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The Marin County Predator Management Program: Will It Save the Sheep Industry?

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ABSTRACT: In 2001, Marin County, California, replaced its Wildlife Services (WS) predator damage management effort with a county-run program that cost-shares non-lethal methods of predation reduction with ranchers and also compensates them for sheep and lamb losses. This paper attempts to compare the former WS program with the current program, using such variables as livestock lost to predators, coyotes and non-target animals killed, and program costs. Inconsistent data collection and lack of information make a clear comparison of the two programs difficult; however, some sheep producers continue to suffer predation loss rates that threaten the sustainability of their enterprises.

KEY WORDS: *Canis latrans*, coyote, damage assessment, economics, guard animals, livestock predation, Marin County, non-lethal methods, predator control, sheep and lamb loss, Wildlife Services

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INTRODUCTION

Predation, particularly by coyotes (*Canis latrans*), has been an increasing problem for the sheep producers on California's northern coast. Producers have used both lethal and non-lethal approaches to reduce predation losses. Even when employing all legal and available methods, coyote-caused losses are one of the main reasons for producers going out of the sheep business (Larson and Salmon 1988). This has led to a long-term decrease in total sheep numbers, with steady declines in both Sonoma and Marin Counties over the past several years. Between 1960 and 1985, sheep numbers in Sonoma County dropped from 143,000 to 27,000. Current sheep inventories are 12,700 in Sonoma and 7,500 in Marin Counties, respectively (Anon. 1960, 1985, 2005a,b).

MANAGING PREDATOR LOSS

Historically, sheep ranchers in Marin County suffered few losses from predators in comparison to those in inland areas of California's more northern coastal counties (i.e., inland Mendocino and Humboldt Counties) during the 1970s and 1980s. Through time, coyotes expanded their range and became more numerous in coastal Humboldt and Mendocino Counties. In the 1980s, coyotes became increasingly numerous in Sonoma County and subsequently moved southward into Marin County. Documented losses of sheep and lambs to coyotes in Marin County began to appear by the mid-1980s, and the problem has spread and increased.

To aid in reducing predation losses, in the late 1980s Marin County began a cooperative animal damage control agreement with the California Department of Food and Agriculture and the U.S. Department of Agriculture APHIS Wildlife Services (WS), which provided professional assistance by a wildlife specialist. A cooperative program with Sonoma County began earlier, and that county's program is still active.

The WS program assigns professional predator control specialists to counties throughout California (and other

states) who respond to incidents of predator damage on a case-by-case basis. In addition to providing on-site investigations of predation incidents and management recommendations on methods for preventing livestock losses, these specialists may also undertake operational predator removal at the request of the landowner. Throughout the 1980s and 1990s in Marin County, WS used a combination of methods to prevent or control coyote predation on livestock, including leghold traps, snares, calling and shooting, M-44s, and following their registration in California, Livestock Protection Collars (LPCs). Some of the predator control tools and materials used (e.g., the M-44 and the LPC) were available only to government agency personnel. The LPC was granted registration in early 1996 and its use by WS was begun in early 1997 only in 3 counties, of which Marin was one (Timm *et al.* 1997). In November 1998 "Proposition 4", an anti-trap initiative approved by California voters, made it illegal to use padded leghold traps (in most instances) to capture animals (Animal Legal & Historical Center 2006), and it also banned the use of two toxicants registered for coyote control, sodium cyanide (used in M-44 ejectors) and sodium monofluoroacetate (used in LPCs).

In late 2000, the Marin County Board of Supervisors decided to replace the Wildlife Services program with a county-administered predator management program supervised by the County Agricultural Commissioner's office. This program is described elsewhere as Marin County's "Ranch Improvement/Non-lethal Control and Indemnity Plan" (Shwiff *et al.* 2005, 2006) but is known locally as the "Livestock Protection Program." Through this program, qualified ranchers were given funding to assist in implementing non-lethal management methods in an effort to reduce coyote depredation. This program came into effect during the county's 2001-2002 fiscal year (beginning July 1, 2001). In actuality, the Wildlife Services program ceased operation in Marin County on December 1, 1999, when the Wildlife Services specialist position became vacant.

Program Requirements

In order to participate in the new county-administered predator management program, ranchers may utilize any combination of four categories of methods to deter predation: 1) new fence construction, or improvements to existing fences, 2) guard animals (dogs and llamas), 3) scare devices, and 4) changes in animal husbandry, including the practice of shed lambing, use of herders, etc. For each method, a rancher can receive a cost-share payment of \$500 per practice, up to a maximum of \$2,000 annually. Once a producer, through inspection and verification, has methods in at least two of the four categories in place, they then also qualify for the indemnification payments for predator losses.

