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Reintroduction Plan
To Reestablish Desert Bighorn Sheep into
The Virginia Range

Introduction

This reintroduction plan has been prepared as a prelude to an effort to reestablish Desert bighorn sheep, *Ovis Canadensis nelsonii*, into the Virginia Range of Storey County. The Virginia Range is encompassed within Hunt unit 195, as described by NDOW's hunt unit boundary map. This plan was prepared in consultation with Tahoe-Reno Industrial Center (TRI), the private land owners in the proposed release area.

The Nevada Department of Wildlife has established the most successful reintroduction program of native wild bighorn sheep species, including *O. c. nelsonii*, in the United States, dating back to 1967. The goal of this reintroduction plan, in continuation of this successful program, is to reestablish a herd of desert bighorn sheep into their native habitat within the Virginia Range and to maintain the population at appropriate management levels. Pending approval of the release, availability of Desert bighorn sheep could be as early as October of 2010.

References

Nevada Revised Statute 501.181; Board of Wildlife Commissioners Policies 21 & 22; *Nevada Department of Wildlife–Bighorn Sheep Management Plan (2001)*; *Bighorn Sheep Reintroduction Plan–Hays Canyon, Mike Dobel, NDOW (1985)*; NDOW & TRI Cooperative Agreement (companion to this document).

Background

Desert bighorn sheep are native to the Virginia Range of northern Nevada, as evidenced by numerous observations documented by 19th century settlers and trappers. At least one bighorn skull (partial) and an attached horn have been found in the area as well (see note # 3 – Appendix section) However, as with most wild sheep species in northern Nevada, this sub-species was extirpated during the early 1900's. It has been speculated that this extirpation was due to several factors, including unregulated hunting, severe overgrazing by and competition for forage with domestic livestock, and the introduction of disease bearing domestic sheep.

The Virginia Range lies directly east of Reno and the Truckee Meadows and within Storey and Lyon counties. NDOW boundary maps list the Virginia Range as unit 195, which roughly extends from Interstate 80 on the north to Highway 50 on the south; and it is bordered by Highway 395 on the west side and Highway 95 on the east.

Under the direction of Commission Policy 21 and originating from the authority provided in Nevada Revised Statute (NRS) 501.181, the Nevada Department of Wildlife has established the most successful reintroduction program of native wild bighorn sheep species, including *O. c. nelsonii*, in the United States, dating back to 1967. NDOW is considering a reintroduction of desert bighorn sheep into the Virginia Range in continuation of this program.

There is a large contingent in the general public of non-consumptive users that would benefit from having desert bighorn sheep, the State animal, this close to the city centers of Reno and Carson City. There is a

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stated desire on the part of both parties in the agreement to make this bighorn sheep population accessible for wildlife viewing opportunities; for example, school age children on field trips. There is also the prospect for research opportunities by having bighorn sheep populations in this location. How and under what circumstances all this will occur is still under consideration, but it is important to realize the educational and research benefits that will arise from having the state animal readily accessible to the citizens of Reno and Carson City.

Release Area Description

Boundaries and Land Ownership

The Virginia Range of Hunt unit 195 is located east of the city of Reno and generally runs in a north-east direction (Map 1). The majority of the range lies within Storey County with smaller portions in Washoe and Lyon Counties, and Carson City. This range is bordered on the north by Interstate 80; on the east by Alternate U.S. Highway 95; on the south by U.S. Highway 50; and on the west by U.S. Highway 395. The Flowery Range also lies with these boundaries, and, although somewhat smaller, parallels the Virginia Range for the most part. The extreme southern and eastern portions of the range contain private land holdings checkered with public land administered by the Carson City District of the Bureau of Land Management. The northern section however, which is the area in which NDOW hopes to establish bighorn sheep, is almost entirely under private ownership. TRI is the primary private land owner in this area, controlling approximately 100,000 acres of land (61% of Storey County) (Map 2).

Potential bighorn sheep habitat within unit 195 has been identified by NDOW (Map 3). Clark Mountain is the main target area (Figure 1) and contains approximately 7,272 acres (11.36 sq mi). The Truckee River corridor area which runs from Derby Dam westward to Clark Mountain contains roughly 4,607 acres (7.19 sq mi) of suitable habitat. There is adequate habitat south and east of Clark Mountain as well, and thus the entire northern half of the area identified by NDOW as being suitable for bighorn sheep is almost 17,000 acres in size, or 26 square miles. This is a conservative estimate. Although it has not been identified as a release area the southern half of the unit which includes

1- North face of Clark Mtn.



parts of the Flowery Range (Map 3) contains about 23,500 acres (36.7 sq mi) of suitable habitat. It should be noted that almost the entire area identified as suitable habitat lies within the boundaries of the TRI property.

