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HARVEST STRATEGY PANEL: MAXIMIZING RAM HARVESTS

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Author's Note: This report is a summary of ideas presented for discussion. It is not intended to represent the position of the Alaska Department of Fish and Game.

Abstract: Discussion of harvest strategy implies a management goal which the strategy is employed to achieve. However, the most common harvest regulation in the western United States, the 3/4-curl law, appears, upon historical review, to exist because of tradition instead of being selected to achieve maximum harvest goals. When maximum sustainable harvest is the management goal, ram mortality patterns, behavior, theoretical energetic considerations, and empirical data gathered in Alaska's Dall sheep (Ovis dalli dalli) management experiences indicate greater harvests of rams can be sustained by limiting harvest to Class IV rams. This strategy may not be the most effective if maximum sustained ram harvests are not the primary management goal.

Use of the term harvest strategy indicates the existence of a goal which managers of mountain sheep populations seek to achieve. Presumably, this goal has been defined by a management plan. Presuming even further, this management plan should have as its basis, a sufficient biological understanding of mountain sheep populations that the goal is achievable.

Harvest strategies comprise a spectrum of possibilities which could have goals ranging, at the extremes, from maximal growth to extirpation of any population. The harvest strategy selected should be appropriate for achievement of the management goal.

A brief review of history shows harvest strategy has been inherited more often than selected on the criteria defined above. After the decline of North American mountain sheep which accompanied the settlement of the American west (Buchner 1960), enlightened approaches to management of wild mountain sheep (mostly total protection) eventually brought many populations back to huntable numbers (Trefethen 1975, Hoefs 1985). As sheep populations returned to viability, managers sought a balance between protection and use. This meant allowing for harvest, either by hunting or

transplant, within the limits of biological safety and herd growth. The need to assure continued herd recovery and health was easily understood. Likewise, the advantages of maximal use by hunters were well known, though less apparent. These included revenues produced by license and tag fees, the development and maintenance of the guiding and outfitting industries, and a high public interest in the conservation and management which attend hunting.

A review of mountain sheep hunting regulations across North America (Demarchi 1978) shows the most common attempt to balance herd growth (either for recovery or transplant programs) with maximized hunter use was an attempt to limit harvest to surplus males (rams). This same thinking produced "bucks only" seasons for deer at about the same time. Historically, rams which could be removed by hunters without noticeably compromising lamb production were defined as surplus. Sheep survivorship in unhunted populations shows a consistently low mortality between 1 and 7 years of age (Deevy 1947, Bradley and Baker 1967). Still, the conclusion reached by most sheep managers was that harvesting rams at the youngest acceptable age (before natural mortality removed any more of them than necessary from the shootable population) would give the greatest sustainable harvests. This was a data-free assumption. Establishment of the 3/4-curl regulation predated, by almost 15 years, the earliest study of mountain sheep mortality (Murie 1944). Nevertheless, it persists as the dominant rule governing harvest of mountain sheep throughout the western United States. Few dicta have persisted in such a data vacuum justified purely on (seemingly reasonable) assumptions.

Because ram horns grow throughout life and describe a full circle (full curl) at maturity, the legal age of rams for harvest has been defined by the degree of horn growth, portion of a full circle or curl, attained. The age/horn size limit commonly applied in North America was arbitrarily set at 3/4 curl in an effort to provide both biological safety and the maximum number of surplus rams. This defined rams above the ages of 3-5 years (depending on species and population growth rate characteristics) as surplus. This represented a step beyond males-only hunting and appears to have been designed to either assure larger horns or to protect young rams. The first 3/4-curl regulation was instituted in Wyoming in 1930 (Demarchi 1978).

Recently, rams have been shown to reach this horn size well after they develop the capacity to sire offspring, usually at 18 months of age (Nichols 1978). Consequently, some western states have set regulations which define rams above half-curl age/size as legal (i.e., surplus) game. According to Demarchi (1978), Oregon has a half-curl rule and Wyoming and Colorado have had them in the past. Colorado established a half-curl regulation again in 1983.

In this presentation, we shall discuss an alternate management strategy which is more likely to produce maximum numbers of rams for harvest. The rams will also be older and larger.