The most common methods implemented by producers were use of guard dogs and improvements to fences. At first, the county program compensated all losses. However, it became apparent that the program's funding could not pay for all losses that occurred, and beginning in July 2003 a cap on compensation (when total reported losses of sheep and lambs reached 5% of the producer's adult sheep flock at that location) was put into effect. For example, a producer running 500 head of adult sheep can be compensated at market rates for a maximum annual predation loss of 25 head of sheep or lambs. The reimbursement for lamb losses is calculated on a 3-year average of market rates, based on the value of market lambs (at a weight of *ca.* 100 lbs).

The number of sheep producers participating in the program in any single year has increased slightly, from 13 producers in FY 2001/02 to 17 producers during each of the past three fiscal years. It is estimated that at present the total number of viable sheep producers in Marin County (with ≥ 25 head of adult sheep) is approximately 25 to 30. However, during the past decade, the number of producers has declined and some producers have reduced their flock size (Anita Sauber, Marin Co. Dept. of Agriculture, pers. commun.). The program currently covers 6,700 head of adult sheep, about 89% of the county's sheep population.

Program Results

Sheep and Lamb Losses

During the first year, the Marin County Agricultural Commissioner's staff and University of California Cooperative Extension (UCCE) personnel randomly verified losses. During the following years, producers have called losses into the Commissioner's office by phone and also mail a monthly loss summary card to the UCCE office.

During the first year of the county-run program (Fiscal Year 2001/02), there were 97 total sheep and lamb losses reported. The next 5 years' data indicate that losses increased above those reported in 2001/02 (Table 1). Based on data submitted by the 13 to 17 ranchers who have reported losses each year since the program's inception, and using the county-established method of calculating percentage loss that determines when the payment cap is reached (total sheep and lambs lost to predators, divided by the total number of adult sheep), individual producers have suffered predation losses ranging from 0% to 18.6%; regarding maximum loss, in FY 2002/03 one producer with 307 head of adult sheep

reported predation losses of 57 sheep and lambs. Overall, sheep and lamb losses as a percentage of the adult flock have ranged annually from 2.21% (in FY 2004/05) to an average of 4.15% (in FY 2002/03). In the 5 completed program years to date, between 2 and 6 producers in any given year have reported sheep and lamb losses $\geq 5\%$, while between 4 and 9 producers have reported 0% predator losses.

Data on sheep and lamb losses suffered by producers who are not reporting to the current county-run program are unavailable. For example, one producer tells of having lost approximately 150 lambs annually, primarily to coyotes, in FY 2003/04 and FY 2004/05. Thus, this one producer's unreported losses appear to be equivalent to the total losses of all reporting program participants combined, in recent years (see Table 1).

Coyotes Removed

Even without a county-funded lethal predator control program in Marin County, by law sheep producers and other landowners are still allowed to shoot or snare coyotes. Because of Proposition 4, the padded leghold trap can no longer be used except in the event of human health and safety emergencies. However, individual producers and others working on their behalf routinely practice snaring, calling and shooting, and denning in an effort to kill damage-causing coyotes. Coyote removal is perhaps most intense in winter and spring, following high incidences of predation losses, primarily loss of lambs. On occasion, there are incidences where "hot spots" occur and losses have occurred over several days on adjacent ranches. At such times, ranchers work together, forming hunting parties in an effort to eliminate the depredating coyote(s).

Some ranchers have also relied on the predator control expertise of one of their fellow program members, who during the past several years has called in, hunted, and subsequently shot coyotes on fellow ranchers' properties at their request. This individual reports taking approximately 40-50 problem coyotes annually in recent years, but in one location more than 100 coyote carcasses have been deposited within approximately a year's time. It is likely that some ranchers themselves are taking more

Table 1. Estimates of livestock killed, coyotes and non-targets removed, and costs in Marin County, CA, during previous and current predator management programs.