A subjective evaluation of the potential carrying capacity is estimated to be between three bighorn sheep/square mile as a minimum with a maximum of ten bighorn

sheep/square mile. When considering the target areas identified as potential bighorn sheep habitat, including only Clark Mountain and the Truckee River corridor (Map 3), this estimate would allow for a prospective wild sheep population of approximately 54 to 180 animals. If the entire unit were cleared of

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resource conflicts the estimated carrying capacity could potentially be between 186 and 620 bighorns, however this maximum number is neither the goal nor the desire of this reestablishment plan.

Topography

The target areas which NDOW has evaluated for this reintroduction is comprised of Clark Mountain, the designated release area, with its surrounding canyons, and the Truckee River corridor. Elevation varies from approximately 4,500 feet on the alluvial fans to 7,198 feet at Clark Mountain. The topographic features of Clark Mountain include north, south, east and west facing exposures with numerous breaks and drainages providing adequate escape cover for bighorn sheep. God's Throne Canyon, which extends northwest off Clark Mountain is a representative sample of good bighorn sheep lambing habitat. Topographic features of the Truckee River corridor provide mostly north facing cliffs and steep slopes descending abruptly down to the Truckee River and the Derby Ditch. The Truckee River corridor and Interstate 80 will both be major impediments to northward expansion of the reintroduced bighorns.

Vegetation

There are four major habitat types within the target area.

- Steep Mountain Slopes – characterized by broken ridges and steep sagebrush covered slopes. These areas contain some mountain big sage, black sage, blue grass, fescue, cheat grass, horse brush, snowberry, bitterbrush, ephedra *sp.*, some juniper and a variety of forbs.
- Rock and Rubble – characterized by rough, rocky breaks, drainages and cliffs containing a mixture of big sage, low sage, wheatgrass, fescue, snowberry, bitterbrush and juniper.
- Alluvial Fan – characterized by gradual slopes covered with low sage, horse brush, blue grass, ephedra *sp.* and various other grasses and forbs.
- River/Riparian –The Truckee River is a perennial stream with banks containing willow, cottonwood, wild rose and numerous grasses and forbs.



2 - Habitat on Clark Mtn.

Water

Water availability is the most limiting factor in this mountain range. Other than the Truckee River the northern portion of the Virginia Range is almost entirely void of perennial sources. There is a man-made reservoir in the industrial section of the TRI property but it is unknown to what extent bighorn sheep would use it. According to NDOW Habitat Biologist Kenny Pirkle there were once a few seeps, ponds or springs on adjacent properties but these have since been reclaimed, capped or otherwise made unavailable to wildlife due to health risks, (see note #1 on Rocketdyne and Gooseberry Mine - Appendix section). A water development reconnaissance flight on September 27, 2009 with habitat biologist Clint Garrett was

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successful in identifying two potential sites on Clark Mountain, two along the river corridor and two more sites in the Flowery Range. Initially NDOW will be installing at least one big game style water development in the target area on Clark Mountain (Map 4 – BG1).

There are numerous “saucer” style water developments on the TRI property which were installed by a previous owner. Almost all of these developments are in a condition that prevents them from holding any water, mostly due to feral horses. The potential exists for these developments to provide water to various wildlife species but they would need varying amounts of work, from minor to extensive, to make this plausible. They would also need horse exclusionary fencing to prevent further damage.

Feral Horse, Domestic Livestock and Human Use

Game biologist observations as well as discussions with the Nevada Department of Agriculture and the Bureau of Land Management indicate there are approximately 1500 feral horses in the entire unit (see note #2 - Appendix section) and they are managed by the Nevada Department of Agriculture. Due to the lack of available water in the Clark Mountain area, horses do not utilize the northern half of the unit in the spring, summer and fall to the extent that they use it in the winter when they are not as water dependant. Regardless, there will be interactions between feral horses and big horn sheep, the extent of which depends on where the sheep eventually establish. The habitat has been overgrazed by horses, in some areas very extensively. In the absence of feral horses and the obtrusive overgrazing that has occurred, the natural vegetative communities would be much more robust. Forage competition between horses and bighorn sheep may be mitigated to a certain extent if horses were excluded from all current and future water sources in the Clark Mountain area. Not only would this benefit all native wildlife species but it would promote the native vegetative plants as well, including a healthier understory of grasses and forbs that would otherwise be in this system. These would include plants like blue bunch wheat grass, Great Basin wild rye and some fescues.

