

Committee Members: Commissioner Almberg (Chair),
Commissioner Barnes, Commissioner Caviglia,
Commissioner Wise, Tom Cassinelli, Fauna Tomlinson

Staff to the Committee: Pat Jackson

**Nevada Board of Wildlife Commissioners
Wildlife Damage Management Committee
Nevada Department of Wildlife
3373 Pepper Lane
Las Vegas, Nevada 89120**

Thursday, March 24, 2022 / 6:00 p.m

DRAFT Minutes

1. Call to Order – Chairman Almberg

Meeting called to order 6:02 P.M.

In attendance:

Commissioner Almberg, Chair
Commissioner Caviglia
Commissioner Wise
Fauna Tomlinson
Pat Jackson, Nevada Department of Wildlife
Mike Scott, Nevada Department of Wildlife
Joe Bennett, Nevada Department of Wildlife
Jack Robb, Nevada Department of Wildlife
Tony Wasley, Nevada Department of Wildlife
Commissioner East
Mark Ono, APHIS-WS Nevada State Director

2. Approval of Agenda – Chair Almberg

Commissioner Almberg motioned for the approval of the agenda.

Commissioner Caviglia seconded the motion.

The motion passed.

3. *Approval of Minutes (March 18, 2021) – Chairman Almberg

Commissioner Almberg motioned to approve the March 18, 2021 Minutes.

Commissioner Caviglia seconded the motion.

The motion passed.

**4. *Report on DRAFT FY 2023 Predator Management Plan – Predator Management
Staff Specialist Pat Jackson**

Staff Specialist Jackson provided a slide show presentation of the DRAFT FY 2023 Predator Management Plan. (Attachment A) The Department also reviewed comments from the Predatory Animal and Rodent Committee (PARC) from its February 10, 2022, meeting (Attachment B).

Member Tomlinson asked how many ravens were to be removed with Project 21. Staff Specialist

Jackson answered the Department has a US Fish and Wildlife depredation permit for the removal of common ravens for the protection of greater sage-grouse for 2500 birds. Member Tomlinson asked how many ravens would be removed with Project 41. Staff Specialist Jackson answered that Project 41 was not a removal project, but a research project and that the project's focus was catching ravens under the same permit but releasing them with GPS devices.

Member Tomlinson asked Staff Specialist Jackson approximately how many coyotes and lions would be removed. Mr. Jackson replied he could not say. Member Tomlinson asked if Project 38 removed the most coyotes. Mr. Jackson was unsure of Member Tomlinson's question and stated if Member Tomlinson was asking if marked coyotes were removed in Project 38 or in Project 40, two projects that have coyotes removed, he would need to reference previous predator reports to answer. Mr. Jackson stated he could not predict which project would remove more coyotes this upcoming year. Member Tomlinson asked Mr. Jackson if he knew about how much each project was planning to remove, that was, if he knew which project was planning to remove more. Mr. Jackson replied he did not. Member Tomlinson asked about lions. Mr. Jackson again replied he did not know how many lions would be removed.

Commissioner Caviglia asked if it were possible to add one column to the Predator Plan showing which year the projects started so people can see how long they have been ongoing. Staff Specialist Jackson replied that would be possible.

Member Tomlinson noted that bobcats were not mentioned in the Predator Plan. Staff Specialist Jackson replied that the Department did not have any bobcat removal projects. Member Tomlinson stated she did not see any foxes in the plan either. Mr. Jackson replied that a handful of foxes may have been removed under Project 43, but Nevada did not have a robust fox population, and they were not a concern.

Commissioner Caviglia asked if Project 46 was something that would happen in the FY23 plan or FY24. Staff Specialist Jackson answered it could happen in FY23 and that it was dependent on the US Fish and Wildlife service to complete the review and grant the permission. Commissioner Caviglia asked if the Shelden were added, would funding for Project 46 be sufficient for that additional portion of that project. Mr. Jackson answered that the Department would probably not purchase and deploy all transmitters in the first year and that Project 37 gave the Department the ability to purchase transmitters for lions and so it would be wrapped it into that project (inaudible).

Member Tomlinson commented that Project 44 had been ongoing in the Delamars for 4 years with lions being collared and just the week prior a lion ate a bighorn sheep. Member Tomlinson asked if it was an older lion. Staff Specialist Jackson answered he believed it was an adult tom. Member Tomlinson asked if that was unusual. Mr. Jackson answered yes, in the Delamars, at least with the Department's marked individuals, it was a rare phenomenon.

Member Tomlinson stated that with Project 22, when the bighorn population drops under 60, all lions are killed, even though the study shows it was probably not the lions that were the problem. Staff Specialist Jackson commented he would not recommend Member Tomlinson take lessons learned in the Delamars and extrapolate them across the state. Mr. Jackson continued, stating in the Delamars, the Department collared lions, and in Unit 013 the Department collared bighorn sheep.

Commissioner Wise stated that Project 41 had a few different species mentioned, and she thought the Department was collecting data on ravens. She asked if the Department was primarily focusing on sage-grouse habitat or if the focus was more dispersed. Staff Specialist Jackson answered that the focus was predominately on the Great Basin and not Mojave, but that the models being built for common raven and sage-grouse interactions overlap with common raven and desert tortoise. Mr. Jackson continued that the US Fish and Wildlife Service were making progress at raven management, as well as any bird offered protection under the Migratory Bird Treaty Act that might be impacting sensitive species. Mr. Jackson continued that the project goals were not unique just

to ravens and also captured data useful for the desert tortoise. Mr. Jackson stated within the Predator Plan, the Department looked at greater sage-grouse, but there had been progress benefitting the desert tortoise.

Commissioner Alberg stated that Project 46 added potentially more collars on the Sheldon and asked if the modeling from Project 42 would be a part of what the Department would like to have in order to make a more robust model. Staff Specialist Jackson answered Commissioner Alberg was correct and that the project would deploy GPS transmitters to other parts of the state to look at space use and habitat size. The modelers did not have access to GPS data in northwest Nevada so there remained some wildlife management challenges in that area, which is also one of the most drought-impacted areas. Commissioner Alberg asked if it would benefit Project 46 to add additional areas besides the Sheldon. Staff Specialist Jackson answered yes.

Commissioner Caviglia motioned to accept the DRAFT FY 2023 Predator Management Plan as presented.

Commissioner Wise seconded the motion.

The motion passed.

5. Mule Deer Enhancement Program Predator Project Proposals – Predator Management Staff Specialist Pat Jackson

Staff Specialist Jackson provided a slide show presentation of the proposed predator projects submitted by the Mule Deer Enhancement Program Oversight Committee (Attachment C). The Committee discussed the proposals. Mr. Jackson explained there were two possible ways to fund the proposed projects: to include them in Projects 37 and 38, or to create a new project series. The Committee discussed costs. Mr. Jackson stated that current projects do not have enough funding to cover the costs of the proposed projects.

The Committee discussed the availability of Wildlife Services staff. Mark Ono, APHIS-WS Nevada State Director, commented on estimated costs given to the Washoe County Mule Deer Enhancement Program Subcommittee (Washoe County Subcommittee) at its request. Mr. Ono stated that Wildlife Services does not have the staff to accommodate the predator-based Mule Deer Enhancement Program project proposals. Mr. Ono stated that a specific skill set is required to work for Wildlife Services, which makes hiring the correct individual challenging. Mr. Ono continued that a year-round position was preferred over seasonal staff positions, however skilled staffing remained a reoccurring problem. Mr. Ono commented he thought the proposed projects were grossly underfunded.

The Committee discussed projects in Wilderness Study Areas and how coyote removal could be an internal project since the Department does not have access to the planes, and other craft and machinery. Commissioner Wise asked if the Committee was prepared to take on these projects and if the Committee should have more data about what the best way to move forward was and if there was a sense of urgency due to the drought.

Member Tomlinson commented that lions and coyotes were not the problem for the mule deer population; the problem was the mega-drought. Staff Specialist Jackson commented that Department staff was already burdened, and the work would need to be outsourced. He stated that the drought is a large portion of the issue. The Department had not collected baseline data to confirm if the mule deer population in an area were underperforming because of predation. Mr. Jackson stated there seemed to be a general assumption that there was good habitat out there and predators were keeping the population from accessing that habitat. Mr. Jackson stated the Department had not thoroughly looked at that theory. Mr. Jackson commented that when the Department assessed mule deer in the early fall, the deer were scored as a 2 to 2.5 out of a metric of 1-5. Mr. Jackson stated that poor body condition going into winter is not a sign of stress from

predators, it is a sign of not enough food. Commissioner Wise agreed.

