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PROBLEM WOLVES IN CATRON COUNTY, NEW MEXICO

A COUNTY IN CRISIS

IMPACTS FROM THE NON-ESSENTIAL MEXICAN WOLF REINTRODUCTION PROGRAM

“It appears that the reintroduction of the Mexican Gray Wolf cannot be accomplished without destroying the rights and lives of others- they become collateral damage.” Jess Carey, Catron County Wildlife Investigator

SUBMITTED TO:
The Honorable Ken Salazar
Secretary of the Interior
Stewart Lee Udall Department of the Interior Building
1849 C St., N.W.
Washington, D.C. 20240

SUBMITTED BY:
Catron County Commission Catron County
P.O. Box 507
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PREPARED BY:
Jess Carey
Wildlife Investigator

June 6, 2012
Executive Summary/Complication of Enclosed Documents

Catron County Commission respectfully submits this compilation, which represents years of field research by Catron County Wildlife Investigator, Jess Carey, and various experts in economics, range science and psychology.

Two studies document the psychological stress and symptoms of PTSD in children and parents who have suffered encounters by habituated wolves.


Two reports discuss the negative economic effects of the wolf program.

2. Thal, Alexander J. Ph.D., Assessment of the Economic Impacts from the Non-Essential, Experimental Mexican Wolf Program, Western New Mexico University, February 2, 2007.

This report provides a perspective and background information to people not familiar with wolf – depredation issues.


Documentation provided by Jess Carey, Catron County Wildlife Investigator, Catron County Sheriff’s Department

1. Carey, Jess Mexican Wolf Recovery Collateral Damage Identification, Catron County, New Mexico.
2. Carey, Jess, Comparability of Confirmed Wolf Depredations to Actual Losses Wolves Denning in Calf/Yearling Core Areas, Catron County, New Mexico, January 21, 2011
Inherent Potential for PTSD Among Children Living in the Mexican Gray Wolf Reintroduction Area

Julia Martin, M.D.
June 12, 2007

Introduction

In the spring of 1998 the Mexican gray wolf, on a list of endangered species, was reintroduced into ranching country in west-central New Mexico and east-central Arizona. The wolves in question had been primarily bred and hand raised in captivity.

The species was most probably endangered because the wolves had been systematically eliminated over a period of 150 years by ranchers who were settling the area and developing herds of beef cattle to support themselves and their families. The cattle industry in the west had become big business in the mid 1800s when, during the Civil War, the governments of both the North and the South were buying beef to feed their armies.

It was very apparent to the ranchers that wolves and cattle are not gregarious companions. It was also very apparent that wolves were also not compatible with the normal activities of family life within the ranching areas.

Ranching continued to be both a way of life and a profitable business in the areas above-described until the concept of “turning back the clock” became popular.

Americans are proud of their heritage. It is admirable to want to remember the past and preserve species that played a role in our lives. However, reintroducing wolves in the Southwest is about as intelligent as it would be to reintroduce smallpox.

Within a few years of the release of the initial wolves, it became apparent to the inhabitants of eastern Arizona and western New Mexico that the reintroduction of the Mexican gray wolf was contributing to the demise of their lifestyles and their communities.

Of paramount concern to the population was the effect of the wolf reintroduction on the children in the region.

Study overview

As a medical doctor with a background in both pediatrics and child psychiatry, I was asked to meet with ranching children and their families within the reintroduction area to ascertain the psychological effects of the wolf program upon the children.

I was able to compare the results of the parent questionnaire which I had constructed for parents in the wolf reintroduction area with questionnaires circulated to ranching families in New Mexico and Arizona who do not reside in wolf country. This was made possible through the efforts of the Cattle Growers Associations in New Mexico and Arizona, thus obtaining a control group for evaluating my findings.
In my study group each child was seen face to face and personally interviewed by me between February 1 and March 15, 2007. Children were seen either in the schools which they attended or in their homes. Questionnaires were completed by the parents.

Weaknesses in this study include:

1. The lack of random selection of subjects from the wolf reintroduction area. (All the ranches in this area had been visited by wolves.)
2. Possibility of prejudice on the part of the author, relative to her residence on a ranch within the reintroduction area.
3. The relatively small numbers in each group. It should be noted that because the study involves ranching, the total population interviewed within the reintroduction are included at least 90% of all families with children living on actual working ranches within the area.

Results of the study:

To date questionnaires have been obtained from equal numbers of children living on ranches in both the wolf reintroduction area and the ranching areas of Arizona and New Mexico where the Mexican gray wolf has not been reintroduced. Several returns were not calibrated because of technical concerns (e.g. reports about children three years of age or less).

Within the reintroduction area parents report that:

93% of their children startle more easily (than prior to the wolves arriving).

87% of the children believe that the wolves are presenting a danger to themselves or family member. (Due to depredation of livestock and family pets, this IS a VERY REALISTIC concern).

80% of the children realize that they are HELPLESS to control or stop the events they see occurring around them because of wolves in proximity to their homes. One or more children have watched wolves kill their pet cats. Another child watched her dog be attacked by wolves and later discovered the carcass of her horse which had been killed by a wolf pack in the horse’s own corral.

80% of children in the reintroduction area who previously slept in their own beds/bedrooms through the night now frequently get out of their beds during the night and come into their parents’ rooms, wanting to get in bed with their parents.

73% of the children awaken in the night crying or screaming because of nightmares (not present prior to the wolf reintroduction).

73% of parents state that they believe that the wolf events which have occurred involving their children have been very traumatic for the children.
67% of parents whose children have been involved in wolf events report that their children have “become more clinging”. Note: Among the children who have not been exposed to wolves (control group) 40% are reported to have experienced recent traumatic events. None of these children are reported to have become more clinging.

53% of the children who have experienced traumatic events involving wolves now appear to be unable to remain focused during activities which they participated in for age appropriate lengths of time prior to their exposure to wolves.

None of the youngsters exposed to wolves are reputed to have exhibited any of the symptoms described above prior to their exposures to the Mexican gray wolf.

It is definitely noteworthy that the behaviors/symptoms described above constitute the major symptoms involved in the diagnosis of Post Traumatic Stress Disorder.

Questionnaires returned from ranches outside of the wolf reintroduction area indicate that 40% of these youngsters have experienced one or more recent traumatic events not involving wolves. 20% of these children have recently developed a fear of snakes. 10% are having trouble staying focused on the events they were usually able to stick with for age appropriate periods.

**Summary**

Post Traumatic Stress Disorder is a major psychiatric illness. While it may exist short term, and dissipate when precipitating factors (e.g. wolves) are removed, the disorder frequently becomes permanent. Occurring in childhood it may impede the child’s normal psychological development. Certainly ongoing exposure to the events which led to the original symptoms can be expected to interfere with development of a stable psychological outlook.

The serious psychological problems currently being expressed by children in the wolf reintroduction areas of Arizona and New Mexico can best be addressed by the immediate relocation of the offending wolf population.

In researching the reintroduction project it is apparent that the ranching families within the area were not consulted prior to reintroduction of the wolves.

As a physician who has dealt with children now for 50 years, I am convinced that concerns for the welfare of the children involved must take precedence over any and all concerns for the wolf project.

Julia Martin, M.D.
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PSYCHOLOGICAL IMPACT OF
WOLF REINTRODUCTION:
A Preliminary Study

Population Studied: Individuals impacted by wolf reintroduction
Dates of Interviews: May and July 2006
Author: James S. Thal, Ph.D. Psychologist
Date of Report: October 22, 2006

PURPOSE OF STUDY

A preliminary study of the psychological impact of wolf reintroduction was requested in order to assess the social and emotional impact on referred individuals.

METHODOLOGICAL LIMITATIONS

Each individual who was interviewed was identified as a result of suspected psychological trauma resulting from one or more encounters with wolves in the re-introduction areas. Interviews were conducted by this evaluator, in private, at locations which included a school, a community center, and at several ranch locations. Interviewees were seen as individuals, couples, or in family groups of three to five persons. One individual, who was unavailable for a face-to-face interview, was interviewed by telephone. Interviewees were assured of anonymity.

This exploratory study was not intended to be scientifically rigorous but rather, clinical in nature. The approach employed was intended to make observations, develop hypothesis, and generate ideas for further study and/or immediate intervention. An attempt was made to follow standard crisis interviewing and “triage” techniques, though no attempt was made to employ random sampling techniques or empirical testing.
Approximately 35 individuals were seen ranging in age from four years of age to 60 years of age. Most individuals interviewed were reporting ongoing encounters with wolves in reintroduction areas (though some resided in towns or communities rather than on ranches in remote locations). However, one group of individuals reported no encounters with wolves for several months because the wolf pack had been relocated to another area. About half of the interviewees were ranchers or members of ranching families.

**FINDINGS**

Many, but not all, of the individuals interviewed described varying degrees of emotional distress resulting from near encounters with wolves in the affected areas. In some cases, the individuals interviewed had been significantly traumatized by what they reported as wolf attacks on their pets and livestock.

In almost all cases, the interviewees reported some degree of insomnia along with continuing vigilance and anxiety about their own welfare, the welfare of their children and/or spouses, and the welfare and safety of their animals. Among the children in the groups interviewed, bedwetting, sleeplessness, fearfulness, and nightmares were evident (though not in all of the children). The worst impacts appeared to be in two instances in which family pets or small livestock were killed by wolf attacks.

It appeared that in all cases, the impacted individuals had made moderate to significant changes in their daily activities as a result of the reintroduction of the wolves in their respective areas. For example, mothers reported that younger children are more closely supervised and no longer permitted to play alone outside, particularly at some distance from their homes and ranch houses. Most individuals reported carrying a weapon because of their perception of a threat by the wolves, relative to an attack on them, their family members, or their animals.

An additional lifestyle modification reported by many impacted individuals included hiking, walking, or riding only with companions and never alone. Although, at least one individual reported no personal fear of attack, but rather a concern regarding continued attacks on pets and livestock.

Other safety accommodations included keeping pets and farm or ranch animals penned for safe keeping. Nonetheless, nearly all individuals interviewed reported chronic fear for the welfare of family members, neighbors, and their animals. The reported level of fear ranged in severity from mild to moderately severe. In the case of two children in two different locations, moderate to severe levels of fear were reported by their mothers.
Other concerns and stressors of impacted individuals seemed to relate to broader, more global concerns which, in turn, appeared to have induced chronic feelings of helplessness and hopelessness in afflicted individuals. Several adults reported fears of losing a cherished way of life (i.e., ranching) and an accompanying diminishing of the quality of their lives. Similarly, several of the adults verbalized opinions that they are helpless to do anything about the threat that they believe the reintroduced wolves present to them, their families, and their animals.

Most adults interviewed appeared to have adopted a “siege mentality,” believing that things would only get worse and that no one in any official capacity is listening to them. During many of the interviews, impacted individuals voiced concerns that government officials have been dishonest and misleading. Some expressed fears that significantly higher numbers of wolves will be released in their areas and that other now-vanished predators will also be reintroduced in their area (e.g., grizzly bears and jaguars) leading to increased worrying about the threats that those predators would present.

Many of the adults interviewed appeared to be quite demoralized and, perhaps, clinically depressed. Symptoms of posttraumatic stress disorder were apparent (in both adults and children), though some individuals reported that symptoms such as nightmares have diminished over time with the removal of wolves from their immediate area.

It is clear that the individuals involved fear a loss of income and serious damage to their way of life. Overall, however, the greatest fear focused around what most individuals believe to be a very real and present threat of a wolf attack on a human, most especially on a young child.

PROPOSED REMEDIES AND INTERVENTIONS

In view of the above findings of moderate to severe stress evident in those interviewed, the followings measures are recommended:

**Mental Health Outreach**

Community counseling services should be made available to children and adults most afflicted with apparent stress-related disorders (i.e., chronic anxiety, tension, depression, insomnia, nightmares, etc.). It is estimated that about 24% of those interviewed might fall into this category. Due to the remote locations of many of the individuals in need of psychological interventions, it is probably most realistic to adopt a service delivery model of in-home or on-site counseling in which a field based mental health professional could visit afflicted individuals.
Psychiatric Services

Some individuals interviewed for this preliminary study appeared to warrant psychiatric care, relative to antidepressants, antianxiety, or other appropriate psychoactive medications. Those individuals will necessarily need to be seen at mental health centers in their respective areas.

Further Study Needed

The mental health of many of the individuals who were interviewed for this study appears to have declined in demonstrable ways. Further investigations would be helpful in defining the scope of the problem. Formal psychological measures could be administered to participants to provide more precise diagnostic data regarding depression, anxiety, anger and other clinical syndromes. Rating forms for children can be completed by their parents or teachers to provide additional objective information about a given child’s adjustment. Use of anonymous (adult and adolescent) self-report surveys, specifically designed for the populations to be studied should be employed as well.

Some important areas of inquiry (e.g., the occurrence of increased domestic violence, substance abuse, etc.) were not addressed in this current study and certainly warrant closer investigation. The literature strongly suggests that stressors such as those impacting individuals in the wolf reintroduction areas (i.e., economic losses, family disruptions, etc.) are often accompanied by increases in family violence, failing grades in school, drug/alcohol abuse, and suicide attempts/completions.

Decision makers are encouraged to use the research capabilities of the psychology departments of the state universities in New Mexico and Arizona to explore these social and psychological issues more fully.

Policy Review

Clearly, some form of policy relief seems to be in order. Virtually all adults interviewed feel that significant wolf reintroduction planning is in need of important review and revisions. It is especially important that communication between policy makers and impacted individuals be clear, reliable, and unambiguous. Nearly all adults interviewed for this study expressed a high degree of distrust of information provided by involved government entities.
Financial Advisement

Practical financial advisement would likely benefit several of the more severely impacted individuals such as ranch owners and managers who were interviewed for this study. Most are reporting significant economic losses which they believe could render their ranching operations unsustainable. Some ranchers interviewed expressed urgent concerns about the immediate viability of their livestock operations with at least one individual reporting the impending sale of their ranching operation. Financial resource consultants might help these individuals marshal their personal resources and those available in their regions.

Implementation of Protective Technologies

Almost all individuals interviewed expressed some level of fear regarding the threat presented by the wolves which have been reintroduced into their respective areas. It appeared that a significant need exists for safety planning for families and use of better protective technologies which could assist the impacted individuals in safeguarding themselves, their children, and their animals. Virtually all individuals reported a moderate to severe feelings of vulnerability to attack.

Special Duty to Safeguard Children

Parents, community leaders, and reintroduction managers have a special duty to safeguard the children impacted by the changes in their lives. At minimum, children need to be shielded from the heated rhetoric of their elders who are embroiled in the controversy surrounding the reintroduction of the wolves. The “worst case” scenario, as reported by many of the individuals, especially parents, interviewed is clearly that of a wolf attack on a child. If such a tragedy were to occur, it is impossible to predict the full extent of the community’s response. It seems likely, however, that the basic goal of reintroducing a wild population of wolves would be significantly jeopardized by the backlash that could develop. Great care needs to be exercised to ensure that an attack on a child does not occur since that potentially catastrophic event could precipitate a major crisis for the communities involved and could result in violence toward those perceived as responsible for planning and promoting the reintroduction of wolves in the effected areas.

James S. Thal, Ph.D.
Preliminary Report on the Results of the Wolf Depredation Study

Submitted to New Mexico Game Commission

Submitted by: By Alexander J. Thal, Ph.D., Western New Mexico University
In cooperation with Nick Ashcroft, Ph.D. New Mexico State Cooperative Extension, and Jess Carey, Catron County Wolf Investigator

May 7, 2011
Background:

- Conducted assessment of the wolf depredation on livestock from 2000 to 2006, using a multiple sources of wolf depredation accounts
- Problems with old methodology
- FWS faces similar problems with accurate accounting: the number of wolves
- Best approach to get an approximation is by determining calf crop and losses
- Ranchers keep accurate accounts for their calf crops, reflected in their sales records
- Canvassed wolf area ranchers

Results of Wolf Depredation Study:

- Results of study: 4,400 calves lost since 2006 – the last 4 yrs.
- Over 1,100 calves lost per yr.
- Results in a 15% calf crop per yr. unsustainable to pay for ranch operations
- Several ranchers have already gone out of business
- Results in over $2.2 mil. in 4 yrs.; $550,000/yr.
- Catron County tax base source of income: 48% from ranching operations; base industry
- Results in annual loss to county schools and government: $35,200 - a teacher’s salary
- Total estimated direct economic loss from 2000 thru. 2010: $5 mil
- Total economic impacts thru. 2010: $5.6 million

Importance of Livestock Production to Catron County: Cattle ranching are the economic base of Catron County, supporting:

- $4.1 million annually to the local economy
- $10 to $15 million to the state’s economy
- $517,000 annual support to schools and county government
- Livestock production support approximately 50% of County tax base

Methodology:

- Designed questionnaire survey
- Canvassed 32 ranchers that suffered livestock losses from wolf depredation. Responses from 21 ranchers
- Estimated % of calf crop and % of aver. Calf losses before & after wolves on ranch
- Peer reviewed responses; conducted two subsequent surveys
Method used to derive Multiplier factor

**Objective:** Derive a multiplier factor to estimate probable cattle losses due to wolf presence.

**Background:** There is an undisputed fact that wolves can and do prey on cattle. Ranchers in the area have complained about depressed calf crops in the presence of the wolf. However, it is difficult to find and confirm all wolf predation on livestock. Therefore, this paper attempts to estimate cattle losses to wolves and derive a multiplier factor to determine approximately how many wolf kills there are that go unconfirmed.

