

Upland Game Bird Stamp Program Report



Nevada Department of Wildlife

June 2021



Table of Contents

| | Page |
|--|------|
| Progress Report on Upland Game Bird Stamp Projects Funded in FY 2021 | 1 |
| Summary of Proposed FY 2022 Upland Game Bird Stamp Projects (table) | 29 |
| Upland Game Bird Stamp Account Budget Status (table) | 31 |
| Proposed FY 2022 Upland Game Bird Stamp Projects | 33 |

Progress Report on Upland Game Bird Stamp Projects Funded in FY 2021

Greater Sage Grouse State-Wide Monitoring

Other Funding Sources: Upland Game Management Grant (75%)
Carson Valley Chukar Club
Nevada Chukar Foundation

Project Start Date: July 1, 2020
Estimated Completion Date: June 30, 2021

Project Accomplishments:

Lek Count Technicians

No lek count technicians were hired to conduct sage-grouse lek surveys during the 2021 spring breeding season, largely due to previously enacted Covid-19 restrictions. Available funding was used to augment aerial infrared surveys conducted at various areas across Nevada (see Fixed Wing Aerial Infrared Survey report below).

Aerial Lek Survey

Aerial helicopter surveys for known sage-grouse leks were conducted in the following areas across Nevada during the 2021 spring breeding season:

- Northern Washoe County including the Buffalo/Skedaddle, Massacre and Vya PMUs;
- Black Rock, Pine Forest, Lone Willow and Santa Rosa PMUs in Humboldt County;
- Battle Mountains in Lander County;
- Tuscarora, North Fork, O'Neil Basin and Snake PMUs in Elko County;
- Monitor, Reese River and Toiyabe PMUs in Nye County
- Bi-State: Mount Grant, Desert Cr./Fales, Pine Nut PMUs in Lyon and Mineral County.

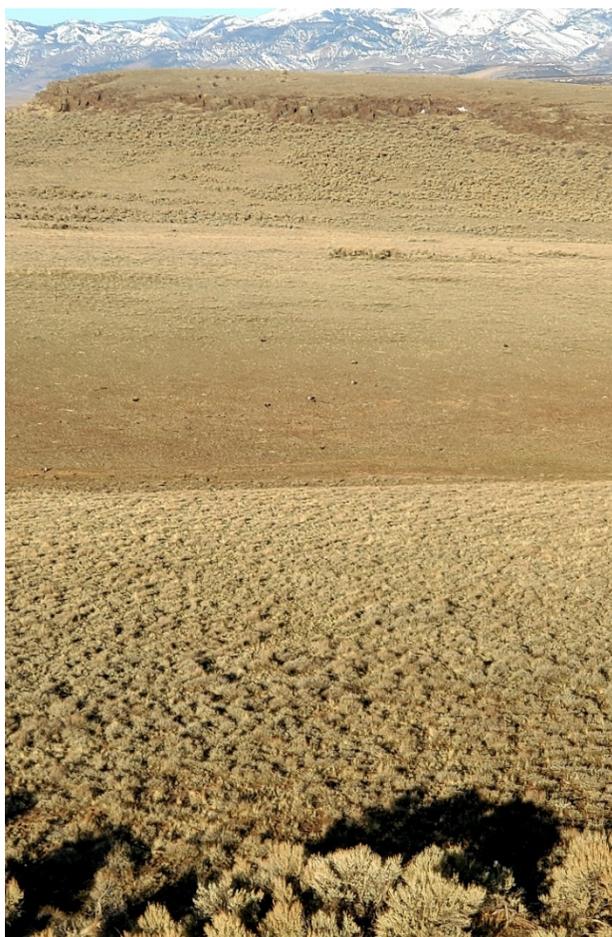


Figure 1. A sage-grouse lek in northeastern Nevada is approached by a helicopter during aerial survey.

Fixed-Wing Aerial Infrared Surveys

2021 aerial infrared (AIR) sage-grouse surveys took place across ten (10) areas throughout the state of Nevada. Lek search areas totaled over 125,000 acres and included Hayes Canyon in northwestern Nevada, as well as the Garden Valley and Pony Express search areas. Ninety-seven (97) individual leks within the ten (10) search areas were censused throughout the three-week survey window.

Methodology

Surveys were conducted daily from approximately one (1) hour before sunrise to approximately two (2) hours after sunrise depending on weather and imagery conditions. Linear transects were flown in a Partenavia P-68 twin-engine fixed-wing aircraft equipped with an L3/Harris MX-10 multi-sensor imaging system paired with a dedicated Shotover Systems augmented reality system (ARS) computer. Transects were spaced 1/4 mile (0.25 miles) apart and flown at approximately 100 miles per hour at 1,000-1,500 feet above ground level (AGL).

When a potential grouse was detected, the aircraft would reverse course and circle the potential target from 0.5 – 0.75 miles away until the system operator could identify the thermal signature. This spacing provides enough distance to ensure the birds were not alarmed or stressed by aircraft while simultaneously ensuring accurate counts. If a target was determined to be a grouse or group of grouse, the exact count and geographical location were recorded. Group composition with respect to sex was also recorded for sage-grouse. Once all pertinent data was recorded, the survey aircraft would then resume the transect prior to the point of leaving. Previously identified leks of interest were also circled in this way regardless of any initial detections. If no sage-grouse were seen on identified leks, the surrounding area was searched for possible satellite leks within a 0.5-0.75-mile radius.

Individual leks were censused with similar protocols: cameras were panned to leks starting at approximately 2.5 miles out and circled over 0.5 miles from the lek location. Leks were searched until birds could be detected and counted, or until a thorough search of the surrounding 0.5-0.75-mile area could be conducted from all angles, by conducting approximately two full rotations around each lek.

Results

Owyhee Air Research (OAR) conducted aerial infrared (AIR) surveys for greater sage-grouse throughout the study areas from April 3, 2021, through April 21, 2021. All search areas were surveyed consecutively from 3 April through 11 April, except the Islands leks, which were censused 10 days later due to weather and aircraft limitations. In total, all 125,000 acres were surveyed and 97 leks censused. Owyhee Air Research detected sage-grouse at 19 leks, including one potential new satellite lek. A total of 189 sage-grouse were counted across all search areas.

Hayes Canyon Lek Search and Survey – Washoe County

Hayes Canyon transects were flown April 3 – 5, 2021 in a west to east direction. Of seven (7) known leks, sage-grouse were only detected at the Flycatcher West Lek. While Flycatcher West has averaged 67 males in attendance (1970-2019), only 32 males were detected on the morning it

was censused. OAR surveyed the Flycatcher West lek for a separate mission on 3/31 and counted 24 birds (10 males, 14 females).

Battle Mountain Lek Survey – Lander County

Of the nine (9) leks censused in the Battle Mountain search area, OAR only detected sage-grouse at the Battle Mountain 2 lek where 9 males were present. While infrared conditions at both the Battle Mountain and Fish Creek leks were favorable, both topography and some shrub cover may have contributed to the reduced detections. On the morning of this survey, OAR first surveyed Battle Mountain, then traveled south to the Fish Creek Leks. Upon returning to base for the day, OAR checked all Battle Mountain leks a second time, but found no new sage-grouse.

Fish Creek Lek Survey – Lander County

Both the Battle Mountain and the Fish Creek leks were surveyed on the morning of 6 April 2021. No birds were detected at any of the Fish Creek leks.

Desert Lek Survey – Elko County

The Desert (east Owyhee Desert) leks consisted of 25 leks that were surveyed on the mornings of April 7-8, 2021. Since over half the leks were surveyed on the first morning, OAR re-visited a number of leks during the second morning to re-examine potential sage-grouse presence. Of the 25 leks surveyed, 8 were active with a total of 54 males detected. On both days, sage-grouse were detected on the Owyhee Mowing 3 and Owyhee Mowing 4 leks. High winds arose approximately halfway through the survey on the morning of April 8th, which may have caused birds to seek shelter, thus reducing their detectability.

Garden Valley Lek Search and Survey – Eureka County

The 26,000-acre Garden Valley search area was flown in 0.25-mile north-south transects from east to west on April 9, 2021. Despite circling at each known lek, no birds were detected throughout the search area or at any of the four (4) known leks. Various livestock (horses, cows) were observed to be present on the following leks: Pinefield 2, Domehouse, and Pinefield 3. While most of the search area was completed on 9 April 2021, the last three most western transects were flown the morning of 10 April 2021 in conjunction with the Pony Express transects.

Toquima & Bald Mountain Lek Survey

The Toquima and Bald Mountain leks were flown on the morning of 10 April 2021, in addition to the Pony Express search area. Of the 10 leks surveyed (6 in Toquima, 2 in north Monitor, 2 near Pony Express), only two leks were found to be active with a total of 6 males in attendance between the Bald Mountain 1 lek and the Bald Mountain 2 lek. Horses were observed to be present on the Henry Meyers lek. Evidence suggests that sage-grouse are highly tolerant of native ungulates near leks (deer and pronghorn), but the presence of feral horses near active leks will negatively affect lek attendance, as horses may directly antagonize lekking grouse (Munoz et al. 2021). This may be an important consideration for future survey's when sage-grouse are absent from leks that are believed to be active.

Pony Express Lek Search and Survey – Eureka County

In addition to the Toquima and Bald Mountain leks, OAR completed the final 3 transects of Garden Valley and all of the 7,000-acre Pony Express search area on the morning of April 11, 2021. No sage-grouse were detected at either of the known leks within this search area. Robust winds were experienced during the survey hours on the morning of April 8th, which may have caused birds to seek shelter, thus reducing their detectability.

White Pine Range Lek Survey – White Pine County

OAR surveyed 16 leks in the White Pine Range of the Butte/Buck/White Pine PMU. No sage-grouse were detected during the survey conducted on April 11, 2021 even though several known active leks were surveyed. Despite additional searching at each known lek and during routes between leks, only various large ungulates (wild horses and cattle) were observed to be present within a 0.75 mile radius of known leks.

Islands Leks

Despite the lateness in the season, the Islands leks contained both the highest detection rate and the most birds detected during the OAR surveys conducted during 2021. OAR concluded the 2021 NDOW survey at the Islands leks on the morning of 21 April 2021. Of the 20 leks surveyed, 77 birds were detected at 8 leks, including one potential new satellite lek. Nine birds were detected roughly 0.75 miles due south of the Pole Creek 01 lek.

Monitoring Greater Sage-grouse Response to Treatments and Management Actions in the Desatoya Range of central Nevada

Other Funding Sources: Nevada Greater Sage-grouse Conservation Grant
Carson Valley Chukar Club

Project Start Date: July 1, 2014

Estimated Completion Date: June 30, 2022

Project Accomplishments Summary

The Great Basin Bird Observatory, working in collaboration with the USGS, measured demographic rates and space use of Greater sage-grouse (*Centrocercus urophasianus*; hereinafter, “sage-grouse”) in the Desatoya Mountains study area in Nevada from 2014 to 2020 as part of a long-term collaborative research program. General goals of the research program are to provide resource managers with information on trajectories and threats to sage-grouse populations across the Great Basin. Specific goals for the Desatoyas study are to evaluate the effects of riparian habitat restoration and enhancement through removal of single-leaf pinyon pine and Utah juniper on sage-grouse demographic rates, movement patterns, and predator community composition. From 2013–2020, 194 sage-grouse were captured and fitted with very high frequency (VHF) ($n = 148$) or Global Positioning System (GPS) transmitters ($n = 48$). Annual population rate of change (λ) derived from an integrated population model utilizing vital rates measured during this study and longer lek count data starting in 2011 was estimated at 0.92 (95 percent credible interval 0.77–1.09). These estimates are largely reflective of drought-like conditions at the Desatoya Mountain study area.

Preliminary Results

From fall 2013 to October 2020, 194 sage-grouse were captured at the Desatoya study site. Of those, 175 were female and 19 were male. GPS transmitters provided 62,516 locations of marked sage-grouse within the study area from 2013 to 2020. During the spring (March-May, i.e. nesting) season, the 50 percent core area of sage-grouse activity and the 95 percent population level home-range were estimated at 8,128 and 44,346 ha., respectively. During the summer (June-August, i.e. brood-rearing) season, the 50 percent core area and the 95 percent population level home-range were much more condensed at 1,475 and 19,969.6 ha., respectively.

Sage-grouse use of the landscape changed as marked individuals utilized distinctly different areas throughout different seasons. The season that sage-grouse were most concentrated was the summer. During this period, sage-grouse were localized to a 50 percent core area of only 1,475 hectares compared to the winter, where they used 12,735 hectares (Figure 2).

Various population vital rates (e.g., nest survival, clutch size, chick survival, etc.) from 2011-2020 are reported in Table 1. Chick survival and annual survival of adults appear low; however, these vital rates should be compared to statewide and even range-wide averages to determine how much these specific factors could be attributing to population declines.

Avian Predator Monitoring

Twenty Raven, Raptor, Horse and Livestock (RRHL) surveys were conducted throughout the Desatoya study area in 2020 for a total of 2,244 surveys during March–August from 2014–2020. In 2020, 56 ravens were observed, which was 0.2 ravens per survey. Because of the novel Coronavirus, nests were not monitored in the Desatoya Mountains in 2020, and therefore, RRHL surveys were not conducted at nest locations. From 2014-2019, GBBO/USGS technicians detected an average of 0.45 ravens per RRHL survey at nest sites, which was lower than the average number of ravens detected per each random survey over the same period (0.70). In 2020, livestock were observed at 6 RRHL surveys, and raven detections per survey were higher at survey points where livestock were present (5.17), compared with surveys in which livestock were not detected (1.04).

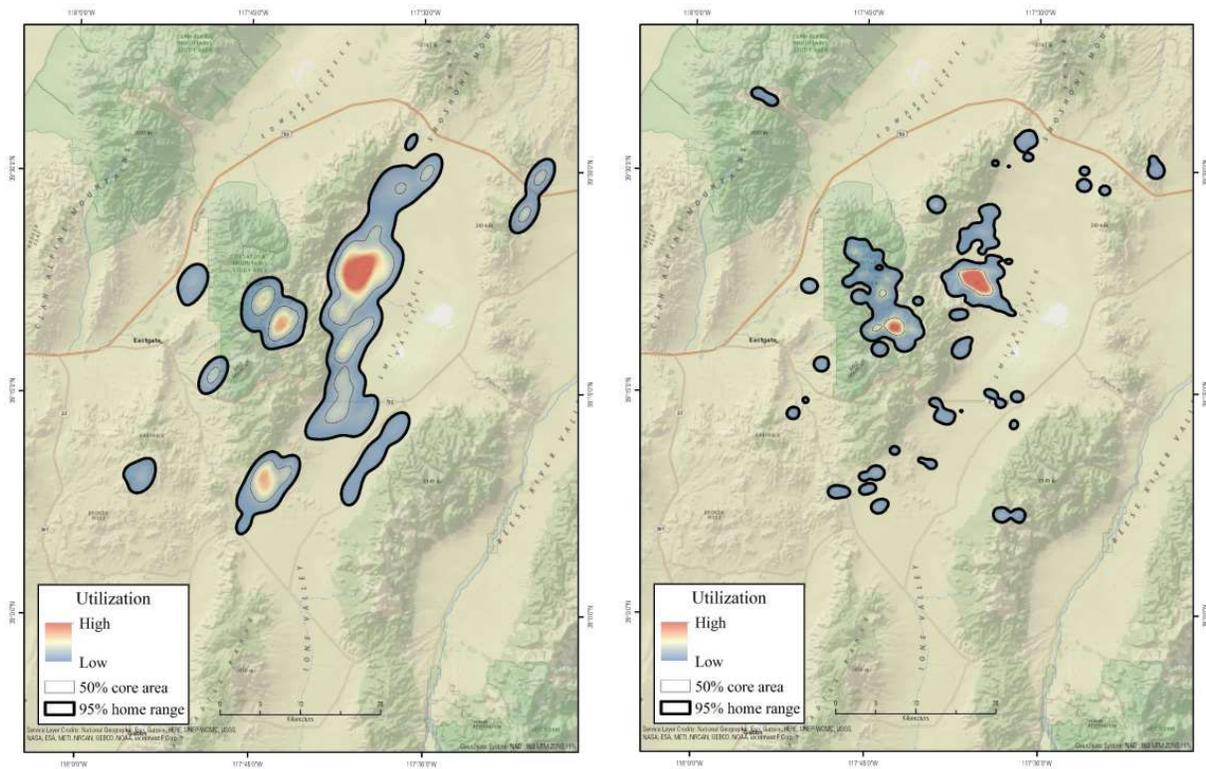


Figure 2. Cumulative utilization distribution of Greater Sage-Grouse (*Centrocercus urophasianus*) during the winter season (left tile) and the summer season (right tile) at the Desatoya Mountains study area Nevada, 2014-2020. Utilization distributions were approximated using kernel density estimators. Summer season use is much more restricted than habitat use during the spring season in this population

Estimates of Population Growth from an Integrated Population Model

From 2011–20, the Desatoya study area had a median population growth rate of 0.92 (Figure 3. 95 percent credible interval=0.77–1.09; hereinafter, CRI). Estimated declines in population sizes are reflected by a trend of decreasing lek counts. At the Desatoya study area, the 9-year log of the odds ratio indicates that there is more evidence of population decrease than that of population increase. Additionally, it was determined that adult sage-grouse had similar, but higher, median annual survival (0.68, 95 percent CRI=0.62–0.73) than yearlings (0.62, 95 percent CRI=0.56–0.68), but lower recruitment (0.29, 95 percent CRI=0.28–0.38) than yearlings (0.39, 95 percent CRI=0.29–0.51).

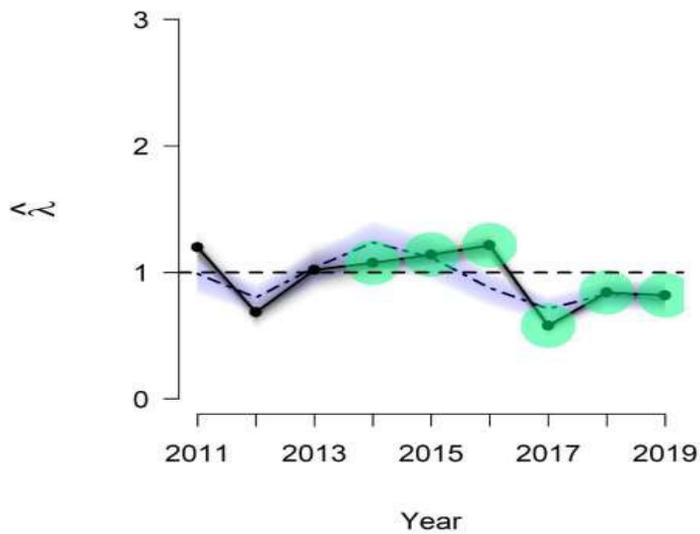


Figure 3. The annual population growth rate (λ^{\wedge} ; solid black line) of sage-grouse at the Desatoya Mountains study area Nevada, 2011–2020 ($\lambda^{\wedge}=0.92$, 95 percent credible interval= $0.77-1.09$). λ^{\wedge} for 2020 is not shown here because lek counts in 2021 are required to calculate λ^{\wedge} in 2020. The dashed line and purple shading represent the 95 percent credible interval of the Great Basin; green circles represent years where both lek lek count and demographic data was collected, while years without circles represent years with only lek count data. The dashed horizontal line represents neutral population growth ($\lambda^{\wedge}=1.0$).

Table 1. Summary of posterior distributions of derived population demographics for sage-grouse at the Desatoya Mountains study area from 2011-2020. Values reports here are cumulative estimates across all years of the study.

| Population Vital Rate | Age | Median Estimate | Credible interval (CRI) | |
|----------------------------|----------|-----------------|-------------------------|--------------|
| | | | Lower -0.025 | Upper -0.975 |
| Annual growth rate | NA | 0.92 | 0.77 | 1.09 |
| Nest propensity (1) | Adult | 0.96 | 0.91 | 0.98 |
| | Yearling | 0.91 | 0.86 | 0.95 |
| Clutch size – First Nest | Adult | 7.52 | 7.17 | 7.91 |
| | Yearling | 7.93 | 7.37 | 8.55 |
| Clutch size – Second Nest | Adult | 7.21 | 6.28 | 8.29 |
| | Yearling | 7.59 | 6.58 | 8.83 |
| Nest survival – First Nest | Adult | 0.30 | 0.24 | 0.39 |
| | Yearling | 0.33 | 0.24 | 0.44 |
| Nest survival – Second | Adult | 0.33 | 0.22 | 0.47 |
| | Yearling | 0.37 | 0.24 | 0.50 |
| Hatchability | Adult | 0.89 | 0.85 | 0.92 |
| | Yearling | 0.92 | 0.88 | 0.94 |
| Chick survival | Adult | 0.27 | 0.22 | 0.33 |
| | Yearling | 0.32 | 0.25 | 0.38 |
| Annual survival | Adult | 0.68 | 0.62 | 0.73 |
| | Yearling | 0.81 | 0.76 | 0.86 |

Monitoring Greater Sage-grouse Response to the Martin Fire in northern Nevada

Other Funding Sources: Upland Game Management Grant (75%)
Carson Valley Chukar Club
Nevada Chukar Foundation

Project Start Date: July 1, 2016

Estimated Completion Date: June 30, 2023

Project Accomplishment Summary:

In collaboration with the USGS – Western Ecological Research Center, Great Basin Bird Observatory technicians measured demographic rates and space use of sage-grouse in the Santa Rosa and west Owyhee Desert during 2016–2020 as part of a broad, long-term collaborative research program. The project aims to use data collected both before and after the 2018 Martin Fire to better understand its effects. To date, 146 sage-grouse have been captured and fitted with very high frequency ($n = 133$) and Global Positioning System ($n = 13$) transmitters. Annual population rate of change (λ) derived from an integrated population model using vital rates measured during this study and longer lek count data starting in 2011 was estimated at 0.92 (95 percent credible interval= 0.76–1.09).

Preliminary Results

From 2016 to 2020, 146 sage-grouse were captured in the fall ($n=79$) and spring seasons ($n=67$; table 1). Of those, 140 were female and 6 were male. Nest and brood locations are overlaid with a map of the Martin Fire of 2018 in Figure 6.

A total of 4,595 GPS locations were obtained at the Santa Rosa study area in 2020. During the spring (that is, nesting) season, the 50 percent core area of sage-grouse activity and the 95 percent population level home-range were 5,117 ha and 29,832 ha, respectively. During the summer (that is, brood-rearing) season, the 50 percent core area and the 95 percent population level home-range were 5,151 and 38,707 ha, respectively. Sage-grouse were most concentrated in the spring. During that season, sage-grouse were localized to a 50 percent core area of 5,117 ha compared to fall, where they used 8,908.46 ha.

Avian Predator Monitoring Preliminary Results

Fifteen Raven, Raptor, Horse and Livestock surveys were conducted at the Santa Rosa study site in 2020 for a total of 957 surveys during March–August 2016–2020. In 2020, ravens were detected during 6 surveys (40 percent). No RRHL surveys were conducted at nest sites in 2020 due to COVID-19 restrictions. At random locations, 1.00 ravens were detected per RRHL at random locations. Livestock were observed at 1 survey, and raven detections per survey were lower at survey points where livestock were present (0 percent), compared with surveys in which livestock were not detected (40 percent). In 2020, for surveys with observed ravens the median number of ravens was 1 per survey, and the maximum number of ravens detected in any survey was 2.

Estimates of Population Growth from an Integrated Population Model

From 2011–20, the Santa Rosa study area had a median population growth rate (λ) estimate of 0.92 (95 percent credible interval=0.76–1.09; hereinafter, CRI Figure 6). Estimated declines in population sizes are also reflected by a trend of decreasing lek counts. The nine-year log of the odds ratio indicates more evidence of a population decrease than that of population increase or neutrality for this study site. Adult sage-grouse at this site had higher median estimates of annual survival (0.64, 95 percent CRI=0.59–0.69) compared to yearlings (0.59, 95 percent CRI=0.53–0.64), but lower recruitment (adult $R=0.27$, 95 percent CRI=0.21–0.35; yearling $R=0.37$, 95 percent CRI=0.27–0.48).

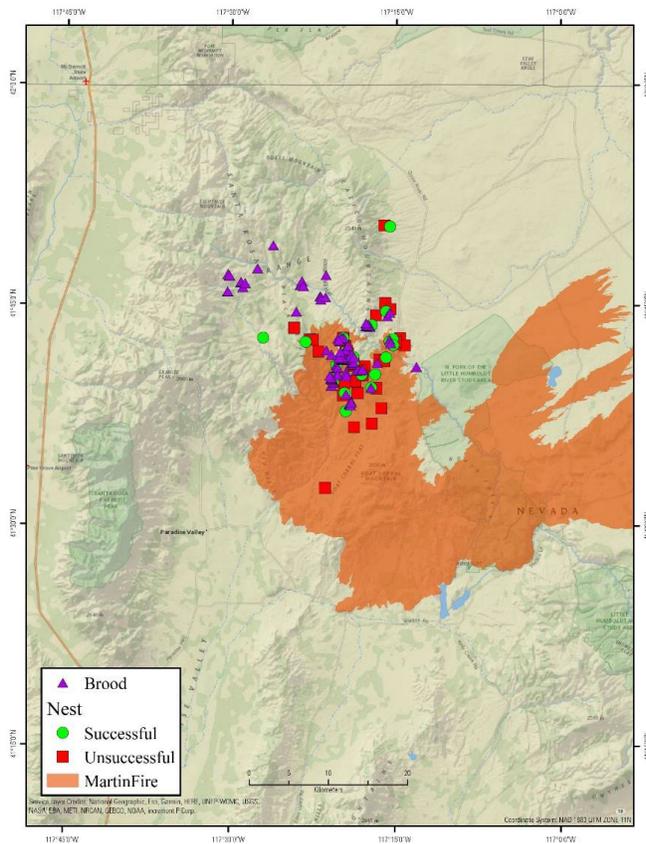


Figure 6. Nest and brood locations of sage-grouse overlaid with the western extent of the 2018 Martin Fire within the Santa Rosa study area.