Commissioner Caviglia asked where the estimates of amounts came from. Game Administrator Scott answered that most of the cost estimates were comparable with other projects and that he directed these costs. Mr. Scott continued he wanted predator removal projects to be more surgical defensible and that such projects were less costly than some of the other projects that have been requested. Commissioner Alberg agreed, but commented it seemed there was nobody available to do the projects. Game Administrator Scott stated that Projects 37 and 38 could handle the proposed projects. He continued that Wildlife Services would need to tell the Department what it needs in order to get the projects done and that the Department might be less efficient than it would like to be.

Mr. Ono commented that ground-based management is less intensive than aviation management. He continued that aviation is less labor intensive, episodic, surgical with using helicopters, etc. He stated that a lot of the projects have ground-based component, which was why he made his earlier comments. Mr. Ono stated that if the projects were aviation-based, they might be more do-able given the contracts Wildlife Services has with certain helicopter companies, although it would depend on the overall goal and how the Department approaches each project.

Commissioner Caviglia asked if the Department met the predator fee amount on Project 37 and 38. Staff Specialist Jackson stated that was hard to answer due to the last 2 years of COVID. Mr. Jackson stated the last 2 years fallen short, but in previous years, the budget was exceeded.

Commissioner Alberg asked Staff Specialist Jackson to elaborate on recommendations for collecting baseline data. Commissioner Alberg wanted to know what data was needed and if the collection of that data created the same capacity problem due to lack of Department staff resources. Mr. Jackson answered that "counting costs more than killing" meaning the cost of data collection is usually higher than predator removal. Mr. Jackson continued that although Wildlife Services had been helpful in creating baseline data, staffing issues continued to be a problem.

The Committee further discussed the scope and cost of the proposed mule deer projects and how those projects may overlap or dovetail with the Predator Plan.

Commissioner Alberg asked Game Administrator Scott if there was a way to incorporate the effects desired by the Washoe County Subcommittee into Predator Plan projects that were already underway. Mr. Scott answered that there was no doubt lions and coyotes were an issue in Washoe County, but drought, wildfire, and habitat loss were also issues. Mr. Scott continued that the mule deer projects would allow the Department and the Subcommittees to get baseline data and learn new information. Mr. Scott stated one item he wanted to require of new projects was they be science-based and that a goal or set of goals be accomplished. Mr. Scott reiterated that everyone involved was learning as they went since this was a new program; a project should collect baseline data and also lead somewhere, i.e., to an action. Mr. Scott stated ultimately baseline data must be collected before a project is initiated. Commissioner Alberg asked if there was a way to accelerate that data collection. Mr. Scott stated the Department discussed collaring lions and had already collared deer and antelope and if animals were to be removed without any science behind the decision, nothing further would be learned about Project 46, which was a sizable investment. Mr. Scott stated middle ground would be where both goals could be accomplished.

Staff Specialist Jackson stated he found many of the proposals interesting, but instead of implementing a management action, Mr. Jackson proposed that this be more of a question to investigate than something that should be acted upon, with what was subsequently learned definitively showing whether removing predators benefits a species. Mr. Jackson used the example of mountain lion removal to benefit bighorn sheep, a subject that has been well documented. Mr. Jackson did not advocate spending time collecting data to prove theories that had already been demonstrated to be true. Mr. Jackson stated in situations where theories had been demonstrated not to work, the Department should attempt to do something differently. Mr.

Jackson continued that if the Department were to do things differently, then the question was what kind of data needed to be collected and what the timeline would be for that collection. Mr. Jackson stated that, historically, there had been a sense of urgency to big game management projects and lethal predator removal. Mr. Jackson continued that he knew it was disappointing to those who wanted more action but collecting data before performing a lethal management action tended to result in better findings. Mr. Jackson commented that it would be helpful to know the fawn survival rates instead of assuming fawns were being consumed by predators. Mr. Jackson stated the proposals discussed poor doe body condition, but he would ask that poor body condition of a 2.5 average meant across the state, or only in the Granites. Mr. Jackson acknowledged this was the first rendition of Mule Deer Enhancement Program projects and the process was still being established.

Game Administrator Scott stated he wanted the Mule Deer Enhancement Program to be successful and support the Subcommittee volunteers who developed the projects. Mr. Scott recognized that the Department needed to establish more communication with the Subcommittees and that he wished the Subcommittee members were at the Committee meeting so there could be a more robust conversation. Mr. Scott stated that the Department and the Committee needed to communicate to the Subcommittees that more information was needed on what the Subcommittees were thinking and wanting to implement. Mr. Scott stated he wanted to support the projects, but he also wanted justification behind them.

Commissioner Wise asked, in terms of data that the Department has already been collecting over the years, if some areas were more studied than others. Commissioner Wise asked if the Commission had baseline data on some of the areas already. Staff Specialist Jackson answered that the Committee should define success. Mr. Jackson continued that the Department cannot necessarily prevent a decrease, particularly in a mega-drought. Mr. Jackson stated that he suggested to the Washoe County Subcommittee that it choose a different metric to judge success by, perhaps fawn survival or population estimate. Mr. Jackson added that just because there may be more fawns that survive from winter to fall did not mean that the survival rate was due to less predation.

Commissioner Caviglia stated it would be good to see the habitat projects alongside the predator projects to see the larger picture of the Mule Deer Enhancement Program. The Committee discussed the Mule Deer Enhancement Program Oversight Committee's methodology of ranking projects, which was to be further discussed at the March Commission Meeting. Commissioner Wise stated she was hesitant to push these projects forward without more information or more background. Commissioner AlMBERG agreed, equating this process to the federal NEPA process.

Game Administrator Scott asked the Committee to provide direction to understand what its desire was for the Department to move forward.

Commissioner Caviglia asked if the Department believed that the lions and coyotes were the limiting factor and if the Department believed there was a benefit to these projects. Commissioner Caviglia did not want to create an adversarial environment between the Subcommittees and the Department, as he recognized that was not the intent of the Mule Deer Enhancement Program. Game Administrator Scott answered that should the projects not be accepted; his concern would be that the message to the Subcommittees would be that they are not supported. Mr. Scott asked the Committee if it did not want to move forward on the projects at this meeting, what would need to happen to add or accept these projects. Commissioner AlMBERG replied that the answer to that would lie with Mr. Jackson, as he was the Staff Specialist. Commissioner AlMBERG felt that the Committee did not have the qualifications to make some of the decisions about predator removal.

Staff Specialist Jackson stated that the Committee needed to define what success would be and what failure would be. Mr. Jackson continued, stating he did not think Nevada was facing the extinction of mule deer, but that a reduction in tags was a very possible. He continued, stating a reduction in tags may make many people unhappy and those people may blame things that were

probably not all encompassing. Mr. Jackson felt the Committee did not need to abide by a sense of urgency like it would for an endangered species, as if something was not done right now, it would not be there anymore. Member Tomlinson commented that it was inevitable that more wildlife would be lost 20 years from now because there was going to be less water, less habitat. Member Tomlinson stated instead of fighting or trying to blame the loss of wildlife on predators, perhaps the Department was already doing everything it could, but with Nevada experiencing the biggest drought in 800 years, there was going to be a reduction in mule deer and there was nothing that could be done about it.

Staff Specialist Jackson stated to move forward, the definition of success needed to be established regarding predator management in mule deer for these different projects, whether that be fawn survival, adult doe survival, predation number; it needed to be established that predator management was minimizing the decrease of a population decline. Mr. Jackson stated the data the Department collects to manage big game species was very good for the specific purpose of setting quotas and managing herds, but it was not helpful with regard to predator management. Mr. Jackson stated that if success was defined, then parameters for the collection of additional data could be established.

Commissioner Caviglia asked if the project proposed by the Washoe County Subcommittee would be useful for a Predator Plan project that was already in place in that area. Staff Specialist Jackson answered no, it would not complement the project that was already in place. Commissioner Caviglia stated the Committee was going to need to communicate to the Washoe County Subcommittee that the project proposal was not going to be approved in its current state. Commissioner Caviglia was concerned about how the Washoe County Subcommittee was going to receive that information given the work that had already gone into the project proposal. Commissioner Almberg commented that the Washoe County Subcommittee felt the data was already there and that the data supported the project; maybe the data was not there statewide, but it was there specific to the Washoe County Subcommittee's project.

