

**Desert Bighorn Sheep Status, Population Projections,
and Proposed Management Actions 2010-2014**
January 2010
NMDGF

The information in this document is intended for assessing the current desert bighorn program and discussing its future during the next 5 years. Population trends and herd conditions are unpredictable, and modifications to projections and actions are expected to reflect changing conditions and new information.

Table 1. Bighorn Sheep Management Summary.

Mountain Range	Sustainable pop estimate	Pop. est., fall '09	Trend	Projected population fall 2014 ¹		Total avg. annual adult bhs mort rate	Avg. annual adult bhs mort rate - cougar predation	Ave \$/yr cougar control ²	Ave. \$/yr monitors ²	Pot. ram hrvtst 2011-2012	Priority for RR xplants
				5%	10%						
Ladrones	??	25-40	↔	41	51	n/a	n/a	\$16,100	\$0	0-1	4
Fras	105	105-115	↑	140	177	0.14	0.06	\$13,500	\$14,000	3-5	n/a
Caballos	300	45-50	↑	100	124	n/a	n/a	\$11,300	\$7,250	2-4	1
San Andres	2200	95-105	↑	161	197	0.13	0.02	\$18,700	\$19,600	3-5	1
Hatchets	325	130-140	↑	172	217	0.11	0.07	\$7,500	\$18,500	4-7	3
Peloncillo	535	75-85	↔	102	129	0.08	0.06	\$7,300	\$11,400	2-4	2
Statewide	3465	475-535	↑	716	895	0.11	0.05	n/a	n/a	14-26	n/a

¹ Includes proposed transplants of 30 bighorn to the San Andres in each of 2011 and 2013.

² The average amount spent on cougar control for each herd reflects only those years during which a contractor was hired. Contractors were hired for different numbers of years in each herd.

POPULATION MODELING

Sustainable population – This is defined as the number of bighorn sheep the habitat can support over the long-term. Estimates are based on estimated bighorn habitat size as calculated from the NMDGF 2008 bighorn habitat maps, and applying a density of 1.0 bighorn/km². This is considered a conservative estimate for desert bighorn herds in the Chihuahuan desert and it is assumed that in many instances herds can exceed this density. Values may differ from estimates derived using alternative methods. The Ladron sustainable population size was not calculated because even though the habitat size is large, the quality is poor, therefore the formula used for the other herds would likely not apply.

Projected Population Size– Bighorn population projections are based on observed average growth rates in each herd since their respective reintroductions/augmentations in the 2000s. Average growth rates range from 7% to 11%, therefore predictions are made based on a 5%

growth rate, and a 10% growth rate (Table 1). These estimates include a proposed transplant of ~30 bighorn to the San Andres in each of 2011 and 2013.

MANAGEMENT ACTIVITIES

Cougar Control – Prior to implementing cougar control to protect desert bighorn sheep, the average annual mortality rate due to cougar predation was 0.17, and the mortality rate from all causes of mortality was 0.23. Following implementation of cougar control, the mortality rate due to cougar predation decreased 71% to 0.05, and the mortality rate from all causes of mortality decreased 52% to 0.11. There are contracted snaremen or houndsmen working in the Peloncillos, Hatchets, Caballos, Fra Cristobals, and Ladrones. If cougar predation is documented on the San Andres, there is a snareman on contract prepared to work there. The cougar management prescription in the San Andres was established in the 2002 EA, and for the Fra Cristobals in the 2006 Management Memorandum.

San Andres: Only offending cougars may be snared. If annual cougar predation exceeds 5% of the bighorn population, range-wide sets may be operated for 6 months or through the end of May, whichever is longer. Range-wide removal will no longer be conducted once the bighorn population reaches 100 with a minimum of 75 ewes; all cougar control will end when the bighorn population reaches 200 with a minimum of 100 ewes.

Fra Cristobals: When there are less than 30 ewes in the population, any cougar in the designated bighorn area can be killed. When there are 31-75 ewes any female cougar can be killed, and any offending male cougars and those that remain in bighorn range greater than 96 hours can be killed. When there are greater than 76 ewes only offending cougars can be killed. The current Management Memorandum expires in 2011.