METHODS

We shall develop this theoretical strategy for maximal ram harvest based on the biology of mountain sheep using several data bases. The first is a review of mortality patterns for Desert (Ovis canadensis nelsoni), Rocky Mountain bighorn (Ovis canadensis canadensis), and Dall sheep (Ovis dalli dalli) by Bradley and Baker (1967). The second is the general behavioral pattern of mountain sheep as described by Geist (1971). The third data base we shall draw upon is our personal interpretation of information obtained from Dall sheep management in Alaska. Graphical analysis for prediction will also be employed.

RESULTS AND DISCUSSION

Natural Mortality Patterns

Murie published the first data relating to his large collection of Dall ram skulls in 1944. Shortly thereafter, Deevey (1947) applied the emerging technology of actuarial statistics to Murie's data, and produced a life table for Dall rams. Twenty years later, Bradley and Baker (1967) wrote a review article in which they produced similar life tables for most other species of North American wild sheep. As the actuarial technology developed, numerous questions arose about these analyses (e.g., Murphy and Whitten 1976). Still, there seems to be little doubt that these life tables, and the survivorship curves they generate, define, generally, the form of the survivorship curves for male mountain sheep and predict with sufficient accuracy to draw general inferences.

Age-specific survival for rams beyond age 1 has been measured for several unhunted populations (Murie 1944, Bradley and Baker 1967, Geist 1971, Murphy and Whitten 1976). The typical pattern from birth to recruitment as yearlings is one of high mortality which ranges 40-60%. The first year is followed by two periods characterized by radically different mortality rates. As Geist (1971:295) said: "It can be seen that there are 2 general phases in the survivalship curve...there is a phase of low mortality between the ages of 2 and 8 years and a phase of accelerated mortality in the higher age categories." Data for Dall rams (taken from Murie 1944) show mean mortality for the low mortality phase averaged about 2.3% per year. The mean rate during the high mortality phase was 17.8% of the 8th-year-and-older rams.

For purposes of analysis and simplicity of comparison, we fitted the least squares straight line to both phases of the survival curve. This analysis confirmed the 7.7-fold increase in mean mortality rate beginning at age 8 in Dall sheep. These mortality rates and the ratios between them are typical for mountain sheep populations (Bradley and Baker 1967). In summary, mountain sheep rams do not face serious mortality risks in unhunted populations until they reach age 8. This age generally corresponds to Geist's Class IV status (Geist 1971). These are the socially dominant rams which do most breeding and maintain social order in ram society.

Hunting Mortality and Management

As a management consideration, development of a strategy for maximizing ram harvests seemingly presumes sufficient harvest effort to take most legal rams, of whatever size, each hunting season. The question then becomes, what are the biological consequences of the 3/4-curl regulation when maximum harvest is allowed?

Observations of several Alaskan Dall sheep populations subjected to this cropping strategy indicated that lamb production continues despite complete removal of Class III and Class IV rams. Formerly, we thought this showed that no negative effects on lamb production attended maximal cropping at 3/4-curl. However, cumulative evidence, which I shall present later in this symposium, indicates this was an optimistic though unwarranted conclusion. Lamb production, it now appears, may be seriously compromised by removal of virtually all rams down to 3/4-curl age/size.

A second question is, "Are we really providing the maximum sustainable harvest by setting the lower legal limit at 3/4-curl age/size?"

Behavior

Consideration of mortality patterns along with studies of the behavior of mountain sheep rams suggest we are not providing the maximum sustainable harvest by setting the lower legal limit at 3/4-curl age/size. Geist (1971:295-296) predicted serious consequences in a population where younger rams actively participate in breeding. Based on energetic considerations, he said:

> "The ages of low mortality in rams coincide with their dominance status and near exclusion from breeding by larger horned, older rams. Conversely, when rams reach near ultimate body and horn size and become dominant breeding rams during the rut, their mortality increases. This relationship between dominance and high mortality appears to be causal for the following reasons: large, dominant rams which breed most ewes virtually do not feed while guarding ewes and they fight extensively and do much running and chasing when following the estrous ewe and discouraging competitors. Unlike small rams, the large breeding males often return exhausted from the rut. They have probably lost most of their fat deposits, whereas subordinate rams probably retain theirs. In the severe winter months following the rut, the rams that have lost their energy reserves probably succumb (see Heptner et al. 1961 for other ruminants). Two predictions, as yet unverified, are that large rams should lose more weight during the rut than small-horned rams and that YOUNG RAMS WILL DIE OFF MORE RAPIDLY IF, DUE TO CIRCUMSTANCES, THEY ARE ALLOWED TO PARTICIPATE IN BREEDING AT THE SAME LEVEL AS OLDER RAMS" (emphasis ours).

