

BIGHORN SHEEP HARVEST STRATEGIES IN WYOMING

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Abstract: Wyoming has employed a limited permit, three-quarter curl or larger ram harvest strategy almost exclusively since 1937, with seasons open primarily from September 1 to October 31. The state's bighorn sheep (*Ovis canadensis*) population has increased substantially over the past 50 years with this harvest strategy. Hunter success statewide has fluctuated from 32 to 64 percent during this time period and has averaged 56 percent since 1980. During the last six years an average 364 permits were issued and an average of 194 bighorn sheep were harvested each year. At the present time ewes and lambs are controlled in only one herd and this is accomplished exclusively by trapping and transplanting.

From 1937 to 1985 bighorn sheep harvest in Wyoming has been regulated by a limited permit system. Harvest has also been restricted most years to rams with at least three-quarter curl horns. During this period hunting seasons have opened as early as August 15 and closed as late as November 20. September 1 is now the opening date for all areas and closing dates occur between September 30 and November 16. Most areas close October 31.

Exceptions to the three-quarter curl ram restrictions occurred in 1965 through 1969 and 1976 through 1978. The Jakey's Fork/Green River area south of Dubois, Wyoming had an either sex hunting season for the entire hunt area in 1965 and for a restricted portion of the area in 1966. Also, during this two year period rams with at least a half-curl horn were legal in the Dinwoody-Sheep Mountain area south of Dubois. This same restriction replaced the either sex season in a portion of the Jakey's Fork/Green River area in 1966 and in the entire area in 1967 and 1968. During the four year period from 1965 through 1968, rams with at least a half-curl horn were legal in the Temple Peak area near Lander, Wyoming, and the same half-curl regulation applied to the Jackson area near Jackson, Wyoming from 1965 through 1969. There were nine hunt areas open for hunting through 1961 and from nine to twelve areas from 1961 to

1969. Any ram was legal in the Temple Peak area from 1976 to 1978.

From 1970 to 1985 the number of hunt areas increased to 25 of which 17 are presently being hunted. Three of these new areas are the result of splitting existing hunt areas and thirteen are the result of sheep reintroductions. Due to an aggressive trapping and transplanting program since the mid 1960's and increasing sheep numbers in many of the state's original, established herds the statewide sheep population has slowly increased during the last 50 years. The current post-hunt population estimate is 6,100. Harvest statistics since 1949 clearly demonstrate this trend in the statewide sheep population. The average annual ram harvest was 26 during the 1940's, 50 during the 1950's, 117 during the 1960's, 142 during the 1970's, and 194 during the first six years of the 1980's.

In response to the observed or perceived increase in sheep numbers over the past 50 years permit numbers have been increased substantially. An average of 71 permits were issued each year during the 1940's, 107 during the 1950's, and 327 during the 1960's, an increase of over 250 percent. The big increase during the 1960's occurred at a time when the concept of maximum sustainable sheep harvest was being promoted and there was sentiment within the Game Division that harvest strategies for elk and deer were also appropriate for bighorn sheep. As a result Wyoming not only increased permit numbers in many areas but half-curl ram and either sex sheep seasons were tried during this decade. The 50 percent average annual hunter success during the 1950's was probably an additional factor influencing the increase in permit numbers during the 1960's. Since good population estimates were not available and hunter success remained relatively high through the 1950's, permit numbers were probably increased each year during the 1960's in an attempt to find out what ram harvest the existing population could support. With the increased number of permits average hunter success for the 1960's dropped to 41 percent despite increased hunter success in those areas with half-curl or either sex regulations. Either sex seasons only lasted two years because of the public protest against the harvest of ewes. The half-curl seasons lasted a few more years but met the same fate as the either sex season due to public pressure to go back to a three-quarter curl restriction probably due to the public's fear that large mature rams would become scarce and therefore much less available for harvest.

