Montana Legislative Audit Division
Performance Audit Summary

Big Game Inventory and Survey Process November 2002

Introduction

The Legislative Audit Committee requested a performance audit of Montana's Department of Fish, Wildlife and Parks (FWP) procedures used in counting ungulates (moose, sheep, goat, white-tailed deer, mule deer, elk, antelope) and predators not controlled by the federal government (black bear and mountain lions).

The objectives of the performance audit include:

- Determine how FWP biologists conduct game counts (surveys) and how the data are used.
- Determine the usefulness of the data collected during the surveys.
- Determine if the game counts are used in conjunction with game management plans to develop appropriate hunting quotas.
- Determine the methods used to estimate the number of large predators not regulated by federal agencies.

Big Game Management Policy

FWP's big game management policy outlines the primary objectives for its harvest management operations. Survey of game populations is an essential part of the strategy. We identified 32 management biologists who conducted regular survey and inventory activities in 2001.

The data gathered through survey and inventory, harvest surveys, and analyses are compared to elements of game management plans to form conclusions and recommendations as to the attainment of management objectives. Game population information and other data are gathered to help determine hunting quotas and set seasons for each managed species.

Survey and Inventory of Wildlife Populations

The survey and inventory process is basic in structure. The objective is to locate animals visually and count them based on sex, age, size, herd size, etc. Biologists survey wildlife populations in particular hunting districts, geographical areas, and regions to count the number of animals seen and to classify them as male, female, and young. Survey information is used to determine population composition ratios (i.e. fawns/does) and trends and, at times, to estimate the total population of a particular group of animals. This information is used with harvest data, habitat conditions, and animal health data to determine herd conditions and if there should be changes in harvest seasons /quotas.

There are three primary modes of travel when surveying animals: fixed wing aircraft (i.e. Supercubs: two-seaters), helicopters, and trucks. The type of ungulate dictates when and why it will be counted.

Other States Survey and Inventory Techniques

To establish a basis of comparison of Montana's survey techniques to accepted standards we contacted other states and gathered information from studies that were completed on survey methodology by wildlife organizations and biologists. We contacted individuals in Montana not associated with the FWP who specialize in game management techniques to get their views on survey and inventory techniques. We compared FWP's techniques to methodologies we identified from these other sources.

None of the comparative states used only one survey method exclusively for a given species. States use a variety of methods, depending upon the species and area surveyed, the biologists conducting a particular survey, and the specific survey needs.

Audit Analyses and Conclusions

A major conclusion from our analysis of survey counts is that survey/inventory techniques are only designed to identify changes in game populations – not the causes of those changes. Biologists must use their experience, knowledge, research and investigation to get at the causes.

Aerial Surveys: All biologists used some system to identify survey areas and schedule flights so trend data would be as consistent. The method of counting animals and documenting the data, survey routes and methodologies were different among biologists. Entire hunting districts are not usually surveyed; just historical or trend areas. There are areas not surveyed every year; these areas may be surveyed on a rotational basis.

The pilot is an integral part of the survey process. Pilots (both FWP and contracted) are used for their knowledge of the areas and the ability to help count and classify. Knowledgeable pilots add an element of consistency to the survey process. The competition for and the scheduling of aircraft and pilots is an issue that has to be addressed each year.

Game counts are not a comprehensive recording of every applicable animal in a survey area. However, biologists

attempt to make the data as accurate as possible. The counts are affected by weather, light conditions, ground cover, animal characteristics (such as size of fawns, antlers still visible, dispersement), observer proficiency, and aircraft movement. If animal characteristics or numbers are in question, the data is not included in the biologists' analysis of the composition of the herds.

Ground Surveys: Ground survey techniques are not as rigorous, but the surveys are completed in similar areas from year to year and provide data about herd composition and are used in monitoring trends in game populations. There is inherent bias in ground surveys conducted from roads (white-tailed deer) since it is difficult to extend results of road-based surveys to non-road areas.

Visibility Bias Adjustment: The error associated with the failure to observe all animals during a specific survey occurs in all studies that attempt to count animals in the field. How detectable or visible animals are depends on many factors, including animal behavior and dispersion, observers, weather, habitat type, equipment, and methodology. Biologists use visibility bias adjustments on a limited basis in Montana. Some states have more extensive programs that use visibility bias adjustments and sightability models to modify raw counts of animals.

Sampling: In comparative states and Montana non-random sampling was more common than random sampling. Random sampling was more prevalent in research studies rather than in ongoing survey techniques. Some statistical sampling methods are being employed for mule deer surveying in Montana.

Population Size and Modeling: Until recently Montana has not used statistically estimated population sizes or simulation models. The major focus is on trend analyses and herd composition of observed animals. The current Adaptive Harvest Management (AHM) Plan for mule deer incorporates simulation modeling.

Herd Composition: The herd composition factors and ratios are consistent with those of other states and are related to the management objectives of the species surveyed. The information is used during discussions of herd health and structure. The ratios and counts are used to help evaluate the success of harvest plans for hunting districts throughout the state. The factors are an integral part of the season and quota recommendations.

Conclusion

Montana's FWP department employs game management methods that compare to accepted standards. The development of the Adaptive Harvest Management Plan and associated survey techniques has refined the department's approach for one species, mule deer. Even though Montana's FWP is comparable to other states in terms of survey methodology and use, it still can improve.

Improving the Survey Process

The department can improve its game inventory system by refining current survey techniques. In refining survey procedures it is now equally important the hunting and general public understand why decisions were made and how the information that was used in making a decision was gathered and compiled. Any refinements to the documentation of the decision-making process should include materials that help in the understanding of count procedures and herd composition analysis. ***We recommend the department refine its survey and inventory techniques for all species to better incorporate the concepts of:***

A. Repetitive surveys of representative management areas;

B. Standardized and documented protocol that is easily transferable;

C. Use of visibility bias adjustments and required sample sizes;

D. Tying survey results directly to management objectives and subsequent recommendations; and

E. Understandable and concise presentation to the public based on objective analysis.

Is Predation Considered as a Factor?

Predation is not included specifically in any game population size decisions that would be used in making season and quota recommendations. Natural mortality is only considered formally as a factor in estimating game populations for mule deer. Research provided the factors necessary to estimate the natural mortality rate for mule deer. Similar research would be necessary to analyze the effects of predation on all species.

Information Used by Commission/Biologists

Survey data is discussed and is a major component of the decision-making process. Survey data is just one component biologists and the FWP Commission use to determine what, if any, changes need to be made to a season or quota. The process used by the department and the Commission follows the established accepted steps of a harvest management program. In the absence of objective and scientific data the decision makers relied upon judgment, personal knowledge, and public opinion. This added a level of subjectivity to the process.

Mountain Lions and Black Bears

The information base for mountain lions and black bears is limited almost entirely to harvest information. Some survey work is conducted of black bears. Research is being conducted for both species.

For a complete copy of the report (02P-05) or for further information contact the Legislative Audit Division at 406-444-3122; e-mail to lad@mt.gov; or check the web site at http://leg.mt.gov/audit.