If the cause of accelerated mortality is the same for both younger and older rams, Geist may be predicting the mortality rate for rams involved in rut should be similar regardless of age. That is, it represents the mortality-cost of dominance.

When maximum harvest of 3/4-curl rams is permitted, it allows younger rams to participate in breeding at the same level as older rams would if they were present. We reported on this situation (Heimer and Watson 1984) in Alaska at the last meeting of this symposium. Our data from Dry Creek in the Alaska Range showed the least squares line describing accelerated mortality among marked rams in a heavily hunted, 3/4-curl-managed population had "the same" slope as that for rams aged 8 years and older found in Murie's skull collection from unhunted McKinley Park (Murie 1944) (Fig. 1).

If we may assume our findings, which verify Geist's prediction about early death, are generally applicable, it becomes possible to predict the number of rams available to hunters under various ram harvest schemes at maximum harvest levels. Fig. 2 is used to make these predictions. In this figure, a survivorship curve for Dall sheep (adapted from Murie 1944, to fit production and recruitment levels at Dry Creek) is plotted, and the slope of the accelerated mortality phase for dominant rams determined. The ram age/status classes (as defined by Geist in 1971) have been superimposed on the abcissa at their corresponding ages for Dall sheep in Alaska. Predications of sustainable harvest with more permissive legal ram definitions are derived by shifting the best straight line for the accelerated mortality phase of the curve toward the left. If removal of dominants has a constant effect on the opportunity of young rams to participate in the rut, the extent of the leftward shift will predict the number of rams of any given cohort which would be expected to survive. Of course, the function is not continuous because rutting is limited to the winter rutting period, and some care must be exercised in placement of the line describing the anticipated accelerated mortality effect.

As a first approximation, we could place the accelerated mortality phase line so it intersects the survivorship curve at the first possible active rut in a ram's life. This is the second rut when a ram is aged 18 months. If rams in this age/status class had the same opportunity to rut as all other rams in the population, and suffered the consequent mortality increase, the predicted harvest would be about 200 of the 570 rams recruited as yearlings. However, Nichols (1972) gathered data on rutting behavior from a population heavily cropped at 3/4-curl. These data suggested the 1/4-curl rams (Class I) did not participate in rut as much as rams which are another age/status class higher (Class II). These data suggest the line describing the accelerated mortality phase should be placed so it intersects the survival curve at the rut before the beginning of age/status Class II, the 1/2-curls. When this is done, the prediction comes to about 275 rams. Here it is worth noting that Heimer and Watson (1984) reported marked rams began to disappear at the increased mortality rate at age 3 in Dry Creek (Fig. 1). This seems to support the argument that under these circumstances, Dall sheep begin actively participating in rut before age 3.

It is important to note that this prediction (a maximum sustainable harvest of 275 rams) exceeds the sustainable ram harvest empirically determined by maximal harvest at 3/4-curl in Alaska. Heimer (1980) reported the observed maximal harvest from steady-state non-lamb populations in Alaska was about 2.5% from four different areas throughout Alaska over a cumulative period of 14 years.

