



Bleats and Blats

Official Newsletter of the
Desert Bighorn Council

October 2008



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Hello DBC members!

This newsletter includes important updates, such as details of the 2009 DBC meeting. It's time to start planning your travel and presentations! We'll include updates in future newsletters and on our website at www.desertbighorncouncil.org.

The next newsletter is scheduled for December, so if you have updates or announcements to share, please email them to me by December 15, 2008. We hope to hear from you!

All the best!

Esther Rubin

DBC Secretary (esrubin@consbio.org)

2009 DBC MEETING – FIRST CALL FOR PAPERS!

The 2009 biennial DBC meeting is just a few months away, so it's time to make some travel plans! We also hope that you'll plan to share some of your recent work with us. Here's the current information on the meeting. Additional details will be posted on our website as they become available.

Dates: April 8-10, 2009

Location: Grand Junction, Colorado
The meeting will be held at the Grand Vista Hotel
<http://www.grandvistahotel.com>
Phone: 970-241-8411

Registration: (details will be posted on our website and in the next newsletter)

Abstract submission: Please submit abstracts to Brad Banulis at brad.banulis@state.co.us
Deadline for abstracts is December 31, 2008. Abstracts submitted after this date will be considered on a space available basis. Abstracts should be limited to one page, include your affiliation and contact information, and be submitted in Word format (PDF is acceptable if necessary). Please refer questions to Brad Banulis at brad.banulis@state.co.us or at 970-252-6051.

Accommodations: The Grand Vista Hotel is on Horizon Drive in Grand Junction, with very easy access from Interstate 70 and the Grand Junction Airport.
Make reservations before March 15, 2009 (\$81/ night, single occupancy).

Meeting Schedule:

April 8: Registration and Social (evening)

April 9: Technical Sessions

Currently planned sessions include:

- *Habitat Management/Recreation Management* (Chair: Brad Banulis)
- *Disease Management* (Chair: Dr. Mike Miller)

Other sessions may be added as needed and pertinent.

Banquet (evening, \$25)

April 10: Technical Session and Field Trip

Morning: State Reports and Business meeting

Afternoon: Field Trip to local desert bighorn sheep habitat.

Sponsorship: The meeting will be sponsored in part by the Rocky Mountain Bighorn Society and the Colorado Division of Wildlife. Thank you!!

For meeting information, please contact: Scott Wait (scott.wait@state.co.us),
Senior Terrestrial Biologist
Southwest Region
Colorado Division of Wildlife
970-375-6745

IMPORTANT HANSEN-WELLES SCHOLARSHIP
REMINDER

Looking for some money for your research or management project? The Hansen-Welles Scholarship may be able to help! Proposals may be submitted by active DBC members or those sponsored by a current member, and must be for the benefit of desert bighorn sheep or desert bighorn sheep habitat. Although any person is eligible to apply, graduate students will receive preference in our selection of applicants. Applications are due February 1, 2009. Additional details can be found on our website (www.desertbighornCouncil.org).

DBC TRANSACTIONS

The 2005 issue of the DBC Transactions was recently mailed to all who paid for them (at the last meeting or as part of your membership). Copies are now available for purchase (via the order form on our website). All previous issues are now also available in digital format, at no cost, on our website.

UPDATE ON BIGHORN SHEEP IN THE PENINSULAR
RANGES, CALIFORNIA

The U.S. Fish and Wildlife Service has released its revised proposal for critical habitat for bighorn sheep in the Peninsular Ranges, California. The public comment period is open until October 27, 2008, and you can find the Federal Register ruling at <http://www.regulations.gov> (then search by “Peninsular” and “bighorn”).

