Draft 1

Nevada Department of Wildlife

Predator Management Plan

Fiscal Year 2017

1 July 2016 to 30 June 2017

STATE OF NEVADA

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Summary

The goal of the Nevada Department of Wildlife's (NDOW's) Predator Management Program is to conduct projects consistent with the terrestrial portion of the Department's Mission "to preserve, protect, manage and restore wildlife and its habitat for the aesthetic, scientific, educational, recreational and economic benefits to citizens of Nevada and the United States." In addition, provisions outlined in NRS 502.253 authorize the collection of a $3 fee for each big game tag application, depositing the revenue from such a fee collection into the Wildlife Fund Account and used by the Department to 1) manage and control predatory wildlife and 2) conduct research, as needed, to determine successful techniques for managing and controlling predatory wildlife, including studies necessary to ensure effective programs for the management and control of predatory wildlife. Expending a portion of the money collected to enable the State Department of Agriculture and other contractors and grantees to develop and carry out programs designed as described above; developing and conducting predator management activities under the guidance of the Wildlife Commission; and a provision that the $3 fee monies remain in the Wildlife Fund Account and do not revert to State General Funds at the end of any fiscal year, are additional provisions of the Statute.

NDOW maintains a philosophy that predator management is a tool to be applied deliberately and strategically. Predator management may include lethal removal of predators or corvids, nonlethal management of predator or corvid populations, Predator management should be applied on a case-by-case basis, with clear goals, and based on an objective scientific analysis of available data. It should be applied with proper intensity and at a focused scale. Equally important, projects should be monitored to determine whether desired results are achieved.

NDOW is committed to using all available tools and the most up-to-date science, including strategic use of predator management, to preserve our wildlife heritage for the long term.

NRS 501.181

(The Department) Shall not adopt any program for the management and control of predatory wildlife developed pursuant to this section that provides for the expenditure of less than 80 percent of the amount of money collected pursuant to subsection 1 in the most recent fiscal year for which the Department has complete information for the purposes of lethal management and control of predatory wildlife.

Budget Summary

Fiscal year 2015 predator fee revenues totaled $563,742; consequently this plan has budgeted over $450,993.60 for lethal predator control. Proposed predator projects for fiscal year 2016 include $472,000 for lethal work. This accounts for 83.7% of proposed predator fee expenditures being used for lethal control.

Table of Contents

TYPES OF PROJECTS **5**

FY 2017 PROJECTS RECOMMENDED FOR CONTINUATION **6**

Project 21: Greater Sage-Grouse Protection (Common Raven Removal) 6

Subproject 21-02: Common Raven Removal and Greater Sage-Grouse Nest Success 9

Project 22: Mule Deer-Game Enhancement 12

Subproject 22-16 Coyote Den Density Effects on Mule Deer Fawns and Other Wildlife Species 17

Subproject 22-074: Mountain Lion Removal for the Protection of Rocky Mountain Bighorn Sheep 20

Project 32: Mountain Lion, Black Bear, and Mule Deer Interactions 23

Project 37: Big Game Protection-Mountain Lions 26

Project 38: Big Game Protection-Coyotes 28

Project 40: Coyote Removal to Complement Multi-faceted Management in Eureka County . 30

FY 2017 NEWLY PROPOSED PROJECTS **33**

Project 41: Common Raven Management and Experimentation 33

PROJECTS RECOMMENDED FOR DISCONTINUATION **36**

Project 35: Using Genetic Testing to Identify Origin of Red Fox 36

Project 39: Predator Education 38

Overall FY 2016 Budget 39

Literature Cited 40

Appendix 41

Below are the three categories of projects in the predator management plan. Some projects have aspects of multiple types within a single activity or action. The project types are listed throughout this document.

TYPES OF PROJECTS

1. **Implementation**: The primary objective is to implement management of predators through lethal or non-lethal means. NDOW will collaborate with USDA Wildlife Services and private contractors to conduct lethal and non-lethal management of predators. NDOW and collaborators will collect all possible data to make inference on outcome and effectiveness of project, although this is not the primary objective.
2. **Experimental Management**: The primary objectives are management of predators through lethal or non-lethal means and to learn the effects of a novel management technique. NDOW will collaborate with Wildlife Services, private contractors, and other wildlife professionals to conduct lethal or non-lethal management of predators and will put forethought into project design. Expected outcomes will include project effectiveness, agency reports, and possible peer-reviewed publications.
3. **Experimentation**: The primary objective is for increasing knowledge of predators in Nevada. NDOW may collaborate with other wildlife professionals to study and learn about predators of Nevada. Expected outcomes will include agency reports, peer-reviewed publications, and information on how to better manage Nevada's predators.

FY 2017 PROJECTS RECOMMENDED FOR CONTINUATION

Project 21: Greater Sage-Grouse Protection (Common Raven Removal)

Justification

This project proposes to lethally remove common ravens from known Greater Sage-grouse leks and nesting habitats.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation and Experimental Management

Project Goals

1. Identify local areas for project implementation through collaboration with NDOW and USDA Wildlife Services wildlife biologists.
2. Increase populations of sage-grouse in specific areas where deemed feasible.

Anticipated Result

1. The removal of common ravens is intended to result in long-term protection for sage-grouse populations through increases in nest success, brood survival, and recruitment.