There is no domestic sheep use in or near the target area and it has been formally agreed upon in the signed Cooperative Agreement between TRI and NDOW that TRI will not allow any domestic sheep or domestic goat use on their lands. There are two active domestic sheep allotments in the southern portion of the unit (Figure 3). The Jumbo allotment is approximately ten air miles away and is bordered on the north by State Highway 341 which will help in preventing interactions. The Carson Plains-Gold Hill allotment is about nine air miles away and lies below the southern edge of the Flowery Range (Map 6).

3 - BLM sheep allotments

Allotment	Class of Livestock	Season of Use	AUMs
Jumbo	Sheep	1 May – 30 June	755
Carson Plains - Gold Hill	Sheep	1 April – 31 May	723

It is felt that there will be a minimal chance of interactions between bighorn sheep and any domestics, both because of the distances between allotments and bighorn habitat, and the areas of unsuitable habitat linking these areas. Additionally, the actual use on these allotments is lower than what is currently allowed. However, if such interactions do occur the Nevada Board of Wildlife Commission Policy #23 provides direction for reestablishment and transplanting of bighorn sheep in areas grazed by domestic sheep. This policy states that on a proposed transplant site where domestic sheep are found to occupy adjacent habitats with the possibility of direct contact with released bighorn sheep, NDOW will evaluate the degree of risk involved and consult when appropriate with the land management agencies, allotment leases and concerned publics to determine the overall long term implications of a bighorn release with consideration for other multiple uses and potential recreational and scientific values. Each circumstance of this kind will be evaluated on its own merits and brought before the Commission for their concurrence.

Feral goats have been documented to occur in the southern portion of the Flowery Range just above the homes in Dayton Valley, however numbers to be extremely small. At this time it would also appear that all of these goats are male.

Human use of a recreational nature is already limited in the entire area controlled by TRI. Access to the property is restricted and is posted as to prevent unauthorized hunting and trespass. Additionally, the property boundaries are patrolled by TRI on a regular basis and these patrols will continue per the Cooperative Agreement.

Release Site Preparation

Prior to a release of bighorn in this area NDOW will install at least one big game water development unit on Clark Mountain, in cooperation with Nevada Bighorns Unlimited-Reno who has offered to fund and build the development(s). Water is the only limiting factor and a water development unit is the only site preparation suggested as this time. Existing fences, mostly TRI perimeter fence boundaries, would not be anticipated to conflict with the reintroduced sheep. If the population were to become established and show an affinity for an area on public land where man-made structures exist that could have a negative impact on the bighorn sheep then, after proper evaluation, recommendations would be made for modifications of such structures.

Potential Conflicts

No depredation issues from bighorn sheep are anticipated to occur on either standing or stored agricultural crops on lands adjacent to the reintroduction as there are no crops of this nature in the vicinity of good escape cover.

The verity that almost the entire area is under private ownership harbors its own issues, including the potential that the land may be sold at some future time. Mitigating this issue to a certain degree is that the topography of bighorn habitat mostly precludes development, and the development that TRI is planning is in the lower elevation valleys within a warehouse zoning

4 – Habitat on Clark Mtn.

area. Additionally, Storey County has developed an ordinance prohibiting housing developments in the entire area. However, at the time of this writing roughly 7,000 acres, mostly on the ridge tops, is in escrow and the intentions are to lease these lands to some form of alternate energy, either solar or wind energy developments. It is unclear to what degree this will affect a bighorn sheep population, and there is little information in the



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literature to substantiate a position either way. An optimistic view point is that these conflicts are manageable and the overall goals are attainable.

Predator Evaluation

Area biologist recommendations and current mountain lion harvest statistics indicate predator control in the release area is not necessary at this time. NDOW is currently engaged in a cooperative mountain lion research project with the University of Nevada, Reno and a significant percentage of the lions being studied have home ranges encompassing the Virginia Range. Based on preliminary results which indicate these lions have a prey selection biased heavily toward feral horses even though mule deer exist in the same area, mountain lion predation which could impede a successful reintroduction is not viewed as a potential problem at this time. Regardless, the Commission's recent adoption of changes to Commission Policy 22 make predator control mandatory before a release can occur. After the initial control efforts, if predator control is deemed necessary in the future to help establish or protect this bighorn sheep population then those animals which are targeting the sheep would be removed.

Release and Monitoring Plans

Release stock will be obtained from existing bighorn populations within Nevada and most likely from central Nevada. Pending the installation of at least one water development in the release area and Commission approval of the reintroduction, a release could occur as early as October of 2010. The goal of this plan would be to initially release between 30 and 40 sheep. The preferred composition would be two rams, aged 2½ to 4½ years, per 10 adult ewes with the remaining balance consisting of yearlings and/or lambs of either sex. At least one ram and four ewes will be fitted with satellite or vhf collars, and all sheep will receive colored All-Flex ear tags.

