Nevada Department of Wildlife

Predation Management Status Report

FY2017

State of Nevada

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Table of Contents

Executive 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 NDOW'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." Provisions outlined in NRS 502.253 authorize the collection of a $3 fee for each big game tag application, deposition of the revenue from such a fee collection into the Wildlife Fund Account, and use by NDOW to 1) develop and implement an annual program for the management and control of predatory wildlife, 2) conduct wildlife management activities relating to the protection of nonpredatory game animals and sensitive wildlife species, and 3) conduct research necessary to determine successful techniques for managing and controlling predatory wildlife. This statute also allows for: the expenditure of 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 Nevada Board of Wildlife Commissioners; and provide that unspent monies remain in the Wildlife Fund Account and do not revert to State General Funds at the end of any fiscal year.

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, non-lethal management of predator or corvid populations, habitat management to promote more robust prey populations which are better able to sustain predation, monitoring and modeling select predator populations, managing for healthy predator populations, and public education, although not all of these aspects are currently eligible for funding through predator fee dollars. NDOW intends to use predator management on a case-by-case basis, with clear goals, and based on an objective scientific analysis of available data. To be effective, predator management should be applied with proper intensity and at a focused scale. Equally important, when possible projects should be monitored to determine whether desired results are achieved. This approach is supported by the scientific literature on predation management. 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.

In FY2017, 11 projects were included in the planned activities, with each project having committed funding. Included in NDOW's ongoing work is Greater sage-grouse protection (Project 21 and Project 21-02), bighorn sheep protection (Project 22-01, Project 22-074, and Project 37), pronghorn protection (Project 38), mule deer protection (Project 40) and waterfowl, turkey, and pheasant protection (Project 43).

Nevada Department of Wildlife spent $650,013 on lethal predator removal during FY2017. This accounted for 113.2% of FY 2015 revenues.

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

Common raven (thereafter raven) control efforts to conserve Greater sage-grouse commenced in early March and extended throughout June 2017. The objective of this project is to increase Greater sage-grouse nest success and recruitment. USDA Wildlife Services (WS) performed raven control work through the placement of corvicide (DCR-1339) injected chicken eggs within occupied Greater sage-grouse habitats. The main treatment areas consisted of eastern and northeastern Nevada in situations where concentrations of ravens have been noted and where habitat has been compromised, potentially by wildfire or anthropogenic subsidies (e.g. landfills and transfer stations). Another treatment area, the Virginia Mountains in western Nevada, is being used as an experimental area and details of that project are reported below (Project 21-02).

Through the efforts of USDA WS personnel, an estimated 2,381 ravens were removed during spring 2017. The total number of ravens taken for Project 21, Project 21-02, and Project 43 was 2,500, which is the maximum that NDOW can remove under the current USFWS depredation permit (#MB37116A-0). Ravens were removed in 11 game management areas during the spring of 2017 under Project 21 and Project 21-02.

Raven take by Management Area (MA) FY2017.

Area	Ravens Removed
MA 3	139
MA 6	71
MA 7	272
MA 8	36
MA 10	79
MA 11	75
MA 14	364
MA 15	273
MA 20	89
MA 22	583
MA 23	400
Total Ravens	2,381

Department Comments on Project

Raven management, including lethal removal, is imperative to maintain and improve Greater sage-grouse and the ecosystems they depend on. NDOW recommends continuing Project 21 while ravens are believed to be a limiting factor for Greater sage-grouse.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$78,000	N/A	$44,432	$0	$37,170	$11,998	**$93,600**

Project 21-02: Common Raven Removal to Enhance Greater Sage-grouse Nest Success

Work was initiated during March and extended throughout May 2017 to monitor the efficacy of raven control on the resident Greater sage-grouse population within the Virginia Mountains, located in southern Washoe County. Over a 2.5-month period, USDA WS deployed corvicide-treated eggs within previously identified Greater sage-grouse nesting habitats located around Sheep Springs, Spanish Flat, and lower Cottonwood Creek. An estimated 83 ravens were removed during the spring months.

reater sage-grouse monitoring work is being conducted by the USGS Western Ecological Research Center. Seven years of baseline monitoring work have been conducted on this population to determine various vital rates and vegetative parameters in used versus random sites across multiple life phases. The information presented below provides summaries of the USGS field crew efforts from March through July 2018.

