

Program Evaluation

Wildlife Management

DFWP Wildlife Division



ENVIRONMENTAL QUALITY COUNCIL

April 22, 2016
Authored by: Hope Stockwell

Table of Contents

INTRODUCTION	2
FINANCIAL SNAPSHOT	3
OVERVIEW	5
WILDLIFE MANAGEMENT PLANS.....	7
POPULATION MONITORING	9
SURVEYS AND INVENTORIES	9
OTHER MONITORING.....	14
FINANCIAL SUMMARY	15
SEASON SETTING	16
FINANCIAL SUMMARY	18
HUMAN DIMENSIONS	18
FINANCIAL SUMMARY	19
RESEARCH	19
CHALLENGES	22

Introduction

The Environmental Quality Council is required to evaluate programs within the Department of Fish, Wildlife, and Parks (DFWP) pursuant to 75-1-324, MCA. That law requires in part that the EQC “review and appraise the various programs and activities of the state agencies, in the light of the policy set forth in 75-1-103, for the purpose of determining the extent to which the programs and activities are contributing to the achievement of the policy and make recommendations to the governor and the legislature with respect to the policy”.

The policy reads as follows:

The legislature, recognizing the profound impact of human activity on the interrelations of all components of the natural environment, particularly the profound influences of population growth, high-density urbanization, industrial expansion, resource exploitation, and new and expanding technological advances, recognizing the critical importance of restoring and maintaining environmental quality to the overall welfare and human development, and further recognizing that governmental regulation may unnecessarily restrict the use and enjoyment of private property, declares that it is the continuing policy of the state of Montana, in cooperation with the federal government, local governments, and other concerned public and private organizations, to use all practicable means and measures, including financial and technical assistance, in a manner calculated to foster and promote the general welfare, to create and maintain conditions under which humans and nature can coexist in productive harmony, to recognize the right to use and enjoy private property free of undue government regulation, and to fulfill the social, economic, and other requirements of present and future generations of Montanans.

At its June 2015 meeting, the Council allocated 272 hours of staff time, or about 45 hours apiece, to evaluate five programs within the DFWP Wildlife Division. In September 2015, the EQC began this review with a look at Wildlife Conflict Management. The EQC continued in January 2016 with a review of Hunting Access and Nongame, Threatened, and Endangered Species. In March 2016, the EQC reviewed Habitat Management. The EQC wraps up its Wildlife Division program evaluations with this Wildlife Management report.

The DFWP defines wildlife management as “the science and art of managing wildlife and its habitat, for the benefit of the soil, vegetation and animals, including humans.”¹ Thus far, all of the programs evaluated fall under this broad umbrella. This report focuses on the components not previously discussed, including:

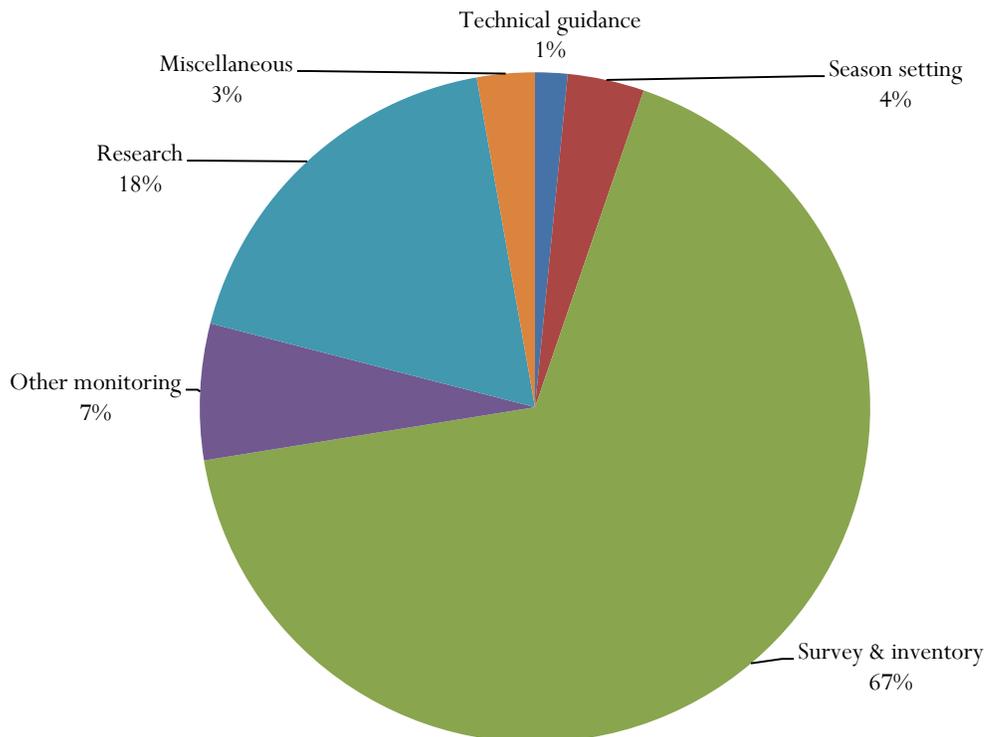
- Species management plans
- Population monitoring (surveys and inventory)
- Season setting
- Human dimensions
- Management-related research

¹ <http://fwp.mt.gov/fishAndWildlife/management/managementPrinciples.html>, February 16, 2016.