PROPOSED DOWNLISTING OF DESERT BIGHORN
SHEEP IN NEW MEXICO

Submitted by Elise Goldstein (New Mexico Department of Game and Fish)
and Eric Rominger (DBC Tech Staff, New Mexico Department of Game and Fish)

Desert bighorn sheep have been listed as a state-endangered species in New Mexico since 1980. Despite numerous bighorn transplanted out of the Red Rock captive breeding facility, population numbers ranged from only 130 to 215 in the 1980s and 1990s. Through radiocollaring and monitoring efforts in the 1990s, it was determined that mountain lion predation was responsible for approximately 85% of cause-known mortalities. In 2001, the statewide bighorn population was estimated at less than 170, at which time the Department effectively implemented a management action to kill mountain lions in desert bighorn sheep ranges to protect the remaining bighorn. Mortality rates, as calculated using program MARK, dropped from 0.24 during years when few lions were removed to protect bighorn, to 0.07 during years when sufficient lions were removed to protect bighorn. Cause-specific mortality rates from lion predation decreased from 0.17 to 0.04 in these same time periods. With lower predation rates, additional bighorn sheep were transplanted out of Red Rock into the wild and monitored intensively, as NMDGF felt the new populations would have a reasonable chance of success. The bighorn sheep population has increased every year since 2001, resulting in a current population estimate of >400 bighorn.

The Plan for the Recovery of Desert Bighorn Sheep in NM 2003-2013 specifies that “bighorn sheep should be downlisted to threatened when a minimum of 250 free-ranging desert bighorn sheep exist in at least 2 geographically distinct populations or metapopulations, each containing at least 100 bighorn.” The Hatchet/Peloncillo metapopulation is estimated at 180-200, and the Fra Cristobal/Caballo metapopulation is estimated at 110-120, meeting the requirement of 2 metapopulations over 100. The San Andres Mountains population is estimated at 85-100, so there is a 3rd population that nearly satisfies this requirement. NMDGF has proposed to the State Game Commission to down-list desert bighorn sheep in NM to threatened as they meet the criteria established in the Recovery Plan. The Commission will vote on December 4, 2008 whether or not to approve the recommendation.

UPDATE ON RECENT MEETINGS

Submitted by Mara Weisenberger (DBC Tech Staff, San Andres National Wildlife Refuge)

The Southwest Desert Bighorn Sheep Partners group had their first meeting during August 2008. Partners included the Turner Endangered Species Fund, Armendaris Ranch, Bureau of Land Management, White Sands Missile Range, U.S. Fish and Wildlife Service, and New Mexico Department of Game and Fish. Among 26 participants, five common issues were most frequently suggested for discussion including: 1) status of downlisting desert bighorn sheep (DBS) in New Mexico from State Endangered to State Threatened, 2) DBS transplant schedule and related justification and expectations of/by land managers, 3) predator management, 4) habitat issues, and 5) collaboration. The group also addressed the need for research to learn from predator control actions, how long state-wide DBS population numbers of 500 bighorn need to be maintained and related listing status, and holding recurring meetings with the benefits of open dialogue. Two action items were identified during the meeting:

1. NMDGF will provide more detailed DBS transplant planning (including lion abundance), justification, and resource needs with short-term goals, herd updates, and expected results (3-4 pp).
2. Land management agencies will provide paragraph on management actions (i.e., habitat efforts, prescribed fire, etc.) that have recently occurred or will occur within next year.

The Bureau of Land Management’s Socorro office offered to host the next meeting in March or April 2009. The group expressed interest to get more players involved, such as the Arizona Game and Fish Department, U.S. Forest Service, and Mexico.

AWARDS AND PROMOTIONS

Bill Bates was recently appointed regional supervisor for the Utah Division of Wildlife Resources (DWR). Bill has worked for the DWR in a variety of responsible positions for 25 years. These included Regional Non-game Program Manager, Regional Habitat Manager, Statewide Mammals Program Coordinator, and Regional Wildlife Program Manager. During his varied career, Bill took special pleasure in bighorn sheep research; bighorn sheep, river otter and bison transplants; habitat projects; and the development of statewide cougar, bear and bison management plans. Bill received his Master of Science degree at Brigham Young University in 1982. His thesis investigated bighorn sheep habitat use in Canyonlands National Park.

Congratulations to you, Bill!!