USGS Sage-grouse Monitoring Report

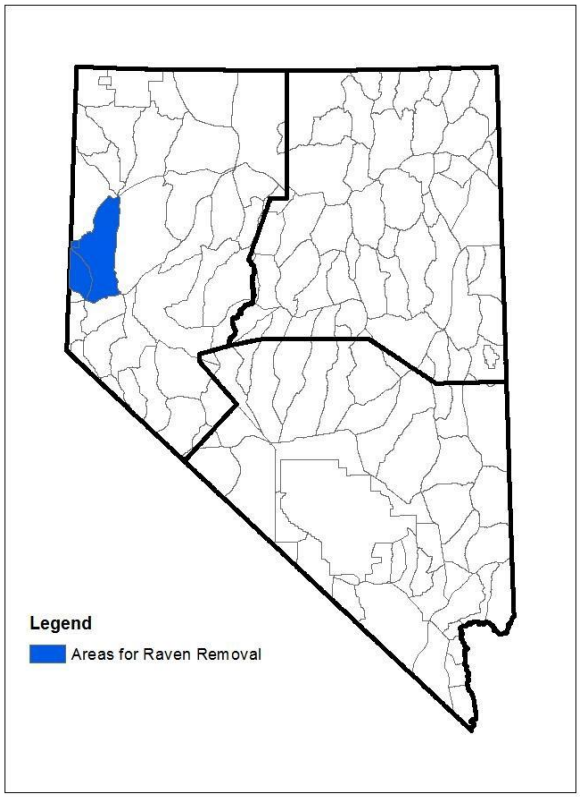
The USGS has provided a summary report (Appendix) for Greater sage-grouse monitoring and survival conducted in the Virginia Mountains. The monitoring portions of this project were not paid for with $3 predator fee. The USGS states:

"This information is preliminary and is subject to revision. It is being provided to meet the need for timely best science. The information is provided on the condition that neither the U.S. Geological Survey nor the U.S. Government may be held liable for any damages resulting from the authorized or unauthorized use of the information."

Department Comments on Project

The area experienced an unplanned, large scale fire in 2017. To better understand the effects of the fire and raven removal on sage-grouse populations, NDOW supports continuing this project until 2019.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$25,000	N/A	$25,242	$0	$0	$11,998	**$37,240**


Legend
Areas for Raven Removal

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

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

Between July 1, 2016 and June 30, 2017, 3 mountain lions were removed by USDA WS in Unit 013. Mountain lion removal efforts were made by a private contractor in Unit 011, no mountain lions were removed. The private contractor submitted the Annual Predator Management Project Reporting Form (Appendix).

Ten GPS collars for bighorn sheep were purchased during FY2017. Five GPS collars will be deployed in Unit 011, 5 in Unit 013 during FY2018.

California Bighorn Herd Health (Biologist III Chris Hampson)
Unit 011 and Unit 013 – Massacre Rim and Coleman Rim Herds
The most recent helicopter surveys for California bighorn sheep within hunt units 011 and 013 occurred during August 2017. Twenty-nine sheep were located on the flight. The resulting composition ratio for the sample was 61 rams:100 ewes:50 lambs. Most sheep were located in the Hays Canyon Range of Unit 013. Unit 011 was only partially flown due to time constraints. Ground surveys will continue into the winter months.

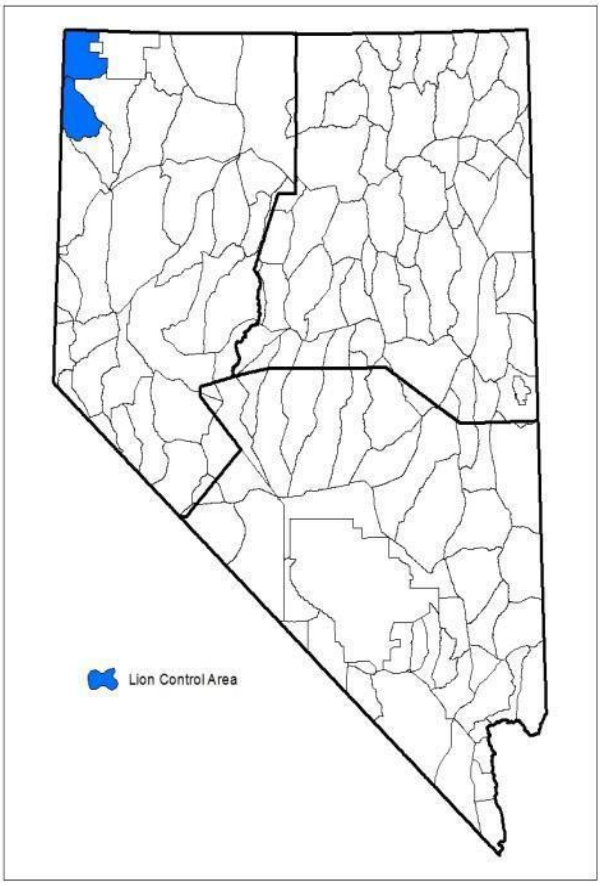
Observations for both units included 8 rams (aged yearling to 5 years of age), 15 ewes, and 8 lambs. The sample provided us a good look at recruitment for this year and indicates excellent survival of lambs to this point in their annual life cycle.

