"DID WE ACTUALLY DO ANYTHING?"—THE ??? MILLION DOLLAR QUESTION

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Abstract: It is unusual for a wild sheep biologist to enter the profession and survive long enough as a specialist/manager to effect a regulatory change in season or bag limit. It is even more unusual for a sheep manager to then live long enough to see the results of that change in management. After wrestling with "what management is" for decades, I have come to define "management" in the general sense as intervening in any established system to enhance a pre-defined benefit. In Alaska, the pre-defined benefit from wildlife management is set by Constitutional and Statutory mandates. These mandates call for maximizing benefits to the economy and general well being of Alaska in a sustainable manner. Working under these guidelines, my friends and I stumbled onto a regulatory change linking Dall sheep (*Ovis dalli*) behavior to Dall ram harvest which manifested itself as Alaska's full-curl regulation 20 years ago. Throughout the full-curl era to date, Alaska has harvested about 23,000 rams. The economic value of each ram in today's dollars can be extrapolated from economic valuation studies in 1983 and 1994. The adjusted economic benefit from Dall ram hunting in Alaska over the last 20 years sums to an astronomical figure, $437 million. The annual economic benefit to Alaska in today's economy is approximately $20 million per year. Benefits to the "general well-being" of the state probably represent general satisfaction of Alaskans with the sustainability of the Dall sheep resource, its status and availability to them, and the degree of public empathy the hunting community and other Alaskans have with their public trust interest in Dall sheep. The economic and "general well-being" benefits derived from Alaska's Dall sheep resource over the last 20 years of full-curl management are presented and discussed in an effort to define whether "We actually did anything" in establishing the full-curl management scheme--or not.

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It is unusual for wildlife managers, particularly managers of long-lived species such as wild sheep, to know with certainty whether they achieved anything beyond implementing a specific regulatory change. With respect to management of wild sheep harvests by human hunters, the success of regulatory changes often takes years or decades to define. Because Dall (*Ovis dalli*) rams do not generally become legal for harvest in Alaska until eight years after their birth, the rationale for regulatory change has often been long-forgotten by the time the results are apparent.

Even if a biologist lives long enough to effect a regulatory change, evaluation of success or failure seldom occurs (perhaps due to the long lag-time required to evaluate the effects of regulatory change). In the absence of a viable evaluation, one opinion seems as good as another while miscellaneous, opinion-based changes befuddle hunters. If success should ever be evaluated, it will most likely be subjectively judged by subsequent generations of opinion-driven hunters or managers. This is not surprising because management itself is not well defined in these postmodern times (Heimer 2004, 2008). In this philosophical environment, there can be no objective criterion for judging success or failure. If there is no objective measure of success, one has to wonder at the logical validity of the enterprise we, as sheep managers, take so seriously we risk our lives in its pursuit (Heimer 1999a).

In an effort to answer the query of a long-time friend and cooperator in Alaskan Dall sheep management, "*Did we actually do anything?*" I

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began with a definition of management which will certainly date me as "modern" (as opposed to contemporary or "postmodern"). This, perhaps antiquated, definition of "management" is:

Intervening in an established system to enhance a pre-defined benefit.

In business management, the pre-defined benefit is profit; in human resource management, efficiency and worker satisfaction are the pre-defined benefits. In wildlife management as a discipline, the pre-defined benefit seems undefined, except perhaps in Alaska. Because the predefined benefit we "manage" to achieve is clearly defined, evaluation of success or failure becomes possible in those terms. It's just a matter of doing it.

In Alaska, the pre-defined benefits mandated as measures of management success are clearly articulated in the Alaska Constitution and Alaska Statutes. The existence of these mandates does not automatically eliminate argument on this matter because of social and political influences and personally held meta-values about wildlife. Nevertheless, Alaska Statutes (16.05.020) define the duties of the chief wildlife manager of the state, the Commissioner of Fish and Game. The Commissioner's second duty (after being the chief wildlife management officer) is to:

(2) manage, protect, maintain, improve, and extend the fish, game, and aquatic plant resources of the state in the interest of the economy and general well being of the state;

This statute gives force to the Alaska Constitution Article VIII which mandates management of maximal harvests (for human use as clearly intended in the notes of the Resource Committee at Alaska's Constitutional Convention) based on the sustained yield principle. Consequently, a legalistic or semantically rigorous approach to defining management success or failure seems to require intervening in established ecosystems, whether "natural" or not, to maximize the predefined benefits to the economy and general well-being of the state.