Potentially Impacted Species

Common raven, Greater Sage-grouse

Span More Than One Fiscal Year

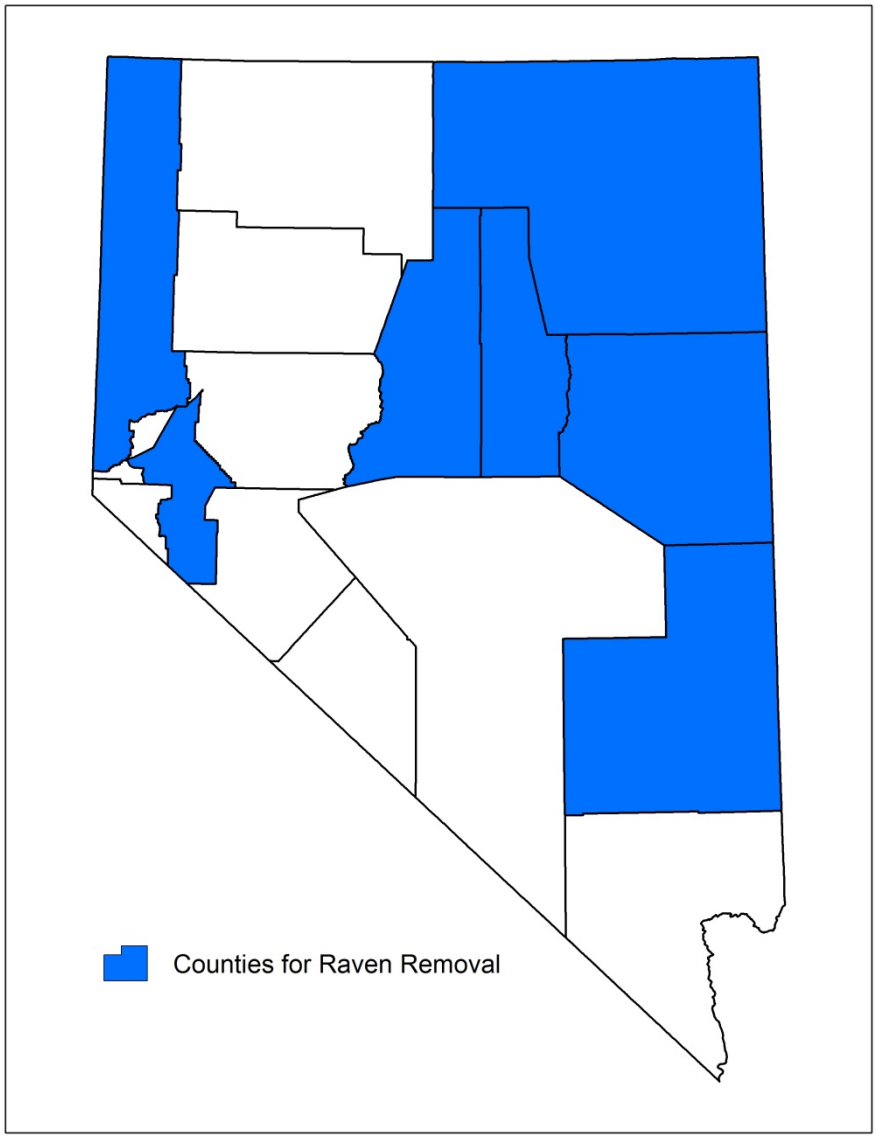
Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for sage-grouse, their populations can be suppressed by abiotic factors such as dry climate and loss of quality habitat. Increases in predator numbers can also cause decreases in sage-grouse populations; common raven abundance has increased throughout their native ranges, with increases as much as 1,500% in some areas (Boarman 1993, Coates et al. 2007, 2014, Sauer et al. 2011).

Project Area

Elko, Eureka, Humboldt, Lander, Lincoln, Lyon, Washoe, and White Pine counties.



Habitat Conditions

Areas of common raven removal will be within or in close proximity to sage-grouse leks, nesting habitat, and brood-rearing habitat. Persistent drought throughout Nevada has reduced herbaceous cover on nesting and broad-rearing habitat.

Comments from FY 2015 Predator Report

None

Methods

Lethal Removal

Chicken eggs treated with avicide (DRC-1339) and will be deployed to remove common ravens (Coates et al. 2007). To reduce non-target species exposure, no eggs will be left in the environment for over 96 hours. No leftover eggs will be used on subsequent treatments. All remaining eggs and any dead common ravens found will be collected and disposed of properly as per avicide protocol. Common raven take will be estimated at 1 raven per 11 eggs gone (Coates et al. 2007).

Recommendations

Fund Project 21. Evaluate efficacy of Project 21 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$78,000	N/A	$78,000

Subproject 21-02: Common Raven Removal and Greater Sage-Grouse Nest Success

Justification

This project proposes to lethally remove common ravens from known Greater Sage-grouse leks and nesting habitats and monitor raven abundance that may be used to target further removal efforts.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation and Experimental Management

Project Goals

1. Understand where raven densities may be negatively affecting Great Sage-grouse populations.
2. Determine what method of raven management is appropriate.
3. Increase populations of Greater Sage-grouse.
4. Implementation will occur near leks for this sensitive species to reduce raven take of nearby nests with eggs.

Anticipated Results

1. The removal of ravens and predators is intended to result in long-term protection for Greater Sage-grouse populations.
2. Monitoring of raven densities will provide managers with needed raven management locations, potentially through a resource selection function model of raven distribution and abundance.

Potentially Impacted Species

Common raven, Greater Sage-grouse

Span More Than One Fiscal Year

Unsure

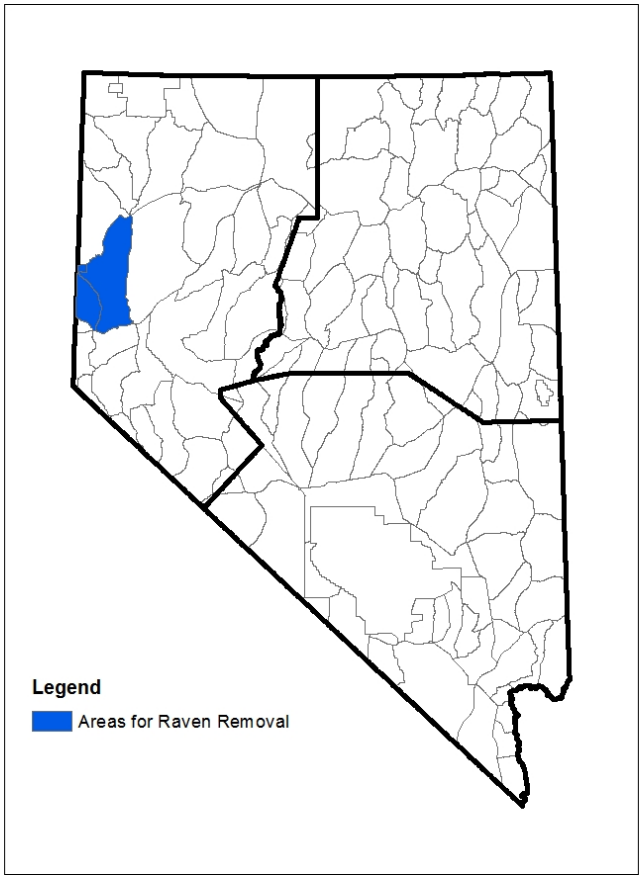
Limiting Factor Statement

Though predation is a naturally occurring phenomenon for Greater Sage-grouse, their populations can be lower or suppressed by abiotic factors such as dry climate and loss of quality habitat. Increases in predator numbers can also cause decreases in Greater Sage-grouse

populations; raven abundance has increased throughout their native ranges, with increases as much as 1,500% in some areas (Boarman 1993, Coates et al. 2007, 2014, Sauer et al. 2011).