Four telemetry collars remain active within the two units to help document sheep movement and survival (3 in Hays Canyon, 1 on Massacre Bench). The telemetry collars also identify when mortalities occur and allow biologists to respond quickly to any mortality event. No mortalities of radiocollared bighorn sheep have occurred during this reporting period.

Bighorn populations within the Hays Canyon Range of Unit 013 appear to be on an upward trend with very good lamb survival. The Massacre Rim and Coleman Rim populations within Unit 011 appear to be stable to slightly increasing. The Coleman Rim sub herd on the Nevada side of the state line appears to be doing well and substantive interchange with the sheep population on the Oregon side of the state line is known to occur.

Department Comments on Project
NDOW supports continuing Project 22-01 until the local bighorn sheep populations reach viability as defined in the annual Predator Plan.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$90,000	N/A	$84,927	$1,800	$9,078	$11,998	**$107,803**


Lion Control Area

Project 22-074: Monitor Rocky Mountain Bighorn Sheep for Mountain Lion Predation

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 typical 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 bighorn sheep herd; however the population rebound has not occurred.

The Contact Area is a major deer winter range. It is possible that mountain lions following the deer herd from summer range in the Jarbidge Mountains to winter range switch their diet to bighorn sheep when deer return to their summer range. Some mountain lions may be staying in the area on a yearlong basis with their primary food source being Rocky Mountain bighorn sheep.

No mountain lion removal efforts were conducted during FY2017. Five GPS collars were purchased for bighorn sheep that will be deployed in FY2018.

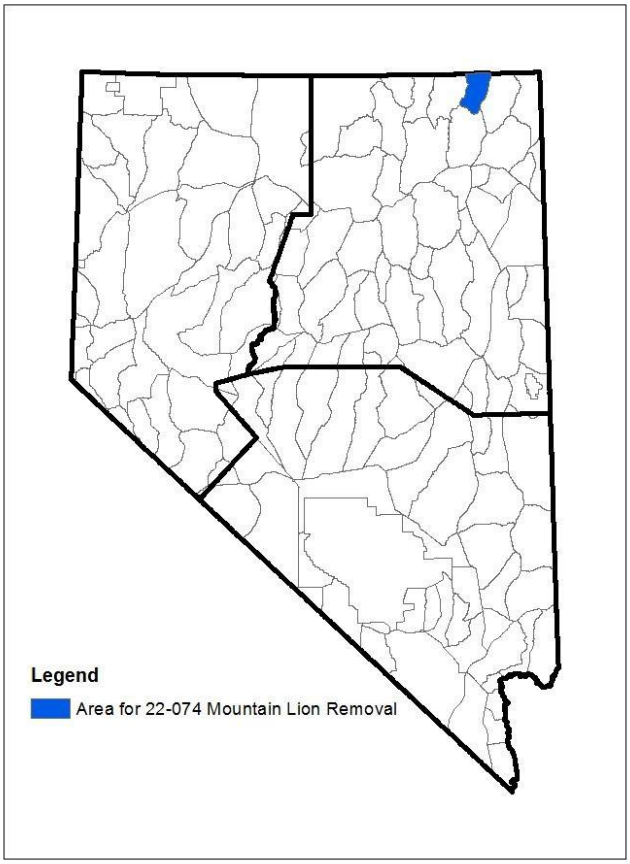
Bighorn Sheep Herd Health (Biologist III Kari Huebner)

On October 20, 2016, 18 bighorn sheep were classified in the Contact herd. Observations included 11 ewes (including 2 yearling ewes), 4 lambs, and 3 rams (2 yearlings and one mature). In July 2016, 14 bighorn sheep were observed on Ella D Mountain. The group consisted of 8 ewes (including the two radiocollared ewes and an unmarked yearling ewe), 3 lambs, and 3 young rams. An additional aerial composition survey will be conducted in October 2017. Most radio collars died due to battery failure, but 2 GPS radio collars on ewes are still functional. Five additional collars have been purchased and will be deployed in January 2018. The population likely numbers between 15-20 sheep. Recruitment is still low, but improving.

