.

Not only was the PARC setting out poison bait stations, but "approximately 155,000 poison baits were being distributed to cooperators free of charge" (Ligon 1924). That more bears and other non-target species were not killed was only due to the reluctance of certain Forest Service administrators to condone poisoning on their forests and the objections of the PARC's houndsmen, who were prevented from working lions and bears in poison-treated areas. This was a real concern, as a well-trained dog could be worth from \$100 to \$500, and several dogs had been killed by poison. Not only could the PARC no longer induce lion hunters to hunt treated rangelands or country adjacent to where baits had been placed, some of the best houndsmen were leaving the Biological Survey altogether.

### Transition to Rodent Control

In 1924, the Forest Service resumed the practice of keeping estimates of big game species numbers on each national forest. Although most game species were thought to be increasing, Forest Service rangers estimated only 27 grizzlies in Arizona. These figures were merely educated guesses, not based on any census techniques other than stock-killing complaints and speculation. It was also about this time that district inspectors asked PARC hunters what was going on with various game and predator populations. These data, while considered useful to the Biological Survey and passed on to the state, were nothing but opinions and had little relation to how many game animals and "big bears"<sup>7</sup> were present on and off the national forests.

What is known is that 16 bears were reported taken in Arizona by the PARC and its cooperators during fiscal year 1924-25 and 10 the following year (Musgrave 1925, 1926). Bears were gaining public support as game animals, as demonstrated in January 1927 by an editorial in the first issue of *Arizona Wild Life*, published by the Arizona Game Protective Association. This article stated that, contrary to government reports,<sup>8</sup> bears in Arizona had become scarce, and it urged that legislation be enacted for a closed season and bag limit—at least on black and "brown" bears. Throughout that year and into 1928, additional articles objected to the widespread use of poison by government agents due to the loss of hunting dogs and the destruction of valuable wildlife species. How many otters, ferrets, and other furbearers were poisoned was not even speculated on, much less documented.

Always quick to react to changes in the political wind, Musgrave (1927) was "glad to report . . . these animals [bears] are increasing on our ranges." As for the more predatory grizzlies, the Forest Service dropped its estimate of this species in Arizona to 10. Musgrave (1928) thought the number to be even less, stating, "To the best of our knowledge there is one large grizzly left in the state. This animal ranges from the New Mexico line around Blue, Arizona, over to the White Mountains south and east of McNary."

Pressure to manage bears rather than kill them increased in 1928, when the electorate voted in Arizona's new game code protecting all bears as game animals with a fall hunting season and a bag limit of one bear. Following New Mexico's example, the Arizona legislation also allowed the Game and Fish Commission to issue a permit for the killing of any bear that was destroying livestock or found within a certain distance of human habitation and threatening life or property. No blanket permits were to be issued; each incident was to be evaluated on its individual merits.

It was only necessary for us to take six bear in the State of Arizona during the fiscal year. . . . The fact that a great many thousands of head of cattle and sheep have been permanently removed from the range, giving vegetation a better chance to grow, will give more food for the bear and make him less of a

<sup>7</sup> The PARC reports are cagey in that they rarely report grizzlies taken *per se*, but instead consider "big bears" as stock-killers, i.e., grizzlies and the larger black bears. And even then not all grizzlies taken are reported.

<sup>8</sup> Both Musgrave (1927) and several national forests were reporting an increase in black and brown (cinnamon phase) bears. In truth, neither Musgrave nor anyone else knew the true status of either species of bear in Arizona.



Mark E. Musgrave with reportedly the largest black bear taken in Arizona. Musgrave was two-faced about the taking of bears, telling sportsmen that PARC men only went after "big bears" known to be stock-killers while encouraging PARC personnel to take whatever animals stockmen wanted killed. (US Biological Survey, courtesy of Bob Housholder)

predatory animal. This past year the state legislature put the bear on the protected list in Arizona. However, we are given permission by the State Game Commission to kill any bear that are destroying livestock. (Musgrave 1929)

Only one wolf was claimed taken by the PARC in 1928, though 43 were submitted for bounty by other trappers (Musgrave 1929). Reports of wolves continued, and several hunters were assigned to investigate specific incidents involving wolves. Musgrave personally visited Guadalupe Canyon in the Peloncillo Mountains east of Douglas where a wolf had been reported as coming in from Mexico. A hunter, Albert S. Field, was assigned to set traps in every pass in the Peloncillos and leave them set until the wolf was caught—which it finally was. Later, Field caught a second wolf that got away, leaving two toes in the trap. And although livestock losses from wolves were reported as "negligible," PARC

hunters took 1,800 lions, bears, coyotes, bobcats, and other "major predators" that year (Musgrave 1929).