Staff Specialist Jackson stated the Washoe County Subcommittee's proposal stems off Project 18, which was a management project before Mr. Jackson started with the Department. Mr. Jackson stated additional data for Project 18 was not collected before or during the project, and some analyses were done after the fact to try to tease out as to whether this project was successful. Mr. Jackson continued, stating the wildlife biologist holding the position in this region disagreed with his predecessor's population estimates of deer and so the models were largely changed. Mr. Jackson did not see the data on Project 18 as an all-inclusive narrative of what happened during the project.

Commissioner Caviglia commented that by focusing on the predators of Unit 014 in the middle of this larger study area, there did not seem to be a benefit to seeing if the predator removal had an impact on the deer herd. Staff Specialist Jackson agreed that the way that the study was set up, it would be difficult to see if there was an impact on the deer herd. Mr. Jackson declared that as the State's predator biologist, he did not think the project was exemplifying good science.

Commissioner Caviglia asked Staff Specialist Jackson what he would recommend to the Washoe County Subcommittee for Unit 014. Mr. Jackson stated he would propose putting collars on lions and removing lions that ate deer in that unit. Mr. Jackson continued, stating most lions in Nevada consume deer and because the Department collars deer in northwest Nevada, he supported the lethal removal of mountain lions whenever they eat a collared deer.

Commissioner Wise listed what she would ask for from a proposed project. A success metric that provided complementary data, for example, data being collected from other places or helping to support results received from other projects, or data informing whether predator removal was having a positive or negative effect. A clear definition of how that was being measured. A much more defined methodology for the study. A refined budget, given that methodology. Some sort of proposed metric for utilizing the data alongside existing and historic data so effectiveness can be

measured. Commissioner Caviglia asked Commissioner Wise to re-state the criteria for the record:

- A success metric that provides some sort of complementary data
- More details on how we intend to measure that
- A more defined methodology
- Refined budget
- A metric for utilizing the data with existing and historic data so we get a larger picture of effectiveness if predator removal for mule deer.

The Committee discussed how best to move forward, with concern about the Washoe County Subcommittee and its project in Unit 014. The Committee suggested Staff Specialist Jackson work with the biologist assigned to the Washoe County Subcommittee to get the information the Committee was looking for before moving forward on approving or adding its project to the Predator Plan. The Committee suggested that the criteria proposed by Commissioner Wise be used for the other projects submitted to the Committee.

Public Comment

No public comment was received.

Meeting adjourned at 8:19 P.M.

Nevada Department of Wildlife
Predator Management Plan
Fiscal Year 2023
1 July 2022 to 30 June 2023

DRAFT

STATE OF NEVADA

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Nevada Department of Wildlife

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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 2021 predator fee revenues totaled \$858,601. The Department expects to need to allocate about \$686,881 on lethal removal to meet the requirements set forth by Assembly Bill 78. Proposed predator projects for fiscal year 2023 include \$759,000 for lethal work, these funds include fiscal year 2021 revenues and previous fiscal years surpluses.

Map Note

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

DRAFT

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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 2022 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 2021 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.

Budget

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

DRAFT

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	Jon Ewanyk, 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 2021 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>
\$100,000	N/A	\$100,000

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, 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 2021 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 2023.

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 2021 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>
\$100,000	N/A	\$100,000

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 2021 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>
\$100,000	N/A	\$100,000

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	Pat Jackson, 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 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 2021 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 2021 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 on of the largest GPS location datasets 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 2022 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.

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 lions are also lethally removed 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. 3. Create a user-friendly model interface for Department employees to model local populations and improve understanding. 4. Draft and ideally publish work in a peer-reviewed manuscript.
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 2021 Predator Report	Findings indicate Nevada has a stable mountain lion population.
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.

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$5,000	\$15,000	\$20,000

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 decline 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 2021 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	<p>1. Increase the number of female turkeys, waterfowl, and pheasants that successful raise clutches.</p> <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 poults. 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.

Budget

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

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 2021 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. NDOW appreciates its ongoing collaboration with the US Geological Survey and Utah State University.

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.
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 2021 Predator Report	NDOW also recommends continuing Project 45 as a monitoring project.

Methods	In a collaboration with Michigan State University and University of Montana, trail cameras will be maintained 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.
Anticipated Results	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.

Budget

<u>\$3 Predator Fee</u>	<u>Pittman-Robertson</u>	<u>Total</u>
\$5,000	\$15,000	\$20,000

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 2021 Predator Report	Project 46 has the potential to greatly increase the understanding of flora and fauna communities in northwest Nevada.
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>
\$40,000	\$120,000	\$160,000

Overall FY 2022 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 22-01: Mountain Lion Removal to Protect California Bighorn Sheep	\$100,000	N/A	\$100,000
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	\$100,000	N/A	\$100,000
Project 38: Big Game Protection-Coyotes	\$100,000	N/A	\$100,000
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	\$5,000	\$15,000	\$20,000
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	\$5,000	\$15,000	\$20,000
Project 46: Investigating Potential Limiting Factors Impacting Mule Deer in Northwest Nevada	\$40,000	\$120,000	\$160,000
Total^b	\$896,500	\$412,500	\$1,259,000

^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 2020 Actual (revised)	FY 2021 Actual	FY 2022 Projected	FY 2023 Projected
Beginning balance	\$287,651	\$363,670	\$622,972	\$595,073
Revenues	\$797,287	\$858,601	\$858,601	\$858,601
Plan Budget	\$829,000	\$854,000	\$886,500	\$896,500
Expenditures	\$721,268	\$599,299	\$886,500	\$896,500
Ending balance	\$363,670	\$622,972	\$595,073	\$557,174

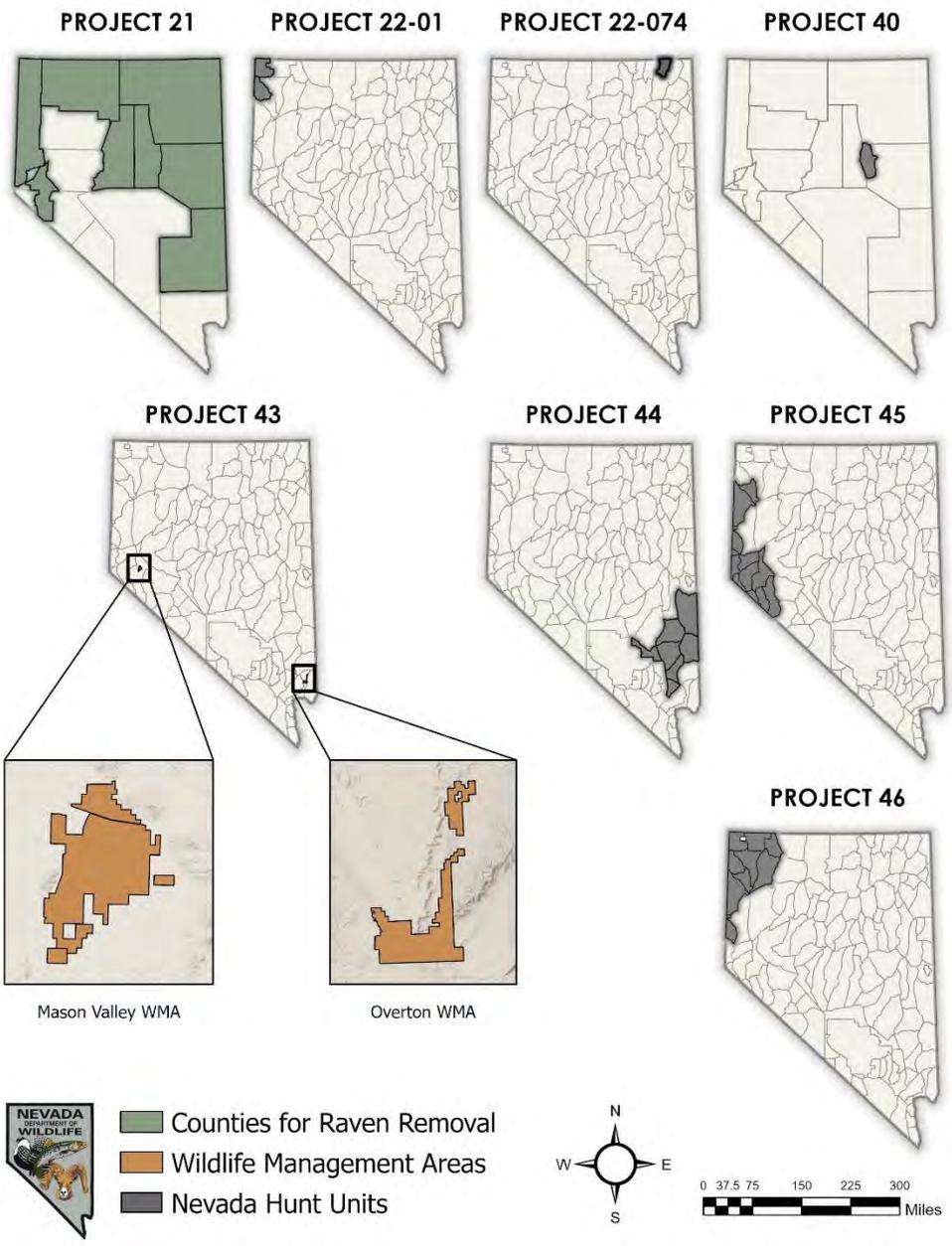
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Appendix

