Bleats and Blats

Official Newsletter of the Desert Bighorn Council

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Hello DBC members and friends,

*I hope you all had an exciting summer! Here's a brief update from the Desert Bighorn Council. Don't forget to visit our website (*http://www.desertbighorncouncil.org*) for more information.*

The next newsletter is scheduled for early December so if you have news, stories, or announcements to share, please send them to me by November 15. Also, if you have photos or other materials for the website, they would be most welcome.

Esther Rubin
DBC Secretary (erubin@sandiegozoo.org)

MEETINGS OF INTEREST

Foundation for North American Wild Sheep: Plan to attend the 29th Annual Convention of the Foundation for North American Wild Sheep! The Convention will be held February 1-4, 2006, at the Reno Hilton in Reno, Nevada. More information can be found on the FNAWS website at www.fnaws.org.

Northern Wild Sheep and Goat Council: Save the date for the biennial symposium of the Northern Wild Sheep and Goat Council! The symposium will be held April 2-6, 2006, at Delta Lodge in Kananaskis, Alberta. More information will soon be found on the NWSGC website at www.nwsgc.org.

Desert Bighorn Council: Our next biennial meeting will be held in Las Vegas, Nevada, in April 2007. Ross Haley is the Chair, and can be contacted at Ross_Haley@NPS.gov. We hope you'll join us! Detailed information will be posted on our website (http://www.desertbighorncouncil.org) at a later date.

DESERT BIGHORN SHEEP LOSE A LONG-TIME FRIEND

Robert Spencer Campbell
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1934-2005

Robert Campbell was born in Detroit, Michigan in 1934. He attended public school there and in Birmingham, Michigan. He studied at Brown University and California State College, Long Beach. He worked for McDonnell-Douglas and later at the Jet Propulsion Laboratory (JPL, California Institute of Technology) on the Voyager I, Galileo and Topex projects.

Since long before his retirement from the JPL, Bob was a dedicated wildlife conservationist, a member of the Society for the Conservation of the Bighorn Sheep (SCBS), and a volunteer for the California Department of Fish and Game (CDFG). As a volunteer for 35 years, Bob spent most of his free time improving conditions for desert wildlife. Whether it was maintaining water flow at a remote desert spring by himself or leading a group of volunteers to construct a wildlife watering device, Bob could be found in the desert at every opportunity. A major project was to document the location and condition of every known, and some previously unknown, spring and water source in the Mohave Desert. His tireless efforts in this area will allow the SCBS and the CDFG to make informed wildlife management decisions for generations to come.

Bob could count nature a familiar acquaintance and lost himself in a generous enthusiasm; he

cooperated with others for a common end and made a host of friends.

RECENT LITERATURE RELATED TO DESERT BIGHORN SHEEP

Bleich, V. C. 2005. **In my opinion: Politics, promises, and illogical legislation confound wildlife conservation.** Wildlife Society Bulletin 33:66-73
(no abstract)

Bleich, V. C., J. T, Villepique, T. R. Stephenson, B. M. Pierce, and G. M. Kutliyev. 2005. **From the field: Efficacy of aerial telemetry as an aid to capturing specific individuals - a comparison of 2 techniques.** Wildlife Society Bulletin 33:332-336.

Abstract:
Long-term investigations of wild ungulates often dictate that telemetry collars on specific individuals be replaced. We described and evaluated the use of aerial telemetry to facilitate recapture of individual ungulates. Capture of marked animals was much more efficient using fixed-wing telemetry when compared to helicopter telemetry. Total time to capture (P=0.012) and pursuit time (P=0.002) differed significantly, but no difference (P =0.434) in body temperature of mule deer (*Odocoileus hemionus*) occurred at time of capture. Application of fixed-wing telemetry during net-gun captures of ungulates resulted in greater safety for capture crews and study animals and in potentially substantial monetary savings.

Coulson, T., Gaillard, J. M., and M. Festa-Bianchet. 2005. **Decomposing the variation in population growth into contributions from multiple demographic rates.** Journal of Animal Ecology 74:789-801.

Abstract:
1. The decomposition of variation in population growth into the relative contributions from different demographic rates has multiple uses in population, conservation and evolutionary biology. Recent research has favoured methods based on matrix models termed “life-table-response experiments” or more generally “the retrospective matrix method”, which provide an approximation of a complete demographic decomposition. The performance of the approximation has not been assessed. 2. We compare the performance of the retrospective matrix method to a complete decomposition for two bighorn sheep populations and one red deer population. 3. Different demographic rates make markedly different contributions to variation in growth rate between populations, because each population is subject to different types of environmental variation. 4. The most influential demographic rates identified from decomposing observed variation in population growth are often not those showing the highest elasticity. Consequently, those demographic rates most strongly associated with deterministic population growth are not necessarily strongly associated with temporal variation in population growth. 5. The retrospective matrix method provides a good approximation of the demographic rate associated most strongly with variation in population growth. However, failure to incorporate the

contribution of covariation between demographic rates when decomposing variation in population growth can lead to spurious conclusions.