Department Comments on Project

NDOW supports continuing Project 22-074 until the local bighorn sheep reaches population viability as defined in the annual Predator Plan.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$90,000	N/A	$0	$0	$4,557	$11,998	**$16,555**


Legend
Area for 22-074 Mountain Lion Removal

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

NDOW technicians collected kill site data on 6 mountain lions, and visited 192 kill sites in fiscal year 2017. WCS did not provide an annual report, but WCS will provide a final report for FY2018 because the project is being discontinued. Peer-reviewed publications are expected.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$40,000	$120,000	$0	$0	$181,346	$11,998	**$193,344**

Department Comments on Project

End Project 32. Begin a project, passive in nature, to estimate the black bear population throughout the inhabited portions of Nevada.

Project 37: Big Game Protection-Mountain Lions

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.

Three contracts were formed with private contractors to remove mountain lions statewide. The Annual Predator Management Project Reporting Forms for Project 37 may be found in the Appendix of this document.

An underperforming population of bighorn sheep currently exists in Unit 115. In response, USDA WS unsuccessfully attempted to lethally remove mountain lions during FY2017. A private contractor lethally removed 3 mountain lions in the Ruby Mountains, another private contractor removed 7 mountain lions from the Snowstorm Mountains and 2 from the East Humboldt Mountain, a third private contractor removed 5 mountain lions in the Jackson Mountains and 2 mountain lions from the Delamar Range, all for the protection of bighorn sheep.

Five GPS collars were purchased to deploy on mountain lions in areas surrounding the Delamar Range. These data will increase understanding of mountain lion space use and prey selection, allowing for more efficient future lethal removal.

Bighorn Sheep Herd Health (Biologist III Matt Jeffress)
As of summer 2017 there are 16 ewes, 9 lambs and about 15 rams on the Snowstorms. The year 2016 marked the third year of recruitment with 6-yearling California bighorn sheep observed in May 2017 (3 yearling ewes and 3 yearling rams). A combination of marked animals well distributed throughout occupied range, weeklong spring and summer ground surveys and a January–February test for Movi and cull experiment has resulted in a reliable estimate of the current population.

In late 2015 and early 2016, NDOW sampled and marked all remaining ewes on the Snowstorms. Marked animals have allowed NDOW to continue monitoring Snowstorm California bighorn sheep to assess herd performance with the removal of animals deemed to be "super shedders." Super shedders are defined as a ewe that is continually shedding *Mycoplasma ovipneumoniae* (Movi). Intermediate shedding ewes are those that can be re-infected with Movi after coming into contact with a super shedder, but clear the pathogen when they are separated from conically infected ewes. Non shedding ewes are characterized as ewes that were initially exposed to Movi, but no longer are susceptible to being re-infected. Per the test and cull protocol, any ewe that is found to be shedding Movi during 2 consecutive sampling efforts will be removed from the population and donated to a research facility.

Following the 2015–2016 sampling, 10 ewes that tested positive for Movi of 25 sampled. However 2 of the 25 evaded capture; both were previously marked. Going into the January 2017 test and cull portion of theproject, we had a target of 12 ewes to resample. One ended up dying sometime in late 2016 from unknown causes. This left us with 11 ewes to sample. The capture

crew caught 10 of the 11 ewes on day 1 of the 2017 trapping. All ten were sampled and placed in an NDOW trailer as samples were rushed to Washington Animal Disease and Diagnostics Laboratory (WADDL) in Pullman, WA. The one ewe on the Owyhee Bluffs that evaded capture on day 1 was eventually captured and sampled on the mountain on day 2. Because our volunteers had already left for WADDL with samples collected the previous day and we thought there was a good chance the Owyhee Bluffs ewe would not test positive a second time, we let her go. We believed the suspected super shedder on the Owyhee Bluffs was likely an intermediate shedder given the Owyhee Bluffs subherd consistently recruited lambs post die-off. Early afternoon of day 2 NDOW received the results from WADDL. Of the 10 ewes we had in the trailer 6 were classified as super shedders. We released all four of the non-shedding ewes on the mountain, 1 was driven to the South Fork Little Humboldt River and 3 were slung into Kelly Creek. When the second round of samples was obtained from WADDL we learned the suspected super shedder on the Owyhee Bluffs was in deed shedding Movi. This ewe was lethally removed in April.