Monitoring will be accomplished through a variety of means available to biologists. Composition surveys and telemetry follow-up flights will be conducted with the use of the Departments helicopter and/or fixed wing aircraft. Ground surveys may be conducted at various times of the year as well. In addition to formal surveys conducted by NDOW biologists some data may be gleaned from observations made by TRI employees. Data received from all of these sources, including data stored on the radio collars will provide an indication of habitat preference. Key areas such as preferred breeding grounds, lambing areas and escape habitat, along with seasonal movement patterns will be identified.

Vegetation monitoring would provide information on utilization levels by bighorn sheep. If such monitoring indicates excessive utilization levels, or if population monitoring indicates that sheep numbers would benefit by reduction of the herd, then NDOW would utilize trapping and/or harvest to reach desired numbers.

Herd Management

As noted earlier the carrying capacity would probably be between 54 and 180 animals, and a number in this range would indicate a successful reestablishment. Barring any unforeseen limiting factors on this reintroduced population of sheep, and assuming the release complement would consist of approximately 35 animals, it would likely take three to five years to reach minimum carrying capacity.

Given adequate recruitment into the ram segment of the population it is conceivable that a ram hunt could occur after a few years. However, this will require further agreements with TRI, including their satisfaction that a release of liability be adequately prepared. One option presented for a hunting opportunity in this

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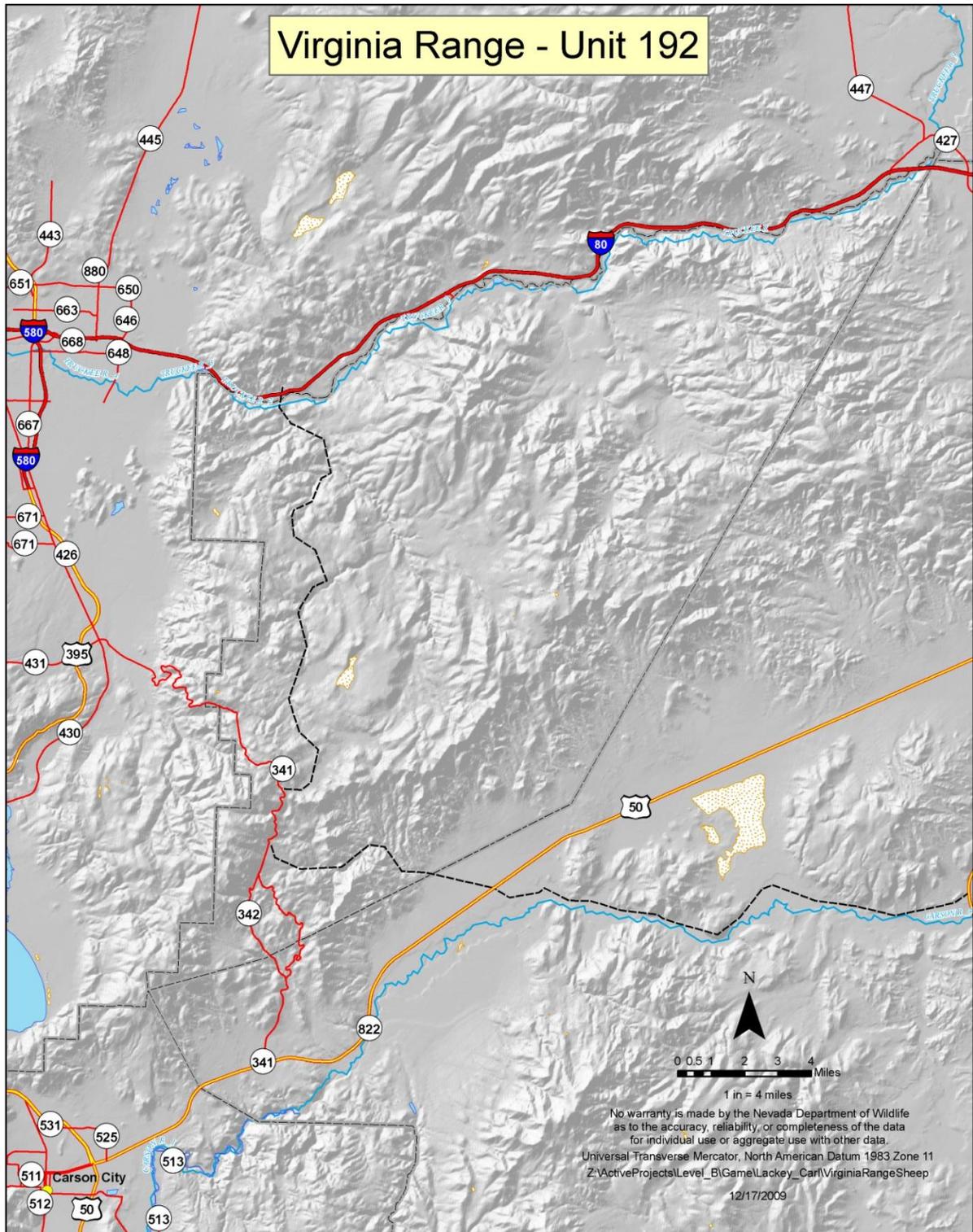
area was to make it a youth hunt only, an idea that is palatable to TRI. An acceptable alternative to having a huntable population though would be to maintain this herd as a desert bighorn nursery, providing capture stock to other areas within the state, much like the River Mountains population.