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





Predatory Animal & Rodent Control Committee Meeting Minutes

Thursday, February 10, 2022, 11:00 A.M.

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

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

Topic: PARC Feb 2022 Meeting

Time: Feb 10, 2022 11:00 AM Pacific Time (US and Canada)

Join Zoom Meeting

<https://zoom.us/j/95984194834?pwd=R284cUIVZkM4VitMZ0FhT1p3OWFtQT09>

Meeting ID: 959 8419 4834

Passcode: XG1UcZ

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 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

Thursday, February 10, 2022, 11:00 A.M.



AGENDA

1. Open meeting-call meeting to order by Chair Darrell Pursel

- a. Pledge of Allegiance
- b. Roll call

Committee members: Dr. Ihsan Azzam, Pete Paris, Tom Barnes, Cody Krenka, Darrell Pursel, Casey Kiel, Jim Puryear

Sparks staff: Doug Farris, Julia Ketcham

Guests: Pat Jackson (NDOW), Mike Scott (NDOW), Richard Yien (DAG), Mark Ono (USDA), Doug Busselman (Nevada Farm Bureau)

2. Public Comment

Doug Busselman – one of the things we’re hoping will come this year is maybe a better understanding of what programs this committee is engaged with. We are very interested in engaging more efforts in rodent control as well as more effort in the area of general predator control. One of the things we are not clear on is what funding is available towards this program to being carried out as well as not just the overall program we need to understand where the federal program and their budgets are to include where their limitations or opportunities areas well as the State Department of Agriculture what their role is and how they fit into the over all program. So we would hope that information would come from the committee and what we are already doing.

Jim Puryear – We’re interested as the Guides Association and the Nevada Big Horns Unlimited. We have all that money set aside in NDOW for Predator Control and all they have been doing so far is studying predators. For anyone that has been around it for more than four or five years that grew up with it – ranching, hunting or anything knows we really need some of this. We can study it to death but it doesn’t help our herds and we would like to see if we could have the wildlife commission get more involved and spend some money harvesting predators. Whether its through Wildlife funding or whatever and that’s what we would like to see.

End of public comment

3. Minutes

- a. *Approval of February 18, 2021, committee meeting minutes (*for possible action*)

Cody Krenka motioned to approve the February 18, 2021 meeting minutes. Tom Barnes seconded this motion. The motion passed.



Predatory Animal & Rodent Control Committee Meeting Minutes

Thursday, February 10, 2022, 11:00 A.M.

4. Committee Business

- a. *Committee selection of new Chair for 2022, per NRS 567.040 (*for possible action*)

Pete Paris nominated Cody Krenka. Tom Barnes seconded this motion. The motion passed. Doug Farris had a question for DAG – Richard Yien in that Cody filled the Sportsman representation and committee member as appointed by Chair Darrel Pursel and can also serve as a Chair and a Sportsman position. Richard Yien would need to read NRS to give better direction. Chairman Pursel noted that he not only is Chairman of the Committee but he also is representative for Farm Bureau. Noted need to complete this meeting. Richard Yien noted to complete

Motion by Jim Puryear to close nomination – Tom Barnes seconded the motion. Cody Krenka was then noted as becoming Chair of the Committee.

- b. *Committee selection of new Vice Chair for 2022, per NRS 567.040 (*for possible action*)

Pete Paris nominated Dr. Azzam. Dr. Azzam rejected nomination as during the pandemic he was already working 72 hours a week. Cody is allowed to appoint the Vice Chair per NRS. Cody then requested Pete Paris – Pete rejected. Cody asked Jim Puryear who inquired about the time needed per week and it was noted that there would only be one meeting per year. Jim then agreed and committee passed the motion passed.

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

Chair and Vice Chair are those designation – no objections and unless Richard Yien sees a conflict in NRS.

- d. *Nevada Department of Wildlife FY2023 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.

Cody Krenka – Mule Deer enhancement committees reached out to NDOW? 5 proposed predator and oversight committee initially approved all 5 and sent them to wildlife damage management committee who will meet in March. Have not heard from particular mule deer enhancement committee. On the Raven \$170,000 waiting for permit and should be discuss where to allocate those funds. Could put a rider that if NDOW take was not increased that the funds be spent somewhere else. Opinions as to what to do with funds – Tom Barnes



Predatory Animal & Rodent Control Committee Meeting Minutes

Thursday, February 10, 2022, 11:00 A.M.

wants to see funds spent on the enhancement projects. Pete also agrees with Cody and Tom in keeping projects moving.

Motion of recommendation for diversion of funds – Committee can accept with Recommended today will be shared with Wildlife Damage committee and then Wildlife commission

Jim Puryear suggest they fund all projects within Mule Deer Management – Seconded by Pete Paris – Motion passed

Pat Jackson will verbally share recommendations and minutes with Wildlife Commission.

Motion to approve as is – Tom Barnes moved and Pete Paris seconded – motion passed

e. NDA program update – Doug Farris, NDA Administrator (*for information*)

7 State EE's work for Dept of Agriculture, employed through Dept of Agriculture but with a MOU and financial plan with USDA – Wildlife Services. There are 4 vacant positions; one acceptance in the Gardnerville Area in April; a position in Ely that has been offered to a successful candidate; another retiring out Fallon and an Ely position will be moved to Elko. Attachments go over what we do in conjunction with USDA – Wildlife Services.

No questions.

f. Progress update on Predatory Animal and Rodent Control program by USDA Wildlife Services – Mark Ono, State Director, Nevada USDA-APHIS-WS (*for information*)

Nevada Wildlife Collaboration been this way for almost 80yrs. Budget cuts, etc have reduced the number of employees down to 7. Background on federal program collaboration with Dept of Agriculture and Dept of Wildlife. Slides to describe where funding is allocated for rodent controls and predator controls with pesticides and aviation and limitations. Supervisors and Staff needing to be increased and due to funding is looking at getting direction from the Committee as to what is important for augmentations. What does committee find important to Agriculture and Wildlife?

Darrel Pursel – Northern part of State has problem with rodents / squirrels. Timing seems to be significant.

Darrel Pursel wanted to thank both Doug Farris and Mark Ono for the presentations and



Predatory Animal & Rodent Control Committee Meeting Minutes

Thursday, February 10, 2022, 11:00 A.M.
information.

Jim Puryear inquired as to helicopter or planes and how Big Horns Unlimited could assist in that purchase. Thanked everyone for their guidance and information being given.

g. *Meeting schedule 2023 discussion (*for information*)

Meet as needed as normal – probably in February of next year.

5. Public Comment

Doug Busselman – Appreciates the information given during meeting. Also sees that there is a huge issue if state staffing is 7 and 4 vacancies and 3 people currently on payroll. Some discussion could be a strategy to encourage full employment back to all 7 employees authorized. Need more people and something that outside organizations could work a strategy they'd be happy to help.