Measuring or quantifying the economic benefits produced by managing hunting and harvest of Alaska Dall sheep was relatively straightforward in concept. The devil was in the details, and the details were managed by my colleague of those days, Sarah Watson-Keller in a pioneering study of the economic value of Alaska Dall ram hunting in 1983 (Watson 1984, 1986). Following this groundbreaking work, in 1994 a subsequent joint economic study overseen by Alaska Department of Fish and Game (ADF&G)'s Suzanne Miller and the US Forest Service repeated the process for all big game hunting in Alaska in 1994. These studies both defined the economic value of Dall ram hunting using established non-market valuation techniques (Watson 1984). When dollar values of both studies were adjusted to express the overall value in today's dollars, they gave remarkably similar estimates of the primary expenditures in Alaska related to Dall ram hunting. In today's dollars, the average primary benefit to the Alaskan economy is about $19,000 dollars per harvested ram (this figure includes the expenditures of unsuccessful hunters). If we multiply the estimate of harvest (23,000 full-curl rams harvested over the last 20 years) by today's average dollar value per ram ($19,000), the cumulative primary economic benefit to Alaska over the 20-year full-curl management period has been about $437 million in today's dollars.

This is a dazzling figure which shows the economic importance of Dall ram hunting to the Alaskan economy, but offers little to answer the question of whether the full-curl regulation produced an economic benefit to the State of Alaska. The best we can do to address this question is to review the original justification for the full-curl regulation. About 1984, Heimer and Watson made the initial counter-intuitive argument that harvests from ram-depleted populations would increase if more mature rams were present during rut, established a demonstration project, and reported confirmatory results in 1990. The data indicated a 35% increase in full-curl ram harvest over 3/4 curl and 7/8 curl harvests under those regulation schemes in a stable, carefully monitored, ram-depleted population of about 2,000 Dall sheep over a five year test period (Heimer and Watson 1986a, 1986b, 1990). If sustainable harvests increased 35% statewide, the net economic benefit from the full curl regulation over the last 20 years would calculate at 35% of $437 million or about $150 million. This sum, while it represents the upper

limit of what might have been possible is simply too large to be credible. For it to approach reasonability, all ram populations in Alaska would have had to have been ram-depleted like the study population. They weren't.

Because the harvest from this ram-depleted population increased by 35 percent following the change from 7/8 to full-curl harvest regulation with no changes in ewe population size, it may be reasonable to suggest ram-depleted population harvests in other areas might have shown similar increases. However, not all populations in Alaska were ram-depleted when the full-curl regulation was implemented. At that time (in the mid- and late-1980s) statewide huntable sheep numbers were at the recorded maximum of about 50,000 Dall sheep of the 72,000 estimated to be present in Alaska (about 25 percent of Alaska's sheep were, and remain off limits to hunters because they are in National Parks).

Hence, the experimental ram-depleted population (numbering about 2,000 sheep) represented 4% of the total huntable population. Taking 35% of the gross revenues from 4% of the estimated $437 million benefit produced by Dall ram harvesting gives a regulation-assignable benefit of 4% of $437 million total dollars produced from the study population alone. This figure is still significant, summing to $17.5 million dollars over the last 20 years. The net increase in harvest, 35 percent, contributing to this figure gives a minimum benefit to Alaska's economy of about $6.1 million present-day dollars accruing to the economy of Alaska from these 2,000 huntable sheep. This calculates to an average of something above $300,000 annually as a minimum economic benefit from the full-curl regulation produced by a ram-depleted population amounting to only 4% of the total huntable population over the last 20 years.

These calculations are somewhat similar to the popularly accepted, simple arithmetic approach to calculating carbon emissions and their effect on global climate change for any given human endeavor. Both seem based on reasonable assumptions at the start, but when the arithmetic has been done, astounding totals result.

In the end the net result of intervening in the existing Dall ram harvest allocation system to maximize biological stability and economic benefits to the economy of the state seems to have been positive. The upper limit of economic benefit might have been as high as $150 million in 2012 dollars (an unrealistically expansive calculation sum simply extrapolated to the entire state) or as low as $6.1 million dollars (if limited to just the realized increase from the first experimental population). By either of these standards, it would seem that Dall ram hunting as presently managed maximizes the opportunity for economic benefit to the state under current harvest allocation procedures (see Heimer, pages 15–24, these proceedings). Consequently, I think the answer to my friend's question, "*Did we actually do anything?*" should be answered in the affirmative. I think we intervened in the established system to increase the pre-determined benefit to the economy of the state. Just how much we'll probably never know—but it was a LOT of money. Dall ram hunting remains a major "profit center" for the state of Alaska.

