Bighorn Sheep Capture and Monitoring in the Alta Toquima and Arc Dome Wilderness Areas.
Alta Toquima and Arc Dome Wilderness Areas
Austin- Tonopah Ranger District
Humboldt-Toiyabe National Forest
Nye County, Nevada
Responsible Official: Lance Brown, District Ranger

BACKGROUND:
The Arc Dome and Alta Toquima Wilderness Areas are both located within the historical range of the desert bighorn sheep (*Ovis canadensis nelsoni*). Historical records indicate that these sheep were once distributed throughout the entire Toiyabe Range, although recent empirical aerial survey data indicates that current occupied habitat is limited to the southern third of the range, encompassing the Arc Dome Wilderness. This herd is an indigenous population, having never been extirpated by anthropogenic activities. It is considered one of the very few “remnant” herds remaining in the state.

A 1981 archaeological dig provided evidence that desert bighorn sheep were present in the Toquima Range, including the Alta Toquima Wilderness, dating back to over 6,000 BP. Dr. David Hurst Thomas and colleagues excavated a high elevation Native American encampment, and they discovered a significant site: a series of hunting blinds for the express purpose of harvesting bighorn sheep. By all accounts, the Toquima Range herd was extirpated prior to 1940. In 1982, the Nevada Department of Wildlife (NDOW) reintroduced native desert bighorn sheep at the base of the Toquima Range, and the animals soon began inhabiting the high elevation Mt. Jefferson plateau, including the Native American encampment area and the Alta Toquima Wilderness. Recent empirical aerial survey data suggests that the majority of occupied summer habitat continues to occur within the Alta Toquima Wilderness.

Purpose of Proposed Action:

NDOW has long-term goals of restoring desert bighorn sheep to their historic range and enhancing connectivity among herds, which includes the need to protect the population from disease. Historically, bighorn sheep habitat encompassed almost all mountain ranges in the state, and with little anthropogenic development, there were few barriers to movement between ranges. These connected habitats allowed for robust genetic exchange and likely contributed to highly viable populations. Unfortunately, this same connectedness also contributed to disease spread once the disease was introduced. NDOW is proposing a landscape-scale data collection effort in order to fill crucial information gaps about the distribution of bighorn sheep herds, topographic pathways of bighorn movement, data on foray movements, seasonal use of habitats, the frequency of use, and of resource selection. The only way to collect this kind of data is to collar a representative sample of animals from within each subherd for GPS tracking. Though GPS collars have been deployed on bighorn in some of the surrounding mountain ranges in central Nevada, no sheep from the Toiyabe or Toquima Range herds have ever been collared. Very little data exists about either of these herds.
Collection of this data would provide information about movement of subherds and movement of sheep within herds, as well as an understanding of forays and connectivity to other herds. It would answer questions about the potential for contact with domestic sheep and the possible vectors for disease transmission. From this, effective management actions could be taken to reduce risks to the population as a whole and to individual herds and subherds. Management actions could include, but would not be limited to, instituting measures to preclude the use of pack goats or llamas in wilderness areas and potentially altering the season of use under grazing permits to minimize the risk of contact inside and outside of wilderness boundaries.

Proposed Action:

The Nevada Department of Wildlife is proposing to capture up to 40 sheep between the Arc Dome and Alta Toquima Wilderness in November 2018. The proposed capture will occur between November 6 and 20 to reduce conflicts with recreational wilderness users. In reference to the signed MRDG, all captures will be conducted via helicopter and when practical, the sheep being slung into a basecamp and appropriately processed. In order to obtain an adequate sample size, a maximum of 15 collars would be deployed on the sheep in the Toiyabe Range and 25 on the sheep in the Toquima Range. Collars would be deployed on both sexes to account for inherent differences in home range and movement patterns. It is likely that most captures and releases would take place in wilderness, although where subherds have strayed beyond wilderness boundaries, some individual captures and releases may not occur within wilderness.

Collars would be deployed on sheep at the staging area outside the wilderness and also within the wilderness at the point of capture. If the capture point is greater than five miles from the staging area, the sheep will be processed by the helicopter crew at the point of capture; this could occur on up to 50 percent of the captures. It is anticipated that capture operations would take a minimum of two full days. However, accounting for weather and winds, the project would likely occur over four days, with a maximum of six days in total. Work would preferentially be conducted on weekdays, avoiding weekends when it may be more likely to impact wilderness visitors, with the possible exception of hunters. However, weather windows may necessitate some weekend work.

Helicopters used for this work are typically a Hughes 369D or Hughes 500 or equivalent, or a smaller helicopter. While the speeds of rotor wash at the ground level are influenced by a complicated formula involving helicopter size, rotor disk size, payload, temperature, elevation, weather, wind, and whether the helicopter is landing, taking off, hovering or idling while landed, general statements can be made in relation to rotor wash. Hovering, taking off, and landing generate greater rotor wash than compared to idling. Larger helicopters generate rotor wash over a larger area, and typically at a greater velocity. For the largest helicopters typically used, a maximum rotor downwash speed at ground level would be 45 to 50 miles per hour under ideal conditions (Rotor & Wing International, rotorandwing.com). However, higher weights, higher altitudes, lower air density, and adverse weather would increase this somewhat.

With a small helicopter, the pilot, gunner and mugger would fly over desert bighorn sheep habitat for the targeted herds and subherds, including flying over wilderness. When a target
animal or group of sheep is identified, the pilot will use the helicopter to herd the sheep to an open, safe area for capture. At this point, the pilot, gunner and mugger must determine whether they can transport the sheep to the staging area for processing and collaring (Option A), or whether they must collar and process the sheep at the capture site (Option B).

