

Committee Members: Commissioner Almborg (Chair),
Commissioner Barnes, Commissioner Caviglia,
Commissioner Hubbs, Tom Cassinelli

Staff to the Committee: Pat Jackson

**Nevada Board of Wildlife Commissioners
Wildlife Damage Management Committee
Meeting held via www.Zoom.us**

Friday, May 15, 2020 / 1:00 p.m.

DRAFT Minutes

1. Call to Order – Chairman Almborg

Meeting called to order 1:03 P.M.

In attendance:

Commissioner Almborg, Chair
Commissioner Barnes
Commissioner Caviglia
Pat Jackson, Nevada Department of Wildlife
Jack Robb, Nevada Department of Wildlife

Absent:

Commissioner Hubbs
Committee Member Cassinelli

2. Approval of Agenda

Chairman Almborg motioned to approve the agenda.

Commissioner Barnes seconded the motion.

The motion passed unanimously.

3. Approval of Minutes (March 14, 2019) – Chairman Almborg

Chairman Almborg motioned to approve the March 14, 2019 Minutes.

Commissioner Caviglia seconded the motion.

The motion passed unanimously.

**4. *Report on DRAFT FY 2021 Predator Management Plan – Predator Management
Staff Specialist – Pat Jackson**

Staff Specialist Jackson provided a slide show presentation of the DRAFT FY 2021 Predator Management Plan. (Attachment A) NDOW also reviewed comments from the Predatory Animal and Rodent Committee (PARC) from its February 28, 2020 meeting (Attachment B).

Commissioner Almborg submitted a letter from the Coalition for Nevada's Wildlife (Attachment C).
Commission Almborg submitted a letter from Mr. Jonathan Lesperance (Attachment D).

Commissioner Barnes motioned to accept the DRAFT FY 2021 Predator Management Plan as presented.

Commissioner Caviglia seconded the motion.

The motion passed unanimously.

5. Public Comment Period

Commissioner Barnes commented that there is a consensus among sportsmen concerned about the deer population in the state and that he would like to encourage the Department to look at the role of predation in this matter.

Meeting adjourned at 1:33 P.M.

Draft 2
Nevada Department of Wildlife
Predator Management Plan
Fiscal Year 2021
1 July 2020 to 30 June 2021

DRAFT

STATE OF NEVADA

Steve Sisolak, Governor

Nevada Department of Wildlife

Tony Wasley, Director

Jack Robb, Deputy Director

Liz O'Brien, Deputy Director

Mike Scott, Game Division Administrator

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Introduction

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, nonlethal 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. NDOW works with area biologists and monitors harvest data to ensure localized removal of predators does not result in negative biological consequences on a region or statewide level.

NDOW is a state agency that must balance the biological needs of wildlife, statutory mandates, and social desires of the public. In the 2015 legislative session, Assembly Bill 78 was adopted which in part amended NRS 502.253 (4) (b) to read: [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." NDOW intends to comply with statute and apply the tools of scientific predation management in biologically sound, socially responsible means.

Budget Summary

Fiscal year 2019 predator fee revenues totaled \$717,064. The Department expects to need to allocate about \$573,651 on lethal removal to meet the requirements set forth by Assembly Bill 78. Proposed predator projects for fiscal year 2021 include \$724,000 for lethal work, these funds include fiscal year 2019 revenues and previous fiscal years surpluses.

Map Note

Maps for each project may be found in the last page of this document.

DRAFT

Table of Contents

TYPES OF PROJECTS	8
LEVELS OF MONITORING.....	9
FY 2021 PROJECTS RECOMMENDED FOR CONTINUATION.....	10
Project 21: Greater Sage-Grouse Protection (Common Raven Removal).....	10
Project 21-02: Common Raven Removal to Enhance Greater Sage-Grouse Nest Success.....	13
Project 22-01: Mountain Lion Removal to Protect California Bighorn Sheep.....	15
Project 22-074: Monitor Rocky Mountain Bighorn Sheep for Mountain Lion Predation.....	17
Project 37: Big Game Protection-Mountain Lions	19
Project 38: Big Game Protection-Coyotes.....	21
Project 40: Coyote and Mountain Lion Removal to Complement Multi-faceted Management in Eureka County	23
Project 41: Increasing Understanding of Common Raven Densities and Space Use in Nevada	25
Project 42: Assessing Mountain Lion Harvest in Nevada	28
Project 43: Mesopredator removal to protect waterfowl, turkeys, and pheasants on Wildlife Management Areas	30
Project 44: Lethal Removal and Monitoring of Mountain Lions in Area 24.....	32
Project 45: Passive Survey Estimate of Black Bears in Nevada.....	34
FY 2021 NEWLY RECOMMENDED PROJECTS	36
Project 46: Investigating Potential Limiting Factors Impacting Mule Deer in Northwest Nevada	36
Literature Cited	40
Appendix.....	41

TYPES OF PROJECTS

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.

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. Identifying and monitoring a response variable is not a primary objective for implementation.
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 USDA Wildlife Services, private contractors, and other wildlife professionals to conduct lethal or non-lethal management of predators and will put forethought into project design. Response variables will be identified and data will be collected to determine project effectiveness. 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.

LEVELS OF MONITORING

Below are the three levels of monitoring outlined in the predator management plan. The level of monitoring for each project is identified within the project description.

1. **Standard Monitoring:** The primary objective of standard monitoring is to use existing survey protocols to evaluate the response of game species or sensitive wildlife to lethal or non-lethal management of predators. NDOW conducts annual and biannual surveys to evaluate trend and composition of game species or sensitive wildlife and to inform the season and quota-setting process. Composition surveys will yield response variables such as recruitment of juveniles into the adult population and will be compared to published benchmarks of productivity in the management area of interest, to neighboring areas not receiving predator management, or in the same area before treatment began. Standard monitoring represents no change to existing monitoring efforts. Expected outcomes include an indication of project effectiveness and agency reports.
2. **Intermediate Monitoring:** The primary objective of intermediate monitoring is to apply a specific monitoring plan designed to evaluate the response of game species or sensitive wildlife to lethal or non-lethal management of predators. NDOW may collaborate with other wildlife professionals to identify reference and treatment areas or evaluate productivity of game species or sensitive wildlife before, during, and after implementation to determine effectiveness of predator management. Composition surveys may be modified to thoroughly evaluate productivity in the reference and treatment areas and to better accommodate annual variation in survey conditions. Expected outcomes will include an indication of project effectiveness, agency reports, and possible peer-reviewed publications.
3. **Rigorous Monitoring:** The primary objective of rigorous monitoring is to evaluate several response variables known to affect productivity of game species or sensitive wildlife and to determine the relative influence of those variables when measuring the response to lethal or non-lethal management of predators. NDOW may collaborate with other wildlife professionals to identify the requirements of rigorous monitoring and to further evaluate factors influencing productivity of game species or sensitive wildlife such as survival of juveniles, body condition of adults, or habitat productivity. Rigorous monitoring efforts will help to disentangle biotic and abiotic conditions that may influence productivity of game species or sensitive wildlife from the effects of lethal or non-lethal management of predators. Expected outcomes will include agency reports, peer-reviewed publications, and information on how to better manage Nevada's wildlife.

FY 2021 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 habitat, common raven predation on Greater Sage-grouse nests and broods can limit population growth. Common ravens will be removed around known Greater Sage-grouse leks because most nest sites are located within 4 km of a lek. Common ravens will be removed in areas of known greater abundance to benefit sensitive populations of Greater Sage-grouse.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Implementation
Monitoring Level	Standard to Intermediate
Potentially Affected Species	Common raven, Greater Sage-grouse
Span More Than One Fiscal Year	Yes
Project Area	Elko, Eureka, Humboldt, Lander, Lincoln, Lyon, Washoe, and White Pine counties.
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for Greater 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 Greater 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, O’Neil et al. 2018). Under these circumstances, common raven predation can have a negative influence of Greater Sage-grouse nesting success, recruitment, and population trend (Coates and Delehanty 2010).
Response Variable	Common raven point counts may be conducted before, during, and after removal to detect changes in common raven densities.

Project Goals	<ol style="list-style-type: none"> 1. Reduce common raven populations in high abundance areas that overlap sensitive Greater Sage-grouse populations identified by NDOW and USDA Wildlife Services wildlife biologists. 2. Increase populations of Greater Sage-grouse in specific areas where deemed feasible.
Habitat Conditions	<p>Areas of common raven removal will be within or in close proximity to Greater Sage-grouse leks, nesting habitat, and brood-rearing habitat. Persistent drought throughout Nevada has reduced herbaceous cover, along with nesting and brood rearing habitat; these effects are exacerbated by wildfire and the invasion of cheatgrass. Transmission lines, substations, and nearby agriculture production often attract common ravens which may threaten nearby Greater Sage-grouse populations.</p>
Comments from FY 2019 Predator Report	<p>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.</p>
Methods	<p><i>Lethal Removal</i> Chicken eggs treated with corvicide (DRC-1339) 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 168 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 DRC-1339 protocol. DRC-1339 is effective only on corvids and most mammals and other birds are not susceptible to the specific effects from this agent.</p> <p><i>Monitoring</i> Point counts for common ravens will be conducted from March through July of each year, which corresponds with Greater Sage-grouse nesting and brood-rearing season. Surveys will be similar to Ralph et al. (1995): lasting 10 minutes; conducted between sunrise and 1400 hrs; conducted under favorable weather conditions; and stratified randomly across study areas (Luginbuhl et al. 2001, Coates et al. 2014).</p>
Anticipated Result	<p>The removal of common ravens is intended to result in long-term protection for Greater Sage-grouse populations through increases in nest success, brood survival, and recruitment.</p> <p>This project will continue until evidence demonstrating Greater sage-grouse nest success and recruitment are not limiting population growth due to common raven predation or common raven populations are in decline from non-lethal measures. The Department anticipates a change in the USFWS raven depredation permit in upcoming years.</p>