Musgrave had much to show for his efforts when he passed the reins of PARC's Arizona district on to Donald A. Gilchrist in 1929. Although it was true that the battle for appropriations was not always won, and there were some setbacks (the legislature had cut the state's annual contribution to the Biological Survey in 1925 to \$15,000 a year), a number of victories against his animal enemies could be justifiably claimed.<sup>9</sup>

Wolves and grizzlies had been eliminated from the state for all practical purposes. Several jaguars had been taken, and the "Mexican leopard" was no longer a resident animal if it indeed ever had been (Brown and Lopéz-González 2001). Mountain lions and black bears were thought to have been much reduced and their numbers manageable. The war against coyotes was proceeding apace, and much progress had been made in the battle against rodents and other noxious animals. This was especially so in the case of the prairie dog, which had been touted as "cleared" from 1,659,203 acres. In 1928-29 alone, nine federal agents, four state employees,<sup>10</sup> and 4,068 private cooperators had distributed 102,961 pounds of poison grain and 2,390 pounds of carbon disulphide (used as a gas) to kill:

- 67,898 prairie dogs on 331,524 acres,
- 1,677 ground squirrels on 15,396 acres,
- 7,992 gophers on 104,179 acres,
- 14,328 jackrabbits on 80,878 acres,
- 360 porcupines on 1,120 acres,
- 372 mice on 2,286 acres,
- 360 rats on 870 acres,
- 303 cotton rats on 4,513 acres,
- 9,565 kangaroo rats on 102,030 acres, and
- 66 packrats on 1,085 acres.

Federal funds expended were \$20,685.68, as opposed to \$14,999.53 for the state and \$77,753 contributed from private operators (Gilchrist 1929).

By 1929, prairie dogs had become the species most despised. The war against the black-tailed prairie dog was essentially over in Arizona, with Cochise, Graham, Santa Cruz, and Greenlee counties declared prairie-dog free. The PARC was not the only government agency attempting to eliminate these animals. As it did with porcupines, the Forest Service contributed money to the prairie-dog eradication program on a cost-share basis, with the emphasis on Zuni prairie dogs (*Cynomys gunnisoni*) in the Apache, Coconino, and Tusayan national forests. Previous efforts on the Apache had left this national forest nearly prairie-dog free, although it was considered doubtful these animals could ever be totally eliminated.

<sup>9</sup>Even small game species were then thought to be controlled primarily by predators, and animals were classified as either beneficial (i.e., game animals and songbirds) or predatory/noxious (e.g., coyotes and jackrabbits). For example, in March 21, 1924, article by Will C. Barnes reports that Kaibab squirrels appear to be declining and a war is being waged against the hawks and other predators that are claimed to take them. That fluctuations in the populations of tassel-eared squirrels were controlled by climatic factors (snow depth) was not then appreciated (Brown 1984a).

<sup>10</sup>These were not employees of the Arizona Game and Fish Department, but people hired through the state's agriculture department.

## Wolves and Lions Reported Taken by PARC Hunters in Arizona, 1918-62

Year	PARC Lions	PARC Wolves
1918	?	27
1919	42	26
1920	79	64
1921	52	37
1922	54	58
1923	77	37
1924	77	22
1925	127	31
1926	93	18
1927	112	16
1928	108	5
1929	145	43
1930	146	14
1931	174	3
1932	86	8
1933	80	4
1934	68	3
1935	129	7
1936	94	5
1937	79	5
1938	55	3
1939	63	8
1940	78	6
1941	54	1
1942	66	8
1943	71	5
1944	73	6
1945	60	5
1946	35	4
1947	46	3
1948	190	4
1949	185	1
1950	212	0
1951	181	2
1952	198	2
1953	200	0
1954	201	0
1955	230	0
1956	189	0
1957	266	0
1958	264	3
1959	243	0
1960	215	3
1961	242	1
1962	231	0

Note: Numbers include bountied wolves and lions after 1947.

The remaining dogs were to be gassed with carbon bisulphide, even though the only sure removal strategy developed on the Coconino had been the laborious process of pre-baiting the areas around dry-farmed parks with steamed oats and then killing the dogs with oats and grain treated with thallium poison. Even then, some shooting was necessary, as the animals became poisonous after their numbers had been reduced from eight dogs per acre to one dog for every four acres. That year, 1929, Mohave County was also declared prairie-dog free due to the assistance of cooperative ranchers and the Hualapai Indian Reservation agency (Gilchrist 1929).

Many cooperators were now more involved with rodent control than predator control. Ranchers supplied horses and other amenities to the agents as they attempted to increase the carrying capacity of their farms and ranges. To sell their program, PARC agents constructed demonstration plots with prairie-dog exclosures, illustrating the effectiveness of prairie-dog control in producing more grass. Gopher control was also proving popular. Gilchrist could brag that more than 2,000 cooperators were engaged in gopher control in every county of the state, with a major effort in Maricopa County's citrus groves and along its 600 miles of canals.

It was no accident that future district inspectors such as Ben Foster and Everett M. Mercer were rodent-control specialists rather than predatory-animal agents. Not that the days of government predator-control were over—in some ways the war against predators had only begun. ☐