**Data:** The first piece of information needed is to find out what the average calf crop for the area is in the absence of the wolf. 29 ranches in the area were surveyed. 25 ranches responded. 21 ranches had calf crop data that pre-dated the presence of the wolf. These ranches represented 7,817 head of production cattle, excluding bulls. Their results are as follows:

<table>
<thead>
<tr>
<th>Ranch</th>
<th>Pre-Wolf Average Calf</th>
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</thead>
<tbody>
<tr>
<td>AA</td>
<td>93%</td>
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<tr>
<td>B</td>
<td>89%</td>
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<tr>
<td>BB</td>
<td>99%</td>
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<tr>
<td>C</td>
<td>97%</td>
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<tr>
<td>D</td>
<td>96%</td>
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<td>E</td>
<td>100%</td>
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<td>F</td>
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<td>N</td>
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<td>O</td>
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<td>Y</td>
<td>98%</td>
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<tr>
<td><strong>Average</strong></td>
<td><strong>89%</strong></td>
</tr>
</tbody>
</table>


Therefore we can use an average calf crop for the area before wolf reintroduction to be approximately 89%.

The next step is to determine what calf crop averages were for the same ranches after the wolf was present and compare calf crop averages. The results are as follows:

<table>
<thead>
<tr>
<th>Ranch</th>
<th>Pre-Wolf Average Calf Crop</th>
<th>Calf Crop with Wolf Present</th>
</tr>
</thead>
<tbody>
<tr>
<td>AA</td>
<td>93%</td>
<td>85%</td>
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<tr>
<td>B</td>
<td>89%</td>
<td>70%</td>
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<tr>
<td>BB</td>
<td>99%</td>
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<td>C</td>
<td>97%</td>
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<td>Y</td>
<td>98%</td>
<td>95%</td>
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</tbody>
</table>

Average 89% 74%

In the presence of the wolf average calf crops on the ranches surveyed fell by 15 percentage points. Some ranches were affected more than others, and a few didn’t see any change. But no ranches saw an increased calf crop after the wolf.

Based on this information we can conclude that the wolf has reduced calf crops by 15 percentage points on an annual basis.

The next piece of information we need is to determine approximately how many total head of production cattle are exposed to the wolf range in New Mexico. Based on County and Forest
Service data, we can estimate that 27,000 head of production cattle live within the range of the wolf in the State of New Mexico. Therefore, if 15% of those cattle’s offspring are lost to wolves, that is a total of 4050 head over a four year period from 2/2007 to 2/2011, there were a total of 72 confirmed livestock deaths related to wolves. That is an average of 14.4 kills per year.

**Conclusion:** If only 14.4 livestock kills are confirmed of the estimated 4050, we can assume that for each confirmed livestock death related to wolves, there are 281 unconfirmed.

**Points of Discussion:**

The ranches surveyed represented a sample size of 29% of the cattle exposed to wolves. This is a great sample size and accurately represents the population.

If a rancher were to be reimbursed 281 times the market value of a confirmed kill, ranchers would be more diligent in finding and reporting suspected wolf kills.

More sufficient proof of data may be necessary to more accurately define how many cattle are exposed to wolves.
Assessment of the Economic Impacts From the Non-Essential, Experimental Mexican Wolf Program

By Alexander J. Thal, Ph.D.
Western New Mexico University

February 2, 2007
Assessment of the Economic Impacts From the Non-Essential, Experimental Mexican Wolf Program

1. Livestock Impacts from the Mexican Wolf Program

This section highlights past, current and projected livestock damages due to the Mexican wolf depredation. It also highlights the indirect but devastating economic impacts on Catron County government, schools, businesses and family residents.

a. Importance of Livestock Production to Catron County: Cattle ranching are the economic base of Catron County, supporting:
   - $4.1 million annually to the local economy
   - $10 to $15 million to the state’s economy
   - $517,000 annual support to schools and county government
   - Livestock production support approximately 50% of its tax base

   Refer to Appendix A for the method of calculations.

b. Wolf depredation on Catron County livestock from 2000-2006 has directly resulted in financial damage:
   - Cattle losses, 182 cows; total value: $129,764
   - Calf losses, 854 calves; total value: $369,992
   - Total number of Catron County cattle lost to wolf depredation: 1,036
   - Total financial loss to ranchers: 1,036 head of cattle = $499,156
   - Two ranchers already lost their cattle ranches directly due to the wolf

   Refer to Appendix A for the method of calculations.

2. Summary of Livestock Economic Impacts on the County

These financial impacts to ranchers from wolf depredation only represent direct losses to ranching operations.

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1 These estimates are conservative, because the figures are based on market value, not replacement value. The average market price for a bred cow in 2005 was approximately $1,000. The replacement cost for that same bred cow (i.e., the rancher goes to a market, buys a cow, acclimates it to his range conditions and starts breeding) is $2,400, according to Assoc. Professor, Nick Ashcroft, Agricultural Economics Dept., NMSU.

2 The above impact assessment was conducted using U.S. Department of Agriculture (USDA) cattle prices and the recorded number of cows and calves killed by wolves from 200 through 2006 period. In a separate and independent survey of the ten most impacted ranchers, financial impacts to their ranch operations were found to be similar.
a. The negative economic impacts from these ranchers to the larger community since 2000: The increasing wolf depredation on livestock has a significant impact on county businesses, government and schools, including, but not limited to:
   - Impacts to Catron County: Negative $598,987 (using a 1.2 multiplier).
   - Impacts to the state of New Mexico: Negative $898,480 (using a 1.8 multiplier)
   - Loss of $33,000 to county government and schools
   - Loss of $47,000 to local businesses
   - Negative impact of approximately $900,000 to the New Mexico’s economy.

b. These estimated impacts come from eight to ten wolf-impacted ranchers.

3. Projected Future wolf depredation and its impacts on the County.

If livestock ranching and its customs and culture are not protected from wolf depredation, viable livestock production will disappear as the County’s base industry in the foreseeable future.

   a. Future wolf population impacts on livestock losses: The wolf population continues to explode, up from a conservative estimate of 25 wolves (in Catron County at the end of 2006) to over a hundred in a few short years. The wolf population increase is driven by both continued introduction and by an average litter size of 4 to 8 pups per year. With the continued release of wolves into Catron County, the wolf population will lead to the destruction of the county’s economic base. The tables below show the projected annual loss of County cattle livestock over the next 9 years, based on a natural wolf population increase of 22% per year (that does not include any more wolf translocations or releases):

   - Livestock losses will jump from 154 in 2006 (mother cows and calves) to 188 calves and mother cows in 2007
   - To an annual loss of 922 cattle in 2015 (419 calves & 503 mother cows)
   - Next 5 year total losses would be:
     - 3,000 head of livestock lost to wolf depredation
     - $1.5 million direct loss to livestock producers
     - $1.8 million impact to Catron County
     - $2.7 million impact to the state of New Mexico

   b. Catron County cattle operations will be destroyed in the foreseeable future: The tables, below, only underscore that viable cattle operations will be devastated long before the year 2015. The impact on Catron County fiscal solvency would be at risk with the loss of 50% of its tax base gone, probably within five years given the current rate of wolf depredation on livestock.
Cattle: Wolf Depredation at 22% Annual Increase
Calves: Wolf Depredation at 22% Annual Increase

![Graph showing the increase in calves and wolves over the years. The graph indicates a 22% annual increase in wolf depredation.]
Cows: Wolf Depredation at 22% Annual Increase
c. Fiscal Impacts on County Government an Schools: Approximately 50% of the County’s tax base is derived from cattle ranching. Two ranchers have already ceased ranching due to wolf depredation. Ten more ranchers could be out of business within the next year. Realtors in Glenwood and Reserve, New Mexico, state that most cattle ranches are for sale because prudent cattle ranch investors will seek to cut their losses before the wolf population grows any larger -- but the ranches for sale will not be sold as cattle ranches. Instead, these ranches will likely become residential subdivisions.

d. Future Impacts on Catron County Outfitting and Guide Industry: Catron County is world renowned as the premier place in the U.S. for trophy elk hunting. Outfitters and guides are already reporting observable elk losses that they believe are due to the wolf population increase. Montana\(^3\) has documented experienced the drastic reductions in their elk populations. Local outfitter, Tom Klumker, San Francisco Outfitters, states that Wyoming and Idaho outfitters are experiencing similar observations regarding the devastation of their elk herds due to wolf predation.

Catron County has 24 outfitting and guides with residence inside the County with another 40 to 50 outfitters/guides dependent upon the County’s elk herds for their living. Another local outfitter in Catron County figures for the New Mexico game unit around Wall Lake, supports roughly 500 elk; 200 elk tags are given out each year but the number of wolves in the same area will devour close to 400 elk in a year. If the wolf population increases like in the northwest, it will destroy this viable local economy, not to mention the loss of the premier elk herd in the US.

D. Cumulative Impacts on Catron County

Below is a summary of cumulative impacts on Catron County’s livestock production and the local economy, social and cultural fabric related to cattle ranching. refer to Appendix B: Cumulative Impacts on Catron County.

1. Cumulative Financial Effects to Family Livestock Ranching

Catron County’s major industry is livestock production. Many factors have a bearing on livestock production, including markets and drought; federal actions, drought and predation organizations and networks, have played the greatest havoc on Catron County’s economy. Economic opportunity costs to the County include:

- Loss of over 25,000 head of cattle in the last decade.
- Loss of about $600,000 in tax revenues to County government and schools
- Loss of $10 million annually in livestock production economy since 1997

\(^3\) Dr. Norma Nickerson, University of MT, states that the wolf predation on elk results in a $238 million annual loss to the state’s economy. source: ww.casperstartribune.com/articles/2007/01/22/news/wyoming.
Appendix A: Basis for Calculations

Figure 1

Cattle Prices

<table>
<thead>
<tr>
<th>Year</th>
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<th>Value</th>
<th>Calf (Avg. wt. 400#)</th>
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New Mexico Agricultural Statistics

Figure 2

Depredation Numbers

<table>
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<tr>
<th>Year</th>
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<th>Value</th>
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<td>44</td>
<td>196</td>
<td>$31,253.65</td>
<td>$89,106.40</td>
<td></td>
</tr>
</tbody>
</table>

A. Total cattle losses due to wolf depredation to Catron County ranchers for 6 years (2000-2006) were:*  
- Total cattle losses are 182 cows; total value: $129,764  
- Total calf losses are 854 calves; total value: $369,992  
- Total number of Catron county cattle lost during this 6 yr. period = 1,036

From the above reported cattle losses, I figured the following:*  

Grand total financial lost from 1,036 head of cattle lost during this 6 yr. period = $499,156

Impacts to Catron county (using a 1.2 multiplier) = $598,987 loss in 6 yrs.
- Impacts to the state of New Mexico (using a 1.8 multiplier) = $898,480 loss in 6 yrs.

* Based on WNMU SCRA’s calculations, using Gila Stockman’s Association’s records for the number of confirmed kills; US FWS multiplier of 7; and Catron County wolf Investigator field records for losses from 4/06 to 12/06.

**BASIS FOR CALCULATIONS**

<table>
<thead>
<tr>
<th>Year</th>
<th>Cow (Avg. wt. 850#)</th>
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<th>Calf (Avg. wt. 400#)</th>
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*New Mexico Agricultural Statistics*

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</table>

44 196 $31,253.65 $89,106.40
Appendix B: Cumulative Impacts on Catron County

Summary of Cumulative Effects of Resource Decisions on Catron County’s Social, Economic and Cultural Fabric

Timber: Until forced to close in 1992 due to Forest Service decisions regarding the Mexican spotted owl and threatened litigation by the Center for Biological Diversity, Catron County had the most prosperous timber mill in New Mexico. Losses to the community of Reserve, New Mexico, due to the Reserve timber mill closure include, but are not limited to:

- Loss of over 150 local timber jobs directly related to the timber mill
- Total job loss: more than 250
- Population no longer supported: 1,000 people
- $12 million annual loss to base industry, Catron County, New Mexico, and Arizona.
- $600,000 to $900,000 annual loss in Forest Receipts to county schools, roads and emergency services.
- $400,000 annual loss of Forest Receipts that once went toward forest restoration.
- Loss of local programs and services

Mining: The one active mine in Mogollon was closed due to litigious actions. Fence Lake coal development ended this year, due in part to litigation threats by the Center for Biological Diversity. Economic opportunity losses to Catron County:

- Expected loss of 150 jobs.
- Expected loss of over $1 million annually to County government and schools.

Family Livestock Ranching: Catron County’s major industry is livestock production. Many factors have a bearing on livestock production, including markets and drought, but federal actions, driven by well-financed Center for Biological Diversity lawsuits and affiliate litigious organizations and networks, have played the greatest havoc on Catron County’s economy. Economic opportunity costs to the County include:

- Loss of over 25,000 head of cattle in the last decade.
- Loss of about $600,000 to County government and schools
- Loss of $10 million annually in livestock production gross economic output since 1997
Reestablishment of the Mexican Gray Wolf: 
The Economics of Depredation
INTRODUCTION
The Mexican gray wolf (*Canis lupus baileyi*) was deliberately extirpated prior to the 1970s from the southwestern United States through concerted efforts and investment. This subspecies was listed as endangered in 1976 after the United States Fish and Wildlife Service (USFWS) determined they were in danger of extinction (F.R. vol. 41, no. 83). In 1982, the USFWS completed the Mexican Wolf Recovery Plan (MWRP) with goals of maintaining a captive breeding program and re-establishing the species in their historical habitat. However, lack of action by USFWS on the MWRP provoked litigation by environmental groups to force immediate implementation of the recovery plan. This suit resulted in a settlement with undisclosed conditions and parameters. By 1996, a proposed experimental rule and Final Environmental Impact Statement (FEIS) were published. In 1998, designation of a Nonessential Experimental Population was accompanied by the Endangered Species Act (ESA) section 10j special rule on managing the reintroduced population.

Reestablishment of this subspecies has generated extensive emotional, political, biological, and socioeconomic debate. This debate has failed to yield consensus regarding the success or failure of the recovery program. The resulting polarity has diminished constructive dialogue and
prevented mitigation of the issues. The current polarized state of the debate means that stakeholders fail to even seek potential middle ground. While there are many unique perspectives on the economic, ecological, social, and political impacts or benefits related to the reestablishment of Mexican wolves, they have not been clearly described or evaluated in a systematic or scientific fashion. The Mexican wolf recovery program would benefit greatly from such analyses.

Local communities and rural counties are particularly concerned about the wolf recovery program and the economic impacts it may be having on livestock operations in the recovery area. From an economic perspective, a fundamental question is whether a disproportionate burden or economic impact is being imposed on a few individuals for the good of American society.

BACKGROUND AND LITERATURE
Since the arrival of domestic livestock in the Southwest, there have been several efforts to control or eliminate predators—wolves (Canis lupus), grizzly bears (Ursus arctos), mountain lions (Puma concolor), bobcats (Lynx rufus), and coyotes (Canis latrans). In 1893, the Territorial Bounty Act was passed by the Arizona–New Mexico Territorial Legislature, allowing a bounty to be paid on stock-killing predators. In 1907, the U.S. Biological Survey and Department of Agriculture assessed damages and began a campaign to control predators. By 1914, Congress created the Biological Survey, including the Predatory Animal and Rodent Control Program, which was responsible for experiments and efforts to eliminate wolves, prairie dogs, and other animals injurious to agriculture and animal husbandry. These efforts, along with private bounty programs, were developed to address the economic impacts of predation on livestock and disease transmission (e.g., spread of rabies) and were the primary reasons for eliminating these predators. While there was a perceived threat to human life from attacks by predators, depredation of livestock and associated economic impacts were likely what led to the concerted effort to control predators at that time. Accompanying the extensive efforts toward eliminating harmful and predatory animals was the development of more efficient and effective methods of elimination.