Staff Comment	Project 21 will become progressively more precise with deliverables from Project 41. It is the Department's desire to ultimately use Project 21 to create temporary voids of ravens for Greater sage-grouse during sensitive times and to reverse the common raven population growth curve.
Project Direction	Fund Project 21. Evaluate efficacy of Project 21 annually.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$175,000	N/A	\$175,000

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

Justification	Common ravens are a leading nest and brood predator for Greater Sage-grouse and reducing common raven abundance can influence Greater Sage-grouse nest success and brood survival (Coates and Delehanty 2010). This project will lethally remove common ravens in habitats surrounding known Greater Sage-grouse leks and nesting habitats to enhance nesting success and brood survival.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Implementation and Experimental Management
Monitoring Level	Intermediate
Potentially Affected Species	Common raven, Greater Sage-grouse
Span More Than One Fiscal Year	Yes, depending on outcomes associated with Greater Sage-grouse response. The scope and location of this project may be modified in future years.
Project Area	Area 02
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for Greater 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 Greater 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, O’Neil et al. 2018). Under these circumstances, common raven predation can have a negative influence of Greater Sage-grouse nesting success, recruitment, and population trend (Coates and Delehanty 2010).
Response Variable	The response variables will be nest success and brood survival of Greater Sage-grouse within treated areas before and after treatment. This monitoring will not be paid for with \$3 predator fees.
Project Goal	1. Increase populations of Greater Sage-grouse through improved nest success and brood survival in treated areas. 2. Determine common raven removal effort needed to reduce raven densities to a level they are not detrimental to Greater Sage-grouse nest success.

Habitat Conditions	Areas of common raven removal will be within or in close proximity to Greater Sage-grouse leks, nesting habitat, and brood-rearing habitat. Persistent drought throughout Nevada has reduced herbaceous cover, along with nesting and brood rearing habitat; these effects are exacerbated by wildfire and the invasion of cheatgrass. Transmission lines, substations, and nearby agriculture production often attract common ravens which may threaten nearby Greater Sage-grouse populations.
Comments from FY 2019 Predator Report	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 through FY 2021.
Methods	<i>Lethal Removal</i> Chicken eggs treated with corvicide (DRC-1339) 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 168 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 corvicide protocol. DRC-1339 is effective only on corvids and most mammals and other birds are not susceptible to the specific effects from this agent.
Anticipated Result	The removal of common ravens is intended to result in long-term protection for Greater Sage-grouse populations through increases in nest success, brood survival, and recruitment.
Staff Comment	Project inception focused on lethal raven removal and its effects on Greater sage-grouse nesting success. Due to unforeseen large-scale fires, the analysis for this project has been confounded.
Project Direction	Fund project 21-02 through FY 2022.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$25,000	N/A	\$25,000

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

Justification	California bighorn sheep populations have been reintroduced in northwestern Nevada; mountain lion predation can be a significant source of mortality that may threaten this population's viability. Area 01 is in close proximity to the Sheldon National Wildlife Refuge, California, and Oregon; all three may act as a source for mountain lions. Mountain lions will be removed proactively by USDA Wildlife Services and private contractors until the local bighorn sheep populations reach population objectives.
Project Manager	Chris Hampson, Nevada Department of Wildlife
Project Type	Implementation
Monitoring Level	Standard to intermediate
Potentially Affected Species	California bighorn sheep, mountain lion, mule deer
Span More Than One Fiscal Year	Yes
Project Area	Units 011 and 013
Limiting Factor Statement	Mountain lions are known predators of bighorn sheep (Rominger et al. 2004). 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. Mitigating abiotic factors by removing predators is imperative for some bighorn sheep populations to stabilize (Rominger 2007).
Response Variable	The response variable will be the number of radio marked bighorn sheep killed by mountain lions.
Project Goal	Remove mountain lions to proactively protect reintroduced California bighorn sheep.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, lambing, and browsing habitat. These effects may also be suppressing bighorn populations below carrying capacity or preventing them from reaching self-sustaining levels. Currently, several collaborations between the Bureau of Land Management and NDOW to remove pinyon-juniper are scheduled. These removals are intended to improve bighorn

	sheep habitat, improve access to water sources, and to remove habitat that is ideal for mountain lions to focus on bighorn sheep.
Comments from FY 2019 Predator Report	NDOW supports continuing Project 22-01 until the local bighorn sheep populations reach viability as defined in the annual Predator Plan.
Methods	NDOW biologists, USDA Wildlife Services, and private contractors will collaborate to identify current and future California bighorn sheep locations and determine the best methods to reduce California bighorn sheep mortality. Traps, snares, baits, call boxes, and hounds will be used to proactively capture mountain lions as they immigrate into the defined sensitive areas.
Population Estimate	The population estimates for California Bighorn sheep in 011 and 013 are approximately 50 individuals each.
Anticipated Result	Decrease or prevent predation from mountain lions for all age classes of reintroduced California bighorn sheep, resulting in an established, viable population.
Staff Comment	Proactive mountain lion removal to assist struggling bighorn sheep populations is well documented within the scientific literature.
Project Direction	Fund project 22-01. Monitor population. Cease proactive removal efforts after the local bighorn sheep population reaches 60 in each area (011 and 013; table 1).

Table 1. Population numbers to be used to redirect focus of project.

Action	Bighorn Sheep Population
Monitor bighorn population, conduct removal on case by case basis	> 80
Remove mountain lions that consume bighorn sheep*	60 - 80
Remove all mountain lions in area	< 60

*Indicates need for monitoring local mountain lion population.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$90,000	N/A	\$90,000

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

Justification	Rocky Mountain bighorn sheep populations have been established in portions of Nevada, but mountain lion predation can be a significant source for mortality that may threaten the population's viability. One collared bighorn sheep has been killed by mountain lions in the past year. The area biologists believe that mountain lion predation is not currently limiting the small bighorn sheep population, but even a small amount of predation has the potential to affect its viability.
Project Manager	Kari Huebner and Tyler Nall, Nevada Department of Wildlife
Project Type	Implementation
Monitoring Level	Standard to intermediate
Potentially Affected Species	Rocky Mountain bighorn sheep, mountain lion
Span More Than One Fiscal Year	Yes
Project Area	Unit 074
Limiting Factor Statement	Mountain lions are known predators of bighorn sheep (Rominger et al. 2004). 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. Mitigating abiotic factors by removing predators is imperative for some bighorn sheep populations to stabilize (Rominger 2007).
Response Variable	The response variable will be the number of radio marked bighorn sheep killed by mountain lions.
Project Goal	Bighorn sheep populations will be monitored on a continual basis and predator control will be implemented as deemed necessary at the discretion of the Area Biologist.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, lambing, and browsing habitat. These effects may also be suppressing bighorn populations below carrying capacity or preventing them from reaching self-sustaining levels.

Comments from FY 2019 Predator Report	NDOW supports continuing Project 22-074 until the local bighorn sheep reaches population viability as defined in the annual Predator Plan.
Methods	NDOW biologists will identify current and future Rocky Mountain bighorn sheep locations and determine the best methods to monitor this population. Additional GPS collars will be purchased and deployed to monitor the bighorn sheep population. If mountain lion predation is identified as an issue, then traps, snares, baits, call boxes, and hounds will be used to lethally remove mountain lions from the area.
Population Estimate	The population estimate for Rocky Mountain Bighorn sheep is approximately 35-40 individuals in area 074.
Anticipated Results	1. Monitor the population of Rocky Mountain bighorn sheep. 2. If mountain lion predation is identified as an issue, conduct lethal removal.
Staff Comment	Proactive mountain lion removal to assist struggling bighorn sheep populations is well documented within the scientific literature. This project has evolved from a proactive lethal removal project to a monitoring project.
Project Direction	Fund project 22-074. Monitor population. Begin mountain lion removal efforts if mountain lion predation is detected (table 2). Evaluate efficacy of project 22-074 annually. The Department will allocate project 22-074 funds to project 37 if they are not spent by 1 March 2021.

Table 2. Population numbers to be used to redirect focus of project.

Action	Bighorn Sheep Population
Monitor bighorn population, conduct removal on case by case basis	> 15
Remove mountain lions that consume bighorn sheep*	10 - 15
Remove all mountain lions in area	< 10

*Indicates need for monitoring local mountain lion population.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$20,000	N/A	\$20,000

Project 37: Big Game Protection-Mountain Lions

Justification	Predation issues frequently arise in a very short timeframe. These issues often occur within a fiscal year. By the time a project can be drafted, approved, and implemented, it may be too late to prevent or mitigate the predation issue. 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
Monitoring Level	Standard
Potentially Affected Species	Mountain lion, mule deer, bighorn sheep, antelope
Span More Than One Fiscal Year	Yes
Project Area	Statewide
Limiting Factor Statement	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).
Response Variable	Response variables may include reduction of prey taken by mountain lions, removal of a mountain lion that was documented consuming the concerned big game species, or a reduction in mountain lion sign. Because of the quick nature of the project, there may be times when no response variable will be measured.
Project Goal	Remove specific, problematic mountain lions to benefit game species.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, lambing, and browsing habitat. These effects may have reduced mule deer and other big game populations below carrying capacity. These effects may also be suppressing mule deer or big game populations below carrying capacity (Ballard et al. 2001).
Comments from FY 2019 Predator Report	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.
Methods	NDOW will specify locations of mountain lions that may be influencing local declines of sensitive game populations. Locations will be determined with GPS

	<p>collar points, trail cameras, and discovered mountain lion kill sites. Removal efforts will be implemented when indices levels are reached, these include low annual adult survival rates, poor fall young:female ratios, spring young:female ratios, and low adult female annual survival rates (table 3). Depending on the indices identified, standard to intermediate levels of monitoring will be implemented to determine the need for or effect of predator removal. These additional monitoring efforts may be conducted by NDOW employees, USDA Wildlife Services, or private contractors.</p> <p>Staff and biologists will identify species of interest, species to be removed, measures and metrics, and metric thresholds. This information will be recorded on the Local Predator Removal Progress Form (see appendix), and included in the annual predator report.</p>
Anticipated Results	<p>1. Lethal removal of individual, problematic mountain lions will provide a precise tool, protecting reintroduced and sensitive big game populations.</p> <p>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.</p>
Staff Comment	Proactive mountain lion removal to assist struggling bighorn sheep populations is well documented within the scientific literature.
Project Direction	Fund Project 37.