Financial Snapshot

The Wildlife Division attributes \$4.5 million in Fiscal Year (FY) 2015 expenditures to population monitoring, survey, and inventory, season setting, and management-related research. As with other DFWP program evaluations, this is a best estimate of expenditures, since employee time is not necessarily coded to individual functions. Some functions discussed in this report, such as species management plans, are so intertwined with others that the DFWP cannot give them a stand-alone price tag.

Wildlife Management Expenditures, FY 2015 \$4.5 million



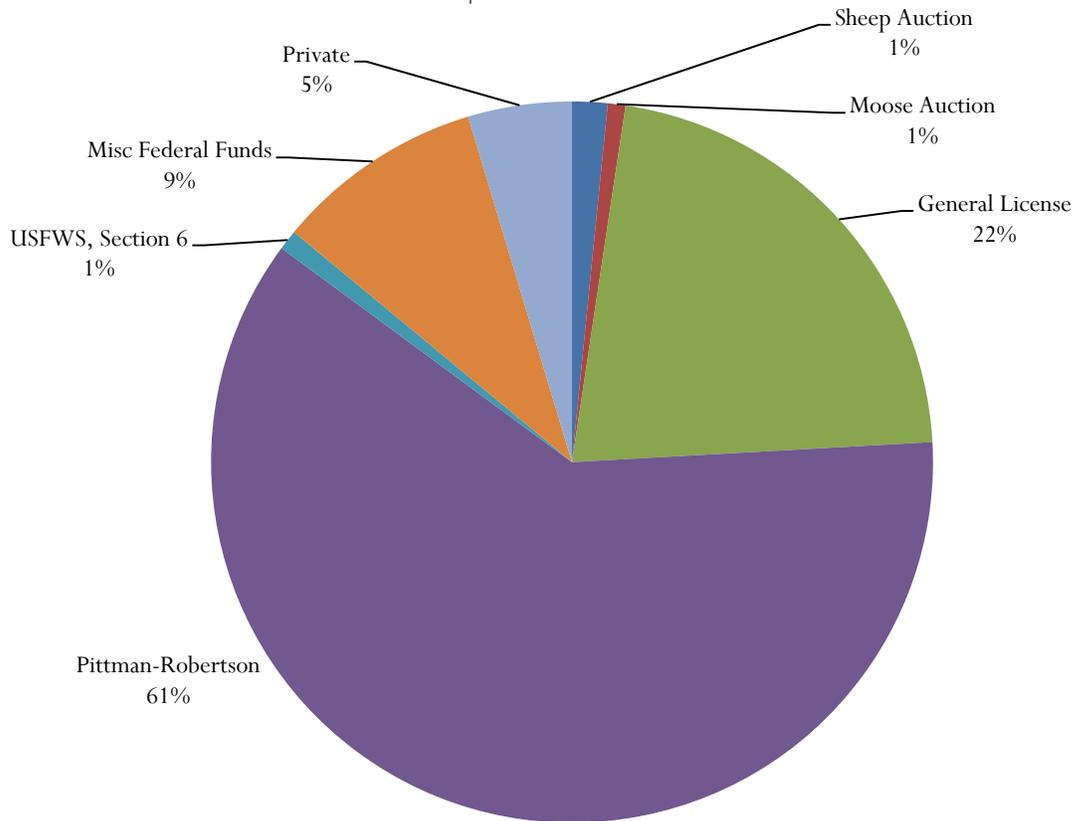
As shown above, the survey and inventory (S&I) of wildlife populations makes up the bulk of expenditures (\$3 million).

Personal services account for 53%. The DFWP attributes 38.12 FTE to the wildlife management components addressed in this report, with 81% assigned to S&I. Of the total FTE, 88% are included in the DFWP's base budget. The rest are funded through "soft" funding sources, such as private contracts and grants and miscellaneous federal funds.

Season setting accounted for 4% of expenditures in FY 2015 (\$166,334), but because season setting is a 2-year process, the odd-numbered year is the less expensive year. In FY 2014, the DFWP spent \$243,295 on season setting, including the costs of multiple public meetings around the state and additional staff time.

Revenue from the sale of hunting licenses, identified in the chart below as 'general license', is a primary funding source for these wildlife management components. But the majority of funds (71%) come from federal sources, most significantly Pittman-Robertson (P-R) funds generated by excise taxes on gun, ammunition, and archery purchases. Most of the general license dollars are used to provide the required nonfederal match (25%) for P-R funds.

Wildlife Management Funding Sources, FY 2015 \$4.5 million



Overview

State law charges the DFWP with the supervision of all wildlife and with enforcement of state laws regarding the protection, preservation, management, and propagation of that wildlife. The Fish and Wildlife Commission, likewise, is tasked with setting the policies for the protection, preservation, management, and propagation of wildlife.

Within the DFWP, the Wildlife Division is responsible for conservation and management of more than 600 species and their habitat. Work is coordinated at the statewide level and implemented through the seven administrative regions.

In 87-1-201(9), MCA, the DFWP is directed to:

- manage species in a manner that prevents them from the need for listing under the state or federal Endangered Species Acts;
- manage listed species, sensitive species, or a species that is a potential candidate for listing in a manner that assists in the maintenance or recovery of those species; and
- manage elk, deer, and antelope populations based on habitat estimates and maintain their population numbers at or below those estimates.

