Nevada Department of Wildlife

Predation Management Status Report

Fiscal Year 2021

State of Nevada

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Department of Wildlife

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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 FY 2021, 12 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), bighorn sheep protection (Project 22-01, Project 22-074, Project 37 and Project 44), pronghorn protection (Project 38), mule deer protection (Project 40) and waterfowl, turkey, and pheasant protection (Project 43). The appendix of this document can be found at http://www.ndow.org/Nevada_Wildlife/Conservation/Nevada_Predator_Management/

Fiscal year 2019 predator fee revenues totaled $717,064. The Department needed to allocate about $573,651 on lethal removal to meet the requirements set forth by NRS 502.253. Proposed predator projects for fiscal year 2021 included $724,000 for lethal work, $478,467 was spent on lethal removal in fiscal year 2021.

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

Common raven (thereafter raven) control efforts to conserve Greater sage-grouse commenced in late March and extended throughout May 2021. 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).

Through the efforts of USDA WS personnel, an estimated 1,591 ravens were removed during spring 2021 for project 21. 2,500 is the current limit that NDOW can remove under the current USFWS depredation permit (#MB37116A-0). Ravens were removed in 12 game management areas during the spring of 2021 under Project 21.

Ravens take by Management Area (MA) FY 2021.

Area	Ravens Removed
MA 2	29
MA 3	75
MA 6	123
MA 7	102
MA 10	8
MA 11	277
MA 14	186
MA 15	110
MA 18	130
MA 20	54
MA 22	307
MA 23	190
Total Ravens	1,591

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 common ravens are believed to be a limiting factor for Greater sage-grouse.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$175,000	N/A	$57,094	$0	$9,547	**$66,641**

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

Efforts to establish a viable California bighorn sheep population along the Massacre and Coleman Rims continue. A recent augmentation on the southern portion of the Massacre Rim has helped to increase numbers in the area. Multiple mature rams were seen in unit grouping 011, 013. For the first time since the 2007 disease event in Hays Canyon, NDOW issued a sheep tag for this unit grouping. In the future, we hope to deploy more collars on sheep in 013 to assist with monitoring for disease and identifying primary causes of mortality.

Between July 1, 2020 and June 30, 2021, 3 mountain lions were removed by USDA WS in Unit 011 and 2 mountain lions in Unit 013. USDA WS incidental take included one black bear in 011, 2 coyotes and 1 bobcat in 013. Mountain lion removal efforts were made by a private contractor in Unit 011, 2 mountain lions were removed. The private contractor submitted the Annual Predator Management Project Reporting Form (Appendix).

Bighorn Sheep Herd Health (Biologist III Jon Ewanyk)

In January of 2019, California bighorn sheep were released on the south end of the Massacre Rim in unit 011. This augmentation was conducted to strengthen the Massacre Rim sub-population and help the herd reach a self-sustaining level.

In August of 2021, aerial surveys were conducted to determine herd composition for units 011 and 013. Bighorn sheep in the Hays Canyon Range of unit 013 appeared to have stable lamb recruitment in 2021. However, bighorn in 011 appeared to have below average recruitment levels again this year. The low recruitment levels are likely a combination of drought conditions and predation. Lion predation remains a factor in hunt unit 011, and the sub-population hasn't reached a self-sustaining level yet. The removal effort seems to have benefitted the sub-population of sheep in unit 013 and should benefit the sheep in 011 once range conditions improve.

This past year, the remaining two GPS collars in unit 013 malfunctioned, leaving biologists without any collared sheep in 013. However, there are still seven collared bighorn sheep on the Massacre Rim in unit 011. These collared animals will continue to help biologists monitor seasonal movement patterns, disease events, and the impact of mountain lions over the next few years.

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	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$90,000	N/A	$99,197	$0	$9,547	**$108,744**

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 completely 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 FY 2021.

Bighorn Sheep Herd Health (Biologist III Kari Huebner)

From extensive ground surveys using collared bighorn locations throughout the summer, 7 rams, 11 ewes, and 5 lambs were classified in this population. Recruitment rates have improved slightly the last few years indicating this herd is slowly recovering from the last disease event.