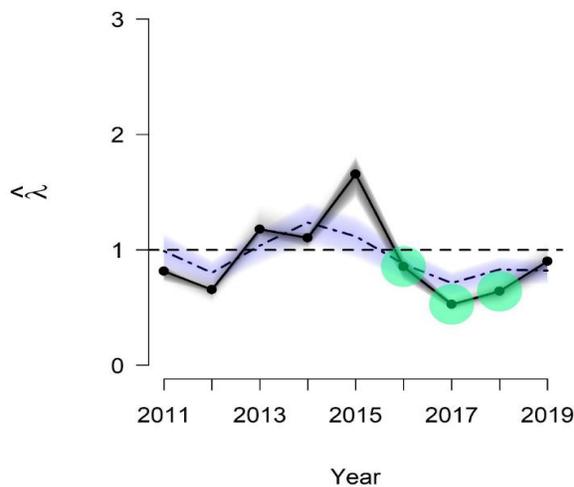


Figure 6. The annual population growth rate (λ ; solid black line) of sage-grouse at the Santa Rosa Mountains study area, Nevada, 2011–19 ($\lambda=0.92$, 95 percent credible interval=0.76–1.09). The dashed line and purple shading represents the 95 percent credible interval of the Great Basin; green circles represent years where both lek count and demographic data was collected, while years without circles represent years with only lek count data. The dashed horizontal line represents neutral population growth ($\lambda=1.0$).

Table 2. Summary of posterior distributions of derived population demographic parameters for sage-grouse in the Santa Rosa study area from 2016–2020. Values reported here are cumulative estimates across all years of the study.

| Population Vital Rate | Age | Median Estimate | Credible interval (CRI) | |
|----------------------------|----------|-----------------|-------------------------|--------------|
| | | | Lower -0.025 | Upper -0.975 |
| Annual growth rate | NA | 0.92 | 0.76 | 1.09 |
| Nest propensity (1) | Adult | 0.96 | 0.91 | 0.98 |
| | Yearling | 0.91 | 0.86 | 0.95 |
| Clutch size – First Nest | Adult | 7.52 | 7.17 | 7.91 |
| | Yearling | 7.93 | 7.37 | 8.55 |
| Clutch size – Second Nest | Adult | 7.21 | 6.28 | 8.29 |
| | Yearling | 7.59 | 6.58 | 8.83 |
| Nest survival – First Nest | Adult | 0.34 | 0.25 | 0.45 |
| | Yearling | 0.37 | 0.28 | 0.49 |
| Nest survival – Second | Adult | 0.37 | 0.24 | 0.52 |
| | Yearling | 0.41 | 0.28 | 0.54 |
| Hatchability | Adult | 0.90 | 0.85 | 0.95 |
| | Yearling | 0.93 | 0.88 | 0.96 |
| Chick survival | Adult | 0.39 | 0.33 | 0.45 |
| | Yearling | 0.44 | 0.37 | 0.51 |
| Annual survival | Adult | 0.50 | 0.42 | 0.56 |
| | Yearling | 0.43 | 0.35 | 0.50 |

Bi-State Sage-grouse Local Working Group Coordinator

Other Funding Sources: Nevada Upland Game Management Grant (75%)
Project Start Date: July 1, 2012
Estimated Completion Date: Ongoing

Project Accomplishments:

The Bi-State Sage-grouse Coordinator position has been in place since 2016 with an office located in Bishop, California. Amy Sturgill has been in the position since its inception. One of the main tasks of this position is to develop a progress report each year that outlines the accomplishments of the Bi-State Sage-grouse Working Group (relative to the 2012 Bi-State Action Plan) along with maintaining and updating the website specific to this population of sage-grouse (www.bistatesagegrouse.com), and coordinating meetings of the Bi-State Local Area Working Group, Bi-State Technical Advisory Committee (TAC), Bi-State Executive Oversight Committee (EOC) and any relevant subcommittees.

2020-2021 Bi-State Progress Report (Preliminary Draft)

The 2012 Bi-State Action Plan (Action Plan) summarized prior conservation efforts and established a road map to conservation of Bi-State sage-grouse populations. In 2014, federal, state, and other partner agencies established a \$45 million-dollar commitment to ensure Action Plan implementation over 10 years. Each year, projects are implemented by the Bi-State Local Area Working Group (Bi-State LAWG), a diverse group of stakeholders made up of federal, state, and local government agencies, Tribal members and representatives, nonprofit organizations, and private landowners. In 2020, Bi-State LAWG partners allocated approximately \$3.9 million dollars to Bi-State sage-grouse conservation efforts.

In 2020, research, monitoring, and conservation action implementation were greatly affected by the COVID-19 global pandemic. All organizations participating in the Bi-State collaborative conservation effort were forced to alter normal operations and implement new directives and strategies to ensure public health and safety. These directives required personnel to work remotely and adhere to travel restrictions which affected their ability to carry out fieldwork and implement planned conservation actions. Despite these challenges, Bi-State partners were able to conduct lek counts on a select number of leks, carry out limited population monitoring activities, assess sage-grouse habitat through vegetation monitoring, and complete planned conservation projects.

In March of 2020, USGS began population monitoring efforts in the Bodie Hills, South Mono, and White Mountains PMUs as scheduled. In April, field technicians were removed from the field and monitoring activities were suspended in accordance with COVID-19 directives. In September monitoring efforts resumed with a reduced crew of technicians. Data collection efforts were atypical during most all of 2020 and monitoring results will reflect this, therefore data presented in this report should be considered a somewhat incomplete account compared to information reported in previous years. A total of 63 birds were captured and fitted with VHF collars or GPS transmitters to better understand habitat use, seasonal movement, and

demography in the Bodie Hills, South Mono, and White Mountains PMUs. Apparent annual survival for Bi-State sage-grouse was 69%. Nest and brood success were not monitored during 2020.

Translocation efforts to bolster the Parker Meadow subpopulation of the South Mono PMU were put on hold in 2020 and will resume in 2021. Funding was secured to carry out translocation efforts for an additional five years.

Annual lek counts were conducted in all Bi-State PMUs between March and May. However, it should be noted that monitoring efforts were impacted by COVID-19 restrictions and directives. Lek count results will reflect changes in protocol as well as limited staff and volunteer availability. A total of 470 males were counted on 30 of the 56 leks surveyed in 2020. The majority of sage-grouse were observed in the Bodie Hills PMU and the Long Valley portion of the South Mono PMU. The highest lek attendance was observed at the Dry Lakes complex in the Bodie Hills (n=73), followed by Long Valley lek 2 (n=43).

Conservation actions to address identified threats to Bi-State sage-grouse and their habitats were carried out on approximately 17,400 acres in the Bi-State area. To address the threat of urbanization and to maintain high quality, intact habitat conditions the Eastern Sierra Land Trust secured a 4,100-acre conservation easement on the Hunewill Ranch in the Bodie Hills PMU, and RCPP funding was available to carry out conservation projects aimed at improving sage-grouse habitat conditions on private lands.

To address the threat of conifer expansion into sagebrush systems, 7,854 acres of conifer treatment were completed in the Pine Nut and Mount Grant PMUs and 3,282 acres of conifer treatment maintenance was completed on previously treated sites in the Bodie Hills and Desert Creek/Fales PMUs.

To maintain healthy sagebrush and meadow systems numerous projects were implemented including stream restoration and meadow irrigation, a TAC subgroup was formed to inventory, assess, and prioritize future mesic resource restoration efforts a meadow monitoring effort was established in the Pine Nut PMU, and NEPA was completed for a meadow restoration project in the Bodie Hills PMU to limit invasive and noxious weeds 724 acres of chemical and mechanical treatment were completed in the Pine Nut, Desert Creek-Fales, Mount Grant, and Bodie Hills PMUs.

To address habitat degradation associated with wild horse and permitted livestock grazing an aerial survey of the Montgomery Pass wild horse territory was completed herd in the Bodie Hills, Mount Grant, and White Mountain PMUs, on the ground surveys occurred in the Bodie Hills and South Mono PMUs, seven range improvement inspections occurred in the Pine Nut and Mount Grant PMUs, and 1,054 acres were protected under a 15-year Conservation Reserve Program lease in the Bodie Hills PMU.

Upland Game Translocation and Monitoring

Other Funding Sources: Upland Game Management Grant (75%)
Carson Valley Chukar Club
Project Start Date: July 1, 2019
Estimated Completion Date: June 30, 2020

Project Accomplishments:

Wild Turkey Establishment

There were no wild turkey translocations that took place in State Fiscal Year 2021 due mainly to Covid 19 limitations, but also due to very dry habitat conditions at the release site in the North Snake Range in White Pine County.

Mountain quail translocation and monitoring

No mountain quail translocations were conducted during the winter of 2020 or spring of 2021, largely due to Covid 19 restrictions. Remote mountain quail call and video recording devices were placed at several prior release locations (Hampton Creek, Hendry's Creek and Buck Mountain in White Pine County) to help determine presence/absence of mountain quail at these sites and sustainability of these populations. Results will be available in June of 2021.

Columbian Sharp-tailed Grouse Update

Lek surveys were conducted in mid-April and early May for Columbian sharp-tailed grouse (CSTG) in the Bull Run Basin in Elko County. In total, 43 CSTG were observed on three active leks. In comparison, 44 CSTG were counted on these same leks in 2020. However, an additional fourth active lek with 3 males was observed in 2020, but no birds were counted on this lek in 2021. This population is showing some resiliency after the South Sugarloaf Fire in 2018, a heavy winter in 2018-2019, followed by moderate to extreme drought like conditions over the last 18 months.

In addition to the continued monitoring of this population, a manuscript submission on this work has been submitted to the Ornithological Applications journal for publication by Steven Mathews with the USGS. The manuscript is titled: "*Offspring of translocated individuals drive the successful reintroduction of Columbian sharp-tailed Grouse in Nevada, USA*". A portion of the abstract of that work is provided below.

"The Nevada Department of Wildlife, working in conjunction with the USGS – Western Ecological Research Center, reintroduced Columbian Sharp-tailed Grouse (T. phasianellus columbianus; CSTG) to northcentral Nevada from 2013 – 2017 and used integrated population models (IPMs) to evaluate the process of population establishment and estimate latent contributions of progeny hatched at the restoration site to population rate of change ($\hat{\lambda}$). Specifically, we used annual lek counts and demographic data from translocated individuals to build two separate IPMs to estimate a population growth rate ($\hat{\lambda}$). While keeping demographic contributions by translocated individuals identical between models, one IPM assumed local progeny performance was demographically similar to translocated individuals (i.e. the baseline-

IPM), and the second assumed that local progeny performed demographically similar to non-translocated CSTG (i.e. the informative-IPM). The baseline-IPM predicted strong population declines following the conclusion of translocations and extirpation by 2020, and it failed to predict observed lek counts. Conversely, the informative-IPM predicted population growth rates ($\hat{\lambda} = 1.27$, 95% credible interval = 0.86 – 1.61) that were more similar to field observations. Offspring of translocated individuals likely perform at similar levels to non-translocated populations, and by not accounting for demographic differences between translocated individuals and non-translocated progeny hatched at the restoration site, managers could underestimate population performance and persistence. Thus, translocation practices that maximize the number of offspring immediately recruited into restoration sites are likely to be the most successful.”



Figure 7. A male Columbian sharp-tailed grouse at the source stock location (capture area) in Little Pocatello Valley in southeastern Idaho.

Dusky Grouse Ecology and Management in Nevada

Other Funding Sources: Upland Game Management Grant (75%)
Carson Valley Chukar Club
Nevada Chukar Foundation

Project Start Date: July 1, 2018
Estimated Completion Date: June 30, 2022

Project Accomplishments:

Population Monitoring Surveys and Abundance

Utah State University (USU) graduate students and technicians performed breeding bird surveys from April through the end of breeding season (early-June) to develop a protocol for indexing breeding populations of dusky grouse. Surveys were performed by identifying 4 random stop locations for each survey, with stop locations remaining > 500 m apart. Each selected field area (n = 5) contained up to 4 survey routes randomly set throughout the area and the survey sites began and ended with survey stop locations that were 500 m or less from easily available access points (i.e., roads or trails). Surveys started one half hour prior to sunrise and each survey consisted of 3 consecutive 4-minute intervals of silent observation, followed by one 4-minute interval of observation using a female “cackle” playback call (Stirling and Bendell 1966, Falls and McNicholl 1978). All surveys were repeated no less than twice throughout each breeding season.

Preliminary Results (2020 Field Season)

Dusky grouse breeding surveys began on April 8 and continued until June 2, 2020. Each survey route was repeated three times, whereas just two survey routes were conducted in previous years. Additional survey routes were accessible during the breeding season in 2020, allowing USU to conduct 240 samples of 20 survey routes, where each route contained four survey stops. Breeding males (\geq one breeding male) were identified at 161 of those route samples, yielding an apparent detection probability of 0.67. Using a Bayesian occupancy model to estimate a preliminary detection probability with 2020 data, a mean detection probability of 0.76 was calculated across all routes. The model and survey protocol that will be developed with these data can be used for continued monitoring of dusky grouse breeding populations across Nevada.

Survival, Harvest Rates and Reproduction

USU captured and banded dusky grouse each year while in the field using predominantly noose poles and walk-in traps (Zwickel and Bendell 1967, Pelren and Crawford 1995). Females received GPS tags when captured. Band returns will be used during the hunting season to estimate the harvest rate of captured and banded dusky grouse. Mortalities of radio-marked females will be used to estimate their seasonal, monthly, and annual survival rates. USU identified nesting dusky grouse, estimated nest initiation dates and determined clutch sizes by observing their nesting and egg-laying behaviors while not disturbing the nesting female to avoid any potential nest abandonment. Each female’s brood survival was monitored by locating those individuals at least once per week for a minimum of 50 days post-hatch. This information provides seasonal survival and reproductive vital rates. Microhabitat characteristics were measured at nest locations within one-week post-hatch and GPS-identified brooding locations within one week of use.

Preliminary Results

No radio-marked birds were lost during the winter to spring migration prior to the 2020 field season; leaving eight females and one male remaining online. During the 2020 field season, USU captured 51 dusky grouse consisting of 22 adults, 3 yearlings, and 26 chicks. Thirty new bands and 18 radio-transmitters were deployed on newly captured females. Before the end of the field season 15 of 27 radio-tagged females were lost: eight to natural mortality (predators or at least evidence of predators due to post-mortem scavenging), 6 failed Argos transmitters, and one dropped rump-mounted radio. The field season concluded with 12 radio-marked birds being actively monitored.

Since the end of the 2020 field season (i.e., August 20), 9 of the 12 remaining marked birds have location data indicating mortalities: 6 occurred during fall migrations and 3 since reaching their wintering areas. Thus, 3 birds remain alive and are currently being monitored, with 3 additional birds that may potentially be relocated via radio-telemetry. Over the fall 2020 hunting season, NDOW biologist, Kody Menghini, collected wings from 26 harvested dusky grouse from the Schell Creek Range, yet no bands or transmitters have been submitted to NDOW or USU since the start of the project in 2018.

Interestingly, many of the radio-marked female dusky grouse began migrating up in elevation nearly three months earlier during the fall of 2021 than the previous two years, though some moved to lower, wetter areas for up to a month prior to moving up in elevation to their wintering areas. Specifically, many of the females began moving within weeks of nesting. It is suspected that the lack of precipitation and water availability in dusky grouse typical summer ranges influenced individuals to seek either 1) higher elevations (near wintering grounds) or 2) lower elevation willow patches and streams, both of which could provide cooler daytime temperatures and increased foraging opportunities during a drought.

All of the surviving females from the 2019 season nested. Thus, a total of 9 active nests were monitored over the main nesting period in 2020 with only one nest failure due to depredation. While peak hatch occurred during the last two weeks of May in 2018 and during the last week of June in 2019, it landed directly between the two previous years this season with peak hatch occurring in early June. Though the sample size of successfully hatched nests was small in 2019 ($n = 2$), both of those nests seemingly hatched all of their eggs. This year, three of out of eight nests successfully hatched all but one of their eggs, while another hatched all but two of her eggs. Nest success is defined as having \geq one egg successfully hatch per nest.

Brood success is evaluated as at least one chick per radio-tagged female surviving to 50 days post-hatch. During the summer of 2020, successful broods averaged 4.0 chicks per female at 50 days post-hatch with an 82% brood success rate. This rate is higher than the 2018 rate (46%) and lower than the 2019 rate (100%, but small sample size). This could be due to many factors, including but not limited to: a) the drought-like conditions experienced over the summer, which can cause uninhabitable thermal micro-environments, reduce water availability, and deplete important food resources (i.e., herbaceous plants, insects); b) increased predator populations or prey switching behavior by predator species; or c) increased exposure to predators, difficult terrain,

and climate extremes at young ages during the early long- distance migrations to wintering habitat that some of the radio-tagged females made shortly after nesting. However, an opposing argument for the early migrations of those females could have been that the migrations were initiated due to having already lost their broods. We cannot determine these outcomes based on our data. However, no chicks were detected with any of the females that had migrated early, but it was possible that the chicks were present but undetected.

Habitat Selection

Location data of individually radio-marked dusky grouse females was used to identify selected nesting and brooding habitats. Vegetation characteristics were surveyed for each identified location, including proportions of predominant grass, forb, and woody plant species, percent canopy cover, vegetation density, vertical cover descriptions, percent bare ground, and thermal micro-habitat measurements. These data will be used along with year-round macro-habitat locations (i.e., forest or grassland type, distance to edge, distance to roads, season/month, elevation, slope, etc.) to perform habitat/resource selection functions, which will characterize both annual and seasonal habitat use of dusky grouse.

Preliminary Results

A total of 192 vegetation surveys of used nest (n = 12) and brooding (n = 52) sites and their associated and unassociated random sites (nests = 24, broods = 104) were completed throughout the season. Each used site had one associated random location and one unassociated random location within the study area.

Thermal landscape ecology of the Great Basin Ranges in east-central Nevada

One hundred iButtons (temperature data loggers) were deployed across five major vegetation types throughout these ranges, including: 1) sagebrush, 2) conifer (i.e., firs and white pines), 3) aspen, 4) mountain mahogany, and 5) pinyon-juniper. The iButton devices were also deployed at all identified dusky grouse nesting and brooding locations.

Preliminary Results

USU technicians were able to relocate 95 of the iButtons (95%) with 5 of them having been taken/eaten by either sheep or cattle in areas where heavy grazing was evident. Ground temperatures were recorded at all microsite locations for 12 weeks over the summer months, and all microsites were described by a brief vegetation survey to determine percent cover and dominant species within a 10-foot radius of the iButton location at the end of the survey period. Data obtained from iButtons will help determine diurnal temperature variations and thermal extremes across differing vegetation types and conditions. This will help further quantify the thermal environment of the Great Basin sky-island ecosystem, but to also identify thermal refugia that are available during the arid summer months for the numerous species that utilize these habitats.

Baseline and chronic corticosterone levels

Fecal and feather samples collected from flushed and captured grouse will be analyzed to establish standards for baseline and chronic corticosterone (stress-induced glucocorticoid

hormone) levels of dusky grouse in the Great Basin ecosystem. Corticosterone levels will be quantified using validated enzyme immunoassays and results will be compared across sex, ages, reproductive stages, and study sites.

Preliminary Results

The use of Arbor Assay's Corticosterone Enzyme Immunoassay Kits was successfully validated for both dusky grouse fecal and feather samples in early spring 2020. During the 2020 field season, 104 fecal samples and 170 feather samples were collected from dusky grouse: 20 fecal and 22 feather samples from adult males, 25 fecal and 63 feather samples from adult females, 34 fecal and 31 feather samples from chicks, and 25 fecal and 54 feather samples from unknown (either unidentified sex, age, or both). Resulting hormone levels will be compared across sex, age, and reproductive season to establish an average of corticosterone levels across the reproductive season for dusky grouse in the Great Basin ranges. These values will provide a foundation in the literature for dusky grouse stress-induced hormone levels that other researchers can use to compare with individuals from other areas of the dusky grouse range, to evaluate changes in the population over time, or to contrast values between the two *Dendragapus* species.

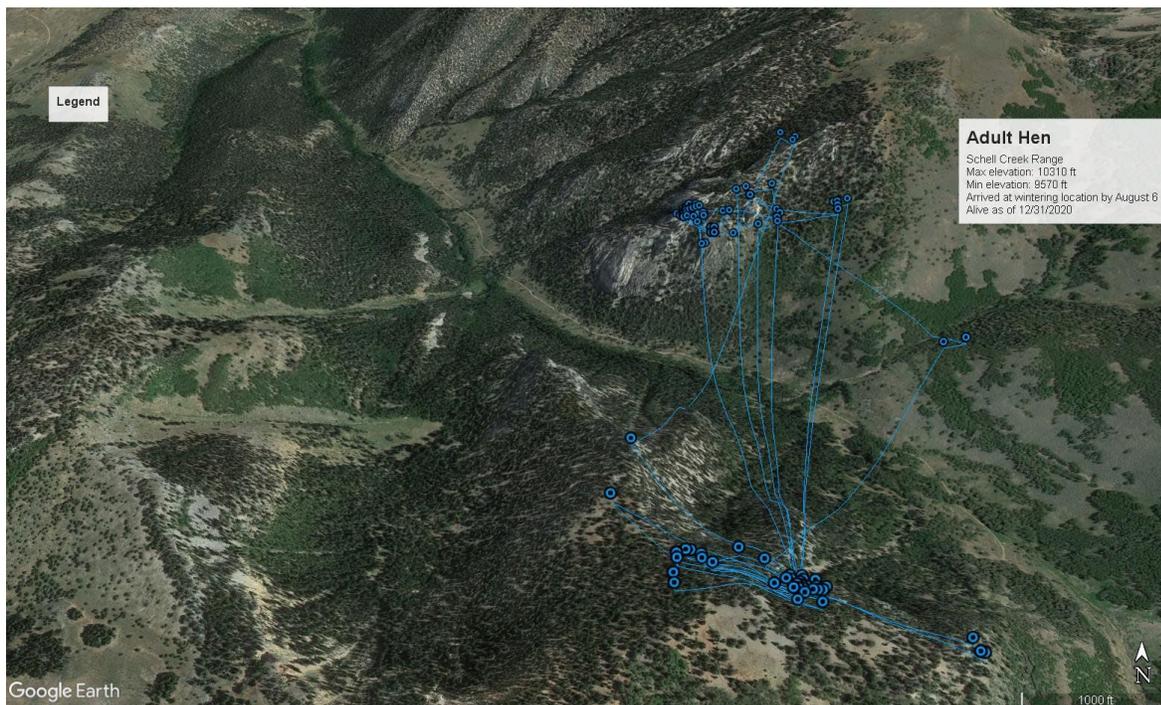


Figure 8. Movements of a 4+ year old female captured as an adult in 2018 during the late fall through winter of 2020. This hen has used these same areas for two consecutive years.

Using Hunter and Population Survey Data to Investigate Drivers of Upland Game Bird Populations and to Forecast Harvest in Nevada

Other Funding Sources: Nevada Chukar Chasers Foundation
Carson Valley Chukar Club
Nevada Chukar Foundation

Project Start Date: July 1, 2021
Estimated Completion Date: June 30, 2022

Projects Accomplishments:

At this stage of the project, we are focused on data curation and model development. Specifically, the data collected or maintained by NDOW (e.g., Chukar brood surveys, upland harvest reports and hunter numbers) has been requested and received by the project personnel, which will serve as the basis for model design. Likewise, a preliminary model focused on exploring the extent we can make predictions regarding future conditions (e.g., numbers of hunters, numbers of harvest upland quarry) will be developed based on how these features have (co)varied through time. Preliminary results (Figure 9) are promising as it suggests that reliable predictions are possible based on the data available, which should only be strengthened with the inclusion of other data sources (e.g., survey data).

Next Steps:

Moving forward, additional years of harvest data (i.e., 2018–2020) will be incorporated (if available), as well as upland gamebird survey data (e.g., chukar covey counts, sage-grouse lek counts) to improve both the predictive accuracy and spatial resolution of the model. Specifically, for widespread and popular quarry, such as chukar, our goal is to create predictive forecasts at the sub-regional level (e.g., counties or ranges), which we believe represents the interests of the upland hunting community in Nevada. Additionally, we will be focusing on assessing model predictive performance in order to provide some metric of certainty for each annual forecast.

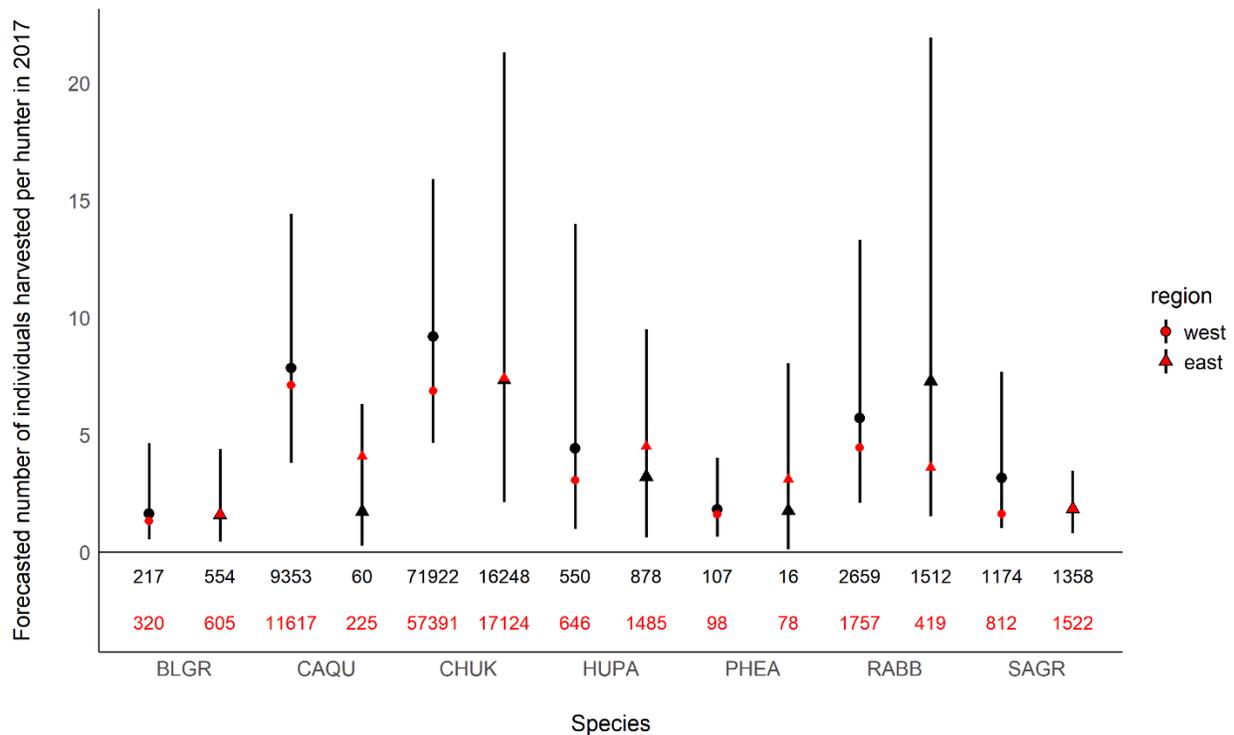


Figure 9. Preliminary results from a predictive model that used data from Nevada’s upland harvest reporting from 1976–2016 to predict the average number of upland birds (and rabbits) harvested per hunter (forecasted: black objects with error bars; observed: red objects) based on the forecasted number of upland quarry harvest (forecasted: black text, observed: red text) and hunters (not pictured) in 2017 for the eastern (circles) and western (triangles) regions.

