

BIGHORN SHEEP MANAGEMENT GUIDELINES

Procedure 1: To annually monitor recruitment rates, ram to ewe ratios, and population trends.

- A. Field Operations personnel should conduct fall surveys in each mountain range or geographic area having a bighorn sheep population. Helicopter surveys should be conducted every third year to estimate recruitment rates, ram to ewe ratios, age structure of ram population, and population trends. Surveys shall be conducted by helicopter between September 15 and December 1 (June 1 to January 15 for Rocky Mountain bighorn sheep). Helicopter surveys must be approved by the Regional Supervisor and the Big Game Supervisor. Interim monitoring may be conducted using remotely-triggered cameras, water hole monitoring, or foot surveys to document minimum numbers of rams by size class. If funds are sufficient and need is demonstrated, supplemental helicopter surveys and surveys of marginal sheep populations may be authorized by the Game Branch Chief.
- B. Surveys will be designed to sample representative bighorn sheep range in each unit. Surveys should be mapped by flight area on topographic maps. Surveys should follow the methods described in the survey chapter of "The Desert Bighorn Sheep in Arizona" (Remington and Welsh 1989). The pilot must be experienced, and both he and the observers should be familiar with bighorn sheep survey methods. The survey time needed for each mountain range should be based on relative sheep density, ruggedness of terrain, vegetation, etc. Generally, one hour of survey for every 10 square miles of habitat is a reasonable survey effort.
- C. Observed bighorn sheep will be classified as lambs (1-12 months), yearling ewes and rams (12-24 months), unclassified yearlings, ewes, and Class I, II, III, and IV rams (Figs. 1 and 2). Animals that cannot be positively classified will be recorded as "unclassified." Each animal or group of animals observed will be recorded as one observation on Bighorn Sheep Survey Record. Those observations believed to be replicates will not be used in making calculations and summaries. Confidence intervals will be calculated for ram, lamb, and yearling:100 ewe ratios for each herd unit.

Procedure 2: To collect data on the ages and condition of harvested bighorn sheep.

- A. Bighorn sheep hunters will be required to check-out their animals according to Commission Order 7 and R12-4-308. Hunters will be encouraged to check any bighorn sheep taken through the Regional Office of their hunt area. Hunters may be requested to collect samples of blood, tissue, feces, rumen contents, ticks, or other samples of interest to the Department from their bighorn sheep.
- B. Field Operations and Game Branch personnel will be familiar with check-out procedures. Only trained personnel will check out bighorn sheep. Bighorn sheep will be checked for general body condition, evidence of scabies, sinusitis, or any abnormalities. Left and right side, frontal, and top view photographs of each head should be taken. Abnormalities and

other unusual characteristics will also be photographed. Other samples may be collected. Data from all sheep checked will be recorded on the Bighorn Sheep Hunt Record. Copies of these forms will be forwarded to the Game Branch within 10 days after the close of the bighorn sheep season. The Game Branch will provide copies to each Region of Bighorn Sheep Hunt Records checked through the Phoenix office. The Game Branch will prepare a statewide hunt summary.

- C. Cumulative hunt data will be summarized by regional personnel on Bighorn Sheep Management Summary Form. These data will be used to formulate future hunt recommendations.

Procedure 3: To use survey and hunt data to determine a prescribed annual harvest of bighorn sheep and formulate hunt recommendations to accomplish that harvest.

- A. Survey data will be summarized by Wildlife Managers and Game Specialists on the Bighorn Sheep Management Summary Form. Survey effort, design, and data manipulation should be well documented.
- B. A population estimate will be constructed for those herd units for which sufficient population data are available.
- C. Hunt recommendations will be made in conformance with the Guidelines for Hunting Season Recommendations. Generally speaking, a population of 50 animals should be sufficiently robust to support the annual harvest of at least a single sheep annually. Hunt recommendations should allow the harvest of 5-10% of the estimated ram population, which is generally 10-20% of the Class III and Class IV rams.
- D. Hunt unit recommendations and survey data must be submitted to the Game Branch for review in accordance with the Hunt Recommendations Guideline schedule.

Procedure 4: To determine factors contributing to bighorn sheep population declines.