Project Area

Unit 02



Introduction

Although predation is a naturally occurring phenomenon for sage-grouse, their populations can be lower or suppressed by abiotic factors such as dry climate and loss of quality habitat. Increases in predator numbers can also cause decreases in Greater Sage-grouse populations; raven abundance has tripled throughout their native home ranges, with increases as much as 1,500% in some areas (Boarman 1993, Coates et al. 2007, 2014, Sauer et al. 2011).

Methods

Lethal Removal

Chicken eggs treated with the avicide (DRC-1339) will be deployed to remove ravens (Coates et al. 2007). To reduce non-target species exposure, no eggs will be left in the environment for over 168 hours. No leftover eggs will be used on subsequent treatments. All remaining eggs and any dead ravens found were collected and disposed of properly as per avicide management protocol. Raven take will be estimated at 1 raven per 11 eggs gone (Coates et al. 2007).

Great Sage-Grouse Monitoring

Leks are counted a minimum of four times from March to May each year. Counts are conducted from 30 minutes before sunrise to 1.5 hours after sunrise. Greater Sage-grouse are marked with ATS VHF transmitters, and throughout the nesting and brood-rearing periods are located at least twice per week. Greater Sage-grouse nests are monitored a minimum of three times per week and classified as successful, depredated, partially depredated, or abandoned. Since 2009, 39 nests have received camouflaged micro-cameras with time-lapsed video recorders to determine the outcome or to identify nest predators.

Development of Resource Selection Function (RSF)

Development of RSF analyses for raven habitat in Nevada will provide NDOW with information to more effectively understand raven population patterns across the state and to effectively implement management actions to reduce raven predation pressures on greater sage-grouse. The RSF mapping process is a data-driven approach that uses raven survey data and multiple environmental factors, including spatial land cover types at multiple spatial scales, edge (interface between two land cover types) indices, energy infrastructure, and other anthropogenic subsidies to determine the landscape parameters for which ravens select. The USGS has recently carried out this habitat mapping approach for ravens within the Idaho National Laboratory in southeastern Idaho (Coates et al. 2014).

Recommendations

Fund subproject 21-02 through FY 2016.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$50,000	N/A	$50,000

Project 22: Mule Deer-Game Enhancement

This is an overarching project description with four subprojects to implement or experiment with aspects of predation management to increase predator management efficacy.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation and Experimental Management

Project Goal

Enhance mule deer and other game populations where they may be at risk, experiencing chronic low recruitment, or catastrophic decline.

Anticipated Results

1. The removal of predators is intended to result in enhancement of mule deer and other big game populations.
2. Further data collection and analysis will determine the effectiveness of this project and direct wildlife management policy in the future.

Potentially Impacted Species

Coyote, mountain lion, mule deer, bighorn sheep, antelope, Greater Sage-grouse

Span More Than One Fiscal Year

Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be suppressed by abiotic factors such as dry climate and loss of quality habitat. Under these conditions, predation may be a regulating factor.

Project Area

Statewide, where determined appropriate

Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, fawning, and browsing habitat.

Comments from FY 2015 Predator Report

None

Introduction

In 2009, Project 22 was initiated statewide to provide flexibility and opportunity to respond quickly to conditions on the ground that biologists believe could be adversely affecting population trajectory of specific mule deer populations and other big game populations.

Methods

NDOW funds Wildlife Services and private contractors to remove predators given the constraints of weather, time, and available funding using aerial gunning, hounds, calling, call boxes, shooting, foot-hold traps, and snares to accomplish the treatment. Selective and timely management work focused on critical seasonal big game ranges. The timing of management work will be in accordance with individual project criteria, but occur primarily on critical winter ranges and summer fawning areas or in release-augmentation areas.

Recommendations

Project 22 should be phased out after completion of sub projects.

Subproject 22-01: Mountain Lion Removal to Protect California Bighorn Sheep

Justification

Lethal removal of mountain lions will allow reintroduced bighorn sheep populations to reach sustainable levels.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation

Project Goals

1. Remove mountain lions to proactively protect reintroduced California bighorn sheep.

Anticipated Results

Decrease predation from mountain lions for all age classes of reintroduced California bighorn sheep, resulting in an established, viable population.

Potentially Impacted Species

California bighorn sheep, mountain lion, mule deer

Span More Than One Fiscal Year

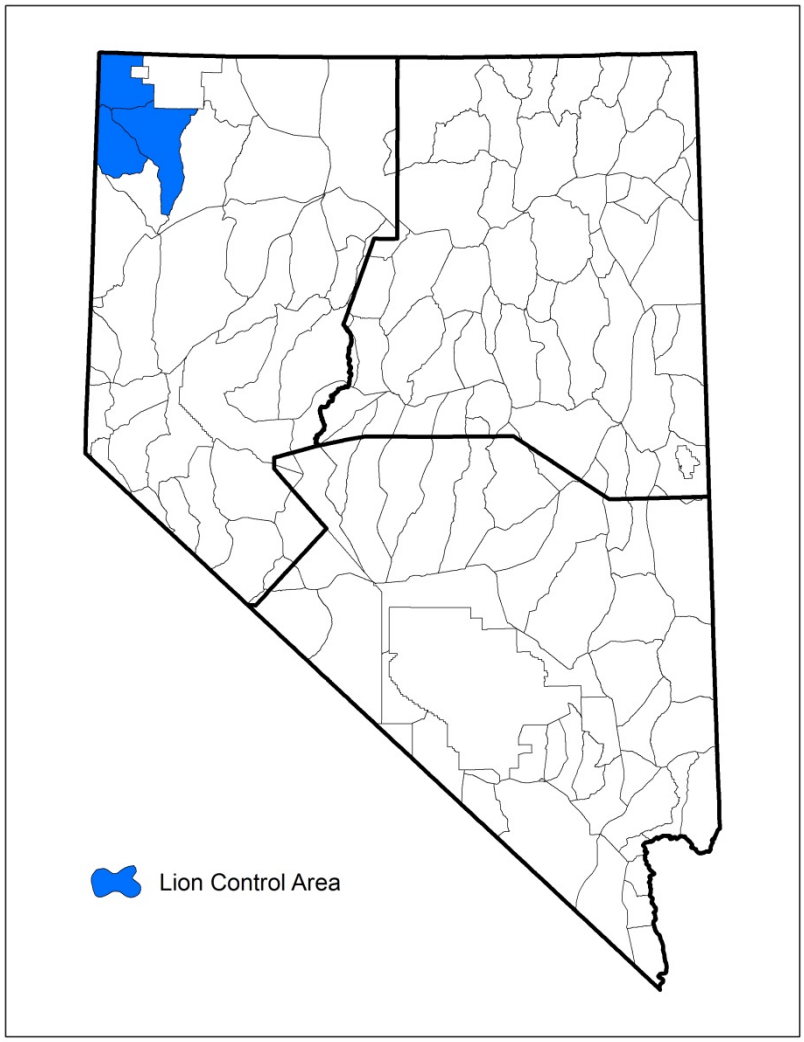
Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for bighorn sheep and other big game, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat.