Estimating the Effects of Large Ungulate Grazing on Greater Sage-grouse in Northwest Nevada

Other Funding Sources: Sheldon-Hart Conservation Fund
 Bureau of Land Management – Applegate Field Office
 Nevada Chukar Foundation

Project Start Date: July 1, 2021
 Estimated Completion Date: June 30, 2022

Project Accomplishments:

From 2013 to 2019, University of Nevada, Reno (UNR) technicians and students captured 775 female and 333 male sage-grouse for a total of 1,108 birds. UNR will model adult female survival using Bayesian survival models. Estimates of survival will be calculated for successful and unsuccessful breeders. During this period, 804 nesting attempts were monitored. Daily nest survival rates will be modeled using a Bayesian hierarchical model with nest age, study area, and year as a three-way interaction. Additionally, 292 hens that successfully hatched a nest were monitored over the course of the field work and chick survival will be modeled using a Bayesian hierarchical framework with double observer counts of chicks from a radio marked

parent. Results from these models will be used to help answer certain hypotheses and subsequent publications will be developed (see below).

Breeding propensity and costs of breeding analyses for adult female sage-grouse have been completed for the years 2013-2016. These analyses will be updated using data from 2017-2019 and influences of wild horse and livestock grazing will be incorporated into these models to assess the impact of grazing on breeding propensity and the cost of breeding. A manuscript will be developed from these analyses. Laboratory analyses of corticosterone from feather samples is complete and preliminary statistical analysis of resulting data is also finished. Spatial assessments of horse and cow use will be incorporated into these analyses to assess the impact of nonnative ungulates on stress in sage-grouse. A manuscript describing these results will be developed. Laboratory analyses of both microsatellites and single nucleotide polymorphisms of samples from Hart Mountain and Sheldon National Wildlife Refuges, and the Massacre-Vya area are complete. Several manuscripts are anticipated describing, paternity of sage-grouse clutches, sex ratio in sage-grouse clutches and population structure as well as a manuscript on sex ratio as part of this sub-grant package.

Vegetation data was collected at sampled at a total of 3,517 locations combined over seven years from 2013-2019. Various characteristics of vegetation were measured at all nests, brood locations and a sample of random points during nesting and brood rearing. These results will be integrated into various habitat use and survival models to determine potential effects.

UNR researchers have completed a spatial model of wild horse and cattle use that integrates field sampling of horse and cow feces with spatial variables, such as slope, elevation, and distance to water. A manuscript is in development. A model for analyzing sage-grouse nest and chick survival has been developed and a manuscript is being drafted. Additionally, using characteristics of habitats used by broods in northern Washoe County, a habitat model to characterize late brood-rearing habitat has been developed. This model has been tested against late brood habitat previously collected from Eureka County.

Comprehensive analyses and production of products will be completed by June 30, 2021. Previous work has identified several key features important for late summer survival of adult hens and young of year for this management area including Bitner Meadows, Pinto Spring, Divine Spring, and Mountain View Creek. Based on these findings, NDOW and the BLM – Applegate Field Office have modified the exclosure around Pinto Spring and extended the protected area and plan to build an enclosure around the meadow associated with Divine Spring during the summer of 2020. The ultimate goal of this work is the assessment of the relative effects of grazing by livestock and feral horses on sage-grouse habitats, demographic rates and population dynamics.

The following manuscripts are expected to be drafted for submittal into peer-reviewed journals:

1. Spatial distribution of nonnative ungulates in relation to landscape features and effects on vegetation. Intended for Ecological Applications.
2. A method for estimating survival and mixing of offspring in broods of dependent young. Intended for Methods in Ecology and Evolution.

3. A model of late brood rearing habitat for sage-grouse in the Great Basin. Intended for The Journal of Wildlife Management.
4. Effects of climate and grazing on breeding investment by sage-grouse. Intended for Ecological Applications.
5. Correcting for transmitter age when estimating survival. Intended for The Journal of Wildlife Management.
6. Grazing by nonnative ungulates and stress response in sage-grouse. Intended for the Condor.

Sex ratio in clutches of sage-grouse. Intended for The Auk.

Monitoring Greater Sage-grouse Vital Rates in Nevada's Most Novel Habitats

Other Funding Sources: Nevada Greater Sage-grouse Conservation Grant
Carson Valley Chukar Club

Project Start Date: July 1, 2015

Estimated Completion Date: June 30, 2023

Project Accomplishment Summary

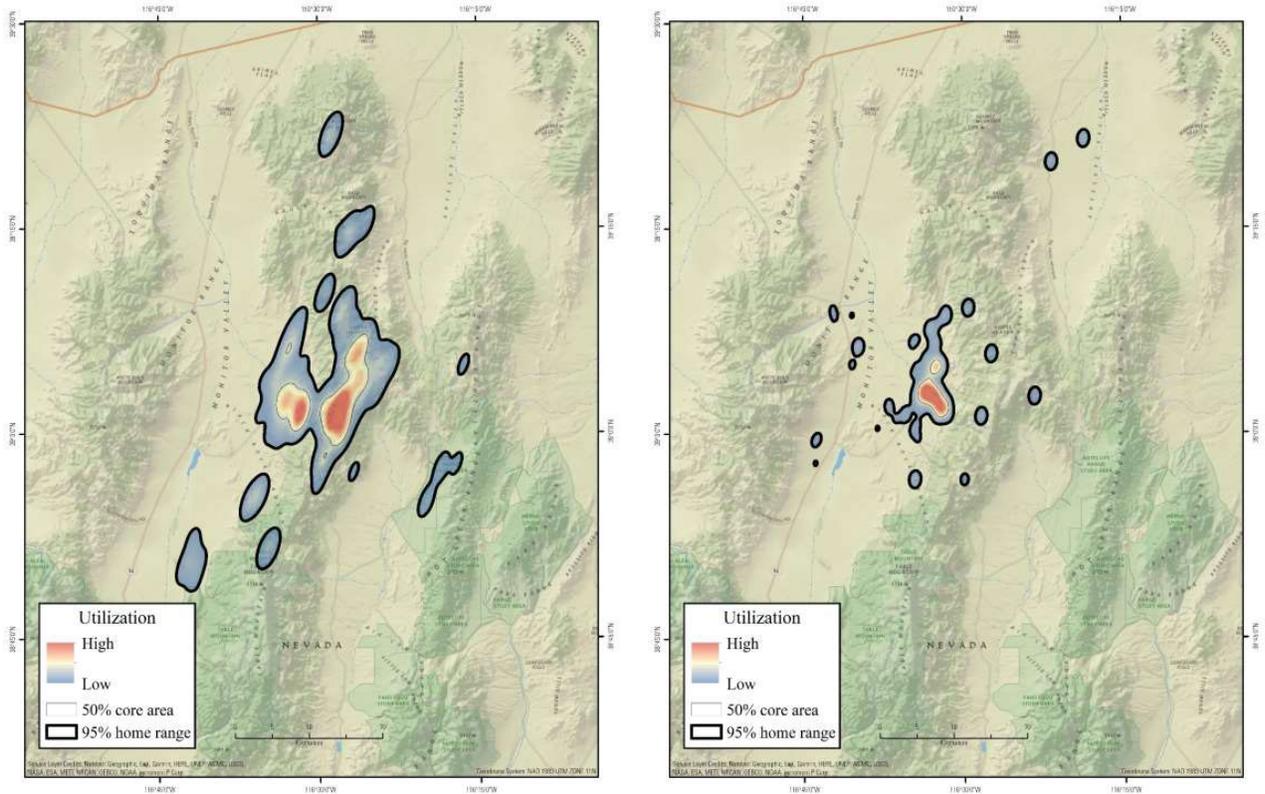
In collaboration with the USGS, Greater Basin Bird Observatory (GBBO) technicians measured demographic rates and space use of sage-grouse in the Monitor Range study area from 2016 to 2020 as part of a long-term collaborative research program. Specific to the Monitor Range, goals of this project are to provide a control site with low anthropogenic disturbance that will allow comparisons of demographic trends in other sage-grouse populations in areas with anthropogenic surface disturbances. To date, 142 sage-grouse have been captured and outfitted with very high frequency (VHF) or Global Positioning System (GPS) transmitters. Annual population rate of change derived from an integrated population model utilizing vital rates measured during this study and longer lek count data was estimated at 0.91 (95 percent credible interval= 0.74–1.09) from 2011 to 2020. We caution that this estimate was largely reflective of drought-like conditions during this study period.

Preliminary Results

From 2015 to 2020, 142 sage-grouse were captured in the fall ($n=83$) and spring seasons ($n=59$). Of those, 137 were female and 5 were male. GPS transmitters provided 14,362 locations of marked sage-grouse at this study site from 2015–2020. Vital rates for sage-grouse in this study area are provided in Table 2.

During the spring (March–May, i.e., nesting) season, the 50 percent core area of sage-grouse activity and the 95 percent population level home-range were 6,342 ha and 45,521 ha., respectively. During the summer (June–August, i.e., brood rearing) season, the 50 percent core area and the 95 percent population level home-range were 6,713 ha. and 36,603 ha., respectively.

In contrast to the Desatoya Range study area, the season in which sage-grouse were most concentrated was the winter (December–February). During winter, Sage-Grouse were localized to a 50 percent core area of only 1,430 ha compared to the summer, where they used 6,713 ha.



(Figure 4).

Avian Predator Monitoring

Seven Raven, Raptor, Horse and Livestock (RRHL) surveys were conducted throughout the Monitor Range in 2020 for a total of 1,235 surveys during March–August 2016–2020. In 2020, a total of 11 ravens were observed during the 7 RRHL surveys, which was 1.22 ravens per survey. No RRHL surveys were conducted at nest sites in 2020 due to COVID-19 restrictions. Technicians detected per 3.00 ravens per RRHL at random locations. Livestock were encountered at 1 RRHL survey, and raven detections per survey were lower during surveys in which livestock were detected (0.00), compared with surveys in which livestock were not detected (1.38). In 2020, for surveys with observed ravens the median number of detected ravens was 2 per survey, and the maximum number of ravens detected in any survey was 5.

Figure 4. Cumulative utilization distribution of Greater sage-grouse during summer (left panel) and winter (right panel) at the Monitor Range study area, 2015–2020.

Estimates of Population Growth Rate Derived from an Integrated Population Model

From 2011–20, the Monitor Range had a median population growth rate estimate of 0.91 (95 percent credible intervals=0.74–1.09; hereinafter, CRI; Figure 5). Estimated declines in population sizes are reflected by a trend of decreasing lek counts. At the Monitor Range, the eight-year log of the odds ratio indicates that there is more evidence of population decrease than that of population increase or neutrality. We also found that adult sage-grouse had slightly higher median estimates of annual survival (0.59, 95 percent CRI=0.50–0.66), but lower recruitment (0.37, 95 percent CRI=0.26–0.49) as compared to yearlings (survival=0.53, 95 percent CRI=0.43–0.61; recruitment=0.48, 95 percent CRI=0.34–0.64).

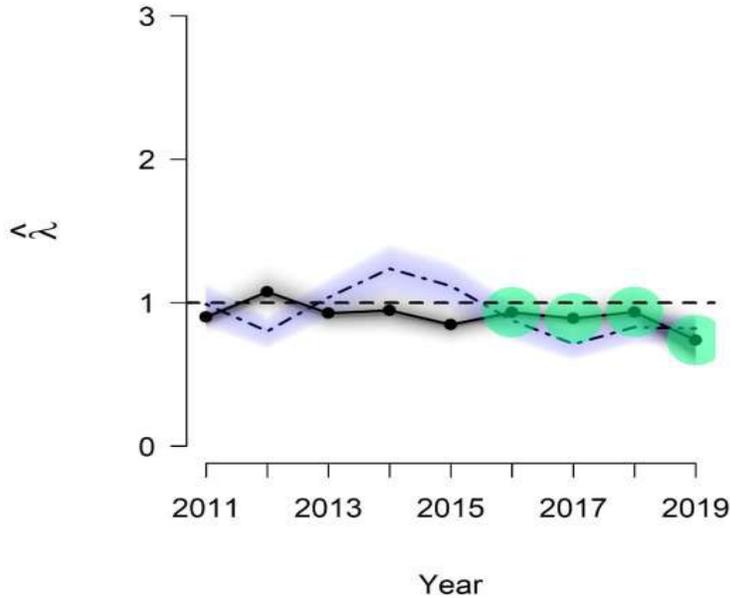


Figure 5. The annual population growth rate (λ^{\wedge} ; solid black line) of sage-grouse at the Monitor Range study area from 2011–2019 (λ^{\wedge} =0.91, 95 percent credible intervals=0.74–1.09). λ^{\wedge} for 2020 is not shown here because lek counts in 2021 are required to calculate λ^{\wedge} in 2020. Shading represents the 95 percent credible interval of the integrated population model; no highlighting represents years wherein only lek count data was collected, and green shading represents years that lek count and demographic data were collected. The solid line is the integrated population model derived estimate and the dashed line represents the derived estimate for the Great Basin. The horizontal dashed line represents a neutral population (λ^{\wedge} =1.0).

Table 2. Summary of posterior distributions of derived population demographic parameters for Greater sage-grouse at the Monitor Range study area from 2016–2020.

| Population Vital Rate | Age | Median Estimate | Credible interval (CRI) | |
|----------------------------|----------|-----------------|-------------------------|-----------------|
| | | | Lower -0.025 | Upper -0.975 |
| Annual growth rate | NA | 0.91 | 0.74 | 1.09 |
| Nest propensity (1) | Adult | 0.96 | 0.91 | 0.98 |
| | Yearling | 0.91 | 0.86 | 0.95 |
| Clutch size – First Nest | Adult | 7.52 | 7.17 | 7.91 |
| | Yearling | 7.93 | 7.37 | 8.55 |
| Clutch size – Second Nest | Adult | 7.21 | 6.28 | 8.29 |
| | Yearling | 7.59 | 6.58 | 8.83 |
| Nest survival – First Nest | Adult | 0.26 | 0.18 | 0.36 |
| | Yearling | 0.30 | 0.19 | 0.40 |
| Nest survival – Second | Adult | 0.29 | 0.17 | 0.43 |

| | | | | |
|-----------------|----------|------|------|------|
| Hatchability | Yearling | 0.33 | 0.19 | 0.46 |
| | Adult | 0.89 | 0.85 | 0.93 |
| Chick survival | Yearling | 0.92 | 0.88 | 0.95 |
| | Adult | 0.38 | 0.30 | 0.47 |
| Annual survival | Yearling | 0.43 | 0.34 | 0.52 |
| | Adult | 0.59 | 0.50 | 0.66 |
| | Yearling | 0.53 | 0.43 | 0.61 |

Eastern Complex Weed Control

As of April 2021 1,582 acres of invasive weeds have been treated on the Eastern Wildlife Management Area Complex. The removal of these weeds has improved wildlife habitat, increased user accessibility, and improved aesthetics on the Complex. \$11,259.13 of reserve account dollars have been spent as of April 2021. All remaining reserve account funding should be spent this spring. Approximately \$36,300 from other funding sources (SNPLMA, NDA Grant, WMA Grant) have been spent to date. It is anticipated this project will be completed by 6/30/2021. All remaining funds held in reserve for spring weed treatments will be used as described in the project proposal. It is estimated an additional 500 acres will be treated this May and June.

Key Pittman WMA Wildlife Food Plots

A total of \$3,900 was expended from Upland Stamp funds and \$2,600 from Duck Stamp funds on seed. Approximately 60 acres were planted in October with winter wheat, fall cereal rye, barley, alfalfa, Austrian winter pea and hairy vetch as a winter cover crop and to enhance hunter success while hunting the fields on the Key Pittman WMA. Due to drought conditions approximately 20 acres of the food plot was unsuccessful due to lack of water. An additional 20 acres were planted in March with intermediate wheat grass, sand dropseed and Sandberg bluegrass to enhance desirable vegetation in areas where the removal of noxious weeds left areas that were lightly vegetated or in areas where improved vegetation cover and variety is needed. Approximately 70 acres were over seeded in March with Spring wheat, oats, Ladak Alfalfa, Rocky Mountain bee plant, sorghum, and native annual sunflower. The spring planting so far is robust and healthy. The annual seeding projects is completed to increase forage production in feeding areas on the WMA and to enhance hunter opportunities. This project was completed by in-house personnel.

Soil Health Restoration on WMAs

Pre-project soil and vegetation monitoring/data collection was completed in July 2020 at Steptoe and Kirch WMAs on 5-acre plots established in coordination with WMA staff for the soil health restoration project. Soil samples taken during pre-project monitoring were sent to International Ag Labs for testing of soil properties and nutrients, and to Earthfort labs to test biological health. Two types of compost were ordered from Full Circle Soils & Compost in Carson City, NV to test on the WMAs for restoring soil health: 7.5 tons of pure compost made from “Lake Tahoe- and Nevada-based recycled materials” and 15 tons of nutrient-amended pure compost to address nutrient deficiencies from the soil nutrient lab tests. Eureka Conservation District (Jake Tibbits) donated 4 tons of biochar that was produced with slash from a 2017 PJ-removal project outside of Eureka, NV. This biochar was applied to the fields with the two types of compost using a block design, each half-acre block being treated using different application rates and combinations of biochar/compost in late October/early November. Full Circle Soils & Compost lent NDOW a gypsum spreader for applying the compost and biochar on both WMAs. The 5-acre plots at each WMA were tilled prior to applying soil amendments due to the overly-compacted surface soils, but all pre-project monitoring was completed prior to tillage.

A cover crop seed mix was ordered for application over part of each treatment block at each WMA field to test whether cover crops can be used instead of amendments for restoring soil health, or whether amendments would be required to get cover crops established in general. The remaining areas of each treatment block were broken into further blocks with combinations of drill-seeding a perennial seed mix of desired vegetation and herbicide treatment. Established cover crops will be tilled into the soil after a season or two of growth and seeded over with the perennial mix to test the sufficiency of using cover crops as another means of restoring soil health in order to get a desired perennial vegetation community established. In total, one acre of each WMA field was seeded with the cover crop and 2 acres of each WMA field were seeded with the perennial mix.

Post-emergent herbicide will be applied by WMA staff to blocks planned for herbicide use in spring 2021 after vegetation and soil monitoring of each plot is completed. If sufficient funds remain in the account, pre-emergent herbicide will be purchased and applied by WMA staff in fall 2021. Soil and vegetation monitoring will be repeated in summer 2021, spring 2022, and summer 2022. Monitoring results will determine how the untreated areas of each field may be

treated in the future to re-establish perennial vegetation for wildlife habitat, at which point additional funding may be sought.

Toiyabe PMU (Bates, Hickison, and Wolf Ranches) Pinyon-Juniper Thinning

The contract for pinyon-juniper thinning on the Toiyabe PMU was delayed due to covid. This project will go out to bid early summer with work slated to begin October of 2021 and finish by February 2022. All associated NEPA clearances and additional funding sources have been secured and finalized.

A Multi-Scale Resilience Based Framework for Restoring and Conserving Great Basin Wet Meadows and Riparian Ecosystems

Work on the wet meadow and riparian framework has been completed. General Technical Reports and Fact Sheets are being printed and will be provided to all partners in the summer of 2021. Additionally, webinars and outreach to field managers are being developed to provide guidance in using the GTs, database, and website associated with the publication of the Framework. The following publications and deliverables have resulted from the project and are available to partners and the public:

1. PUBLICATIONS

- a. Fogarty, F., Yen, J., Fleishman, E., Sollmann, R., and Ke, A. A novel, multiple-region, N-mixture community model to assess the associations of riparian area and fragmentation with avian species richness. Submitted to Ecological Applications.
- b. Knight, A.C., Weisberg, P.J., Chambers, J.C., Dilts, T.E., Board, D.I., Greenberg, J., Wesely, N.K. Watershed-scale geomorphology and disturbance influence riparian vegetation change in small mountain basins. In progress.

2. THESIS

- a. Knight, Anna C. 2019. Watershed-scale controls on riparian vegetation distribution and dynamics: Impacts of geomorphology, climate, and disturbance. MS Thesis, University of Nevada, Reno.

3. PRESENTATIONS

- i. AGU
- ii. ESA
- iii. SRM
- iv. IAG

4. DATABASE AND GTR
5. GTR –CONCEPTS AND ASSESSMENT PROTOCOL
6. WEBSITE –OVERVIEW OF CONCEPTS & ASSESSMENT PROTOCOL
Geomorphic sensitivity and ecological resilience of Great Basin streams and riparian ecosystems –a rapid assessment protocol.
<https://usfs.maps.arcgis.com/home/item.html?id=49f171f01aed451d8bbebb5558638a6c>
7. Ongoing work related to this project includes incorporating effects of wildfire on Great Basin Watersheds, being conducted by Jerry Miller and Mark Lord with Western Carolina University.

Proposed Upland Game Bird Stamp Projects for State Fiscal Year 2022

| Title of Proposed Project | Project Manager | \$ Requested from UGBS Account | Other Funding Sources (only quantified in-kind contributions included) |
|---|------------------|--------------------------------|--|
| Bi-State Sage-grouse Coordinator (672) | Shawn Espinosa | \$5,000 | BLM, USFWS, USFS, IWJV(combined contribution of \$62,775) |
| Bi-State Sage-grouse Monitoring within the Mount Grant and Desert Creek Population Management Units (673) | Shawn Espinosa | \$22,500 | USFWS Wildlife Restoration Grant (\$67,500) |
| Desert Creek Ranch Conservation Easement (679) | Shawn Espinosa | \$10,417 | NDOW Heritage(\$100,000), NDOW Q1 (\$50,000), Carson Valley Chukar Club (\$10,000), NRCS (\$2,285,000), NDOW Habitat Conservation Fee (\$20,000) |
| Desert Creek Weed Treatment (680) | Victoria Cernoch | \$2,500 | n/a |
| Eastern Complex Weed Control (666) | Adam Henriod | \$10,000 | NDOW DS (\$10,000), NDOW HCF (\$10,000), WMA Grant (\$20,000) |
| Estimating Greater Sage-grouse Vital Rates (678) | Shawn Espinosa | \$22,500 | USFWS State Wildlife Grant (\$67,500), USGS (\$22,684 in-kind) |
| Greater Sage-grouse Monitoring (677) | Shawn Espinosa | \$44,440 | USFWS State Wildlife Grant (\$170,000) |
| Key Pittman WMA Wildlife Food Plots (686) | Andrew Coonen | \$3,900 | NDOW DS (\$2,600) |
| Monitoring Greater Sage-grouse Response to the Martin Fire (683) | Shawn Espinosa | \$22,500 | USFWS State Wildlife Grant (\$22,500), USGS (\$22,984 in-kind) |
| Monitoring the Effects of Landscape Level Treatments on Greater sage-grouse in the Desatoya Mountains of Central Nevada (676) | Shawn Espinosa | \$22,500 | USFWS State Wildlife Grant (\$67,500), USGS (\$22,492 in-kind) |

Proposed Upland Game Bird Stamp Projects for State Fiscal Year 2022

| Title of Proposed Project | Project Manager | \$ Requested from UGBS Account | Other Funding Sources (only quantified in-kind contributions included) |
|--|------------------|--------------------------------------|---|
| Montana-Humboldt SGI Spring Protection (674) | Victoria Cernoch | \$15,000 | NDOW HCF (\$10,000), NDOW IDF (\$15,000) |
| Native Seed Acquisition for Private Landowner Transition to Native Seed Production (690) | Brittany Trimble | \$14,000 | n/a |
| Nine-Mile Unit Riparian Fence - Rough Creek (681) | Shawn Espinosa | \$15,174 | NDOW HCF (\$15,175). NV Division of State Parks (\$2,000), Walker Basin Conservancy (\$2,000) |
| Upland Game Translocation and Monitoring (675) | Shawn Espinosa | \$19,400 | USFWS State Wildlife Grant (\$30,000) |
| Virginia Mountains Greenstrip 2021 (669) | Victoria Cernoch | \$22,500 | NDOW HCF (\$22,500) |
| Mormon Mountains Post-Fire Restoration (691) | Anthony Miller | \$20,000 | n/a |
| Assessing Impacts to Sage-Grouse from Anthropogenic Noise in Nevada (682) | Matt Maples | \$50,000 | NDOW IDF (\$100,000) |
| Nelson Creek Habitat Improvement (711) | Matt Glenn | \$18,750 | NDOW HCF (\$25,000), NDOW Heritage (\$57,750) |
| Totals | | \$341,081 | \$3,250,185 |

Upland Game Bird Stamp Account Budget Status

| | |
|--|----------------------|
| Balance in the Account at Start of FY 2021 | \$ 167,612.00 |
| Plus Estimated Revenue Accrued During FY 2021 | \$ 326,345.00 |
| Less Estimated Total FY 2021 Expenditures | (\$ 98,160.00) |
| Less Estimated Administrative Costs (10% of Revenue) | (\$ 32,634.50) |
| Estimated Balance at End of FY 2021 / Start of FY 2022 | \$ 559,482.50 |
| Plus Estimated Revenue to be Accrued During FY 2022 | \$ 326,345.00 |
| Less Estimated Administrative Costs (10% of Revenue) | (\$ 32,634.50) |
| Less Proposed New Project FY 2022 Expenditures | (\$341,081.00) |
| <u>Estimated Balance at End of FY 2022</u> | <u>\$ 512,112.00</u> |
| Less Remaining Obligations on Previously Funded Projects | \$366,860.87 |
| <u>Account Balance Less Previous Obligations</u> | <u>\$145,251.13</u> |

Notes: The budget information in this table is preliminary and subject to change. The amount of Upland Game Bird Stamp revenue accrued during FY 2020 was not available when this report was prepared; therefore, the FY 2019 revenue number was used for both FY 2020 and 2021.