Table 3. Indices used to initiate predator removal.

Species	Annual Adult Survival Rates	Fall Young: Female Ratios	Spring Young: Female Ratios	Adult Female Annual Survival Rates
California Bighorn Sheep	< 90%	< 40:100	--	--
Rocky Mountain Bighorn Sheep	< 90%	< 40:100	--	--
Desert Bighorn Sheep	< 90%	< 30:100	--	--
Mule Deer	--	--	< 35:100	< 80%
Pronghorn	< 90%	< 40:100	--	--

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$75,000	N/A	\$75,000

Project 38: Big Game Protection-Coyotes

Justification	Predation issues frequently arise in a very short timeframe. These occurrences often occur within a fiscal year, therefore by the time a project can be drafted, approved, and implemented, to prevent or mitigate the predation issue, it may be too late. 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
Monitoring Level	Standard
Potentially Affected Species	Coyote, mule deer, antelope, Greater Sage-grouse
Span More Than One Fiscal Year	Yes
Project Area	Statewide
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be lowered or suppressed by abiotic factors such as dry climate and loss of quality habitat. Predation from coyotes may further suppress these populations (Ballard et al. 2001).
Response Variable	Response variables may include reduction of prey taken by coyotes, removal of a coyote that was documented consuming the concerned big game species, or a reduction in coyote sign. Because of the quick nature of the project, there may be times when no response variable will be measured.
Project Goal	Conduct focused coyote removal to protect game species.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, lambing, and browsing habitat. These effects may have reduced mule deer and other big game populations below carrying capacity. These effects may also be suppressing mule deer or big game populations below carrying capacity (Ballard et al. 2001).
Comments from FY 2019 Predator Report	NDOW supports continuing Project 38 pending available funding.
Methods	USDA 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 indices levels are reached, these include low annual adult survival rates, poor fall young:female ratios, poor spring young:female ratios, and low adult female annual survival rates (table 3). Depending on the indices identified, standard to intermediate levels of monitoring will be implemented to determine the need for or effect of predator removal. These additional monitoring efforts may be conducted by NDOW employees, USDA Wildlife Services, or private contractors.
Anticipated Results	1. Removal of coyotes in winter range and fawning and lambing 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.
Staff Comment	Proactive coyote removal to assist struggling pronghorn populations is well documented within the scientific literature.
Project Direction	Fund Project 38.

Table 3. Indices used to initiate predator removal.

Species	Annual Adult Survival Rates	Fall Young: Female Ratios	Spring Young: Female Ratios	Adult Female Annual Survival Rates
California Bighorn Sheep	< 90%	< 40:100	--	--
Rocky Mountain Bighorn Sheep	< 90%	< 40:100	--	--
Desert Bighorn Sheep	< 90%	< 30:100	--	--
Mule Deer	--	--	< 35:100	< 80%
Pronghorn	< 90%	< 40:100	--	--

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$75,000	N/A	\$75,000

Project 40: Coyote and Mountain Lion 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	Clint Garrett, Nevada Department of Wildlife
Project Type	Implementation
Monitoring Level	Standard to intermediate
Potentially Affected Species	Coyote, Greater Sage-grouse, mule deer
Span More Than One Fiscal Year	Yes
Project Area	Units 141-144
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for mule deer and other big game, their populations can be reduced or suppressed by abiotic factors such as dry climate and loss of quality habitat, these populations can be suppressed by predation from coyotes (Ballard et al. 2001).
Response Variable	The response variable will be the fawn to doe ratios in the Diamond Mountains. This ratio will be observed throughout the life of the project. The project will be altered or discontinued after three consecutive years of observed spring fawn:adult ratios averaging 50:100 or higher.
Project Goal	To increase mule deer and Greater Sage-grouse populations by removing coyotes and mountain lions.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, fawning, and browsing habitat. These effects may have reduced mule deer below carrying capacity. These effects may also be suppressing mule deer below carrying capacity (Ballard et al. 2001).
Comments from FY 2019 Predator Report	NDOW supports continuing Project 40 until mule deer populations reach levels defined in the annual Predator Plan.
Methods	USDA Wildlife Services and private contractors working under direction of NDOW and Eureka 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.
Anticipated Result	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.
Staff Comment	The Department supports multi-faceted management projects such as Project 40.
Project Direction	Fund Project 40. Evaluate efficacy of Project 40 annually.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$100,000	N/A	\$100,000

DRAFT

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

Justification	Common ravens are the primary predator of Greater Sage-grouse nests and chicks (Coates and Delehanty 2010). Their populations have increased dramatically in Nevada, primarily due to human subsidies (Boarman 1993, Sauer et al. 2011). Understanding common raven density, distribution, and subsidy use will allow for intelligent management decisions to be made to reduce or alter common raven densities in Nevada. These efforts are intended to benefit Greater Sage-grouse, though desert tortoise may also benefit from this project.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Experimentation
Monitoring Level	Rigorous
Potentially Affected Species	Greater Sage-grouse, common raven, desert tortoise
Span More Than One Fiscal Year	Yes
Project Area	Statewide
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for Greater 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 Greater 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, Sauer et al. 2011). Under these circumstances, common raven predation can have a negative influence of Greater Sage-grouse nesting success, recruitment, and population trend (Coates and Delehanty 2010). Common raven predation has also been documented to negatively impact desert tortoise populations (Boarman 1993, Kristan and Boarman 2003)
Response Variable	No response variable will be collected, this is an experimentation project.
Project Goals	<ol style="list-style-type: none"> 1. Increase understanding of common raven density, distribution, and subsidy use to maximize common raven management effectiveness. 2. Develop a protocol to estimate common raven populations in Greater Sage-grouse habitat, and monitor these populations. 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 a resource selection function model to identify landscape features that influence common raven abundance and that may be used in conjunction with Greater Sage-grouse priority habitat maps to locate sites where lethal

	treatments of common ravens may be applied with the greatest efficacy and efficiency.
Habitat Conditions	Persistent drought throughout Nevada has reduced herbaceous cover, along with nesting and brood rearing habitat; these impacts are exacerbated through wildfire and the invasion of cheatgrass. Transmission lines, substations, and nearby agriculture production also threaten Greater Sage-grouse habitat.
Comments from FY 2019 Predator Report	Common raven predation may be the greatest limiting factor in Greater sage-grouse nest success, NDOW supports continuing Project 41.
Methods	<p><i>Population monitoring and space use</i> Point counts for common ravens will be conducted from March through July of each year, which corresponds with Greater 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). ARGOS backpack transmitters will be deployed to monitor common raven space use and space use.</p> <p><i>Development of Resource Selection Function (RSF)</i> An RSF will be developed using data on landscape features collected in habitats with varying observed abundance indices for common ravens. The abundance indices collected will include common raven point count and Greater Sage-grouse point counts. The landscape features that will be entered into the model will include 1 meter resolution digital elevation models and fire regime. The RSF for common ravens will be overlaid on polygons that feature Greater Sage-grouse priority habitats.</p> <p>Identifying habitats likely to support high numbers of common ravens where Greater Sage-grouse conservation is of highest priority will provide future locations where common raven removal may be warranted, land use activities may be modified, or more intensive Greater Sage-grouse monitoring may be focused.</p> <p><i>Utility line surveys</i> Various utility lines will be identified in and near Greater 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.</p>

Anticipated Results	<p>1. Develop a protocol to estimate common raven populations in Greater Sage-grouse habitat, and monitor these populations.</p> <p>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.</p> <p>3. Determine what common raven removal location will provide the greatest benefit to Greater Sage-grouse. Determine what time of the year is the optimal time to conduct common raven removal to optimize benefit to Greater Sage-grouse.</p>
Staff Comment	<p>Project 41 has resulted in the largest GPS location dataset for common ravens in history. It has also resulted in several peer-reviewed publications. The most recent list of these accomplishments may be found in the Appendix of the FY 2019 Predator Report.</p> <p>This project will develop a statewide population estimate for ravens, common raven growth rate, a common raven density map, detailed analysis of common raven movement and space use, and information necessary to increase the USFWS depredation permit.</p>
Project Direction	Fund Project 41. Evaluate efficacy of Project 41 annually.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$87,500	\$262,500	\$300,000

Project 42: Assessing Mountain Lion Harvest in Nevada

Justification	Nevada Department of Wildlife has a yearlong mountain lion hunting season limited by harvest quotas, although mountain lion are also lethally removal for livestock depredation and to limit predation on specific wildlife populations. Statewide annual adult female harvest is $\leq 35\%$, 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.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Experimentation
Monitoring Level	Rigorous
Potentially Affected Species	Mountain lion, mule deer, bighorn sheep, elk
Span More Than One Fiscal Year	Yes
Project Area	Statewide
Limiting Factor Statement	Habitat and prey availability likely limit mountain lion populations in the state of Nevada.
Response Variable	No response variable will be collected, this is an experimentation project.
Project Goals	<ol style="list-style-type: none"> 1. Develop a population model that incorporates NDOW mountain lion harvest data to predict the number of mountain lions that must be removed to reach desired goals in mountain lion removal projects. 2. Identify limitations and gaps in the existing demographic data for mountain lions that precludes a more complete understanding of mountain lion population dynamics and limits NDOW's management ability with the greatest efficacy and efficiency.
Habitat Conditions	This work would not be conducted in the field, but would rely on statewide harvest data collected over time to include periods of normal and less-than-normal precipitation. Due to the span of the state data collection, habitat during the period of inference would also span a wide variety of conditions and vegetative communities.

