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INFERRED NEGATIVE EFFECT OF "TROPHY HUNTING" IN ALBERTA: THE GREAT RAM MOUNTAIN/*NATURE* CONTROVERSY

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Compiling Author's Note and Comment: The wild sheep community is diverse. Specialties within this community range from focus at the molecular level of life increasing in complexity through the cellular level of disease mechanisms and the physiology of life leading to individually adaptive whole-animal behaviors we define as autecology. In animal groups, these individual responses to environment are first defined as "population biology," and ultimately, synecology. When modern humans interact with mountain sheep synecology, the integration of these diverse disciplines, with the goal of producing human benefits while conserving wild sheep, produces the overarching effort we call "management."

For optimal management, complete and rational integration of information the diversity represented within the wild sheep community is required. This almost never happens because few "basic researchers" understand the complex nature of management, and few "managers" appreciate the imputed significance of some "basic research." In the words of actor, Stroether Martin's prison-warden character in "Cool Hand Luke," "What we have here is a failure to communicate." Whether we are "basic researchers" or are

working in management at the political level, all of us exhibit the human tendency toward thinking our specialty is the touchstone of successful wild sheep conservation.

The "Great Ram Mountain/NATURE controversy" illustrates this common human weakness compounded by sensationalized communication efforts. Dave Coltman and his co-authors applied molecular genetic analysis to the Ram Mountain (Alta.) data, and published an interpretation which others in the wild sheep community did not find particularly helpful. If the "Nature Science Update" (an electronic digest) hadn't emphasized Coltman et al's more extreme suppositions as fact, and if the "NATURE Publishing Group" has not made much of the hunting management- critical interpretations, Coltman et al.'s "Letter to NATURE" would have probably gone largely unnoticed. However NATURE's radical representation of hunting management criticisms in the tabloid press was interpreted as "anti-hunting," and was, thus, impossible for other researchers and managers to ignore.

The following collection of essays was produced by way of critique, commentary, and rebuttal. Their "target audiences" vary from the "deeply scientific" to the "popular." The Frisinas review the contributions hunter-funded conservation has made to wild sheep welfare and cite data which appear to refute the broad "hunting/genetic-harm" claims attributed to Coltman et al.. Rominger points to the unacknowledged variance between the Coltman et al. letter and previously published conclusions where the "et al." were senior authors. In these unacknowledged papers, density-driven nutritional scarcity was the common rationalization for observed declines in horn and body size on Ram Mountain. Geist discusses the history of "trophy selection" in Europe and suggests alternate (non-genetic) explanations for the changes in horn and body size reported from Ram Mountain. Geist's essay was submitted to NATURE a rebuttal. It was not accepted for publication. Finally, Heimer and Lee answer Coltman et al.'s allegation that managers have not considered genetic factors in regulation of wild sheep harvest management. They also place the arguments in the unique context of resource management politics in the USA.

If there is any value to recording this event, it is probably simply as a case study where academia and management collided. If there's a lesson in this history, it may be that "academics" no longer live in a sequestered world. Hence, it may be helpful for everyone in our community to understand what "managers" learned long ago from bitter experience: "Be circumspect in communications with the press because what 'comes out' isn't going to look very much like what you 'put in.'"

Perhaps more importantly, the wild sheep community, from the loftiest academic to the lowest manager, should realize that scientific data, their interpretation, and the inferences drawn from them have considerably less influence on the decisions that drive management in the "real world" than publicity in the tabloid press. That said, it is perhaps worth noting that, in spite of this spate of creative controversy in the wild sheep community, the world seems to have pretty much forgotten this ever happened…and it's only been three years. Nevertheless, this "scientific finding" is "out there," and it would be naïve to presume politically partisan publicists will not resurrect it for use as it suits

the anti-hunting agenda. I may be paranoid, but my experience at all levels of involvement in the wild sheep and management communities suggests a high probability it will pop up again…it's just a matter of when. [WEH]

