Sierra Nevada Bighorn Sheep Herds: 2002 Status

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This report summarizes population information on bighorn sheep herds in the Sierra Nevada developed since the last report was produced one year ago. That 2001 report provided a detailed historical summary of demographic data developed since the early to mid 1990s, depending on herd. This report will summarize only as much past information as is needed to understand the newest data. The information in this report is a distillation of information collected by Dave German, Dennis Jensen, Tom Stephensen, Jeff Villapique, and myself.

The past year was not generally favorable to the development of demographic information on bighorn sheep in the Sierra Nevada. At least a couple of reasons are involved. Winter conditions did not favor concentrations of sheep at low elevations in late winter, which historically have provided some of the best census opportunities, especially for larger herds. Winter began in late November of 2001, which was notably earlier than in the previous three years. While it caused some early use of low elevation winter ranges by sheep in the Wheeler Ridge herd, this did not occur elsewhere. The early winter snow storms continued through much of December, but winter largely ended then. In late winter when sheep are most likely to descend to winter ranges, south-facing slopes were largely bare of snow to high elevations, providing sheep with many snow-free alternatives. In 2001, helicopter surveys at the end of winter provided a productive tool to help focus ground efforts. In 2002 that tool was not available.

Recent rapid increases in herd sizes also played a role in the success of monitoring efforts in 2002. Increased herd sizes mean that more sheep must be observed well enough to be correctly classified by sex and age categories and individual marks in a short time period to provide good minimum counts. The probability of this occurring has been declining with each increment of population increase which is evident in a decline in the frequency of good count data for most herds.

Below is a summary of pertinent information, organized by the herd units as defined in the Draft Recovery Plan. Where herd units include multiple female demes, these are discussed separately. Monitoring efforts have been focused on determining numbers of females and measuring reproductive success.

I. Mount Langley Herd Unit

The only sheep in this herd unit observed during winter were two males seen on the Carroll

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1 completed as partial fulfillment of interagency agreement P0260003 with the California Department of Fish and Game.
The Mount Williamson population continues to defy efforts to make direct counts. Indicative of different lands.

Data on microsatellite genotypes were collected from both sides of Mount Williamson. Data on microsatellite genotypes was found on the north side of Mount the previous year. Instead, considerable genetic diversity was found on the south spine. A summer investigation in late June found very sparse evidence of sheep use above the South Sheep Creek drainage in contrast to August found very dense evidence of sheep use above the Mount Sheep Creek drainage during the past year. A check of the Sheep Creek winter range on 11 March found evidence that about 4–5 sheep had spent the winter in the range. No members of this herd were observed in winter or summer during the past year. A check

II. Mount Williamson Herd Unit

20. A current comparative population estimate of 50 is reasonable. Nevertheless, it is reasonable to expect this year’s lambs have put this population over that in 1996 and is fairly unlikely that all nine lambs have put this population over 1996. The population appears to have doubled from population

The year was the second consecutive year in which no major inconsistencies occurred.

compared with other winters since 1995. Pothole Mountain and Cowan Mountain in which females may have lost considerable body condition

Rece land from sheep were collected for genotyping from multiple locations during

With more dual females in 2001, these additional genotyping females and more genotyping males potentially exist in addition to

and 11 males. In the absence of mortality, the population would consist of 27 dual and 76 single females. The 2001 population now includes 67 females and 16 males. From 1996 to 2001, known lamb samples have produced eleven different

Before sheep, dual females and 76 single females. Genotyping of lambs in

In addition, sheep were marked evidence that they existed. Based on genotyping of lambs in

2002, where additional genotyping females and more genotyping males potentially exist in addition to
female lambs, 2 male lambs, and 2 other (probably yearling) males. Unfortunately, sampling of this herd was inadequate in 2000. The following winter, one lamb was observed in the Shepherd Creek winter range, but how many other lambs might have existed in the herd that year is unclear. A young female that was born in 1998 is known to have died on Shepherd Creek winter range in 2001. Samples collected in the summer of 2001 produced 7 different lamb genotypes, of which 5 were male. These data suggest that the reproductive base at Mount Williamson could be 15 or more adult and yearling females. With the addition of this year’s lambs, it is likely that this herd now numbers more than 30 sheep. Thirty would be a reasonable conservative estimate for 2002.

Climbing guide SP Parker reported finding fresh droppings and beds of sheep on the top of the north ridge of Mount Williamson during a winter ascent this year. This is consistent with field evidence since 1996, which points to the north ridge as the current center of distribution of this herd. It would be worth allocating helicopter time to this ridge system in late winter to see if sheep can be found.