Summary

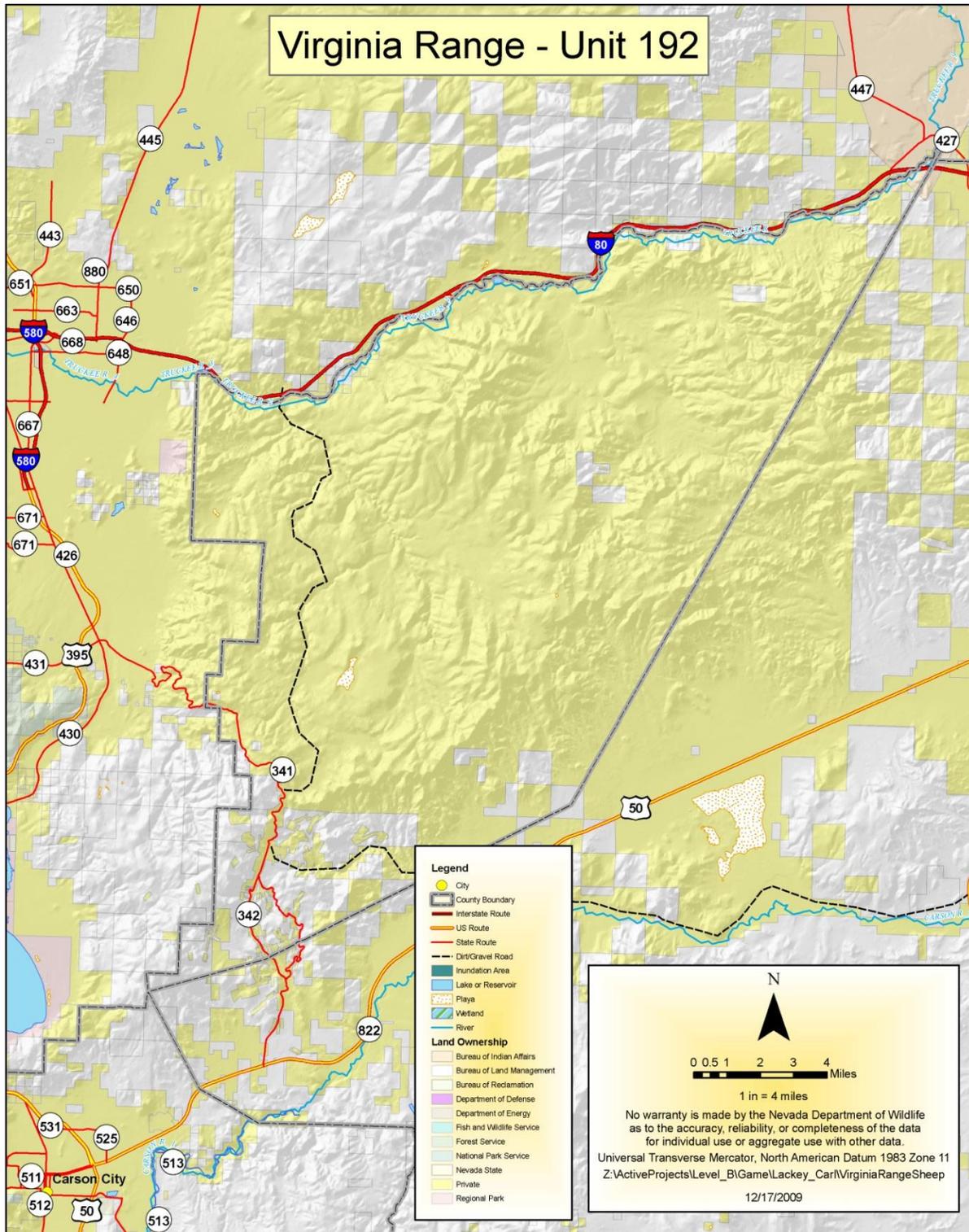
The goal of this reintroduction plan is to reestablish a herd of desert bighorn sheep into their native habitat within the Virginia Range and to maintain the population at appropriate management levels. It is felt that the pros outweigh the cons in regards to this reintroduction by – having a site that would help alleviate higher densities of sheep elsewhere in the state by providing a release location; allowing for potential release stock if the population persists in the future; having a population of desert bighorn sheep within minutes of the State Capitol and Reno; a population that would be available to University researchers; and bighorn sheep viewing opportunities for school age children, versus – a reintroduction on private lands; the potential that the sheep population would be held to minimum densities due to water and horse issues; and the still unknown affects that wind energy development would have on the population.