In 1972, the Commission adopted 12.9.101, ARM, which is the department's "big game management policy". The policy formally applies to game animals, as defined in 87-2-101, MCA: deer, elk, moose, antelope, caribou, mountain sheep, mountain goat, mountain lion, bear, and wild buffalo. But the DFWP says many of the directives guide other species' management as well.

The rule says that in order to "properly manage the big game resource of Montana and to allow full hunter harvest", the department's primary objectives are to:

- produce and maintain a maximum breeding stock on all suitable lands, public and private, in harmony with other uses, and consistent with available forage;
- utilize, through public hunting, the available crop of big game produced annually;
- maintain the best possible range conditions;
- encourage harmonious relationships between landowners and hunters;
- permit the harvest of surplus big game and control populations causing appreciable damage to cultivated crops and forest or range lands;
- manage big game without using artificial feeding;
- work out with interested parties an equitable allocation of forage for big game and livestock where conflict or competition exists and regulate big game in accordance with those agreements;
- encourage predator control chiefly on understocked ranges, on ranges where hunters are able to fully use the annual harvestable crop of animals, or on ranges where rarer species (e.g., mountain sheep) are introduced or remnant bands are encouraged;
- make objective surveys and investigations of big game populations and their range to guide hunting regulations and other aspects of their management;
- encourage sport hunting and recreational use of big game and public access to hunting areas; and

- keep hunting regulations clear and concise. Regulations are directed primarily to accomplish management objectives.

In its 2008 strategic plan, the DFWP aimed to manage wildlife and their habitats to achieve sustainable populations that provide related recreational activities, including but not limited to hunting and trapping, seasons and quotas, species reintroduction, relocation of species, and habitat management.² The DFWP says it also must consider the needs of landowners and urban dwellers.

The program priorities identified in the strategic plan include:³

- align big game population objectives and hunting season recommendations;
- focus management on the 5-week general season and simplify regulations;
- enhance population surveys to meet management objectives;
- integrate game and nongame programs to manage more comprehensively;
- prioritize research to address management needs;
- tailor hunting access programs to assist in desired harvest distribution and quality recreational activities;
- expand efforts at community level to address public safety and nuisance wildlife;
- address game damage proactively;
- develop disease monitoring and management plans with specific action protocols;
- integrate management of wolves in traditional wildlife management;
- adjust elk regulations and management actions to bring populations to objectives identified in the elk management plan;
- develop and implement a bison conservation plan;
- assume management of the Montana portion of the Greater Yellowstone Area grizzly bears; and
- develop and implement an upland game bird management plan.

In 87-5-102, MCA, the legislature defines "management" as the collection and application of biological information for the purposes of conserving populations of wildlife consistent with other uses of land and habitat. It includes a range of activities that constitute a modern scientific resource program, e.g., research, census, law enforcement, habitat improvement, control, and education, as well as the periodic protection of species or populations and regulated taking. The definition specifically applies to nongame and endangered species but is used in reference to other wildlife.

Other key terms related to wildlife management include:⁴

- "Carrying capacity" - the number of animals an area can support throughout the year without permanently damaging the habitat or starving the animals.
- "Social tolerance" - the number of animals a landowner or the public will allow in an area. The DFWP says the tolerable level is frequently below carrying capacity.

² The Road Ahead: Strategic Plans, Montana Fish, Wildlife, and Parks, Updated March 2008, page 14.

³ Ibid, pages 15-16.

⁴ <http://fwp.mt.gov/fishAndWildlife/management/managementPrinciples.html>, February 16, 2016.

- “Landowner tolerance”, as defined in 87-1-301(1)(h), MCA - the written or documented verbal opinion of an affected landowner regarding the impact upon the landowner’s property within the particular hunting district where a restriction on elk hunting on public property is proposed.
- “Population dynamics” - the ways in which the number of wildlife goes up and down. Birth and death rates are two major factors, with most species experiencing high rates of each. Smaller species have higher birth and death rates than larger ones. Factors include starvation, development, climate extremes, predation, diseases and parasites, hunting, and other human activities.

The FWP says the job of its wildlife managers is to control the number of animals at the carrying capacity of their habitat with an eye toward the overall ecosystem and social tolerance. The intent is to give animals the best chance of staying healthy and not harming the habitat.⁵

Wildlife Management Plans

The DFWP develops and implements management plans for many species to provide guidance for wildlife and land managers in making planning and policy decisions. Plans help prioritize field activities, manage time and budgets, make management recommendations, and coordinate management with other state and federal agencies and private landowners as needed.

With a potentially years-long shelf life, plans are designed to be flexible enough to respond to changes in populations, habitat factors, and social tolerance. For instance, management plans for deer and elk include the use of adaptive harvest. Standard, restrictive, or liberal hunting seasons are implemented depending on population objectives, survey and inventory results, and harvest statistics from previous seasons.

In 2000, statewide management plans existed for deer and elk. The DFWP also wrote environmental impact statements for management of black bears and mountain lions with the intent to develop plans for both species.⁶ A performance audit published in March of that year encouraged the DFWP to continue formalizing management plans and establish a process to review and update them on a regular basis.