Comments from FY 2019 Predator Report	None
Methods	A private contractor will use existing mountain lion harvest data collected by NDOW biologists to develop a harvest model. The modeling approach will involve Integrated Population Modeling (IPM) which brings together different sources of data to model wildlife population dynamics (Abadi et al. 2010, Fieberg et al. 2010). With IPM, generally a joint analysis is conducted in which population abundance is estimated from survey or other count data, and demographic parameters are estimated from data from marked individuals (Chandler and Clark 2014). Age-at-harvest data can be used in combination with other data, such as telemetry, mark-recapture, food availability, and home range size to allow for improved modeling of abundance and population dynamics relative to using harvest data alone (Fieberg et al. 2010). Depending on available data, the contractor will build a count-based or structured demographic model (Morris and Doak 2002) for mountain lions in Nevada. The model (s) will provide estimates of population growth, age and sex structure, and population abundance relative to different levels of harvest.
Anticipated Results	1. Estimate statewide population dynamics, age structure, and sex structure of mountain lions in the state of Nevada with existing NDOW data. 2. Recommend additional data that could be collected to improve the model and reduce uncertainty in model results in the future.
Staff Comment	Building an Integrated Population Model for mountain lions will allow the Department to manage mountain lions on a finer scale.
Project Direction	Fund Project 42 through FY 2021.

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$2,500	\$7,500	\$10,000

Project 43: Mesopredator removal to protect waterfowl, turkeys, and pheasants on Wildlife Management Areas

Justification	Mesopredators including coyotes, striped skunks, and raccoons often consume waterfowl, pheasant, and turkey eggs. Consuming these eggs may limit fowl species population growth, and could be causing a declines on Overton and Mason Valley Wildlife Management Areas.
Project Manager	Isaac Metcalf and Bennie Vann, Nevada Department of Wildlife
Project Type	Implementation
Monitoring Level	Standard
Potentially Affected Species	Assorted waterfowl, turkey, pheasant, coyote, striped skunk, raccoon
Span More Than One Fiscal Year	Yes
Project Area	Overton and Mason Valley Wildlife Management Areas
Limiting Factor Statement	Though predation is a naturally occurring phenomenon for waterfowl, turkeys, and pheasants, their populations can be lowed or suppressed by abiotic factors such as dry climate and loss of quality habitat.
Response Variable	The response variable for waterfowl, turkeys, and pheasants will be the number of females with clutches, and the number of young per clutch.
Project Goals	To increase clutch size and survival of waterfowl, turkeys, and pheasants on Overton and Mason Valley WMAs.
Habitat Conditions	Persistent drought throughout Nevada has reduced herbaceous cover, nesting, and browsing habitat.
Comments from FY 2019 Predator Report	NDOW recommends continuing project 43 pending funding availability.
Methods	USDA Wildlife Services and private contractors working under direction of NDOW, will use foothold traps, snares, calling and gunning from the ground to remove coyotes, striped skunks, and raccoons during waterfowl, turkey, and pheasant nesting seasons.
Anticipated Results	1. Increase the number of female turkeys, waterfowl, and pheasants that successful raise clutches.

	<p>2. Increase the number female turkeys, waterfowl, and pheasants that have clutches.</p> <p>This project will be cancelled or altered once there are two consecutive three year averages where:</p> <p>The average hen turkey successfully raises 3 polts. Area biologists believe waterfowl no longer need predator removal. Area biologists believe pheasants no longer need predator removal.</p>
Staff Comment	Area managers have noticed a substantial increase in waterfowl nest success and an increase in clutch size since the inception of project 43.
Project Direction	Fund Project 43 through FY 2021.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$50,000	N/A	\$50,000

DRAFT

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

Justification	The local desert bighorn sheep population has been underperforming in the Delamar Mountains since the initial reintroduction in 1996 (M. Cox, <i>personal communication</i>). Mountain lions may be a contributing factor to this underperformance.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Experimental Management
Monitoring Level	Intermediate
Potentially Affected Species	Mountain lion, bighorn sheep
Span More Than One Fiscal Year	Yes
Project Area	Areas 23 and 24
Limiting Factor Statement	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).
Response Variable	Response variables may include reduction of prey taken by mountain lions, removal of a mountain lion that was documented consuming the concerned big game species, or a reduction in mountain lion sign. Because of the quick nature of the project, there may be times when no response variable will be measured.
Project Goals	1. Remove specific, problematic mountain lions to benefit desert bighorn sheep 2. Deploy and maintain up to 20 GPS collars on mountain lions in proximity area to increase understanding of mountain lion diet, space use, and movement.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, lambing, and browsing habitat. These effects may have reduced bighorn sheep and other big game populations below carrying capacity. These effects may also be suppressing mule deer or big game populations below carrying capacity (Ballard et al. 2001).
Comments from FY 2019 Predator Report	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.

Methods	<p>Mountain lions in the area of concern will be lethally removed (see map) until three consecutive years of adult annual survival for bighorn sheep exceed an average of 90% and fall female to young ratios exceed 30:100.</p> <p>Mountain lions in the proximity area (see map) will be captured with the use of hounds and/or foot snares. Captured mountain lions will be chemically immobilized and marked with a GPS collar. Marked mountain lions that enter the area of concern and consume bighorn sheep will be lethally removed.</p>
Anticipated Results	<ol style="list-style-type: none"> 1. Remove any offending mountain lion known to be consuming bighorn sheep. 2. Increase understanding of mountain lion movements, space use, and diet within the proximity area. 3. Increase local bighorn sheep adult annual survival rates and fall young:female ratios.
Staff Comment	<p>Determining mountain lion prey selection prior to lethal removal allows the Department to make more informed decisions on which mountain lion to remove. The Delamar based lions are consuming a substantial number of feral horses. The Department will increase our understanding of the effect mountain lions can have on feral horse populations.</p>
Project Direction	<p>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.</p>

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$ 100,000	N/A	\$ 100,000

Project 45: Passive Survey Estimate of Black Bears in Nevada

Justification	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.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Experimentation
Monitoring Level	Rigorous
Potentially Affected Species	Black bear
Span More Than One Fiscal Year	Yes
Project Area	Units 014, 015, 021, 192, 194, 195, 196, 201, 202, 203, 204, 291
Limiting Factor Statement	Black bears have recently expanded their distribution in western Nevada 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). Nevada black bears are an extension of a California based metapopulation (Malaney et al. 2017), monitoring this rewilding is important for proper management.
Response Variable	No response variable will be collected, this is an experimentation project.
Project Goals	1. Passively estimate the abundance of black bears in Nevada. 2. Predict the density and occupancy of black bears in Nevada. 3. Provide guidance to the Department on which passive methods should be continued for future use.
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 mountain lions do not use as primary habitat.

Comments from FY 2019 Predator Report	Due to FY 2018 being extremely hot and dry, and FY 2019 having above average snow fall, NDOW supports continuing Project 45 through FY 2022.
Methods	In a collaboration with Michigan State University 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. Please see the appendix for project proposal.
Anticipated Results	<ol style="list-style-type: none"> 1. A statewide black bear population estimate. 2. An estimate of black bear occupancy, density, and abundance based on hair snares and trail cameras. 3. Guidance to the Department on which methods will be best suited for sustained population estimation.
Staff Comment	Project 45 will allow the Department to make more informed decisions on statewide black bear management, including the black bear hunt seasons and harvest limits.
Project Direction	Fund Project 45 through FY 2022.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$25,000	\$75,000	\$100,000

FY 2021 NEWLY RECOMMENDED PROJECTS

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

Justification	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.
Project Manager	Pat Jackson, Nevada Department of Wildlife
Project Type	Experimental Management
Monitoring Level	Rigorous
Potentially Affected Species	Mule deer, bighorn sheep, pronghorn, coyote, mountain lion
Span More Than One Fiscal Year	Yes
Project Area	Units 021, 011, 012, 013, 014, 015, 032, 033, 034
Limiting Factor Statement	Predation, drought, fire, degraded habitat, and competition from feral horses may all be limiting factors.
Response Variable	For the first phase of this project, no treatment is expected, therefore no response variable will be collected.
Project Goals	<ol style="list-style-type: none"> 1. Accurately estimate mountain lion, feral horse, mule deer and/or pronghorn densities in specified areas. 2. Increase understanding of how mountain lion, feral horse, mule deer and/or pronghorn densities changes throughout the course of a year.
Habitat Conditions	Persistent drought combined with fires and human disturbances throughout Nevada have reduced herbaceous cover, fawning or lambing, and browsing habitat. These effects may have reduced mule deer and other big game populations below carrying capacity. These effects may also be suppressing mule deer or big game populations below carrying capacity (Ballard et al. 2001).