Due to poor lamb recruitment values between 2011 and 2016 this herd has continued to decline since the initial die-off in 2011. The Snowstorm herd declined from 160 in early 2011 to approximately 65 by 2012. Through natural attrition and targeted removal this herd has further declined to approximately 30 adults in 2017. We acknowledge limited bighorn mortalities attributed to mountain lion predation has always occurred in the Snowstorms but never affected the sustainability of the herd. As part of this experiment, NDOW and NGO's have dedicated a great deal of time and funding to capturing and collaring animals, pathogen testing and tracking interactions among subherds. As part of the project, we are attempting to keep alive the remaining marked ewes for the next four years. Unfortunately, mountain lion predation on marked ewes will impact our research results, potentially compromising the ability for the bighorn herd to recover.

Bighorn Sheep Herd Health (Biologist III Caleb McAdoo)

During the 2016–2017 winter, mountain lion removal specifically targeting mountain lions adjacent to the Rocky Mountain bighorn sheep herds that had a high likelihood of preying on the bighorn sheep began. The bighorn sheep populations in each of these units have undergone disease events since 2009, which have had population-level effects resulting in populations less than 40 individuals.

Prior to mountain lion removal, 25 bighorn sheep (3rams, 17 ewes, and 5 lambs) were known to be occupying the contract area in Unit 101. No formal bighorn sheep surveys have been conducted for bighorn sheep post-mountain lion removal; however, a summer mountain goat survey yielded an incidental observation of 16 bighorn sheep (1 ram, 12 ewes, and 3 lambs). Winter bighorn sheep surveys are slated for January of 2018 and should provide more insight as to the status of the Unit 101 sheep herd.

Prior to mountain lion removal in Unit 102, 27 sheep, consisting of 7 rams, 11 ewes, and 9 lambs were observed in the area. No formal surveys have been conducted since the mountain lions were removed. Winter bighorn sheep surveys are slated for January of 2018 and should provide more insight as to the status of the Unit 102 sheep herd.

Bighorn Sheep Herd Health (Biologist III Cooper Munson)
Current mountain lion removal in the Delamar Mountains may result in higher recruitment of offspring of Desert bighorn sheep as well as mule deer. In FY2017 the 2 mountain lions that have been removed are on the Northern fringes of the distribution of sheep within the mountain range, but well within the year round occupied habitat of mule deer.

The Delamar mountains sheep herd has been a difficult hunt unit for managers as many sheep have been translocated into the range, with limited numbers of sheep maintaining permanent residency. Movements of sheep from the Delamars have been observed throughout the bordering ranges including, Pahrocs, Hikos, Meadow Valleys, Pahranagats, and Sheep mountain ranges. It is currently unclear if habitat selection factors or predation pressure may be the result of sheep movement. It is known that mountain lions do inhabit the rugged desert terrain of the Delamar Range throughout the year verified by photo surveillance and past predation events of radio marked sheep.

The anticipated GPS collaring of mountain lions in the area will greatly improve our knowledge of mountain lion movements throughout the Delamar Range and potentially many of the bordering mountain ranges. This will allow NDOW to selectively remove mountain lions that solely prey upon bighorn sheep or pose a greater risk to sheep within the Delamar Range.

The population model that is used for the Delamar Range also includes the North and South Hikos, and the South Pahrocs, but is divided from the other areas for hunting of bighorn sheep. It is assumed that ~ 45% of the modeled sheep population resides within the Delamar mountains. In 2013 the combined population estimate for hunt units 223 and 241was 253 individuals and estimated at 209 individuals for 2017. This modeled population estimate results in an 18% reduction in 4 years, although it is unknown if there may be disease factors contributing to the decline as well as predation events. Surveys were conducted in the Delamar Mountains in September of 2017 and resulted in the classification of 42 sheep consisting of 18 rams, 19 ewes, and 5 lambs.