Oehler, M. W., V. C. Bleich, R. T. Bowyer, and M. C. Nicholson. 2005. **Mountain sheep and mining: Implications for conservation and management**. California Fish and Game 91:149-178.

Abstract:
Opportunities to quantitatively assess responses of ungulates to mineral extraction have been limited. Reasons for this dearth of research include a lack of adequate funding, available personnel, and logistical constraints. In 1992, a request was submitted to the Bureau of Land Management by a mining company for permission to extract and process gold ore in the Panamint Range, Inyo County, California, near a spring presumed to be critically important to mountain sheep, *Ovis canadensis*. Ensuing compliance with the National Environmental Policy Act resulted in funds to monitor effects of mining activities on mountain sheep inhabiting that area. Because funding was not released until 8 months prior to construction and operation of the mine, we were unable to adequately address the pre-mining ecology of sheep in the "affected" area. We therefore employed a simultaneous treatment-control study designed to test several hypotheses regarding effects of mining activities on habitat selection, demographics, home-range dynamics, foraging activities, and composition and quality of diet for mountain sheep during 1995-1997. During our 3-yr study, we radiocollared and monitored 86% (n = 19) of all adult female sheep known to exist within the mined (treatment) and nonmined (control) areas. Size of annual home ranges, composition of diet, and ratios of young to adult females did not differ between female sheep inhabiting mined and nonmined areas. The nonmined area contained more annual plants, succulents, and perennial forbs than did the mined area, whereas abundance of shrubs, quality of forage, and relative abundance of carnivores did not differ between sites. During spring, female sheep adjacent to the mine spent more time foraging and had a lower-quality diet than those in the nonmined area. Conversely, during summer and autumn, female sheep from the mined area spent less time foraging than those in the nonmined area, but continued to have a lower-quality diet. All females were nearest water in summer compared with other seasons. During all seasons, females selected sites with more mixed-woody scrub, lower elevations, steeper slopes, and less visibility than available at random locations. We observed the greatest disparities between study areas in time spent foraging and diet quality during summer. In summer, females from the mined area were nearest to the mine; amount of explosives used, frequency of blasting, and amount of ore hauled from the mine were greatest during that period. Because of their reliance on a source of permanent water adjacent to the mine during summer and autumn, we hypothesize that female sheep from the mined area spent more time vigilant during those seasons and, consequently, less time foraging than conspecifics in the nonmined area. If outcomes we observed persist for mountain sheep in the mined area, reduced nutrient intake could have demographic consequences for that subpopulation. Thus, providing a reliable source of water away from the mine, or reducing mining activity during summer, may benefit mountain sheep that currently use areas adjacent to the mine.

Wehausen, J. D., V. C. Bleich, and R. R. Ramey. 2005. **Correct nomenclature for Sierra Nevada bighorn sheep.** California Fish and Game 91:216-218.
(no abstract)

White, P. J. and R. A. Garrott. 2005. **Yellowstone's ungulates after wolves - expectations, realizations, and predictions.** Biological Conservation 125:141-152.

Abstract:
We evaluated the initial implications of wolf (*Canis lupus*) recovery on ungulates in Yellowstone National Park and compared expectations prior to wolf restoration with observed impacts since restoration. The numerical and functional responses of colonizing wolves inYellowstone's prey-rich environment were higher than expected and close to the maximum rates predicted prior to wolf restoration. Counts of northern Yellowstone elk (*Cervus elaphus*) decreased more (50%) than predicted (5-30%), and will likely continue to decrease given the strong preference of wolves for elk and continued high kill rates despite this substantial reduction in elk abundance. Contrary to expectations, human harvests were not reduced appreciably concurrent with wolf restoration, but instead remained similar to pre-wolf restoration years. However, antler-less permits were gradually reduced by 51% during 2000-2004 and additional reductions may be necessary while wolf densities remain high. There have been no substantial effects of wolf recovery on other ungulate species (bighorn sheep (*Ovis canadensis*), bison (*Bison bison*), moose (*Alces alces*), mule deer (*Odocoileus hemionus*), pronghorn (*Antilocapra americana*)). However, wolf recovery may eventually contribute to increased bison and pronghorn abundance by decreasing elk and coyote abundance, respectively. Wolf recovery may also contribute to more-pronounced spatial structuring of sex/age classes of northern Yellowstone elk through changes in their distribution, migration, and age structure. The initial consequences of wolf recovery support the premise that wolves may naturally achieve densities above their threshold for ecological effectiveness and contribute to significant changes in ecosystems, including the amelioration of ungulate-caused landscape simplification.

Coltman, D. W. 2005. **Testing marker-based estimates of heritability in the wild.** Molecular Ecology 14:2593-2599.

Abstract:
Marker-based estimates of heritability are an attractive alternative to pedigree-based methods for estimating quantitative genetic parameters in field studies where it is difficult or impossible to determine relationships and pedigrees. Here I test the ability of the marker-based method to estimate heritability of a suite of traits in a wild population of bighorn sheep (*Ovis canadensis*) using marker data from 32 microsatellite loci. I compared marker-based estimates with estimates obtained using a pedigree and the animal model. Marker-based estimates of heritability were imprecise and downwardly biased. The high degree of uncertainty in marker-based estimates suggests that the method may be sufficient to detect the presence of genetic variance for highly heritable traits, but not sufficiently reliable to estimate genetic parameters.