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Bi-State Sage-grouse Coordinator
 Project Manager: Shawn Espinosa Phone: 775-688-1523 Email sespinosa@ndow.org
 Project Monitor: Shawn Espinosa Start Date: 7/1/2021
 Implementation Lead: Bureau of Land Management End Date: 6/30/2021
 Partners: US Fish and Wildlife Service, Nevada Department of Wildlife, California Department Fish Wildlife, USFS Humboldt-Toiyabe Agrt., Bureau of Land Management
 Project Category: Habitat Restoration
 Project Category: Upland Habitat Improvement
 Project Actions:
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Lyon, Mineral,
 General Location: Bi-State Sage-grouse Conservation Area

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------------|------------------|--------------------------|----------------------|
| Bureau of Land Management | | | |
| Intermountain West Joint Venture | | | |
| NDOW Upland Game Stamp | \$5,000 | | |
| US Fish and Wildlife Service | | | |
| US Forest Service | | | |
| Project Totals: | \$5,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

Continue to partially fund the Bi-State Sage-grouse Communication and Data Coordinator position to

maintain effectiveness and efficiency in meeting reporting and accountability requirements for this Distinct Population Segment of Greater sage-grouse. This position broadens outreach to more of our community, and it will free up precious time for our professionals allowing them to focus on their primary job of getting conservation done on the ground. Also, because much of this work is happening across agency, private and nonprofit ownership boundaries, having a person who is not tied to a specific agency helps improve the seamlessness of the communication effort.

2. Project Approach and Tasks

Base of operation: Bishop, CA, but frequent travel throughout the Bi-State and to Reno

Duties, responsibilities and type of work to be performed

The Bi-State Sage-grouse Executive Oversight Committee has agreed that the communication and outreach coordinator is responsible for the following duties:

- Development and completion of annual and 5-year accomplishment reports;
 - oDevelop template for reports;
 - oCompile information and data from LAWG members, and write and editing of reports;
 - oCoordinate the annual data call;
 - oQA/QC of data
- Facilitate and schedule LAWG meetings and Conferences (e.g., conifer workshop, Traditional Ecological Knowledge (TEK) Forum);
- Create and manage files related to the Bi-State such as meeting notes, agendas, research, news etc.
- Manage the Bi-State Website
- Communicate to LAWG and public about BSSG accomplishments and ongoing work
 - oWebsite posts and updates;
 - oNewsletter/mailchimp for relevant projects;
 - oLeading and coordinating volunteer projects and field trips;
 - oWriting success stories and developing outreach products (brochures, videos, merchandise, posters, giveaways, etc.);
 - oGiving or scheduling for others presentations about sage-grouse/sagebrush systems
 - oStaffing booths at local events such as Earth Day;
 - oPhotographic projects, events and gatherings.

The position facilitates the reporting on all the actions identified in the Bi-State Action Plan (BSAP) and through reducing these outreach and communication tasks for agency staff, would increase completion of on the ground accomplishments. Specific actions this position helps achieve in the action plan are:

- Action CIA1-1: Implement a “Sage-Grouse Service Team” approach to support sage-grouse conservation and management in Bi-State area. Provide cross-jurisdictional staff support to facilitate coordinated interagency effort to conserve Bi-State DPS and its habitat.
- Action CIA1-2: Provide multi-jurisdictional funding to support sage-grouse conservation and management in Bi-State area. Establish process to identify and support cross-jurisdictional funding opportunities to facilitate coordinated interagency effort to conserve Bi-State DPS and its habitat.
- Action CIA1-3: Annually engage Bi-State Local Area Working Group (LAWG) via Technical Advisory Committee (TAC) to develop proposed program of work for upcoming calendar year based on available staff and funding. Proposed annual program of work should be completed by January 31 each calendar year.
- Action MSI1-3: Conduct Bi-State LAWG planning meetings on semi-annual basis to review status of greater sage-grouse populations and habitats in Bi-State area and to identify, prioritize, and coordinate implementation of annual conservation actions. Continue University of NV Cooperative Extension facilitation of Bi- State LAWG meeting.
- Action MSI2-1: Conduct workshops to provide information about programs available to assist ranchers/ private landowners that may be interested in implementation of sage-grouse conservation projects and to explore opportunities for cooperative conservation of sage-grouse in Bi-State area.
- Action MSI2-2: Develop and publish a Bi-State LAWG sage-grouse conservation newsletter.

- Action Action MSI2-3: Develop and implement a publically accessible Bi-State LAWG Sage- Grouse Conservation webpage to facilitate the sharing and distribution of information specific to greater sage-grouse conservation efforts in Bi-State area.

3. Anticipated Beneficial Effects of the Project

This position has been instrumental in facilitating at least 2-4 meetings or field trips a year for the LAWG, keeping the email list current, sending emails about meetings, action items, and important Bi-State news, maintaining the Bi-State Sage-grouse website and keeping meeting notes and agendas. In addition, the position has developed annual reports and project record keeping, which has reduced workload for agency biologists and created efficiency with respect to these assignments. The Bi-State has its own project database which requires yearly data entry and analysis. Every partner in the LAWG with work to report currently enters data into this database. Having one person who is dedicated to managing this database improves data quality and consistency. Taking the information from the project database and using it to effectively communicate the accomplishments of the LAWG improves accountability for the funding that is received and helps tell the conservation success story. Additionally, staffing this position allows agency biologists more time to design rehabilitation projects and monitor treatment results and management actions.

Despite a decade of success in conservation work, the LAWG finds that many people in the communities near Bi-State sage-grouse habitat remain unaware of the LAWG's efforts and the importance of the sagebrush ecosystem. Communication and outreach duties fall to members of the LAWG who lack both the time and expertise to do a good job. The communications and outreach coordinator allows all LAWG members and staff to use their skills more effectively to contribute to conservation success. The coordinator improves internal and external communication. This work includes updating the Bi-State website, developing success stories, leading field trips and volunteer events, and coordinating among partners about current projects. Also, at every LAWG meeting in the last 2 years, there have been new people attending who are interested in the Bi-State and have a lot of questions. These new potential partners need an orientation to the LAWG to ensure that they understand the purpose of the group and then can hopefully become invested in this work.

Improved communication about the Bi-State sage-grouse and the sagebrush ecosystem (both outside and inside the LAWG) leads to more community support, a better appreciation for the sagebrush ecosystem, and more on the ground accomplishments. The importance of accountability to ourselves and to our supporting agencies cannot be overstated. Regular reporting to the LAWG, the public, and state and federal agencies on grant spending, future budgeting, and monitoring results for effectiveness and implementation takes more time than one would think, but is imperative for the long-term conservation of the Bi-State sage-grouse.

4. Project Schedule

Initially, this is expected to be a 3-year position; however, given the output and value added, the position term is likely to persist beyond the three-year horizon.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

This position does not require NEPA clearances.

6. Monitoring Plan

This position has been instrumental in facilitating at least 2-4 meetings or field trips a year for the LAWG, keeping the email list current, sending emails about meetings, action items, and important Bi-State news, maintaining the Bi-State Sage-grouse website and keeping meeting notes and agendas. In addition, the position has developed annual reports and project record keeping, which has reduced workload for agency biologists and created efficiency with respect to these assignments. The Bi-State has its own project database which requires yearly data entry and analysis. Every partner in the LAWG with work to report currently enters data into this database. Having one person who is dedicated to managing this

database improves data quality and consistency. Taking the information from the project database and using it to effectively communicate the accomplishments of the LAWG improves accountability for the funding that is received and helps tell the conservation success story. Additionally, staffing this position allows agency biologists more time to design rehabilitation projects and monitor treatment results and management actions.

Despite a decade of success in conservation work, the LAWG finds that many people in the communities near Bi-State sage-grouse habitat remain unaware of the LAWG's efforts and the importance of the sagebrush ecosystem. Communication and outreach duties fall to members of the LAWG who lack both the time and expertise to do a good job. The communications and outreach coordinator allows all LAWG members and staff to use their skills more effectively to contribute to conservation success. The coordinator improves internal and external communication. This work includes updating the Bi-State website, developing success stories, leading field trips and volunteer events, and coordinating among partners about current projects. Also, at every LAWG meeting in the last 2 years, there have been new people attending who are interested in the Bi-State and have a lot of questions. These new potential partners need an orientation to the LAWG to ensure that they understand the purpose of the group and then can hopefully become invested in this work.

Improved communication about the Bi-State sage-grouse and the sagebrush ecosystem (both outside and inside the LAWG) leads to more community support, a better appreciation for the sagebrush ecosystem, and more on the ground accomplishments. The importance of accountability to ourselves and to our supporting agencies cannot be overstated. Regular reporting to the LAWG, the public, and state and federal agencies on grant spending, future budgeting, and monitoring results for effectiveness and implementation takes more time than one would think, but is imperative for the long-term conservation of the Bi-State sage-grouse.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004). The project also assists with objectives outlined in the Bi-State Action Plan (2012).

Special Reserve Account Project Cost Estimate Table

Bi-State Sage-grouse Coordinator

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 672

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | \$ | 5,000.00 | \$ 58,138.00 |
| C. Total Personnel Costs | \$ | 5,000.00 | \$ 58,138.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | \$ 3,887.00 |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ 3,887.00 |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ | - | \$ - |
| 5. Materials | | | |
| A. | | | |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | - | \$ - |
| 6. Miscellaneous | | | |
| A. Training | | | \$ 750.00 |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | - | \$ 750.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 5,000.00 | \$ 62,775.00 |
| Total Project Costs | \$ | | \$ 67,775.00 |

Units in Nevada. In addition, vegetative measurements will also be collected at used and random sites during various life stages. This information will also help to further refine the resource selection function model for the Bi-State DPS. We propose to conduct this monitoring over a three-year period from 2021 through 2024. The information collected will also help assess the effects of various habitat improvement projects, as identified within the Bi-State Action Plan, that have taken place within this portion of the Bi-State DPS and will continue to occur.

This project is intended to better understand habitat utilization, identify key habitats and determine movement patterns of sage-grouse as well as determine vital rates within the Desert Creek and Mount Grant Population Management Units. The greatest threats to these populations of sage-grouse are pinyon and juniper encroachment, suburban development, wildfire and the degradation of small meadows and spring complexes over time that serve as late-brood rearing habitat. Initial objectives include the following:

- 1) Capture at least 10 female sage-grouse and place GPS/Satellite transmitters to determine seasonal movement patterns and determine home range;
- 2) Capture approximately 20 females sage-grouse and place VHF radio transmitters to augment the GPS/Satellite marked sample; and
- 3) Maintain approximately 20-30 VHF radio-marked females for two subsequent years after year 1 of the study through year 3.

This work will assist with determining the following:

- a) adult survival rates (monthly and annual);
- b) identification of nest sites and nest success;
- c) examination of nest-site vegetative characteristics and if differences exist between successful and unsuccessful nest sites;
- d) determination of nest survival rates;
- e) brood rearing habitat selection
- f) vital rate associations with habitat co-variables;
- g) overall distribution and seasonal movement patterns

2. Project Approach and Tasks

Bi-State Habitat Utilization and Effectiveness Monitoring

Sage grouse movement, survivorship, and reproduction will be monitored following release. Portable receivers (Communication Specialist Inc., Orange, CA; Advanced Telemetry Systems Inc., Isanti, MN) are used along with 3-element Yagi antennas to monitor radio-marked grouse. Relocation error is minimized by circling around each grouse 30 – 50 m. Using the approximated distance and a compass bearing, the location coordinates (Universal Transverse Mercator) are obtained using GPS. Throughout the nesting and brood-rearing period, researchers attempted to locate female grouse ≥ 2 times per week.

Relocation coordinates are transferred into a GIS (ArcMap 9.2, ESRI Products, Redlands, CA) for space-use analysis. Kernel density (50, 90, and 95%) is calculated for all radio locations and for each grouse separately (95%). The purpose of using all locations is to estimate area used at the population level. Kernel density is also calculated for brood-rearing females. Kernel calculations are carried out in multiple steps. First, relocation points are weighted to account for biases associated with non-equivalent relocation intervals. Second, robust estimates of smoothing parameters (h) are generated using Animal Space Use 1.3 (Horne and Garton 2009). Last, those parameters are used in Hawth's Tools (ArcMap 9.2) to calculate fixed kernel densities. Kernel density maps are generated based on the estimated densities for 2009 and 2010.

If a grouse is found at the same location during the nesting period, researchers visually determined if a grouse is nesting. Nests are monitored ≥ 3 times per week until fate is determined. Successful nests are classified as ≥ 1 chick hatched. Nests are also scored as depredated, partially depredated, or abandoned.

Following nest fate, understory cover is recorded at the nest bowl using a coverboard (Jones 1968), Robel pole (Robel 1970), and digital photography method. Vegetation composition cover is measured at multiple subplots (20 X 50 cm) located ≤ 25 m of each nests using Daubenmire method (Daubenmire 1959). Canopy cover is measured along two 25-m transects, one 50-m transect, and one 100-m transect extending from the nest bowl every 90°. The orientation of the quadrants is randomized. Shrub species are recorded and measured. Width (cm) and heights (cm) of a random sample of individual shrubs along the line are recorded. These shrub widths are measured within 5, 10, and 25 m from the nest for all four transect lines, within 50 m for two transect lines, and 100 m for one transect line. The purpose of the different transect lengths is to identify the scale of use for shrub cover within 100 m radius of a nest site.

To identify vegetation factors selected by grouse, defined as the disproportionate use to availability, measurements of vegetation characteristics are compared at nests to those at random points. Thus, the same habitat measurements are conducted at random points to represent available habitat. Evidence for multi-scale selection generating two random points for each nest is evaluated. One point is within 200 m of the nest (dependent) and the other is within the study area (independent). The preliminary results are reported as means (\pm SE) of vegetation characteristics for random points and nests. However, multiple a priori generalized mixed effects models with a binomial error distribution at multiple spatial scales will be compared for strength of evidence. Researchers will use an information-theoretic approach, including Δ AIC, Akaike's weights, evidence ratios, likelihood-based R², and likelihood ratio tests to evaluate models. Model averaged parameter estimates will be used to develop resource selection functions.

Following the completion of a successful nest, female grouse with broods are monitored closely by obtaining >2 locations per week. Spotlights are used every 10 days following nest hatch during night hours to count the number of chicks in the brood. Broods are considered unsuccessful if no chicks are found during spotlight surveys. To confirm unsuccessful broods (prevent false negative), females are rechecked within 48 hours. A similar habitat measurement protocol is conducted at brood sites as that at nest sites. However, transects maximum extent is 25 m for broods sites. Canopy cover is measured along three 25 m transects, which extended from the brood location every 120° with random orientation. The width (cm) of each shrub species is measured along the three transect lines within 5, 10, and 25 m from the brood location. Because habitat changes through time and broods are mobile, measurements are collected at each 10-day interval. Differences in vegetation use between night (roosting) and day (foraging) hours are also investigated. These surveys included one day and one night observation of habitat used by broods (within a 24 hour period), as well as, one observation of a random location within 200 m of the brood (dependent) to estimate disproportionate use to availability.

3. Anticipated Beneficial Effects of the Project

Over the course of this monitoring effort (3 years), we will be able to determine certain population characteristics such as seasonal use areas, important movement corridors, and potential connectivity with other adjacent Bi-State DPS sage-grouse populations. In addition, we will be able to estimate vital rates among individual birds such as nest initiation rates, nest survival, adult and juvenile survival rates, brood survival rates and potential differences in mortality between seasons. These data, collected before, during and after implementation of several projects listed in the Bi-State Action Plan, and in the NEPA planning stages, will serve as one mechanism to monitor the overall effectiveness of the proposed habitat enhancement projects.

4. Project Schedule

State Fiscal Year 2022 will be the second phase of planned monitoring within the Mount Grant and Desert Creek Population Management Units of the Bi-State Sage-grouse Conservation Area. Per the 2012 Bi-State Action Plan, initial capture and monitoring work took place during the fall of 2015 with and concluded in 2018. This second phase of monitoring will begin during the fall of 2021 and will conclude in 2024.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

None. This is a research and monitoring project.

6. Monitoring Plan

Over the course of this monitoring effort (3 years), we will be able to determine certain population characteristics such as seasonal use areas, important movement corridors, and potential connectivity with other adjacent Bi-State DPS sage-grouse populations. In addition, we will be able to estimate vital rates among individual birds such as nest initiation rates, nest survival, adult and juvenile survival rates, brood survival rates and potential differences in mortality between seasons. These data, collected before, during and after implementation of several projects listed in the Bi-State Action Plan, and in the NEPA planning stages, will serve as one mechanism to monitor the overall effectiveness of the proposed habitat enhancement projects.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004). The project also assists with objectives outlined in the Bi-State Action Plan (2012).

Special Reserve Account Project Cost Estimate Table

Bi-State Sage-grouse Monitoring within the Mount Grant and Desert Creek Population Management Units

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 673

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|--|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | \$ | 14,188.00 | \$ 42,562.00 |
| C. Total Personnel Costs | \$ | 14,188.00 | \$ 42,562.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ - |
| 4. Equipment | | | |
| A. VHF Transmitters (30 @ \$225 ea.) | \$ | 2,812.00 | \$ 8,438.00 |
| B. Vehicles (2 @ \$10,500/6 mo. lease) | \$ | 5,250.00 | \$ 15,750.00 |
| C. Total Equipment Costs | \$ | 8,062.00 | \$ 24,188.00 |
| 5. Materials | | | |
| A. | | | |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | - | \$ - |
| 6. Miscellaneous | | | |
| A. Field Housing | \$ | 250.00 | \$ 750.00 |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | 250.00 | \$ 750.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 22,500.00 | \$ 67,500.00 |
| Total Project Costs | \$ | | \$ 90,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Desert Creek Ranch Conservation Easement
 Project Manager: Shawn Espinosa Phone: 775-688-1523 Email sespinosa@ndow.org
 Project Monitor: Shawn Espinosa Start Date: 7/1/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 6/30/2022
 Partners: Eastern Sierra Land and Trust, Nevada Department of Wildlife, Nevada Department of Wildlife
 Project Category: Habitat Protection
 Project Category: Conservation Easement
 Project Actions:
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Lyon
 General Location: Desert Creek Population Management Unit - Bi-State Sage-grouse Conservation Area

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|--|------------------|--------------------------|----------------------|
| Carson Valley Chukar Club | | \$10,000 | |
| Habitat Conservation Fees | \$20,000 | | |
| natural Resources Conservation Service | | \$2,285,000 | |
| NDOW Heritage Trust Account | | \$100,000 | |
| NDOW Q1 Program | | \$50,000 | |
| NDOW Upland Game Stamp | \$10,417 | | |
| Project Totals: | \$30,417 | \$2,445,000 | |

Project Proposal

1. Brief Purpose and Goal of the Project

The purpose of this project is to conserve an essential piece of private land for the long-term conservation of the Bi-State sage-grouse Distinct Population Segment (DPS) and other wildlife species in western Nevada. The Desert Creek Ranch provides a significant amount of breeding and brood rearing habitat for the Bi-State sage-grouse. A lek is located on the property that had 17 males observed displaying on it during the spring of 2019 and two other leks are located in the vicinity of the property. This property was identified in the 2012 Bi-State Action Plan as being one of the high priority properties in Nevada for the conservation of the Bi-State sage-grouse. The Nevada Department of Wildlife is working in conjunction with the Eastern Sierra Land Trust and other partners to purchase a conservation easement on this property and prevent potential future subdivision and development of the property.

2. Project Approach and Tasks

This ~1,228-acre cattle ranch is owned and operated by father and son Bruce and David Park. The property is primarily irrigated pastureland with Desert Creek running through the western and southern portion of the property, and upland sagebrush steppe surrounding the wet meadows. The ranch is composed of two disjunct parcels. The ranch is mostly surrounded by the Humboldt-Toiyabe National Forest, except for an area of multiple private properties adjacent to the west side of the northern parcel.

Within the Bi-State Action Plan, urbanization was identified as a high risk for the Desert Creek/Fales PMU. Lyon County has designated parcels in this area with a Land Use Designation of "Agriculture", with one development unit per 20 acres, and RR5 (Land Use Code 600: Agricultural Qualified per NRS 361A – Vacant). According to the Lyon County Planning Department, "The purpose of the AG zone is to implement the Lyon County master plan, to conserve agricultural resources, retain open spaces and the rural character of the county, and to direct urbanization into manageable and identified development areas. This is a low-density land use district. Unless otherwise specified in this development code, no more than one primary residence per parcel is permitted in this land use district. However, even under this designation, the Desert Creek Ranch could have up to 56 development units. Given the level of development near Wellington, the western edge of Smith Valley and along the lower section of Desert Creek Road, conservation of the remaining intact quality habitat is of maximum importance currently.

The grasslands on the property have been identified through various planning efforts including the Bi-State Action Plan for Conservation of the Greater Sage-Grouse Bi-State DPS (2012). The property is located in the Desert Creek-Fales PMU for sage-grouse in a region specifically identified for protection with a conservation easement under the "Minimize and Eliminate Risks" section, Action MER2-2: "Secure a conservation easement or agreement with the Desert Creek Ranch to maintain essential brood rearing habitat in proximity to Desert Creek Lek #2 in the Desert Creek-Fales PMU."

The importance of the property to sage-grouse has been further documented by GPS and VHF transmitter occurrence data. Existing sage-grouse telemetry data shows intensive sage-grouse use of the property. The property is also located in an important movement corridor, containing winter range for the Wellington and Pine Grove mule deer herds.

The ranch has appropriate water rights in Desert Creek, which is a tributary to the West Walker River. Its headwaters are in the Sweetwater Mountains of California at greater than 9,000 ft. in elevation. The water rights used to flood irrigate the meadows are fully adjudicated under the Walker River Decree in Equity (C-125) entered April 14, 1936 and amended in April 24, 1940. The use of this water right is regulated by the federal watermaster in accordance with the Rules and Regulations for the Distribution of Water on the Walker River Stream System under the Provisions of Paragraph 15 of the Decree in Equity, No. C-125 as approved by the Federal District Court on September 3, 1953 and subsequent orders and amendments that specify that irrigation water may be applied beginning March 1 and ending October 31 each year with a water duty of 1.6 cubic feet per second for each 100 acres of land. Water rights under this decree include pre-1914 rights with priority assigned by year. This water has been diverted and

spread to maintain the irrigated pasture on the ranch, enhancing wet meadows and riparian species, and supporting habitat for the Bi-State sage-grouse and other wildlife. Our intent is to continue these practices for the benefit of sage-grouse and other wildlife species.

3. Anticipated Beneficial Effects of the Project

The property is rich in wildlife, habitat types, and provides corridors for movement of wildlife including mule deer. Habitat of special interest on the property includes healthy sagebrush steppe, riparian and meadows critical to sage-grouse in the Desert Creek Population Management Unit (PMU) of the Bi-State Sage-grouse DPS. Bi-State sage-grouse associated with three nearby leks are plentiful on the property, and the meadows provide important brood-rearing habitat. Mule deer, golden eagle, mountain quail, and many other species of wildlife frequent the ranch. The property contains valuable habitat for the Bi-State population of Greater sage-grouse. The property was identified in the Bi-State Action Plan under Action MER2-2: "Secure a conservation easement or agreement with the Desert Creek Ranch to maintain essential brood rearing habitat in proximity to Desert Creek Lek #2 in the Desert Creek-Fales PMU."

The property also includes more than one mile of Desert Creek and approximately one mile of Fourmile Hill Creek. The property has significant use by mule deer, Bi-State greater sage-grouse, mountain quail, sage thrasher, American badger, golden eagle, pinyon jay, short-eared owl, and neotropical migratory songbirds. Desert Creek, which runs through the property, has native fish including Paiute sculpin as well as a trout fishery. This project meets the goals of the Bi-State Regional Conservation Partnership Program (RCPP) by protecting key wet meadow ecosystems and would improve water quality in Desert Creek. Additionally, the landowners have already initiated fence marking (to reduce sage-grouse fence collisions) and invasive weed control projects on their land. Their conservation practices are a good demonstration for nearby private and public landowners who may wish to conduct similar projects.

4. Project Schedule

To date, a draft Grant Deed of Conservation Easement has been developed for the property. The draft language of the easement has been reviewed by the Deputy Attorney's General office; however, additional review will be necessary as final negotiations approach. Additionally, a draft funding agreement has been developed between the Nevada Department of Wildlife and the Eastern Sierra Land Trust for the matching sources of funding for the easement. Meanwhile, a federally approved appraisal will need to be conducted for the property, which is scheduled for the summer of 2021. The Eastern Sierra Land Trust will continue to negotiate with the landowner regarding the easement language, all the while keeping the State of Nevada apprised of these negotiations. Much depends on the appraisal and these negotiations, but we anticipate that the conservation easement will be finalized during the winter of 2021-2022.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

6. Monitoring Plan

The property is rich in wildlife, habitat types, and provides corridors for movement of wildlife including mule deer. Habitat of special interest on the property includes healthy sagebrush steppe, riparian and meadows critical to sage-grouse in the Desert Creek Population Management Unit (PMU) of the Bi-State Sage-grouse DPS. Bi-State sage-grouse associated with three nearby leks are plentiful on the property, and the meadows provide important brood-rearing habitat. Mule deer, golden eagle, mountain quail, and many other species of wildlife frequent the ranch. The property contains valuable habitat for the Bi-State population of Greater sage-grouse. The property was identified in the Bi-State Action Plan under Action MER2-2: "Secure a conservation easement or agreement with the Desert Creek Ranch to maintain essential brood rearing habitat in proximity to Desert Creek Lek #2 in the Desert Creek-Fales PMU."

The property also includes more than one mile of Desert Creek and approximately one mile of Fourmile Hill Creek. The property has significant use by mule deer, Bi-State greater sage-grouse, mountain quail,

sage thrasher, American badger, golden eagle, pinyon jay, short-eared owl, and neotropical migratory songbirds. Desert Creek, which runs through the property, has native fish including Paiute sculpin as well as a trout fishery. This project meets the goals of the Bi-State Regional Conservation Partnership Program (RCPP) by protecting key wet meadow ecosystems and would improve water quality in Desert Creek. Additionally, the landowners have already initiated fence marking (to reduce sage-grouse fence collisions) and invasive weed control projects on their land. Their conservation practices are a good demonstration for nearby private and public landowners who may wish to conduct similar projects.