Project Area

Washoe County in Units 011, 012 and 013.



Introduction

Attempts have been made to establish a California bighorn sheep population in Area 01. Significant levels of mountain lion-induced mortality have been observed. California bighorn sheep populations may require a reduction in mountain lion densities to reach population viability.

Methods

NDOW biologists and Wildlife Services will collaborate to identify current and future California bighorn sheep locations and determine the best methods to reduce California bighorn sheep mortality. Mountain lion traps, snares, baits, and call boxes will be set to proactively capture mountain lions as they immigrate into the defined sensitive areas.

Recommendations

Fund subproject 22-01. Evaluate efficacy of subproject 22-01 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$45,000	N/A	$45,000

Subproject 22-16 Coyote Den Density Effects on Mule Deer Fawns and Other Wildlife Species

Justification

Understanding coyote den densities will allow for testing the efficiency of locating and removing coyotes from dens in future years. Lethal removal is intended in future fiscal years.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Experimental Management and Implementation (Future Years)

Project Goals

1. Determine the number of active coyote dens in the Monitor Mountains and the diet of pups at discovered dens.
2. Determine the density, abundance, and/or occupancy of prey species in the Monitor mountains including lagomorphs, sage-grouse, and mule deer.
3. Determine the occupancy of coyotes and other predators in the Monitor Mountains.

Anticipated Results

1. Understand how the increased caloric requirements to support young influences dietary selection of parental coyotes for prey species including mule deer fawns and other wildlife species, ultimately influencing population level effects on prey.
2. Determine the number of coyote dens across the landscape, the number of coyote dens in sensitive mule deer fawning habitat, and calculate the effort for effective management.
3. Determine efficacy of removing specific pairs of coyotes to benefit recruitment of mule deer and benefit other wildlife species (future years).

Potentially Impacted Species

Coyote, mule deer

Span More Than One Fiscal Year

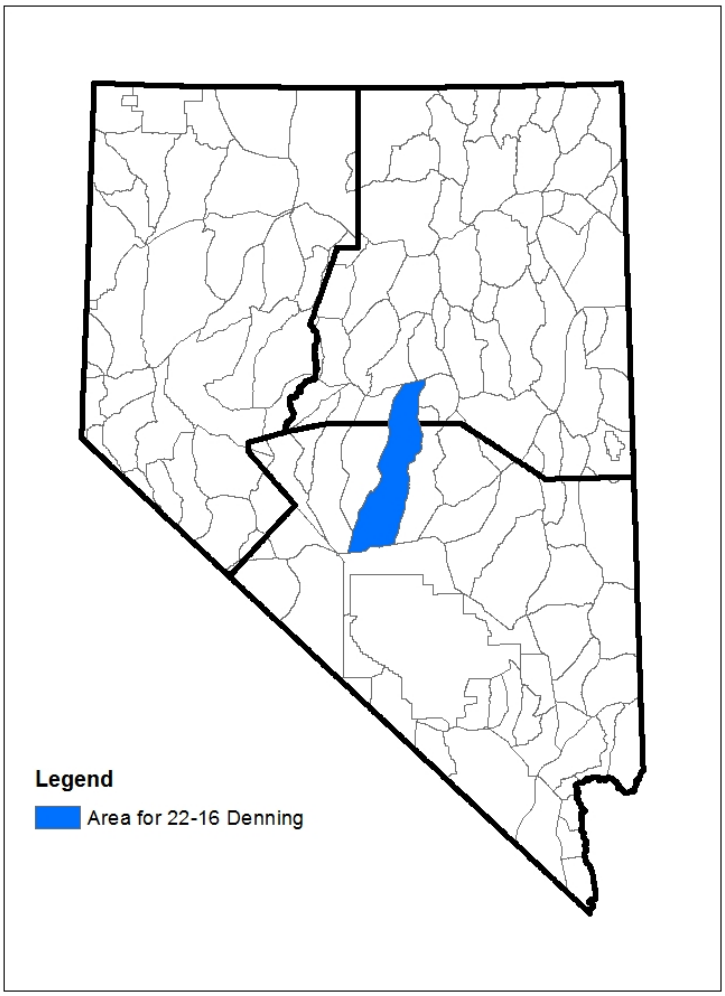
Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat. Under these conditions, predation may become a regulating factor.

Project Area

Monitor Mountains in Unit 162



Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, fawning, and browsing habitat.

Comments from FY 2015 Predator Report

To experiment with the best way to discover coyote den locations two methods were tested; forward looking infrared (FLIR) and ground searches with a contractor to locate dens. FLIR systems have been used to find a wide array of wildlife species. FLIR searches have also been able to find other species den entrances. Unfortunately, Owyhee Air was not able to find any coyote dens during this search. Until further advances are made elsewhere using FLIR searches to find coyote dens, NDOW will not use this technique. A private contractor was able to locate one active den during a week of ground searches.