Fiscal Year	Adult Sheep Killed	Lambs Killed	Total Head Killed	Coyotes Taken	Non-Targets Taken	Cost to County
1995/96*	22	117	139	27 ^a	0 ^a	\$12,420
1996/97*	34	77	111	32 ^a	7 ^a	13,518
1997/98*	45	141	186	21 ^a	7 ^a	13,128
1998/99*	90	243	333	17 ^a	5 ^a	38,526
1999/00*	43	137	180	14 ^a	0 ^a	28,560
2000/01**	44 ^a	614 ^b	658	2 ^a	0 ^a	
2001/02**			97 ^c	~40 ^d	?	\$43,181
2002/03**			236 ^c	~50 ^d	?	57,598
2003/04**			158 ^c	~50 ^d	?	44,132
2004/05**			149 ^c	~70 ^d	?	39,800
2005/06**			165 ^c	~100 ^d	?	39,797

* Federal Fiscal Year Oct. 1 - Sept. 30

** County Fiscal Year Jul. 1 - Jun. 30

^a documented plus reported to WS

^b reported to WS, not documented

^c reported by ranchers to County

^d estimated (see text)

coyotes than when the WS program was in place, as WS specialists requested that landowners not attempt coyote control efforts themselves except by agreed-upon methods, in order to reduce the chance of coyotes become “wise” to snares, traps, or other devices that landowners might utilize with less expertise than the WS specialist.

DISCUSSION

Livestock Loss

Ideally, an evaluation of the Marin County Livestock Protection Program would involve comparison of various data collected during the plan’s first 5 years (July 2001 - June 2006) to data from the Wildlife Services program’s last 5 years of existence (October 1995 - September 2000). However, the means by which data on sheep and lamb losses were collected, and on the number of coyotes removed (see Table 1), are inconsistent between the two periods.

The WS specialist did not report losses occurring on ranches with which he had no working agreement; it is estimated that his reports of livestock loss represent approximately $\frac{2}{3}$ of all viable sheep ranchers in Marin County during that time period. During the last few years of the WS program, WS had formal working agreements with between 25 and 45 ranchers covering up to 73,000 acres of land (Carlsen 1999). In contrast, the total acreage reported by county-run program participants has not exceeded 10,275 acres in any of the past 5 years (A. Sauber, pers. commun.). Similarly, sheep and lamb losses reported by current participants do not include those that may be occurring on non-participants’ ranches, estimated to be about 10 additional ranches and 11% of the sheep at the present time. Further, the number of available sheep and lambs has changed through time; this variable may affect predator losses in unpredictable ways.

The difficulty in making a comparison between the former WS program and the current county-run program is not unexpected: Marin County Agricultural Commissioner Stacy Carlsen noted, during discussion of the potential change in programs, that “Privatizing predator control would eliminate the ability to... maintain public records of control activities, ...[and] would make reporting of livestock and wildlife losses and damage, speculative at best” (Carlsen 2000). It is difficult, if not impossible, to draw a conclusion as to whether the current county-run program is more effective in preventing losses than was the WS program.

The exceptionally high number of lambs reportedly killed by predators during FY 2000/01, which is about 2.5 times greater than any other year reported, was from data collected by WS during the course of a special survey of Marin County sheep producers that was done at the height of discussion regarding the possible change in predator management programs. Thus, these loss data, gathered from approximately $\frac{2}{3}$ of the county’s sheep ranchers, may have represented a heightened interest on the part of producers to make sure that decision-makers were aware of the severity of the predation problem. These losses were not independently verified.

Coyotes and Non-Target Animals Killed

Regarding the number of coyotes removed under the two programs, data collected during the WS program are

an accurate reflection of the coyotes removed by the WS specialist. However, it is not known how many coyotes were removed by landowners on properties that were not visited by the WS specialist. Because WS’ formal agreement with cooperating landowners specifies that rancher must not attempt coyote control except as agreed by the specialist, it is unlikely that the total number of coyotes removed on cooperating ranchers’ properties is significantly higher than reported. Under the county-run program, individual ranchers, whether they are reporting data to the county or not, have the ability to kill coyotes by any legal method (i.e., shooting or snaring, or killing pups in dens). Data on coyotes taken after 1999, as reported in Table 1, represent an estimate based on ranchers’ personal knowledge and opinions.

An aspect of the county-run program important to animal welfare activists, as well as to others who lobbied heavily in favor of the current program, is its emphasis on non-lethal predator damage control methods. For example, Fox (2001, 2006) states “...as a result of public controversy over USDA Wildlife Services use of... lethal control methods, the Marin County Board of Supervisors replaced the Wildlife Services program with a locally-run non-lethal predator management plan.” However, the available information suggests that more coyotes (and perhaps significantly more) have been killed during the past 5 years than were killed during the WS program.