There are currently 9 bighorn collared (7 ewes and 2 rams), however only 5 (all ewes) are functional. The collar activity is used to determine if there are any mountain lion related predation events. In June 2021 a collared ewe and a yearling ram were comingling with domestic sheep and were euthanized. Another collared ewe died in August. The mortality was investigated. It appeared the death was not predation related, but more likely a result of disease. Five additional collars will be purchased and deployed in early 2022. The population is most likely less than 25 bighorn.

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	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$20,000	N/A	$0	$0	$9,547	**$9,547**

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.

USDA WS removed 1 mountain lion in 032. A private contractor lethally removed 1 mountain lion in the Calico mountains, 4 in the Snowstorm Mountains, and 2 in the Jackson Mountains. The Annual Predator Management Project Reporting Form for Project 37 may be found in the appendix of this document.

Department Comments on Project

NDOW supports continuing Project 37 until local bighorn sheep and other big game 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	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$75,000	N/A	$60,357	$0	$9,547	**$69,904**

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 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.

Coyote and coyote dens take by Management Area (MA) FY 2021.

Area	Coyotes Removed	Coyote Dens Removed
MA 3	14	1
MA 11	48	5
MA 12	5	0
MA 13	25	0
Total	92	6

Department Comments on Project

NDOW supports continuing Project 38 pending available funding.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$75,000	N/A	$60,905	$0	$9,547	**$70,452**

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 2020 until June 2021 USDA WS conducted aerial gunning and trapping of coyotes in Area 14, removing 114 coyotes 3 coyote dens. The 3-year average spring adult to fawn ration for area 14 is 28.

Department Comments on Project
NDOW supports continuing Project 40 until mule deer populations reach levels defined in the annual Predator Plan.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$100,000	N/A	$100,445	$0	$9,547	**$109,992**

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

Between July 2020 and June 2021, we captured and radio-tagged 8 juvenile ravens. We started the season tracking 22 ravens radio-tagged during previous capture efforts resulting in a total of 30 birds tracked during the season. At the end of the season, 17 ravens were still alive with active transmitters (8 juveniles and 9 adults). Four devices stopped transmitting, 6 ravens died (3 juveniles captured in June 2020 and 3 adults) and 3 ravens had an unknown fate. Of the 6 known mortalities, 4 appeared to have been depredated or scavenged and 2 carcasses were found mostly intact. We did not find remains near the transmitter of 1 of the ravens with an unknown fate; we did not recover the transmitter or find remains for 2 ravens with unknown fates.

USGS Projects

The USGS engaged in 12 common raven related projects during fiscal year 2021. Project summaries and products can be found in the appendix, there titles are as follows:

1. Modeling common raven occurrence across sagebrush ecosystems in the Great Basin, USA
2. Science driven management and a rapid survey for site level estimates of raven densities
3. Estimating common raven densities in a semi-arid ecosystem: implications for conservation of sage-grouse and other sensitive prey species
4. Relating raven density to sage-grouse nest success at the nest level in California and Nevada
5. Spatially explicit predator impact models: linking common raven density to sage-grouse nest success using hierarchical modeling
6. Raven influences on sage-grouse population growth
7. Raven and sage-grouse interactions and behavioral ecology
8. Raven monitoring at Virginia Mountains (no $3 predator fee funds spent)
9. Raven monitoring across Nevada
10. Raven disease exposure in the Great Basin

11. Effectiveness of egg-oiling raven nests using drone technology and sage-grouse nesting responses
12. Comprehensive literature review of raven space use, demography, and impacts to sensitive prey species

Department Comments on Project

Common raven predation may be the greatest limiting factor in Greater sage-grouse nest success, NDOW supports continuing Project 41.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$87,500	$262,500	$0	$267,451	$9,547	**$276,998**