III Mount Baxter Herd Unit.

Mount Gardiner Group

In early August, mountain guide SP Parker contacted us about 11 females, lambs, and associated sheep that he observed at the base of Charlotte Dome. Charlotte Dome is a rock pinnacle that sits north above Bubbs Creek about 6 miles west of Kearsarge Pass, and about 5 miles west of known female range (see map). This area was surveyed on multiple trips this past summer in an effort to ascertain whether this was a recent range expansion or an old, but unknown, group with a distribution including the rock buttresses above the lower reaches of Bubbs Creek and the South Fork of the Kings River to the west of Charlotte Dome. Key information relative to this question was the pattern of sheep use nearest to Charlotte Dome and Bubbs Creek. It has been a consistent pattern that females develop summer ranges in the suitable habitat that is closest to their winter ranges. This expands as population density necessitates more summer range.

For sheep using Bubbs Creek and Charlotte Dome, access to summer alpine range is along a spur ridge north above Charlotte Dome that connects to a primary ridge system connecting Glacier Monument and Mount Gardiner (see map). From the top of the spur ridge above Charlotte Dome, the closest suitable (and excellent) summer habitat for sheep lies immediately north in a lake basin north of Gardiner Pass. Additionally, there is a small area of potential summer habitat at the top of the drainage north of Glacier Monument. If a herd of sheep using Bubbs Creek has existed for a long time undetected, their summer range would be expected to include this nearest excellent summer habitat. If this population is the result of a recent range expansion from the Mount Baxter herd via Mount Gardiner, these closest alpine habitat patches might not receive summer use because a summer range was already established in the Mount Gardiner area.

Surveys this summer found the following: (1) ample sign of the sheep observed by SP Parker at Charlotte Dome; (2) weathered sheep droppings from past years at and immediately west of Charlotte Dome; (3) no sign of sheep use in the lake basin immediately north across Gardiner Pass;
(4) no sign of sheep use of the potential habitat in the drainage immediately north of Glacier Monument; and (5) ample sign of sheep high on Mount Gardiner along with the carcass of a 3-year old male on its south side. This information suggests that the Charlotte Dome area is a recent colonization. This is also supported by a lack of reported observations of sheep in the region of lower Bubbs Creek in the past, nor females west of the Rae Lakes drainage.

Additional past observations have bearing on the question of the origin of this female group. For decades, males from the Mount Baxter herd have been known to use the Sixty Lakes and Gardiner Basins, including Mount Gardiner, as part of their summer range. In September of 1999, I investigated a report of thirteen sheep in the Gardiner Basin because it was notably more than the expected number of males using that area. To my surprise, I found clear evidence of lambs, thus also females, neither of which had previously been known to use habitats on the west side of the Rae Lakes drainage. Later that same month in 1999 I had the chance luck of meeting the hiker who had seen the group of 13 sheep, and she verified that it included everything from lambs to mature males. That observation was notable as the first evidence of females using that region.

From the mid 1970s to the mid 1990s, adult females and associated younger sheep were well documented in summer in the area immediately north of Onion Valley and Kearsarge Pass from Kearsarge Peak to Mount Gould. After the Mount Baxter herd sheep began avoiding winter ranges in 1987, we found evidence that a small number of females in this region remained there year round; occasionally they could be found low above the road to Onion Valley in April. In the second half of the 1990s this changed, and by 1997 we could no longer find evidence of females using this area during any season. The small amount of sign of sheep found in the Kearsarge Peak area in recent years has suggested males, and I verified this in the laboratory from droppings collected in 1998 and 2001. Yet, females have continued to use adjacent Black Mountain and Mount Mary Austin every summer, which had been thought to be the same group of females that used the Kearsarge Peak area. This has remained a biologically unexplainable change in habitat use, given the close proximity and connectivity of these two areas.

The female group on Mount Gardiner appears to be the missing link. The simplest explanation that accounts for all of the above information is (1) the Kearsarge Peak group of females was independent of the Black Mountain group; and (2) about 1996 the Kearsarge Peak group moved west and took up residence around Mount Gardiner. These two areas are directly connected by excellent sheep habitat; thus, this expansion is not exceptional. Perhaps this occurred first during years with mild winters, with the sheep abandoning their old range east of the Sierra Nevada crest after discovering that they could drop west down to the steep south-facing habitat above Bubbs Creek to find winter range that is largely snow-free.