The Peloncillo, Hatchet, Caballo, and Ladrones: These herds do not have a formal management strategy in place. The thresholds established in the other 2 herds were a result of all involved parties compromising on how to proceed. However, we do not know if these management strategies will be effective because none of the herds in New Mexico have reached the thresholds for reducing levels of cougar control. We do know that a less intensive level of control when the bighorn population is still small, is not as effective in reducing bighorn mortality as a more intensive control program, as evidenced in the Fras population. Therefore, we will continue to remove any cougar that enters bighorn range until a bighorn population reaches 75 ewes. At that time, we will hopefully have better information about bighorn and cougar interactions when bighorn populations are larger, and we can reevaluate the cougar control strategy at that time.

Monitoring – All herds are monitored approximately monthly from fixed-wing flights. Helicopter surveys are conducted in the spring and fall, although a given herd is usually not surveyed both times. There has been a full time ground monitor in the San Andres that is generally employed a minimum of 9 months per year, although that has changed to a half-time position as of November 2009. There is a ¾ time contractor monitoring the Hatchets and Peloncillo herds, combined, and a half-time contractor monitoring the Caballo herd. In addition, a full time contractor funded by both NMDGF and TESF monitors the Fra Cristobal herd and works to snare and monitor cougars.

Transplants - NMDGF generally transplants out of Red Rock every other year, ~ 30-35 bighorn of both sexes (currently on an 'odd' year rotation). The San Andres are currently the first priority, as is establishing a population in the Caballos. The northern Peloncillos is the next transplant priority location. WSMR has determined that an EA is necessary to conduct cougar control in conjunction with a central San Andres release. NMDGF would like to transplant to the central San Andres in 2011, and northern San Andres in 2013 (depending of success of 2011 release). Assuming the Caballos is doing well, a transplant to the northern Peloncillos would be the next priority. This would increase the Peloncillo population, and expand the population into the northern end of the range.

- If the Fra Cristobals becomes large enough to serve as a transplant source herd i.e., >60 ewes, the San Andres and Caballos would not be the first choices for the recipient herd. The close proximity to the Fra Cristobals increases the likelihood that the transplanted animals would return to the Frases.

GENETIC DIVERSITY

Bighorn sheep in Red Rock have been documented having low genetic diversity. While it is unknown if it is low enough to be detrimental to the herd, increasing the genetic diversity in Red Rock is a management goal. Introducing animals with greater genetic diversity into Red Rock is the most promising method to achieve this goal, and the benefits of increasing genetic diversity must be weighed against the disease exposure risk from placing bighorn from different areas together. Increased genetic diversity at Red Rock would lead to increased genetic diversity in all New Mexico herds because Red Rock is currently the only source herd for transplants into the wild. We are currently pursuing two options for increasing genetic diversity:

- Importing bighorn sheep from Mexico and placing them in Red Rock. We plan to test bighorn in the Pilares captive facility in Coahuila, Mexico for genetic diversity to see if it makes sense to import them, and are working with the USDA on importation requirements.
- The San Andres herd is comprised of bighorn from both Red Rock and the Kofa National Wildlife Refuge in Arizona. Kofa bighorn have some of the highest genetic diversity of bighorn tested. Transplanting approximately 10 rams from the San Andres to Red Rock would serve to increase Red Rock genetic diversity. Although it would decrease the San Andres bighorn population, it would not reduce growth potential of the herd as ewes would not be removed.

HUNTING

NMDGF is considering opening desert bighorn hunts in herds in addition to the Peloncillos.

- Now that bighorn are listed as state-threatened, and in 2010 should meet the population requirements to delist, a state-wide hunt is possible. It would likely start in fall 2011, although it may take longer to implement.
- Agreements should be developed for the Fra Cristobals (privately owned by TESH) and the San Andres (managed by WSMR/Refuge) before opening these hunts. In addition, a hunt plan must be completed for the San Andres NWR, prior to hunting that portion of the San Andres Mountains.
- Guidelines for the number of permits to be issued need to be developed. Western states commonly base license number on 7%-12% of the ram population. None of the proposed herds have ever been hunted, therefore we should not have to err on the conservative side for several years. The proposed number of licenses in Table 1 assumes a population

structure of 45% ewes, 40% rams, and 15% lambs. It is based on the population size in autumn 2011 starting from the midpoint of the 2009 estimated.

- The creation of a second auction permit, i.e., a state-wide Rocky Mountain bighorn sheep permit and a state-wide desert bighorn sheep permit is to be discussed based on funding needs relative to funding base.