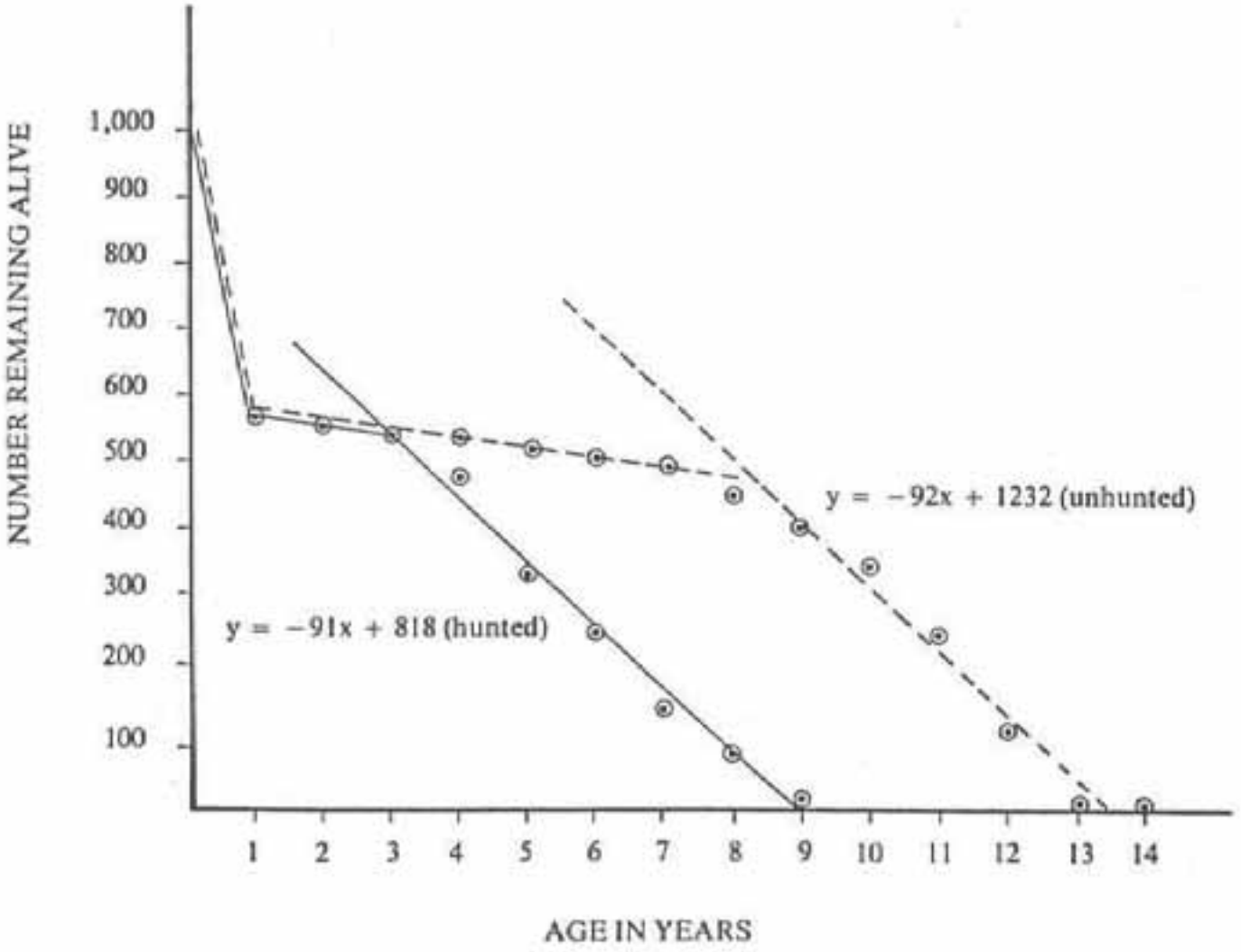

Fig. 1. Survival of Dall Rams in the heavily hunted (Dry Creek) and unhunted (Mt. McKinley Park) sheep populations.