7. Relationship to NDOW Plans, Policies, and Programs

The project assists with objectives outlined in the Bi-State Greater Sage-grouse Action Plan (2012).

Special Reserve Account Project Cost Estimate Table

Desert Creek Ranch Conservation Easement

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 679

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|-----------|--|
| 1. Land Acquisitions | \$ | 30,417.00 | \$ 2,445,000.00 |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ | - | \$ - |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ - |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ | - | \$ - |
| 5. Materials | | | |
| A. | | | |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | - | \$ - |
| 6. Miscellaneous | | | |
| A. | | | |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | - | \$ - |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 30,417.00 | \$ 2,445,000.00 |
| Total Project Costs | \$ | | \$ 2,475,417.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Desert Creek Weed Treatment 2021
 Project Manager: Victoria Cernoch Phone: Email: victoria.cernoch@ndow.org#mailto:victoria.cernoch@ndow.org#
 Project Monitor: Mark Freese Start Date: 9/1/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 12/31/2021
 Partners: Nevada Department of Wildlife, US Forest Service
 Project Category: Habitat Restoration
 Project Category: Upland Habitat Improvement
 Project Actions:
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Lyon
 General Location: Western Nevada

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|------------------------|------------------|--------------------------|----------------------|
| NDOW Upland Game Stamp | \$2,500 | | |
| Project Totals: | \$2,500 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

The goal of this project is to reduce the propensity of cheatgrass within the project site and increase cover of preferred vegetation restoring the integrity of the site to benefit wildlife species with a special emphasis on Bi-State Sage-Grouse. The project site is located within Bi-State Sage-Grouse habitat and borders high quality habitat that Bi-State Sage-Grouse depend on. There are two active sage-grouse leks, Desert Creek Pasture and Desert Creek #2 within ¼ and ½ mile, respectively. The current condition of the site does not benefit wildlife species in any way. It is dominated by cheatgrass and tumble mustard which do not allow for preferred species to re-vegetate the site without management intervention.

2. Project Approach and Tasks

The site was previously treated in fall 2020 with Plateau, a preemergent herbicide. Herbicide treatment effectiveness will be assessed in the spring or summer of 2021. If the herbicide treatment was successful (i.e. the level of competition is low) we will re-seed the site via broadcast seeding in the fall of 2021. If the herbicide treatment results are poor, we will likely reapply herbicide to the area with either Plateau or a combination of Plateau and another product before re-seeding in 2022. If the situation arises in which we re-seed in the fall of 2021 and are not satisfied with the establishment of preferred vegetation in 2022 we may choose to broadcast seed a second time in fall 2022. Precipitation timing for broadcast seeding oftentimes drives seedling establishment. Although we do not expect to treat the site with herbicide twice or broadcast seed the site twice, it is listed within our plan as a contingency in case those treatments are our best option to reach our overall goal.

3. Anticipated Beneficial Effects of the Project

Rehabilitating the site will improve habitat for the sage-grouse using this area for nesting and brood-rearing.

4. Project Schedule

2021 Spring/Summer – Evaluate herbicide effectiveness, determine next steps.

2021 Fall – Spray or seed (if necessary)

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

Forest Service Agreement 21-PA-11041700-0011

6. Monitoring Plan

NDOW will complete field visits to determine the effectiveness of the treatment and validate seeding needs and potential. We will establish repeat photo monitoring points. We will also provide project information to the NPCD monitoring crews in hopes that this project may have monitoring plots established and measured.

7. Relationship to NDOW Plans, Policies, and Programs

This project is consistent with NDOW's mission, charter, and FYI 18-22 Strategic Plan:

- 1) "To protect, preserve, manage and restore wildlife and its habitat..."
- 2) "To the maintenance and enhancement of Nevada's diverse wildlife habitats."
- 3) "To the maintenance and enhancement of Nevada's wildlife diversity."
- 4) "To a management program which is carefully designed to result in healthy wildlife populations throughout the state."
- 5) "To a leadership role in the conservation and management of the state's wildlife resources."
- 6) "Work with state, federal and local agencies, as well as, private landowners, industry and conservation organizations through the Nevada Partners for Conservation and Development to preserve and protect quality habitats and enhance deficient habitats."
- 7) "Strategically employ and leverage special reserve account revenues to acquire, protect, treat and restore wildlife habitats."

**Special Reserve Account Project Cost Estimate Table
Desert Creek Weed Treatment 2021**

Name of Proposed Project: Victoria Cernoch

Name of Proposed Project Manager: 680

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|--|
| 1. Land Acquisitions | | |
| 2. Personnel Costs | | |
| A. NDOW Personnel | | |
| B. Other Personnel | | |
| C. Total Personnel Costs | \$ - | \$ - |
| 3. Travel Costs | | |
| A. Per Diem | | |
| B. Mileage | | |
| C. Total Travel Costs | \$ - | \$ - |
| 4. Equipment | | |
| A. | | |
| B. | | |
| C. Total Equipment Costs | \$ - | \$ - |
| 5. Materials | | |
| A. Herbicide or seed | \$ 2,500.00 | |
| B. | | |
| C. | | |
| D. Total Materials Costs | \$ 2,500.00 | \$ - |
| 6. Miscellaneous | | |
| A. | | |
| B. | | |
| C. | | |
| D. | | |
| F. Total Miscellaneous Costs | \$ - | \$ - |
| 7. In-Kind Services | | |
| A. | | |
| B. | | |
| C. Total In-Kind Services | \$ - | \$ - |
| Subtotals | \$ 2,500.00 | \$ - |
| Total Project Costs | \$ | 2,500.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Eastern Complex Weed Control
 Project Manager: Adam Henriod Phone: 775-289-1690 Email ahenriod@ndow.org
 Project Monitor: Adam Henriod Start Date: 7/1/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 6/30/2022
 Partners: Nevada Department of Wildlife, Eastern Nevada Landscape Coalition, US Forest Service
 Project Category: Habitat Restoration
 Project Category: Riparian, Spring or Meadow Habitat Improvement
 Project Actions: Herbicide application
 Priority Resource: General Habitat Improvement
 Priority Species:
 County Location: White Pine, Nye, Lincoln
 General Location: Steptoe WMA, Kirch WMA, Key Pittman WMA

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|---------------------------------------|------------------|--------------------------|----------------------|
| Federal WMA Grant | \$20,000 | | |
| NDOW Duck Stamp | \$10,000 | | |
| NDOW Habitat Conservation Fee | \$10,000 | | |
| NDOW Upland Game Stamp | \$10,000 | | |
| Jurisdictional Noxious and Invasive W | \$50,000 | | |
| Project Totals: | \$100,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

NDOW is mandated by state law to control listed noxious weeds found on our property. Removal of

noxious and undesirable weeds improves appearance, public access, limits the spread of these weeds to other areas and enhances wildlife habitat. The goal of this project is to remove noxious/invasive weeds such as Russian knapweed, hoary cress, perennial pepperweed, phragmites and Canada thistle found on the Steptoe Valley, Wayne E. Kirch and Key Pittman Wildlife Management Areas. This will be accomplished through the application of herbicides to noxious and invasive weeds in upland areas, riparian areas, parking lots and right of ways. WMA staff has engaged heavily in efforts to eradicate invasive vegetation on these properties; however the magnitude of weed infestations currently out ways employee's ability to provide the treatments needed to make long term impacts. This project seeks reserve account funding for additional resources (Tri-County Weed Control) to apply herbicide on Kirch WMA, Key Pittman WMA and Steptoe WMA.

2. Project Approach and Tasks

Awarded funds will be used to purchase herbicides and hire contract labor to maintain and enhance current weed control efforts on NDOW-managed wildlife management areas. In order to address increasing issues with weeds and given the substantial duties of NDOW staff related to tasks other than fighting weeds, we are in need of additional monies to contract out additional weed spraying to improve the effectiveness of weed control efforts. Tri-County Weed Control is most likely to be contracted to conduct the spraying.

Examples of specific tasks to be accomplished by this project are provided below.

A. Perennial pepperweed (*Lepidium lotifolium*), and hoary cress (*Cardaria draba*) will be treated in the spring and summer of 2021 by applying appropriate herbicides from ATV, truck, and backpack sprayers. The chemicals chosen for control of these species will be determined by the characteristics of the site and the life stage of the plant; all chemicals are applied according to their labels.

B. Ditches, water control structures, boating access points, parking lots and right-of-ways will be treated, as needed, in the summer of 2021 by applying glyphosate herbicide from ATV, truck, and backpack sprayers. Control of undesirable vegetation in ditches and water control structures is essential for water delivery to reservoirs, wetland impoundments, and irrigation of food plots.

C. Russian knapweed (*Acroptilon repens*), and Canada thistle (*Cirsium arvense*) will be treated in the fall of 2021 and spring of 2022 by applying appropriate herbicides from ATV, truck, and backpack sprayers.

D. Vegetation on wetland impoundments and reservoirs will be treated, as needed, with aquatic approved herbicides. Primary focus will be on phragmites (*Phragmites australis*) removal on the Key Pittman WMA. Treatments on reservoirs will be completed using a boat mounted sprayer, wetland impoundments will be treated with an ATV sprayer. Treatment of emergent vegetation in these areas will improve feeding, resting, nesting, and brood rearing habitat for waterfowl.

3. Anticipated Beneficial Effects of the Project

There will be a major reduction in noxious and other types of invasive weed species at the treated areas, thus improving the quality of wildlife habitat.

Monitoring through yearly inspections will determine the effectiveness of treatments. Treated sites will be evaluated after application of herbicides to determine the effectiveness of the timing, method and chemicals chosen for the treatment. Effective treatments will show a significant die-off of targeted vegetation after treatment and reduced regrowth the following growing season. The vegetation control will improve habitat values and public access.

4. Project Schedule

This project is an ongoing, yearly habitat management activity. Herbicide treatments to vegetation on the WMAs will primarily occur in the late summer and fall of 2021 and the spring and summer of 2022.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

6. Monitoring Plan

Monitoring through yearly inspections will determine the effectiveness of treatments. Treated sites will be evaluated after application of herbicides to determine the effectiveness of the timing, method and chemicals chosen for the treatment. Effective treatments will show a significant die-off of targeted vegetation after treatment and reduced regrowth the following growing season. The vegetation control will improve habitat values and public access.

7. Relationship to NDOW Plans, Policies, and Programs

This program certainly falls within NDOW's general goal of maintaining and enhancing habitats. More specifically, the Conceptual Management Plans for the WMAs all contain goals and objectives such as the following: "Goal: Habitat is the key to the success of all wildlife populations. Effective habitat is an integral function of the Department of Wildlife. NDOW will preserve and protect quality habitat and enhance deficient habitats. Objective: Maintain, protect and enhance wildlife habitats on wildlife management areas (WMA's) by applying good science and best management practices through implementation of Comprehensive Management Plans."

Special Reserve Account Project Cost Estimate Table
Eastern Complex Weed Control

Name of Proposed Project: Adam Henriod
Name of Proposed Project Manager: 666
Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|--|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | \$ 20,000.00 |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ - | | \$ 20,000.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ - | | \$ - |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ - | | \$ - |
| 5. Materials | | | |
| A. Herbicide | \$ 4,000.00 | | |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ 4,000.00 | | \$ - |
| 6. Miscellaneous | | | |
| A. Tri-County Weed Control | \$ 26,000.00 | | \$ 50,000.00 |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ 26,000.00 | | \$ 50,000.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ - | | \$ - |
| Subtotals | \$ 30,000.00 | | \$ 70,000.00 |
| Total Project Costs | \$ | | 100,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Estimating Greater Sage-grouse Vital Rates in Central Nevada
 Project Manager: Shawn Espinosa Phone: 775-688-1523 Email sespinosa@ndow.org
 Project Monitor: Shawn Espinosa Start Date: 7/1/2021
 Implementation Lead: U.S. Geological Service End Date: 6/30/2022
 Partners: U.S. Geological Service, Nevada Department of Wildlife, Great Basin Bird Observatory
 Project Category: Wildlife Population Protection or Enhancement
 Project Category: Wildlife Monitoring and Research
 Project Actions: Small game collaring
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Nye, Eureka,
 General Location: Monitor Valley and Monitor Range in central Nevada

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------|------------------|--------------------------|----------------------|
| NDOW Upland Game Stamp | \$22,500 | | |
| U.S. Geological Service | | | \$22,684 |
| USFWS State Wildlife Grant | \$67,500 | | |
| Project Totals: | \$90,000 | | \$22,684 |

Project Proposal

1. Brief Purpose and Goal of the Project

This project is intended to determine key demographic parameters and how certain vegetation metrics might influence demographic rates such as adult and juvenile survival, nest success and brood success within intact and un-fragmented sagebrush habitats. Monitor Valley (and surrounding area) in central Nevada was selected as a control site because it generally contains a diverse array of sagebrush and other shrub species with associated mountain shrub communities in the higher elevations that have an understory of perennial grasses and forbs. Additionally, little in the way of anthropogenic development

occurs in this area. Research efforts for this project were initiated in 2016 and our objective is to monitor sage-grouse over an eight-year period to properly account for effects of environmental variables such as drought. The intended completion date for this project is the fall of 2023 with additional time for development of final reports and publications.

Much of the recent research that has been conducted on Greater sage-grouse in Nevada has been in response to some form of anthropogenic structure or disturbance such as the development of utility scale transmission lines, geothermal energy facilities, or mine development and processing. Some of these developments have offered a classic Before, After, Control, Impact (BACI) study design, but many have not. In order to better understand how sage-grouse are responding to anthropogenic disturbances and habitats that are in less than desirable condition, we feel that it is important to gain a more comprehensive knowledge base of demographic parameters and habitat use in areas that are considered in relatively good ecological condition, free from anthropogenic structures (utility scale) and associated noise, and offer contiguous habitat (large, uninterrupted blocks). The following describes the objectives and demographic parameters for the project:

1. Capture approximately 25-30 female sage-grouse and place VHF radio transmitters and leg bands on the birds at the study site. At a minimum, maintain that number of radio marked females annually;
2. Capture at least 5 female sage-grouse and place GPS/Satellite transmitters to determine seasonal movement patterns and determine home range at each study site;

This work will assist with determining the following:

- a) determination of survival rates of adults and juveniles (both male and female); and
- b) identification of nest sites and nest initiation rates;
- c) determination of nest survival rates;
- d) examination of nest-site vegetative characteristics and if differences exist between successful and unsuccessful nest sites;
- e) determination of differences of seasonal survival rates; and
- f) understand and map movement patterns, seasonal distribution and key habitats.

2. Project Approach and Tasks

Field work for this project will be conducted by the USGS Western Ecological Research Center in Dixon, California working in conjunction with the Great Basin Bird Observatory that will provide field technicians to conduct trapping and monitoring work. Match funding for this project is being provided by the Nevada Upland Game Stamp program (\$22,500) allows for \$67,500 of WSFR-PR funds to be used on the project for a total cost of \$90,000. This will be a multi-year effort (up to 8 years) in order to gain enough data from a large enough sample of birds to mitigate the influences of natural variability due to factors such as weather, climate and predation.

Radio-Telemetry. We are proposing to capture approximately 20-30 female and up to 10 male sage-grouse annually over an eight-year period and maintain at least 20 live females during each reproductive season. Sage-grouse movement, survivorship, and reproduction will be monitored following release. Portable receivers (Communication Specialist Inc., Orange, CA; Advanced Telemetry Systems Inc., Isanti, MN) will be used along with 3-element Yagi antennas to monitor radio-marked grouse. Throughout the nesting and brood-rearing period, researchers will attempt to locate female grouse ≥ 2 times per week.

Space-Use. Relocation coordinates will be transferred into a GIS (ArcMap 9.2, ESRI Products, Redlands, CA) for space-use analysis. Kernel density (50, 90, and 95%) is calculated for all radio locations and for each grouse separately (95%). Kernel density is also calculated for brood-rearing females. Kernel calculations are carried out in multiple steps. First, relocation points are weighted to account for biases associated with non-equivalent relocation intervals. Second, robust estimates of smoothing parameters (h) are generated using Animal Space Use 1.3 (Horne and Garton 2009). Last, those parameters are used in Hawth's Tools (ArcMap 9.2) to calculate fixed kernel densities.

Nests and vegetation. If a grouse is found at the same location during the nesting period, researchers will visually determine if a grouse is nesting. Nests are monitored ≥ 3 times per week until fate is determined. Successful nests are classified as ≥ 1 chick hatched. Nests are also scored as depredated, partially depredated, or abandoned.

Following nest fate, understory cover is recorded at the nest bowl using a coverboard (Jones 1968), Robel pole (Robel 1970) and digital photography. Vegetation composition cover is measured at multiple subplots (20 X 50 cm) located ≤ 25 m of each nests using Daubenmire method (Daubenmire 1959). Canopy cover is measured along two 25-m transects, one 50-m transect, and one 100-m transect extending from the nest bowl every 90° . The orientation of the quadrants is randomized. Shrub species are recorded and measured. Width (cm) and heights (cm) of a random sample of individual shrubs along the line are recorded. These shrub widths are measured within 5, 10, and 25 m from the nest for all four transect lines, within 50 m for two transect lines, and 100 m for one transect line. The purpose of the different transect lengths is to identify the scale of use for shrub cover within 100 m radius of a nest site.

To identify vegetation factors selected by grouse, defined as the disproportionate use to availability, measurements of vegetation characteristics are compared at nests to those at random points. Thus, the same habitat measurements are conducted at random points to represent available habitat. Evidence for multi-scale selection generating two random points for each nest is evaluated. One point is within 200 m of the nest (dependent) and the other is within the study area (independent). Researchers will use an information-theoretic approach, including ΔAIC , Akaike's weights, evidence ratios, likelihood-based R^2 , and likelihood ratio tests to evaluate models. Model averaged parameter estimates will be used to develop resource selection functions.

Brood-rearing and vegetation. Following the completion of a successful nest, female grouse with broods are monitored closely by obtaining >2 locations per week. Spotlights are used every 10 days following nest hatch during night hours to count the number of chicks in the brood. Broods are considered unsuccessful if no chicks are found during spotlight surveys. To confirm unsuccessful broods (prevent false negative), females are rechecked within 48 hours. A similar habitat measurement protocol is conducted at brood sites as that at nest sites. However, transects maximum extent is 25 m for broods sites. Canopy cover is measured along three 25 m transects, which extended from the brood location every 120° with random orientation. The width (cm) of each shrub species is measured along the three transect lines within 5, 10, and 25 m from the brood location. Because habitat changes through time and broods are mobile, measurements are collected at each 10-day interval. Differences in vegetation use between night (roosting) and day (foraging) hours are also investigated. These surveys included one day and one night observation of habitat used by broods (within a 24 hour period), as well as, one observation of a random location within 200 m of the brood (dependent) to estimate disproportionate use to availability.

Predator Monitoring

Raven and Raptor Surveys. Surveys are conducted for Common Ravens (*Corvus corax*; hereafter ravens) and raptors during nesting and following nest fate. Surveys are conducted using binoculars at each nest for 15 minutes searching all four quadrants around the nest equally. Time of sighting, bearing, distance (using a rangefinder) of each raptor and corvid is tallied and birds are identified to species when possible.

Additional surveys are used to estimate raven and raptor densities using Program Distance (Thomas et al. 2009) across the landscape and relate it to nest survival parameters. Survey points are randomly generated within the study area. Points are generated on and off roads. No points are assigned to paved roads. Surveys are completed between mid-May and late-July. The time of survey is randomized between one half hour our before sunrise to one half hour following sunset. The same protocol for nest surveys is carried out at points. These data will provide valuable information on factors that influence raven and raptor numbers before and after energy development throughout the study area.

Fall and winter location. During the fall and winter months (September – February), flights will be conducted every 3-4 weeks to determine location and survivorship. Attempts will be made to locate each individual radio-marked sage-grouse and determine its status (alive or dead).

3. Anticipated Beneficial Effects of the Project

Over the course of this monitoring effort we will be able to estimate sage-grouse vital rates (e.g. nest initiation rates, nest survival rates, male and female survival rates, adult and juvenile survival rates, and brood survival rates) as well as determine important seasonal use areas, movement corridors, and potential connectivity with other adjacent sage-grouse populations within Nevada’s most undisturbed and intact sagebrush landscapes. These data can be used for comparison purposes for other ongoing research projects that are currently investigating various forms of anthropogenic disturbance or development such as utility scale transmission lines, geothermal energy development and mining activities/associated infrastructure.

4. Project Schedule

Capture and radio-marking efforts for this project will take place during the spring of each year from early March through April beginning in 2016 and concluding in 2023. Follow-up work will extend from this period through August of each year. Monthly flights to locate radio marked individuals will occur from November through February.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

This is a research and monitoring project.

6. Monitoring Plan

This is a monitoring project.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004).

Special Reserve Account Project Cost Estimate Table
Estimating Greater Sage-grouse Vital Rates in Central Nevada

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager:

678

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|--|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | \$ | 13,125.00 | \$ 39,375.00 |
| C. Total Personnel Costs | \$ | 13,125.00 | \$ 39,375.00 |
| 3. Travel Costs | | | |
| A. Per Diem | \$ | 250.00 | \$ 750.00 |
| B. Mileage | \$ | 500.00 | \$ 1,500.00 |
| C. Total Travel Costs | \$ | 750.00 | \$ 2,250.00 |
| 4. Equipment | | | |
| A. VHF Transmitters (30 units @ \$230/ea.) | \$ | 1,725.00 | \$ 5,175.00 |
| B. | | | |
| C. Total Equipment Costs | \$ | 1,725.00 | \$ 5,175.00 |
| 5. Materials | | | |
| A. Trapping Supplies | \$ | 400.00 | \$ 1,200.00 |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | 400.00 | \$ 1,200.00 |
| 6. Miscellaneous | | | |
| A. Field Housing | \$ | 250.00 | \$ 750.00 |
| B. Vehicles (4WD truck lease: 2 @ \$10,500 ea.) | \$ | 5,500.00 | \$ 16,500.00 |
| C. ATV (1 ATV @ \$2,000) | \$ | 500.00 | \$ 1,500.00 |
| D. ATV Fuel and Maintenance | \$ | 250.00 | \$ 750.00 |
| F. Total Miscellaneous Costs | \$ | 6,500.00 | \$ 19,500.00 |
| 7. In-Kind Services | | | |
| A. USGS Research Wildlife Biologist (Permanent, 0.2 FTE) | | | \$ 12,834.00 |
| B. USGS Wildlife Biologist (Term, 0.2 FTE) | | | \$ 9,850.00 |
| C. Total In-Kind Services | \$ | - | \$ 22,684.00 |
| Subtotals | \$ | 22,500.00 | \$ 90,184.00 |
| Total Project Costs | \$ | | \$ 112,684.00 |

aerial resources are dedicated to support on the ground efforts.

2. Project Approach and Tasks

Lek Count Technicians

Assistance with lek counts, in the form of part-time technicians, allows us to achieve our objectives of surveying at least 40% of known lek locations throughout Nevada (n=796). This is a somewhat lofty objective considering the number of field biologists in each region and the availability of volunteers and federal agency personnel available to conduct lek survey work. The use of part time technicians dedicated solely to lek surveys alleviates some of the workload on agency field biologists at a time of the year when surveys for other species (e.g. big game animals) are taking place and big game quota recommendations are being made. We anticipate hiring 2 seasonal part time technicians to work approximately 6 weeks to assist with lek counts.

Fixed Wing Infrared Surveys

This modern survey technique has proven to be effective over the last five years given advancements in the system and the use of sage-grouse lek habitat modeling using maximum entropy (MaxEnt) methods. These surveys contributed a great deal of data during 2020, as the pandemic severely limited monitoring efforts. The technique allows for documenting presence or absence of birds at known leks, numbers of males and females, and has been effective at detecting undiscovered lek locations without disturbing birds as the elevation of the aircraft is generally about 1,000 above ground level. This technology may also be utilized to survey areas for wintering sage-grouse. Very little comprehensive work has been conducted to document winter use areas and delineate this important seasonal habitat. We estimate approximately 35 hours of aerial fixed wing survey to be conducted during 2022.

Aerial Telemetry Surveys

In addition to the lek survey work described above, this project will also cover fixed wing aerial telemetry surveys to follow-up on radio-marked grouse in several project areas. These flights will largely occur once each month from October through February in various study areas and roughly involve approximately 32 hours of work. These surveys not only provide locations of birds, but are also able to document mortality which is important for estimating monthly, seasonal and annual survival rates. Additionally, telemetry information obtained from sage-grouse throughout Nevada has been utilized to inform a statewide resource selection function model (RSF) and mapping product for the species.

3. Anticipated Beneficial Effects of the Project

Lek Count Technicians:

Assistance with lek counts, in the form of part-time technicians, allows us to achieve our objectives of surveying 40% of known lek locations throughout Nevada (n=796). This is a somewhat lofty objective considering the number of field biologists in each region, volunteers and federal agency personnel available to conduct lek survey work. Additionally, this alleviates some of the workload on agency field biologists at a time of the year when surveys for other species (e.g. big game animals) are taking place.

Fixed Wing Infrared Lek Detection and Wintering Ground Survey:

Cooled infrared camera technology with a telephoto lens mounted on a fixed wing aircraft platform has the ability to detect the presence/absence of sage-grouse at leks without invoking disturbance. The technique allows observers to obtain counts of individuals at leks and potentially detect new lek locations. Accurate counts of numbers of birds at a lek can also be determined. This tool allows for efficient survey of multiple leks or suspected wintering grounds each morning.

Fixed Wing Telemetry Surveys:

These surveys greatly increase the strength of our telemetry location dataset and can assist with the development of a resource selection function model being developed by the USGS. Additionally, beyond locating radio-marked sage-grouse, these surveys allow us to determine monthly survival and periods of elevated mortality which could help influence management decisions.

4. Project Schedule

Lek count work conducted via ground/vehicle surveys would take place during the spring breeding season which is typically defined as March 1 – May 15 of each year.

Fixed wing infrared work would be conducted during the winter or spring breeding season depending on the purpose of the survey.

Fixed wing telemetry surveys would be conducted throughout the fiscal year, with emphasis on locating radio-marked birds during late fall and winter periods on a monthly basis when research crews are out of service.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

No NEPA compliance is necessary for this particular project.