Mark Ono – when state has a vacancy or federal government gets out to associations when announced. Uses social media that can be shared and that has brought good candidates.

6. Adjournment

Meeting adjourned at 12:21pm with Darrel Pursel motioning and Jim Puryear seconded the motion. The motion passed.

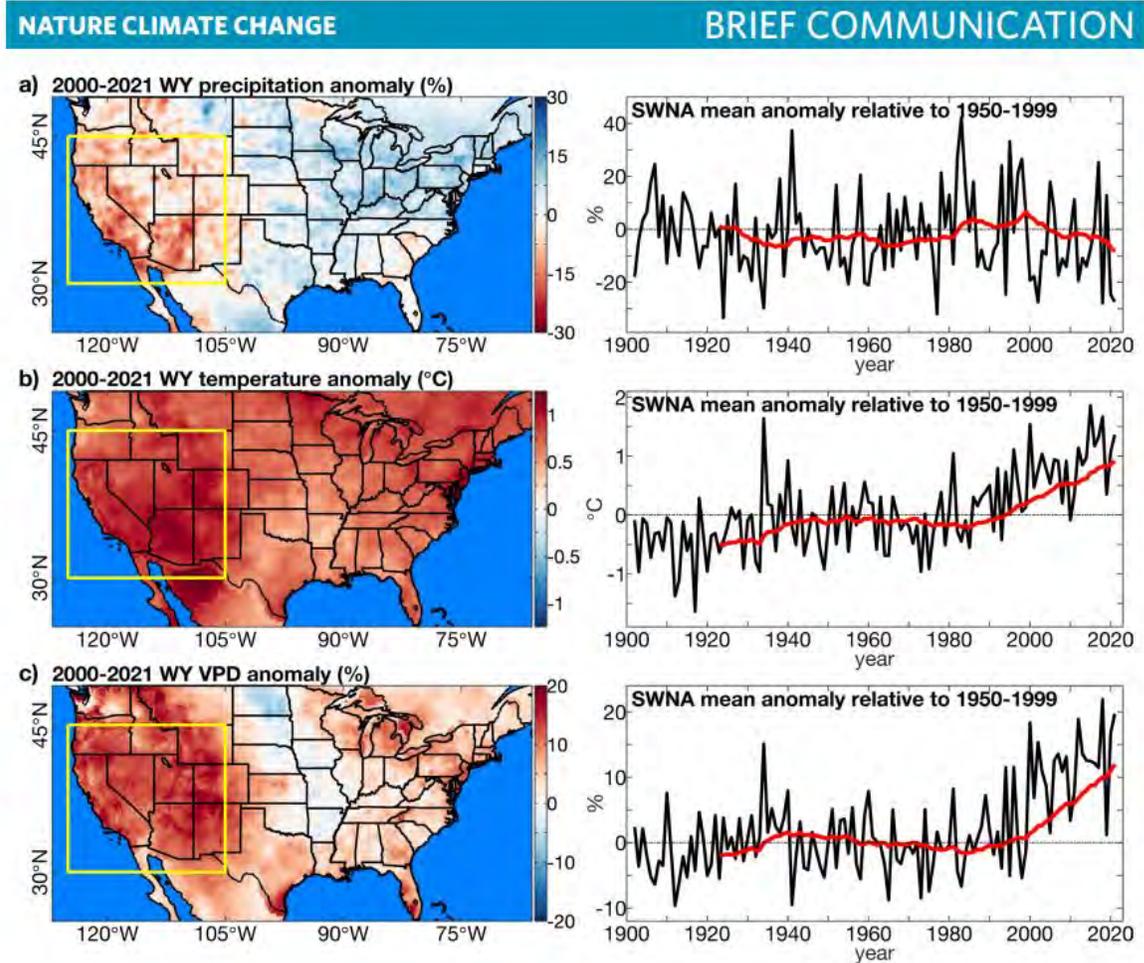
Mule Deer Enhancement Program Projects



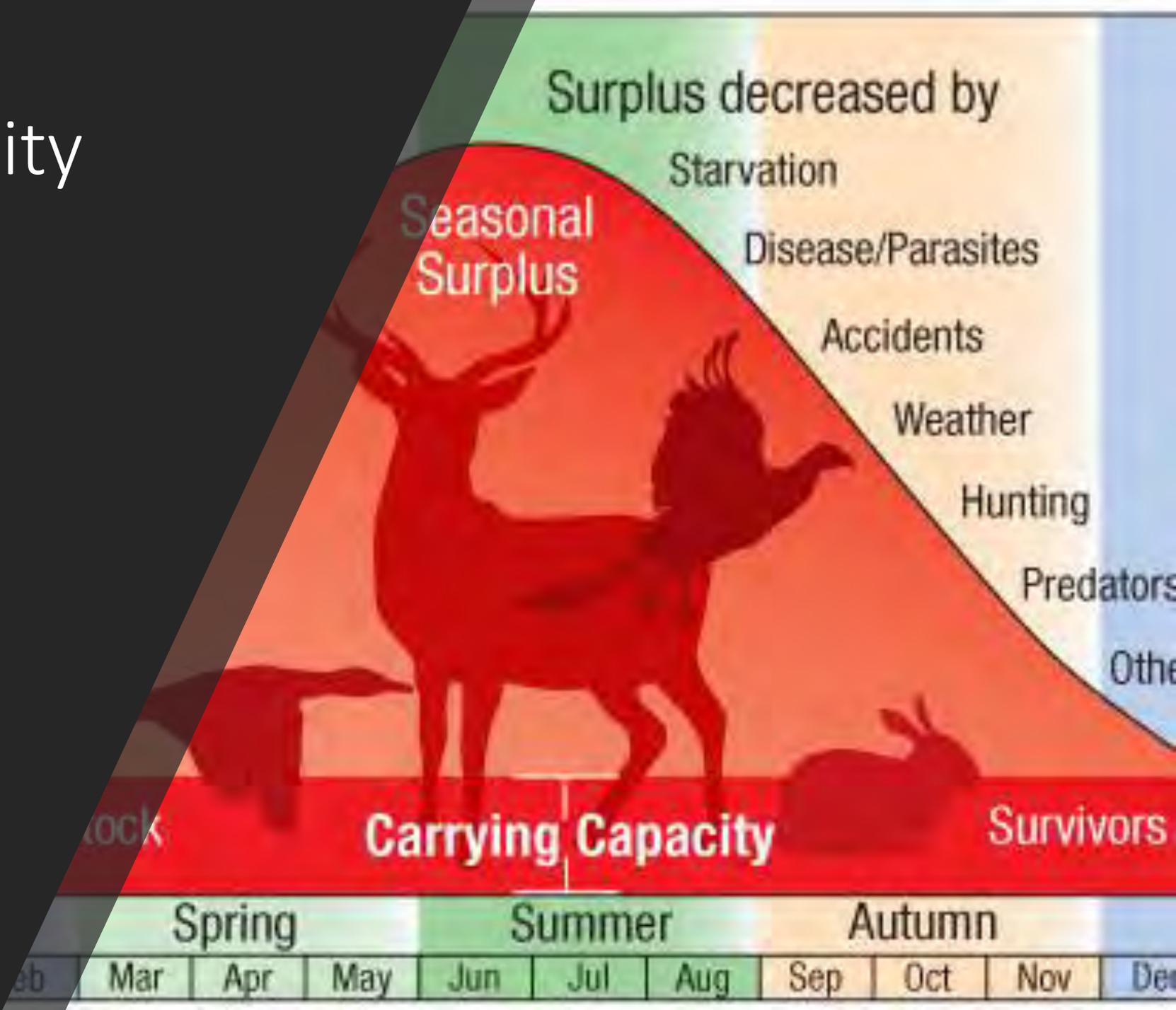


Think about a
turn pivot

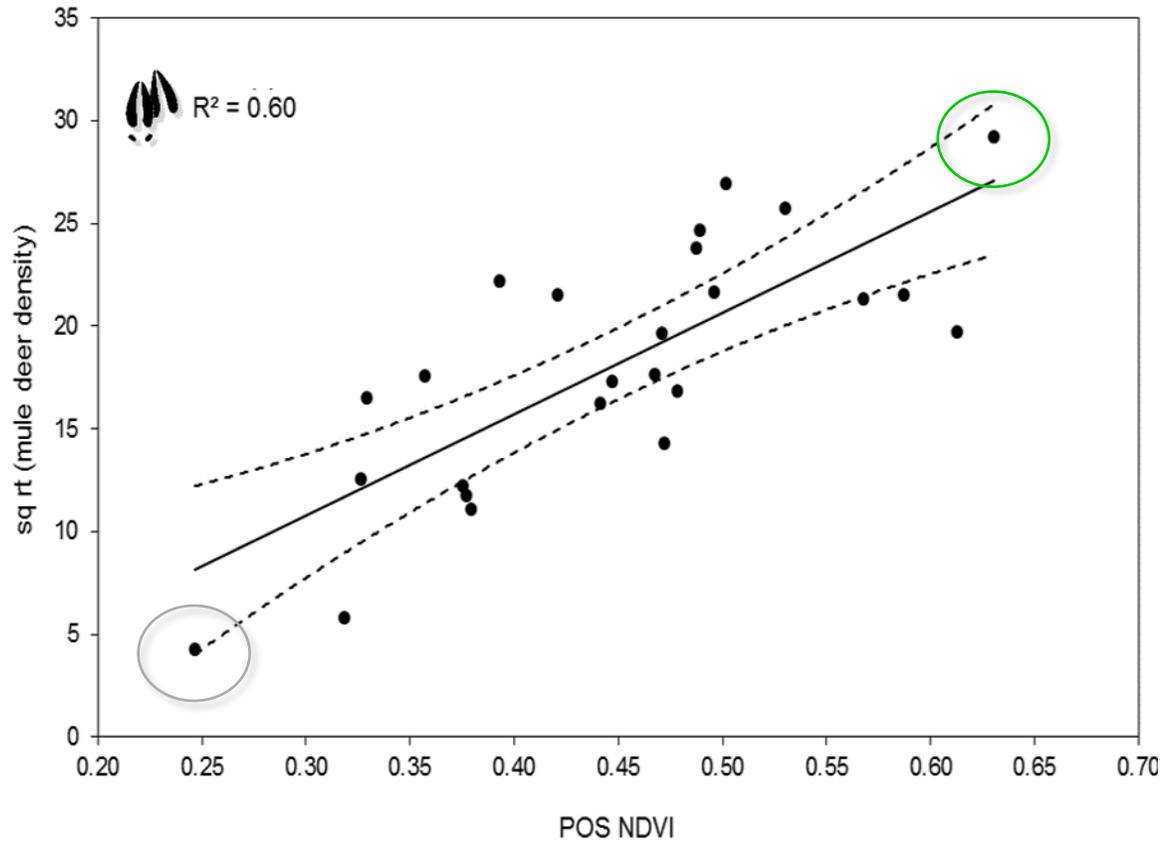
Mega Drought



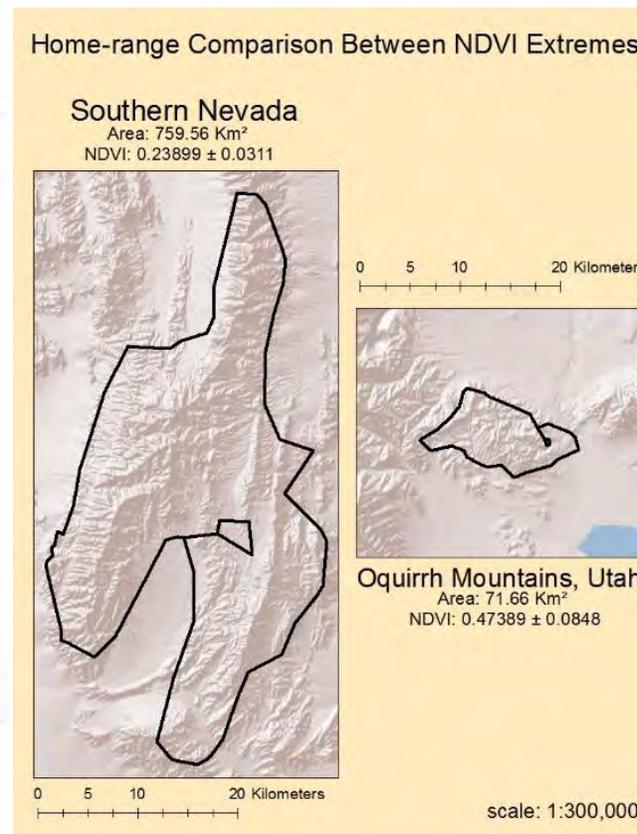
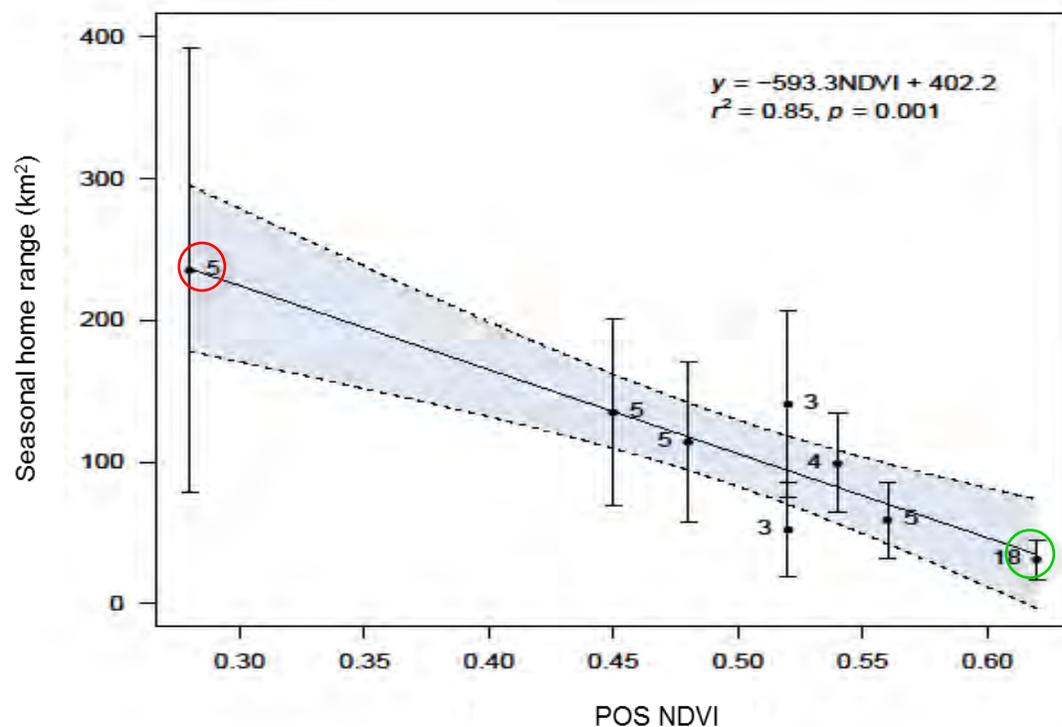
Carrying Capacity