Comments from FY 2019 Predator Report	N/A
Methods	In a collaboration with outside researchers, trail camera grids will be placed in strategic locations to determine densities of both predators and prey species. The locations of these camera grids will be determined by using area biologist and input, existing mule deer GPS data, BLM feral horse estimates, and other forms of institutional knowledge.
Anticipated Results	<ol style="list-style-type: none"> 1. A better understanding of predator and prey densities across Northwest Nevada. 2. Specific management recommendations.
Staff Comment	Project 46 should be considered the analysis of a “check engine” light in Northwest Nevada. Upon completion the Department will have a better understanding of predator and prey densities in Northwest Nevada.
Project Direction	Fund Project 46 through FY 2025. Seek outside funding opportunities such as Heritage Grant funds.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$15,000	\$45,000	\$60,000

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Overall FY 2021 Budget

Project	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)	\$175,000	N/A	\$175,000
Project 21-02: Common Raven Removal to Enhance Greater Sage-Grouse Nest Success	\$25,000	N/A	\$25,000
Project 22-01: Mountain Lion Removal to Protect California Bighorn Sheep	\$90,000	N/A	\$90,000
Project 22-074: Monitor Rocky Mountain Bighorn Sheep for Mountain Lion Predation	\$20,000	N/A	\$20,000
Project 37: Big Game Protection-Mountain Lions	\$75,000	N/A	\$75,000
Project 38: Big Game Protection-Coyotes	\$75,000	N/A	\$75,000
Project 40: Coyote and Mountain Lion Removal to Complement Multi-faceted Management in Eureka County	\$100,000	N/A	\$100,000
Project 41: Increasing Understanding of Common Raven Densities and Space Use in Nevada	\$87,500	\$262,500	\$300,000
Project 42: Assessing Mountain Lion Harvest in Nevada	\$2,500	\$7,500	\$10,000
Project 43: Mesopredator Removal to Protect Waterfowl, Turkeys, and Pheasants on Wildlife Management Areas	\$50,000	N/A	\$50,000
Project 44: Lethal Removal and Monitoring of Mountain Lions in Area 24	\$100,000	N/A	\$100,000
Project 45: Passive Survey Estimate of Black Bears in Nevada	\$25,000	\$75,000	\$100,000
Project 46: Investigating Potential Limiting Factors Impacting Mule Deer in Northwest Nevada	\$15,000	\$45,000	\$60,000
Total^b	\$854,000	\$390,000	\$1,194,000

^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 lethal removal as a primary aspect, making them ineligible for Federal Aid funding.

Expected Revenues and Beginning Balance of Predator Fee

	FY 2018 Actual	FY 2019 Actual (revised)	FY 2020 Estimated	FY 2021 Projected
Beginning balance	\$592,122	\$412,582	\$287,651	\$175,715
Revenues	\$677,186	\$717,064	\$717,064	\$717,064
Plan Budget	\$961,500	\$961,500	\$829,000	\$854,000
Expenditures	\$856,726	\$841,994	\$829,000	\$854,000
Ending balance	\$412,582	\$287,651	\$175,715	\$38,799

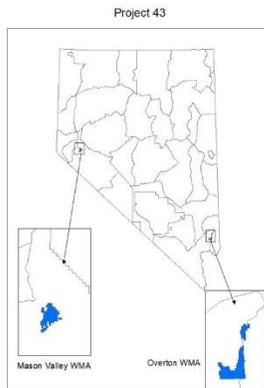
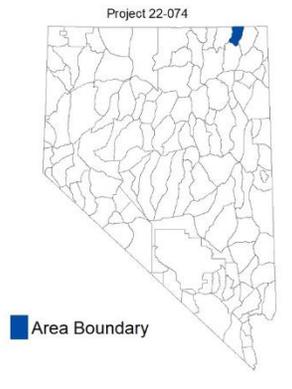
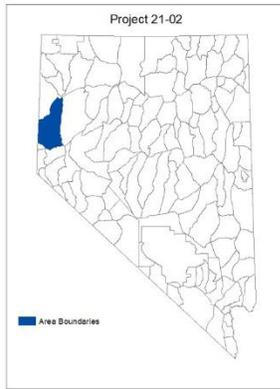
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Appendix

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



**Nevada Department of Wildlife
Predator Management Plan
Fiscal Year 2021**

Summary on Plans and Reports

- Just reported on FY 2019
- Currently in FY 2020
- Presenting on FY 2021
- All available at

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

NRS 502.253 (predator fee)

- ~\$717,000 generated annually
- \$14,000 admin support Dept of Agriculture
- Predator plan projects
- Staff salary
- Reserve remains available for future years

NRS 502.253

1. Management of predatory wildlife
2. Research on lethal control techniques of predatory wildlife
3. Protection of sensitive species

NRS 502.253

- Mandates that 80% of revenues from most recent fiscal year from which we have complete accounting to be spent on lethal removal
- Includes monitoring of effects from lethal removal efforts

Budget Summary

- \$717,064 revenues from FY 2019 (last year with complete accounting, still receiving revenue in FY 2020)
- $\$717,064 \times 0.8 = \$573,651$ (80% mandate)
- \$724,000 allocated to lethal removal in FY 2021 plan

Dust is Settling Summary

- PARC recommended no change 2.28.2020
- Whole world got hit with a case of corona
- Still figuring everything out

Projects Recommended for Continuation



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

Project Type: Implementation and Experimental Management



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

- Protect greater sage-grouse populations
- Lethally remove common ravens
- Determine what level of raven control is
needed

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

Budget:\$175,000

- Wildlife Services administers corvicide (DRC-1339)
- Surveys to determine common raven densities across Nevada



Monitoring

Response Variable

- Point counts before, during, and after to determine changes in raven densities

Level of Monitoring

- Standard to intermediate



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

Project Type: Implementation and Experimental
Management



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

Budget: \$25,000

- Document effect of raven removal
- Wildlife Services conducts avicide application
- USGS will conduct telemetry, camera, and lek surveys



Monitoring

Response Variable

- Sage grouse nest success
- Brood survival

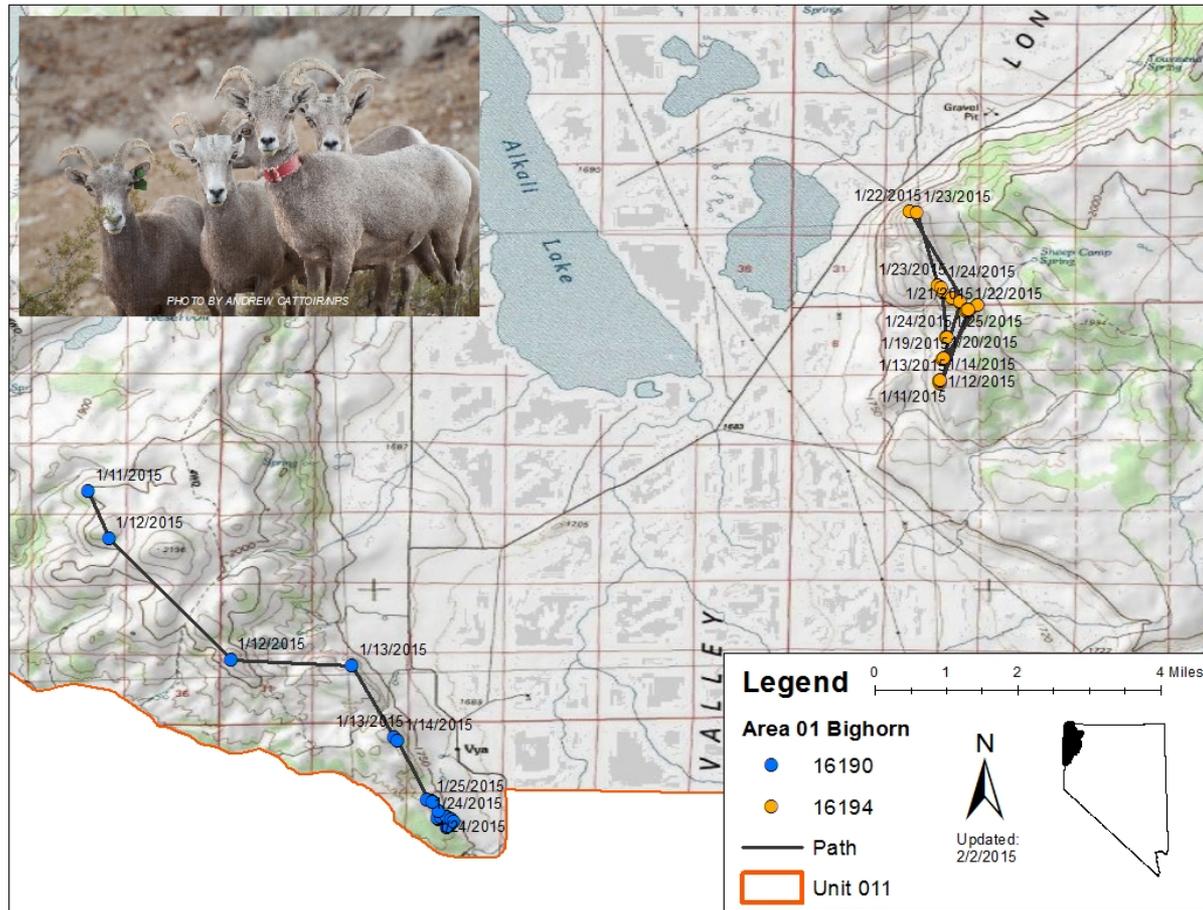
Level of Monitoring

- Intermediate (funding not from predator fee)