The gunner would shoot the net from the netgun to capture the animal. Once the animal is netted, the pilot will, in almost all cases, hover near but above the ground. Conditions that might force a helicopter landing in wilderness include wind, weather and other safety concerns. The mugger would jump out of the helicopter, restrain and package the sheep for transport. While the mugger is working the captured sheep, the pilot and gunner will then pursue another sheep from the same group. The gunner will again deploy the net-gun to capture the second animal. He will then hover or land to drop off gunner to process animal, pick up the first sheep and mugger, return to the second capture site, pick up the second animal, and then transport animals back to the staging area.

The sheep would be transferred as a sling load beneath the helicopter to the staging area to be processed. At the staging area, the sheep would be dropped on bare ground and ground crews will carry animal to portable processing tables. Processing involves collecting vital rates, attaching the collar and ear tag, and collecting biological data and pathogen samples.

The sheep would then be secured back in the sling bag and flown back to the general area where it was initially captured. The helicopter would set the sheep down and hover near the ground, the mugger would jump out, release the collared sheep, collect the net and transport equipment, then climb back into the helicopter, which would either search for other animals to collar or return to the staging area, depending on conditions. As with capture, the helicopter itself would not likely land to release the sheep unless wind, weather or safety conditions warranted the landing.

While a majority of captured sheep would be transported to the staging area to be collared, it is possible that as many as half of the captured animals would need to be collared at the capture site, which could occur within wilderness. Once the animal is netted, the pilot will typically land and idle the helicopter while the sheep is collared and processed.

The mugger and the gunner would exit the helicopter once it has landed. At the capture site, the mugger and the gunner would process the sheep. The sheep would be released on site, and the mugger and gunner would return to the helicopter. The helicopter would take off, then either search for other animals to collar or return to the staging area, depending on conditions.

**Project Location:**

The proposed captures will occur within the Arc Dome and Alta Toquima wilderness areas in Nye County Nevada (figures 1 and 2). Mountain Ranges encompassed include the Toiyabe Range and the Toquima Range. Staging areas are outside of the wilderness boundary. For the Toiyabe Capture the proposed staging areas will occur near the trailhead in South Twin river (11 S 479159, 4304439) and to the south in Broad Canyon (11 S 483348, 4291028) (figure 1). The South Twin River site is a disturbed area on Forest Service lands located near the South Twin
River Trail Head. The Broad Canyon location is located on BLM lands where the dozer line was implemented for the Broad Fire. For the Toquima capture the main basecamp location is proposed to occur in Meadow Canyon North of the forest service admin site (11 S 507350, 4283346). The Meadow Canyon location is preferred due to distance from the Mount Jefferson Summits. With this site, there is less elevation loss and it is relatively open allowing for a safer capture environment. The alternative staging areas occur off the Moore’s Creek road (11 S 505827, 4301442), and near the Pine Creek Campground (11 S 513152, 4294214) (figure 2). The former two capture locations are not as desirable due to elevation loss and distance to known bighorn locations. However, for a multitude of reasons including weather and shifts in animal distribution during early November there is a need to take into consideration alternative sites.

**Timing of proposed action:**

Captures will occur between November 6 and November 20. The proposed dates mitigate the number of people recreating in these wilderness areas due to there being no open hunting seasons. The late deer season will have ended and the bighorn sheep season would have yet to begin. Captures will occur during a 6-day window to account for weather factors and provide enough time to complete the proposed captures. The month of November is the only feasible time to capture and collar desert bighorn sheep in the Toquima and Toiyabe Ranges. The animals are still divided into subherds, this is not the time of year for gestation or lambing, and concerns for safety and impacts to primitive recreational experiences are low due to this being a period of reduced visitation. NDOW will coordinate with the Forest Service prior to and during November 2018 to designate the appropriate six-day capture period.

**Mitigation Measures:**

When selecting a staging area, NDOW will make an effort to select an area not impacted or minimally impacted by invasive species. Staging locations will be surveyed prior to captures to determine if any archeological concerns exist. The NDOW will attempt to identify staging areas where previous disturbance has occurred if at all possible. NDOW will choose staging areas with compact substrates to alleviate the effects of capture activities and minimize the chances detrimental vegetative effects. Timing of capture will be when vegetation is senesced further reducing negative impacts on vegetation.

NDOW will ensure that the helicopter and all equipment in the helicopter to be used for the mission is cleaned of weeds prior to use for each day of sheep captures.

NDOW will record site coordinates with GPS of all landing, capture and release sites and share with the Forest Service for monitoring purposes. The Forest Service will conduct post monitoring at capture sites where captures occur in wilderness lands. NDOW will provide GPX files of capture locations to the Forest service within a week of capture events. This will allow time for Forest Service crews to monitor locations where captures occurred for archeological concerns before weather prohibits access. NDOW will not capture sheep on, or with a helicopter land on or hover above sites deemed by the Forest Service to be sensitive and to be avoided. The Forest Service will provide shapefiles and geo-referenced coordinates for all sites to be avoided. NDOW will record and report to the Forest Service all forms of incursion and prohibited use in
wilderness during the six-day scope of the collaring project.

NDOW will monitor collars and collect them when they have dropped off of live animals at the end of the study and from deceased animals when a mortality event has occurred. Collar collection in wilderness will be accomplished by travel on foot or horseback, and NDOW will inform the Forest Service prior to collection.
Figure 1: Arc Dome Wilderness Capture and Staging Areas.

Arc Dome Wilderness Bighorn Sheep Capture And Staging Areas
Figure 2: Alta Toquima Wilderness Capture and Staging Areas.