Department Comments on Project
NDOW supports continuing Project 37 until local bighorn sheep populations become viable as defined in the annual Predator Report. NDOW supports the ability to remove mountain lions quickly.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$125,000	N/A	$28,261	$164,166	$15,748	$11,998	**$220,173**

Project 38: Big Game Protection-Coyotes

Coyotes face an increase in caloric need when raising pups, both through an increase in parent energetic output and feeding growing pups (Till and Knowlton 1983, Sacks et al. 1999, Seidler et al. 2014). Parent coyotes and their pups may consume a drastically 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 coyotes may increase mule deer fawn and other wildlife species reproductive output.

Upon approval of Project 38, game biologists with pronghorn management responsibilities were asked whether or not their pronghorn herds may be underperforming due to coyote predation. Areas where predation by coyotes could be a factor limiting pronghorn populations received removal efforts from USDA WS. From March through June USDA WS conducted coyote removal, primarily with helicopter for the benefit of pronghorn. Three hundred ten coyotes were removed.

Area	Coyotes Removed
MA 1	34
MA 6	27
MA 7	64
MA 10	76
MA 16	75
MA 20	10
MA 22	4
MA 23	15
MA 24	2
MA 29	3
Total	310

Department Comments on Project

NDOW supports continuing Project 38 until local pronghorn populations become viable as defined in the annual Predator Report. NDOW supports the ability to remove coyotes quickly.

$3 Planned Expenditures	**P-R Planned Expenditures**	**Wildlife Services Expenditures**	**NDOW Lethal Expenditures**	**NDOW Non-Lethal Expenditures**	**NDOW Salary, Travel, and Office**	**Total**
$125,000	N/A	$135,507	$0	$0	$11,998	**$147,505**

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

Mule deer populations in Diamond Mountains in Eureka County are believed to be underperforming due to competition with feral equids, pinyon-juniper expansion, and predation. To alleviate pressure on resources, 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 directed the removal of pinyon and juniper trees on private range lands in the Diamonds and Roberts Mountains in 2008, 2009, and 2011. USDA WS removed coyotes in the area in 2011 and 2012. A private contractor removed coyotes in 2014. On-going removal of coyotes may assist mule deer population recovery.

From July 2016 until June 2017 USDA WS conducted aerial gunning and trapping of coyotes in the Diamond Mountains, removing 593 coyotes and 1 mountain lion.

NDOW purchased and deployed 10 GPS collars for doe mule deer during FY2017. NDOW also had a contractor conduct 3 Forward Looking Infrared (FLIR) surveys (1 in FY2017, 2 in FY2018). The purpose of these surveys was to located collared mule deer does, and determine the presence/absence of fawns. NDOW believes this method has potential. Preliminary results will be discussed in the FY2018 Predator Report.

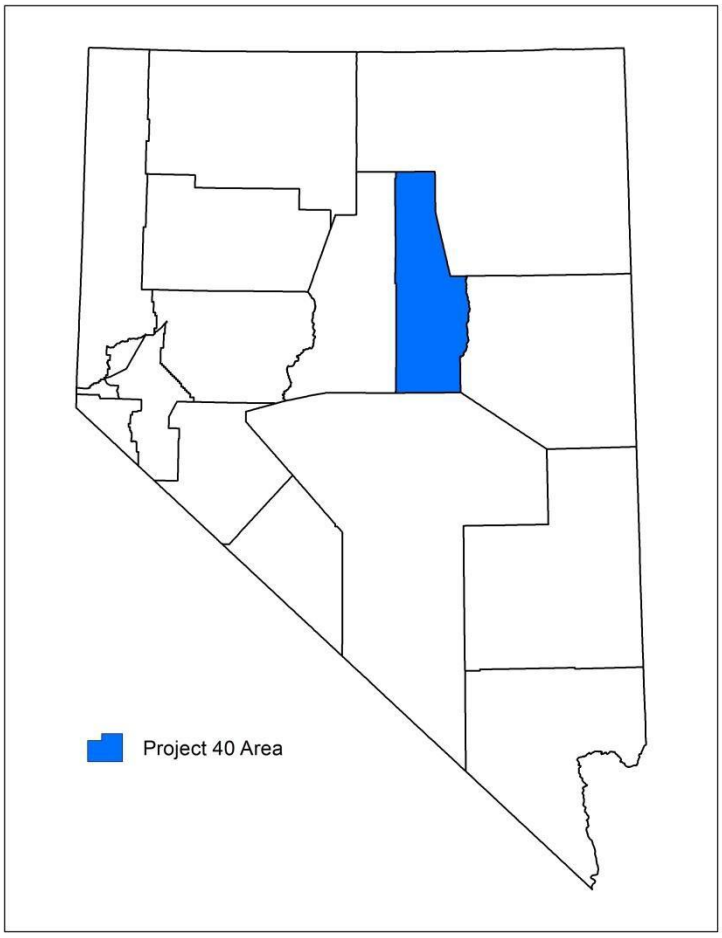
144 Deer Herd Health (Biologist III Clint Garrett)
The Diamond Range (Unit 144) coyote removal project (Project 40) focuses on deer wintering and fawning grounds to reduce the effects of potentially high concentrations of coyotes that may be suppressing mule deer below carrying capacity. Information is currently being collected to help determine these removal impacts to this deer herd.