6. Monitoring Plan

This is a monitoring project.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004). The project also assists with objectives outlined in the Bi-State Action Plan (2012).

Special Reserve Account Project Cost Estimate Table

Greater Sage-grouse Monitoring

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 677

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|---|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | \$ 132,200.00 |
| A. NDOW Personnel | | | |
| B. Other Personnel (Lek Count Technicians - 2 @ \$18/hr. for 6 weeks) | \$ | 8,640.00 | |
| C. Total Personnel Costs | \$ | 8,640.00 | \$ 132,200.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | \$ 3,800.00 |
| B. Mileage | | | \$ 12,000.00 |
| C. Total Travel Costs | \$ | - | \$ 15,800.00 |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ | - | \$ - |
| 5. Materials | | | |
| A. Miscellaneous Supplies | | | \$ 4,000.00 |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | - | \$ 4,000.00 |
| 6. Miscellaneous | | | |
| A. Infrared Imagery Flights (Lek Search & Survey - 32 hrs. @ \$900/hr.) | \$ | 28,800.00 | \$ 8,000.00 |
| B. Fixed-wing Telemetry Survey (20 hrs. @ \$350/hr.) | \$ | 7,000.00 | \$ 10,000.00 |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | 35,800.00 | \$ 18,000.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 44,440.00 | \$ 170,000.00 |
| Total Project Costs | \$ | | 214,440.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Key Pittman WMA Wildlife Food Plots
 Project Manager: Andrew Coonen Phone: (775) 7253521 Email: acoonen@ndow.org
 Project Monitor: Adam Henriod Start Date: 8/9/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 4/15/2022
 Partners: Nevada Department of Wildlife
 Project Category: Habitat Restoration
 Project Category: Upland Habitat Improvement
 Project Actions: Drill seeding
 Priority Resource: Small game
 Priority Species: Waterfowl
 County Location: Lincoln
 General Location: Key Pittman WMA

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|------------------------|------------------|--------------------------|----------------------|
| NDOW Duck Stamp | \$2,600 | | |
| NDOW Upland Game Stamp | \$3,900 | | |
| Project Totals: | \$6,500 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

The goal of this project is a measurable increase of wildlife use with increased hunter and public use and hunter success. This will be achieved by completing annual plantings and vegetation manipulation, in order to enhance existing habitat on the management area for the benefit of wildlife.

2. Project Approach and Tasks

On October first the food plot fields are mowed, disked, seed drilled (fall/winter cereal grains and legumes) and irrigated. At the same time the NW corner of the Frenchy Unit is mowed. In December and January grass seed is broadcast or drilled in deficient habitats mostly created by noxious weed

treatments or other mechanical disturbances such as fuel/fire breaks. In February or March the food plots are drilled again with additional cereal grains, forbs, legumes and sunflower. At this time the northern impoundments are drained. In June millet, sorghum, and sunflower is broadcast or drilled along portions of the pond edges. In mid-August the desirable native vegetation (goose foot and alkali bulrush) has matured and the northern impoundments are mowed and filled with water. During the last week of August the food plots are strip mowed for the dove season. At the end of September the dove season ends and the cycle starts again. Due to the extended dove season conflicting with the waterfowl season opener, the food plots have to be mowed, disked, seeded and irrigated prior to the waterfowl opener starting around October 1st. Approximately 60 acres of fields will be mowed, disked, drilled, and irrigated. Approximately 5 acres of wetland edge habitat will be seeded.

3. Anticipated Beneficial Effects of the Project

The food plot program incorporates forbs, grasses, nitrogen fixing plants and cereal grains to provide forage for wildlife and maintain and/or improve the soil for better production, reduce noxious and invasive weeds and eliminate the need for commercial fertilizer.

4. Project Schedule

Schedule outlined in the project approach.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

6. Monitoring Plan

The results of food plots in FY22 will be evaluated for their effectiveness and benefit to wildlife and sportsmen.

7. Relationship to NDOW Plans, Policies, and Programs

Annual habitat maintenance and enhancement is identified in all of the current WMA Conceptual Management Plans.

Desired Outcome: Wildlife habitats that are in good ecological condition, capable of supporting a diverse array of wildlife species.

Goal: Habitat is the key to the success of all wildlife populations. Effective habitat is an integral function of the Department of Wildlife. NDOW will preserve and protect quality habitat and enhance deficient habitats.

Objective: Maintain, protect and enhance wildlife habitats on wildlife management areas (WMA's) by applying good science and best management practices through implementation of Comprehensive Management Plans on all WMA's (Comprehensive Strategic Plan). Achieve an overall goal of no net loss of wetland area or function and the long-term goal to enhance and increase wetland quantity and quality within the WMA (Wetland Conservation Plan).

Special Reserve Account Project Cost Estimate Table

Key Pittman WMA Wildlife Food Plots

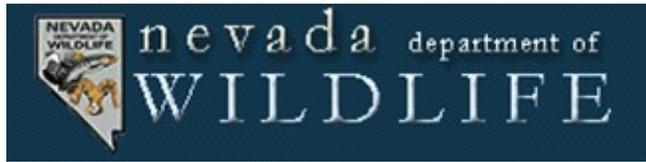
Name of Proposed Project: Andrew Coonen

Name of Proposed Project Manager: 686

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|--|--|--|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | \$ 13,850.00 |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ - | | \$ 13,850.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ - | | \$ - |
| 4. Equipment | | | |
| A. Tractor and ATV fuel | | | \$ 800.00 |
| B. Tractor, ATV, Drill, Disk maintenance | | | \$ 450.00 |
| C. Total Equipment Costs | \$ - | | \$ 1,250.00 |
| 5. Materials | | | |
| A. Seed - Upanad account | \$ 3,900.00 | | |
| B. Seed - Duck stamp account | \$ 2,600.00 | | |
| C. | | | |
| D. Total Materials Costs | \$ 6,500.00 | | \$ - |
| 6. Miscellaneous | | | |
| A. | | | |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ - | | \$ - |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ - | | \$ - |
| Subtotals | \$ 6,500.00 | | \$ 15,100.00 |
| Total Project Costs | \$ | | \$ 21,600.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Monitoring Greater Sage-grouse Response to the Martin Fire
Project Manager: Shawn Espinosa Phone: 775-688-1523 Email: sespinosa@ndow.org

Project Monitor: Shawn Espinosa Start Date: 7/1/2021
Implementation Lead: U.S. Geological Service End Date: 6/30/2022
Partners: U.S. Geological Service, Nevada Department of Wildlife, Great Basin Bird Observatory
Project Category: Wildlife Population Protection or Enhancement
Project Category: Wildlife Monitoring and Research
Project Actions: Small game collaring
Priority Resource: Small game
Priority Species: Sage grouse
County Location: Humboldt
General Location: Eastern Santa Rosa Range, Owyhee Desert area of Humboldt County

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------|------------------|--------------------------|----------------------|
| NDOW Upland Game Stamp | \$22,500 | | |
| U.S. Geological Service | | | \$22,984 |
| USFWS State Wildlife Grant | \$67,500 | | |
| Project Totals: | \$90,000 | | \$22,984 |

Project Proposal

1. Brief Purpose and Goal of the Project

This project is intended to determine key demographic parameters and gain a better understanding of habitat utilization and movement patterns after the 2018 Martin Fire. Pre-fire data was collected from 2016-2018 within this study area as it served as a representative control site within the Great Basin that exhibited characteristics of quality sage-grouse habitat free from moderate to significant anthropogenic disturbances. Further monitoring at this study sites provides a great opportunity to determine the effects of fire on sage-grouse population and also help determine the recovery of habitat under varying

treatment scenarios (e.g. herbicide/fallow/seed, seed only, and natural recovery). The following describe the objectives and demographic parameters for the project:

1. Capture approximately 25-30 female sage-grouse and place VHF radio transmitters and leg bands on the birds at each study site. At a minimum, maintain that number of radio marked females annually;
2. Capture at least 5 female sage-grouse and place GPS/Satellite transmitters to determine seasonal movement patterns and determine home range at each study site;

This work will assist with determining the following:

- a) determination of survival rates of adults and juveniles (both male and female); and
- b) identification of nest sites and nest initiation rates;
- c) determination of nest survival rates;
- d) examination of nest-site vegetative characteristics and if differences exist between successful and unsuccessful nest sites;
- e) determination of differences of seasonal survival rates; and
- f) understand and map movement patterns, seasonal distribution and key habitats.

2. Project Approach and Tasks

Field work for this project will be conducted by the USGS Western Ecological Research Center in Dixon, California using field technicians employed by the Great Basin Bird Observatory.

Radio-Telemetry

We are proposing to capture approximately 20-30 female and up to 10 male sage-grouse annually over a three-year period and maintain at least 20 live females during each reproductive season. Sage grouse movement, survivorship, and reproduction will be monitored following release. Portable receivers (Communication Specialist Inc., Orange, CA; Advanced Telemetry Systems Inc., Isanti, MN) will be used along with 3-element Yagi antennas to monitor radio-marked grouse. Relocation error is minimized by circling around each grouse 30 – 50 m. Using the approximated distance and a compass bearing, the location coordinates (Universal Transverse Mercator) are obtained using GPS. Throughout the nesting and brood-rearing period, researchers attempted to locate female grouse ≥ 2 times per week.

Space-Use. Relocation coordinates will be transferred into a GIS (ArcMap 9.2, ESRI Products, Redlands, CA) for space-use analysis. Kernel density (50, 90, and 95%) is calculated for all radio locations and for each grouse separately (95%). The purpose of using all locations is to estimate area used at the population level. Kernel density is also calculated for brood-rearing females. Kernel calculations are carried out in multiple steps. First, relocation points are weighted to account for biases associated with non-equivalent relocation intervals. Second, robust estimates of smoothing parameters (h) are generated using Animal Space Use 1.3 (Horne and Garton 2009). Last, those parameters are used in Hawth's Tools (ArcMap 9.2) to calculate fixed kernel densities. Kernel density maps are generated based on the estimated densities for 2009 and 2010.

Nests and Vegetation

If a grouse is found at the same location during the nesting period, researchers visually determined if a grouse is nesting. Nests are monitored ≥ 3 times per week until fate is determined. Successful nests are classified as ≥ 1 chick hatched. Nests are also scored as depredated, partially depredated, or abandoned.

Following nest fate, understory cover is recorded at the nest bowl using a coverboard (Jones 1968), Robel pole (Robel 1970), and digital photography method. Vegetation composition cover is measured at multiple subplots (20 X 50 cm) located ≤ 25 m of each nests using Daubenmire method (Daubenmire 1959). Canopy cover is measured along two 25-m transects, one 50-m transect, and one 100-m transect extending from the nest bowl every 90°. The orientation of the quadrants is randomized. Shrub species are recorded and measured. Width (cm) and heights (cm) of a random sample of individual shrubs along the line are recorded. These shrub widths are measured within 5, 10, and 25 m from the nest for all four

transect lines, within 50 m for two transect lines, and 100 m for one transect line. The purpose of the different transect lengths is to identify the scale of use for shrub cover within 100 m radius of a nest site.

To identify vegetation factors selected by grouse, defined as the disproportionate use to availability, measurements of vegetation characteristics are compared at nests to those at random points. Thus, the same habitat measurements are conducted at random points to represent available habitat. Evidence for multi-scale selection generating two random points for each nest is evaluated. One point is within 200 m of the nest (dependent) and the other is within the study area (independent). The preliminary results are reported as means (\pm SE) of vegetation characteristics for random points and nests. However, multiple a priori generalized mixed effects models with a binomial error distribution at multiple spatial scales will be compared for strength of evidence. Researchers will use an information-theoretic approach, including Δ AIC, Akaike's weights, evidence ratios, likelihood-based R², and likelihood ratio tests to evaluate models. Model averaged parameter estimates will be used to develop resource selection functions.

Brood-rearing and vegetation. Following the completion of a successful nest, female grouse with broods are monitored closely by obtaining >2 locations per week. Spotlights are used every 10 days following nest hatch during night hours to count the number of chicks in the brood. Broods are considered unsuccessful if no chicks are found during spotlight surveys. To confirm unsuccessful broods (prevent false negative), females are rechecked within 48 hours. A similar habitat measurement protocol is conducted at brood sites as that at nest sites. However, transects maximum extent is 25 m for broods sites. Canopy cover is measured along three 25 m transects, which extended from the brood location every 120° with random orientation. The width (cm) of each shrub species is measured along the three transect lines within 5, 10, and 25 m from the brood location. Because habitat changes through time and broods are mobile, measurements are collected at each 10-day interval. Differences in vegetation use between night (roosting) and day (foraging) hours are also investigated. These surveys included one day and one night observation of habitat used by broods (within a 24 hour period), as well as, one observation of a random location within 200 m of the brood (dependent) to estimate disproportionate use to availability.

Predator Monitoring

Raven and Raptor Surveys. Surveys are conducted for Common Ravens (*Corvus corax*; hereafter ravens) and raptors during nesting and following nest fate. Surveys are conducted using binoculars at each nest for 15 minutes searching all four quadrants around the nest equally. Time of sighting, bearing, distance (using a rangefinder) of each raptor and corvid is tallied and birds are identified to species when possible.

Additional surveys are used to estimate raven and raptor densities using Program Distance (Thomas et al. 2009) across the landscape and relate it to nest survival parameters. Survey points are randomly generated within the study area. Points are generated on and off roads. No points are assigned to paved roads. Surveys are completed between mid-May and late-July. The time of survey is randomized between one half hour our before sunrise to one half hour following sunset. The same protocol for nest surveys is carried out at points. These data will provide valuable information on factors that influence raven and raptor numbers before and after energy development throughout the study area.

Fall and winter location. During the fall and winter months (September – February), flights will be conducted every 3-4 weeks to determine location and survivorship. Attempts will be made to locate each individual radio-marked sage-grouse and determine its status (alive or dead).

These approaches are subject to change based on improved data collection techniques and improved technologies.

3. Anticipated Beneficial Effects of the Project

Over the course of this monitoring effort, we will be able to estimate sage-grouse vital rates (e.g. nest

initiation rates, nest survival rates, male and female survival rates, adult and juvenile survival rates, and brood survival rates) in response to the Martin Fire. These data can be used for comparison purposes for other ongoing research projects that are currently investigating sage-grouse and habitat response to mega-fires.

4. Project Schedule

Capture and radio-marking efforts for this project will take place during the spring of each year from early March through April beginning in 2020. Follow-up work will extend from this period through August of each year. Monthly flights to locate radio marked individuals will occur from November through February.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

Not applicable.

6. Monitoring Plan

This is a monitoring project.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004).

Special Reserve Account Project Cost Estimate Table

Name of Proposed Project: g Greater Sage-grouse Response to the Martin Fire
Name of Proposed Project Manager: Shawn Espinosa
Project ID: 683

Please provide a breakdown of your project’s costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|--|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | \$ | 13,125.00 | \$ 39,375.00 |
| C. Total Personnel Costs | \$ | 13,125.00 | \$ 39,375.00 |
| 3. Travel Costs | | | |
| A. Per Diem | \$ | 350.00 | \$ 850.00 |
| B. Mileage | \$ | 400.00 | \$ 1,700.00 |
| C. Total Travel Costs | \$ | 750.00 | \$ 2,550.00 |
| 4. Equipment | | | |
| A. VHF Transmitters (30 units @ \$230 ea.) | \$ | 1,725.00 | \$ 5,175.00 |
| B. | | | |
| C. Total Equipment Costs | \$ | 1,725.00 | \$ 5,175.00 |
| 5. Materials | | | |
| A. Trapping Supplies | \$ | 400.00 | \$ 1,200.00 |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | 400.00 | \$ 1,200.00 |
| 6. Miscellaneous | | | |
| A. Field Housing | \$ | 250.00 | \$ 750.00 |
| B. Vehicles (4WD truck lease: 2 @ \$10,500/ea.) | \$ | 5,500.00 | \$ 16,500.00 |
| C. ATV (1 ATV @ \$2,000/ea.) | \$ | 500.00 | \$ 1,500.00 |
| D. ATV Fuel and Maintenance | \$ | 250.00 | \$ 750.00 |
| F. Total Miscellaneous Costs | \$ | 6,500.00 | \$ 19,500.00 |
| 7. In-Kind Services | | | |
| A. USGS Research Wildlife Biologist (Permanent, 0.2 FTE) | | | \$ 12,834.00 |
| B. USGS Wildlife Biologist (Term, 0.2 FTE) | | | \$ 9,850.00 |
| C. Total In-Kind Services | \$ | - | \$ 22,684.00 |
| Subtotals | \$ | 22,500.00 | \$ 90,484.00 |
| Total Project Costs | \$ | | \$ 112,984.00 |

effectiveness of these projects, we have been actively monitoring demographic parameters and habitat selection of the sage-grouse population within the Desatoya Range since 2014. As habitat related projects are implemented, it is important to continue monitoring to determine to what degree these management actions and treatment are influencing the species.

Measuring how intended landscape improvement projects ultimately affect target species such as sage-grouse is critically important with respect to adaptive management. Information gained from this project will not only identify important seasonal use areas, movement and potential connectivity corridors to other adjacent populations of sage-grouse, but also help understand the response to various treatments or management actions including pinyon/juniper removal, meadow enhancement and wild horse removal.

Being that the primary purpose of the proposed action is to improve availability, quantity, and quality of sage-grouse habitat, in particular late brood rearing habitat that is dependent upon springs/wet meadows that support abundant and diverse forb and insect populations, continued monitoring of the sage-grouse population within this area will ultimately be the measure of success, failure or neutral effect of the overall project.

This project is intended to better understand habitat utilization, identify key habitats and determine movement patterns of sage-grouse between these areas and determine vital rates within the Desatoya Population Management Unit. The greatest threat to this population of sage-grouse is pinyon and juniper encroachment and the degradation of small meadows and spring complexes that serve as late brood rearing habitat. Research efforts are expected to lead to the identification of factors limiting this population and habitat associations including:

1. Capture/maintain approximately 20-30 female sage-grouse marked with VHF radio transmitters per year;
2. Capture at least 10 female sage-grouse and place GPS/Satellite transmitters to determine seasonal movement patterns and determine home range;

This work will assist with determining the following:

- a) identification of nest sites and nest initiation rates;
- b) examination of nest-site vegetative characteristics and if differences exist between successful and unsuccessful nest sites;
- c) determination of nest survival rates;
- d) determination of survival rates of adults and juveniles (both male and female); and
- e) determination of differences of seasonal survival rates

2. Project Approach and Tasks

Sage grouse movement, survivorship, and reproduction will be monitored following release. Portable receivers (Communication Specialist Inc., Orange, CA; Advanced Telemetry Systems Inc., Isanti, MN) are used along with 3-element Yagi antennas to monitor radio-marked grouse. Relocation error is minimized by circling around each grouse 30 – 50 m. Using the approximated distance and a compass bearing, the location coordinates (Universal Transverse Mercator) are obtained using GPS. Throughout the nesting and brood-rearing period, researchers attempted to locate female grouse ≥ 2 times per week.

Relocation coordinates are transferred into a GIS (ArcMap 9.2, ESRI Products, Redlands, CA) for space-use analysis. Kernel density (50, 90, and 95%) is calculated for all radio locations and for each grouse separately (95%). The purpose of using all locations is to estimate area used at the population level. Kernel density is also calculated for brood-rearing females. Kernel calculations are carried out in multiple steps. First, relocation points are weighted to account for biases associated with non-equivalent relocation intervals. Second, robust estimates of smoothing parameters (h) are generated using Animal Space Use 1.3 (Horne and Garton 2009). Last, those parameters are used in Hawth's Tools (ArcMap 9.2)

to calculate fixed kernel densities. Kernel density maps are generated based on the estimated densities for 2009 and 2010.

If a grouse is found at the same location during the nesting period, researchers visually determined if a grouse is nesting. Nests are monitored ≥ 3 times per week until fate is determined. Successful nests are classified as ≥ 1 chick hatched. Nests are also scored as depredated, partially depredated, or abandoned.

Following nest fate, understory cover is recorded at the nest bowl using a coverboard (Jones 1968), Robel pole (Robel 1970), and digital photography method. Vegetation composition cover is measured at multiple subplots (20 X 50 cm) located ≤ 25 m of each nests using Daubenmire method (Daubenmire 1959). Canopy cover is measured along two 25-m transects, one 50-m transect, and one 100-m transect extending from the nest bowl every 90° . The orientation of the quadrants is randomized. Shrub species are recorded and measured. Width (cm) and heights (cm) of a random sample of individual shrubs along the line are recorded. These shrub widths are measured within 5, 10, and 25 m from the nest for all four transect lines, within 50 m for two transect lines, and 100 m for one transect line. The purpose of the different transect lengths is to identify the scale of use for shrub cover within 100 m radius of a nest site.

To identify vegetation factors selected by grouse, defined as the disproportionate use to availability, measurements of vegetation characteristics are compared at nests to those at random points. Thus, the same habitat measurements are conducted at random points to represent available habitat. Evidence for multi-scale selection generating two random points for each nest is evaluated. One point is within 200 m of the nest (dependent) and the other is within the study area (independent). The preliminary results are reported as means (\pm SE) of vegetation characteristics for random points and nests. However, multiple a priori generalized mixed effects models with a binomial error distribution at multiple spatial scales will be compared for strength of evidence. Researchers will use an information-theoretic approach, including Δ AIC, Akaike's weights, evidence ratios, likelihood-based R^2 , and likelihood ratio tests to evaluate models. Model averaged parameter estimates will be used to develop resource selection functions.

Following the completion of a successful nest, female grouse with broods are monitored closely by obtaining >2 locations per week. Spotlights are used every 10 days following nest hatch during night hours to count the number of chicks in the brood. Broods are considered unsuccessful if no chicks are found during spotlight surveys. To confirm unsuccessful broods (prevent false negative), females are rechecked within 48 hours. A similar habitat measurement protocol is conducted at brood sites as that at nest sites. However, transects maximum extent is 25 m for brood sites. Canopy cover is measured along three 25 m transects, which extended from the brood location every 120° with random orientation. The width (cm) of each shrub species is measured along the three transect lines within 5, 10, and 25 m from the brood location. Because habitat changes through time and broods are mobile, measurements are collected at each 10-day interval. Differences in vegetation use between night (roosting) and day (foraging) hours are also investigated. These surveys included one day and one-night observation of habitat used by broods (within a 24 hour period), as well as, one observation of a random location within 200 m of the brood (dependent) to estimate disproportionate use to availability.

3. Anticipated Beneficial Effects of the Project

This project will help understand sage-grouse habitat use prior to and during landscape scale treatments that the Bureau of Land Management is conducting in the Desatoya Range of central Nevada. There are several collaborators on the project including, but not limited to, the Nevada Department of Wildlife, the U.S. Fish and Wildlife Service and the Smith Creek Ranch. The BLM project area is approximately 230,000 acres within the Porter Canyon and Edwards Creek grazing allotments. There are 192,700 acres of the Desatoya sage-grouse Population Management Unit (PMU) and 34,195 acres of the Desatoya Wilderness Study Area within the project area.

Approximately 30,000 acres of various treatments are proposed within the project area. While the project's primary focus is to enhance sage-grouse habitat, multiple wildlife species dependent upon

healthy forests and sagebrush communities will benefit. Treatments will include piñon/juniper removal and thinning, wet meadow and spring rehabilitation/protection, potential rabbitbrush control using herbicide treatment and seeding, and excess wild horse removal. It will be important to monitor sage-grouse movement and demographic parameters before, during and after project implementation.

4. Project Schedule

Initial capture efforts were conducted in early fall of 2013 and re-commenced during the spring months of 2014. Follow-up of radio marked individuals has taken place each year since the inception of the project. More intensive monitoring has occurred during the spring breeding period through late brood rearing (August/September). During the late fall and winter months, follow-up monitoring has been conducted using a contracted fixed-wing aircraft to monitor locations and mortality. State fiscal year 2020 will be the seventh year of this monitoring effort. We anticipate this research effort to last eight to ten years with field work likely concluding in 2023 while analysis and publications development will take place during 2024.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

National Environmental Policy Act compliance for sage-grouse monitoring has been addressed in NDOW's Sage-grouse Conservation Project grant program. Habitat improvement projects taking place on public lands within the project area have been documented through the BLM Carson City District and Battle Mountain District offices.

6. Monitoring Plan

See above

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004).

Special Reserve Account Project Cost Estimate Table

Monitoring the Effects of Landscape Level Treatments on Greater sage-grouse in the Desatoya Mountains of Central Nevada

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 676

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> | |
|--|--|-----------|--|------------|
| 1. Land Acquisitions | | | | |
| 2. Personnel Costs | | | | |
| A. NDOW Personnel | | | | |
| B. Other Personnel | \$ | 15,250.00 | \$ | 50,250.00 |
| C. Total Personnel Costs | \$ | 15,250.00 | \$ | 50,250.00 |
| 3. Travel Costs | | | | |
| A. Per Diem | | | | |
| B. Mileage | | | | |
| C. Total Travel Costs | \$ | - | \$ | - |
| 4. Equipment | | | | |
| A. VHF Transmitters (30 @ \$225/ea.) | \$ | 1,750.00 | \$ | 5,000.00 |
| B. Vehicles (2 @ \$10,500/6 mo. Lease) | \$ | 5,250.00 | \$ | 15,750.00 |
| C. Total Equipment Costs | \$ | 7,000.00 | \$ | 20,750.00 |
| 5. Materials | | | | |
| A. | | | | |
| B. | | | | |
| C. | | | | |
| D. Total Materials Costs | \$ | - | \$ | - |
| 6. Miscellaneous | | | | |
| A. Field Housing | \$ | 250.00 | \$ | 750.00 |
| B. | | | | |
| C. | | | | |
| D. | | | | |
| F. Total Miscellaneous Costs | \$ | 250.00 | \$ | 750.00 |
| 7. In-Kind Services | | | | |
| A. USGS Research Wildlife Biologist | | | \$ | 6,417.00 |
| B. USGS Wildlife Biologist | | | \$ | 4,925.00 |
| C. Travel (Per-diem) | | | \$ | 1,500.00 |
| D. Additional equipment (radio, receivers, antennas, banding supplies, etc.) | | | \$ | 5,400.00 |
| C. Total In-Kind Services | \$ | - | \$ | 18,242.00 |
| Subtotals | \$ | 22,500.00 | \$ | 89,992.00 |
| Total Project Costs | \$ | | | 112,492.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Montana-Humboldt SGI Spring Protection
 Project Manager: Victoria Cernoch Phone: Email: victoria.cernoch@ndow.org#mailto:victoria.cernoch@ndow.org#
 Project Monitor: Mark Freese Start Date: 8/1/2021
 Implementation Lead: Pheasants Forever End Date: 12/1/2022
 Partners: Pheasants Forever, Natural Resources Conservation Service, Nevada Department of Wildlife, Bureau of Land Management
 Project Category: Habitat Restoration
 Project Category: Riparian, Spring or Meadow Habitat Improvement
 Project Actions:
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Humboldt, Pershing,
 General Location: 5 different spring sites: 2 in the Montana Mountains, 1 in the Double H Mountains, and 2 in the Humboldt Range near Unionville.