Wildlife species for which formal management plans or guidelines now exist or are being developed include:

Bald eagle	Elk	Piping plover
Bison	Grizzly bear	Prairie dog
Black bear	Interior least tern	Sage grouse
Common loon	Mountain lion	Wolf
Deer	Mountain sheep	

⁵ Ibid.

⁶ Performance Audit 98P-11 Wildlife Division, Montana Legislative Audit Division, March 2000, page 29.

In 2003, Senator Keith Bales (R-Otter) raised concern that species management plans should not be habitat or land use plans. He sponsored Senate Bill No. 392, which originally prohibited plans that would affect or direct the use or management of non-DFWP administered lands, public or private. Of particular concern was a draft sage grouse plan that proposed standards and guidelines for land use activities.⁷

The DFWP testified against the bill saying it would hinder its ability to enter cooperative conservation agreements with federal agencies and other land managers aimed at removing grizzly bears, wolves, and other species from protection under the Endangered Species Act (ESA). Ultimately, SB 392 was amended so that it only subjects management plans to the general provisions of the Montana Environmental Policy Act.

The 2000 performance audit also recommended the DFWP monitor and report on its strategies for and progress toward meeting management objectives. A followup to the audit published in September 2003 found the department partially implemented the recommendation through its season setting processes, Commission meetings, and updates to individual species management plans. But the followup said the department did not have a comprehensive process.

The followup noted that House Bill No. 42 (Rep. Debby Barrett, R-Dillon), enacted by the 2003 Legislature, moved the DFWP closer to the audit's recommendation. HB 42 requires the Fish and Wildlife Commission to manage elk, deer, and antelope populations in a sustainable manner that does not adversely affect Montana land.⁸ The Commission must calculate the total available habitat by October 1 of each odd-numbered year.⁹ Based on that acreage, the Commission must determine the number of elk, deer, and antelope that can be viably sustained, giving consideration to the concerns of private landowners.¹⁰

Once the sustainable number is set, the DFWP uses existing wildlife management programs to keep the population at or below that number, including liberalized harvests, game damage hunts, landowner permits, and animal relocation.

Supporters of HB 42 testified that increased game populations negatively affect private lands due to lost forage and hay and to damaged crops, fences, and water developments. They spoke of drought leaving forage unable to replenish itself and pushing wildlife onto irrigated lands.¹¹

DFWP Director Jeff Hagener testified that the closure of private land to the general hunter complicates the problem. Hagener said the department was working to bring together the community of landowners within an elk herd's range, such as the Devil's Kitchen working group in Cascade County, to reach agreement on how many elk there should be and how hunting could be managed and access provided to meet population objectives.¹²

⁷ Senate Committee on Fish and Game Minutes, February 25, 2003, page 2.

⁸ 87-1-321, MCA.

⁹ 87-1-322, MCA.

¹⁰ 87-1-323, MCA.

¹¹ Senate Fish and Game Committee Minutes, March 7, 2003.

¹² Ibid, Exhibit 3, page 2.

The longstanding Devil's Kitchen group is involved in the DFWP's latest attempt to meet the requirements of HB 42 – implementation of elk shoulder seasons. The shoulder season guidelines include specific performance criteria and periodic review by the Commission to determine whether shoulder seasons are helping meet objectives and should be continued.

This is one current example of how the agency monitors its progress. Another is the work plan for elk management in areas with brucellosis that the Commission adopted in October 2015. The plan includes an annual evaluation of the effectiveness of management actions.

In 2013, Senator Debby Barrett sponsored Senate Bill No. 249, which stipulates that the Fish and Wildlife Commission must comply with, adopt policies that comply with, and ensure the department implements in each region the provisions of its management plans.¹³

The bill also requires the DFWP to actively provide information to and seek information and advice from counties and tribes regarding proposed policy decisions for large predators (bears, mountain lions, and wolves) and large game species (deer, elk, mountain sheep, moose, antelope, and mountain goats) that may harm agricultural production or livestock operations or that may pose a risk to human health or safety.

Population Monitoring

The DFWP combines data gathered by four primary monitoring tools to paint a picture of wildlife populations in Montana: surveys and inventories (S&I), check stations and harvest surveys, which are subsets of S&I, and other monitoring projects.

Surveys and Inventories

The DFWP surveys and inventories many species, ranging from the statewide perspective to the local level in a specific area for a specific reason. The data collected provides the scientific basis for management of those species, including decisions that affect species abundance, wildlife conflicts, hunting and harvest opportunity, habitat management and land use decisions, and other recreational opportunities. The data informs not only the DFWP and Fish and Wildlife Commission, but also the Legislature, other governmental agencies, and organizations and individuals with wildlife interests.

In 2000 and 2002, the Legislative Audit Division made recommendations to the DFWP for refining its survey and inventory techniques. The audits suggested use of repetitive surveys; standardized, transferrable, and documented protocols; use of visibility bias adjustments and required samples sizes; collection of weather data; improved connections between survey results, management objectives, and subsequent recommendations; and understandable and concise presentation to the public.¹⁴

The department concurred, but said in 2002 that full implementation would be a long-term commitment. Repetitive surveys, for instance, are costly and require prioritization with other activities.¹⁵

¹³ 87-1-301(1)(i), MCA.