Introduction

Coyotes face an increase in caloric need when raising pups, both through an increase in parent energetic output and feeding growing pups. In some instances, parent coyotes have been found to be exclusively responsible for domestic sheep predation; removing coyote pups from dens or preventing parents from breeding has reduced predation on domestic livestock (Till and Knowlton 1983, Sacks et al. 1999, Seidler et al. 2014). Parent coyotes and their pups may consume a substantially different diet than their non-parent counterparts at the same time of year. This difference in diet likely requires larger prey, including mule deer fawns. Removing parental coyotes may increase mule deer and other wildlife species reproductive output, potentially allowing managers to be more selective in predator removal efforts.

Methods

Coyote dens will be found using a private contractor who specializes in coyote denning. Lagomorph densities will be estimated driving road transects, using spotlights to detect individuals (Smith and Nydegger 1985, Ralls and Eberhardt 1997). Sage-grouse will be monitored through lek counts and wing counts. Mesopredators and mountain lion occupancy will be estimated using camera traps placed in a grid system (Mann et al. 2014).

Recommendations

Fund subproject 22-16 through FY 2020. Evaluate efficacy of subproject 22-16 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$40,000	$120,000	$160,000

Subproject 22-074: Mountain Lion Removal for the Protection of Rocky Mountain Bighorn Sheep

Justification

Lethal removal of mountain lions will allow reintroduced Rocky Mountain bighorn sheep populations to reach sustainable levels.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation and Experimental Management

Project Goal

1. Remove mountain lions within close proximity of Rocky Mountain bighorn sheep to allow for population growth. This removal will be implemented only in association with populations that are being affected negatively by mountain lion predation as determined by the best available biological evidence.

Anticipated Result

1. Decrease predation from mountain lions for all age classes of Rocky Mountain bighorn sheep.

Potentially Impacted Species

Rocky Mountain bighorn sheep, mountain lion, mule deer

Span More Than One Fiscal Year

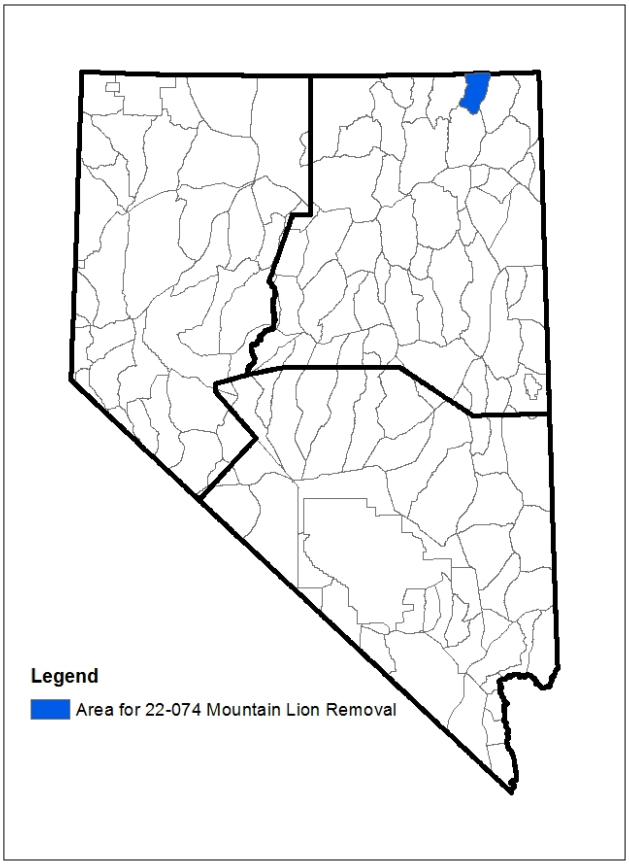
Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can suppressed by abiotic factors such as dry climate and loss of quality habitat.

Project Area

Unit 074



Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, lambing, and browsing habitat.

Comments from FY 2015 Predator Report

None

Introduction

The Unit 074 Rocky Mountain bighorn sheep herd experienced a die-off in 1999. Two years following the die-off the lamb recruitment was low, remaining consistent with bighorn sheep die-offs. Since then the average lamb recruitment has been 48 lambs:100 ewes. This level of recruitment should have resulted in an increasing sheep herd; however sheep numbers have remained stagnant.

The Contact area is a major deer winter range. It is possible that mountain lions following the deer herd to winter range from the nearby Jarbridge mountains are remaining after the deer have left in the spring and switching their diet to bighorn. Some mountain lions may be staying in the area on a year-round basis with their primary food source being Rocky Mountain bighorn sheep.

Methods

Removals will be conducted in winter months to take advantage of snow conditions. Removals will be conducted with mountain lion hounds.

Recommendations

Fund subproject 22-074. Evaluate efficacy of subproject 22-074 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$45,000	N/A	$45,000

Project 32: Mountain Lion, Black Bear, and Mule Deer Interactions

Justification

Black bears are expanding numerically and geographically, and in so doing they are recolonizing historic ranges in Nevada. It is imperative to understand to what extent this increasing distribution is affected by their interactions with lions. Black bear interactions with mountain lions at kill sites could potentially have effects on mule deer populations, and possible implications on livestock husbandry practices.

Project Manager

Jon Beckmann, Wildlife Conservation Society

Project Type

Experimentation

Project Goals

1. Increase understanding of apex predator resource partitioning, competition, and commensalism in desert ranges where black bears have established territories recently that overlap those of mountain lions.
2. Determine if mountain lion predation rates on mule deer increase in areas occupied by black bears.
3. Determine if mountain lion conflicts with humans increase where black bears are present (i.e., prey switching to less energetically expensive prey such as domestic livestock).

Anticipated Results

1. Improved understanding of mountain lion and bear dietary preference, dietary overlap and prey switching capabilities will provide insight for better big game population management.
2. Targeted predator population management could improve attendant big game population management which has implications for big game tag allocation.
3. Mountain lion subsidies may increase black bear recolonization eastward into Nevada, which could have direct implications on future management decisions.
4. Use field-based, scientific data to understand, predict, and potentially mitigate, changes in human-lion conflict where bears are re-establishing historic ranges.