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------------|------------------|--------------------------|----------------------|
| NDOW Habitat Conservation Fee | \$10,000 | | |
| NDOW Industrial Development Fund | \$15,000 | | |
| NDOW Upland Game Stamp | \$15,000 | | |
| Project Totals: | \$40,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

The purpose of this project is to improve spring, riparian, and meadow conditions to benefit wildlife such as greater sage-grouse, particularly during the late brood-rearing season when chicks depend upon succulent forage and cover for growth and survival. Currently, livestock overutilize these five spring

resources warranting further management. It was determined that fencing was the most appropriate management action to improve these spring, riparian, and meadow resources for hydrologic and biologic benefits. Secondly, this project is part of an NRCS Sage Grouse Initiative spring protection effort. By assisting the NRCS with this project, we are investing in this partnership which will lead to a greater coordination and project development, subsequently, benefitting habitat and wildlife.

2. Project Approach and Tasks

NRCS Winnemucca and Pheasants Forever (PF) requested NDOW's help with this project, to utilize more-durable pipe rail fencing as the NRCS programs are currently unable to pay for pipe rail fence. Use of pipe rail will ensure long-term spring protection with minimal maintenance needs over time, while being permeable to wildlife movement. NDOW funds may be used to help with material purchase or fence installation. The NRCS will be covering spring development and water trough work and materials. Funds have been applied for from the BLM, and if secured, these would reduce the amount of funds needed from NDOW. Additionally, PF may apply for NFWF funds to further lower NDOW's contributions.

3. Anticipated Beneficial Effects of the Project

Spring development and functioning water troughs are utilized by the NRCS as part of prescribed grazing plans in order to appropriately spread out grazing across the landscape and prevent livestock from seeking water directly within the riparian area. By reducing livestock pressure on the spring and then protecting it with a fence enclosure, the riparian vegetation is able to recover, creating better habitat for greater sage-grouse during late-season brood rearing. Other wildlife species benefit from this improved riparian habitat as well.

4. Project Schedule

2021 Fall – Fence Contract and Material Procurement

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

This project has NEPA clearance and is considered “maintenance of existing structure” by the BLM.

6. Monitoring Plan

Spring sites will be revisited over successive years with photo points collected to document the effects of protection.

7. Relationship to NDOW Plans, Policies, and Programs

This project is consistent with NDOW's mission, charter, and FYI 18-22 Strategic Plan:

- 1) “To protect, preserve, manage and restore wildlife and its habitat...”
- 2) “To the maintenance and enhancement of Nevada’s diverse wildlife habitats.”
- 3) “To the maintenance and enhancement of Nevada’s wildlife diversity.”
- 4) “To a management program which is carefully designed to result in healthy wildlife populations throughout the state.”
- 5) “Strategically employ and leverage special reserve account revenues to acquire, protect, treat and restore wildlife habitats.”

Special Reserve Account Project Cost Estimate Table

Montana-Humboldt SGI Spring Protection

Name of Proposed Project:

Victoria Cernoch

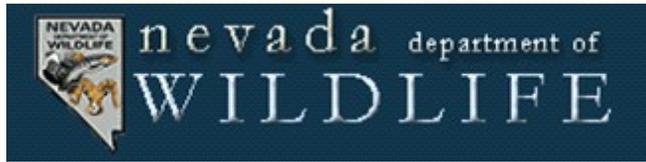
Name of Proposed Project Manager:

674

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|--|
| 1. Land Acquisitions | | |
| 2. Personnel Costs | | |
| A. NDOW Personnel | | |
| B. Other Personnel | | |
| C. Total Personnel Costs | \$ - | \$ - |
| 3. Travel Costs | | |
| A. Per Diem | | |
| B. Mileage | | |
| C. Total Travel Costs | \$ - | \$ - |
| 4. Equipment | | |
| A. | | |
| B. | | |
| C. Total Equipment Costs | \$ - | \$ - |
| 5. Materials | | |
| A. Pipe rail fence | \$ 20,000.00 | \$ 30,000.00 |
| B. | | |
| C. | | |
| D. Total Materials Costs | \$ 20,000.00 | \$ 30,000.00 |
| 6. Miscellaneous | | |
| A. Fence contracting | \$ 20,000.00 | \$ 30,000.00 |
| B. | | |
| C. | | |
| D. | | |
| F. Total Miscellaneous Costs | \$ 20,000.00 | \$ 30,000.00 |
| 7. In-Kind Services | | |
| A. | | |
| B. | | |
| C. Total In-Kind Services | \$ - | \$ - |
| Subtotals | \$ 40,000.00 | \$ 60,000.00 |
| Total Project Costs | \$ | 100,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Native Seed Acquisition for Private Landowner Transition to Native Seed Production

Project Manager: Brittany Trimble Phone: Email btrimble@ndow.org

Project Monitor: Caleb McAdoo Start Date: 9/1/2021

Implementation Lead: Nevada Department of Wildlife End Date: 6/30/2021

Partners: Nevada Department of Wildlife, Test

Project Category: Habitat Restoration

Project Category: Fire Rehabilitation - Upland Habitat

Project Actions:

Priority Resource: General Habitat Improvement

Priority Species:

County Location: Elko, Churchill, Other

General Location: Various private properties across the state and in Utah

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|------------------------|------------------|--------------------------|----------------------|
| UGS | \$14,000 | | |
| Project Totals: | \$14,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

These funds would be used to purchase seed of various native species, mostly perennial grasses and forbs, to provide to private landowners for growout on their lands for production of native seed for use in Nevada rehabilitation and restoration projects. While the ultimate goal is to have locally-adapted populations collected in Nevada to use for growout, providing cultivars of native species to landowners for them to learn from and develop their production practices will allow for a smooth transition once locally-collected populations are more available for growout. Specific species to purchase will be decided through communication with each landowner based on their interest, operational abilities, and their property's soil and climate characteristics. Price and amount of the seed produced by the landowner will be negotiated for purchase by NDOW with each landowner.

Native seed available for purchase on large enough scale for rehabilitation and restoration projects is

sourced and produced in states with higher precipitation levels (i.e., Washington, Oregon, Idaho, Colorado, California) and is typically not well-adapted to Nevada climates, often resulting in poor establishment success and inefficient use of resources. Research has shown that locally-adapted native species have higher success of establishment and reproduction than cultivars of native species that are sourced and produced in wetter climates. Various private landowners have expressed interest in producing native seed for use in rehab and restoration projects, but they have a high amount of risk associated with transitioning from their current operations to native seed production. If NDOW were to provide the starter seed they need to transition, some of that risk will be alleviated and native seed production becomes more appealing and realistic. Providing seed that has been collected from local sources to landowners is also risky since native species have very different growth and harvest requirements than crops, and initial collections of Nevada populations may essentially be wasted while landowners learn how to effectively grow and harvest them. Not only will the seed go to waste in this situation, but the time, energy, and cost of population identification, seed collection, and cleaning will be lost. Even though most native species available to purchase are commercial cultivars and may have different adaptations than those same species that have evolved in Nevada climates, giving landowners the ability to learn the growth and harvest requirements of a specific species will allow for a smooth transition into the production of seed sourced from local populations. This way, time and energy required by multiple people and agencies to acquire viable, clean seed from a local population is much less likely to go to waste, not to mention the precious seed. A plan is already in place to acquire locally-adapted native populations of target species with research and production partners. Please see the proposal for “Native Seed Collection at the Southern End of Species’ Ranges for Increased Germination, Survival, and Restoration Success” submitted by Lee Davis.

2. Project Approach and Tasks

Seed will be purchased through Nevada Division of Forestry, the BLM consolidated seed buys, or directly from a seed distributor. The type and amount of seed purchased will vary by landowner and will depend on the property size, operational abilities, and soil and climate characteristics of the property. This being said, target species for production include perennial grasses (i.e., Indian ricegrass, bluebunch wheatgrass, thickspike wheatgrass, western wheatgrass, etc.) and perennial forbs (i.e., globemallows, beeplant, flax, penstemon, buckwheats, biscuitroots, etc.) commonly used for rehabilitation and restoration. These funds would also be used to clean and test seed produced for purity and viability to calculate the amount of pure live seed (PLS) available to purchase.

Project cost estimated by the following metrics:

Assuming four landowners have interest in growing 10 acres worth of native seed at 10 lbs/ac (8-9 PLS lbs/ac):

- Desired perennial grass species (Indian ricegrass and bluebunch wheatgrass) cost around \$11/lb
o\$11/lb X 100 lbs X 4 landowners = \$4,400
- Desired perennial forb species average \$30/lb
o\$30/lb X 100 lbs X 4 landowners = \$12,000
- Accounting for some landowners being interested in growing forbs instead of grasses (assuming 2 landowners growing grasses and 2 growing forbs), the average cost for seed would be around \$8,000

Seed cleaning assuming 50 lbs of seed produced per acre

- 50 lbs/ac X 10 ac = 500 lbs
- Cleaning charge of \$85/hr and typical processing time of 3 hours for 100 lbs seed
o\$85/hr X 3 hrs = \$255/100 lbs seed
o\$255 X 5 = \$1,275 for 500 lbs of seed
o\$1,275 X 4 landowners = \$5,100

3. Anticipated Beneficial Effects of the Project

Ultimately, beneficial effects will include landowner knowledge gained about the needs of specific native

species for production, and greater availability of seed produced in Nevada climates for use in rehab and restoration projects. More immediate beneficial effects include some amount of native cultivars of seed available to purchase from local producers, or even just enough seed produced to support subsequent years of production.

4. Project Schedule

Summer 2021 – communication with interested landowners about potential species for specific properties

Summer – early Fall 2021 – purchase seed for growout

Spring – Summer 2022 – communication with landowners about progress and developments

Fall 2022 – seed cleaning, testing, and potential purchase of seed produced

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

None required since project occurs on private land.

6. Monitoring Plan

Communication with landowners will occur throughout the growing season to gauge availability of seed to purchase for fiscal planning. The amount of seed produced will be evaluated on a PLS pounds basis.

7. Relationship to NDOW Plans, Policies, and Programs

Maintenance of functional vegetation communities is a key aspect of conservation strategies for each of the 22 key habitat types listed in the Nevada Wildlife Action Plan. Also, NDOW is a key partner in the Nevada Native Partnership, whose primary goal is increased production of native seed for use in Nevada rehabilitation and restoration projects.

Special Reserve Account Project Cost Estimate Table

Name of Proposed Project: Native Seed Acquisition for Private Landowner Transition to Native Seed Production
Name of Proposed Project Manager: Brittany Trimble
Project ID: 690

Please provide a breakdown of your project’s costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | <i>Costs to be Paid by Other Sources</i> |
|------------------------------|--|--|
| 1. Land Acquisitions | \$ - | \$ - |
| 2. Personnel Costs | | |
| A. NDOW Personnel | | |
| B. Other Personnel - NDF | | |
| C. Total Personnel Costs | \$ - | \$ - |
| 3. Travel Costs | | |
| A. Per Diem | | |
| B. Mileage | | |
| C. Total Travel Costs | \$ - | \$ - |
| 4. Equipment | | |
| A. | | |
| B. | | |
| C. Total Equipment Costs | \$ - | \$ - |
| 5. Materials | | |
| A. Seed | \$ 8,400.00 | |
| B. | | |
| C. | | |
| D. Total Materials Costs | \$ 8,400.00 | \$ - |
| 6. Miscellaneous | | |
| A. Seed Cleaning | \$ 5,000.00 | |
| B. Seed Testing | \$ 600.00 | |
| C. | | |
| D. | | |
| F. Total Miscellaneous Costs | \$ 5,600.00 | \$ - |
| 7. In-Kind Services | | |
| A. | | |
| B. | | |
| C. Total In-Kind Services | \$ - | \$ - |
| Subtotals | \$ 14,000.00 | \$ - |
| Total Project Costs | \$ | \$ 14,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Nine-Mile Unit Riparian Fence - Rough Creek
 Project Manager: Shawn Espinosa Phone: 775-688-1523 Email sespinosa@ndow.org
 Project Monitor: Shawn Espinosa Start Date: 7/1/2021
 Implementation Lead: Natural Resources Conservation Service End Date: 6/30/2022
 Partners: Natural Resources Conservation Service, Nevada Department of Wildlife, Nevada Division of State Parks
 Project Category: Habitat Restoration
 Project Category: Riparian, Spring or Meadow Habitat Improvement
 Project Actions: Other fencing
 Priority Resource: Small game
 Priority Species: Sage grouse
 County Location: Mineral
 General Location: Walker River Recreation Area

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|--------------------------------|------------------|--------------------------|----------------------|
| NDOW Habitat Conservation Fee | \$15,175 | | |
| NDOW Upland Game Stamp | \$15,174 | | |
| Nevada Division of State Parks | \$2,000 | | |
| Walker Basin Conservancy | \$2,000 | | |
| Project Totals: | \$34,349 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

This project serves several intended purposes: 1) improve brood rearing habitat for Bi-State sage-grouse; 2) protect Rough Creek channel from livestock grazing to improve riparian conditions; and 3) develop three pastures for rotational grazing of the Nine-mile Unit of the previous Flying M Ranch.

The proposed fence will relieve grazing pressure from the Rough Creek channel which was previously incised, but has reached a new stable state within a secondary flood plain. Future projects are planned to raise the streambed over a 20-30 year period and allow Rough Creek to once again access its original flood plain. The fence also allows livestock to be grazed in a rotational pattern and reduce grazing pressure in a few key areas that are primarily used by sage-grouse as brood rearing habitat. In addition, continued irrigation will be implemented the lessee to maintain and improve brood rearing habitat in key areas.

2. Project Approach and Tasks

This project will provide funding for materials and labor to construct a four-strand wire and steel post fence to be built on either side of Rough Creek within the Nine-Mile Unit of the Walker River Recreation Area. The total fence length is approximately 12,962 feet and will be constructed per the following wildlife friendly specifications:

- The top wire of the fence will be no more than 42" above ground;
 - Allow for 12" of spacing between the top two wires;
 - The bottom wire will be placed at 18" above ground to allow movement of pronghorn in the area;
 - The bottom wire will be a smooth wire;
 - The second wire from the bottom should be placed approximately 24" above ground;
 - Posts should be placed at 16.5 foot intervals;
 - Gates will be placed at locations where irrigation ditches intercept the fence to allow for maintenance;
 - The top strand of wire and the second strand up from the bottom will be marked with fence markers to deter avian strikes, particularly, greater sage-grouse.
- oFence markers can be cut from vinyl "undersill" trim siding in 3" lengths with reflective tape added if necessary.
- oFence markers are placed at approximately 3' intervals across the top wire and alternate with markers placed on the second wire from the bottom (i.e., half-way between top strand markers).

3. Anticipated Beneficial Effects of the Project

This fencing project will alleviate grazing pressure from the Rough Creek channel and allow for some natural recovery to take place. At the same time, some small to moderate scale in-stream restoration projects such as beaver dam analogs and Zeedyke structures may be developed to enhance recovery. In addition, the fence allows for the potential establishment of up to four pastures within the lower portion of the Nine-Mile Unit for livestock grazing. This will alleviate grazing pressures in certain areas and allow for greater abundance of wetland vegetation, key forbs and grasses and height of those species to conceal grouse during the brood rearing period.

4. Project Schedule

We anticipate that construction of the fence will begin in September or October of 2021.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

No NEPA compliance is necessary for this particular project.

6. Monitoring Plan

This project will provide funding for materials and labor to construct a four-strand wire and steel post fence to be built on either side of Rough Creek within the Nine-Mile Unit of the Walker River Recreation Area. The total fence length is approximately 12,962 feet and will be constructed per the following wildlife friendly specifications:

- The top wire of the fence will be no more than 42" above ground;
- Allow for 12" of spacing between the top two wires;
- The bottom wire will be placed at 18" above ground to allow movement of pronghorn in the area;
- The bottom wire will be a smooth wire;
- The second wire from the bottom should be placed approximately 24" above ground;

- Posts should be placed at 16.5 foot intervals;
 - Gates will be placed at locations where irrigation ditches intercept the fence to allow for maintenance;
 - The top strand of wire and the second strand up from the bottom will be marked with fence markers to deter avian strikes, particularly, greater sage-grouse.
- o Fence markers can be cut from vinyl “undersill” trim siding in 3” lengths with reflective tape added if necessary.
 - o Fence markers are placed at approximately 3’ intervals across the top wire and alternate with markers placed on the second wire from the bottom (i.e., half-way between top strand markers).

7. Relationship to NDOW Plans, Policies, and Programs

The project assists with objectives outlined in the Bi-State Greater Sage-grouse Action Plan (2012).

Special Reserve Account Project Cost Estimate Table

Nine-Mile Unit Riparian Fence - Rough Creek

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 681

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | <i>Costs to be Paid by Other Sources</i> |
|--|--|--|
| 1. Land Acquisitions | | |
| 2. Personnel Costs | | |
| A. NDOW Personnel | | |
| B. Other Personnel (Fence Contractor Labor: \$1.65/ft. for 12,962 ft.) | \$ 19,387.00 | \$ 2,000.00 |
| C. Total Personnel Costs | \$ 19,387.00 | \$ 2,000.00 |
| 3. Travel Costs | | |
| A. Per Diem | | |
| B. Mileage | | |
| C. Total Travel Costs | \$ - | \$ - |
| 4. Equipment | | |
| A. | | |
| B. | | |
| C. Total Equipment Costs | \$ - | \$ - |
| 5. Materials | | |
| A. Fence Material (\$1.00/ft. for 12,962 ft.) | \$ 10,962.00 | \$ 2,000.00 |
| B. | | |
| C. | | |
| D. Total Materials Costs | \$ 10,962.00 | \$ 2,000.00 |
| 6. Miscellaneous | | |
| A. | | |
| B. | | |
| C. | | |
| D. | | |
| F. Total Miscellaneous Costs | \$ - | \$ - |
| 7. In-Kind Services | | |
| A. Part-time Labor (Irrigation Ditch Maintenance and Irrigation - 360 hrs. @ 27.20/hr.) | | \$ 9,792.00 |
| B. Water Contribution (Walker Basin Conservancy - 3 cfs/day for 180 days @ 25 per acre-foot) | | \$ 26,730.00 |
| C. Total In-Kind Services | \$ - | \$ 36,522.00 |
| Subtotals | \$ 30,349.00 | \$ 40,522.00 |
| Total Project Costs | \$ | \$ 70,871.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Upland Game Translocation and Monitoring
 Project Manager: Shawn Espinosa Phone: 775-688-1523 Email sespinosa@ndow.org
 Project Monitor: Matt Jeffress Start Date: 7/1/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 6/30/3022
 Partners: Nevada Department of Wildlife
 Project Category: Wildlife Population Protection or Enhancement
 Project Category: Species Augmentation
 Project Actions:
 Priority Resource: Small game
 Priority Species: Ruffed Grouse
 County Location: Humboldt, White Pine, Mineral
 General Location: Pine Forest Range, Humboldt County; North Snake Range, White Pine County; Walker River Recreation Area, Mineral County

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------|------------------|--------------------------|----------------------|
| NDOW Upland Game Stamp | \$19,400 | | |
| USFWS State Wildlife Grant | \$30,000 | | |
| Project Totals: | \$49,400 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

The overall goal of this project is to increase population redundancy and resiliency of certain upland game species, particularly ruffed grouse, wild turkey and potentially gray (Hungarian) partridge within suitable and appropriate habitats across Nevada’s landscape. In addition, this project is proposed to assist with monitoring of existing upland gamebird populations to help determine the efficacy of previous translocations (particularly mountain quail restoration efforts), availability of source stock (gray partridge) and to help develop forecasts for the upcoming season. Intensive monitoring would likely be focused on chukar and gray partridge with the use of trail cameras placed at various spring sources during the mid-summer months.

Since 2008, the Nevada Department of Wildlife has released approximately 1,200 mountain quail (Churchill, Humboldt, Lander, Washoe and White Pine Counties), 203 ruffed grouse (Elko, Humboldt, Lander and Nye Counties), 251 Rio Grande turkeys (Douglas, Lander and Lincoln Counties) and 246 Merriam's turkeys (Lander and Elko Counties). These translocations, and subsequent augmentations, are conducted to fulfill the objective of expanding certain upland game species distribution and abundance within Nevada as stated in the Nevada Upland Game Species Management Plan developed in 2008. These efforts have also led to increased sportsmen opportunity and have contributed to non-consumptive uses as well (e.g., wildlife watching and photography).

2. Project Approach and Tasks

The capture and translocation of either species is highly dependent on habitat conditions, both at the capture site and the proposed release site. If adequate habitat conditions are not experienced, it is likely that these efforts will be re-scheduled.

Ruffed Grouse

We propose to capture 20-30 ruffed grouse, likely from the Santa Rosa Range to augment a prior release in the Pine Forest Range of Humboldt County. If the existing population in the Santa Rosa Range is not capable of providing a reliable source stock, alternative sites could be selected such as the Merritt Mountain area of northern Elko County.

A subset of captured and translocated birds (up to 10) may be radio-marked with VHF telemetry units to help determine habitat usage and survival rates. Fixed wing telemetry surveys will be conducted intermittently for the life of the individual or the units to monitor for survival and dispersal from the release site. Drumming counts will take place at specific locations during May and early June to document presence and density of birds.

Merriam's Turkey

Source stock of Merriam's turkeys was most recently obtained (January 2020) via the Idaho Department of Fish and Game working in conjunction with private landowners in southeastern Idaho. Additionally, Merriam's turkeys have also been made available to Nevada through the Colville Confederated Tribe located in eastern Washington. In this instance, capture work was conducted by the Colville Confederated Tribal personnel with partial transportation of birds to a "halfway point" in eastern Oregon. We hope to continue this relationship in 2021 and 2022.

Monitoring activities will include aerial telemetry surveys of radio-marked birds within the northern Snake Range. In addition, intermittent ground follow-up monitoring will take place following flights, especially during the nesting season to determine nest location and habitat selection.

Rio Grande Turkey

We will coordinate with the Utah Division of Wildlife Resources to determine source stock availability for this species from portions of central and southern Utah. In the past, we have obtained several hundred birds from Utah for release into Lincoln County, which has been considered a success. We intend to release approximately 100 of these birds within the Walker River Recreation Area in January of 2022.

There may also be an opportunity to capture birds from Paradise Valley in 2021 as the turkey population here has expanded recently and there are congregations of over 200 birds that have been reported in the community of Paradise Valley. Trap and translocation of up to 50 individuals may be necessary in 2021.

Chukar and Gray Partridge Surveys

We will deploy 20 camera stations at various springs and water sources where congregations of chukar and gray partridge are expected. This will be conducted to serve two purposes: 1) evaluate brood sizes for these species during the summer months to help develop forecasts and 2) evaluate population of gray

partridge to determine whether they are of suitable size to serve as a source stock for translocations.

3. Anticipated Beneficial Effects of the Project

Expanding the distribution of ruffed grouse populations addresses concerns of population decline and loss of redundancy (numbers of populations) across the range of the species. This provides assurances that populations will persist over the long-term and enable resiliency in case of stochastic events. Ultimately, if successful, the establishment of these populations also increases recreational opportunities for sportsmen and wildlife watchers.

Likewise, expanding wild turkey populations in Nevada meets sportsman demand for this species. Only 166 turkey tags were issued for the spring 2020 hunt and the number of applicants far exceeds availability of tags. Providing sportsmen with alternative hunt areas to choose from and expanded opportunity would help alleviate the demand deficit.

4. Project Schedule

Ruffed grouse capture efforts would commence in late summer or early fall of 2021 (August/September) if habitat conditions and bird numbers are deemed appropriate. This type of effort normally takes approximately 10-14 days to complete. However, this is highly dependent on habitat conditions and productivity of ruffed grouse populations from potential source stock areas.

Merriam's turkey capture efforts normally begin in December or January of each year. Capture work would likely begin in December of 2021 or January of 2022 and releases would take place immediately after that. As in years past, two or three capture efforts and bird translocations are necessary to achieve the release complement objective of between 50 and 100 birds.

Like Merriam's turkey, efforts to capture Rio Grande turkey would take place in December of 2021 or January of 2022, with subsequent translocations occurring after disease testing requirement have been met.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

USFS in the Ely Ranger District have been consulted on the Merriam's turkey release within the northern portion of the Snake Range.

Ruffed grouse releases would take place on private lands within the Pine Forest Range in Humboldt County.

Nevada State Parks has requested the release of Rio Grande Turkeys within the Walker River Recreation Area.

6. Monitoring Plan

Chukar and Gray Partridge Surveys

We will deploy 20 camera stations at various springs and water sources where congregations of chukar and gray partridge are expected. This will be conducted to serve two purposes: 1) evaluate brood sizes for these species during the summer months to help develop forecasts and 2) evaluate population of gray partridge to determine whether they are of suitable size to serve as a source stock for translocations.