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

Project Type: Implementation



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

Budget: \$90,000

- Establish self-sustaining population of bighorn sheep, subset of population is currently collared
- Wildlife Services and private contractors are proactively removing lions entering area
- Wildlife Services or others may respond reactively with dogs after a sheep mortality

Monitoring

Response Variable

- Number of collared bighorn sheep killed by mountain lions

Level of Monitoring

- Standard to intermediate



Population Dynamics

- Populations estimated at approximately 50 individuals in 011 and 013

Action	Bighorn Sheep Population
Monitor bighorn population, conduct removal on case by case basis	> 80
Remove lions that consume bighorn sheep*	60 - 80
Remove all lions in area	< 60

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

Project Type: Implementation and Experimental
Management

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

Budget: \$20,000

- Establish self-sustaining population of bighorn sheep
- Monitor bighorn sheep populations with GPS collars
- Remove mountain lions consuming bighorn sheep

Monitoring

Response Variable

- Number of collared bighorn sheep killed by mountain lions

Level of Monitoring

- Standard to intermediate



Population Dynamics

- The population estimate is 35-40 individuals in area 074

Action	Bighorn Sheep Population
Monitor bighorn population, conduct removal on case by case basis	> 15
Remove lions that consume bighorn sheep*	10 - 15
Remove all lions in area	< 10

Project 37: Big Game Protection- Mountain Lions

Project Type: Implementation



Predator Removal Indices

Species	Annual Adult Survival Rates	Fall Young: Female Ratios	Spring Young: Female Ratios	Adult Female Annual Survival Rates
California Bighorn Sheep	< 90%	< 40:100	--	--
Rocky Mountain Bighorn Sheep	< 90%	< 40:100	--	--
Desert Bighorn Sheep	< 90%	< 30:100	--	--
Mule Deer	--	--	< 35:100	< 80%
Pronghorn	< 90%	< 40:100	--	--

Project 37: Big Game Protection- Mountain Lions

Budget: \$75,000

- Addressing population limiting predation by mountain lions
- Work will be conducted by Wildlife Services, private houndsmen, and/or private trappers
- Problematic mountain lions will be identified through GPS collar locations, trail cameras, and kill sites

Monitoring

Response Variable

- Reduction of mountain lion induced mortalities
- Reduction of mountain lion densities or sign
- Removal of known offending individual
- Response variable may not be collected

Level of Monitoring

- Standard

Project 38: Big Game Protection- Coyotes

Project Type: Implementation



Project 38: Big Game Protection- Coyotes

Budget: \$75,000

- Addressing coyote predation that has a negative influence on game populations
- Removal of coyotes in pronghorn and deer winter range and fawning areas in certain situations
- Work will be conducted by Wildlife Services and private contractors

Monitoring

Response Variable

Level of Monitoring

- Reduction of coyote induced mortalities
 - Removal of offending individuals
 - Reduction in coyote sign
 - Response variable may not be collected
- Standard

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

Project Type: Implementation



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

Budget: \$100,000

- Coyote removal will complement previously conducted feral horse removal, habitat improvement, and past predator removal efforts

Monitoring

Response Variable

- Fawn to doe ratios in Area 14

Level of Monitoring

- Standard to intermediate



Project 41: Common Raven Management and Experimentation

Project Type: Experimentation



Project 41: Common Raven Experimentation

Budget: \$300,000 (25% from \$3 predator fee)

- Develop a protocol to estimate common raven populations
- Increase the understanding of common raven density and distribution
- Increase the understanding of how human subsidies affect common raven movements and space use

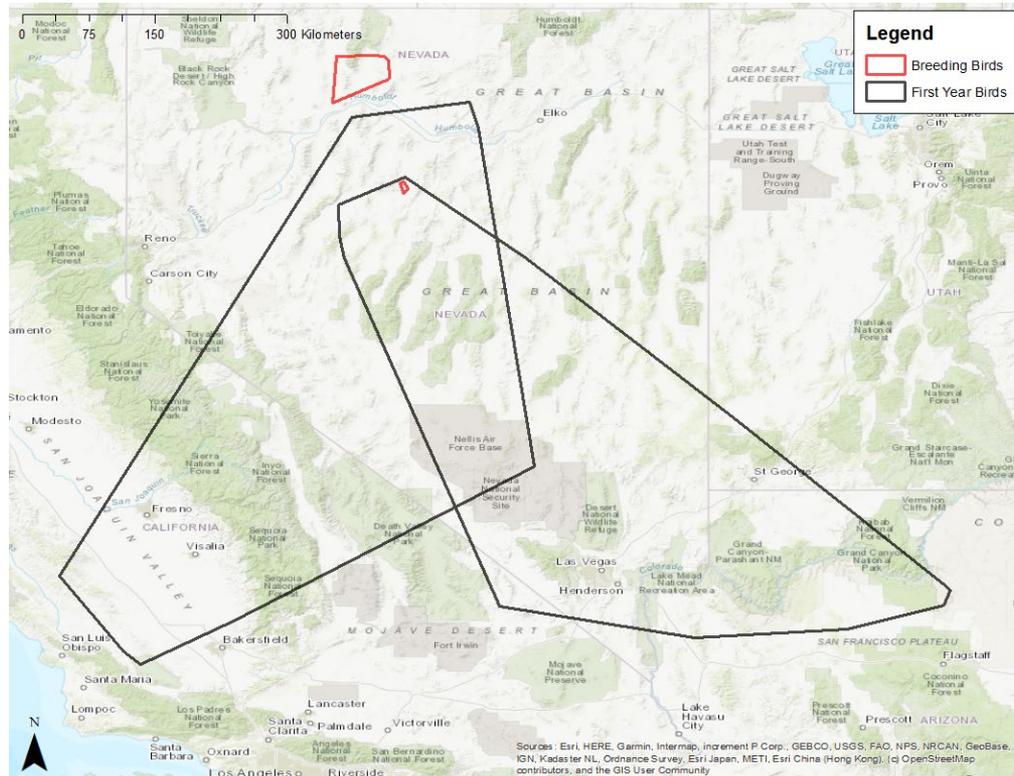
Monitoring

Response Variable

Level of Monitoring

- None, this is an experimental project

- Rigorous



Project 42: Assessing Mountain Lion Harvest in Nevada

Project Type: Experimentation

Project 42: Assessing Mountain Lion Harvest in Nevada

Budget: \$10,000 (25% from \$3 predator fee)

- Develop a model that predicts the number of lions that must be removed to reach management goals
- Identify gaps in data
- Determine what data is necessary to increase NDOWs understanding of mountain lions statewide

Monitoring

Response Variable

- None, this is an experimental project

Level of Monitoring

- Rigorous



Project 43: Mesopredator removal to protect waterfowl, turkeys, and pheasants on Wildlife Management Areas

Project Type: Implementation



Project 43: Mesopredator removal to protect waterfowl, turkeys, and pheasants on Wildlife Management Areas

Budget: \$50,000

- To occur on Overton and Mason Valley WMAs
- Coyotes, striped skunks, and raccoons will be lethally removed

Monitoring

Response Variable

- Number of females with clutches
- Number of young per clutch

Level of Monitoring

- Standard



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

Project Type: Experimental Management

Project 44: Lethal Removal and Monitoring of Mountain Lions in Areas 23 and 24

Budget: \$100,000

- To occur primarily in areas 23 and 24
- Mountain lions in collar area will be captured and collared. Any collared lion killing bighorn sheep will be lethally removed

Monitoring

Response Variable

- Project will continue until adult annual survival for bighorn sheep reach 90% annually and fall female to young ratios exceed 30:100
- Goals may change based on collaring data

Level of Monitoring

- Intermediate

Project 45: Passive Survey Estimate of Black Bears in Nevada

Project Type: Experimentation



Project 45: Passive Survey

Estimate of Black Bears in Nevada

Budget: \$100,000 (25% from \$3 predator fee)

- To occur primarily in areas inhabited by black bears

Project 45: Passive Survey

Estimate of Black Bears in Nevada

1. Passively estimate the abundance of black bears in Nevada
2. Predict the density and occupancy
3. Provide guidance to the Department

Project 45: Passive Survey

Estimate of Black Bears in Nevada

- Collaboration with Michigan State University and University of Montana
- Postdoctoral researcher from Michigan State University
- Hair snag and trail cameras main focus of field work

Monitoring

Goals

1. A statewide black bear population estimate
2. An estimate of black bear occupancy, density, and abundance based on hair snares and trail cameras
3. Guidance to the Department on which methods will be best suited for sustained population estimation