Ten deer were radiocollared in January 2017 to help understand the connectivity between the Unit 144 deer herd and surrounding hunt units. Information gathered through this collaring effort can give a better understanding of limiting factors and seasonal use patterns that in turn would initiate habitat enhancement or predator projects for the future as well as recognize the success or failure of past projects. To date there have been 3 of the 10 collared does killed by mountain lions which occurred in March, June and July of 2017, all within Unit 144. As of August 2017 there are 6 radiocollared does remaining in Unit 144.

The Diamond Range is part of Management Area 14 and contains the majority of the mule deer for this hunt unit grouping. For MA14, the 2017 spring survey is above the previous 10 year average of 34 fawns:100 adults and slightly above the previous 5 year average of 39 fawns:100 adults. The past 5 year population estimate (2012–2016) is 4,000 deer with the 2016 and 2017 estimates being 4,100 and 4,200 respectively showing a slight increase in population and fawn recruitment.

Department Comments on Project
NDOW supports continuing Project 40 until mule deer populations become viable, as define in the annual Predator Plan.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$100,000	N/A	$109,432	$0	$0	$11,998	**$121,430**



Project 41: Increasing Understanding of Common Raven Densities and Space Use in Nevada

The common raven (*Corvus corax*) has been identified as the most common nest predator of Greater sage-grouse (*Centrocercus urophasianus*) (Coates et al. 2008, Lockyer et al. 2013). Although the raven is a natural predator of Greater sage-grouse nests (Schroeder and Baydack 2001), human subsidies, including food sources (e.g., roadkill (Kristan III et al. 2004, Coates et al. 2014*a*, *b*), landfills (William III and Boarman 2007, Peebles 2015) and artificial nesting structures (e.g., power and utility lines (Knight et al. 1995, Coates et al. 2014*a*, *b*, Howe et al. 2014), dramatically increased raven abundance as much as 1600% in some areas (Boarman 1993, Sauer et al. 2017). Increased raven abundance coupled with Greater sage-grouse habitat loss (Schroeder et al. 2004) and degradation (e.g., invasive species invasion (Commons et al. 1999, Baruch-Mordo et al. 2013, Coates et al. 2016), wildfire (Crawford et al. 2004, Lockyer et al. 2015) resulted in reduced or decreased Greater sage-grouse population growth in portions of its range (Klebenow 2001, Stiver 2011).

Raven Transmitters

In an effort to increase understanding of ravens throughout the state of Nevada, NDOW purchased 25 GPS transmitters to attach to ravens. A private contractor deployed 6 transmitters on ravens during FY2017 (Appendix). NDOW technicians were able to deploy another 20 transmitters, all on juvenile ravens. Juvenile ravens proved to be particularly susceptible to aggressive capture techniques. As of October 2017, 11 tagged ravens have died. Another 3 transmitters have gone offline.

Point Count Surveys

NDOW technicians conducted 616 raven and raptor point count surveys. These data will be part of the USGS' statewide population estimate.

Transmission line Surveys

NDOW technicians collected data on 110 miles of transmission lines and located a total of 48 nests.