7. Relationship to NDOW Plans, Policies, and Programs

The following documents were used while developing this proposal:

- Nevada Upland Game Species Management Plan (2008);
- Upland Game Release Plan for FY2020-2021;
- NDOW's W-4 Game Management Federal Assistance Grants (Pittman-Robertson);

Special Reserve Account Project Cost Estimate Table

Upland Game Translocation and Monitoring

Name of Proposed Project: Shawn Espinosa

Name of Proposed Project Manager: 675

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|---|--|--|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | \$ 25,416.00 |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ - | | \$ 25,416.00 |
| 3. Travel Costs | | | |
| A. Per Diem | | | \$ 3,584.00 |
| B. Mileage | | | |
| C. Total Travel Costs | \$ - | | \$ 3,584.00 |
| 4. Equipment | | | |
| A. VHF radio-transmitters (20 @ \$230/ea.) | \$ 4,600.00 | | |
| B. Reconyx Trail Cameras (10 @ \$500/ea.) | \$ 5,000.00 | | |
| C. Cuddeback Cellular Trail Camera (8 @ \$250/ea.) | \$ 2,000.00 | | |
| D. Total Equipment Costs | \$ 11,600.00 | | \$ - |
| 5. Materials | | | |
| A. Capture Materials (ruffed grouse) | | | \$ 1,000.00 |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ - | | \$ 1,000.00 |
| 6. Miscellaneous | | | |
| A. Telemetry Flights (20 hrs. @ \$350/hr.) | \$ 7,000.00 | | |
| B. Disease Testing Kits and Lab Costs (for approx. 30 turkey samples) | \$ 800.00 | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ 7,800.00 | | \$ - |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ - | | \$ - |
| Subtotals | \$ 19,400.00 | | \$ 30,000.00 |
| Total Project Costs | \$ | | \$ 49,400.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Virginia Mountains Greenstrip 2021
 Project Manager: Victoria Cernoch Phone: Email: victoria.cernoch@ndow.org#mailto:victoria.cernoch@ndow.org#
 Project Monitor: Mark Freese Start Date: 9/1/2021
 Implementation Lead: Bureau of Land Management End Date: 11/15/2021
 Partners: Bureau of Land Management, Nevada Department of Wildlife
 Project Category: Habitat Restoration
 Project Category: Fire Supression or Prevention
 Project Actions: Fuel Break
 Priority Resource: General Habitat Improvement
 Priority Species: Greater sage-grouse
 County Location: Washoe
 General Location: Virginia Mountains, northwestern Nevada

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|-------------------------------|------------------|--------------------------|----------------------|
| NDOW Habitat Conservation Fee | \$22,500 | | |
| NDOW Upland Game Stamp | \$22,500 | | |
| Project Totals: | \$45,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

Areas north of Reno including the Virginia, Petersen, Fort Sage, and Dogskin Mountains are important habitats for wildlife including sage-grouse, mule deer, and antelope. Unfortunately, these areas also have a large problem with fire. Fires primarily originate from vehicles or trailers on highway 395 (e.g. Trailer 1 and 2 and Long Valley Fire) and lightning (Virginia Mountains complex) leading to many thousands of acres burned. The Virginia Mountains are particularly important because they provide very valuable wildlife habitats including 4 sage-grouse leks, migrating mule deer winter range, and resident mule deer habitat year-round. Repeated wildfire is continuously degrading this wildlife-rich resource area. For example, sage-grouse nesting substrate is marginal, resulting in poor nesting success (USGS Virginia

Mountains Study literature).

After the Long Valley Fire in 2017, NDOW began working with the BLM to develop a green strip, with the goal of keeping fire out of the Virginia Mountains. The green strip parallels Winnemucca Ranch Road, continues through Newcome Lake Valley, and will tie in to Fish Springs Ranch Road. This is year 4 of a multi-phased project. Previous work completed by the BLM includes 2,032 acres of herbicide application, 1,469 acres of seeding, 671 acres of mastication, and 3,230 acres of hand removal. NDOW joined the project and assisted with an additional 2,996 acres of herbicide application last year.

The purpose of this project is to break up the landscape by first removing cheatgrass, Juniper, and some brush, and then establishing green strip species (e.g. Siberian wheatgrass, kochia, and Sandberg's bluegrass). The goal is to create a strip with reduced fuels and higher fuel moisture that, when a fire does occur, will lower flame lengths allowing deployment of Initial Attack resources. This will ideally limit fire spread into the Virginia Mountains and protect habitat improvement projects implemented and planned by BLM, NDOW, NRCS and others.

2. Project Approach and Tasks

BLM requested NDOW services to help contract this project to include private lands (i.e. Buckhorn Land and Livestock). BLM will purchase and supply herbicide for public lands. NDOW will contract the aerial application in September 2021. Aerial herbicide application will target the removal of cheatgrass and other annual species and will cover a total acreage of 2,674 (this includes 80 acres of private land). This treatment ties into previous spraying and seeding phases of the project. BLM and NDOW will monitor the herbicide application and as needed seed green strip species within 200 feet of the road and a native mix greater than 200 feet from a road within the effective herbicide treatment area.

In lieu of a payment to NDOW and due to the difficulty with NDOW-BLM Financial Agreements, BLM has purchased seed through the seed warehouse for NDOW's use, which will be more than double the project BLM cost (~\$98,910).

3. Anticipated Beneficial Effects of the Project

Removing cheatgrass and other fine fuels along Winnemucca Ranch Road will help establish green strip species. Established green strip species will lower flame lengths and fire spread, allowing Initial Attack (IA) suppression to occur. An effective green strip will support the use of IA resources to help prevent repeated fires starting along US 395 and moving northwest/west in the Virginia Mountains. This project is part of the larger Virginia Mountains landscape-scale habitat improvement project (<https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=renderDefaultPlanOrProjectSite&projectId=52595&dtmId=0b0003e8808c5310>), aimed at improving habitat values and treating fuels to minimize wildfire impacts. The green strip will help protect BLM and NDOW investments associated with larger landscape-scale projects.

4. Project Schedule

2018- Fall - BLM contracted cutting of 500 acres of Juniper around Lorrie Spring

2018 October - BLM sprayed 2,032 acres along Winnemucca Ranch Road south of Dry Valley Creek

2019 Winter - BLM seeded 1,469 acres in the herbicide treatment area

2019 Fall - BLM contracted cutting of 2,730 acres of Juniper removal along Winnemucca Ranch Road

2019 Fall - BLM contracted masticating 671 acres of Juniper along Winnemucca Ranch Road

2020 Fall - NDOW/BLM applied herbicide on 3,789 acres

2021 Fall - Seed - TBD

2021 Fall - Phase III aerial herbicide connecting 2020 NDOW contract treatment to Fish Springs Road; 2,674 acres

2022 Fall - Seed - TBD

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

The project has NEPA clearance.

All of these decisions tier to the Carson City Integrated Weed Management Plan DOI-BLM-NV-C000-2015-0003-EA and the 17 states herbicide EIS

EA REFERENCE NUMBER:

Virginia Mountain Treatments DOI- BLM-NV-C020-2015-0034-EA

Sheep Springs Project, 2019 Cottonwood and Canyon Fires DOI-BLM-NV-C000-2015-0003-EA

DECISION RECORD (DR) NUMBER:

Virginia Mountains Treatments DOI-BLM-NV-C020-2015-0034-EA

Sheep Springs Project DOI-BLM-NV-C020-2018-004-DNA and DOI-BLM-NV-030-02-07-EA

2019 Cottonwood and Canyon Fires DOI-BLM-NV-C020-2020-001-DNA and DOI-BLM-NV-030-2-07-EA

6. Monitoring Plan

BLM and NDOW will complete field visits to determine the effectiveness of the treatment and validate seeding needs and potential. Agricultural Research Service is a partner on this project providing technical expertise and an additional source of information. We will also provide project information to the NPCD monitoring crews in hopes that this project may have monitoring plots established and measured.

7. Relationship to NDOW Plans, Policies, and Programs

This project is consistent with NDOW's mission, charter, and FYI 18-22 Strategic Plan:

- 1) "To protect, preserve, manage and restore wildlife and its habitat..."
- 2) "To the maintenance and enhancement of Nevada's diverse wildlife habitats."
- 3) "To the maintenance and enhancement of Nevada's wildlife diversity."
- 4) "To a management program which is carefully designed to result in healthy wildlife populations throughout the state."
- 5) "To a leadership role in the conservation and management of the state's wildlife resources."
- 6) "Work with state, federal and local agencies, as well as , private landowners, industry and conservation organizations through the Nevada Partners for Conservation and Development to preserve and protect quality habitats and enhance deficient habitats."
- 7) "Strategically employ and leverage special reserve account revenues to acquire, protect, treat and restore wildlife habitats."

Special Reserve Account Project Cost Estimate Table
Virginia Mountains Greenstrip 2021

Name of Proposed Project: Victoria Cernoch

Name of Proposed Project Manager: 669

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|--------------------------------------|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ | - | \$ - |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ - |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ | - | \$ - |
| 5. Materials | | | |
| A. Herbicide | | | \$ 19,123.00 |
| B. | | | |
| C. | | | |
| D. Total Materials Costs | \$ | - | \$ 19,123.00 |
| 6. Miscellaneous | | | |
| A. Herbicide application contracting | \$ | 45,000.00 | |
| B. | | | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | 45,000.00 | \$ - |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 45,000.00 | \$ 19,123.00 |
| Total Project Costs | \$ | | \$ 64,123.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Mormon Mountains Post-Fire Restoration
 Project Manager: Anthony Miller Phone: 702-280-1177 Email ajmiller@ndow.org
 Project Monitor: Matt Flores Start Date: 10/15/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 10/15/2022
 Partners: Nevada Department of Wildlife, Bureau of Land Management
 Project Category: Habitat Restoration
 Project Category: Fire Rehabilitation - Upland Habitat
 Project Actions: Seedling planting
 Priority Resource: Small game
 Priority Species: Quail
 County Location: Lincoln
 General Location: S Lincoln Count, NV

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|---------------------------|------------------|--------------------------|----------------------|
| Bureau of Land Management | | | \$235,000 |
| NDOW Upland Game Stamp | | | \$40,000 |
| Project Totals: | | | \$275,000 |

Project Proposal

1. Brief Purpose and Goal of the Project

The purpose of this project is to restore wildlife habitat at guzzlers within burned areas. The restoration work will use native cover plants that benefit wildlife using nearby guzzlers. It is anticipated that wildlife usage will increase at the guzzlers near the restoration sites. The primary species that will benefit include Gambel's quail, chukar, mourning dove, desert cottontail, and multiple other wildlife species dependent on free water. The purpose of this project is to restore wildlife habitat at guzzlers within burned areas. The restoration work will use native cover plants that benefit wildlife using nearby guzzlers. It is anticipated that wildlife usage will increase at the guzzlers near the restoration sites. The primary species that will benefit include Gambel's quail, chukar, mourning dove, desert cottontail, and multiple other wildlife species dependent on free water. The purpose of this project is to restore wildlife habitat at

guzzlers within burned areas. The restoration work will use native cover plants that benefit wildlife using nearby guzzlers. It is anticipated that wildlife usage will increase at the guzzlers near the restoration sites. The primary species that will benefit include Gambel's quail, chukar, mourning dove, desert cottontail, and multiple other wildlife species dependent on free water.

2. Project Approach and Tasks

To reduce wildfire potential, BLM will be creating fuel breaks by treating brome grasses with herbicide along roads and subsequently seeding for green stripping. The roadways will include access roads leading to area guzzlers. During implementation of the project NDOW will subsequently plant perennial native vegetation at or adjacent to described small game water developments. Plantings will be protected from herbivores and monitoring of the planting sites will be necessary to ensure the survival of new plants and viability of wildlife habitat.

3. Anticipated Beneficial Effects of the Project

Restoration of strategically located islands of habitat, and connectivity of intact habitats. Establishing and maintaining habitat corridors is key for plants and wildlife. An increase in wildlife usage at the guzzlers located near the restoration sites.

4. Project Schedule

October 2021 - December 2022

This project is very likely to be a multi-year or recurring project

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

The BLM Ely District Office has prepared a Determination of NEPA Adequacy (DNA) document for the above described federal actions and include NDOW's restoration objectives at selected sites on BLM-managed lands

6. Monitoring Plan

Regular site assessment of plant health and size, water requirements, and cages to protect plants from herbivores. Presence of wildlife and targeted species will be assessed in relationship to habitat enhancements

7. Relationship to NDOW Plans, Policies, and Programs

This project is consistent with NDOW Habitat Division's program emphasis: 1) Protect, enhance, and rehabilitate wildlife habitats throughout the State; 2) Enhance water deficient habitat for wildlife through the effective development and maintenance of water sources; 3) Develop positive communication with partner governmental agencies having land management or wildlife habitat responsibilities.

Special Reserve Account Project Cost Estimate Table

Mormon Mountains Post-Fire Restoration

Name of Proposed Project:

Anthony Miller

Name of Proposed Project Manager:

691

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|---------------------------------|--|-----------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDF Personnel | \$ | 12,000.00 | |
| B. GBI Personnel | \$ | 15,000.00 | |
| C. Total Personnel Costs | \$ | 27,000.00 | \$ - |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ - |
| 4. Equipment | | | |
| A. Hand and Power tools | \$ | 1,500.00 | |
| B. | | | |
| C. Total Equipment Costs | \$ | 1,500.00 | \$ - |
| 5. Materials | | | |
| A. Plants | \$ | 6,000.00 | |
| B. Plant cage material | \$ | 3,500.00 | |
| C. | | | |
| D. Total Materials Costs | \$ | 9,500.00 | \$ - |
| 6. Miscellaneous | | | |
| A. BLM Fuelbreaks and seeding | | | \$ 235,000.00 |
| B. Misc Supplies andd Equipment | \$ | 2,000.00 | |
| C. | | | |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | 2,000.00 | \$ 235,000.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 40,000.00 | \$ 235,000.00 |
| Total Project Costs | \$ | | \$ 275,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Assessing Impacts to Sage-Grouse from Anthropogenic Noise in Nevada

Project Manager: Matt Maples Phone: 775-688-1568 Email mmaples@ndow.org

Project Monitor: Matt Maples Start Date: 7/1/2021

Implementation Lead: Nevada Department of Wildlife End Date: 12/31/2025

Partners: Nevada Department of Wildlife

Project Category: Wildlife Population Protection or Enhancement

Project Category: Wildlife Monitoring and Research

Project Actions: Ground surveys

Priority Resource: Small game

Priority Species: Sage grouse

County Location: Statewide

General Location: Project occurs at approximately 100 sage grouse lek sites across northern and central Nevada

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|----------------------------------|------------------|--------------------------|----------------------|
| NDOW Industrial Development Fund | \$100,000 | | |
| NDOW Upland Game Stamp | \$50,000 | | |
| Project Totals: | \$150,000 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

Anthropogenic development activities have long been identified as causal factors in the range-wide decline of the greater sage-grouse (Braun 1987, 1998, Swenson et al. 1987, Connelly and Braun 1997, U.S. Fish and Wildlife Service 2013). Recent work has focused on examining less understood mechanisms that should be considered when making land management decisions that might impact sage-grouse. The effect of anthropogenic noise on sage-grouse has been a field of research that has received significant attention recently resulting in a greatly expanded understanding of sound and its influence on sage-grouse (e.g., Blickley and Patricelli 2012, Hess and Beck 2012, Blickley et al. 2012b, 2012a, Blickley 2013, Patricelli et

al. 2013). Most recently Amrbose et. al (2020) found significant impacts to sage-grouse lek attendance from anthropogenic noise emitted from an oil and gas field in Wyoming.

The purpose of this project is to further examine relationships between anthropogenic sound levels and sage-grouse population performance and behavior. Data collection and analysis in 2019 and 2020 helped to establish pre-development background sound levels in sagebrush habitats of Nevada and and verify data collection methodologies. This project seeks to expand upon that existing work and will use sound level data and audio recordings at sage-grouse leks across a broad spectrum of environmental and anthropogenic conditions in central and northern Nevada. Sound level and sound source data will be compared against sage-grouse population growth rate, sage-grouse nest site selection and success, as well as sage-grouse lek behavior. The goal of this project is to identify thresholds at which impacts to sage-grouse occur from anthropogenic noise, which are critical when making land management decisions in sage-grouse habitat.

2. Project Approach and Tasks

Objective 1: Link sound levels at lek sites (control vs impact) to population growth rate.

- a. Use stratified and strategic selection to assess variation in sound across space and tie.
 - i. Target sample size of 75-100 trend leks during lekking seas
 - ii. Leks will include a range of development activity levels to capture maximum variion.
- B. Bring sound level information into state-space model with Bayesian framework to estimate changes in population growth as a function of sound measured in decibe.
- C. Incorporate landscape variables that may confound changes in lambda (e.g. wildfire, precipitation, raven density, development density or fragmentation, annual herbaceous). Assessment of these landscape variables will be a desktop analysis using existing datasets.
- D. Assess lek extirpation and relate back to the targeted annual warning system to see what leks have triggered or signaled relative to mining or other point source noise disturbance.

Objective 2: Link sound levels to nest site selection, nest survival, and brood rearing success (control vs impact).

- A. Measure sound levels at nests and at random locations in nesting habitat to determine if sound levels influence nest site selection patter.
- B. Determine variability in nest survival relative to nest sites and random locations in nesting habit
- c. This will be completed at study sites with existing USGS demographic monitoring.

Objective 3: Build generalizable model that can be used to create a soundscape model for Nevada leks (as additional funding becomes available).

- A. Measure sound at point sources, random locations, and leks to capture spatial and temporal variati.
- B. Use topographic impedance information and landscape covariates to estimate additive effects on sage grouse population growt
- c. Develop a model to relate sound levels to population growth and apply this information to a planning tool that can identify areas in which sound may have greatest negative impacts.

3. Anticipated Beneficial Effects of the Project

1. Provide replication to Ambrose et al. 2020 by identifying decibel thresholds necessary to protect Greater sage-grouse leks near anthropogenic development. Increase our understanding of sound level impacts, when compared to landscape variables, on sage grouse population growth. Identify probability of lek attendance, decline, and extirpation at various sound levels. (Objective 1)
2. Increase our understanding of potential effects of anthropogenic noise on sage grouse during nesting and brood rearing. Current management strategies are singularly focused on managing sound levels at lek sites, without consideration of sound level increases within nesting or brood-rearing habitat. Given like communication needs between hen and chicks, sound levels in habitat other than lek sites could also be important and warrant management consideration. (Objective 2)
3. Develop planning tools that identify areas of greatest to least consequence for sage-grouse from threat

of increased anthropogenic sound levels. When overlaid with data such as mining claims, exploration notices, exploration plans of operation, and sound levels at existing sources or mineral exploration or production, managers can identify areas to focus efforts on avoiding, minimizing, and mitigating increases in anthropogenic sound levels. (Objective 3)

4. Project Schedule

2021 - Monitor 20 leks with SLM/digital recorder and 30 leks with digital recorder only

2022 - Monitor 24 leks with SLM/digital recorder and 50 leks with digital recorder on. Provide preliminary data analysis and report to validate methodology

2023 - Monitor 24 leks with SLM/digital recorder and ≥ 44 leks with digital recorder only

2024 - Monitor ≥ 48 leks with digital recorder only

2025 - Monitor ≥ 24 leks with digital recorder on. Initiate final data analysis and manuscript preparation

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

NEPA is not required to complete this project.

6. Monitoring Plan

This research project is heavily dependent upon collection and analysis of field data, but does not include a long-term monitoring plan at this time.

7. Relationship to NDOW Plans, Policies, and Programs

This project fits within the 1st Edition of the Greater Sage-grouse Conservation Plan for Nevada and Eastern California (2004).

Special Reserve Account Project Cost Estimate Table
Assessing Impacts to Sage-Grouse from Anthropogenic Noise in Nevada

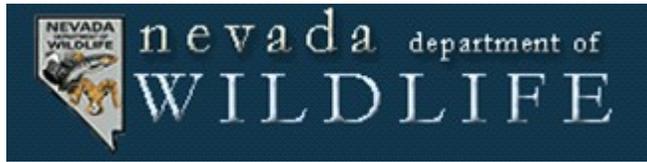
Name of Proposed Project: Matt Maples

Name of Proposed Project Manager: 682

Project ID:

Please provide a breakdown of your project's costs in the table below. Only include costs for the upcoming fiscal year for which you are applying. Only include in-kind services under item 7. NDOW personnel and travel expenses may not be covered by any of our Special Reserve Accounts - you must use alternative funding sources to cover these types of costs.

| <i>Project Components</i> | <i>Costs to be Paid by NDOW Special Reserve Account(s)</i> | | <i>Costs to be Paid by Other Sources</i> |
|----------------------------------|--|------------|--|
| 1. Land Acquisitions | | | |
| 2. Personnel Costs | | | |
| A. NDOW Personnel | | | |
| B. Other Personnel | | | |
| C. Total Personnel Costs | \$ | - | \$ - |
| 3. Travel Costs | | | |
| A. Per Diem | | | |
| B. Mileage | | | |
| C. Total Travel Costs | \$ | - | \$ - |
| 4. Equipment | | | |
| A. | | | |
| B. | | | |
| C. Total Equipment Costs | \$ | - | \$ - |
| 5. Materials | | | |
| A. SLM and DAR Rental | \$ | 20,000.00 | \$ 21,000.00 |
| B. DAR Purchase | \$ | 50,000.00 | \$ 10,000.00 |
| C. | | | |
| D. Total Materials Costs | \$ | 70,000.00 | \$ 31,000.00 |
| 6. Miscellaneous | | | |
| A. Western Bioacoustics Subgrant | \$ | 30,000.00 | \$ 70,000.00 |
| B. USGS WERC Subgrant | | | \$ 100,000.00 |
| C. Helicopter Flight Time | | | \$ 50,000.00 |
| D. | | | |
| F. Total Miscellaneous Costs | \$ | 30,000.00 | \$ 220,000.00 |
| 7. In-Kind Services | | | |
| A. | | | |
| B. | | | |
| C. Total In-Kind Services | \$ | - | \$ - |
| Subtotals | \$ | 100,000.00 | \$ 251,000.00 |
| Total Project Costs | \$ | | \$ 351,000.00 |



Wildlife Reserve Account Project Proposal

Project Summary

Project Name: Nelson Creek Habitat Improvement Project
 Project Manager: Matt Glenn Phone: 775-777-2369 Email mglenn@ndow.org
 Project Monitor: Caleb McAdoo Start Date: 7/1/2021
 Implementation Lead: Nevada Department of Wildlife End Date: 7/1/2021
 Partners: Nevada Department of Wildlife
 Project Category: Wildlife Population Protection or Enhancement
 Project Category: Migration or Movement
 Project Actions:
 Priority Resource: Big game
 Priority Species: Mule deer
 County Location: Elko
 General Location: The project area lies completely on private land located in the North Tuscarora Mountains, Elko County, Nevada. The sites can be most easily accessed from the Midas-Tuscarora County Road, then heading north along Willow creek on a private two track until you reach the sites.

Project Funding Request

| Funding Source | Amount Requested | Existing Budget Approval | In Kind Contribution |
|-------------------------------|------------------|--------------------------|----------------------|
| Heritage | \$57,750 | | |
| NDOW Habitat Conservation Fee | \$25,000 | | |
| NDOW Upland Game Stamp | \$18,750 | | |
| Project Totals: | \$101,500 | | |

Project Proposal

1. Brief Purpose and Goal of the Project

The primary objective of the Nelson Creek Habitat Improvement Project is to provide mule deer a critical forage and thermal cover component as they transition and migrate from summer to winter range. The proposed treatment areas represent two polygons within the greater stop-over, transition, and winter range located in the North Tuscarora mountains. At present, the two polygons identified in this proposal

can be characterized by a mix of native herbaceous species and winter annuals (cheatgrass primarily) with little to no brush species. As a result of multiple wildfires, the seed bank has become depleted of brush species which in turn has significantly slowed the recovery of a crucial brush component.

The importance of the North Tuscarora mountains cannot be overstated as it relates to the Management Area 6 mule deer herd health. On heavy snow years this is an important stop-over site as deer migrate to winter range, and on lighter snow years a large proportion of the deer will select to stay here throughout the winter. As this area provides crucial habitat annually regardless of winter conditions for one of Nevada's largest deer herds, its importance for the resource is critical.

2. Project Approach and Tasks

Project implementation at the Nelson Creek sites will be initiated in the late summer of 2021 with an application of pre-emergent herbicide to approximately 700 acres of crucial mule deer habitat. The pre-emergent herbicide controls and prevents the germination of cheatgrass which presents a window to establish desirable plant materials like sagebrush and bitterbrush. The pre-emergent chosen for this project is an imazapic (active pre-emergent agent) based formulation that is bound to sand so that when applied aerially it easily falls through the vegetation canopy and is not captured by the leaves and stems of existing vegetation like a traditional liquid herbicide application.

Controlling cheatgrass germination to free up resources for existing vegetation and future seeding plantings provides desirable plant material a competitive advantage that could not otherwise be achieved. The use of the pre-emergent herbicide imazapic in post fire applications has been implemented with consistent success in controlling cheatgrass germination; however, application of the herbicide over existing vegetation has not been employed historically without having a mechanism to achieve soil contact with the herbicide. The formulation identified for use in this proposal being attached to inert sand granules allows for the necessary canopy penetration and soil contact needed to be effective.

As the native herbaceous component and its seed source remain present in the system, seeding planting to promote brush species recovery in the absence of winter annuals completes a crucial step in recovering a fully functional system for mule deer. The seeding planting phase of this project will be implemented in the fall of 2022 and or spring 2023 in coordination with the Humboldt River Ranch to avoid unintended use by cattle until seedlings reach mature state.

3. Anticipated Beneficial Effects of the Project

Reestablishing a crucial brush component in such an important migratory/stop over site for the Area Six mule deer herd provides species with much needed forage and thermal cover that is not presently available.

4. Project Schedule

Implementation of this project would begin in the late summer or early fall of 2021 with an application of pre-emergent herbicide to reduce winter annual competition followed by a seeding planting in the fall of 2022 and or spring of 2023.

Delay in the seeding planting component is due to the logistical restraints of purchasing seed, delivering the seed to the prospective nursery, and the time that it will take to grow the plants out to a mature enough state to allow for success.

5. Required Clearance Activities and Schedule (NEPA, other permits, authorizations)

As this project lies completely on private land, it presents a unique opportunity to improve crucial mule deer habitat without the cumbersome and sometimes slow NEPA process. It should be highlighted that this project is in cooperation with Nevada Gold mines and the Humboldt River Ranch with a joint objective of achieving well functioning range condition.

6. Monitoring Plan

As mule deer migrate and deplete fat stores made over the summer, and prepare for the difficult winter months. Functioning habitat in locations such as this provide these animals the ability to maintain body condition which translates into greater population stability.

7. Relationship to NDOW Plans, Policies, and Programs

This project specifically meets the objectives in subsection 1(a) of NRS 501.3575, "...the protection, propagation, restoration, transplantation, introduction, and management of any game fish or mammal, game bird or fur-bearing mammal in this state. In taking measures to protect a limited habitat type and resource for mule deer, elk, and pronghorn antelope the objective of sustainability of these populations can more easily be achieved."