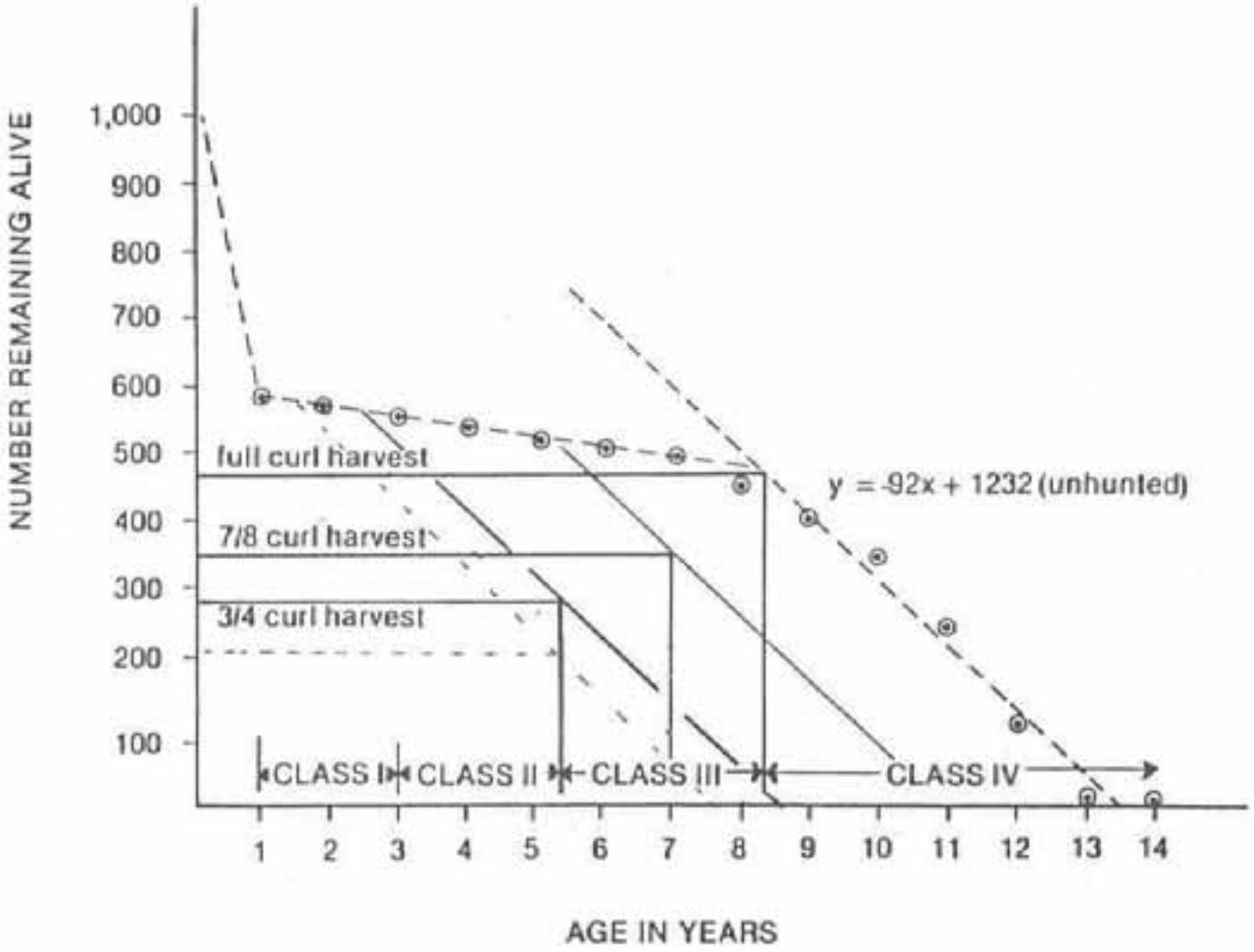

Fig. 2. Dall sheep ram survival in an unhunted population (dashed line) and survival of sublegal rams under different hunting regulations assuming maximum harvest of legal rams (from Murie 1944).

In Fig. 2, the sustainable harvest rate was estimated by calculating the number of sheep (excluding lambs) required to produce a "cohort" of 1,000 lambs. The sex ratio of mountain sheep is about 50-50 at birth (Hoefs and Cowan 1979), so the production of 1,000 rams lambs required the birth of 2,000 lambs. Based on the mean production rate required for stability in the Dry Creek population since 1970, 42 lambs/100 ewes, the number of ewes required to produce 2,000 lambs would be 4,671 ewes. Population composition in Dry Creek averaged 54% ewes during the aerial surveys of 1970, 1975, and 1980. When this mean figure is applied to the data, it yields a calculated population of 8,817 sheep (excluding lambs) required to produce 1,000 ram lambs. When the predicted sustainable harvest (275 rams) is divided by the non-lamb population, the result is a harvest rate of 3.0%. This prediction exceeds by 20% the sustainable cropping rate empirically determined in Alaska. Other factors may cause the theoretical rate to be greater than the observed rate. In any case, it appears that greater survival of recruited ram yearlings to shootable age when old rams are present will provide more rams for maximum harvest even if they must live to full-curl age/size than are available for maximum harvest at 3/4-curl age/size. This could lead to as much as a doubling of ram harvests of older (and larger) rams.