Department Comments on Project

NDOW supports continuing Project 41. It is important to note this is a multiyear project, large findings, peer-reviewed publications, and new discoveries will likely not be available on an annual basis.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$100,000	$300,000	$0	$0	$255,611	$11,998	**$267,609**

Project 42: Assessing Mountain Lion Harvest in Nevada

No work was performed on Project 42 during FY2017. Please see Appendix.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$0	$0	$0	$0	$0	$0	**$0**

Project 43: Mesopredator Removal to Protect Waterfowl, Turkeys, and Pheasants on Wildlife Management Areas

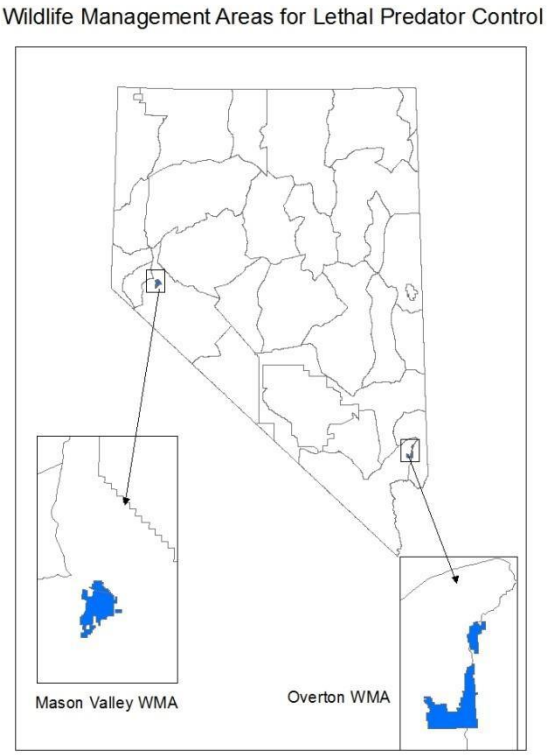
USDA WS conducted mesopredator removal for the benefit of primarily waterfowl and turkeys in Mason Valley and Overton Wildlife Management Areas in 2017.

Species	Mason Valley	Overton
Badger	0	2
Raven	198*	0
Coyote	22	10
Feral Cat	2	4
Mink	1	0
Raccoon	0	14
Stripped Stunk	1	1

*162 ravens were removed on USDA WS raven depredation permit.

Department Comments on Project
NDOW supports continuing Project 43.

$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$50,000	$N/A	$42,246	$0	$0	$11,998	**$54,244**



Overall Budget and Expenditures for FY2017

Project	$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office[b]	Total
Department of Ag Transfer[a]	$14,000	N/A	$14,000	$0	$0	$0	**$14,000**
Project 21	$78,000	N/A	$44,432	$0	$37,170	$11,998	**$93,600**
Project 21-02	$25,000	N/A	$25,242	$0	$0	$11,998	**$37,240**
Project 22-01	$90,000	N/A	$84,927	$1,800	$9,078	$11,998	**$107,803**
Project 22-074	$90,000	N/A	$0	$0	$4,557	$11,998	**$16,555**
Project 32	$40,000	$120,000	$0	$0	$181,346	$11,998	**$193,344**
Project 37	$125,000	N/A	$28,261	$164,166	$15,748	$11,998	**$220,173**
Project 38	$125,000	N/A	$135,507	$0	$0	$11,998	**$147,505**
Project 40	$100,000	N/A	$109,432	$0	$0	$11,998	**$121,430**
Project 41	$100,000	$300,000	$0	$0	$255,611	$11,998	**$267,609**
Project 42	$2,500	$7,500	$0	$0	$0	$0	**$0**
Project 43	$50,000	N/A	$42,246	$0	$0	$11,998	**$54,244**
Total[c]	**$839,500**	**$427,500**	**$484,047**	**$165,966**	**$503,510**	**$119,980**	**$1,273,503**

[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 WS (e.g., mountain lion removal to benefit wildlife).
[b]Incorporates both $3 and P-R expenditures
[c]Nevada Department of Wildlife spent $650,013 on lethal predator removal during FY2017. This accounted for 113.2% of FY 2015 revenues.

Expected Revenues and Beginning Balance of $3 Predator Fee

	FY 2015 Actual	FY 2016 Actual	FY 2017 Actual	FY 2018 Projected
Beginning balance	$380,038	$544,631	$591,382	$404,660
Revenues	$574,312	$595,107	$635,835	$635,835
Plan Budget	$338,000	$556,000	$839,500	$961,500
Expenditures	$409,719	$548,356	$840,557	$961,500
Ending balance	$544,631	$591,382	$404,660	$78,995

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Appendix

http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Predator_Management/