Level of Monitoring

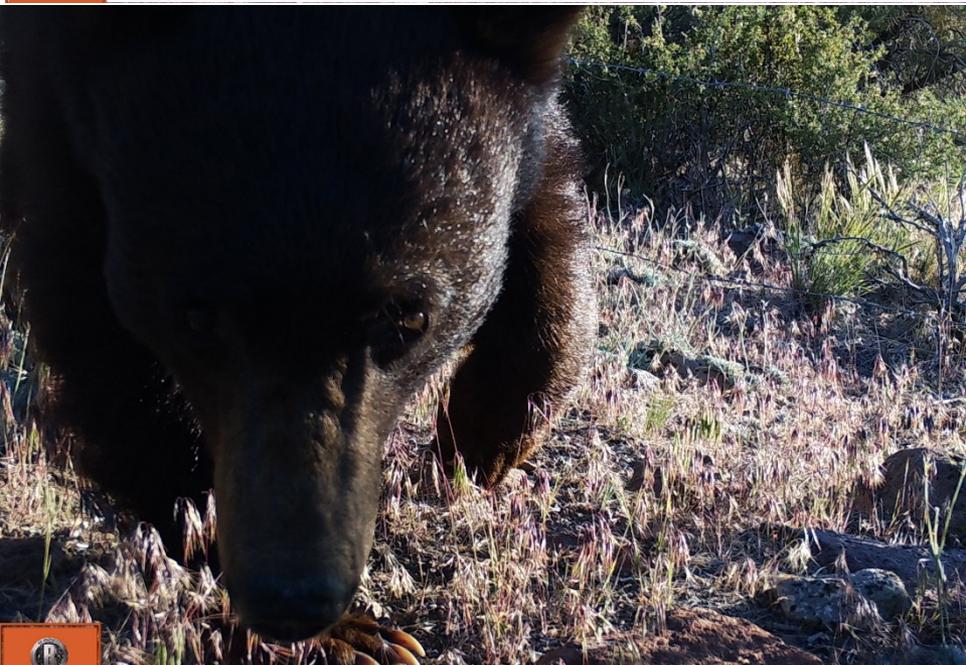
- Rigorous



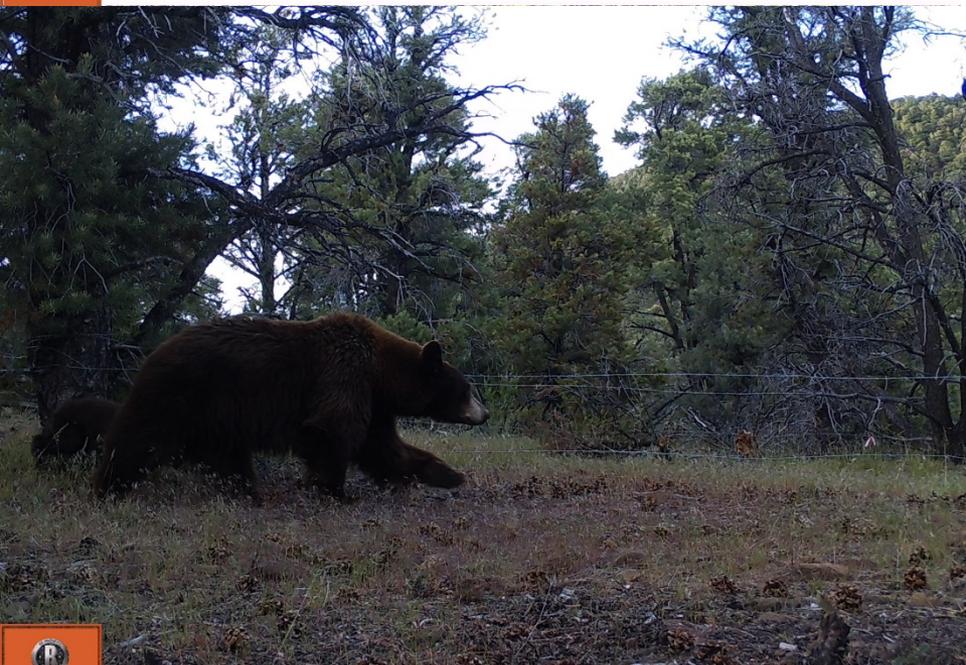
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 Bushnell  NVB105 51°F 10°C ● 06-08-2019 19:33:15





Bushnell  NVB158 95°F 35°C  07-29-2018 17:12:31



Bushnell  NVB158 142°F 61°C  07-29-2018 17:21:39

Newly Proposed Projects



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

Project Type: Experimentation

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

Budget: \$60,000 (25% from \$3 predator fee)

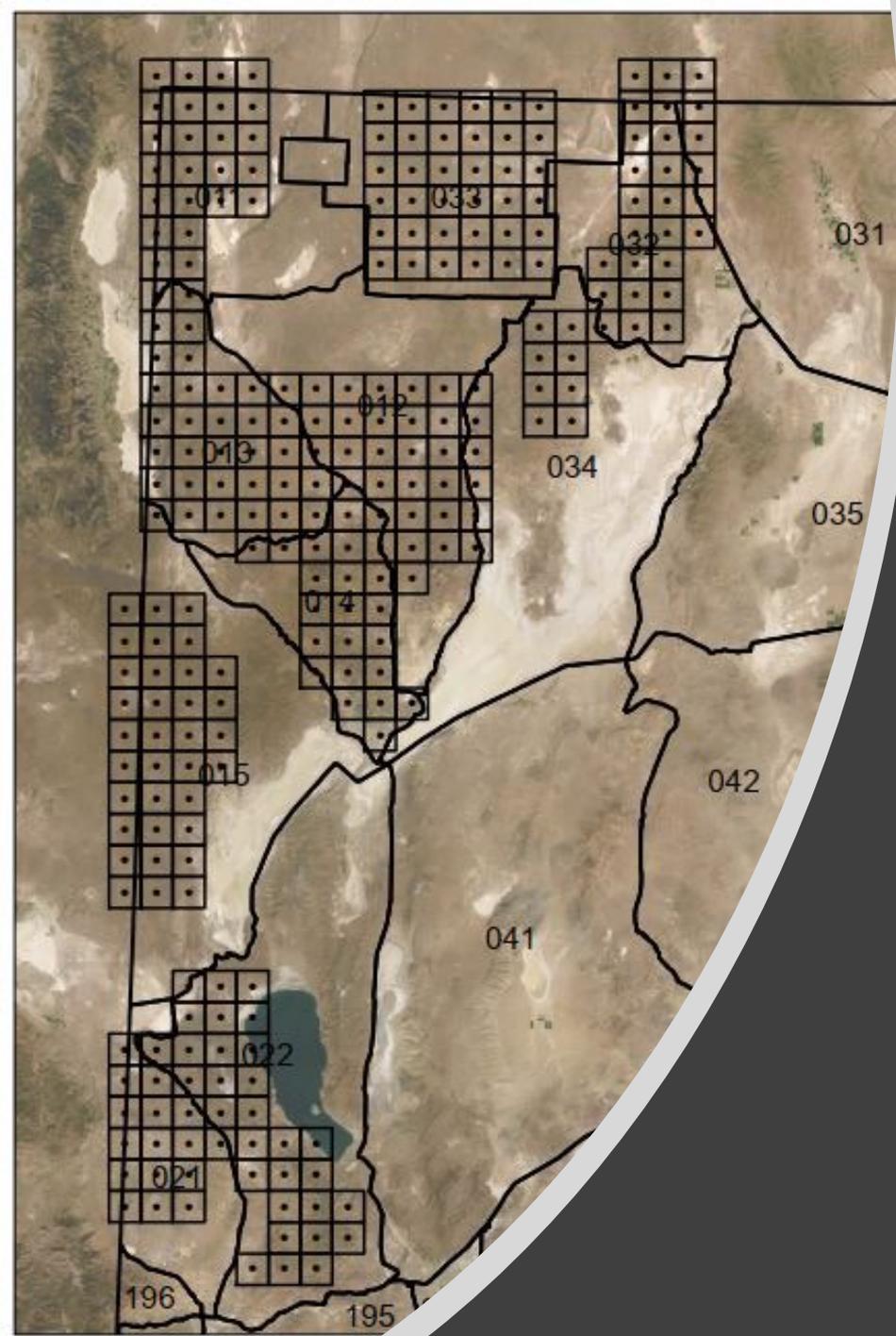
- To occur in northwest Nevada

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

1. Accurately estimate mountain lion, feral horse, mule deer and/or pronghorn densities in specified areas
2. Increase understanding of how mountain lion, feral horse, mule deer and/or pronghorn densities changes throughout the course of a year

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

- Collaboration with outside institution
- Series of trail camera grids throughout study area
- Year long monitoring



Draft Map

Next Actionable Items

- Large area
- Long term management action likely necessary
- \$\$\$
- May be a management recommendation
- May be more data collection

Questions?





Predatory Animal & Rodent Control Committee Meeting Minutes

Friday, February 28, 2020, 2:30 P.M.

Meeting location: Nevada Department of Agriculture
4780 East Idaho Street
Elko, NV 89801
775-738-8076

Video conference: Nevada Department of Agriculture
405 S. 21st Street
Sparks, NV 89431
775-353-3601

Nevada Department of Agriculture
2300 East St. Louis Ave.
Las Vegas, NV 89104
702-668-4590

Public Notice

*Below is an agenda of all items to be considered. **Action may be taken on items preceded by an asterisk (*)**. Denotes possible closed session (**). Items on the agenda may be taken out of the posted order, items may be combined for consideration; and items may be pulled or removed from the agenda at any time at the discretion of the Chairperson. Unless noted as an action item, discussion of any item raised during a report or public comment is limited to that necessary for clarification or necessary to decide whether to place the item on a future agenda. Public comment may be limited to three minutes per person at the discretion of the chairperson.*

Reasonable efforts will be made for members of the public who have disabilities and require special accommodations for assistance at the meeting. Please call the Executive Assistant at 775-353-3619.

Notice of this meeting was posted on or before 9:00 a.m. on the third working day before the meeting at the following locations: Nevada Department of Agriculture, 405 S. 21st Street, Sparks, NV 89431, Nevada Department of Agriculture, 2150 Frazer Ave., Sparks, NV 89431, Nevada Department of Agriculture, 4780 E. Idaho Street, Elko, NV 89801, Nevada Department of Agriculture, 2300 E. St. Louis Ave., Las Vegas, NV 89104, State of Nevada Capital Building, Carson City NV, State Library and Archives, Carson City.