The estimate of economic damage in New Mexico caused by 40 to 50 wolves in 1918 was $60,000—equivalent to about $960,000 in 2007 dollars (Brown, 1992). From 1915 to 1920,² wolf-induced economic losses were estimated at half a million dollars—comparable to $9.4 million in 2007 dollars (Brown, 1992). In a 1921 U.S. Department of Agriculture news release, the Bureau of Biological Survey estimated annual economic losses in livestock of $20 to $30 million ($205 to $308 million in 2007 dollars) to all predators throughout the West. According to Brown (1992), average destruction by predatory animals during this same period was estimated to be $1,000 worth of livestock annually ($10,000 in 2007 dollars) for each wolf and mountain lion, $500 ($5,000 in 2007 dollars) for each stock-killing bear, and $50 ($500 in 2007 dollars) for each coyote and bobcat. He also illustrated cases where substantial damage was caused by just a few predators. For example, one wolf in Colorado killed nearly $3,000 worth of cattle ($30,000 in 2007 dollars) in one year, two wolves in Texas killed 72 sheep in two weeks, one wolf in New Mexico killed 25 head of cattle in two months, and another wolf killed 150 cattle valued at $5,000 ($51,000 in 2007 dollars) during a six-month period. During this era, wild ungulate populations were low and livestock numbers had reached record high numbers, which possibly led to higher depredation rates and economic impacts. However, Mexican wolves were extirpated prior to scientific study of the predator–prey relationship. Although most

²Used base year 1917
of the information regarding wolf damages is anecdotal, there is little argument that wolves preyed upon domestic livestock.

The objective of the MWRP is “to conserve and ensure the survival of Canis lupus baileyi by maintaining a captive breeding program and re-establishing a viable, self-sustaining population of at least 100 Mexican wolves in the middle to high elevation of a 5,000 square mile area within the Mexican wolf’s historic range” (1982 Mexican Wolf Recovery Plan). Contrary to historic evidence of depredation, current recovery documents state most wolves will not depredate even when livestock are present, and that ranch failures are not expected to occur (USDI, 1982). The same document also states that only a small number of livestock owners are expected to be affected; however, some could sustain significant losses in a given year (USDI, 1982, pp. 4–7). The evolving view on predators is likely related to the distinct change in the U.S. economy that has occurred since the early 20th century. In the early 1900s, agriculture was the primary industry in the United States, seen as an important tool in settling the frontiers, and necessary for the sustenance of families. Today, most Americans do not have daily contact with agriculture or food production. The agrarian mindset under which wolves were extirpated is unfamiliar to them. However, in rural areas, and to individual family enterprises involved in agriculture, the challenges offered by the presence of wolves are real and present. It is also very likely that these family ranches disproportionately bear the economic impacts of wolf reintroduction, and this individual-level perspective is often overlooked in economic analyses of endangered species recovery. Meyer (1995) suggested that the economic effects of endangered species listings are so highly localized and of such small scale and short duration that they do not substantially affect state economic performance in the aggregate. Despite the limited contribution of endangered species listings to the aggregate, analyses of impacts at the local scale are needed. We conducted analyses and interviews of numerous livestock operations in the recovery area to examine the possibility that livestock depredation by reintroduced Mexican wolves was negatively impacting a small subset of ranches in the recovery area. The objective of this paper is to analyze the impacts of the MWRP on rural agricultural enterprises in the Mexican Wolf Recovery Area (MWRA). This effort was designed to (1) provide perspective and background information to people not familiar with wolf depredation issues and (2) provide a basis for improved discussion and decision-making regarding socio-economics of individual family enterprises in the recovery area.

**METHODS**

Beginning in 2005, we invited ranchers in Catron County, New Mexico to discuss economic impacts of the Mexican Wolf Recovery Program on their individual operations. Ranchers interviewed can be viewed as proactive and progressive managers because they readily participated and expressed interest in devising new approaches to managing livestock in the wolf recovery area. Many ranchers expressed concern about impacts to themselves and their neighbors. Seven ranchers met two criteria: (1) directly affected with numerous depredations over several years, and (2) were willing to discuss their experiences in some detail. Ranchers reported livestock killed or injured by wolves, and we termed these *direct* losses. Some of these losses were confirmed by USDA Wildlife Services as being caused by wolves, whereas other losses were not confirmed by the agency for reasons discussed below. Interviews also revealed several types of *indirect* and *related* losses associated with the recovery program. However, there is currently no mechanism for confirming these types of losses. Each of these seven ranchers was interviewed during...
April of 2006 to discuss economic impacts of depredation. Using ranch records, livestock losses were classified as wolf-related or typical ranch losses. Wolf-related losses were further classified as direct (i.e., wolf killing livestock) or indirect (i.e., changed management activities due to wolf recovery program).

Direct Losses
Published ranch cost-and-return estimates from New Mexico State University (NMSU) were used to estimate effects on net income associated with loss of cattle (direct loss) due to wolf depredation (Torell, 1998; Hawkes, 2006). Information on direct losses derived from interviews was inputted into the livestock budget model to estimate net income differences. This approach enabled comparisons of net incomes between a typical ranch with and without wolf depredations. Losses attributed to wolves were not solely confirmed kills or even investigated depredations. All animals included in the wolf responsible category were classified as such by ranchers, given some credible evidence (e.g., wolf tracks and no other predator tracks, known calf completely missing and only wolf tracks in the area). If the rancher being interviewed did not know the cause of an animal’s death, or had no evidence of wolf involvement, animal losses were considered normal losses that would have happened without the wolf being reintroduced into the area.

Compensation Program
The Bailey Wildlife Foundation Wolf Compensation Trust is the only compensation program available to ranches for livestock losses caused by wolves. This program typically pays the current market value of the depredated animal. This is not a guaranteed compensation program, as is revealed by the fact that no payments were made in New Mexico in the fall of 2007 and spring of 2008, even though livestock depletions by wolves were confirmed. We evaluated the market value relative to the real value these animals represent to a ranch, including investment to date, loss of future productivity, and loss due to replacement and acclimation (to elevation, fitness for terrain, knowledge of pasture foraging and watering locations). We also analyzed differences in compensation relative to variations within and across years. Time of year is important because livestock prices cycle within the year, with the typically highest calf value in March and April and the lowest in October and November.

Indirect Losses
Data from 1996 and 2006 ranch cost-and-return estimates from NMSU (Torell, 1998; Hawkes, 2006) were used to estimate losses associated with changing management (indirect loss) at the individual ranch level. Estimates were not intended to calculate precise losses to these ranches; rather they were used to evaluate the incremental impacts due to wolf presences and management changes. Information collected during interviews was used to adjust budgets based on estimated management changes as a result of wolves on individual ranches. Indirect losses considered in the analyses used adjustments (based on interviews) of 5% more in feed cost, 50% more in fuel and maintenance of vehicles, hiring a permanent full-time person, and 1% in increased vet costs associated with changes in management in an attempt to address wolf presence.

Adobe Ranch Case Study
In addition to direct and indirect losses, ranchers reported additional expenditures or losses as a result of wolf presence on their ranch. Related losses (i.e., decreased livestock performance as a result of wolf presence) were calculated for one ranch in the Gila as a case study. The Adobe Ranch in the Gila National Forest experienced an increase in wolf presence during 2007, confirmed livestock depletions.

and resulting management challenges. Adobe Ranch personnel were interviewed regarding their experiences with depredations. Ranch management personnel provided ranch monitoring records that recorded precipitation, estimated wolf presence based on sightings, number of confirmed and likely livestock depredations, and performance of steer calves from fall weaning to shipping off the ranch (a period of 35–102 days depending upon the year, 2002–2007). This practice of weaning calves on the ranch and shipping at a later date has several advantages, especially if ample forage is available. It allows the calves to be vaccinated and adapt to weaning with less stress and stress-related sickness. It can also be financially advantageous, as calves that have been weaned at least 45 days with appropriate vaccinations receive a premium, and market prices are rebounding from seasonal lows.

Only steer calves were used in this analysis because the heaviest heifer calves were retained as replacements some years, which artificially deflated average heifer weights at shipping. Calves were shipped off the ranch at weaning during 2004; therefore, there are no data for that year. A 99% confidence interval for calf Average Daily Gains (ADG) was computed. In addition, regression analysis was conducted to quantify the relationship between growing season (April–October) precipitation and ADG. Using calf values from previous years, estimates are provided regarding dollar losses to the Adobe Ranch from direct losses (e.g., animal mortality), indirect losses (e.g., increased medicine costs), and related costs (e.g., animal performance—or lack of gain—losses). Results are supplemented with qualitative information provided by ranch personnel with respect to wolf activity and effects on livestock management.

**RESULTS AND DISCUSSION**

**Direct Losses**
Average annual normal calf loss on these ranches (losses due to lightning, disease, coyotes, etc.) since re-introduction of Mexican wolves in New Mexico ranged from 3.2% (2002) to 10.2% (2005) as a percent of total mother cows on the ranch. Average annual normal losses of mature cows ranged from 0.4% (2001) to 4.4% (2005) as a percent of total mother cows on the ranch. Wolves were likely responsible for annual mortality of 1.1% (2002) to 18.9% (2005) of calves and 0.3% (2001) to 3.1% (2005)
of cows per ranch (Figure 2), in addition to normal mortality.

Confirmed and probable livestock depredations by Mexican wolves fall into the lower range of actual depredations and do not address depredations that are never found or might be found too late for confirmation. Research in Idaho suggests that the ratio of detected kills to undetected kills is approximately 1:8 (Oakleaf et al., 2003). Many wolf depredations are likely contaminated by other predators (i.e., coyotes) and scavengers prior to confirmation of the predatory species responsible for the mortality, and in some cases species confirmation may be precluded due to contamination. Reported wolf-killed livestock numbers estimated in this analysis likely underestimate actual losses because of unfound or indeterminable losses that were listed as normal losses.

Depending on where the industry exists within the beef price cycle and the size of their operation, ranches may or may not be able to absorb additional losses. To demonstrate the effects of the price cycle, we used published NMSU cost-and-return estimates from 1996 (a low in the price cycle) and 2006 (a peak in the price cycle) to estimate the economic effect on an individual ranch with wolf-related livestock losses for 2005 (3.1% cows, 18.9% calves). In 1996, a ranch with about 180 cows would have a decrease in net income of $63.17 per cow, whereas in 2006, a comparable ranch would have experienced a decrease in net income of $125.18 per cow via direct losses of livestock to wolves. The 2006 ranch went from a positive net income to a negative ranch income when livestock depredations were included in the analysis. Therefore, with similar losses through the entire price cycle of this representative ranch, it would not experience any positive net returns.

Compensation Program

The FEIS (USFWS, 1996) assumes that depredated livestock are replaced on grazing allotments, and that effects on the overall number of livestock present during a grazing season are marginal. It became clear during the interviews that this was an unsubstantiated statement because the current compensation program falls short in several areas. First, compensation only occurs for confirmed kills, and confirmation is often difficult. Second, for confirmed wolf depredations, compensation often takes 3 to 6 months. Even if compensation is received sooner, ranchers may hesitate to place a naïve animal in unfamiliar, rough terrain. Naïve animals may experience increased vulnerability to depredation by wolves, reduced performance relative to experienced local animals, and a reluctance to range far from water, which can result in excessive forage use in certain areas. Given these factors, as well as rancher hesitation to leave the ranch (to remain vigilant of further depredations), replacements would likely not be purchased until the following year. Further, animals are often selected and bred for specific traits, including birth weight, confirmation, disposition, and acclimation to terrain and climate, that are not easily replicated in purchased animals. Livestock are not easily replaceable—ranchers must search for and purchase appropriate replacement stock. Another shortcoming of the current compensation program as revealed through interviews is that compensation is paid at the current market value for a confirmed wolf kill. This practice underestimates the real value of the animal to the economic enterprise. For example, if a bred four-year-old cow is killed by a wolf, we assume that it would cost $1,000\(^4\) to purchase a bred four-year-old cow. However, it is likely that this replacement cow will be purchased later in the year, given that the

\(^4\)Market value as of April 2006, when this study was completed—value changes as the market fluctuates.
compensation takes several months. When this occurs, there will likely be one less calf at market time ($605 value\(^2\)) for that year, and only in the following year will the replacement cow produce a saleable product. But many ranchers stated that due to the time required to acclimate, and the associated stress of raising that calf, the replacement cow will often not breed back the following year. We assumed that 30% of replacement animals would not breed back the following year (estimate provided by C. Mathis, Extension Livestock Specialist, personal communication, 2008), which contributes an additional $182 loss of income to the ranch. If we include the cost of travel to acquire the new animal (estimated at $250) the total cost of replacing the lost animal is $2,037 if compensation is delayed and $1,432 if compensation is immediate (Table 1).

Another option, and the preferred alternative of ranchers we interviewed, is to raise a replacement animal (Table 1). The opportunity costs include retaining a replacement heifer that could have been sold ($605), and waiting two years before the replacement heifer will produce a sellable product ($605 × 2). However, the cow that was killed would have had a shorter productive life than the younger heifer that replaced her. Therefore, the younger animal is credited $350 (35% of $1,000) for a potentially longer productive life. The total sum loss of $1,465 does not include feed and vaccination costs of raising the animal or the risk associated with losing the animal. This scenario assumes a constant value of animals and available forage.

Using either scenario, the likely real value of an animal lost ranges between $1,432 and $2,037 as compared to the fluctuating market value ($605–$1,000) typically paid to ranchers through the existing compensation program. Applying estimated dollar values to the total number of discovered livestock killed by wolves potentially underestimates total financial impact by a factor of eight (Oakleaf et al., 2003). We did not calculate these estimates here, as we are uncertain of the applicability of Oakleaf’s research to the Southwest and because of the informality of our data collection. Research investigating the probability of ranchers detecting wolf-related depredations of their livestock on southwestern rangelands is lacking. In addition to the direct costs of wolf depredation, indirect costs also affect the economic realities of rural citizens.

### Indirect Costs

Interviews with producers revealed additional impacts to ranch income beyond direct losses of livestock. Published net ranch income estimates from 1996 (Torell et al.) suggested a loss of $189.87 per cow for medium-sized ranches (186 mother cows) in the northwest region of New Mexico, the region Catron County was grouped into in 1996. Net ranch income in 2006 for a large ranch (183 mother cows) in the southwest region of New Mexico was estimated as $52.79 per cow. Catron County was grouped in the southwest region in 2006 because it was determined...
its ranches were more characteristic of that region (J. Hawkes, personal communication, 2008). Indirect costs resulted from changes in management by ranchers in an attempt to minimize livestock depredations and stress-related losses associated with the presence of wolves. Adjustments in gross income and variable costs (resulting from management changes) revealed that loss in net ranch income was an estimated $338.88 and $157.04 per cow for 1996 and 2006, respectively. Reductions in calf crop percentages and weight losses associated with livestock being stressed and harassed were not estimated, but merit further consideration.

**Economics of Ranching in the Mexican Wolf Recovery Area**

The livestock industry in southwestern xeric (hot and dry) forests exhibits unique organizational attributes and infrastructure that should be considered when estimating economic impacts of wolf recovery on individual ranches. Most family ranches (48% to 99.6%) in the recovery area are highly dependent upon Forest Service lands for sustainability of their family’s economic enterprise (USFWS, 1996). Changes in federal regulation, pressure from special interest groups, and endangered species issues add to traditional challenges that ranchers face. Traditional challenges include market fluctuations (Figure 3), the cost-price squeeze (Figure 4), weather variation, and livestock illness. As a result, these families and the communities they make up may face substantial difficulty in absorbing additional costs without recourse to adequate compensation. Economically, agriculture meets the criteria of a perfectly competitive market where all firms (i.e., ranchers) sell an identical or homogenous product, are price takers not price setters, have a relatively small share of a market, and have complete freedom to enter and exit the market. The key point here is that ranchers are price takers and unable to effect a price change or determine the price of their product. Therefore, they are at the mercy of the markets. The market has an average price cycle of 12 to 13 years from peak to peak, but can vary with external forces such as opening international borders, dairy buy-outs, and weather extremes. Ranch survival may depend on when these incremental and additive impacts occur relative to the price cycle. For example, calculations of 2006 (a peak year) net income losses based on direct costs and indirect costs were $72 and $157, respectively. In 1996 (a low year),
net income losses for direct and indirect costs were estimated at $253 and $339, respectively. This suggests that continuous depredations by wolves on a single ranch could result in negative net incomes and dramatic effects upon the financial stability of the ranch.