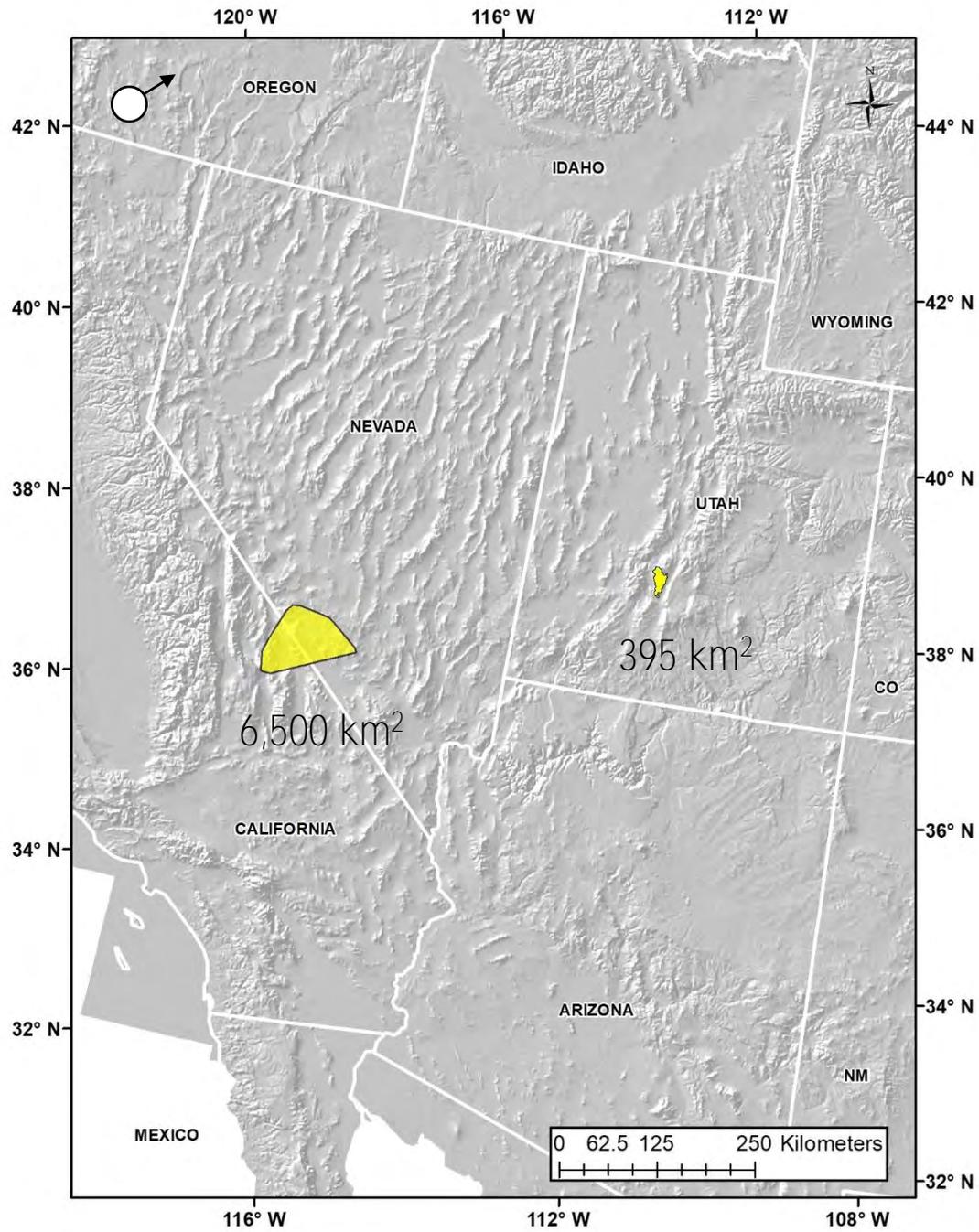
(1a) Mule deer density increases with primary productivity



Cougar home range *decreases* with primary productivity



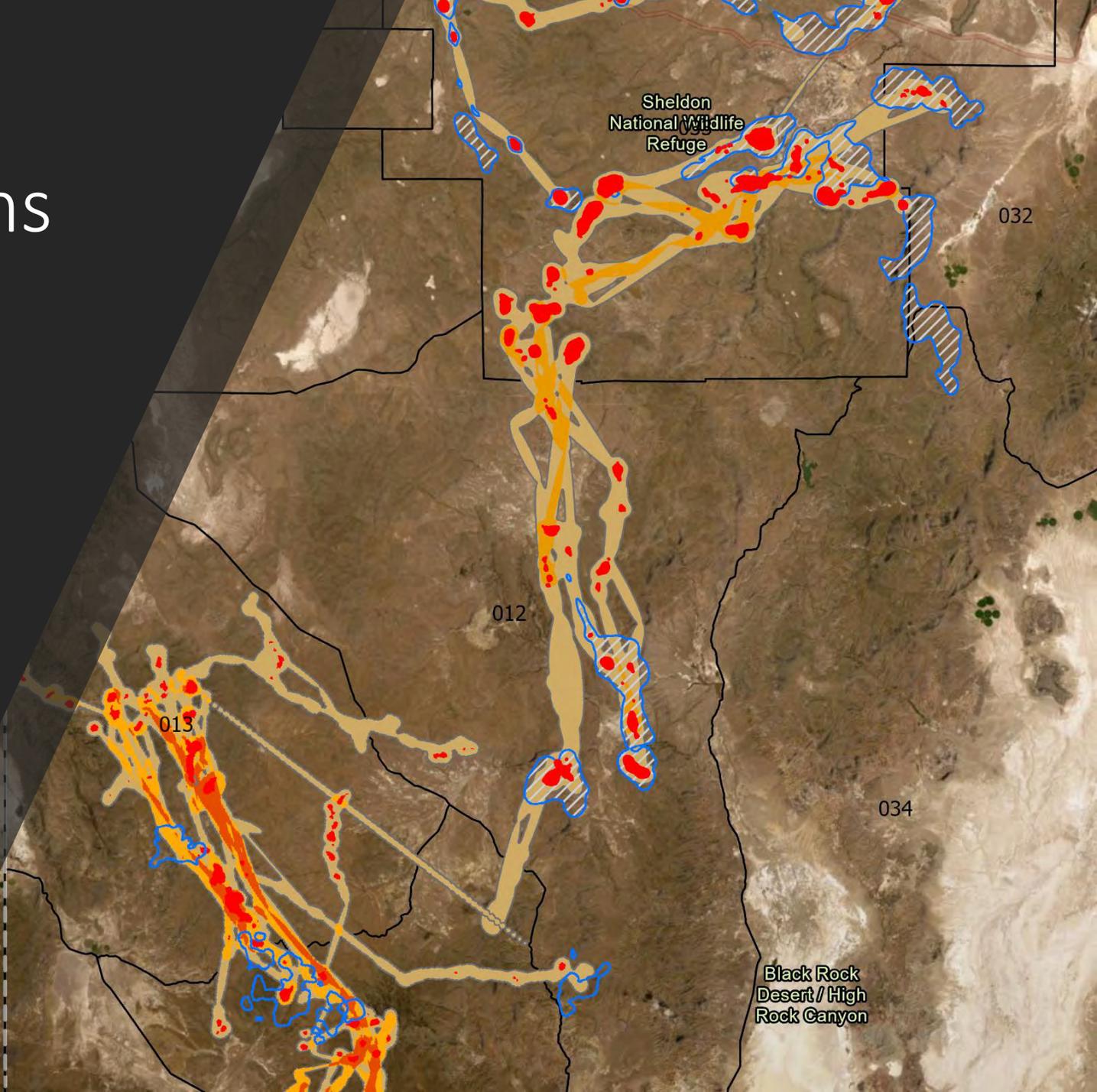
Home range = km² / individual; **Density** = individuals /km²



Wildlife population dynamics are complicated

- We, as humans grasp what we see
 - Hunter mortality
 - Vehicle strikes
 - Predation
- Many biotic and abiotic factors at play
 - Fawn born to malnourished doe can impact several generations