Further supportive evidence comes from marked rams in a full-curl regulated area in Alaska. Heimer and Watson (1984) reported a return rate of only 16% for ear tags placed on sublegal rams in the maximally cropped 3/4-curl area when the population was about 1,500 sheep. In contrast, at least 27% of rams marked in a similar manner from the full-curl area have reached full-curl as of this time--they survived not only to 3/4-curl age but to full-curl age/size. Harvest in the full-curl management area is submaximal, being limited by permit to less than the calculated recruitment to the full-curl age class, and many of the 33 marked rams have not yet reached legal status. Tag returns by hunters are expected to increase further as more of these rams become legal game.

The above data have important management implications. If the management goal is to practically maximize ram harvest, then higher harvest levels are likely to be sustained by taking rams from only the upper age/status class (Class IV). Certainly, some rams will be lost to natural mortality between Class III and Class IV, but the potential harvest may double if only Class IV rams are harvested (Fig. 2). If the limit is set at 7/8-curl, as in most of Alaska at the present time, the model predicts an increase in harvest of approximately 30% over that at 3/4-curl in areas of maximal harvest.

It is possible that the anticipated Class IV (full-curl for Dall and Stone sheep) harvest may not be fully realized. Based on computer simulations of horn growth, Nichols (1984) suggested that in some thinhorn populations up to 15% of the rams may never reach full-curl horn development. Should this prediction be correct, the efficacy of setting a legal age minimum as well as a degree of horn development (such as in British Columbia) when maximum harvest is desired becomes apparent. However, even a maximally restrictive full-curl rule could still be expected to increase sustainable thinhorn harvest, even though the increase would theoretically be less.

Establishing regulations which limit harvest to Class IV rams for thinhorn sheep is relatively easy. Thinhorn rams broom their horns less frequently and later in life than bighorns. Hence, setting a regulation defining legal sheep as full-curl or with both horns broomed (not worn) effectively limits harvest to Class IV rams. Establishing a regulation which will limit harvest to Class IV bighorn rams appears to be a more challenging management problem.

In practice, a noticeable increase in sustainable harvest rate has yet to be conclusively demonstrated by maximum harvest. Heimer (1980) reported a submaximal harvest percentage of the non-lamb population from the full-curl management area (where participation is limited by permit) of almost 4% (compared with 2.5% maximum at 3/4-curl in other populations). This harvest rate allowed maintenance of a 12-year horn size of 36.5 inches and a mean age of nearly 8 years for rams harvested from this population of about 1,800 sheep. Experimental full-curl regulations were established two hunting seasons ago in interior Alaska. To this time, there has been no notable increase in number of rams harvested. In these areas, maximal cropping for 7/8-curl rams had been in effect for the previous 5 years, so no increase is anticipated for another year. Still, the harvest has not declined, and harvest across the entire full-curl area in 1985 was the highest since 1977. Hunter success in 1985 equaled that for heavily hunted 7/8-curl populations and was comparable to hunter success for 3/4- and 7/8-curl rams in past years. Similarly, British Columbia has implemented a series of progressively more "restrictive" horn development regulations (Demarchi 1978). Their current full-curl regulations have been in effect since 1978, and no decline in harvest has been observed. In fact, harvests have increased (Demarchi, pers. commun.).

In summary, theoretical, experimental, and empirical approaches to the question of whether traditional 3/4-curl management provides maximal harvests of mountain sheep rams are in remarkable agreement that the answer is "no." It should be stressed here that these arguments are applicable where maximum harvest is the desired management goal. If submaximal harvest is the goal, or if hunting pressure is insufficient to take all legal rams, other harvest schemes may function within the biological capabilities of mountain sheep populations to meet these goals. However, our conclusion is that when maximum harvest is desired, and in fact, practiced, harvest levels will be greater, and population health improved by restricting harvest to Class IV rams.