Livestock prices are just one factor that affects profitability and cannot be controlled by individual ranchers. The cost–price squeeze refers to the difference between the prices paid for inputs and the amount received for a product. The Prices Paid Index (PPI) and the Prices Received Index (PRI) demonstrate an increase in operating costs accompanied by a relative decrease in prices received for the product (livestock) from 1990 through 2002 (Figure 4). Ranches are paying more for ranch supplies, in real terms, than they are receiving for their product. Although these two indices neared each other in 2004–2005, the gap has widened since then, with a decrease in the prices received and an increase in prices paid for inputs.

Given the combination and cumulative effects of low cattle prices and high input costs, we would anticipate increased hardship for ranches experiencing additional losses caused by wolves. Research is needed to investigate impacts to rural agricultural communities in association with wolf presence. Understanding the economic challenges ranchers face and identifying opportunities to offset the costs brought about by wolf recovery could benefit ranchers in maintaining their family businesses. In our study, interviewees’ ability to absorb high livestock losses in 2005 was largely due to favorable livestock prices that year. However, it is anticipated that when the market takes a downturn such as that which occurred in 1996, losses will be more difficult to absorb and ranchers will be less likely to maintain a viable business. Ranchers were reluctant to identify thresholds at which they would be forced to sell their ranches. Several did suggest that with the current price cycle and increased input costs, if calf crops fell 15% lower than average, they would seriously consider discontinuing their family beef production enterprises.

Figure 4. National Prices Received Index (PRI) and Prices Paid Index (PPI) from 1987 through 2007 for agricultural producers. (Source: USDA, NASS, Agricultural Prices Summary.)
Importance of Scale
When predicting economic impacts associated with Mexican wolves, depredation rates were analyzed at a scale comprising all cattle within the recovery area (USFWS, 1982). According to the five-year review (USFWS, 2003), total direct economic impact represented between 0.05% and 0.47% of total cash receipts, and uncompensated losses represented between less than 0.02% and 0.44% of total cash receipts in the Blue Range Wolf Reintroduction Area (BRWRA). Although technically correct, these statements do not provide accurate analysis of impacts to individuals or local communities directly affected by livestock losses and costs associated with depredations by Mexican wolves. When analyzed at a state or regional scale, impacts may appear insignificant. This approach masks localized wolf activity and depredations that are often clustered on a small number of the total ranches in the recovery area. Individual ranchers may suffer a disproportionately large proportion of wolf depredation within a given time period, suggesting that research and associated analyses need to occur at a scale congruent with the effect. To a rural community, each ranch is a key social and economic contributor, helps define customs and culture, and is an important component of the local economy. What affects one ranch affects its neighbors and the community at large. At a region or state level, individual ranch enterprises have a less significant impact, yet still contribute and define the larger area socioeconomically. The greater the spatial scale used, the less any one individual contributes proportionally; this masks the localized effects individuals and communities experience with regards to wolf presence. It is important, for full disclosure, to analyze the effects of the recovery program at a smaller scale relevant to affected parties, not simply at the greater scale of interested parties.

Adobe Ranch Case Study—Performance-Related Losses
From 2000 to 2003, the Adobe Ranch knew of only two wolves on the ranch. In 2004, the number of wolves increased to nine, until 2006 when the total dropped to six. By the fall of 2007, a total of 14 wolves (three packs) were known to be on the ranch (Adobe Ranch Management, personal communication, 2008). Wolves were also in close proximity to the ranch headquarters and branding pasture beginning in February. This level of wolf activity coincidently led to eight confirmed and one probable depredation. Total depredations for 2007 included confirmed (13 animals), probable (1 animal), and possible (4 animals) on the Adobe Ranch. The Adobe Ranch alone accounted for 46% of the total confirmed depredations reported to the Bailey Wildlife Foundation Wolf Compensation Trust in New Mexico for 2007. Also, 50% of the possible depredations and 100% of the probable depredations for 2007 occurred on this ranch.

Weaning weights, shipping weights, and site-specific precipitation were available for the Adobe Ranch from 2002 to 2007. Growing season precipitation was correlated to steer performance, as forage production is closely related to growing season precipitation. Cumulative precipitation from April through October was considered growing season precipitation.

There was little variation in steer ADG from 2002 through 2006 (Figure 5), with an average of 0.08 lbs/day, which is considered normal performance in the region when fall-weaned calves are retained (C. Mathis, personal communication, 2008). However, ADG in 2007 was much lower than in previous years when calves were managed similarly between weaning and shipping, falling well below the lower limit of a 99% confidence interval of -0.75 lb/day. Using actual market values from the Clovis Livestock Auction in Clovis, New

Mexico,\(^7\) the cost of the estimated impact of weight loss in 2007 was -$108.83 per steer weaned:

\[
NG = (\text{ASW} - (\text{AWW} + (\text{ADG} \times D))) \times (S + P) / 100
\]

- **NG** = Net gain or loss
- **ASW** = Average shipping weight
- **AWW** = Average weaning weight
- **ADG** = Average daily gain
- **D** = number of days between weaning and shipping
- **S** = Sale price ($/cwt)
- **P** = Premium ($/cwt)

The previous calculation assumes a $7.00 premium for weaning and preconditioning steer calves a minimum of 45 days before shipping (King, 2007). Additionally, growing season precipitation explained only 2% \((r^2 = 0.02)\) of the variation in steer ADG from weaning to shipping on the Adobe Ranch (Figure 6). Therefore, 98% of the variation in ADG was due to something other than the growing season precipitation received on the ranch.

These results do not prove that wolves

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\(^7\)http://www.retail-lmic.info/tac/spreadsheets/spreadsheets.html—No. 1-2 steers, 450- to 500-lb calves with average dates of weaning October 6 and shipping on December 10.
impacted steer performance because the data were not generated from a controlled study. However, with negligible impact of growing season precipitation on calf ADG, and calf management in 2007 similar to previous years, it is possible that increased wolf activity and depredation among weaned calves had a detrimental effect on steer ADG. At the least, this case study supports the need for research on non-lethal impacts of wolves on livestock. Total values for direct losses on the Adobe Ranch ranged from $8,585 for confirmed losses to a combined $11,993 for confirmed, possible, and probable losses. These calculations assumed an opportunity loss for calves equal to the shipping values of steers in the fall of 2007. Cow values were the average value of replacement cows (medium to large, young to middle aged, and 3- to 6-months bred) at the Roswell livestock auction during the month the depredation occurred (http://www.ams.usda.gov). Management of the Adobe Ranch estimated that there were probably four calves lost for every calf loss investigated. Using this estimate, the direct impact increases to $36,407 for 2007, not including the additional cost in medicine ($720.00) and labor/opportunity costs of approximately $1,484.33.

**SUMMARY**
The entire U.S. economy has changed drastically since the extirpation of wolves in the Southwest. Big game animals have become more valuable, outdoor recreation continues to increase, and ranches have changed from a few large operations to many smaller operations. Mexican wolf depredations represent potentially greater economic losses to smaller individual ranches than to larger ranches in the past. Economies of scale allowed larger ranches to more easily absorb these types of losses before the Mexican wolf eradication than smaller ranches can today. Similarly, impacts today would have incremental effects on local communities and counties, as the historic tax bases have decreased with reduced livestock numbers and the loss of receipt-generating activities such as logging.

“Adaptive management” has been a common phrase used for the Mexican wolf recovery program, presumably because scientific data would be used to guide management decisions. As more scientific information becomes available from research, management practices should be adjusted to improve potential for biological and social success. However, there has been very little scientific research on the Mexican wolf since its release into the wild, and virtually none has been made available to local producers to help them manage their livestock in the presence of wolves.

**MANAGEMENT IMPLICATIONS AND FUTURE WORK**
Our analysis did not include the daily disruptions and costs accrued by the rancher living with wolves. A great deal of this information was relayed during interviews, but these types of data are qualitative and difficult to summarize and analyze. These include, but are not limited to, time and money spent cooperating with the USFWS, not being able to use their cow dogs, and precautionary measures for horses and cattle. It should be recognized that there are undoubtedly other costs that were not quantified and which, cumulatively, represent significant burdens to residents in the MWRA. There have been some attempts to identify how many depredated livestock are never found or identified as wolf-related, but the results of the research conducted in the Southwest have not been finalized or published. An additional project by the University of Arizona is trying to determine what the wolves are eating through tracking movements of wolves. This could be beneficial information to local livestock producers in planning grazing strategies to avoid depredations by wolves. There has also been research conducted

by Texas Tech University that determined elk to be the primary prey of the Mexican wolf (Reed et al., 2004). However, ranchers in the area were concerned that the data were collected on an area or at a time when no livestock were present. Any flaws in experimental design of this nature must be addressed before research outcomes will garner widespread acceptance. Economic analysis relies on results of these types of research to determine a comprehensive set of financial-based variables to ranch net income. Information from well-designed, well-executed studies must be made available to the local producers and should focus on including producers in the development of research questions and objectives, data collection, and interpretation. It is our estimation that dissemination of research results by existing federal and state government wildlife agencies will not result in significant acceptance by local producers; too much trust has been lost. Third-party entities trusted by local citizens and with the scientific expertise to interpret results should be part of the scientific inquiry, design, and education/outreach effort. This approach would undoubtedly improve the reception given such scientific information and the social acceptance of the recovery program.

Only after goals and objectives of wolf recovery have been clearly identified and specifically defined will objective third-party scientists be able to develop research that addresses management of wolf recovery and its effect on residents. There are multiple issues and conflicts (such as effects on hunting, pets, livestock industry, and residence), with complex interactions, that have been identified since release of Mexican wolves in the BRWRA. This analysis has demonstrated that our understanding of the disproportionate economic impacts on a few affected individuals has been limited and that further investigation is warranted. Potential research questions include, but are not limited to, (1) Why are wolf depredations more numerous in certain geographic areas (and what are the characteristics of these areas)? (2) Are depredation rates and numbers a function of animal husbandry practices, topography, prey availability, the breed of livestock, or individual wolf-specific factors? (3) Is adapting livestock and wolf management practices from other areas to minimize wolf depredation practical and effective in the Southwest? and (4) How can we identify and implement innovative practices that incorporate unique habitats, wild ungulate populations, management practices, and local customs and cultures? Once data on these types of questions are collected, a comprehensive economic analysis will be possible in determining the effects of wolf presences on rural economies dependant on livestock agriculture for their livelihoods.
LITERATURE CITED


United States Department of Agriculture, 10-11-1921, “Freeing the range country of predatory wild animals.” Division of Publications, Press Service.


SUGGESTED CITATION
Mexican Wolf Recovery

Collateral Damage Identification

Catron County, New Mexico

By Jess Carey, County Wolf Interaction Investigator
February 27, 2011

CASE # AP-226
Wolves fed upon cow while alive, 20 + pounds of muscle tissue eaten out around back end and pelvis. Wolves leave; cow stressed and tries to birth calf. Calf found half way out dead not fed upon by wolves; cow could not stand and was put down. This is a typical confirmed wolf depredation.
When I looked for a title for the following factual wolf information, I had to look at the folks most impacted by Mexican Wolf Recovery. Many rural family ranchers have lost their peace of mind, lost their dreams, lost their pursuit of happiness, lost their livestock and lost their ranches. Collateral Damage Identification seemed appropriate. All damage was due to non-compensated wolf caused livestock losses, a “taking” by Federal wolves administered by Federal agencies and our own New Mexico Department of Game and Fish. These agencies will and have push Mexican Wolf Recovery forward knowing that their wolves are destroying family rancher’s ability to survive, in the end selling off their ranches. In fact, lost family ranchers are collateral damage to achieve Mexican Wolf Recovery.

The purpose of the contained information is for you to be able to indentify wolf presence in your area. People that do not have wolves on them yet and people who live outside the Mexican Wolf Recovery Area (BRWRA) are unaware of what to look for to identify wolf activity. Wolves travel a long distance and could be in your area. Unidentified depredations on livestock, killed pets and farm animals could be wolf interactions attributed to other causes.

Un-collared wolves have dispersed from the Blue Range Wolf Recovery Area (BRWRA) to other counties and parts of the State of New Mexico and Arizona. Look at the wolves put into the Yellowstone National Park, within a few years wolves dispersed from Yellowstone into Wyoming, Idaho, Montana, Oregon, Washington, and Colorado.

Un-collared Mexican wolves have had 12 years to disperse into other parts of the state of New Mexico. Breeding and having offspring with other un-collared wolves, they in turn repeat the process. This is part of the hidden strategy of Mexican Wolf Recovery they do not talk or tell you about. This is also why the USFWS do not collar all wolves. The US Fish and Wildlife Service and the New Mexico Department of Game and Fish (the lead wolf recovery agency in New Mexico) are depending on un-collared wolf dispersals to saturate New Mexico and Arizona with wolves. The information in this document should help you identify wolf activity and who to call for an investigation to document wolf activity.

It is clear that wolf recovery agencies are managing family ranchers and not wolves. Now, the US Forest Service has entered Mexican Wolf Recovery big time and will be putting all types of wolf directives on the permitted grazing allotments.

Wolf agencies will tell you they have a solution for depredating livestock killing wolves or habituated wolves who seek our humans and human use areas. Habituatned wolves lack an avoidance response to humans and are bold, and fearless. Habituatned wolves come to your home and in your front yard where your children play.

Non-positive wolf agency solutions for problem wolves are; hazing wolves away, supplemental feeding (to stop wolves from killing livestock), flaggery (flags on a shocking wire), and bang/rag boxes (to scare wolves). Some non-lethal schemes may work short term, but do not solve the problem of wolves killing livestock or cure flawed habituated wolves. What these non-lethal schemes do accomplish is give the wolf agencies something to write down in their reports to show their upper bosses that they have attempted to fix the problem knowing full well they will fail and prolong the problem.

There is only one positive cure for problem wolves and that is to remove them....period
How Much Do Family Ranchers Loose to Mexican Wolves?

Comparability Study Synopsis

This study consist of five ranches A, B, C, D, E, located within the Blue Range Wolf Recovery Area in Catron County, New Mexico. These ranches were identified as having wolves denning in and or near calf/yearling core areas. Prior to this study the relationship between high calf loss rate and proximity of denning wolves was not understood. It was also not realized that coyotes swarm to areas where wolves are continually killing livestock, contributing to the removal and destruction of evidence of the remains. Of the five ranches; four are cow/calf operations and one a yearling operation. All five ranches share a constant factor: Mexican wolf packs denning in and or near calf/yearling core areas.

Confirmed and probable findings do not reflect the true number of livestock losses. The information provided in this document indicates the true livestock loss and effects on family ranchers for sustainable economic viability. The final analyses indicate that annual post-wolf introduction losses are higher than the average annual pre-wolf losses for the five study ranches:

- Total combined livestock losses = 651.0 head,
- Total combined dollar value losses = $ 382,198.50

In this comparability study, two of the five ranches went out of business; one selling the ranch and the second is on the market now. A third ranch sold off their livestock in the fall of 2009 and did not re-stock cattle in 2010.

Wolf-caused stress disrupts a cow’s breeding cycle; the resulting calf loss must be measured in monetary value as if the wolf depredated a calf. To alleviate the taking of private property without compensation by the Federal Government, confirmation standards and the compensation scheme as a whole must be reevaluated. In-depth studies must be conducted to evaluate the negative impacts of wolves’ denning in calf/yearling core areas and the effects of wolf-related stress on livestock. Evaluation of data must include the wide spectrum of negative impacts to livestock and livestock producers, rather than the current focus solely on benefits to wolves. Recommended areas of study include:

1. Pre-wolf introduction historic annual losses;
2. Post-wolf introduction annual livestock losses;
3. Wolves denning in calf/yearling core areas;
4. Wolves denning near calf/yearling core areas;
5. Wolf rendezvous sites located in calf/yearling core areas;
6. Wolf-claimed territory overlapping livestock core areas; and
7. Wolf-caused chronic stress and effects on livestock and producers.
Negative effects beyond wolf-caused mortality

The negative effects to livestock producers caused by Mexican Wolves are a wide spectrum not addressed and/or ignored by the US Fish and Wildlife Service. Prior negative data and documentation of wolf recovery from other states were not utilized to mitigate the same negative effects of Mexican wolf recovery in New Mexico and Arizona.

Wolves continually killing, prey testing in a herd produces chronic wolf stress in cattle. Chronic wolf-caused stress in cattle leads to loss of body condition, cows birthing weak calves, pre-mature birth of calves, abortion of calves, immune suppression, decreased pregnancy rates-open cows, increased susceptibly to disease, weight loss, and wolf attacks alter the demeanor of cows from docile to aggressive.