Prepared by: Carl Lackey, Wildlife Biologist, and
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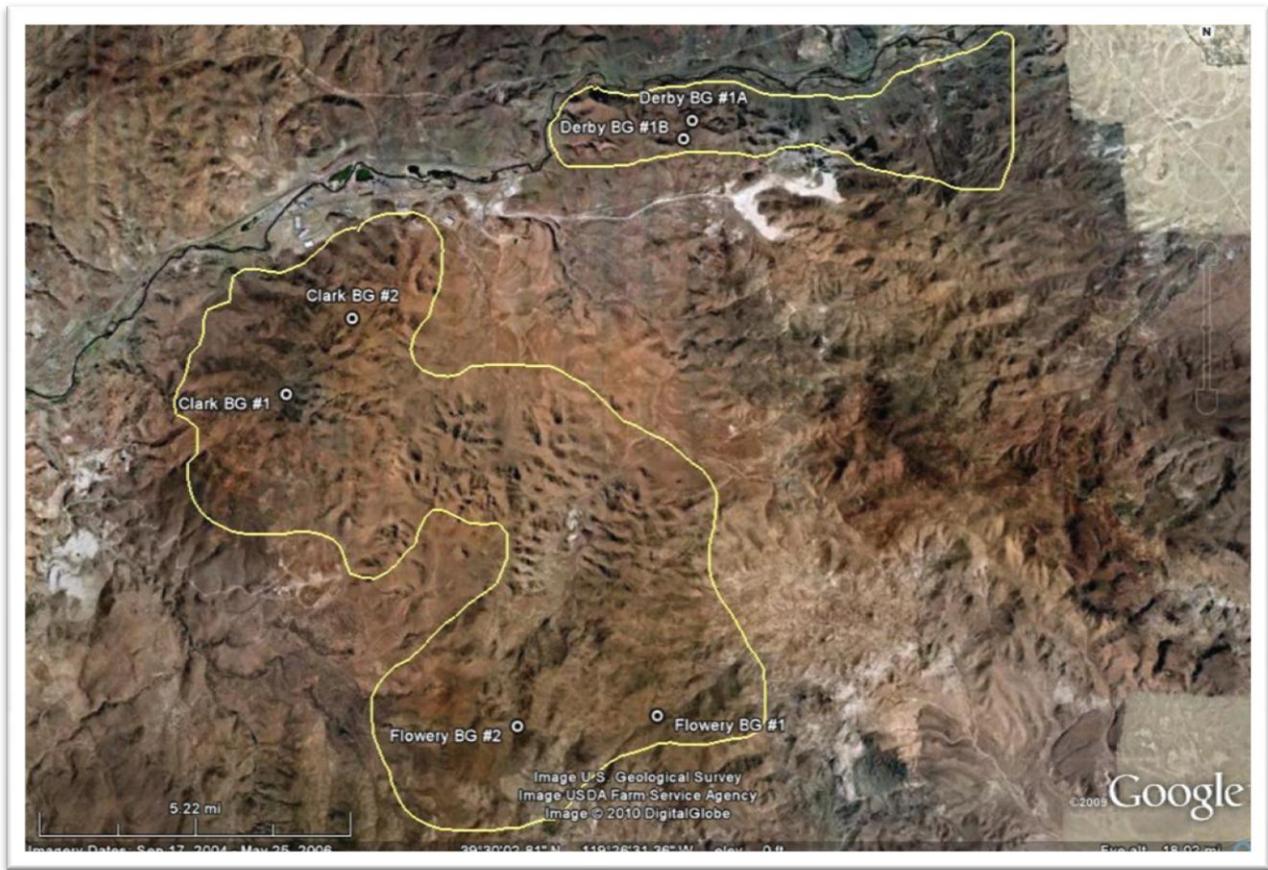
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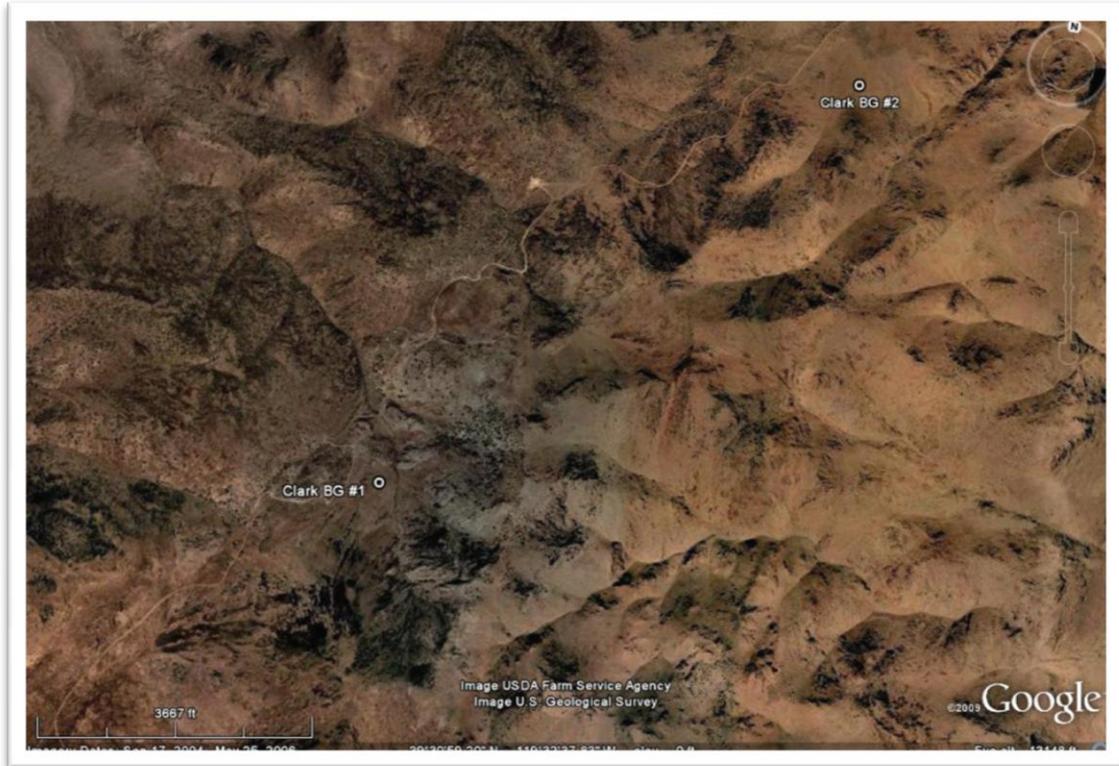
MAP 2 - Private Lands (in olive)