Abstract: More than 30 years ago, Bill Wishart, a charter member of the Northern Wild Sheep and Goat Council, initiated a long-term study of a small, isolated bighorn sheep *(Ovis canadensis canadensis*) population on Ram Mountain in Alberta. The primary rationale for this long-term study was field-testing prevailing wildlife management theories and practices. The first study documented the survival of lambs orphaned by fall ewe harvests. This study involved a complete trapping and marking program that began in 1971. Every sheep on the mountain has reportedly been captured and handled, perhaps twice, annually ever since. Many Ram Mountain studies have been published in the proceedings of this symposium. Throughout the years, the best possible records of matings and births have been gathered and maintained. In a 2003 paper by Coltman et al., these data on lineage were supplemented by population geneticists evaluating DNA similarities in cooperation with bighorn biologists. Resulting data were analyzed using a breeding value computer program from which a relationship between gene frequency and changes in body and horn size was inferred. Coltman et al. published these results and inferences drawn from them in a letter in the journal, NATURE. This letter statistically linked "trophy hunting" as practiced on Ram Mountain with decreases in horn and body sizes among rams. By way of suggestion these authors were credited with concluding, that "trophy hunting" was the cause of horn and body size decreases. Their letter to NATURE included an apparent indictment of "sport harvesting" in general, concluding traditional wild sheep harvest management has been particularly harmful. The letter and its suggestions subsequently became the basis for sensationalized non-technical articles by the *NATURE Publishing Group* in both newsprint and on the internet. Several rebuttals have been offered by the sheep management community. None has been as broadly distributed as the original "popularized" accounts of the original letter to NATURE. NATURE chose not to publish any of these rebuttals. This paper includes the available rebuttals.

[*Editor's note: This first essay represents a non-technical communication to the sheep hunting community. WEH*]

SPORT HUNTING: A MODEL OF BIGHORN SUCCESS

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The popular press is filled with bad news lately. Bighorn hunters, it is stated, are destroying the very rams they covet. Some argue that by killing large, older males, we are ruining the "gene pool" and favoring survival of small-horned bighorns. However, nobody seems to have informed North America's bighorns—they just seem to be getting bigger and bigger instead of going the way of 'tuskless' elephants. So, before you hang your head in shame, and your favorite sheep rifle over the mantle for good, consider some observable, documented facts.

Hit the Books

To get the truth, take a look at recorded bighorn trophies—the biggest of the big. While any legally taken, free-ranging bighorn should be considered a trophy, we chose to analyze the top 100 bighorns in the 11th edition of the Boone and Crockett (B&C) Record book. By analyzing these records, we can address the criticisms leveled against hunting by some scientists. If, as the scientists argue, hunting has been giving an advantage to smaller-horned sheep genes, bighorn trophies should have been getting smaller over time. The B&C records are a good data source because they take into account horn length and mass. Thus, the higher the score, the bigger and heavier the horns.

The B&C records show the number of rams with really big horns has dramatically increased over the past two decades. For example, there are only 19 rams reported in the B & C 11th edition with scores greater than 200 "points" (the way measurements are converted from inches into record scores). Nine of these rams (47%) were taken between 1883 and 1955 (over 72 years of harvesting). No "200 pointers" were reported from 1956 to 1986, but 10 (53%) were reported taken between 1987 and 1997 (a ten-year run). So, most (at least 53 percent) of the very biggest bighorn rams ever reported were taken within the last 10-year period of bighorn harvesting reported in the 11th edition of the B&C records.

Keep in mind that the 11th edition of the B&C book covers only trophies recorded through 1997, and 200 point bighorn rams continue to be harvested at what will prove a statistically increased rate compared with history as the records are continually updated. The new world's record bighorn (breaking a record which has been on the books since 1911) will be listed in the next edition of the B&C records. Also, an Alberta bighorn scoring 208 3/8, which will be yet another record for largest bighorn ever harvested, was taken in 2000. It is interesting to note that Alberta, the province where a tiny population of bighorns was studied to produce the "small horn gene selection" argument also produces these huge rams.

This story gets even more interesting when we compare the top 100 bighorn rams of all time from the same B&C record book. It took 100 years to produce 47% of the top 100 trophies, and only two decades to produce 53% of the top 100. (The percentages here coincidentally match those for 200 point rams.) Keep in mind that, due to the timing of the 11th edition, the final three years of the 1990s are not included, and unusually large rams continue to be harvested and what appears to represent an increased rate.

These are real data; no complex computer modeling; no assumed factors; and no complicated statistical analyses. These simple data indicate a different phenomenon than those produced by what we consider excessive statistical massaging of marginal information. The information we present here represents hunters pursing Rocky Mountain bighorns across their entire range, not from one, unusual, small area.

What Makes for Big Horns in Bighorns?