Project 42: Assessing Mountain Lion Harvest in Nevada

Nevada Department of Wildlife has a yearlong mountain lion hunting season limited by harvest quotas, although mountain lions are also lethally removed for livestock depredation and to limit predation on specific wildlife populations. Statewide annual adult female harvest is ≤35%, which indicates that statewide harvests are unlikely to be reducing statewide mountain lion population abundance (Anderson and Lindzey 2005). Nevertheless, regional area harvests may be greater and can be more difficult to assess the effects due to small sample sizes. Conversely, current NDOW mountain lion removal projects may not be sufficiently intensive to reduce local mountain lion populations to attain reduced predation on prey populations. Improved understanding of mountain lion population dynamics in Nevada would allow for better informed management.

A report highlighting findings was providing in FY2021. An expert read:

In general, statewide harvest numbers increased from the late 1960's before stabilizing in the early 1990's (Figs. 2 - 4), with a peak of 215 harvested individuals in 1997. Reported non-harvest mortality was approximately a third of reported harvest numbers. However, these non-harvest numbers were relatively stable throughout the time series with the possible exceptions of 1968 and 1969 with higher than average non-harvest mortalities for the time period (Figs. 2 - 4). Throughout, we refer to individuals as kittens when reported younger than 1 year, sub-adults as individuals between 1 and 2 years, and adults as ≥2 years old. We included both reported and known ages, prioritizing known ages in cases where ages were more definitively assessed. Adults are overwhelming represented in both harvest and non-harvest mortality (Fig. 5), with adult proportions being higher in annual harvest (μ = 0.94, σ = 0.05) than in non-harvest data (μ = 0.80, σ = 0.10). Females were consistently represented in both harvest and non-harvest data (Fig. 3 - 4, Fig. 6), with proportions only slightly below parity relative to males (Harvest: μ = 0.44, σ = 0.09; μ = 0.46, σ = 0.10).

The final report can be find on NDOW's website.

Department Comments on Project
Findings indicate Nevada has a stable mountain lion population.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$2,500	$7,500	$0	$14,850	$9,547	**$24,397**

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 FY 2021.

Species	Mason Valley	Overton
Badger	0	1
Beaver	0	0
Coyote	8	30
Coyote Den	2	0
Raccoon	0	12
Skunk	0	7

Department Comments on Project

NDOW recommends continuing project 43 pending funding availability.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$50,000	$N/A	$17,350	$0	$9,547	**$26,897**

Project 44: Lethal Removal and Monitoring of Mountain Lions in Area 24

Mountain lions are known predators of bighorn sheep and other big game species (Rominger et al. 2004). Though predation is a naturally occurring phenomenon for bighorn sheep and other big game, their populations can be lowered or suppressed by abiotic factors such as dry climate and loss of quality habitat. Mitigating abiotic factors by removing predators is imperative for some bighorn sheep populations to stabilize (Rominger 2007).

Attempts have been made to establish a desert bighorn sheep population in Area 24. Reintroduction attempts have provided mixed results, it has long been thought lion predation may be a contributing factor. Project 44 has evolved to be a reactive removal project. Mountain lions within the Delamars are captured, receive GPS collars, and kill sites are visited to determine diet. If a lion consumes a bighorn sheep it is lethally removed. The Annual Predator Management Project Reporting Form may be found at the appendix of this document.

From July 1, 2020 to June 30, 2021 6 mountain lions were collared. A total of 169 GPS Clusters were visited; 103 of these clusters had evidence of a mountain lion kill. Of the 103 kills identified, 0 consisted of bighorn sheep, 25 consisted of feral horses, 65 consisted of mule deer, 3 consisted of elk, 1 of coyote, and 9 were not able to be identified to species.

Bighorn Sheep Herd Health (Biologist III Daniel Sallee)

The Delamar Mountain bighorn sheep herd continues to show low lamb recruitment and stagnant hunter success over the past 5 years. Bighorn sheep herds in adjacent mountain ranges have had stable or increasing population growth and a high rate of hunter success during the same timeframe. The cause of population decline within the Delamar Mountain range is not fully understood, although several known factors affect the herd. Mountain lion predation has been documented within the Delamar Mountains and likely has a limiting effect on the small population. Disease-related mortalities from *Mycoplasma ovipneumoniae* have also been documented in this herd. In addition, bighorn sheep may be dispersing to adjacent mountain ranges.