Map 3 - Potential bighorn habitat in Virginia Range with guzzler notations



Map 4 – Potential Clark Mtn water development sights

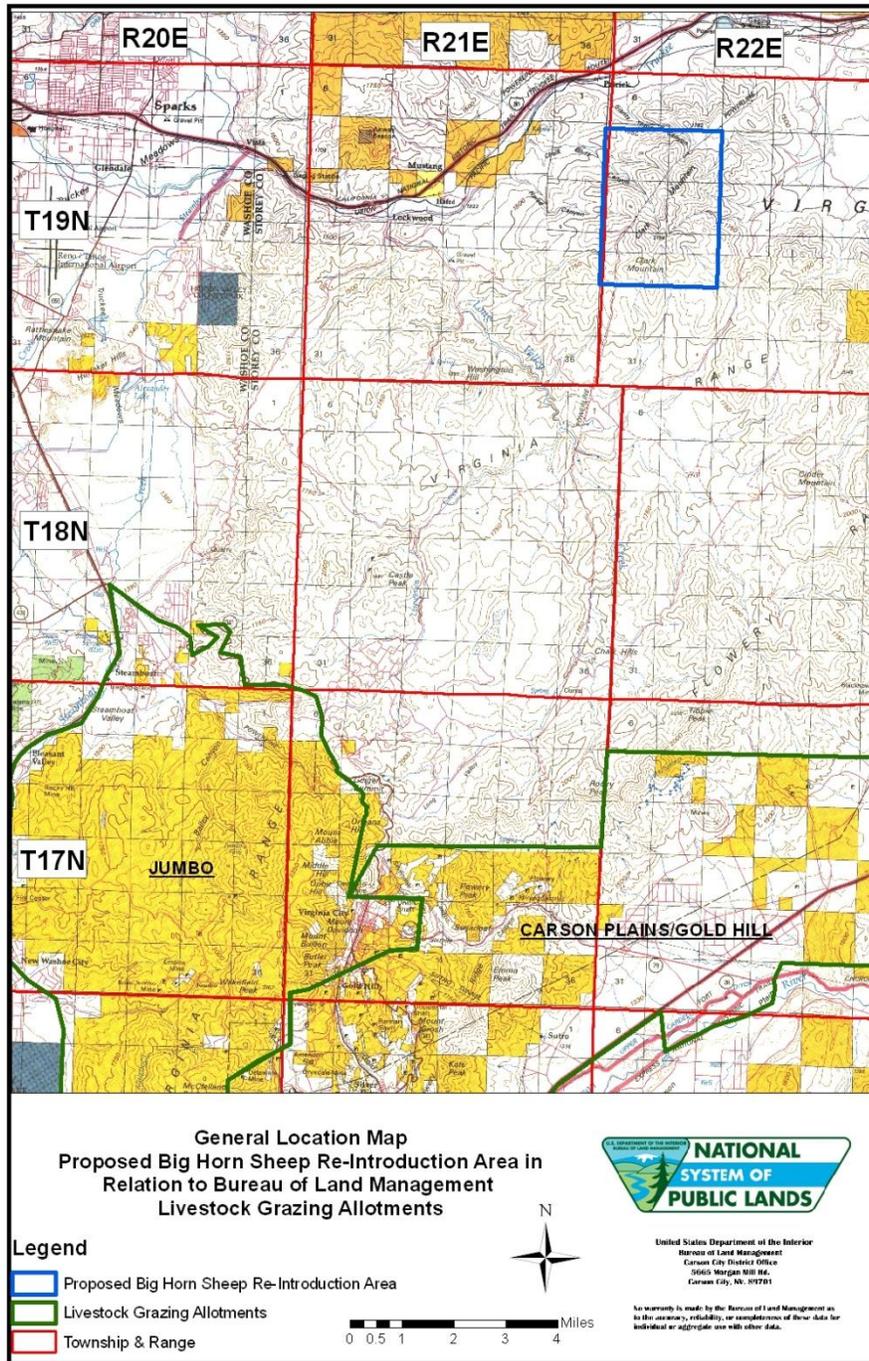


Map 5 – Potential River Corridor water development sights



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Map 6 – Domestic sheep allotment locations



Appendix

- 1) Report from Habitat Division on adjacent landowners and status of water on their properties.

Carl,

Here are my findings for the rocket fuel plant and the Gooseberry Mine.

- Rocket Fuel Plant (Rocketdyne)

This facility was bought by Boeing in 1997 and they are still the current owner. Boeing bought the facility as part of a remediation clean up, and apparently there is 3 natural springs that were affected by a spill in the 1960's that are now contaminated with PCE. As part of this clean up the 3 springs are never allowed to run surface water, so Boeing went in and designed a French drain system for all the springs to collect all the water, then the water is injected back to the aquifer, never allowing the water to surface. Most of the infrastructure has been removed, however there are some structures still in place. The ponds that were once there has been backfilled and reclaimed. The individual who is responsible for this property is Adam Boettner with Boeing, and he is in LA and can be reached at 1-818-466-8724. Adam said that he may be in Reno this October, so we may be able to meet with him and talk about the project. All of the files on this property are held at Washoe County District Health Department, which their number is 1-775-328-2400.

- Gooseberry Mine