It is obvious that genetics plays a role. If male, you are likely to end up with the hairline of your mother's father. Still, it is common to overlook how much genetic diversity there is within a specific animal population. Remember the forgotten 50 percent. Ewes contribute half of the genes determining individual sheep characteristics. It is also true that it isn't only the biggest rams that do the breeding. A recent study of Rocky Mountain bighorn sheep found that although a few larger-horned rams (age 8+ years) had a very high reproductive success, younger rams sired about 50 percent of the lambs. Mating success was not restricted to a few top-ranking rams each year. When all is said and done, the potential for horn size may be set by genes, as are other horn characteristic such as curl tightness and overall shape (probably influenced by both parents), but achieving that potential is limited by the environment occupied by the sheep population. A favorable weather cycle may have contributed to the recent bonanza in huge bighorns harvested, but could not have done so if the genetics for large horns had been previously compromised by harvest management.

A good way to understand potential is by analogy to a truck engine. You might have a dandy, beefy Dodge (a Ram, we hope) "Hemi," but if there's an engine speed "governor" that keeps the engine from driving your truck more than 50 miles per hour, you are not achieving the potential of the "Hemi." In the real world of wild sheep, habitat is the "governor" of horn size. It overrides genetic potential. Many years of research on North American deer indicate this is the way it is for antlered animals. In a nutshell, one can make a yearling buck deer (age 18 months) grow to any size from a "spike" to a "4-point," depending on the quality of nutrition provided. It probably works the same for bighorn sheep. [*Editor's note: See Geist's essay here for European experience in deer management.*]

The Montana Case

Montana graphically demonstrates how habitat quality determines horn size in bighorn sheep. Montana is colloquially known as "The Land of Giant Rams." The "Big Sky" has produced 42 of the top 100 rams listed in the B&C 11th edition. As mentioned earlier, many of these rams were taken by hunters during the 1980s and 1990s from herds created through a series of transplants over the past 30+ years. Many of the top 100 rams reported from Montana were taken from these transplanted herds, and the breeding stock for many of these transplants came from the Sun River population. The Sun River population is notable for its absence in the B&C records. Still, these "Sun River genetics," when introduced to new areas where population density is low and competition for food is minimal, produce the biggest of bighorn rams in the United States. Apparently other factors than genetics are at work here.

Sport Hunting: Sin or Savior?

To the sport hunter or general bighorn enthusiast, the "good old days" are now! Why? It is because the alliance between sportsmen/women, wildlife managers, and

conservation organizations such as the Foundation for North American Wild Sheep (FANWS) are realizing the results of their investments and efforts on behalf of bighorn restoration and management.

A key time in the history of North American wildlife conservation was 1937, the year the Federal Wildlife Restoration Act (or Pittman-Robertson (P-R) Act) was passed by the US Congress. The P-R Act defined the mechanism by which hunters were able to focus tax dollars from sales of ammunition and firearms on restoration and management of wildlife in the USA. The law is very specific; the money must be used for meaningful wildlife restoration, conservation, and management to benefit purchasers of hunting licenses. These federal excise tax dollars match state hunting license dollars (3:1) to produce the dominant funding source for wildlife conservation efforts in the United States.

An important use of P-R funds, along with other hunter dollars generated by organizations such as FNAWS, is the restoration of bighorn herds through bighorn re-introductions and habitat conservation. Habitat acquisitions, conservation easements, and other creative strategies have resulted in many herds being re-established on historic ranges. Thus it is sport hunting which has provided the means for restoration of bighorn sheep and a steadily increasing number of unusually large bighorn rams. These facts were not presented in the newspapers from London to New York and across the internet as were the results of the scientists and their strained opinions.

The moral of the story:

Hunters, don't hang your heads, and don't be swayed by assumptions and theoretical conjecture disguised as truth by complex statistical analyses and computer models. The reality of things is that if we want to keep producing the biggest of the big, the proven way is more, not less, sport hunting of bighorn sheep. There is no need to apologize for that.

As so often happens, subjecting a small amount of data to statistical analysis led to a mathematical linkage of results with supposed causes that don't stand up under other testing. The results in this case have been assumptions and opinions which have accomplished little on behalf of North America's wild sheep. Hunting, however, has enabled the comeback of our beloved bighorns and continues to assure a future for the biggest of the big, as well as the average.

Suggested Reading:

Voodoo Science: The Road from Foolishness to Fraud by Robert Park. Available from "Amazon.com"

Records of North American Big Game, 11th Edition by Boone and Crockett Club. 1999. Available from Boone and Crockett Club, Missoula, Montana.