1. True livestock losses are not reflected in confirmed and probable investigative findings;
2. Few livestock depredations are actually compensated;
3. Cumulative effects of wolf predation makes livestock production untenable;
4. Impact on individual family ranchers is devastating, even though the impact to the entire livestock industry of the state may be small;
5. Wolf depredation disrupts grazing management plans;
6. Increased uncompensated hours tending injured calves;
7. Increased uncompensated hours checking livestock;
8. Increased uncompensated hours mending fences when wolves attack/run livestock through them;
9. Increased uncompensated hours gathering livestock and returning to proper pasture;
10. Loss of market value for maimed and disfigured calves;
11. Loss of replacement heifers/production;
12. Loss of revenue while new herd takes several years to acclimate;
13. Loss of revenue while replacement heifers take three years to acclimate into an existing herd.

Wolves Denning in Calf/yearling Core Areas Result In:

1. Wolves subsistence on small calves;
2. High incidence of wolf depredation during the period when wolves were most active, i.e. providing sustenance to denning female and offspring;
3. Intensive localized wolf depredation of small calves;
4. After initial wolf gorging off calf and returning to the den, calf carcasses are scavenged and consumed by coyotes, requiring wolves to advance their frequent kill sequence;
5. Wolves’ utilize 20 pounds per calf depredation, coyotes and scavenging birds utilize remainder of carcass;
6. Wolf killing steadily in an area invariably causes a coyote swarm to that area;
7. Few calf carcasses (as compared to adult cattle carcasses) are found for investigation;
8. Carcass remains are mostly consumed, scavenged, destroying evidence of depredation;
9. Handicapped wolves with missing limbs/feet target (prefer) livestock, as wild game is difficult to capture;
10. When wolves den on a ranch the USFWS blame ranchers for not preventing livestock depredations;
11. USFWS demands that ranchers change their entire husbandry scheme to accommodate the presence of wolves; if the rancher refuses, no compensation is paid on Wildlife Services findings on confirmed or probable livestock depredations by Defenders of Wildlife;

12. Ranchers cooperating with the USFWS wolf recovery agencies nevertheless continue to have livestock losses.

The following information will educate the resource owner and the public on the negative aspects of Mexican Wolf Recovery, identify wolf presence and recognize wolf depredations on livestock, pets, and farm animals so they can be investigated.

**What do Mexican wolves look like?**

Mexican wolves come in a variety of colors, sizes and display different behaviors. Most wolves are large in size, bigger than a German Shepard and weigh 70 to 90 pounds; some are smaller in size and weigh 45 to 50 pounds. The head of the wolf is blockier than a coyote and they have a broader nose than a coyote; also the ears are more rounded. The front feet are larger than the rear feet. Color ranges from a grizzled gray, reddish-brown, whitish mixture to reddish-brown. Look at photograph #1, these three wolves represents the typical coloration of Mexican wolves. The two outside wolves are gray in color; the one in the middle is very reddish-brown. This is why many people mistake Mexican wolves for coyote’s when seen further than a 100 yards. Most wolves will stand and look at you, then move away slowly. Some habituated wolves will stand and look at you even after you fire a firearm into the air.

1. 3 of 5 wolves in calf core area; 3 confirmed calf depredations, 1 probable (photo Jeannie Jones)
2. Luna Pack  (photo Jeannie Jones)

3. Luna Pack  (photo Jeannie Jones)
Wolf attacks on cattle

Wolves primarily attacked cattle on the hindquarters including tail, vulva, lower thigh, hock, hamstring, and occasionally on the neck, face, and jaw, behind the front legs, in front of the rear legs, and on the belly. Wolf attack sites on cattle very, wolves continue to attack the way they have learned to capture cattle and all wolves do not attack at the same sites on the prey animal.

Wolves will run cows, calves, and yearlings stressing the animal until it cannot stand, normally there will be capture bite and rake marks on the skin with corresponding hemorrhage.

Livestock killed by predators usually can be distinguished from those dying from other causes by the presence of external hemorrhaging; subcutaneous hemorrhaging and tooth punctures; damage to the skin, other soft tissues, and skull; blood on the soil and vegetation; and carnivore tracks, scats, or territorial marks near dead animals. Urgent calling and alert, defensive, and frightened behavior of livestock also suggest that predators may have killed livestock.

Newborn livestock killed by predators and partially consumed can be distinguished from stillborn livestock by characteristics not found in stillborn animals: a blood clot present at the closed end of the navel, pink lungs that float in water, fat around the heart and kidneys, milk in the stomach and intestines, milk fat and lymph in the lymphatic vessels that drain the intestinal tract, a worn soft membrane on the bottom of the hooves, and possibly soil on the bottom of the hooves.

Normally, when wolves kill new calves there is little left of the carcass, possibly a few small bones or a piece of the skull but usually there is just a bloody place on the ground is all that remains. The calf is totally consumed including hooves. If a larger calf and there are remains left a lot of the time there are no capture bite sites. The reason is the calf is bedded and the wolf pins the calf down and the feeding begins, the wolf does not have to bite the calf to capture it.

Remains of calf – part of skull – wolves present
Wolves kill by consumption, they eat their victims alive and they die from stress, tissue and blood loss. In 233 wolf depredation investigations I have never documented a lethal bite site on cattle carcasses.

**Confirmed Wolf Depredations on Livestock**

In the following photographs you can see the results of wolf attacks on calves, yearlings, horse and cow’s. This will give you an idea of what to look for.

View the carcass attack sites, feeding sites, bite sites and rake marks with corresponding hemorrhage. Some cattle are stressed down and the wolves eat 20 pounds from the victim and the injured cow, calf, or yearling is not dead and walks around with its rear end eaten out.

Your observations and action is key to indentify wolf presence and depredating wolves. Also, notification for an investigation will indentify un-collared wolves.
Calf still alive with massive tissue loss – San Mateo Pack denning between 2 pastures

Bull calf (350 pounds) attacked by 4 wolves, bite sites with massive hemorrhage
Skin off bull calf (above) held up to the sun, massive bite sites and rake marks on skin.

Remains of calf – Middle fork Pack.
Most cattle die at the feeding site, some survive after the wolves have eaten their fill. Still, the victim with massive tissue loss has to be put down by the resource owner. All wolf depredated livestock go through this “death by consumption”.
Yearling walking around with massive tissue loss for six days, maggot infested wounds
Middle fork pack

Remains of horse in corral – seven wolves stripped all tissue from carcass
Wolves kill cattle by consumption producing blood loss, tissue loss and stress. In 12 confirmed wolf killed yearlings on one ranch, 5 did not die at the attack and feeding site. They traveled for some distance after being fed upon by wolves. Four yearlings were found alive and walking around with massive tissue loss. One yearling was found dead and the scene lacked evidence of an attack and feeding site. Dried blood found on the legs indicated the yearling was bleeding while standing upright and walking.

**Lack of evidence at the carcass/found alive site; importance**

There have been past cases where cattle were found with canine spreads and rake marks consistent with wolves and the scene lacked attack/feeding site, wolf tracks, wolf scats, blood trails, drag marks, ground/vegetation disturbance or ground telemetry. Some of these investigation findings were probable, possible or something other than wolf. In the 12 confirmed killed livestock by the Middle fork Pack in 2009, evidence indicates that these 5 yearlings were attacked and fed upon by wolves in one location and lived to travel for some distance before being found alive and or dead in another location.

Carcasses that lack wolf evidence at the scene should be investigated to determine that the victim did or did not travel from a wolf attack/feeding site. To determine the cause of death based on the best available evidence, canine spreads, rake marks with corresponding hemorrhage consistent with a wolf and evidence the victim traveled away from the attack/feeding site is vital.

**Wolf Attacks on Pets**

Dog scalped by wolves at home, chunks bitten out of back end, lucky to be alive
Dog killed in yard by wolves – leg bone crushed – massive hemorrhage

Jaw crushed by wolf attack in back yard

Wolf bites head off kitten in front of children
At the scene

Protecting fragile evidence

Canine tracks can be destroyed by people walking within the scene. Other livestock, scavenging birds can also destroy tracks etc. You yourself can destroy tracks if you do not take the precaution to look where you step. The best procedure when entering the scene to check a carcass is to protect the evidence such as canine tracks as you find them; cover these tracks to prevent other livestock/people from trampling them. Cover the carcass with a tarp rocked around the edges to prevent scavenging canines and birds from feeding on it. Cover blood trails or droplets of blood leading to the carcass if rain is eminent. Timely carcass detection and notification is key to depredation investigations to determine the cause of death. Lost or destroyed evidence can result in a non-confirmation. Calf carcasses left uncovered in the field will disappear during the night. If you do not have a tarp, hang the calf high up in tree, if no tree mark the area and bring the calf in and store it so dogs cannot get to it.

Procedure: Investigating a Livestock Carcass

I want to discuss the procedure of investigating livestock carcasses. Notification is given by the resource owner, or others that may have found a livestock carcass suspected of predator depredation. In Catron County, USDA Wildlife Services and I respond to the scene to perform an investigation to determine the cause of death of the animal.

Dirt roads are checked for predator tracks, scats and any sign of predators as you near the area of the carcass. If tracks are located on the roadway they are marked and protected so no one drives over them.

Other cattle in the pasture are observed for unusual behavior; calling and alert, defensive, and frightened behavior, injury bite sites, and impact wounds like running into barriers or barbwire fences.

The area is checked for a wolf collar signals using a ground telemetry receiver. If a signal or signals are picked up the corresponding wolf number is noted.

The scene around the carcass is searched to identify the attack site, feeding site, drag marks, tracks, scats, blood trails, trampled/uprooted vegetation, torn up ground, broken fences. The scene could be less than fifty to several hundred yards in size.

All scene evidence is photographed. Measurements are taken to document predator tracks and scats. A diagram is drawn to reflect attack and feeding site, drag marks, carcass site, blood trails, predator/victim track location and direction of travel. Check barbwire fence wire; bottom and second strands are checked for hair caught in the barbs when predators pass under or through them. A predator’s identification can be made with this transfer evidence (hair).
The carcass is photographed; head, back, rear, and belly. Injuries; attack sites on the carcass, bite sites, feeding sites, impact injuries. Scavenging canines and birds are noted.

Once everything is documented the investigation focuses on the carcass and a necropsy is performed. The percentage of carcass remains is noted, as well as disarticulation of limbs and bones. Some carcass remains are just dried skin and bones; these have to be soaked in water 3 to 5 days to soften the skin, yet compression bite sites on the skin still remain. A compression bite site can only be made if the victim was bit while alive.

First the hair is clipped from the skin of the carcass to detect bite sites and rake marks. Without clipping the hair you cannot see the bite and rake marks. Photographed measurements of all canine spreads are documented. The skin is removed to document bite site corresponding hemorrhage, and deep hemorrhage in the mussel tissue and injuries. Most times there are no internal organs left inside the carcass for assessment. The skin is held up to the sun and photographed to document bites sites and rake marks with hemorrhage in the skin.

Example of a wolf confirmation:

Canine spreads are documented at; 42.50mm, 40.20mm, 39.60mm, 41.80mm with corresponding hemorrhage consistent with a Mexican wolf. Documented deep hemorrhage in mussel tissue, large femur bones are bitten into, wolf tracks at carcass site, wolf tracks in blood trail and drag marks. Wolf scat is documented 40 yards from carcass site. A 55 inch territorial wolf scrap is documented at a nearby tree. Ground telemetry signal received on wolf AF924 and wolf AM001. Based on the best available evidence the cause of death is a confirmed wolf depredation.

Running wolf tracks along side running cow and calf tracks
Results - wolves ran down calf leaving blood trail, feeding site, and drag marks
Luna Pack

1st calf, Attack site in snow, blood and wolf tracks, carcass drug 45 yards to carcass site
1st calf, At the end of the drag marks is the carcass site - 4 wolves- Luna Pack

2nd Calf, 50 yards from 1st calf, remains with wolf tracks- 4 wolves- Luna Pack
Wolf Scat Identification

Wolf scat is large, usually 1 1/8” or larger in diameter and measures 9” to 12” inches in length and black in color from eating meat and will contain hair and bone chips of its prey.

Wolf scat

Wolf Scat – toilet station
Wolf scat

Wolf scat at front door of residence
Wolf Tracks

Wolf tracks in snow 50 yards from a residence on private property

Wolf tracks with typical overstep – smaller rear foot overstep larger front foot
Wolf tracks – traveling gate – tracks in straight line

Domestic dog track and the dog – compare to wolf tracks
Example; M1039.

This male wolf was released into the Gila; it took off and was located in the San Mateo mountains, then crossed highway US 60 and went to Acoma, then to El Malapai then to Zuni where he was captured.

Ariel flight telemetry located M1039; 5 miles inside Arizona on a Monday, within 24 hours he traveled 76 air miles back to Mount Sedgwick in Grants New Mexico where he was again captured.

Dispersing wolves from the recovery area in Catron County, New Mexico and Arizona could have travel hundreds of miles throughout the state of New Mexico.

Contact Information

If you find any evidence of wolf presence in your area follow the above information and contact the following agency.

Cibola, McKinley Counties
USDA/APHIS Wildlife Services
Northern Supervisor, Ken Podborny – 505-346-2640
Jon Grant – 505-287-7838, 505-290-0518 cell

Sierra, Grant, Hidalgo, Luna, Counties
USDA/APHIS Wildlife Services
Southern Supervisor, Keel Price – 575-527-6980

Catron County
Jess Carey
County Wolf Interaction Investigator
575-533-6668
Sheriff Department – radio contact
575-533-6222
If you have any questions call or email me at; 3trees@gilanet.com

Jess Carey
County Wolf Interaction Investigator
HC 62 Box 1-8
Reserve, New Mexico 87830
575-533-6668

Catron County Commission
Hugh B. McKeen, Chairman
P.O. Box 507
Reserve, New Mexico 87830
575-533-6423
Comparability of Actual Losses to “Confirmed” Wolf Depredations in Wolf Denning, Calf/yearling Core Areas
Catron County, New Mexico

Submitted to:
Catron County Commission
Reserve, NM

Submitted by:
Jess Carey
Catron County Wolf investigator

January 21, 1911
Preface:

In 1998 Mexican gray wolves were re-introduced on the landscape in Arizona by the U.S. Fish and Wildlife Service. Shortly thereafter Mexican wolves dispersed across the state line into New Mexico. Wolves were also trans-located into New Mexico from Arizona; among them were problem wolves that had prior confirmed livestock depredations. These problem wolves continued to kill livestock on family ranches in New Mexico.

This study compares cattle losses on 5 New Mexico ranches before and after the inception of the Mexican wolf re-introduction program. When wolves moved onto the ranges each ranch experienced a significant decrease in the size of fall calf crops, and revenue. Because wolf-caused mortalities are difficult to detect and prove in range livestock areas each discovered carcass is categorized according to the likelihood of wolf-caused mortality; confirmed, probable, possible or unknown. The actual mortality rate, due to wolf-related depredations, that go undetected or unconfirmed is unknown. Two studies (Oakleaf, et. al., 2000 and Bjorge and Gunson, 1985) on cattle have shown that for every 5.8 or 6.7 cattle lost only 1 confirmed kill was noted. Evidence from this study corroborates those findings and shows a direct correlation between introduction of wolves and livestock depredation, suggesting the ratio may be significantly higher in some situations.

To alleviate the taking of private property without compensation by the Federal Government, the organization, Defenders of Wildlife offers 100% market value compensation for confirmed wolf kills and 50% for probable. Certain conditions must be met which have proven largely unfeasible to livestock owners. During the period of this study, ranchers received $8100 in compensation for over 600 losses that totaled more than $380,000\(^{1}\). Two of the ranches went out of business\(^{2}\), one remediated the situation by moving to other pastures and hiring a range rider and another sold off all livestock until 2010.

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\(^{1}\) Compensation offered by DOW was meted out to 3 ranches; A $600/$131,000.00 loss, D $1200/$35,400.00 loss, E $6300/$55,505.00 loss.

\(^{2}\) Note: in the fall 2009 Ranch A sold the remainder of his livestock and went out of business, then passed away.
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DISCUSSION

The 558,065 acre Gila Wilderness, stretching into 2 counties, Catron and Grant, was initially considered to be ideal Mexican wolf habitat. Human activity is minimal. The U.S. Forest Service has eliminated all but six of the historic grazing allotments. Currently only five allotments, in Grant County, are stocked with 422 head including over 345 cow/calves\(^3\).