Potentially Impacted Species

Mule deer, mountain lion, black bear

Span More Than One Fiscal Year

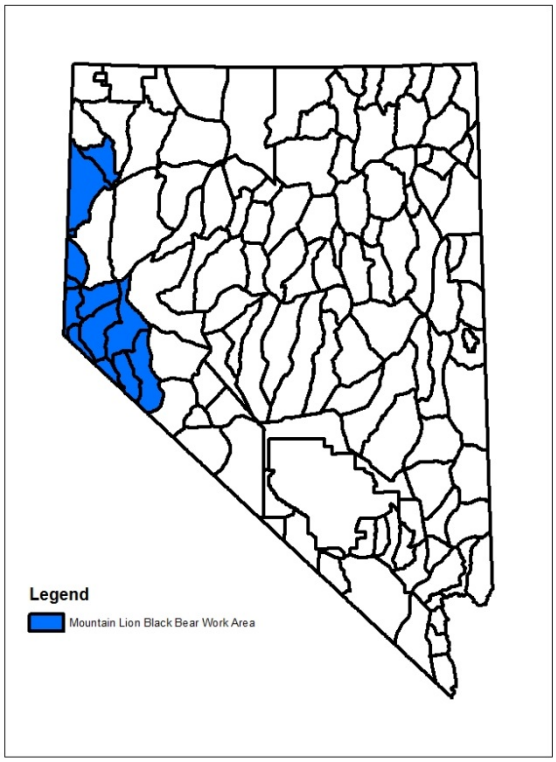
Yes

Limiting Factor Statement

Black bears have expanded their distribution in western Nevada recently to include historical bear habitat in desert mountain ranges east of the Sierra Nevada and Carson Front (Beckmann and Berger 2003, Lackey et al. 2013). Additionally, recent findings have shown during summer months 50% of mountain lion killed deer are scavenged by black bears (Andreasen 2014, unpublished data). The current recolonization of historical bear habitat provides a unique opportunity to determine if these interactions between black bears and mountain lions are subsidizing the bear population increase.

Project Area

Units 014, 015, 021, 192, 194, 195, 196, 201, 202, 203, 204, 291



Habitat Conditions

The study area consists of mountain ranges and associated basins that are characterized by steep topography with high granite peaks and deep canyons. Mountain ranges are separated by desert basins that range from 15–64 km across (Grayson 1993). These basins are often large expanses of unsuitable habitat (e.g., large areas of sagebrush) that bears and lions do not use as primary habitat.

Comments from FY 2015 Predator Report

None

Methods

A minimum of 18 black bears and 18 mountain lions, will be captured and fitted with Vectronic brand GPS PLUS collars with proximity sensors to assess behavioral responses of each species upon close interaction. We will attempt to maintain sample sizes of six bears and six mountain lions collared in each of our three study areas for five years. To further maximize probability of recording predator-predator interactions, we will monitor kill sites of collared mountain lions with real-time trail cameras and target black bears scavenging from lion kills for collaring with GPS proximity collars. Sixty mule deer will be fitted with Vectronic brand GPS PLUS Vertex Survey collars to monitor daily survival of individuals and to estimate annual adult doe survival in each study area, this will be funded from a source other the predator fee monies.

Recommendations

Fund Project 32 through FY 2020. Evaluate efficacy of Project 32 annually (see appendix).

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$40,000	$120,000	$160,000

Project 37: Big Game Protection-Mountain Lions

Justification

Removing mountain lions that prey on sensitive game populations quickly is a required tool to manage big game populations statewide.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation

Project Goal

Remove specific, problematic mountain lions to benefit game species.

Anticipated Result

1. Lethal removal of individual, problematic mountain lions will provide a precise tool, protecting reintroduced and sensitive big game populations.
2. Implementation will occur in association with game populations that are sensitive (e.g., small in size, limited in distribution, in decline) and may benefit from rapid intervention from specific predation scenarios.

Potentially Impacted Species

Mountain lion, mule deer, bighorn sheep, antelope

Span More Than One Fiscal Year

Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat. Predation may become a regulating influence under these conditions.

Project Area

Statewide

Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, fawning, and browsing habitat.

Comments from FY 2015 Predator Report

N/A

Introduction

In some circumstances, culling of top predators is beneficial for protection of newly translocated big-game populations, small and isolated big-game populations, or big-game populations held below carrying capacity by predation (Hayes et al. 2003, Rominger et al. 2004, McKinney et al. 2006). The geographic range of mountain lions is larger than any big-game mammal in North and South America (Logan and Sweanor 2000), and specific areas may benefit from removal efforts that may target more than a single mountain lion.

Methods

Working with Wildlife Services, private houndsmen, and private trappers, NDOW will specify locations of mountain lions that may be influencing local declines of sensitive game populations. Locations will be determined with GPS collar points, trail cameras, and discovered mountain lion kill sites. Work will be implemented when population trends are detected, fawn to doe ratios fall below 30:100, problematic mountain lions are detected on trail cameras (i.e. at water sources) or area biologists have other biological evidence demonstrating mountain lion removal is necessary.

Recommendations

Evaluate efficacy of Project 37 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$90,000	N/A	$90,000

Project 38: Big Game Protection-Coyotes

Justification

Removing problematic coyotes quickly is a required tool to manage big game populations statewide.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation

Project Goal

Conduct focused coyote removal to protect game species.

Anticipated Result

1. Removal of coyotes in winter range and fawning areas in certain situations will provide a valuable tool for managers.
2. Implementation will occur during times and locations where sensitive game species are adversely affected (e.g., local decline, reduced recruitment) based on the best available biological information.

Potentially Impacted Species

Coyote, mule deer, antelope, Greater Sage-grouse

Span More Than One Fiscal Year

Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat. Predation may become a regulating factor under these circumstances.

Project Area

Statewide

Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, fawning, and browsing habitat.

Comments from FY 2015 Predator Report

N/A

Introduction

Coyotes face an increase in caloric need when raising pups, both through an increase in parent energetic output and feeding growing pups. Coyotes are known predators of mule deer and antelope, particularly fawns (Hamlin et al. 1984, Brown and Conover 2011). Removing coyotes may increase mule deer and other wildlife species reproductive output.

Methods

Wildlife Services and private contractors working under direction of NDOW, will use foothold traps, snares, fixed-wing aircraft and helicopters for aerial gunning, calling and gunning from the ground to remove coyotes in sensitive areas during certain times of the year. Work will be implemented when population trends are detected, fawn to doe ratios fall below 30:100, or area biologists have other biological evidence demonstrating coyote removal is necessary.