Wildlife constantly
break our assumptions



Fire Contributing to the System



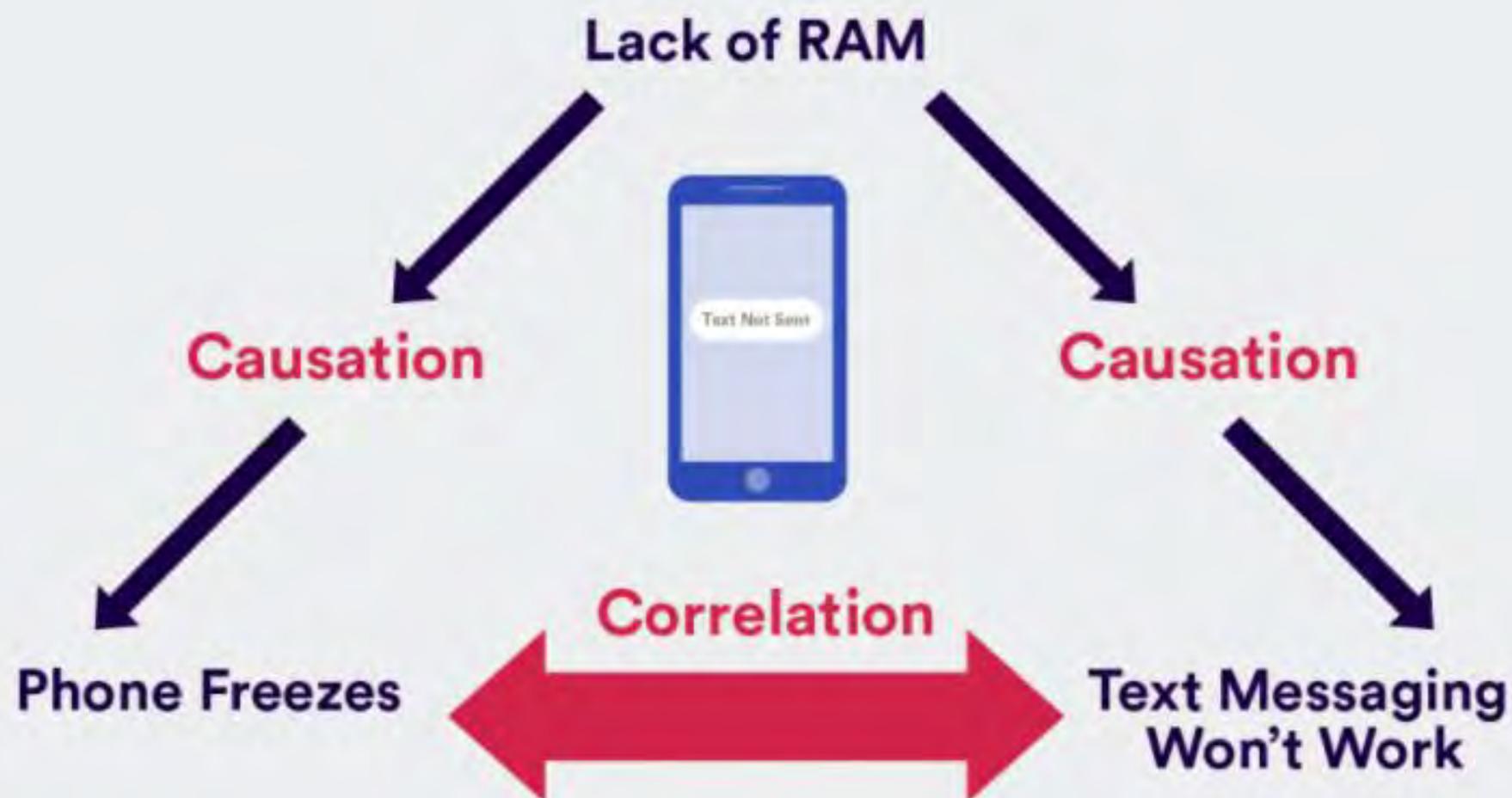
Bishop Burn: Before Rains After Rains

Causation vs. Correlation

- Causation: The action of causing something
 - After I exercise, I feel tired
- Correlation: A mutual relationship between two or more things
 - The more gas I put in my car, the further I can go

Causation vs. Correlation

- <https://www.youtube.com/watch?v=VMUQSMFGBDo>



Change in Habitat



Causation

Causation

Fewer Bobwhite Quail

Correlation

More Turkeys

Predators we remove

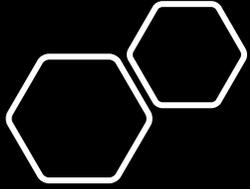
- Common raven
- Coyote
- Mountain lions

Prey we protect

- Greater sage grouse
- Bighorn sheep
- Pronghorn
- Mule deer

Difficulty with quantifying mule deer

- Most susceptible to environmental conditions
- Fawn survival \neq recruitment
- Recruitment \neq population growth
- Population growth \neq hunter success metrics



5 proposed projects

1. Units 043-046 Coyote Removal
2. 014 Predator Management Project
Antelope Range Predator Removal
3. Antelope Range Predator Removal
4. Bothwick and Gleason Creek Predator
Removal
5. Predator Removal in Priority Fawning
Grounds

Units 043-
046 Coyote
Removal

Hunt units 043-046

May 2022/2023-July 2025

\$25,000-\$50,000 annually

Remove coyotes seasonally,
remove lions opportunistically

014 Predator Management Project

Hunt units 011-013, 014, 015, 021, 022

May 2022-December 2027

\$125,000 annually

Remove coyotes during fawning season, remove lions in winter months

Antelope
Range
Predator
Removal

Hunt units 111-115

May 2022-April 2025

\$30,000-\$75,000 annually

Remove coyotes and lions

Bothwick
and
Gleason
Creek
Predator
Removal

Hunt unit 121

May 2022-April 2025

\$30,000-\$75,000

Remove coyotes and lions

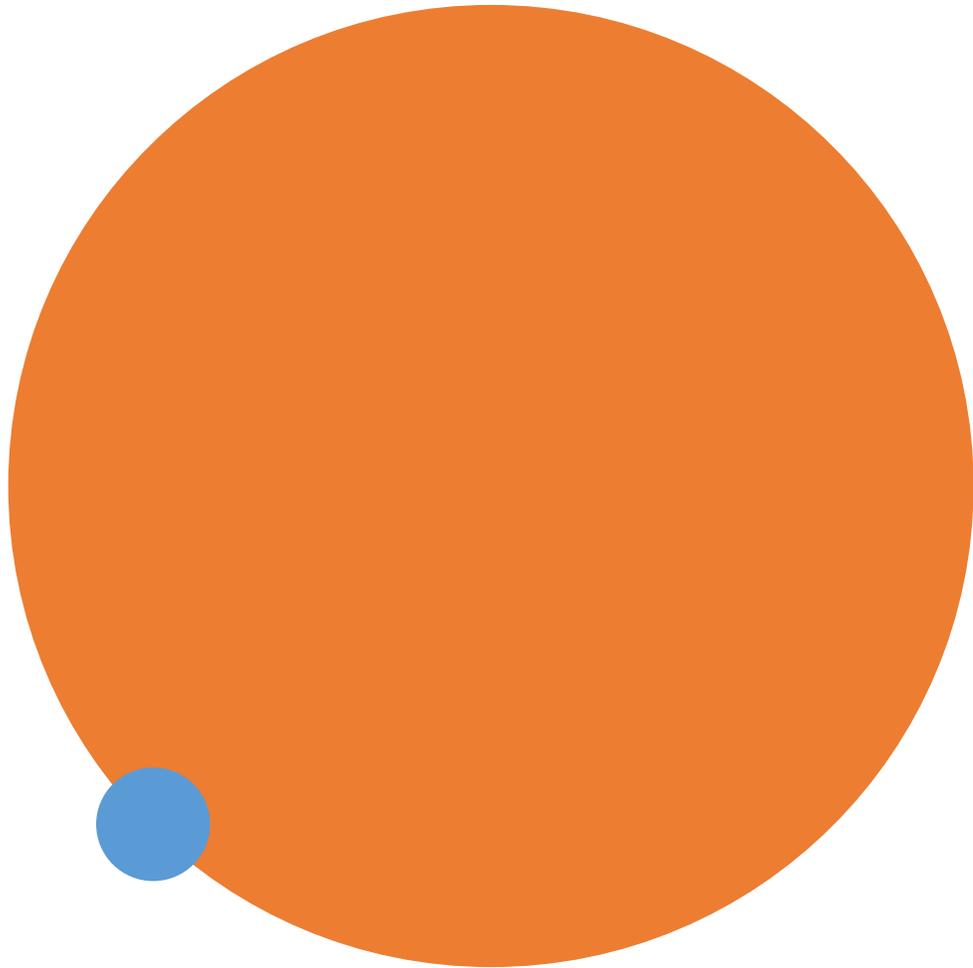
Predator
Removal in
Priority
Fawning
Grounds

MA 22, 23, 24

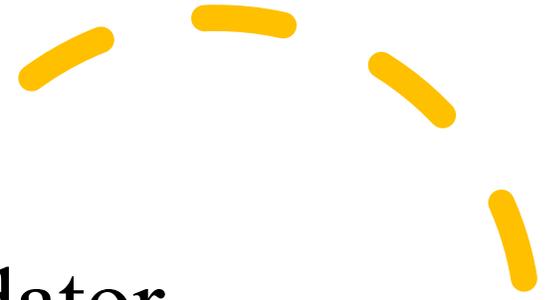
May 2022-December 2026

\$25,000

Remove coyotes in fawning
habitat



NDOW maintains a philosophy that predator management is a tool to be applied deliberately and strategically





Recommendations
to committee

Wait on 014 Predator
Management Project





Recommendations
to committee on
other projects

- 
1. Do not continue with projects
 2. Continue with projects as written
 3. Collect baseline data, reconsider projects

Questions