¹⁴ Performance Audit 02P-05 Big Game Inventory and Survey Process, Montana Legislative Audit Division, November 2002, page 43.

¹⁵ Ibid, page A-3.

The following year, the 2003 Legislature adopted Senate Bill No. 209 (Sen. Jon Tester, D-Big Sandy), which requires the DFWP to publish annual game counts, estimating to the best of its ability the number of deer, elk, moose, antelope, caribou, mountain sheep, mountain goat, mountain lion, bear, and wild buffalo in the hunting districts and administrative regions of the state. The DFWP may use field observations, hunter reporting statistics, or any other suitable method of determining game numbers, but the publication must explain how the count was calculated.¹⁶

The DFWP testified that few of the estimates would be precise. Chief of Staff Chris Smith said that although the department conducts numerous surveys, only a few determine actual population size. Most detect trends in population size or sex and age structure, which is adequate for most management decisions.¹⁷ Smith said precision is expensive and rarely necessary, and that surveys would not be conducted for caribou or bison.¹⁸

For important areas and populations, the DFWP currently conducts trend area counts, otherwise known as trend counts. The definition of a trend area can differ between publications and biologists. But for the DFWP's monitoring of elk, deer, and antelope, the term means a specific area where the population, the composition of animals, or both is believed to be representative of a larger population. For example, if a biologist observed 30 fawns per 100 adults and a population decline of 20% in a trend area, then the biologist would expect to see the same in the larger population.

Trend counts underestimate total numbers but, when conducted under the same conditions, can show whether a population is up, down, or stable relative to the previous year.¹⁹

Trend counts are usually conducted by aerial survey over relatively open range, although some may be conducted on the ground. A production count, where the primary goal is to determine the number of young per adult or female, and sometimes the ratio of males to females, may be recorded at the same time or through separate surveys on the ground.

Thick timber in Northwest Montana makes aerial census or trend count flights impractical; all but substantial changes in population are difficult to detect. Using elk as an example, not all areas of the state can be surveyed aerially, but almost all of the significant winter concentrations are. This accounts for about 60-70% of the elk in Montana.²⁰

For most important areas, the DFWP conducts trend counts every year during early to late winter or early Spring. But budget constraints and pilot availability may limit some areas to review every 2 or 3 years. Even where flights are attempted every year, they may not be completed due to a variety of factors.²¹

¹⁶ 87-1-201(10), MCA.

¹⁷ Senate Fish and Game Committee Minutes, February 6, 2003, Exhibit 1.

¹⁸ The DFWP says caribou currently are absent from the state in countable numbers and most wild bison are largely confined to Yellowstone National Park where they are annually surveyed by park staff.

¹⁹ Montana Statewide Elk Management Plan 2004, Montana Department of Fish, Wildlife, and Parks, Wildlife Division, page 31.

²⁰ Ibid.

²¹ Ibid, page 32.

Other population monitoring and estimation techniques include:

- Complete coverage: This is a trend count, but one with the opportunity to count 100% of a population. It involves flying a pattern over an entire area, often a hunting district or specific habitat in which animals are known to concentrate during a survey period, e.g., winter range for elk.
- Mark-recapture: A number of methods may be used, but in the simplest form a portion of a population is captured, marked, and released. Later, another portion is captured and the number of marked individuals within the sample is counted. The number of marked individuals in the second sample should be proportional to the number of marked individuals in the whole population. The DFWP uses those proportions in a formula to estimate the total population.
- Sightability indexes: These are used to estimate and adjust population counts for visibility bias in wildlife population surveys. It happens in two stages: 1) sightability trials are conducted with marked individuals; the probability of detection is estimated as a function of certain variables such as group size, habitat, percent vegetation, sky conditions, animal behavior, etc.; 2) the model is used to adjust counts in future surveys for animals that are not observed.
- Population reconstruction: This technique combines a variety of data sets, such as age at capture or harvest, harvest rates, and natural mortality. Each data set on its own could only indicate a minimum population, but when combined can be used to formulate a true population estimate.

The DFWP says it does not widely use sightability indexes and population reconstruction because of the associated cost and complexity. Trend counts are the most used tool, particularly for deer. Complete coverage is commonly used for elk on winter range, for antelope in Regions 2, 3, and 5, and for mountain goats and sheep because of their concentrations in specific habitat. Moose are difficult to survey using any technique; the DFWP is currently researching more effective methods as discussed in the Research section of this report.

Counting a species' young is an important factor in management decisions. For elk, wildlife managers traditionally believe that poor nutrition related to high animal densities results in lower than expected recruitment (number of calves per 100 cows). In this case, the usual corrective action is to increase hunting pressure and reduce competition for food, unless weather conditions or predation are the more likely cause.²²

The DFWP records male/female ratios to monitor male survival and mortality during the hunting season. This helps determine the expected number of males available in the next season, whether harvest rates are stable, declining, or increasing, and whether harvest regulations are meeting established goals for hunting and viewing experiences. The ratios are usually minimum figures as males are more often missed during winter surveys.²³

Incorporated in the S&I work are tailored, species-specific efforts, including elk population modeling that includes carnivore, precipitation, habitat quality, and winter weather data and

²² Ibid, pages 35-36.