Recommendations

Fund Project 38. Evaluate efficacy of Project 38 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$90,000	N/A	$90,000

Project 40: Coyote Removal to Complement Multi-faceted Management in Eureka County

Justification

Continuing predator removal will complement previous coyote removal, feral horse removal, and habitat restoration to benefit mule deer populations.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation

Project Goal

To increase mule deer and sage-grouse populations by removing coyotes.

Anticipated Results

1. Coyote removal will complement feral horse removal already conducted by the BLM, habitat improvement conducted by Eureka County, private coyote removal funded by Eureka County, and Wildlife Service coyote removal funded through Wildlife Heritage funds in 2011 and 2012.

Potentially Impacted Species

Coyote, Greater Sage-grouse, mule deer

Span More Than One Fiscal Year

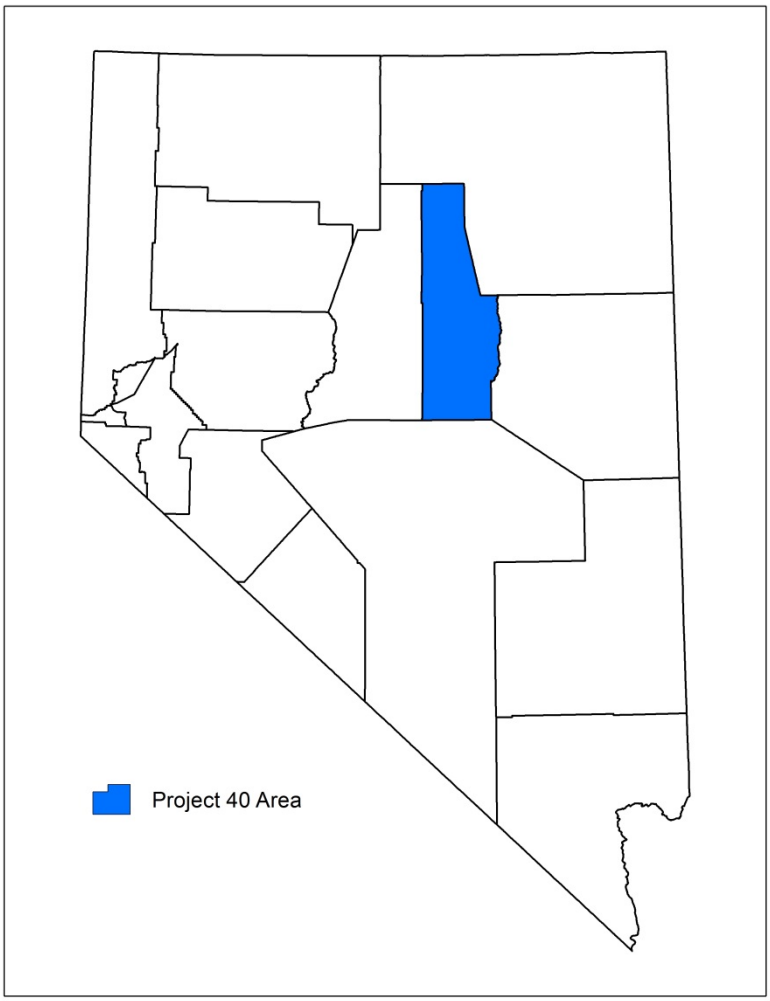
Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat.

Project Area

Diamond Mountains in Eureka County



Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, fawning, and browsing habitat.

Comments from FY 2015 Predator Report

N/A

Introduction

The BLM conducted a feral horse round-up in the Diamond Mountains in January 2013, removing 792 horses. Eureka County and the Eureka County Advisory Board to Manage Wildlife had crews with chain saws cut pinyon and juniper trees on private range lands in the Diamonds and Roberts Mountains in 2008, 2009, and 2011. Wildlife Services removed coyotes

in the area in 2011 and 2012. A private contractor removed coyotes in 2014. Continuing to remove coyotes may assist mule deer population recovery.

Methods

Wildlife Services and private contractors working under direction of NDOW and Washoe County, will use foothold traps, snares, fixed-wing aircraft and helicopters for aerial gunning, and calling and gunning from the ground to remove coyotes in sensitive areas during certain times of the year.

Recommendations

Fund Project 40. Evaluate efficacy of Project 40 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$60,000	N/A	$60,000

FY 2017 NEWLY PROPOSED PROJECTS

Project 41: Common Raven Management and Experimentation

Justification

Common ravens are the primary predator of Greater Sage-grouse nests and chicks. Their populations have increased dramatically in Nevada, primarily due to human subsidies. Understanding common raven density, distribution, and subsidy use will allow for intelligent management decisions to be made to reduce or alter raven distribution in Nevada.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Type

Implementation, Experimental Management, and Experimentation

Project Goal

Increase understanding of common raven density, distribution, and subsidy use to maximize common raven management effectiveness.

Anticipated Results

1. Develop a protocol to estimate common raven populations in Greater Sage-grouse habitat, and monitor these populations.
2. Increase the understanding of common raven density and distribution in the state of Nevada, and how human subsidies increase common raven density and distribution.
3. Increase the understanding of how human subsidies affect common raven movements and space use, particularly near Greater Sage-grouse leks and nesting areas.
4. Develop recommendations to utility companies on how to reduce common raven nests in utility lines.
5. Develop recommendations for livestock producers and agriculture growers to reduce common raven subsidies.

Potentially Impacted Species

Greater Sage-grouse, Common Raven

Span More Than One Fiscal Year

Yes

Limiting Factor Statement

Though predation is a naturally occurring phenomenon for Greater Sage-grouse, their populations can be reduced or suppressed by abiotic factors such as dry climate and loss of quality habitat. They may also be reduced by an artificially high level of common raven predation.

Project Area

Statewide

Habitat Conditions

Persistent drought throughout Nevada has reduced herbaceous cover, along with nesting and brood rearing habitat.

Comments from FY 2015 Predator Report

N/A

Methods

Population monitoring and space use

Point counts for common ravens will be conducted from March through July of each year, which corresponds with sage-grouse nesting and brood-rearing season. Surveys will be similar to Ralph et al. (1995): lasting 10 minutes; conducted between sunrise and 1400; conducted under favorable weather conditions; and stratified randomly across study areas (Luginbuhl et al. 2001, Coates et al. 2014). A combination of ARGOS and GSM backpack transmitters will be deployed to monitor common raven space use.