Locke, S. L., C. E. Brewer, and L. A. Harveson. 2005. **Identifying landscapes for desert bighorn sheep translocations in Texas.** Texas Journal of Science 57:25-34

Abstract:
This study used a GIS-based evaluation of escape terrain to identify landscapes for potential desert bighorn sheep (*Ovis canadensis*) translocation sites in west Texas. The quantity and

heterogeneity of escape terrain (i.e., slopes >= 60% with a contiguous 150-m buffer) were quantified for Big Bend National Park, Guadalupe Mountains National Park, Big Bend Ranch State Park, and Black Gap Wildlife Management Area using a 30-m digital elevation model. Big Bend National Park had the largest amount of escape terrain (501 km^2) of the four study areas but had the largest perimeter-to-area ratio (4.9). Guadalupe Mountains National Park had the smallest amount of escape terrain (112 km^2) but also had the smallest perimeter-to-area ratio (2.8). Although other factors (e.g., vegetation, water availability, predators, and interspecific competitors) should be considered prior to translocation, the GIS-based evaluation offers an efficient, preliminary, and quantitative method for evaluating desert bighorn sheep habitat. Based on the results of this study, biologists should further evaluate Big Bend National Park and Big Bend Ranch State Park for future desert bighorn sheep translocation sites in Texas.

Bangs, P. D., P. R. Krausman, K. E. Kunkel, and Z. D. Parsons. 2005. **Habitat use by female desert bighorn sheep in the Fra Cristobal Mountains, New Mexico, USA.** European Journal of Wildlife Research 51:77-83.

Abstract:
Mexican desert bighorn sheep (*Ovis canadensis mexicana*) populations have declined since the 1980s, and restoration efforts are necessary to establish viable populations. Mexican desert bighorn sheep were translocated to the Fra Cristobal Mountains of south-central New Mexico in 1995. We described seasonal habitats used by female desert bighorn sheep by comparing characteristics of radiolocations with random locations within their home range. We developed a geographic information system to derive aspect, distance to steep slopes, elevation, slope, substrate associations, terrain ruggedness, and visibility. We developed seasonal logistic regression models that incorporated distance to 60% slope patches, ruggedness, slope, substrate, and visibility. Habitat characteristics at bighorn sheep locations were similar among seasons. Bighorn sheep locations were on steeper and more rugged terrain, closer to topography with a 60% slope, and had lower visibility than random locations. Based on our description of habitat selection by sheep, managers in New Mexico may need to reassess the amount of escape habitat in restoration areas to prioritize translocations and plan to manage predators.

BIGHORN SHEEP DIE-OFF IN NEVADA

(News Release from Nevada Department of Wildlife)

The Nevada Department of Wildlife (NDOW) is investigating the deaths of 21 desert bighorn sheep that were discovered by ATV riders Sunday (7/24/05) near a water development in the McCullough Range south of Las Vegas.

Rob Buonamici, Chief of Law Enforcement for NDOW, said officers found no obvious signs of trauma in the animals, nor indications that they had been shot. “We will not speculate on what may have caused the deaths,” Buonamici said. “We have taken samples and we’re testing both the sheep and the water to determine the cause of death.” NDOW is working closely with the State Veterinarian’s Office and the University of California, Davis, School of Veterinary Medicine to

handle samples.

When found, 18 of the sheep were in close proximity to the water source, along with three quail that were affected as well. The other three sheep were located a short distance away. Water developments, commonly called "guzzlers," collect and store rain water for year-round use by animals. Desert bighorn sheep are Nevada's state animal. More than 5,500 desert bighorns are found in mountain ranges in the southern and central part of the state.

The Nevada Department of Wildlife is the state agency responsible for the restoration and management of fish and wildlife resources, and the promotion of boating safety on Nevada's waters. Wildlife offices are located in Las Vegas, Henderson, Winnemucca, Fallon, Elko, and Reno. For more information, contact the agency web site at www.ndow.org.

NEW MEXICO AND ARIZONA TRADE BIGHORN SHEEP

(Submitted by Eric Rominger, New Mexico Game and Fish Department)

In 2001, the State Game Commissions in New Mexico and Arizona approved a trade of bighorn sheep. The proposal was for New Mexico to capture 60 Rocky Mountain bighorn sheep from the Pecos and Wheeler Peak Wildernesses in exchange for 60 desert bighorn sheep captured from the Kofa National Wildlife Refuge. Arizona sent 20 desert bighorn to the San Andres NWR in 2002 and intends to capture 30-40 more desert bighorn in November 2005. New Mexico captured 27 Rocky Mountain bighorn sheep in 2003 and sent an additional 32 Rocky Mountain bighorn sheep in August 2005. This agreement will provide both genetic and demographic support for extant wild populations in each state.