Over the last 10 years, the U.S. Fish & Wildlife Service (USFWS) has released numerous Mexican wolf packs into the interior of the Gila Wilderness. Despite these supposedly idyllic conditions, not one of the wolf packs has remained. Within a short time after release, the wolf packs leave the Gila Wilderness and travel to ranching operations, homes and communities scattered throughout the surrounding Gila National Forest.

Since April 2006, there have been 172 wolf-animal or wolf-human interactions reported on private property. Behavior that would be considered unusual in truly wild wolves appears to be the norm for captive released wolves\(^4\). Wolves have approached occupied areas and marked their territory by urinating and defecating on tires, equipment, ice chests, porches and claimed their territory by fighting over specific sites, including 23 scrapes at one home.

The evidence suggests that fostered Mexican wolves are unable to adapt or thrive in the designated recovery area and are habituated to humans. They seek humans, lack an avoidance response towards them, are dependent on them and are opportunistic predators on domestic animals. It is likely that the habituated wolf parents will teach their offspring the benefits of humans and human use areas. It is expected that the wolf recovery program will lead to further livestock depredation, economic crises for ranchers and counties, increased cost to the taxpayers of our nation and wolves that still fail to thrive. The release of more fostered wolves will not benefit the wolf recovery effort.

Unfortunately the focus of the debate is changing towards the compensation aspect rather than the purpose and need for the Mexican Wolf Introduction program.

\(^3\) Grazing information provided by the USFS Wilderness District. In Catron County the Jordan Mesa/Black Mountain permit is allotted 20 cows and is in Non-Use. There are five permits in Grant County located in the southern portion of the Gila Wilderness; Canyon Creek - 5 cows, permitted for 20 cows; Indian Creek is 50 head; Mimbres 230 cow/calves; East Canyon 65 cow/calves; Shepard permit 72 steers. The total numbers of grazing cattle in the 558,065 acres of the Gila Wilderness is 422 head. All other historic grazing permits have been eliminated by the U.S. Forest Service.

\(^4\) There is a lack of scientific studies on Mexican wolf behavior. Data has been collected by Catron County, New Mexico since the USFWS release of Mexican wolves in 1998. There are many unknowns, and unusual wolf behavior has been documented by Catron County including:

- Mexican wolves urinating on vehicle tires and on an ice chest located outside an occupied camp trailer.
- A wolf defecating on the front of an ATV vehicle located in a front yard.
- Wolves defecating on porches and yards at door entrances of occupied homes.
- Scrapes at occupied residences where the wolves were claiming the residence as part of their territory.
- Numerous territorial scrapes at one residence where wolves were documented at the home 23 times.
Adaptive Management Oversight Committee (AMOC) - (NOTE, AMOC is no longer involved).

An interagency Adaptive Management Oversight Committee (AMOC) manages the wolf project, which is carried out on the ground by an Interagency Field Team (IFT). AMOC confirmation standards currently in place require that evidence at the scene and on the carcass include:

1. Measurable canine spreads with corresponding hemorrhage;
2. Massive hemorrhage in the muscle tissue;
3. Large bones broken;
4. Measurable compression canine spreads;
5. Blood trail;
6. Ground disturbance;
7. Uprooted/torn/tramped vegetation;
8. Wolf tracks;
9. Wolf scat;
10. Attack site;
11. Feeding site;
12. Drag marks;
13. Ground and aerial telemetry documenting wolves at the scene or in the area;
14. Other confirmed livestock depredations in the immediate area.

Adaptive Management Oversight Committee (AMOC) members have challenged wolf-livestock depredation findings by Wildlife Services and implemented strategies favoring wolf survival even when risk to livestock or human enterprise is at stake. In order to prevent female wolves or wolves with 2 strikes against them from permanent removal, AMOC members have blamed depredation strikes on non-depredating wolves, contrary to Wildlife Services findings. AMOC implemented an unwritten rule which requires wolf depredations be confirmed by a specific “canine spread with corresponding hemorrhage.” Even when these strict, very specific requirements are met, confirmation has been denied. Livestock have been found with canine spreads and rake marks with corresponding hemorrhage consistent with wolf attack. This event was still not classified as a confirmed wolf kill because the scene lacked wolf presence. These disputable actions have cast doubt on the credibility and impartiality of the AMOC and IFT. They have a real effect when these determinations skew the statistics, because resource owners to lose compensation or, worse, allow habituated, depredating wolves to remain on the range. It is also tampering with evidence.

**Loss of evidence**

Wolves kill livestock by consumption, not by slaughter. Therefore in cases where there are non-lethal capture bites on the carcass and livestock have fled the attack/feeding site, investigative conclusions will not confirm wolf depredation. This results in lost
compensation to the resource owner. Wolves can stress cattle to a point they can no longer stand; once they go down the feeding begins while they are alive.

Evidence that has a direct effect on the findings of livestock death investigations by USFWS, WS and Catron County may be lost for various reasons. **Loss of evidence does not equate to non-depredation.** Reasons for loss of evidence include but are not limited to:

1. Missing livestock, no remains because wolves ate the entire carcass;
2. Coyotes, birds and other scavengers consuming remainder of calf carcasses;
3. Calves/yearlings/cows could not be found in rough remote terrain;
4. Advanced decomposition; rapid and severe in summer weather;
5. Insect infestation;
6. Weather conditions;
7. Rocky, hard ground conditions limit impressions;
8. Untimely carcass detection.

**When livestock flee an attack/feeding site, evidence confirming a depredation may be lost. However, these indicators remain:**

1. Blood stains/drainage on carcass inconsistent with carcass position;
2. Blood stains/drainage on lower legs indicating that the victim was standing after being fed upon;
3. Lack of blood drainage from wound onto the ground;
4. Blood spatter indicating the droplets came from a height consistent with the standing victim;
5. Wound/skin glazed over (dried) inconsistent with the time of death;
6. Fresh areas exposed within the glazed over (dried) area due to non-wolf scavenging;
7. Scavengers identified at the carcass site, (e.g. birds, coyotes, etc.);
8. Insect infestation inconsistent with time of death (e.g. fly eggs hatch within 24 hours, live for approximately one week, turn into pupae; depending on species, flesh fly life cycle 8 to 21 days).

**Negative effects beyond wolf-caused mortality**

The negative effects to livestock producers caused by Mexican Wolves are a wide spectrum. They have either been ignored or have not been addressed by the US Fish and Wildlife Service. Data and documentation of wolf recovery efforts from other states were not utilized to mitigate these negative effects in New Mexico and Arizona. The presence of wolves induces chronic stress in cattle leading to loss of body condition, weight loss, immune suppression, decreased pregnancy rates-open cows, abortion of calves, pre-mature calves, weak new-born calves and even altered demeanor of cows from docile to aggressive. Wolf-caused stress disrupts a cow’s breeding cycle; the resulting calf loss must be measured in monetary value as if the wolf depredated a calf.
The negative impacts of Mexican Wolf recovery to livestock producers have severe economic effects on local agricultural industry, including:

1. True livestock losses are not reflected in confirmed and probable investigative findings;
2. Few livestock depredations are actually compensated;
3. Cumulative effects of wolf predation makes livestock production unsustainable;
4. Economic impact on individual family ranches is devastating, and spreads throughout the economy;
5. Wolf depredation disrupts grazing management plans;
6. Increased uncompensated hours and expense tending injured calves;
7. Increased uncompensated hours and expense checking livestock;
8. Increased uncompensated hours and expense mending fences when wolves attack/run livestock through them;
9. Increased uncompensated hours and expense gathering livestock and returning to proper pasture;
10. Loss of market value for maimed and disfigured calves;
11. Loss of replacement heifers/production;
12. Loss of revenue while new herd takes several years to acclimate;
13. Loss of revenue while replacement heifers take three years to acclimate into an existing herd.

County Findings

Catron County has documented, on one ranch that 36% of the yearlings, confirmed as having been attacked and fed upon by the Middle Fork Pack, were still alive after the initial attack/feeding and fled a great distance before stopping, or dying, at the site where they were found. Wounds on livestock from wolf attacks have been documented with maggots three quarters of an inch long.

Since June, 2010 the USFWS has supplemented horse meat as well as elk and deer road kills to the diet of the San Mateo Pack (with 5 confirmed livestock kills) and the Middle fork Pack (with 11 confirmed livestock kills) to keep them from depredating more livestock. When the supplementation ends, these packs will continue to kill livestock and teach their offspring to become livestock killers also.

One note of interest concerning yearlings: USFWS initiated supplemental feeding stations in an effort to discourage depredation of livestock. When wolves were not supplemented, they returned to a carcass and continued to feed. However, after a supplemental feeding station was put out by the USFWS, the wolves attacked and ate approximately 15 to 20 pounds out of the rear ends of three yearlings and did not remain to feed. These yearlings lived and traveled from the attack/feeding site. During this same period when the wolves were heavily hazed out of the yearling herd, the
wolves would circle the hazers and make additional confirmed depredations. The kill interval averaged every four days.

Catron County has compiled information from numerous ranches with wolves’ denning in calf/yearling core areas and investigations which indicate the following:

1. Wolves subsist on small calves;
2. High incidence of wolf depredation occurs during the period when wolves were most active, i.e. providing sustenance to denning female and offspring;
3. Intensive localized wolf depredation of small calves;
4. After initial wolf gorging off calf and returning to the den, calf carcasses are scavenged and consumed by coyotes, requiring wolves to increase the frequency of their kill sequence;
5. Wolves’ utilize 20 pounds per calf depredation, coyotes and scavenging birds utilize remainder of carcass;
6. Frequent wolf kills in an area invariably causes coyotes to swarm to that area;
7. Few calf carcasses (as compared to adult cattle carcasses) are found for investigation;
8. Carcass remains are mostly consumed, destroying evidence of depredation;
9. Handicapped wolves with missing limbs/feet target (prefer) livestock, as wild game is difficult to capture;
10. When wolves den on a ranch the USFWS blame ranchers for not preventing livestock depredations;
11. USFWS demands that ranchers change their entire husbandry scheme to accommodate the presence of wolves; if the rancher refuses, no compensation is paid on confirmed or probable livestock depredations by Defenders of Wildlife;
12. Ranchers cooperating with the USFWS wolf recovery agencies nevertheless continue to have livestock losses.

Many ranchers fear they will go out of business because of actual livestock loss. For every confirmed wolf depredation there are an estimated seven (7) that are not found and confirmed. Our evidence shows that the presence of wolves denning in calf core areas cause many more than seven (7) depredations for each confirmed wolf/livestock depredation. Wolves select denning sites based on the presence of easy prey (livestock). Indications show that when wolves den in calf core areas the ratio of confirmed losses to true losses increases beyond the numbers suggested in a 2003 USFWS study by John Oakleaf.
Comparability Study

Prior to this study, the relationship between high calf mortalities and proximity of denning wolves was not known. There has been insufficient research conducted on the cause and effect of livestock losses when Mexican wolves are denning in or near calf and yearling core areas. A core area is a grazing pasture, enclosed by barbwire, where mother cows with calves and yearlings are legally present and maintained. Unlike elk and deer, which have the ability and agility to clear barbwire fences and escape pursuing wolves, cattle confined within fences are easy prey when wolves attack.

This study compares the following factors on five subject ranches A, B, C, D, and E, located within the Blue Range Wolf Recovery Area in Catron County, New Mexico:

1. Historic pre-wolf normal calf/yearling losses;
2. Confirmed and probable wolf calf/yearling depredations;
3. Actual calf/yearling losses;
5. USFWS John Oakleaf 2003 study, carcasses found 1 to 8 ratio

Four of the ranches are cow/calf operations and one a yearling operation. All five ranches share a constant factor: Mexican wolf packs den in and or near calf and yearling core areas. Mexican wolves kill livestock throughout the year, not just during denning. When wolves begin to den packs travel to areas where livestock are present. They seldom den in areas lacking livestock. Findings by USFWS, WS, and Catron County confirm that wolves denning in core areas leads to major livestock losses with few carcasses found. Coyotes swarm to areas where wolves are continually killing livestock, destroying evidence of wolf depredation. An unrealistically low number of confirmed or probable depredations results.

Conclusions and recommendations

Confirmed and probable findings do not reflect the actual number of livestock losses. Ratios ranged from 1:9 to 1:119, averaging 1 confirmed to 34 actual wolf depredations.

Annual post-wolf introduction losses are higher than the average annual pre-wolf losses for the five study ranches:
Total combined livestock losses = 651.0 head,
Total combined dollar value losses = $382,198.50

In this comparability study, two of the five ranches went out of business; one sold out and the second is on the market now. A third ranch sold off their livestock in the fall of 2009 and did not re-stock cattle in 2010.

To alleviate the taking of private property without compensation by the Federal Government, confirmation standards and the compensation scheme as a whole must be reevaluated. In-depth studies must be conducted to evaluate the negative impacts of wolves’ denning in calf/yearling core areas and the effects of wolf-related stress on livestock. Evaluation of data must include the wide spectrum of negative impacts to livestock and livestock producers, rather than the current focus solely on benefits to wolves. Recommended areas of study include:

1. Pre-wolf introduction historic annual losses;
2. Post-wolf introduction annual livestock losses;
3. Wolves denning in calf/yearling core areas;
4. Wolves denning near calf/yearling core areas;
5. Wolf rendezvous sites located in calf/yearling core areas;
6. Wolf-claimed territory overlapping livestock core areas; and
7. Wolf-caused chronic stress and effects on livestock.

Submitted by Jess Carey, Catron County Wolf Interaction Investigator

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Note: in the fall 2009 Ranch A sold the remainder of his livestock and went out of business, then passed away. On May 30, 2010, a sad day in our community, rancher A passed away. I talked numerous times with rancher A about the psychological stress of losing his calves to wolves that put him out of business. He stated he could not take it anymore. He had trouble sleeping and worried all the time about wolves killing his calves. He felt hopeless and helpless to protect his private property. He was a law abiding citizen and would not take matters into his own hands against the federally protected wolves. His children could not take over the ranch because it was not sustainable with wolf presence. In the fall of 2009 he sold what was left of his herd. In 2008 and 2009, with a combined loss of 219 head, valued at $130,800.00, his ranch was doomed. The USFWS would not remove the San Mateo pack that had numerous confirmed depredations. They remained on the landscape and continued to kill livestock. There are many family ranchers that suffer psychological stress due to wolves killing their livestock, a taking of private property, with no compensation.
Appendix A – Ranch Study Data

Ranch A

Ranch A is a cow/calf operation. Records of average annual pre-wolf introduction losses were 16%. The herd consisted of 300 head. Herd makeup: 20 bulls, 25 replacement heifers (not expected to calve), 0 steers and 255 production cows. 255 production cow numbers X 16% average pre-wolf annual calf losses = a 41.0 head loss. 255 – 41 = 214 fall calf crop number, representing an 83.9% calf crop. Losses pre-wolf were attributed to calving, open cows, coyote predation, and winter weather.

2008, the San Mateo Pack denned in calf core areas on Ranch A. The heard consisted of 300 head. Herd makeup: 20 bulls, 0 steers, 25 replacement heifers (not expected to calve) and 255 production cows. Fall calf crop numbers were 95.0 head.

255 production cows – 41.0 head pre-wolf calf loss = 214.0 calves – 95.0 fall calf crop numbers = 119.0 additional calf crop loss.

Fall calf crop numbers dropped from 214.0 head to 95.0 head, representing an additional 47% loss beyond normal pre-wolf losses.

Monetary loss = 47% calf loss with wolves’ denning in calf core area. 119.0 X $600.00 = $71,400.00 additional dollar loss with no compensation.

2009, the San Mateo Pack denned in calf core areas on Ranch A. The herd consisted of 300 head. Herd makeup: 20 bulls, 23 replacement heifers (not expected to calve), 0 steers and 257 production cows.

257.000 head – 41.0 head pre-wolf calf loss = 216.0 calves – 116.0 fall calf crop numbers = 100.0 additional calf crop loss.

Fall calf crop numbers dropped from 216.0 head to 116.000 head, representing an additional 39% loss beyond normal pre-wolf losses.