Utility line surveys

Various utility lines will be identified in and near sage-grouse habitat from February until June of each year, which corresponds with common raven nesting and brood rearing. Surveys will be conducted from OHV vehicles, variables including utility pole type, cross arm type, utility pole height, insulator position, perch deterrent effectiveness, and proximity to Greater Sage-Grouse habitat will be recorded.

Recommendations

Fund Project 41. Evaluate efficacy of Project 41 annually.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$25,000	$75,000	$100,000

PROJECTS RECOMMENDED FOR DISCONTINUATION

Project 35: Using Genetic Testing to Identify Origin of Red Fox

Justification

Exotic red fox populations may be increasing in Nevada, which can negatively affect Greater Sage-grouse populations. Understanding this increase to properly manage and potentially reclassify red fox populations is imperative; red fox may disproportionally affect the Bi-State population of Greater Sage-grouse.

Project Manager

Russell Woolstenhulme, Nevada Department of Wildlife

Project Goals

1. Determine if European red fox are spreading and hybridizing with native Sierra Nevada red fox.
2. Determine potential zones of occupation for any delineated populations.
3. Potentially make recommendations to reclassify red fox in the state of Nevada to unprotected.

Potentially Impacted Species

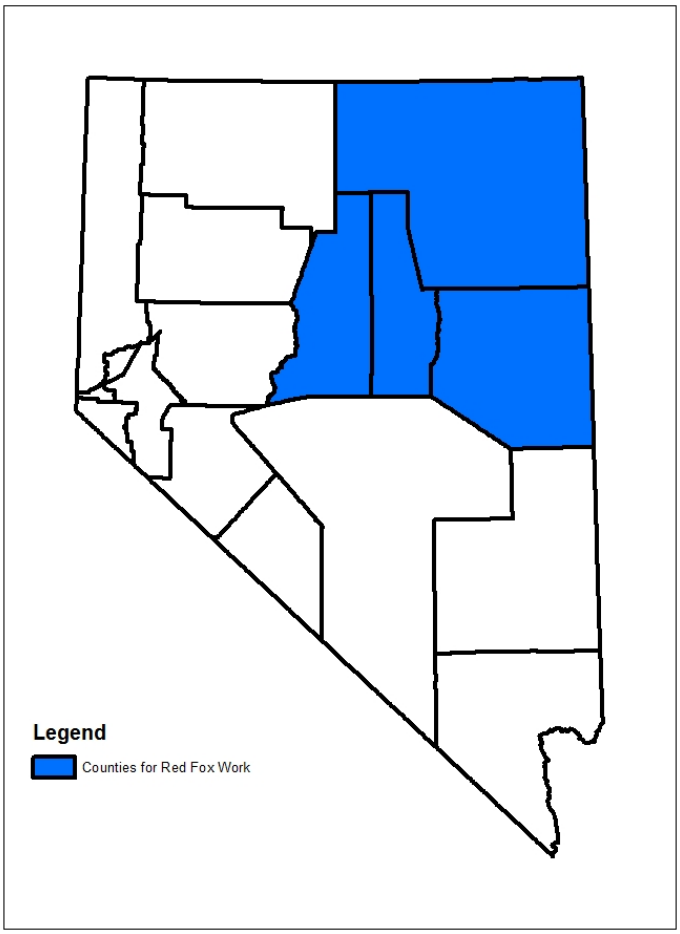
European red fox, Sierra Nevada red fox, Greater Sage-grouse

Span More Than One Fiscal Year

No

Project Area

Elko, White Pine, Lander, and Eureka counties



Recommendations

Terminate Project 35 as of 30, June 2016.

Budget

$3 Predator Fee	**Pittman-Robertson**	**Total**
$2,500	$7,500	$10,000

Project 39: Predator Education

Justification

Educating the public about predator habits will reduce human-wildlife interactions, and participation with waste management. Public support and participation will benefit future predator management activities, and potentially reduce common raven densities through removal of human subsidies.

Project Manager

Pat Jackson, Nevada Department of Wildlife

Project Goals

1. To educate the public about predator issues, biology, and management.
2. To decrease predator populations through public participation.

Potentially Impacted Species

Common raven, Greater Sage-grouse

Project Area

Statewide

Recommendations

Terminate Project 39 as of 30 June 2016.

Overall FY 2016 Budget

Project	$3 Predator Fee	PR Funds	Total
Department of Agriculture Administrative Support Transfer[a]	$14,000	N/A	$14,000
Project 21: Greater Sage-Grouse Protection (Common Raven Removal)	$78,000	N/A	$78,000
Subproject 21-02: Common Raven Removal and Greater Sage-Grouse Nest Success	$50,000	N/A	$50,000
Subproject 22-01: Mountain Lion Removal to Protect California Bighorn Sheep	$45,000	N/A	$45,000
Subproject 22-16 Coyote Den Density Effects on Mule Deer Fawns and Other Wildlife Species	$40,000	$120,000	$160,000
Subproject 22-074: Mountain Lion Removal and Diet Analysis for the Protection of Rocky Mountain Bighorn Sheep	$45,000	N/A	$45,000
Project 32: Mountain Lion, Black Bear, and Mule Deer Interactions	$40,000	$120,000	$160,000
Project 37: Big Game Protection-Mountain Lions	$90,000	N/A	$90,000
Project 38: Big Game Protection-Coyotes	$90,000	N/A	$90,000
Project 40: Coyote Removal to Complement Multi-faceted Management in Eureka County	$60,000	N/A	$60,000
Project 41: Nonlethal Common Raven Management and Experimentation	$25,000	$75,000	$100,000
Total[b]	**$577,000**	**$315,000**	**$892,000**

[a] This transfer of $3 predator fees for administrative support to the Department of Agriculture partially funds state personnel that conduct work for the benefit of wildlife at the direction of USDA Wildlife Services (e.g., mountain lion removal to benefit wildlife).

[b] The projects that contain limited lethal removal as a primary aspect, making them ineligible for Federal Aid funding.

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Appendix

http://www.ndow.org/Public_Meetings/Commission/Agenda/