²³ Ibid, pages 36-37.

the radio-monitoring of female grizzlies to help count grizzly bears in the Northern Continental Divide Ecosystem.

Wolves are the only species for which statute provides specific monitoring instructions.²⁴ The DFWP must collar at least one wolf in each wolf pack that is active near livestock or near a population center in areas where depredations are chronic or likely. The department conducts ground tracking and flies one to two times per month to locate collared animals.

In 2014, the DFWP used telemetry to monitor 67 wolves in 48 packs. At least 20 of those collars didn't last through the year for a variety of reasons, including animal harvest, other mortality, long-range dispersal, slipped collars, collar failure, and dead batteries.²⁵ At the end of 2015, there were collared wolves in 40 packs.²⁶ An effort to develop patch occupancy modeling as a more time- and cost-effective form of wolf population monitoring is discussed in further detail under the Research section of this report.

The DFWP says it is becoming more consistent with its population surveys and inventories, developing specific protocols for deer, elk, antelope, mountain sheep, and sage grouse in recent years. In 2010, the DFWP hired a survey and inventory specialist to help with wildlife monitoring protocols, decisions and operations analysis, and evaluation of data at local, regional, and statewide scales.

Since DFWP operations are not centralized, survey protocols evolved over time and can differ by region and hunting district. The DFWP says exceptions were mostly borne out of necessity, such as meeting requests for specific information, collecting data for a specific research project or environmental analysis, or a change in budget or personnel resources.²⁷

As the DFWP standardized its protocols, the department interviewed most of its wildlife biologists in 2010 and 2011 about the species they survey, type of survey and methods used, the time period for and frequency of the survey, and the area covered.

The biologists were also asked whether there are species for which data is lacking for season setting and if there are other pressing S&I needs in their area. Seventy percent said more data is needed for moose. At least 75% believed that they had enough data for elk, mule deer, antelope, mountain sheep, and upland game birds. Between 40% and 50% felt they were lacking sufficient information on black bears, mountain lions, mountain goats, many furbearers, and white-tailed deer.²⁸

When asked how to improve S&I protocols and analysis, 40% called for consistency, but recognized the difficulty of transitioning from historical practices. Suggestions were also

²⁴ 87-5-132, MCA.

²⁵ Montana Gray Wolf Conservation and Management 2014 Annual Report, Montana Fish, Wildlife, and Parks, pages 14, 15, 17, and 19.

²⁶ Montana Gray Wolf Conservation and Management 2015 Annual Report, Montana Fish, Wildlife, and Parks, pages 25, 27, and 30.

²⁷ Survey & Inventory Protocols for Big Game in Montana: White-tailed Deer, Newell, Jay, August 2013, page 3.

²⁸ Survey & Inventory Protocols for Big Game in Montana: Survey Questions for Management Biologists, Newell, Jay, January 9, 2014, page 7.

made for more funding, including enough money to repeat a survey flight if the first one was unsuccessful, and for additional experienced pilots.

Check Stations

The DFWP operates check stations in each of its regions during big game hunting seasons. The check stations collect information on all game harvested, but depending on their location may gather more information on a particular species. In addition, some locations are chosen because nearly all hunters in a specific hunting district or districts must pass by them on the way home.

Data collected may vary by region, based upon specific needs. Generally, the data reflects four categories: the check station itself (e.g. weather conditions and dates of operation), the animal (species, sex, age, and antler points), the location of the kill, and the hunter or hunting party. Some check stations also collect samples to be tested for disease (e.g. chronic wasting disease) or other biological information, interview hunters about specific issues and wildlife observations, or have wardens on site to check regulation compliance.²⁹

When sample sizes are large enough, check station data is used to verify the accuracy of hunter harvest survey data and to provide real-time information about the harvest, since harvest estimates are not released until several months after the general season closes.³⁰

The DFWP says check stations also serve as an important interface between hunters and department staff, allowing for conversations about land use (public versus private), hunter access problems, and other issues hunters want to bring to the agency's attention.

Harvest Surveys

Since 1941, the DFWP has surveyed hunting license and permit holders after the hunting season to estimate total wildlife harvest. Currently, telephone surveys are used to reach hunters one-on-one in the evenings and on weekends to ask questions about success rates, number of days hunted, areas in which hunting occurred, and the sex and age of animals harvested. The results help to alert biologists to changing population trends, to inform about hunting pressure and harvest patterns on public and private land, to develop future hunting season regulations, to evaluate and develop wildlife management strategies, with research, and with hunt planning by the public.

The DFWP's harvest survey methods changed several times over the years due to program reviews, complex and changing hunting regulations, and staff changes. License years 2004 and 2005 marked a major change in staffing as well as a reorganization of the harvest team and program. A new biometrician position devotes significant time to harvest surveys and procedures. A survey coordinator adds structure to the seasonal team of approximately 50 interviewers and provides supervisory support. An internal working group of approximately 15 biologists, researchers, and other staff oversees and influences the direction of the program with approval of the regional wildlife managers.

²⁹ Survey & Inventory Protocols for Big Game in Montana: White-tailed Deer, Newell, Jay, August 2013, page 8.

³⁰ Ibid, page 19.