LITERATURE CITED

Buchner, H. K. 1960. The bighorn sheep in the United States: its past, present, and future. Wildl. Monogr. 174pp.

Bradley, W. R., and D. P. Baker. 1967. Life tables for Nelson bighorn sheep on the Desert Game Range. Trans. Desert Bighorn Counc. 11:142-169.

Deevey, E. S., Jr. 1947. Life tables for natural populations of mammals. Quart. Rev. Biol. 22:283-341.

Demarchi, R. A. 1978. Evolution of mountain sheep horn curl regulations in British Columbia. Pages 17-29 in D. M. Hebert and M. Nation, eds. Proc. Bienn. Symp. North Am. Wild Sheep and Goat Counc., Penticton, B.C.

Geist, V. 1971. Mountain sheep: A study in behavior and evolution. Univ. Chicago Press. 383pp.

Heimer, W. E. 1980. A summary of Dall sheep management in Alaska during 1979--(or how to cope with a monumental disaster). Pages 355-382 in B. Hickey, ed. Proc. Bienn. Symp. North Am. Wild Sheep and Goat Counc., Salmon, Idaho.

_____, and S. M. Watson. 1984. Excess ram mortality in a heavily hunted Dall sheep population. Pages 425-432 in M. Hoefs, ed. Proc. Bienn. Symp. North Am. Wild Sheep and Goat Counc., Whitehorse, Yukon Territory.

Hoefs, M. 1985. Wild Sheep: Distribution, abundance, management, and conservation of sheep of the world and closely related mountain ungulates. North. Wild Sheep and Goat Counc., Spec. Rep., Yukon Wildl. Branch, Whitehorse. 218pp.

_____, and I. McT. Cowan. 1979. Ecological investigation of a population of Dall sheep. Seyesis 12 (Suppl. I):1-81.

Murie, A. 1944. The wolves of Mt. McKinley. U.S. Dep. Int. Natl. Park Serv., Fauna Ser. 5.

Murphy, E. C., and K. R. Whitten. 1976. Dall sheep demography in Mt. McKinley Park and a reevaluation of Murie's data. J. Wildl. Manage. 40:597-609.

Nichols, L. 1972. Sheep report. Alaska Dep. Fish and Game. Fed. Aid in Wildl. Rest. Prog. Rep. Proj. W-17-3, W-17-4, Job 6.4R. Juneau. 51pp.

_____. 1978. Dall's sheep. Pages 173-189 in J. Schmidt and D. Gilbert, eds. Big Game of North America: Ecology and management. Stackpole, Harrisburg, Penn. 494pp.

_____. 1984. Some effects of a full-curl law on Dall's sheep management. Pages 389-395 in M. Hoefs, ed. Proc. Bienn. Symp. North Am. Wild Sheep and Goat Counc., Whitehorse, Yukon Territory.

Trefethen, J. B., ed. 1975. The wild sheep in modern North America. Proc. Workshop Manage. Biol. North Am. Wild Sheep. Univ. Montana, Missoula. 295pp.

QUESTIONS AND ANSWERS

Daryll Hebert, British Columbia: I was just wondering if you had a similar ram mortality curve for any other area in Alberta besides Ram Mountain?

Wayne Heimer, Alaska: It's about the same.

Hebert: Wayne, the other question I have is, you've got as you mentioned tag returns on your 3/4 curl sheep area and your full curl sheep area. Is there going to be an attempt to reverse the harvest procedures to experimentally test whether you can change that around?

Heimer: There's going to be an attempt to try to get it done. I keep proposing that we go ahead and test these ideas. What we have done is, we've done it once where we do it really big in 3/4 curl shooting. We have those results. We've done it where we do it in full curl and trying to go back and re-establish another experimental situation at 3/4 curl maximum yield to try and just tighten things up a little bit here. Just send your money to Wayne Heimer.

Jim Ford, Montana: This is for Brian Horejsi, I wonder if you would care to comment on Wayne's presentation as it applies to bighorns maybe in Alberta.