So far I have developed genetic data on 11 microsatellite loci for 10 samples representing 7 different individuals (incl. 2 lambs) from dropping collected at Charlotte Dome. These samples contain the alleles typical of the larger Mount Baxter area, which is consistent with a recent range expansion.

The discovery of the Mount Gardiner deme raises questions concerning the level at which
During the previous year, it is again true that at least two females were present from the same group. From the previous year, we have a record of two potential females. The group that included these females appears to have been larger than the group that we found this year.

During the previous year, the group that included these females was observed on Block Mountain. The group contained at least one adult female and one young male. We observed this group on July 16. In the same area, we also observed one young female and one adult male on July 21. The group was observed again on August 17. The young female was observed again on August 21. The young male was observed again on August 25.

This summer, two groups of sheep were observed on Block Mountain. One group contained one adult female and one young male. The other group contained two adult females and one young male. The groups were observed on July 1 and July 21, respectively.

During the past two years, the sheep have been observed on Block Mountain and on adjacent peaks. The groups have been observed to move between the different areas. The sheep have been observed to graze in the same area for several days at a time.

The sheep have been observed to move to different areas on Block Mountain and on adjacent peaks. The sheep have been observed to graze in the same area for several days at a time. The sheep have been observed to move between the different areas.
cameras that filmed sheep on a natural mineral lick on Baxter Pass from July 26 to October 5 did not provide data that would increase numbers of sheep in any sex/age classes above what was observed in July.

IV. Sawmill Canyon Herd Unit

Field data for this herd unit have been insufficient in recent years. Winter range observations documented 6 adult females in 1997, and that same number was counted in the summer range in 1999. Field data have not determined whether the number of females has exceeded 6 in recent years, but genotypic analysis of excellent fecal collections from the summer range in 2001 identified 6 different lamb genotypes. Consequently, more than 6 females have been expected to exist.

I recently genotyped 24 samples of adult and yearling droppings collected from 1999 to 2001 north of Sawmill Canyon (Mount Cedric Wright to Mount Wynne) on high elevation ranges used by females from the Sawmill Canyon herd, with the following preliminary results. Samples from 1999 produced 5 different adult female genotypes and 1 female lamb genotype, which matched the composition of the group I sampled at Mount Wynne. My sampling the following year identified 2 new adult female genotypes, and two female lambs, while two additional female genotypes matched ones sampled in 1999. Adults sampled in 2001 added 3 new female genotypes. Two additional female genotypes were identified from droppings attributed to yearlings in 2001, and one of those matched a lamb sampled in 2000. A yearling male also sampled in 2001 brings the 2000 lamb crop to at least 4. In total, this sampling identified 12 yearling and adult female genotypes. There may be additional females not yet sampled, but there is also no guarantee that all of the females sampled were alive in 2001. It does seem clear that this herd unit has contained more females than the 6 known from ground observations in 1999. If additional female lambs identified genotypically survived to adulthood, which is likely given the high lamb survivorship during those years, the number of females in the Sawmill Canyon herd unit may have been 15 or more in 2001. Yearlings in 2002 could increase that yet further.

During the past winter, 13 different sheep were observed in the Sawmill Canyon winter range: 4 adult females, 1 yearling female, 2 lambs, 1 yearling male, 2 2-year old males, and 3 older males (ages: 4, 4, 6).

No summer data were developed this year due to an early October snowstorm that terminated a trip before any productive investigations could take place.

V. Wheeler Ridge Herd Unit

The Wheeler Ridge herd is the largest in the Sierra Nevada and consequently a challenge to development of good data on total numbers. During the past winter this appeared to be the one population that might yield a good count as a result of the early snows that began in late November. Sheep were already moving into front country winter ranges by early December and significant census efforts began in December. However, it was evident from count totals and collared sheep that a significant portion of the sheep remained high during that early winter period. One of the 4
The census conditions this past winter were perhaps worse than average, but it should be
remembered that ideal winter conditions for coastal or near coastal areas of Alaska tend to have never
occurred in consecutive years. Since the mid-1970s and particularly since 1992/93, the occasional or
infrequent occurrence of true blizzard events have meant that natural population recovery plans need not
have been used since the 1970s, as well as the revision of the data recovery plan does not
appear to have been necessary.