- A. Past recruitment rates will be compared with climatological data to test possible correlations between precipitation patterns, drought indices, and recruitment rates. Analyses should be a cooperative effort among the Game Branch, Research Branch, and regional personnel.
- B. Disease investigations will be coordinated with Research Branch, University, State Health, and other interested parties. Cooperative investigations into bighorn sheep diseases will be encouraged.
- C. The Research Branch will maintain a file on all samples collected and tested and the results of pertinent disease investigations. These data will be available to anyone doing or interested in research on bighorn sheep diseases.

- D. Predator control for the benefit of bighorn sheep populations may be considered in hunt units with declining bighorn sheep populations. An assessment of other influences on bighorn sheep survival should be made before predator management is recommended. Written landowner permission is needed for private or leased land before planning can proceed. Site specific planning must be done in accordance with the Commission's Predation Management Policy (DOM A2.31).
- E. Field Operations personnel will submit their predator management recommendations to Game Branch. The Game Branch will evaluate recommendations and set priorities on the basis of need, control methods to be used, and funds available. Approved recommendations will be forwarded to the USDA, Wildlife Services, for an action program.
- F. The Regional Game Specialist, in conjunction with the Predator-Furbearer Biologist, will document all data pertaining to recommendations for predator control and for predators removed, both before and after control. These personnel will also be responsible for preparing the environmental compliance documentation required for predator management activities

Procedure 5: To maintain and enhance bighorn sheep habitat.

- A. Habitats of importance to bighorn sheep will be identified, rated, and ranked in importance. An attempt will be made to identify important areas in private ownership and transfer them to AGFD or U.S. Government administration. Acquisition may be through trade of state or Federal lands or by purchase.
- B. Livestock grazing allotments containing important bighorn sheep habitat will be evaluated for conflict with bighorn sheep. Management alternatives to domestic sheep, goat, and ephemeral range cattle operations on public lands will be encouraged. Ranges having cow-calf and rotating steer operations will be evaluated for forage condition. Those areas where forage conditions are in need of upgrading will be discussed with the appropriate land management agency and the permittee in an effort to reduce grazing pressure. An attempt may be made to obtain data on the condition and on the presence of disease antibodies in a sample of pastured or intended stock animals. Such actions will be determined and conducted with the cooperation of the appropriate land management agency.
- C. Bighorn sheep watering requirements should be evaluated. If it can be demonstrated that bighorn sheep are watering with domestic or feral stock, an effort will be made to keep stock from watering at that source, or an alternate source limited to bighorn sheep will be developed. Water development evaluations will be a joint effort of Game Branch, Development Branch, and Field Operations personnel with various land management agencies.
- D. Wild horses and burros should be maintained at the lowest numbers possible, or as identified in land use plans, to minimize impacts to bighorn sheep and their habitat. Resolution of conflicts with feral horses and burros should be pursued with the appropriate land

management agency. No release of exotic ungulates should be permitted in bighorn sheep habitat.

Procedure 6: To restock former bighorn sheep range.

- A. Potential bighorn sheep transplant sites will be determined according to the Evaluation of Bighorn Sheep Habitat described in "The Desert Bighorn Sheep in Arizona" (Cunningham 1989). Transplants will be accomplished in accordance with the Big Game Transplant Procedures.
- B. When Regional personnel determine that a particular bighorn sheep population can be used as a source for sheep, animals may be transplanted from this population to the priority ranking area within the historic range of the subspecies to be captured. The Big Game Supervisor must approve all transplant sites. Actual release location will be determined jointly by Field Operations and Game Branch personnel. Extra-Departmental requests for bighorn sheep must be in accordance with AGFD Policy and procedures.
- C. AGFD personnel may capture bighorn sheep using helicopter and capture gun procedures or drop-net captures may be attempted throughout the year using suitable bait, such as apple mash bait. Other techniques may be developed. Capture techniques are described in "The Desert Bighorn Sheep in Arizona" (Remington and Fuller 1989). Each release will require a minimum of 15 animals. Preferably these will be 65% ewes, 20% yearlings, and 15% medium aged rams (Classes II and III).
- D. Captured bighorn sheep will be transported to the release area by trailer or helicopter. Transportation procedures are outlined in "The Desert Bighorn Sheep in Arizona" (Remington and Fuller 1989). Animals may be "free" released or kept in temporary holding pen(s) at the release site and "soft" released from 4 to 24 hours after arrival. A minimum of four to six ewes should be radiomarked for monitoring purposes.
- E. Released bighorn sheep will be monitored by Field Operations personnel. The need for supplemental releases shall be jointly determined on an ad hoc basis by regional and Game Branch personnel.