This mine has been in and out of operation since the 1920's, and stopped operation in the early to mid 1990's. The past owner went into bankruptcy (Bill Jordan with Pallis Resources Corp. 1-775-825-8027) and never paid any of the taxes, so now Storey County owns the property. Since this property went into bankruptcy NDEP took the bond and did as much reclamation as they could, which was completed a few months ago. There is an evaporation pond still present, however, there is no water available to wildlife, since the pond is capped with gravel, and there is still a fence around the pond, however it is in poor condition. This was an underground gold mine, and there are 2 portholes that are still present, which are very poorly closed off. Most of the infrastructure has been removed, however there are some remnants left, which are still being removed slowly. There is a pseudo grounds keeper that lives on site, however he reportedly has no right to be on the property. The property is fenced and gated, but you can just take a road to the south around the fence approximately 100 feet and drive into the mine. Storey County assessor office will be our contact for this property, which can be reached at 1-775-847-0961.

Kenny Pirkle

Biologist, Habitat Division

- 2) Spoke with Phil Lerusa – Nevada Department of Agriculture

- Regarding feral horses

Survey flight in August of 2009 found 1468 feral horses and the flight covered 80-90% of the range. These horses are under state control due to the BLM declaring the unit "horse free" in 1984, in addition to the area being almost entirely under private ownership.

- 3) Spoke with Steve Woods – trapper.

Steve picked up a bighorn skull and one horn from an area just south of the Gooseberry Mine in the mid-1980's. He turned it in to Mike Hess – NDOW.

Potential water development site on Clark Mountain



Clark Mountain as seen from Interstate 80