Carlsen (2000) stated in regard to the previous WS program, “There are very few predators taken by USDA. Generally, when predators are removed, livestock losses cease and depredation is curtailed at that site for long periods of time.” However, since coyotes now are apparently more numerous in the county, there is no way to know whether WS, had that program been continued, would also have taken increasing numbers of coyotes. Because the WS program responds to damage complaints and then focuses on removing problem-causing coyotes, it can be argued that the WS specialist is more selective in removing only offending coyotes than is a landowner. Recent research in Mendocino County, CA supports the notion that most lamb loss is caused by dominant coyote pairs, which are the most difficult coyotes to control by trapping or snaring (Sacks *et al.* 1999). Thus, experienced WS specialists can solve predation problems by more selectively targeting the problem coyotes, in contrast to less-experienced landowners who likely remove more juvenile and subordinate coyotes.

Carlsen (1999, 2000) speculated that “privatizing predator control could increase use of lethal devices... [which] could result in indiscriminate taking of non-target animals...” or in “...the likelihood that unskilled citizens will resort to ‘home remedies’ that could adversely affect the animals, environment, and non-target species.” WS reports state 19 non-targets were taken during FYs 1995/96 through 1999/00 (see Table 1). There are no data on current take of non-target species by landowners or their agents. Thus, there is no way to know whether predator control activities today are having a different impact on non-target species than they did under the WS program. However, some landowners currently report widespread use of snares in areas without guard dogs. If not expertly set, snares are likely to capture non-target species such as deer, raccoons, foxes, skunks, and opossums.

Program Cost

Under the Wildlife Services cooperative program, cost-share support was available from both state and federal funds. During the WS program years considered, Marin County expended from \$12,420 to a high of \$38,526 annually (see Table 1). Since taking over the program, Marin County has incurred the costs of reimbursing participating producers for sheep and lamb losses, cost-sharing funds for ranchers to implement non-lethal management techniques, and the costs of personnel within the county who administer the current program. The county's annual cost has ranged from a low of \$39,797 in FY 2005/06 to a high of \$57,598 in FY 2002/03 (A. Sauber, pers. commun.). Thus, the average annual cost to the county for the current program over its first 5 years was approximately 1.2 times the cost of the WS program in its highest year (FY 1998/99) (see Table 1).

Program Acceptance

Initially, most of Marin County's sheep producers opposed the change to the current predator management program, and they felt their views were not given adequate weight by the Board of Supervisors. Currently, the majority of producers participate in the county-run program. Advantages for these ranchers are that they can obtain cost-share subsidies (\$500 per individual practice, maximum of \$2,000 annually) for performing non-lethal predator management improvements, and they can receive compensation for sheep and lambs lost to predation, up to 5% of the adult flock as calculated (see above). Further, they are not prohibited from killing coyotes on their land or hiring others to do so. A disadvantage of the current program is that sheep producers who lease, rather than own, their pastures or rangelands may not wish to incur the cost of fence improvements, even if cost-shared. The same drawback applies to producers who are not sure they will continue in business into the foreseeable future, as their investment in fencing may not be recaptured. Thus, such individuals may have chosen not to participate in the current program.

There may be a few producers who do not participate simply because they are philosophically opposed to the county-run program. The current program was implemented only after contentious debate within Marin County, accompanied by intense lobbying, particularly by animal welfare proponents and their organizations. While the current program is described (by activists) as "... a model that has successfully addressed and embraced ethical concerns as well as differing values expressed by both the animal protection and ranching communities (Fox 2001, and Fox and Papouchis 2005, cited in Hadidian *et al.* 2006), this opinion is not necessarily shared throughout the livestock production community, either in Marin County or elsewhere within California. It may, in fact, be difficult to transfer this program to other areas, based on geographical and demographic differences (S. K. Carlsen, pers. commun.).

Given the circumstances, perhaps the current program is the only sort of compromise that could be reached by a publicly-elected Board of Supervisors in an affluent area, where most voters have values typical of urban populations. Whether the program succeeds in sustaining the

county's sheep and lamb industry during the coming years remains to be seen. Given the current apparent rates of sheep and lamb losses to predators, this may be difficult. The demise of the sheep industry would likely result in land conversion to other agricultural uses (e.g., cattle grazing, or winegrape vineyards). Open-space values that accompany the sustainability of the ranching industry in Marin County are recognized by the public, although most of the citizens have little understanding of how difficult it is for ranchers to cope with livestock losses caused by predators.

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