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Table 1. Best counts for the Wheeler Ridge herd, December 2001 - March 2002.
Efforts this past spring, summer, and fall at Wheeler Ridge were focused largely on determining the reproductive status of collared females. Seven sheep were caught in Pine Creek under a drop net in 1999. The four adult females received radio collars, and a female lamb and two young males received only ear tags. During the past winter season, four females were caught and collared, two under a drop net and two net gunned from a helicopter. The two caught under the drop net were recaptures of females caught in 1999, but included the female with only ear tags. Consequently, there are now seven collared females in this population. Six of those seven females bore lambs in 2002, one of which died shortly after birth, which yields a surviving lamb:adult ewe ratio of 71:100 coming into winter. Adding other adult females that were recorded with those collared females during these samplings yields totals of 11 lambs for 15 adult females, or a ratio of 73:100. While this sampling is somewhat limited, it suggests that lamb:ewe ratios continue to run around 75:100, a level that has been recorded every year beginning in 1999. Apparently, rising population density is not yet having a negative effect on reproductive output.

In the absence of good census data, one can only project a probable population size based on past data. It is likely that the Wheeler Ridge herd contained 60-65 sheep at least a year of age during the 2001-02 winter and a total of 80-90 with lambs. Similarly, it is likely that the herd size broke 100 with the addition of lambs this past summer. A future year of good census opportunities should allow refinement of these figures through reconstructed populations. Until such a count occurs, a current round estimate of 100 is reasonable and conservative.

VI. Mount Gibbs Herd Unit

It has been possible to track the female component of this deme in complete detail, in part due to its small size. In 2001, it contained 2 adult females, 1 yearling female, and 1 lamb. Six adult males were known in addition. This year there were 3 adult females, 1 lamb (probably female), and 1 yearling male. In addition, 4 adult males were seen multiple times. If this year’s lamb survives to become an adult, the reproductive base of the herd unit will probably grow to 4 females. While that number sounds precariously low, it is a major increase from the single female that was the reproductive base during 1993-1997.

VII. Mount Warren Herd Unit

Tioga Crest Deme

Similar to the Mount Gibbs herd, it has been possible to track this little group of females over time. In 2001 it contained 2 adult females, 2 lambs, 1 yearling male, and 1 2-year old male. This year it contained 2 adult females, 2 yearling females, and 1 2-year old male in early July. Thus, the reproductive base doubled between years, which is the highest it has been since 1995.

Mount Warren Deme

Despite its small size, this group of females has been very difficult to track since 1998. In 2001, 3 females and 2 lambs were observed. In late July this year, Les Chow of USGS BRD
translocations to additional herd units remain a major conservation challenge for these sheep.

While continued population increase is a very positive sign, range expansion through
expected to exceed 300. Thus, for 2002, 300 is a reasonable and conservative total figure to use.

Nevada total to 300. Given the conservative nature of these projections, the actual total can be
Canyon (and Churro Dome combined) bringing the total in these two herds units to 96 and the Stew-
located only 30 (67 males; 100 females; adding 15 lambs from this year). Assuming only 4 at Sawmill
Canyon herd units can be protected conservatively to be 45. Even if the males in these herd units
number of adult and yearling females in the Sawmill and StewII
summarized in Table 7.1. The number of adult and yearling females in the Sawmill and StewII

This figure can be developed independently. In this report I put forth the belief that
conservative, breed-level sizes for all herd units exceed Mount Baxter and Sawmill Canyon herd
2002 lambs. In addition, 2002 lambs and possibly another female.

2002 developed in three years will pull the total sheep numbers in the Sierra Nevada above 300.
Conservatively, it is very probable that this population size is well beyond the 2002 land total to more than 50. All evidence suggests that adult survival begins this
right next year. Consistency this adult survival begins this
Spring in the Wheeler Ridge and the Mount Wallow herds will almost certainly
Sawmill Canyon herd. In addition, 2002 lambs and possibly another female.
Mount Wallow, and Mount
errer In 2002 and an additional 15 lambs produced in 2002 in the Wheeler Ridge, 2002 lambs (including 2002 lambs) that are sheep prolifically
be added to the 2002 sheep seen in Table 7.1. (including 2002 lambs). The combined Mount Wallow herd
be known to continue at least 2 females, females, including yearlings, 12 males, and 4 lambs (probable
The combined Mount Wallow herds currently are known to continue at least 11 females,

Leem Times Canyon where range drinking springs, where two of them were captured and collared
summer in the area of "Camp-Lowe Basin" south of Mount Wallow. They also were present in the
in addition to female groups, 7 additional males were sighted on multiple occasions during
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females, including yearlings, and may gain 3 more if this year’s lambs survive to adulthood.
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