Drought and habitat loss are compounding factors that may make bighorn sheep within the Delamar Mountains more susceptible to predation. Severe drought conditions have affected the area over the last several years and has led to degraded habitat conditions and limited water distribution. In 2020 multiple wildfires burned large areas of preferred bighorn sheep habitat in the area. Severe drought conditions, limited water distribution, and removal of preferred habitat have put the Delamar Mountain bighorn sheep herd at higher risk of population collapse. Ongoing predator control efforts and maintenance of water development projects are very important for the future of this bighorn sheep population.

The last aerial survey in the Delamar Mountains was conducted in September of 2020. This survey resulted in the observation of 61 bighorn sheep classified as 19 rams, 29 ewes, and 13 lambs. This survey effort was extensive and provided vital knowledge of the population growth rate. The lamb ratio of this survey was higher than previous years (26 lambs:100 ewes in 2017, 8 lambs:100 ewes in 2019, and 45 lambs:100 ewes in 2020), however the population is not in a

"recovery" pattern at this time. Severe drought conditions in 2021 may have led to lower lamb ratios. Surveys in adjacent units have shown lower-than-average lamb ratios, which indicates the Delamar Mountains may also have experienced lower ratios this year.

Department Comments on Project

NDOW supports continuing Project 44 until the local bighorn sheep populations reach viability as defined in the annual Predator Plan. NDOW also supports reactive removal of offending mountain lions while learning more about local mountain lion diet. NDOW supports seeking outside collaboration and funding sources.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$100,000	N/A	$68,686	$0	$9,547	**$78,233**

Project 45: Passive Survey Estimate of Black Bears in Nevada

Black bears are expanding numerically and geographically, and in so doing they are recolonizing historic ranges in Nevada. It is imperative the Department be able to estimate Nevada's black bear population and monitor growth and change. Being able to do so passively will ensure the Department can reach these objectives safely and cost efficiently.

In a collaboration with Oxford and University of Montana, hair snare stations and trail cameras will be deployed on a grid to determine black bear density. Existing black bear GPS data will be incorporated into models. These data will ultimately result in a population estimate.

This is an ongoing project, a submitted Annual Predator Management Project Reporting Form can be found in the appendix of this document. The main excerpt includes:

The project has progressed smoothly and efficiently since its inception in January of 2018. The only perturbation has been the onset of the COVID-19 pandemic, which shifted the timing of the field season in the summer of 2020 from an intended start date of May to a start date of July. That being said, we adjusted the end date of the field season accordingly and continued to make progress. We have collected image data from a grid of approximately 100 camera traps distributed across ~5000 km^2 of black bear habitat since June of 2018, resulting in approximately 3.7 million images. These images have been analyzed and the animals identified to the species level. We have also collected hundreds of hair samples over the first two summer field seasons, which have been analyzed at the Institute for Quantitative Health Sciences and Engineering at Michigan State University. We also had a paper (see below) accepted for publication in peer-review with another that it is in preparation.

Department Comments on Project
NDOW also recommends continuing Project 45 as a monitoring project.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$25,000	$75,000	$0	$99,858	$9,547	**$109,405**

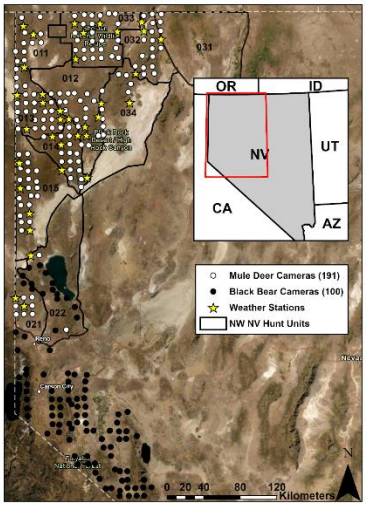
Project 46: Investigating Potential Limiting Factors Impacting Mule Deer in Northwest Nevada

Recent decades have seen Northwest Nevada's mule deer herds decline, resulting in fewer tags issued and low-quality hunt experiences. Several factors may be contributing, including predation, drought, wildland fire, invasive plant species, and competition from feral horses. A combination of these factors are likely at play, it is the Department's desire to better understand the situation.