Still, we should not forget that Alaska's mandate to its wildlife managers goes beyond economic benefit to the state, also including the state's general well-being. Did we maximize the benefit to the general well-being of the state? Here, I argue the answer should be, "Yes."

I have previously argued that the North American wildlife management model, as applied in the United States, makes hunting the lynchpin of conservation in the United States. When the general citizenry identifies itself as an active participant in realizing benefits from its resources (the Alaskan public-trust model from Article VIII of Alaska's Constitution), the money to effect conservation flows freely (from hunting licenses and matching federal revenues). Also, an interested public is protective of its personal interest in benefits resulting from resource management. Hence, it should follow that the chances for successful conservation increase with heightened public support and interest. For Dall sheep in Alaska, this still means ram hunters.

After looking at the Alaskan situation for four decades, I suggest the major benefit we provided for the general well-being of the state (and its Dall sheep) was heightened identity of the Dall ram hunting public with its Dall sheep resource. When I arrived in Alaska 44 years ago, it was difficult to find a resident who was not closely tied to the land, the water, or the wildlife in some way. As time

passed, this bond seemed to erode. Building the Trans-Alaska Oil Pipeline attracted a differing type of person to Alaska. These newcomers were not here to bond with Alaska's land, waters, and wildlife, but to make money building the pipeline. As I have written, perhaps too extensively, determining who would own the land the pipeline sat on (and thus receive royalty money and have taxation power) first required settlement of long-standing Alaska Native Land Claims. In the course of this settlement, folks with a new and different conservation model (coercive protection of resources) gained the upper hand (Heimer 1999b).

The resulting ascendancy of managing agencies as "owners" further eroded the bond Alaskans had with land, water, and wildlife. The separation of Alaskans from land, water, and wildlife was particularly accelerated by the re-assumption of ownership of all these essential elements of the Alaskan lifestyle by the federal government. The state agencies were not immune from this trend, and the "manager as owner" began to emerge as the dominant ethos at the state level as well. This was the condition with respect to Dall sheep when my friends and I stumbled onto the notion that meeting the constitutional and statutory mandates in Alaska would require we take steps to maximize harvests that had not yet entered the general management consciousness.

Our Department of Fish and Game leadership was uniformly unprepared to factor animal behavior into harvest regulations (which is the principle upon which the full-curl regulation rests). Consequently, the management agency was virulently opposed to the counter-intuitive notion that waiting till rams were full-curl or eight years old would actually increase harvests (which it did by 35% in a study population—see above or the references to papers by Heimer and Watson).

As events unfolded, because of my advocacy for this change, I was punitively reassigned from the research section to the management section at ADF&G. This gave me ready access to the sheep-hunting public which invariably wanted not only to know where they could hunt, but what was "new" in sheep biology. This was a logical question for hunters because I had been the "research face" of Dall sheep at ADF&G for 15 years at that time. Naturally, I shared our data, and explained what we had learned to hunters. It all seemed quite reasonable to them. As a result, proposals from the sheep hunting public were submitted to establish the full-curl regulation to increase benefits (harvests). Although the struggle over this issue when it came before the Board of Game was bitter and epic, the will of the Dall ram hunting public eventually prevailed over the strident resistance of ADF&G leaders, and our now 20-year old full-curl regulation was passed.

I argue that this public involvement in a fundamental management change basically wrested "ownership" from the managing agency (ADF&G) and returned it to the people of Alaska. This, I further suggest, was of immense, even if un-measurable, benefit to the "general well-being of the [people of] the state" as prescribed by AS 16.05.020. Not only did it vindicate data-based species biology as the basis of management (including harvest), it empowered Alaska's Dall sheep hunters, and effectively raised the status of sheep hunters and sheep hunting. All these years later, Dall sheep research and management budgets have grown to levels unimaginable during my tenure as a sheep researcher and manager.

Of course, owner-hunters can be more troublesome for managing agencies to "satisfy" than passively managed predators, which is what hunters become when they fail to assert their ownership of Alaska's resources. The other paper I have in this symposium demonstrates that the "owner-hunters" may not always have the most enlightened view of management, allocation of harvests, and Alaska's constitutional and statutory mandates. Still, as long as they're actively participating in the system (whether in harmony or acrimony), the chances for successful Dall sheep management appear to remain higher.

So, to my friend who asked, "Did we actually do anything?" my answer is an emphatic yes. Others may disagree, but I think things are better than they might have been in spite of the challenges faced over the years.

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