Insight into some effects of half-curl ram seasons can be obtained by reviewing the harvest results from two hunt areas where half-curl or larger ram seasons were implemented. The half-curl ram regulation was maintained for the longest period of time in the Jackson hunt area. The total number of permits for the area remained at 40 from 1960 to 1974 a time

period that includes the five years that half-curl rams were legal. Harvest doubled during the second, third, and fourth year of the half-curl season then dropped back to the pre-half-curl regulation harvest level the last year. In the Jakey's Fork/Green River area, ram harvest also doubled during the three years when half-curl rams were legal. The average age of rams harvested during the five year period (1969-1973) immediately following the three years of half-curl or larger harvest in the Jakey's Fork/Green River area was 5.3 (sample size 72). The average age increased during the next five year period (1974-1978) to 6.7 (sample size 68) after five years of the three-quarter curl or larger ram harvest. The number of permits were essentially the same during this time period. These results do suggest that large mature rams will become less abundant when rams as young as half-curl are harvested with no adjustment in permit numbers to compensate for the increased harvest that occurs with a half-curl harvest restriction compared to a three-quarter curl harvest restriction.

Despite a drop in hunter success in the 1960's permit numbers continued to increase through 1973 peaking at 408. Twelve areas were open to hunting at that time. During this 1967 to 1973 period when permit numbers were at their peak hunter success reached an all time low averaging 35 percent for the seven year period. Probably in response to the lower hunter success permit numbers were reduced to 356 in 1974 and have remained between 352 and 389 up until the present time. There were an average of 364 permits issued per year from 1980 to 1985 and hunter success averaged 56 percent.

Through a combination of trial and error over the last 50 years and recently more intensive data collection efforts and population modeling on certain herds it appears that with the present harvest strategy Wyoming can issue approximately 375 to 390 permits annually, harvest about 200 rams three-quarter curl or larger, and maintain a hunter success of 45 to 50 percent with the current sheep population.

Hunter success between 30 and 60 percent has recently been established as an acceptable range for bighorn sheep hunting in Wyoming. This success range has been determined to be a suitable compromise for providing adequate hunter opportunity and maintaining an acceptable number of class III and IV rams in the harvest and post-hunt population. An analysis of harvest statistics from the two hunt areas that make up the Whiskey Basin Sheep Herd, the largest and most intensively managed herd in Wyoming, indicates that if permit numbers are kept low enough, in relation to the number of legal rams available, that average hunter success will be maintained at 40 percent or greater, the average age of harvested rams will remain near six, the post-season ram/ewe ratio will run between 40 to 50/100, and the post season class III and IV rams/ewe ratio will run near 8/100. This

herd's annual yearling recruitment has averaged 13 percent (13 yearlings per 100 sheep) from 1981 to 1985. A sheep herds accessibility during the hunting season and of course different recruitment rates would effect these relationships.

There has been a moderate yet steady increase in state-wide sheep harvest and hunter success during the past six years, even though permit numbers have remained about the same. These trends suggest that the state's population is still increasing gradually under the current limited permit, three-quarter curl ram harvest strategy. All the net increase in the Whiskey Basin Herd is removed annually through ram hunting and annual trapping of ewes, lambs, and a few young rams. Since 1980 this herd has been decreased about 10 percent and is now stabilized at approximately 950 to 1,000 sheep, the carrying capacity of the herd's crucial winter range. An average of 105 sheep (59 rams, 32 ewes, 14 lambs) have been removed each year since 1980. This intensive herd management in conjunction with some range improvement, and redistribution work has increased the herd's lamb/ewe ratio and lowered the age at which rams are reaching three-quarter curl status. Despite an average 20 percent fewer permits and a stable post-season ram/ewe ratio, the age of rams harvested from this herd has decreased from 6.2 (sample size 160) to 5.6 (sample size 185) in the 1980's relative to the 1970's. A large number of rams are now growing three-quarter curl horns at four-and-a-half years of age and even a few at three-and-a-half. In other herds within the state where the sheep winter above timber line on wind swept plateaus and ridges periodic severe winters appear to keep the populations relatively stable. In some of the reintroduced herds population levels are still increasing but have not reached carrying capacity yet, in others recruitment is so low that the populations are not increasing. A few of the older established sheep herds in the Cody country have experienced obvious population increases over the last twenty years and are probably approaching their winter range carrying capacity.

A limited permit three-quarter curl ram harvest strategy has served the state well during the past fifty years providing a quality hunting experience and allowing sheep numbers to rebound from the extremely low levels that occurred in the state around the turn of this century. Currently in the one sheep herd known to be near its winter range carrying capacity an aggressive trapping/transplanting program has been an effective tool for maintaining the herd in a thrifty condition as well as re-establishing many historical sheep herds. However, with the current high sheep populations in a few areas still with three-quarter curl ram only harvest Wyoming may in the near future need to look at additional trapping/transplanting programs or ewe/lamb harvest as methods for stabilizing these populations.