The program uses a formula to determine what percentage of license and permit holders are surveyed based on the total number of people in a particular license or permit group. Hunters are randomly selected from the Automated Licensing System, except in cases where all permit or license holders are interviewed because the group is small enough. Up to three attempts may be made to contact selected hunters.

Some states require mandatory reporting of all harvested animals. However, the DFWP says surveys are still the best tool for Montana for multiple reasons. Surveys are less than a quarter of the cost of self-reporting because self-reporting hunters appreciate access to 24-hour call centers in addition to online reporting options, whereas survey interviewers call hunters at specifically staffed times.³¹

Mandatory reporting also doesn't guarantee a 100% response rate, requiring followup surveys. In Idaho, for instance, 2009 nonresponse rates range from 16% to 29%.³² The DFWP says followup surveys would be complicated by the short period of time available before the data is needed for the season setting process.

Some states penalize hunters who do not report by prohibiting them from buying a hunting license in the following season. The DFWP says it could not afford to impose such a penalty.

Other Monitoring

In addition to S&I and research projects discussed later in this report, the DFWP conducts other kinds of population monitoring. Current examples include:

Bat and Cave Monitoring

The DFWP is taking a proactive approach to detection and prevention of white-nose syndrome (WNS). WNS is associated with massive bat mortality in the northeastern and mid-Atlantic United States. Bat populations declined between 80% and 97% in the most severely affected areas since the winter of 2006-2007. It is the most precipitous decline of North American wildlife caused by infectious disease in recorded history.

The DFWP and the Montana Natural Heritage Program (MNHP) are actively engaged with existing and emerging WNS networks, including state and federal agencies and nonprofits, private landowners, and recreational caving interests. Partners are developing coordinated early detection and diagnosis measures to prevent WNS from affecting Montana sites, known as roosts, for large concentrations of bats.³³

The DFWP spent \$36,608 in federal funds on bat and cave monitoring in FY 2015.

Spion Kop Wind Farm

Starting in the Spring of 2015, Northwestern Energy contracted with the DFWP to conduct postconstruction wildlife monitoring at the approximately 4,000-acre Spion Kop wind farm in Judith Basin County. This currently includes eagle use point counts, raptor nest monitoring,

³¹ Evaluating Cost-Efficiency and Accuracy of Hunter Harvest Survey Designs, Lukacs, et al., Wildlife Society Bulletin 9999:1-8; 2011; DOI: 10.1002/wsb.61, page 5-6.

³² Ibid, page 3.

³³ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/nongame/batWhiteNoseSyndrome/>, March 14, 2016.

sharp-tailed grouse lek surveys, and fatality monitoring. The MNHP also monitors bat activity at the site.

The DFWP spent \$11,766 from Northwestern Energy on this monitoring in FY 2015.

Brucellosis Surveillance

The DFWP is conducting a multiyear targeted elk brucellosis surveillance project to evaluate the prevalence and geographic extent of brucellosis in southwest Montana elk populations, the extent of interchange between infected and adjacent herds, and the risk of seropositive elk shedding and potentially transmitting the disease.

Between 2011 and 2015, the DFWP captured and radio collared elk in each study area and outfitted seropositive, pregnant elk with vaginal implant transmitters to monitor birth events and sample for the disease at birth sites. The DFWP found brucellosis in four areas beyond the previously known distribution of the disease, a higher exposure rate than previously documented in one area, and no exposure in two areas.

The DFWP collared 38 seropositive elk and 144 seronegative elk. The department monitored 51 seropositive pregnancies. There were three abortions, 45 live births, and three unknown events. The DFWP detected brucellosis at each abortion site and one of the live birth sites.³⁴

In FY 2015, the DFWP spent \$247,127 in federal funds on this surveillance.

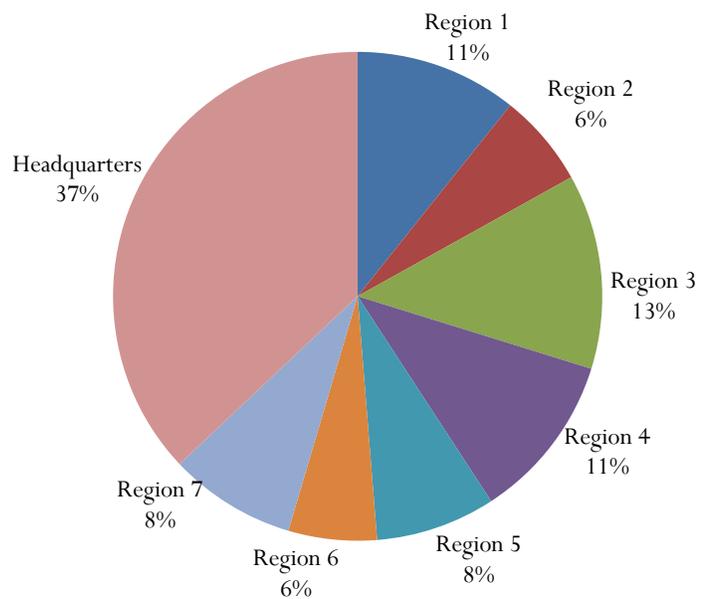
Financial Summary

Excluding the three monitoring projects described above, the DFWP spent \$3 million on S&I in FY 2015. Of the S&I work, 63% occurred at the regional level, as shown in the below chart.