Brian Horejsi, Alberta: Well, I believe Wayne is referring to a situation where they crop them all. In other words, its a clean sweep of our rams. Several years ago Geist suggested that for every 100 bighorns, you can expect about five trophy rams a year being produced. That's pretty close. We see about six trophy rams a year being produced. We crop maybe 2/3 of them, but there's still about 1/3 of them that go on to become larger. We don't wipe out all the big rams, but there may be some influence, we're not sure. Certainly that differential decline in rams versus the ewes in natural mortality, there's something going on there.

Heimer: I think it's quite probably that we're better at vacuuming all Dall rams off the mountain than bighorns. There you're hunting a white sheep standing on either a green or brown mountain. Its in the alpine exclusively. They can't hide in the trees. They like people. I think we can be a lot more efficient at taking Dall rams off a mountain than you probably can bighorns.

Kevin Hurley, Wyoming: I have a question for John McCarthy. With some of these different permits, the 1/2 curl or less or the ewe permits, how does that effect an individual's opportunity in subsequent years to draw a permit for a 3/4 trophy ram.

John McCarthy, Montana: We did away with the waiting period. We had a preference system and a waiting period until 1983. It was a stroke of business to get rid of both of them. It became a horrendous bookkeeping task to track the waiting period and preference. It got so far out of hand that when you had seven years preference, 95% of our sheep hunters had seven years preference. We were able to get rid of both the waiting period and preference. There's a move on right now to re-establish the waiting period.

Hurley: Yes, the reason I asked that question is because in Wyoming there's a five-year waiting period between drawing successive permits. In order to achieve the population control that you're talking about, by using ewe permits for example, the palatability of selling those permits would decrease because of a waiting period. I think your ability to sell those permits would be enhanced if it didn't effect an individual's opportunity to get a permit for a ram.

McCarthy: We went through the same thing. When the ewe permits were first initiated there was that five-year waiting period, but I don't think we had trouble selling them in most of the areas. We initiated them in the Sun River area, and for some reason, I can't sell a ewe permit. But if you go down to Thompson Falls, they're snapping them up left and right. Again, I am alluding to the accessibility. If you can't shoot a ewe right on the highway, then people are going to buy them and they'll take that five-year wait to do it. In the Sun River, if you've got to walk more than a mile away from the road, the percent success or the percent of people who even hunt drops dramatically. It's just amazing.

Heimer: I've got a question for John. You said that you thought the harvest of 1/2 curl rams and the low mortality period of their life was probably compensatory rather than additive. We struggled with this problem in our model saying that we can kill more sheep if we kill only the class 4 and up; on the other hand, we asked ourselves if we could kill them from all across the board. I'm just wondering if you could explain why it is you think that mortality is compensatory rather than additive. We just kind of have taken a simple minded approach and said you're never going to get to be an old ram if you don't be a young ram first. We are operating under the supposition that when you die, you're dead.

McCarthy: I guess that the way we're looking at it is that as long as we're cropping those age classes at a rate that is less than their natural mortality we will be able to take a certain amount of those. Again, we aren't looking at the clean sweep that you guys are on taking those older age classes, and I think that's also got something to do with the population structure.

No Name: Just for Dr. Olsen's benefit, we classify our ewe season as a non trophy season. We're just not after trophies,

we're after non-trophies. I don't think it makes much difference in terms what you call them, but maybe it does after hearing Dr. Olsen.

Jim Bailey, Colorado: John Emmerich, you gave some experiences with 1/2 curl regulations. Was there any evidence of an affect on ewe survival or lamb productivity in those seasons you describe?

John Emmerich, Wyoming: No, we didn't have the data. Really, the only area in the state we have good data is the Whiskey Basin herd. We're trying to get more data on some of these other herds, but in those particular areas we didn't have data to determine what effect there was on the production.

Hebert: Wayne, since you're having trouble convincing Alaska Department of Fish and Game about your full curl regulation, what does Alaska think about our over full curl regulation for Stone sheep in BC?

Heimer: It's not widely known in Alaska that there's a lot of other stuff going on. The prevailing sentiment seems to be that I just make all this stuff up, and if you'd care to drop a letter asking, I could give you some addresses to write to.