INFORMATION OF INTEREST

Submitted by Rick Brigham (DBC Tech Staff, BLM [retired])

I now live in southeastern Washington, within a few miles of Hells Canyon on the Snake River, and I have remained active in bighorn endeavors. Among other things, I serve as scribe for a coalition of interest groups, which includes the Idaho and Oregon chapters of the Wild Sheep Foundation (ex-Foundation for North American Wild Sheep), national headquarters of the Wild Sheep Foundation, the Wilderness Society, Hells Canyon Preservation Council, Idaho Sportsmen's Caucus Advisory Council, Nez Perce Indian Tribe, and the Confederated Tribes of the Umatilla Indian Reservation. Members of this coalition protested an updated U.S. Forest Service land use plan, which covered three national forests, including the Payette. The updated plan did not address the issue of domestic sheep grazing and Rocky Mountain bighorn sheep. The protests resulted in a "panel of experts" being convened to identify the risk of disease transmission between domestic sheep and bighorn sheep. This evolved from an assessment of risk of contact to an assessment of viability once contact occurs. In November 2006, a distinguished panel of 11 veterinarians and researchers was convened at the request of the Forest Service. Panel members included Dr. Dave Jessup (California Department of Fish and Game), Dr. Ben Gonzales (California Department of Fish and Game), Dr. Bill Foreyt (Washington State University at Pullman), domestic sheep veterinarians, and livestock proponents. With the help of a facilitator, the group drafted what is now referred to as the "Payette Principles". They are repeated here since the issue of contact between mountain sheep and domestic sheep is the same everywhere in the lower 48 states:

- 1a) Scientific observation and field studies demonstrate that "contact" between domestic sheep and bighorn sheep is possible under range conditions. This contact increases risk of subsequent bighorn sheep mortality and reduced recruitment, primarily due to respiratory disease.
- 1b) The complete range of mechanisms/causal agents that lead to epizootic disease events cannot be conclusively proven at this point.
- 1c) Given the previous two statements, it is prudent to undertake management to prevent contact between these two species.
- 2) Not all bighorn sheep epizootic disease events can be attributed to contact with domestic sheep.
- 3) Gregarious behavior of bighorn sheep and domestic sheep may exacerbate potential for disease introduction and transmission.
- 4) Dispersal, migratory, and exploratory behaviors of individual bighorn sheep traveling between populations may exacerbate potential for disease introductions and transmission.
- 5) There are factors (e.g., translocation, habitat improvement, harvest, weather, nutrition, fire, interspecies competition, and predation), some that can be managed and some that cannot, that can influence bighorn sheep population viability.
- 6) Pasteurallaceae, other bacteria, viruses, and other agents may occur in healthy, free-ranging bighorn sheep.

The entire document is available from the Payette National Forest in McCall, Idaho.

Of related interest, two Forest Service biologists, Tim Schommer and Melanie Woolover (with help from John Wehausen [DBC member]) recently prepared the following report:

A Review of Disease Related Conflicts Between Domestic Sheep and Goats and Bighorn Sheep, General Technical Report RMRS-GTR-209, U.S. Forest Service Rocky Mountain Research Station, Fort Collins, Colorado 17pp.

Finally, the Payette National Forest has, because of protests and lawsuits in Federal court in Boise, and decisions made at the Washington office of the U. S. Forest Service, revised its land use plan to address the bighorn sheep-domestic sheep issue, and in late September issued *Draft Supplemental Environmental Impact Statement* (160 pp.). The review period extends into December 2008. The resulting decision could set the tone for management of domestic sheep in bighorn sheep areas on all National Forests throughout the west for the foreseeable future. You may obtain a copy by contacting Sylvia Clark at 208-634-0796 or by visiting the Payette website at:

http://www.fs.fed.us/r4/payette/publications/big_horn/big_horn_sheep_documents_index.shtml.

RECENT LITERATURE RELATED TO BIGHORN SHEEP

George, J. L., D. J. Martin, P. M. Lukacs, and M. W. Miller. 2008. Epidemic pasteurellosis in a bighorn sheep population coinciding with the appearance of a domestic sheep. *Journal of Wildlife Diseases* 44(2):388-403.