Monetary loss = 42.800% calf loss with wolves’ denning in calf core area. 100.0 X $600.00 = $60,000.00 additional dollar loss with no compensation.
Wolf denning losses are additional to pre-wolf losses

On Ranch A, the findings of investigations by USFWS, Wildlife Services and Catron County utilizing AMOC set standard for wolf depredation confirmation were:

**2008:** wolf depredations = calf confirmed 1, calf unknown 1
**2009:** wolf depredations = calf confirmed 1, calf probable 1

**Defenders of Wildlife compensation Rate:**

- Confirmed at 100% market value
- Probable at 50% market value
- Possible at 00% market value
- Unknown at 00% market value

**2008**
- Confirmed: 1 – calf = $600.00
- Probable: 0-- calf $300.00
- Possible: 0 - = $000.00
- Injury: 0 – = $000.00
- Unknown: 1 –calf = $000.00
  - Total = $900.00

**2009**
- Confirmed: 1– calf = $ 600.00
- Probable: 1-- calf = $300.00
- Possible: 0– = $000.00
- Unknown: 0 – = $000.00
  - Total $ 900.00 compensation denied

Compensation paid to Ranch A: 2008 = $600.00
  2009 = $00000
  Total   $600.00

**2008,** Compensation was for 1 confirmed wolf killed calf at 100% market value = $600.00, paid by Defenders of Wildlife.
2009, Compensation of $900.00 was denied to resource owner by Defenders of Wildlife. The stated reason was that the resource owner did not conform to changing his husbandry scheme as requested by USFWS to prevent wolf-livestock interactions. The USFWS wanted the resource owner to corral his calves and let the cows out during the day to pasture, and then herd them into the corral at night so the calves could suck the cows. Also, the rancher was to feed the cows hay at night. The resource owner refused this suggestion and was penalized for failure to obey the USFWS.

The combined actual calf losses above pre-wolf average annual losses for Ranch A for 2008 and 2009 were 219.0 head X $600.00 = $131,400.00 loss value.

$131,400.00 loss value - $600.00 compensation value paid by Defenders of Wildlife = $130,800.00 total loss beyond pre-wolf normal losses.

Graph - Dollar Loss - Ranch A

Wolf denning loss is additional to pre-wolf dollar loss.

USFWS John Oakleaf study (2003) states that for every (1) one confirmed wolf-calf depredation there are (7) seven more wolf killed calves that are not found by the resource owner.

Oakleaf study ratio of 1 to 8 applied to Ranch A:

2008 - All confirmed, probable, possible - 1 \( - 1 \times 7 = 7 \) not confirmed
1 divided into 119.0 = 119.0
Ratio 1 to 119.0

2009 - All confirmed, probable, possible - 2 \( - 2 \times 7 = 14 \) not confirmed
2 divided into 100.0 = 50.0
Ratio 1 to 50.0
Ranch B
Ranch B adjoins Ranch A.

Ranch B is a cow/calf operation. Records of average annual pre-wolf introduction calf losses were 2.455% for 3 years running with an average annual loss of 4.000 to 6.000 head per annum. The herd consisted of 256 head. Herd makeup: 18 bulls, 30 replacement heifers (not expected to calve), 5 steers and 203 production cows. Average calf crop = 97.5%. Losses pre-wolf were attributed to calving, open cows, coyote predation, and winter weather.

2008, the San Mateo Pack denned near calf core areas on Ranch B. Herd makeup: 18 bulls, 5 steers, 30 replacement calves (not expected to calve) and 203 production cows. Fall calf crop numbers were 171.0 head.

203 production cows – 5.0 head pre-wolf calf loss = 198.0 calves – 171.0 fall calf crop numbers = 27.0 additional calf crop loss.

Fall calf crop numbers dropped from 198.0 head to 171.0 head, representing an additional 13.5% loss beyond normal pre-wolf losses.

Monetary loss = 13.5% calf loss with wolves’ denning in calf core area, 27.0 X $600.00 = $16,200.00 additional dollar loss with no compensation.

2009, the San Mateo Pack denned near calf core areas on Ranch B. The herd consisted of 287 head. Herd makeup: 19 bulls, 25 replacement calves (not expected to calve) and 243 production cows.

With wolves denning in calf core areas, calf losses increased to 23.895% with losses of 58.0 head.

243 production cows – 6.0 head pre-wolf calf loss = 237.0 calves – 179.0 fall calf crop numbers = 58.0 additional calf crop loss.

Fall calf crop numbers dropped from 238.0 head to 179.0 head, representing an additional 23.845% loss beyond normal pre-wolf losses.

Monetary loss = 23.845% calf loss with wolves’ denning in calf core area, 58.0 X $600.00 = $34,800.00 additional dollar loss with no compensation.

Of the 58.0 additional losses, a portion of the decrease is attributed to the harassment by wolves disrupting the breeding cycle. 

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6 Idaho Wolf Depredation Compensation Plan (2004 Grazing Season) excerpt: “Some scientific data also suggests that further effects of wolf predation include stress-related loss of body condition in harassed herds and subsequent decreases in pregnancy rates and weaning weights”. (Stricklin and Mench, 1989)
Wolfdenning losses are additional to pre-wolf losses

The findings of investigations by USFWS, Wildlife Services and Catron County utilizing AMOC set standard for wolf depredation confirmation were:

- **2008:** wolf depredations = calf confirmed 1, calf probable 1, calf injuries confirmed 3 (no compensation)
- **2009:** wolf depredations = calf confirmed 1

Defenders of Wildlife compensation Rate (there was no contact between Ranch B and Defenders of Wildlife; compensation was not paid):

Confirmed at 100% market value
Probable at 50% market value
Possible at 00% market value
Unknown at 00% market value

**2008**
- Confirmed: 1 – calf = $600.00
- Probable: 1-- calf = $300.00
- Possible: 0 - = $ 000.00
- Injury: 3 – calves = $000.00
- Unknown: 0 – calves = $ 000.00
  Total = $900.00

**2009**
- Confirmed: 1– calves = $ 600.00
- Probable: 0- = $ 000.00
- Possible: 0– = $ 000.00
- Unknown: 0 – = $ 000.00
  Total $600.00
Total  
2008 = $900.00  
2009 = $600.00  
Total $1500.00

2008 and 2009 combined calf loss with wolf presence; 85.0 head above pre-wolf average annual losses. 85.0 head X $600.00 = $51,000.00 additional loss value.

$51,000.00 loss value – $0000.00 compensation paid by Defenders of Wildlife = $51,000.00 non-compensated additional livestock loss value.

Graph - Dollar Loss - Ranch B

Wolf denning loss is additional to pre-wolf dollar loss.

Oakleaf study ratio of 1 to 8 applied to Ranch B:

2008 - All confirmed, probable, possible = 2 – 2 X 7 = 14  
2 divided into = 27.0 = 13.50  
Ratio 1 to 13.508

2009 - All confirmed, probable, possible = 1 – 1 X 7 = 7  
1 divided into = 58.0 = 58.0  
Ratio 1 to 58.0
**Ranch C**

Ranch C is located approximately 35 miles as the crow flies in a southerly direction from Ranch A and Ranch B.

Records show that Ranch C had a 3% average annual pre-wolf introduction loss. Total herd is 330 head. Herd makeup: 18 bulls, 0 steers, 30 replacement heifers (not expected to calve), and 282 production cattle. Average annual pre-wolf losses of 8.46 head per annum were noted. Fall calf crop numbers were 231 head representing an 81.9% calf crop. Losses were attributed to birthing, coyote depredations, open cows, and winter weather.

**2005**, the Luna Pack denned in calf core areas on Ranch C. Herd makeup: 18 bulls, 0 steers, 30 replacement calves (not expected to calve) and 282 production cows. Fall calf crop numbers were 231 head.

282 production cows– 8.46 head pre-wolf calf loss = 273.5 calves – 231.0 fall calf crop numbers = 42.0 additional calf crop loss.

Fall calf crop numbers dropped from 273.5 head to 231.0 head, representing an additional 15.0% loss beyond normal pre-wolf losses.

Monetary loss = 15.0% calf loss with wolves’ denning in calf core area. 42.0 X $600.00 = $ 25,200.00 additional dollar loss with no compensation.

**2006**, the Luna Pack denned in calf core areas on Ranch C. Herd makeup: 20 bulls, 0 steers, 15 replacement calves (not expected to calve) and 295 production cows. Fall calf crop numbers were 204 head.

295 production cows– 9.0 head pre-wolf calf loss = 286.0 calves – 204.0 fall calf crop numbers = 82.0 additional calf crop loss.

Fall calf crop numbers dropped from 286.0 head to 204.0 head, representing an additional 28.0% loss beyond normal pre-wolf losses.

Monetary loss = 28.0% calf loss with wolves’ denning in calf core area. 82.0 X $600.00 = $ 49,200.00 additional dollar loss with no compensation.

**2007**, the Luna Pack denned in calf core areas on Ranch C. Herd makeup: 21 bulls, 0 steers, 0 replacement calves (not expected to calve) and 309 production cows. Fall calf crop numbers were 231 head.

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7 Merkle, Jerod et al. 2009. *Summer diet of Mexican gray wolf (Canis lupus baileyi)*. Study excerpt: “In 2005, the researchers say that the Luna pack consumed 52.7 percent of their diet as cattle and 45.9 percent as elk. The following year, the pack ate 24.1 percent of their diet as cattle, and 75.1 percent as elk.”
309 production cows – 9.0 head pre-wolf calf loss = 300.0 calves – 231.0 fall calf crop numbers = 69.0 additional calf crop loss.

Fall calf crop numbers dropped from 309.0 head to 231.0 head, representing an additional 22.0% loss beyond normal pre-wolf losses.

Monetary loss = 22.0% calf loss with wolves’ denning in calf core area. 69.0 X $600.00 = $ 41,400.00 additional dollar loss with no compensation.

**Graph - Calf Loss - Ranch C**

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre-Wolf</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf loss</td>
<td>9.0 head</td>
<td>42.0 head</td>
<td>82.0 head</td>
<td>69.0 head</td>
</tr>
<tr>
<td>Losses</td>
<td>wolves’ denning</td>
<td>wolves’ denning</td>
<td>wolves’ denning</td>
<td></td>
</tr>
</tbody>
</table>

Wolf denning losses are additional to pre-wolf losses

Ranch C combined losses for 2005, 2006, and 2007 were 190.0 head beyond pre-wolf annual losses. 190.0 head X $600.00 = $ 115,800.00 additional loss.

On Ranch C, the findings of investigations by USFWS, Wildlife Services and Catron County utilizing AMOC set standards for wolf depredation confirmation were:

2005: Wolf depredations = confirmed -1 colt, 3 calves, probable -1 calf, Injuries confirmed -1 horse, unknown 4 calves

2006: Wolf depredations = confirmed -2 calves, probable – 5 calves, possible – 1 calf, unknown – 4

2007: Wolf depredations = confirmed -4 calves, probable – 0, possible – 2 calf, unknown – 4
Defenders of Wildlife compensation Rate

Confirmed at 100% market value
Probable at 50% market value
Possible at 00% market value
Unknown at 00% market value

2005
Confirmed: 1 – colt = $1,000.00
3 – calves = $1,800.00
1 – Injury - horse = $2,500.00 sold by resource owner for $125.00
Probable: 1 – calf = $300.00
Possible: 0 – calves = $000.00
Unknown: 4 – calves = $000.00
Total $5,600.00

2006
Confirmed: 2 – calves = $1,200.00
Probable: 5 – calf = $1,500.00
Possible: 1 – calf = $000.00
Unknown: 4 – calves = $000.00
Total $2,700.00

2007
Confirmed: 4 – calves = $2,400.00
Probable: 0 – calf = $000.00
Possible: 2 – calf = $000.00
Unknown: 4 – calves = $000.00
Total $2,400.00

Total compensation value = $10,700.00

Total compensation paid to Ranch C by Defenders of Wildlife = $00.00

The combined actual calf losses beyond pre-wolf annual losses for Ranch C in 2005, 2006, and 2007 were: 193.0 head X $600.00 = $115,800.00 loss value.

$115,800.00 loss value – $0000.00 compensation paid by Defenders of Wildlife = $115,800.00 non-compensated additional livestock loss value.
Graph - Dollar Loss - Ranch C

Wolf denning loss is additional to pre-wolf dollar loss.

Comment: June 2006, Craig Miller of Defenders of Wildlife (a pro-wolf organization) at an AMOC meeting at the Honda Casino in Arizona announced that his compensation fund was to purchase tolerance and those who were not tolerant would be finding it harder to be compensated. Several ranches received no compensation on livestock depredation investigations conducted by Wildlife Services for documented; confirmed or probable losses. The failure of DOW to pay these legitimate claims cost the resource owner thousands of dollars. These DOW compensation denials appear to be selective and target New Mexico ranchers.

USFWS John Oakleaf took claim forms and Wildlife Services reports to Defenders of Wildlife, still DOW refused to make compensation payment to Ranch C.

Oakleaf study ratio of 1 to 8 applied to Ranch C:

2005 - All confirmed, probable, possible – $4 \times 7 = 28$
    4 divided into 42.0 = 10.5
    Ratio 1 to 10.5

2006 - All confirmed, probable, possible – $8 \times 7 = 56$
    8 divided into 82.0 = 10.25
    Ratio 1 to 10.25

2007 - All confirmed, probable, possible - $6 \times 7 = 42$
    6 divided into 69 = 11.5
    Ratio 1 to 11.5
Note: In the fall of October 2007, Ranch C went out of business and the ranch was sold.

**Ranch D**

Ranch D is located to the west of Ranch C. When the livestock were removed from Ranch C the wolves immediately left the vicinity of Ranch C and dispersed to Ranch D where there were livestock.

Records show Ranch D had an 11% annual pre-wolf introduction loss. Total herd is 205 head. Herd makeup: 15 bulls, 0 steers, 10 replacement heifers (not expected to calve), and 180 production cattle. Average annual pre-wolf losses of 19.0 head per annum were noted. Losses were attributed to birthing, coyote, bear depredations, open cows, and winter weather.

**2008**, the Luna Pack dened in calf core areas on Ranch D. Herd makeup: 15 bulls, 0 steers, 10 replacement heifers (not expected to calve) and 180 production cows. Fall calf crop numbers were 125,000 head.

\[
180,000 \text{ production cow numbers} - 19.0 \text{ head pre-wolf calf loss} = 161.0 \text{ calves} - 125.0 \text{ fall calf crop numbers} = 36.0 \text{ additional calf crop loss with wolf presence.}
\]

Fall calf crop numbers dropped from 161.0 head to 125.0 head, representing an additional 20.0% loss beyond normal pre-wolf losses.

Monetary loss = 20.0% calf loss with wolves’ denning in calf core area, 36.0 X $600.00 = $ 21,600.00 additional dollar loss with no compensation.

**2009**, the Luna Pack dened in calf core areas on Ranch D. Total herd 205. Herd makeup: 15 bulls, 0 steers, 20 replacement heifers (not expected to calve) and 170 production cows. Fall calf crop numbers were 128,000.

Note: Ranch D moved 65 production cows to another pasture several miles away from the denning wolves. This area contained no known wolves. Also a range rider patrolled the remaining 105 production cows at the original pasture where the Luna Pack again dened in 2009.

\[
105.0 \text{ production cow numbers} - 12.0 \text{ head pre-wolf calf loss} = 93.0 \text{ calves} - 70.00 \text{ fall calf crop numbers} = 23.0 \text{ head additional loss with wolf presence.}
\]

This represents an additional 22.0% calf loss with wolf presence, 23.0 X $600.00 = $13,800.00 additional loss.
Wolf denning losses are additional to pre-wolf losses

Defenders of Wildlife compensation Rate:

Confirmed at 100% market value
Probable at 50% market value
Possible at 00% market value
Unknown at 00% market value

2008
Confirmed: 0 = $0
Probable: 0 = $0
Possible: 0 = $0

Injuries confirmed wolf: 3 – calves = $0
Missing confirmed wolf: 2 – calves = $1,200.00
(2 calves missing with wolf presence, 3 wolf confirmed calf injuries at scene)
Unknown: 1 – cow = $0
Total $1,200.00

2009
Confirmed: 0 = $0
Probable: 0 = $0
Possible: 0 = $0
Injuries: 0 = $0
Unknown: 1 – cow = $0
Total $0

Total compensation $1,200.00. Amount paid by Defenders of Wildlife = $0
The combined actual calf losses above pre-wolf average annual losses for Ranch D in 2008 and 2009 were: 59.0 head X $600.00 = $35,400.00 loss value

**Graph - Dollar Loss - Ranch D**

<table>
<thead>
<tr>
<th>Dollar loss</th>
<th>Pre-Wolf Annual Losses</th>
<th>2008 wolves’ denning</th>
<th>2009 wolves’ denning</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$8,100.00</td>
<td>$21,600.00</td>
<td>$13,800.00</td>
</tr>
</tbody>
</table>

**Wolf denning loss is additional to pre-wolf dollar loss.**

Oakleaf study ratio of 1 to 8 applied to Ranch C:

**2008** - All confirmed, probable, possible – 2 X 7 = 14
2 divided into 35.450 = 17.725
Ratio 1 to 17.725

**2009** - All confirmed, probable, possible - 0 X 7 = 0
0 divided into 22.450 =
Ratio 1 to 22.450

**Ranch E**

Ranch E is located north east of Ranch C and ran yearlings.