This is an ongoing project, a submitted Annual Predator Management Project Reporting Form can be found in the appendix of this document. The main excerpt includes:

The project has progressed smoothly and efficiently since its inception in January of 2018. The only perturbation has been the onset of the COVID-19 pandemic, which shifted the timing of the field season in the summer of 2020 from an intended start date of May to a start date of July. That being said, we adjusted the end date of the field season accordingly and continued to make progress. We have collected image data from a grid of approximately 100 camera traps distributed across ~5000 km^2 of black bear habitat since June of 2018, resulting in approximately 3.7 million images. These images have been analyzed and the animals identified to the species level. We have also collected hundreds of hair samples over the first two summer field seasons, which have been analyzed at the Institute for Quantitative Health Sciences and Engineering at Michigan State University. We also had a paper (see below) accepted for publication in peer-review with another that it is in preparation.

Project 45 and project 46 have the same collaborators, hence the same expert. As you can see in the map, the grid of cameras across northwest Nevada are now one continuous grid.

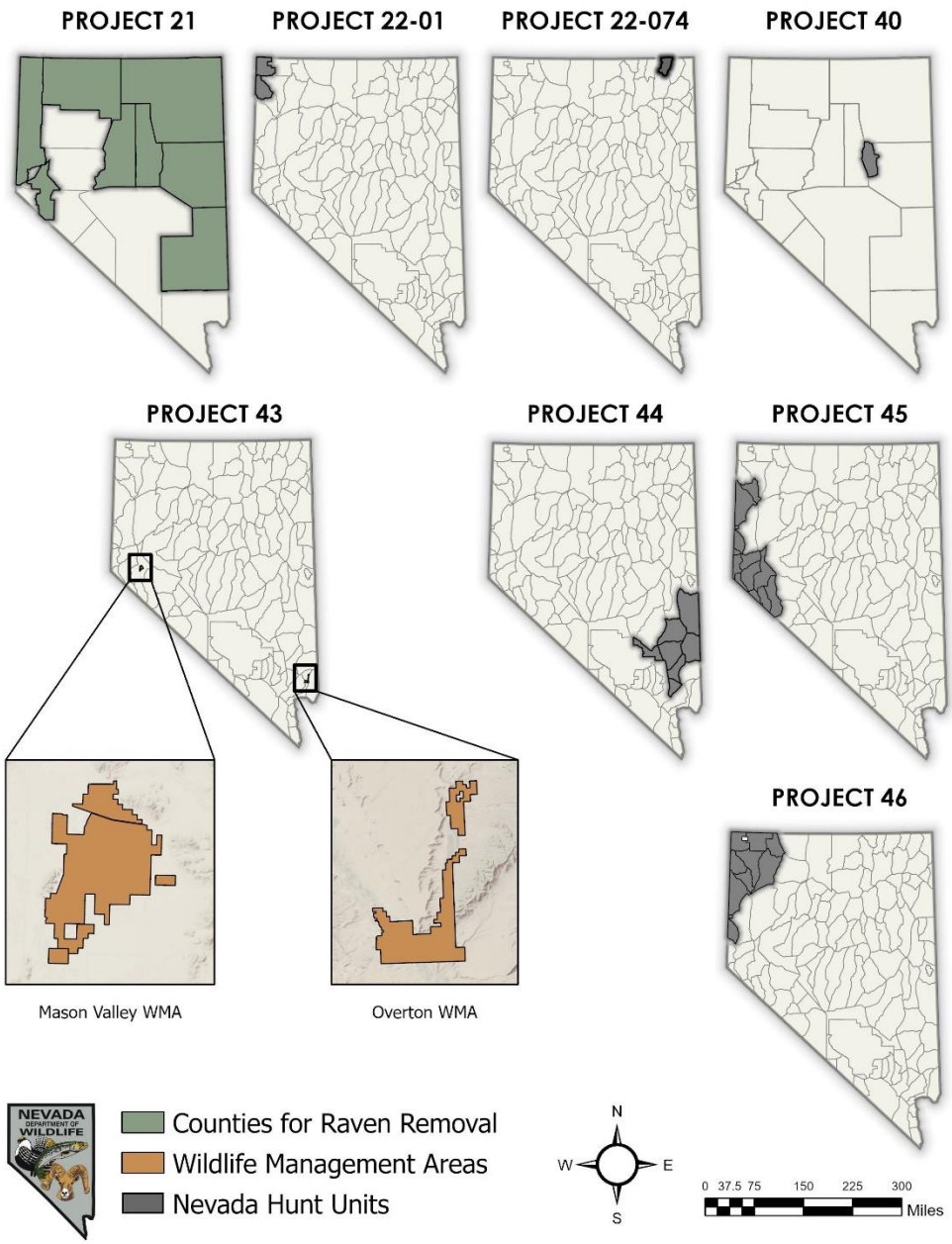


Department Comments on Project

Project 46 has the potential to greatly increase the understanding of flora and fauna communities in northwest Nevada.

$3 Planned Expenditures	P-R Planned Expenditures	Lethal Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office	Total
$15,000	$45,000	$0	$86,308	$9,547	**$95,855**

Maps of Projects



Overall Budget and Expenditures for FY 2021