Abstract: A pneumonia epidemic reduced bighorn sheep (*Ovis canadensis*) survival and recruitment during 1997-2000 in a population comprised of three interconnected wintering herds (Kenosha Mountains, Sugarloaf Mountain, Twin Eagles) that inhabited the Kenosha and Tarryall Mountain ranges in central Colorado, USA. The onset of this epidemic coincided temporally and spatially with the appearance of a single domestic sheep (*Ovis aires*) on the Sugarloaf Mountain herd's winter range in December 1997. Although only bighorns in the Sugarloaf Mountain herd were affected in 1997-98, cases also occurred during 1998-99 in the other two wintering herds, likely after the epidemic spread via established seasonal movements of male bighorns. In all, we located 86 bighorn carcasses during 1997-2000. Three species of *Pasteurella* were isolated in various combinations from affected lung tissues from 20 bighorn carcasses where tissues were available and suitable for diagnostic evaluation; with one exception, beta-hemolytic *mannheimia* (*Pasteurella*) *haemolytica* (primarily reported as biogroup 1(G) or 1(alpha G)) was isolated from lung tissues of cases evaluated during winter 1997-98. The epidemic dramatically lowered adult bighorn monthly survival in all three herds; a model that included an acute epidemic effect, differing between sexes and with vaccination status, that diminished linearly over the next 12 months best represented field data. In addition to the direct mortality associated with epidemics in these three herds, lamb recruitment in years following the pneumonia epidemic also was depressed as compared to years prior to the epidemic. Based on observations presented here, pasteurellosis epidemics in free-ranging bighorn sheep can arise through incursion of domestic sheep onto native ranges, and thus minimizing contact between domestic and bighorn sheep appears to be a logical principle for bighorn sheep conservation.

Marshal, J. P., V. C. Bleich, and N. G. Andrew. 2008. Evidence for interspecific competition between feral ass *Equus asinus* and mountain sheep *Ovis canadensis* in a desert environment. *Wildlife Biology* 14(2):228-236.

Abstract: Different ungulate species that co-occur over evolutionary time have been hypothesized to develop mechanisms to limit the degree to which they directly compete for the same limited resources (i.e. resource partitioning). In situations where an exotic ungulate has been recently introduced to a system, resource partitioning has not likely developed; this appears to be the situation between introduced feral ass *Equus asinus* and indigenous mountain sheep *Ovis canadensis* in the Sonoran Desert of southeastern California, USA. We analysed data from aerial surveys conducted during 1993-2003 to look for evidence of an effect of feral ass abundance on mountain sheep demography. After controlling for the influence of forage availability

via rainfall, we found no evidence of relationship between an index of feral ass abundance and indices of reproduction or recruitment in mountain sheep ($P \geq 4360$). However, we found strong evidence for an effect on indices of sheep abundance and population rate of change. There was an interactive effect of rainfall and feral ass, such that a negative relationship between abundances of mountain sheep and feral ass was strongest during the driest years ($P = 0.014$). There was a negative relationship between rate of change for sheep populations and feral ass abundance ($P = 0.016$), which was not affected by rainfall. These results indicated a competitive effect of feral ass on mountain sheep populations, but the mechanism of competition remains unclear. Further research should use manipulations in feral ass abundance to clarify interactions between these species.

Mincher, B. J., R. D. Ball, T. P. Houghton, J. Mionczynski, and P. A. Hnilicka. 2008. Some aspects of geophagia in Wyoming bighorn sheep (*Ovis canadensis*). *European Journal of Wildlife Research* 54(2):193-198.

Abstract: Geophagia has been commonly reported for bighorn sheep (*Ovis canadensis*) and other ungulates worldwide. The phenomenon is often attributed to the need to supplement animal diets with minerals available in the soil at mineral lick locations. Sodium is the mineral most frequently cited as being the specific component sought, although this has not been found universally. In this study area, bighorn sheep left normal summer-range to make bimonthly 26-km, 2,000-m-elevation round-trip migrations, the apparent purpose of which was to visit mineral licks on normal winter-range. Lick soil and normal summer-range soil were sampled for their available mineral content and summer-range forage was sampled for total mineral content, and comparisons were made to determine the specific components sought at the lick by bighorn sheep consuming soil. It was concluded that bighorn sheep were attracted to the lick by a desire for sodium but that geophagia also supplemented a diet deficient in the trace element selenium. Where sheep are denied access to licks, populations may be limited by mineral deficiency.

Poissant, J., A. J. Wilson, M. Festa-Bianchet, J. T. Hogg, and D. W. Coltman. 2008. Quantitative genetics and sex-specific selection on sexually dimorphic traits in bighorn sheep. *Proceedings of the Royal Society Biological Sciences Series B* 275 (1635): 623-628.