**2009**, the Middle fork Pack denned in yearling core areas on Ranch E. The Allotment consisted of three (3) pastures. There were 300 yearlings in excellent condition in pasture A and B, and 287 yearlings in pasture C. Average pre-wolf losses were 5.

Pasture A, B, and C yearlings were run through fences by wolves chasing them. There were 10 confirmed wolf depredations, 14 carcasses found that were too far gone to investigate and 80 yearlings’ location unknown. Many hours were spent by the resource
owner mending fences and trying to locate and put livestock back in their proper pasture. The area is very remote and mountainous with thick tree covered canyons.

It has been documented on Ranch E that 4 of the 11 yearlings that were confirmed, attacked, and fed upon by the Middle Fork Pack were alive after the initial feeding. After the wolves fed, 36% of the yearlings traveled a long distance before being found alive or dead at the carcass site. Livestock have been found in the past with canine spreads and rake marks consistent with wolves but the scene lacked wolf presence and the finding of investigations were less than confirmed. Under these circumstances the results represent lost compensation to the resource owner.

Of the 80 missing yearlings, 7 yearlings were recovered in good health in the spring and were moved to the headquarters pasture on private property. On 04-27-10 one of the yearlings were attacked and its rear end eaten out, suffering a loss of approximately 20 pounds of tissue. The yearling was located 4 miles away from the attack/feeding site that contained wolf tracks, blood trail and torn up ground. This yearling was a confirmed wolf kill by the Middle Fork Pack. The other six yearling had barbwire cuts on them from running into barbwire fences try to evade the wolves. No more yearlings have been found to date even though a rigorous search is ongoing.

Of the 11 confirmed wolf depredations; 8 were heifers, 2 steers and 1 sex unknown.

Graph - Yearling Loss - Ranch E

<table>
<thead>
<tr>
<th>Year</th>
<th>Pre-wolf Loss</th>
<th>2009 confirmed kills</th>
<th>2009 carcasses</th>
<th>2009 missing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>5</td>
<td>11.0</td>
<td>14.0</td>
<td>73.0</td>
</tr>
</tbody>
</table>
Wolf denning losses

Defenders of Wildlife compensation Rate:

Confirmed at 100% market value;
Steers = .94c @ 650 lbs. = $611.00
Heifers = .87c @ 650 lbs = $565.50
Probable at 50% market value
Possible at 00% market value
Unknown at 00% market value

2009:
Confirmed: steers = 2 = $1,222.00
Heifers = 9 = $5,085.00
Probable: 0 = $ 0
Possible: 0 = $ 0
Injuries: 0 = $ 0
Unknown: = $ 0
Total $ 6,307.00

Total compensation amount $ 6,307.00.

Of the 80 yearlings missing, 7 were found resulting in 73 yearlings still missing.

11 confirmed wolf depredations
14 carcasses too far gone to investigate
73 missing
Total = 98

Total number of yearlings put on pasture = 887 – 98 head loss = 789
Percentage loss of herd = 11.048 %

Value loss:
Confirmed wolf depredations = 11 = $6,307.00
Carcasses too far gone to investigate = 14 X $565.50 = $7,917.00
Missing yearlings = 73 x $565.50 = $41,281.50
Total = $55,505.50
Graph - Dollar Loss - Ranch E

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2009</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>pre-wolf Loss</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>confirmed wolf kills</td>
<td>$100,000.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>carcasses</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
<tr>
<td>missing</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
</tr>
</tbody>
</table>

Wolf denning loss is additional to pre-wolf dollar loss.

Amount paid by Defenders of Wildlife = $6,307.00 – 55,505.50 = a total loss of = $49,198.50

Ranch E sold off their livestock in the fall of 2009 and did not stock the ranch in 2010 due to livestock losses.

**Note of interest concerning yearlings:** When wolves were not being supplementally fed the wolves returned to carcasses and continued to feed. After a supplemental feeding station was put out by the USFWS to feed the wolf pups (including dragging a confirmed wolf killed livestock yearling to the feeding station with the permission on resource owner) and thereby deter the Middle Fork Pack from continued livestock depredations, the wolves attacked and ate approximately 15 to 20 pounds out of the rear ends of each of four (4) yearlings. These yearlings survived the attack and traveled from the attack/feeding site. During this same period, although the wolves were heavily hazed from the yearling herd by USFWS and New Mexico Game and Fish employees, the wolves would circle the hazers and make additional confirmed depredations. The Kill sequence interval averaged one every four (4) days.

Oakleaf study ratio of 1 to 8 applied to Ranch E:

2009 - All confirmed, probable, possible – 11 X 7 = 77
11 divided into 98 = 8.909
Ratio 1 to 8.909
The findings of confirmed and actual losses are consistent with other ranches across Catron County where wolves den in calf and yearling core areas. Very few livestock carcasses are found or found in a timely manner with evidence retained. When carcasses are found very few meet the standards for confirmation set by AMOC, due to lost evidence.

Many ranchers have cooperated with wolf recovery agencies utilizing recommended non-lethal schemes to prevent wolf-livestock interactions that result in livestock depredation. The ranches have added additional range riders, moved livestock to other pastures, penned livestock and fed hay and worked multiple additional hours to prevent wolves from killing their livestock. Still the wolves depredate their livestock. The ongoing added effort, stress and expense are a high loss cost factor beyond pre-wolf introduction.
Appendix B: Literature Cited

Idaho Wolf Depredation Compensation Plan (2004 Grazing Season)

Wolf-caused mortalities are difficult to detect in range livestock areas. Heavy cover, large pastures, great topographical variation and complete carcass consumption by wolves lend increasing degrees of difficulty to timely detection of wolf kills. The proportion of wolf-related depredations that go undetected or unconfirmed is unknown and will vary by area.

For example, two studies (Oakleaf, et. al., 2000 and Bjorge and Gunson, 1985) on cattle have shown that for every 5.8 or 6.7 cattle lost only 1 confirmed kill was noted. Given this, the number of unconfirmed depredation losses attributed to wolves will always be a contentious issue.

Some scientific data also suggests that further effects of wolf predation include stress-related loss of body condition in harassed herds and subsequent decreases in pregnancy rates and weaning weights (Stricklin and Mench, 1989).

Cattle seeking to escape wolves may leave areas where they are supposed to be and disrupt grazing management plans. Economic losses and/or penalties from land management agencies could be the result.

For some ranchers, the cumulative effects of wolf predation may cause losses sufficiently severe that livestock production becomes untenable. Although the impact of wolf predation to the entire livestock industry of the state is expected to be small, the impact to the individual can be devastating.

USFWS John Oakleaf study on wolf-livestock depredations indicated for every confirmed wolf-livestock depredation there are (7) seven more that area not confirmed.

In Catron County there is evidence to conclude Mr. Oakleaf’s findings are supported per wolves overlapping livestock areas, but differ when wolves den in calf/yearling core areas. In the case of Ranch A, Ranch B, Ranch C, Ranch D, and Ranch E the ratio is much higher than 1 to 8.
The Cost of Wolves to Ranchers
By Ron Skinner D.V.M.

Excerpt:

- Many animals that are killed are not found; one Idaho study showed one out of eight cattle killed is found.

- Stress is a significant problem for both animals and humans. Stress increases the cortisol level in the blood stream in both cattle and humans. Increased cortisol levels will cause pre-mature delivery of calves or abortion of calves. A direct result of this increased stress from wolves is that we are seeing a decreased pregnancy rate in our cattle.

- Cortisol also causes immune suppression as is commonly acknowledged in the medical field. Cortisol also causes recrudescence (bringing the virus from a dormant stage to an active stage). A virus in cattle called Infectious Bovine Rhinotrachitis (IBR) can recrudesce and causes abortion in cattle.

- It also causes fetal deformities, latent carriers, weak newborns, and sick newborns that die shortly after birth.

- With suppression of the immune system, other groups of organisms that can create diseases such as foot rot, pink eye, and pneumonia become active. These diseases often show up 48 to 72 hours after stress.

- There is injury to livestock from the wolves while they are chasing them. The wolves try to take animals down by biting and tearing at their hindquarters on the run. Some may get away but later die a slow death from gangrene.

- Stress on livestock producers is significant. The constant hunting for depredation and sick cattle is stressful.

- Cattle stressed at a young age do not grade choice at a high enough percent. This has been shown in numerous trials. In today’s market that can cost $59.00 per head and varies with the time of the year and sometimes can be twice that. Another cost that the buyer must incur and another reason for him to decide he does not want your cattle.

- Another problem ranchers face is deciding how many replacement heifer calves to keep to offset the decreased pregnancy rates because of the wolves. The net cost of keeping extra replacement heifers back as the result of wolves is $603.25 per pregnancy loss. If there is a 5% increase in open cows, then a rancher with 500 cows will lose $15,081.25.
Scott Creel, Montana State University, shows lower birth rates in the elk population in Yellowstone Park area due to wolves. Although partially due to wolf kills on the calves, Creel shows the largest factor to be nutrition. The elk are forced into areas without good feed by the wolves and to compound that they eat 27% less now and are slowly starving to death. This means the elk are choosing survival over reproduction and that is simply not sustainable for any population over the long run. We see this same scenario with ranchers and their livestock.

**Wolf-Caused Stress (various sources)**

The regular presence of wolves in close proximity to livestock may result in a chronic stress situation for the domestic animals. Many infectious diseases result from a combination of viral and bacterial infections and are brought on by stress (Faries and Adams 1997). Wolves chase ungulates much more frequently than actual kills are made as part of the testing of the prey (MacNulty 2002). While wild ungulates are probably well adapted to being occasionally tested by predators, domestication and genetic selection for docility in livestock has likely resulted in animals more susceptible to increased stress from predator harassment.

Stress can result in increased susceptibility to disease and weight loss, reduction in the value of the meat, and interfere with reproduction (Fanatico 1999). Stress prior to slaughter is thought to be a contributor to “dark-cutters,” meat which is of unacceptable color not being the normal bright cherry red but rather almost purple. Dark-cutters are discounted severely because these meat products are difficult to sell (Fanatico 1999).

In addition, the stress of being repeatedly chased/harassed by predators can cause cattle to abort, calve early or give birth to a weak calf (Dr. Gregory Palmquist, personal communication).

**Wolf-caused livestock Stress Death in Catron County**

Catron County brought to the attention of Wildlife Services that wolves were causing stress deaths in livestock. Case AP-030, 08-24-06 was the first case of stress death confirmed by Wildlife Services and Catron County. I also requested a study be done by Wildlife Services concerning livestock stress deaths on 11-01-06.
Pathological Fatigue

In this case it would be the over exertion of cattle by wolf harassment, chasing, and prey testing. The wolf attack would also produce extreme fear or fright in cattle.

Pathological Fatigue interferes with the activity of every gland in the cows system; its principle effect is to destroy the capacity of muscles and nerves to perform the work natural to them. A chemical change takes place in the muscles; these toxic substances are #1. Lactic Acid, #2. Creatine, and #3 Carbon Dioxide. These toxic substances are acids and cause a state of fatigue in the cow’s muscles and system.

During rest following fatigue, these acids are neutralized by alkaline of the blood and internal secretions, which restores freshness, strength and tone of the muscle.

I conclude, once a cows system has been saturated to a certain point, “beyond recovery” of these toxic substances, there is no ability for the cows system of neutralization (alkalinity) and the cows system shut down and it dies.

I have seen healthy cows in prime condition just seem to fall over dead; lying on their sides there is no indication of head movement or leg movement, no sign that the hooves disturb the ground or ground liter at all. Some had wolf capture bite sites, some not.

Case AP-030, 08-24-06 was the first case of stress death recognized and documented by Wildlife Services in Catron County. The 1200 pound Black Angus cow was 6 years old and in good health, ear tag #208. Cow was pursued and attacked by wolf F924. This collared female wolf weighed approximately 45-50 pounds and was documented by Ariel Telemetry 250 yards away from the carcass on the side of a hill. The cow had been run by F924 in the pasture, ending where the cow was running around in circles. The pasture looked like a race track with the cow’s hooves tearing up the ground and up-rooting vegetation. There were non-lethal bite sites with corresponding hemorrhage on the cow’s tail from the root of the tail down approximately twelve inches. Canine spreads were documented at; 41.00mm and 39.89mm consistent with the Mexican wolf. Some cattle are stressed to death and there are no capture bite sites or feeding on the carcass.

In Manitoba, wolves and coyotes are able to spatially and temporally coexist with each other (Paquet, 1992)

Wolves did not always consume the entire ungulate carcass: 91% of elk kills were abandoned before all of the edible portions were eaten and 86% of moose remained only partially eaten.

In this study, all wolf-killed carcasses were visited by coyotes, in most instances the carcass was scavenged by these coyotes.
Another key factor in considering the consumption habits of wolves, when ungulate abundance is high enough they do not have to devour all of the ungulate, they can leave some.

Moose calves and yearlings were the primary targets of the attacks in Ballard et al.’s (1987) study, as wolves prefer to prey on the weakest members of any ungulate herd.

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**The Mexican Wolf (Canis lupus baileyi): A Historical Review and Observation On Its Status and Distribution**  

Excerpt:

Wolves in Mexico do not appear to be scavengers, nor do they appear to feed upon sick, wounded or crippled animals. Contrarily, the wolves feed upon and prefer top-of-the-line animals (Figs 16 and 17).

When cattle are weaned, a percentage of young calves usually do not adjust easily, responding with much slower growth and generally poorer condition than the other calves. These animals, when being driven to the pen, usually drop to the rear and have to be pushed along, while the healthier calves get far ahead in the drive.

The same occurs during attack by wolves. The cattle stampede and during the chase the “Sanchos” (poor calves) drop to the rear and present easy targets for the wolves. However, the wolves pass by these cattle and take better, heavier calves even though it is more of a struggle to kill them. **At times large chunks are bitten from the steer’s hindquarters or flanks** (Fig. 18). Wolves do feed at times without killing the steer, although these steers invariably die.

**Even though some stricken cattle were still alive the second night the wolves did not feed upon them but returned to catch another steer. At times wolves kill three to four animals in the same night but only feed on one.** This habit makes them a hated enemy of the cattlemen.

In Mexico, the wolf seems to totally ignore the coyote, while the coyote takes great interest in where the wolf has been. I have frequently seen coyote tracks following wolf tracks in the opposite direction, probably intent in finding a kill.

When a wolf is killing steadily in an area there is invariably a swarm of coyotes, ravens, and eagles taking advantage of the remains of kills.
**Study; Blue Range Wolf Recovery Area**


Excerpt:

In 2005, the researchers say that the Luna pack consumed 52.7 percent of their diet as cattle and 45.9 percent as elk. The following year, the pack ate 24.1 percent of their diet as cattle, and 75.1 percent as elk

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**Summer Diet of the Mexican Gray Wolf (Canis Lupus Baileyi)**


Excerpt:

Calving by cattle takes place year around, but peaks during spring and summer, and parts of the Blue Range Wolf Recovery Area do not support cattle in winter. These grazing dynamics may account for the increase in biomass of cattle in scats in our study relative to results reported by Reed et al. (2006).

All territories of packs of Mexican wolves’ overlapped active cattle-grazing allotments during our collection period (i.e., summer). However, grazing takes place seasonally or year around throughout the Blue Range Wolf Recovery Area due to a climate gradient.

We detected a difference in diet between grazing areas, but the difference was driven by one pack. The Luna pack consumed a significantly higher amount of cattle than all other packs in the study area.

One potential hypothesis for the observed diet of the Luna pack is decreased predation on cattle in areas where they were not consistently exposed to cattle as a potential prey item. Younger calves (i.e., more vulnerable cattle; Oakleaf et al., 2003; Chavez and Gese, 2005) are likely more consistently present on year-around grazing allotments relative to seasonal grazing patterns, possibly subsidizing diet of the Luna pack.

These results suggest that significant wolf-livestock issues may be pack specific, and that further research is needed.

Studies addressing the following questions may elucidate impacts of different cattle grazing regimes on diet of the Mexican wolf.
Are there a higher proportion of cows with young calves on grazing allotments occupied by packs that consume livestock?

Does a higher proportion of calving take place on territories of wolves that consume more livestock compared to other territories of wolves?

Finally, what are the ages of cattle stocked on allotments occupied by territories of wolves that consume more livestock compared to other territories of wolves?

With a better understanding of predation by wolves and grazing dynamics of livestock, improved management decisions regarding successful conservation of Mexican wolves can be made.