Copies of the agenda, supporting documentation and meeting minutes are available, at no charge, at the Department of Agriculture website at www.agri.nv.gov or www.notice.nv.gov or by visiting Nevada Department of Agriculture, 405 S. 21st St., Sparks, NV 89431, attention Executive Assistant.



Predatory Animal & Rodent Control Committee Meeting Minutes

Friday, February 28, 2020, 2:30 P.M.

AGENDA

1. Open meeting-call meeting to order by Chair Pete Paris

- a. Pledge of Allegiance
- b. Roll call

Sparks committee members: Dr. Ihsan Azzam, Darrell Pursel, Tom Barnes.

Sparks staff: Doug Farris, Julia Ketcham.

Sparks guests: Pat Jackson (NDOW), Mike Scott (NDOW), Brandee Mooneyhan (DAG).

Elko committee members: Pete Paris, Boyd Spratling, Tom Barnes, Walt Gardner, Cody Krenka.

Elko staff: Linda Manning.

Elko guests: Joe Bennett (USDA).

Las Vegas: None.

2. Public Comment

None.

3. Minutes

- a. *Approval of February 27, 2019 committee meeting minutes (*for possible action*)

Darrell Pursel moved to approve the February 27, 2019 meeting minutes. Tom Barnes seconded this motion. The motion passed.

4. Committee Business

- a. *Committee selection of new Chair for 2020 and 2021, per NRS 567.040 (*for possible action*)

Darrell Pursel nominated himself – Boyd Spratling nominated Darrell Pursel. Walt Gardner seconded this motion. The motion passed.

- b. *Committee selection of new Vice Chair for 2020 and 2021, per NRS 567.040 (*for possible action*)

Pete Paris nominated Tom Barnes. Boyd Spratling seconded this motion. The motion passed.



Predatory Animal & Rodent Control Committee Meeting Minutes

Friday, February 28, 2020, 2:30 P.M.

- c. *Chair designation of 2 members, per NRS 567.030 (for possible action)

Chair designated Cody Krenka and Walt Gardner, they both accepted.

- d. *Nevada Department of Wildlife FY2020 Predator Control Plan presentation and coordination of submission of comments – Pat Jackson, Nevada Department of Wildlife (*for possible action*)

Presentation of additional information regarding new goals and focus. Question and answer session between the committee and NDOW staff.

Where is Project #46 – Units listed on page 36 of the Draft Units 021, 011, 012, 013, 014, 015, 032, 033, 034

Walt Gardner made a motion to accept the plan as written. Tom Barnes seconded the motion. The motion passed.

*Progress update on Predatory Animal and Rodent Control program by USDA Wildlife Services, Joe Bennett. (*for information*)

Boyd Spratling questioned the permits for legal take Fish / Wildlife Services form 37

- e. *Meeting schedule discussion (*for information*)

Secretary will provide committee with dates available for the next meeting. Committee discussed NDOW Board meeting being held Jan 29-30, 2021 and a desire to have the 2021 meeting as soon as possible following. Pat Jackson stated they can have information provided the week following the NDOW meeting.

5. Public Comment

Doug Busselman requested that rodent control needs to be addressed and what help or services can this committee provide to landowners.

6. Adjournment

Meeting adjourned at 3:22pm with Walt Gardner motioning and Cody Krenka seconded the motion. The motion passed.

Coalition for Nevada's Wildlife

P. O. Box 70143
Reno, Nevada 89570

May 15, 2020

Nevada State Wildlife Commission
Wildlife Damage Management Committee

Re: FY 2021 Predator Management Plan (Draft)

Committee Members:

NRS502.253 authorized the collection of a \$3 fee for each big game application for use by NDOI to manage and control predatory wildlife. Sportsmen were in strong support of this concept, believing these funds would be spent on actual predator control. This has not always been the case with funds expended on such studies as "what coyotes eat". In 2015, the bill was amended to require 80% (eighty percent) of the monies to be expended on lethal management and control.

While we fully recognize that environmental factors such as drought and wildfire seriously impact wildlife populations, we also know that predation is an important factor. When big game populations are at low levels, predation can retard or prevent recovery. Our mule deer herds are depressed throughout much of the state; however, the Draft FY 2021 Predator Management Plan has only limited response to this issue. Only Projects 37, 38, 40, and 44 directly address this issue. Projects 41 and 45 are of interest, but should not be funded with predator fees. Project 46 is too little, too late; mule deer populations in NW Nevada have plummeted to alarmingly low levels. Actually, to now propose a predator-prey interaction study in Washoe County would almost be comical if not for the immense tragedy of the resource that has been lost. As you are undoubtedly aware, Nevada is not a state in want for predatory wildlife. We are, however, facing an incredible loss of our mule deer herds. While studies can be informative, our mule deer deserve action!

NDOI increasingly places emphasis on social desires while bemoaning the lack of recruitment of new hunters. In Nevada the demand for big game tags far outweighs the number of tags available. The surest and most ecologically responsible way to increase opportunity is to increase game numbers (not artificially increase tags). This is truly responding to the needs of the public and the appropriate use of the predator management fees. The Predator Management Plan should maintain this as a priority. To do otherwise fails to meet the merits of the fiduciary responsibility incumbent upon this Committee.

Thank you for your consideration.

The Coalition for Nevada's Wildlife

Larry J. Johnson – President (also Director of Nevada Outdoorsmen in Wheelchairs, and 30 yr. past director, Nevada Bighorns Unlimited)

Tom Smith – Vice President (also Director, Truckee River Flyfishers)

Joel Blakeslee – Director (also President, Nevada Trapper's Association)

**NEVADA SPORTSMEN AND CONSERVATIONISTS WORKING FOR
THE ENHANCEMENT OF WILDLIFE AND HABITAT**

Karen Boeger – Director (also Director, Back Country Hunters and Anglers)
Brunner, Bob - Director
Judi Caron – Director (also past President, Northern Nevada SCI)
Mike Cassidy – Director (also past President, Northern Nevada SCI)
Rex Flowers – Director (also former Washoe County Advisory Board)
John Hillenbrand – Director (also Director, Carson Valley Chukar Club)
Johnathan Lesperance – Director (also President, Nevada Sporting Dog Alliance)
Linda Linton, Esq. - Director
Willie Molini – Director (President, Nevada Waterfowl Association, and past Director of Nevada Department of Wildlife)
Jim Puryear -- Director (also Director, Nevada Bighorns Unlimited–Reno)
Bob Sack – Director (also Nevada Bow Hunters Association)
Sean Shea - Director (also member Nevada Outfitters and Guide Association)
Les Smith – Director (also State Chairman, Rocky Mountain Elk Foundation)



**NEVADA SPORTSMEN AND CONSERVATIONISTS WORKING FOR
THE ENHANCEMENT OF WILDLIFE AND HABITAT**

May 15, 2020

Nevada Board of Wildlife Commissioners
Wildlife Damage Management Committee
6980 Sierra Center Parkway, Suite 120
Reno, NV 89511

Via E-Mail

RE: DRAFT FY 2021 Predator Management Plan

Dear Committee Members:

Since the May 1, 2020 Quota Setting meeting I have been pondering the Commission's discussion of a particular irony noted in regards to the state's black bear population. Having reviewed the draft fiscal year 2021 Predator Management Plan, I've found a similar irony exists regarding Project 45 – Passive Survey Estimate of Black Bears in Nevada. The irony is that for all of discussion regarding the general public's stated concern about black bears, the entirety of the costs for funding research of the species are still being borne by the state's sportsmen and women.

Our current population estimate has been established through rigorous efforts employing a capture-mark-recapture methodology, representing the best available science and highest confidence intervals available. What warrants the additional study? Further – shouldn't the other stakeholders have a share in the costs? Regardless, I offer the following comments for your consideration specific to the project:

- What are the required densities for sample sites necessary to achieve reasonable confidence intervals?
- What percentage of viable bear habitat needs to be sampled at these densities to establish a "statewide" estimate?
- Are those densities even remotely feasible to achieve given the exceptionally rugged terrain of our state's bear habitat?
- Has additional time been allocated to field personnel in order to collect the samples in a timely manner?
- Where photographs are collected at sites but no biological samples are retained, what technologies will be employed to identify individual animals? There are technologies available and employed by other conservation organizations to detect and identify individual animals captured with trail camera photos. Are these being considered?

- What are the management implications if the population is determined to be lower through the passive study than the existing population estimate? What if the population is determined to be higher?
- Previously there was an indication that the attractant at the sample sites was ineffective at getting a hair sample, as evidenced by photographs of bears at the sites without retention of a viable sample. Has this issue been addressed?
- As a suggestion – a better utilization of the sample collection efforts could be achieved by targeting springs and riparian areas rather than the proposed grid density proposed in the study. Before it was made illegal I was able to observe dozens of distinct bears at a single water source through the use of trail cameras.
- Are volunteer efforts going to be allowed for this project?

In regards to the proposed Project 46 - Investigating Potential Limiting Factors Impacting Mule Deer in Northwest Nevada, this study strikes me as more of an autopsy of the deer herds in Washoe County rather than an intervention to prevent the continued decline of this population, which is desperately needed. Please consider defunding this project and reallocating the monies to a better use that will actually benefit Washoe County's mule deer. Historically these areas were considered among the crown jewels of our state's deer herds, and we are presently looking at nearly complete loss of this once great resource.

Thank you for your consideration of the above.

Sincerely,

s/Jonathan Lesperance