Abstract: Sexual conflict at loci influencing traits shared between the sexes occurs when sex-specific selection pressures are antagonistic relative to the genetic correlation between the sexes. To assess whether there is sexual conflict over shared traits, we estimated heritability and intersexual genetic correlations for highly sexually dimorphic traits (horn volume and body mass) in a wild population of bighorn sheep (*Ovis canadensis*) and quantified sex-specific selection using estimates of longevity and lifetime reproductive success. Body mass and horn volume showed significant additive genetic variance in both sexes, and intersexual genetic correlations were 0.24 +/- 0.28 for horn volume and 0.63 +/- 0.30 for body mass. For horn volume, selection coefficients did not significantly differ from zero in either sex. For body weight, selection coefficients were positive in females but did not differ from zero in males. The absence of detectable sexually antagonistic selection suggests that currently there are no sexual conflicts at loci influencing horn volume and body mass.

Rieucou, G. and J. G. A. Martin. 2008. Many eyes or many ewes: vigilance tactics in female bighorn sheep *Ovis canadensis* vary according to reproductive status. *Oikos* 117(4):501-506.

Abstract: In gregarious animals, there is usually a negative relationship between individual vigilance and group size. This effect of group size is generally explained by increasing probability of predator detection (the many-eyes hypothesis) and by the dilution of risk occurring in larger groups. Few studies have attempted to examine the specific implications of either hypothesis on the expected vigilance pattern of an animal. Here we examine whether reproductive status affects vigilance patterns in bighorn sheep *Ovis canadensis* ewes. We also test whether the observed vigilance patterns are consistent with predictions from dilution or detection models of vigilance. Although vigilance decreased with increasing group size, vigilance tactics

differed between barren and lactating females. Lactating ewes relied solely on predator detection. In contrast, barren ewes benefited from both detection and dilution effects when group size increased and adjusted vigilance effort according to the proportion of lactating ewes in their group. It is generally assumed that gregariousness increases safety. Here we further show that reproductive status influenced how animals reduce predation risk and that some individuals take advantage of the vigilance effort provided by others.

White, P. J., T. O. Lemke, D. B. Tyers, and J. A. Fuller. Initial effects of reintroduced wolves *Canis lupus* on bighorn sheep *Ovis canadensis* dynamics in Yellowstone National Park. *Wildlife Biology* 14 (1):138-146.

Abstract: Wolves *Canis lupus* may naturally achieve densities that contribute to significant changes in prey populations and entire ecosystems. We analyzed a time series of counts, index of recruitment, and estimates of survival for bighorn sheep *Ovis canadensis* during 1995-2005 to evaluate the prediction that sheep numbers would decrease in the northern portion of Yellowstone National Park, Montana and Wyoming, USA, owing to lower survival and recruitment following wolf reintroduction. The number of wolves residing in the northern range increased from 21 to a maximum of 106 in response to an abundant elk *Cervus elaphus* population and legal protection. Counts of bighorn sheep decreased following the severe winter of 1997, but then increased by 7% annually during 1998-2005 (95% CI: 2-11%). Recruitment followed a similar temporal pattern, decreasing to 7-11 lambs/100 ewes during the severe winter of 1997 and the following winter, but then increasing to 21-34 lambs/100 ewes during 1998-2005. Annual estimates of survival for 14 adult females and four males 1-3 years old were high (0.94; 95% CI: 0.89-0.97) and indicative of an increasing or constant population. Thus, the presence of wolves did not prevent the bighorn sheep population from increasing slowly during the decade following reintroduction. However, sheep counts remain low compared to the 487 sheep observed before an outbreak of keratoconjunctivitis caused 60% mortality during 1982, suggesting that other factors limited the recovery of this relatively isolated, high-elevation, native sheep population. Increases in abundance and recruitment of bighorn sheep during 1998-2005 were concurrent with a 50% decrease in the numbers of northern Yellowstone elk after wolf reintroduction. Thus, the potential effects of decreased competition for resources between elk and bighorn sheep on lamb recruitment and sheep population growth merit further investigation.