Project	$3 Planned Expenditures	P-R Planned Expenditures	Wildlife Services Expenditures	NDOW Non-Lethal Expenditures	NDOW Salary, Travel, and Office[b]	Total
Department of Ag Transfer[a]	$14,000	N/A	$14,000	$0	$9,547	$23,547
Project 21	$175,000	N/A	$57,094	$0	$9,547	$66,641
Project 21-02	$90,000	N/A	$99,197	$0	$9,547	$108,744
Project 22-074	$20,000	N/A	$0	$0	$9,547	$9,547
Project 37	$75,000	N/A	$60,357	$0	$9,547	$69,904
Project 38	$75,000	N/A	$60,905	$0	$9,547	$70,452
Project 40	$100,000	N/A	$100,445	$0	$9,547	$109,992
Project 41	$87,500	$262,500	$0	$267,451	$9,547	$276,998
Project 42	$2,500	$7,500	$0	$14,850	$9,547	$24,397
Project 43	$50,000	N/A	$17,350	$0	$9,547	$26,897
Project 44	$100,000	N/A	$68,686	$0	$9,547	$78,233
Project 45	$25,000	$75,000	$0	$99,858	$9,547	$109,405
Project 46	$15,000	$45,000	$0	$86,308	$9,547	$95,855
Total[c]	**$829,000**	**$390,000**	**$478,034**	**$468,467**	**$114,564**	**$1,061,065**

[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 predator fee and P-R expenditures
[c] Fiscal year 2018 predator fee revenues totaled $717,064. The Department needed to allocate about $573,651 on lethal removal to meet the requirements set forth by Assembly Bill 78. Proposed predator projects for fiscal year 2020 included $724,000 for lethal work, $478,467 was spent on lethal removal in fiscal year 2019.

Expected Revenues and Beginning Balance of $3 Predator Fee

	FY 2019 Actual	FY 2020 Actual	FY 2021 Actual	FY 2022 Estimated
Beginning balance	$412,582	$287,651	$363,670	$622,972
Revenues	$717,064	$797,287	$858,601	$858,601
Plan Budget	$961,500	$829,000	$854,000	$886,500
Expenditures	$841,994	$721,268	$599,299	$886,500
Ending balance	$287,651	$363,670	$622,972	$595,073

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Appendix

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