Helena-based S&I operations include furbearer, nongame, and waterfowl work, as well as the harvest survey, which cost \$214,375 in FY 2015, and the pilots who fly for S&I. The pilots (2.16 FTE) cost \$190,720 in personal services and \$11,132 in operating expenses in FY 2015.

The DFWP attributes 30.96 FTE to S&I. This is 81% of all FTE discussed in this report. All but two of these FTE (part of S&I for grizzly bears and swift fox) are included in the department's base budget.

S&I Expenditures, FY 2015



³⁴ Targeted Elk Brucellosis Surveillance Project, 2011-2015 Comprehensive Report, Montana Fish, Wildlife, and Parks, page 1.

Season Setting

The DFWP says hunting and trapping are some of the most important wildlife management tools because hunters can be controlled by laws and regulations.³⁵ State law recognizes the “vital role” hunters play in achieving population management objectives for game animals.³⁶ In years of abundant populations, seasons may be longer and harvests greater. When numbers are down, seasons may be shortened and daily bag limits and harvest quotas may be smaller.

The primary use of the DFWP’s population monitoring data is to provide information for managers to make annual and biennial recommendations for season setting. The Fish and Wildlife Commission adjusts the structure of the hunting seasons every other year. Decisions include changes to hunting district boundaries, quotas for specific species or hunting districts, and whether general license holders can harvest any buck or bull, either-sex, or antlerless animals. Adjustments to the number of permits and “B” tags³⁷ issued may be made every year.

DFWP biologists use a combination of survey, check station, and harvest data and discussions with landowners, sportsmen and women, and game wardens to support their recommendations to the Commission regarding the seasons. In some cases, not all of the data is available.

In a best-case scenario, biologists have the necessary information to estimate how many animals are available to harvest, the success rate of hunters, and the number of landowners who will allow access to hunters. In addition, biologists would be able to accurately predict post-hunting season survival rates, emigration and immigration rates, and the number of spring fawns that would be recruited prior to the next survey.

The DFWP says this level of knowledge is rarely available. Complete coverage surveys, relied on more heavily for antelope, elk, and mule deer, usually undercount the actual number of animals. Also, surveys must be done under nearly ideal circumstances to get comparable data. Even taking care to reduce sampling variability, survey conditions sometimes require cautious treatment of particular counts.

When considering season changes, biologists look for trends in various population parameters that point in the same direction. They rely heavily on anecdotal information, professional experience, and input from landowners and hunters who spend large amounts of time in a hunting district.

Season setting must also consider hunter access, hunter preferences, and landowner tolerance of hunters and animals. Data on landowner tolerance may be the most difficult to gather; there is often no systematic method for its collection and use. Interpretation of the

³⁵ <http://fwp.mt.gov/fishAndWildlife/management/managementPrinciples.html>, February 16, 2016.

³⁶ 87-1-293(1)(a), MCA.

³⁷ B tags are issued in addition to general deer and elk licenses for game management purposes and allow residents and nonresidents to take a (typically antlerless) deer and allow residents to take an antlerless elk.

data can be difficult and open to more criticism than other types. In many cases, other data, such as the hunter success rate, is used as a surrogate for landowner tolerance.³⁸

In addition to the broad season setting powers given to the Fish and Wildlife Commission in 87-1-304, MCA, the Legislature authorized some additional tools for adjusting the permits and licenses available in any given year and where they may be used.

In 1997, Senate Bill No. 394 (Sen. Reiny Jabs, R-Hardin) authorized the Commission to strip the deer license from a Class B-10 nonresident big game combination licenses³⁹ when “necessary and appropriate” for the biologically sound management of deer and elk and to control their impacts on private property. The Commission may sell the deer license separately, limit the number sold, and condition the use of the license.⁴⁰

Dave Simpson, Vice Chair of the Fish, Wildlife, and Parks Commission, testified that the Commission requested the bill for three reasons: very low mule deer numbers in southwest Montana and the Missouri River Breaks, low buck-doe ratios and few older bucks in some mule deer populations, and a desire by deer hunters for larger mule deer bucks.⁴¹

Simpson said the structure of the Class B-10 license frustrated the Commission’s ability to implement deer seasons that differ from the traditional five-week unrestricted season. Of particular concern were nonresidents who booked with an outfitter and would be required to hunt with the outfitter in an area that might not be open to deer hunting.⁴²

On the other end of the population management spectrum, 87-2-104, MCA, authorizes the Commission to issue more than one deer, special antelope, or wolf license to residents and nonresidents. The commission may also issue antlerless elk B tags to residents and nonresidents. In doing so, the Commission must determine the hunting districts or portions of hunting districts in which the licenses or tags may be used, the number to be issued, and the terms and conditions of their use.

The antlerless elk tags were authorized by Senate Bill No. 122 (Sen. Bill Tash, R-Dillon) in 2003. FWP Director Jeff Hagener testified that cow elk are difficult to harvest adequately and that the antlerless tags would allow a hunter to take a cow early in the season and continue to hunt bull elk.⁴³

A 2000 performance audit recommended the DFWP do a better job of documenting its decisions during the season setting process and how they relate to management objectives.

³⁸ Survey & Inventory Protocols for Big Game in Montana: White-tailed Deer, Newell, Jay, August 2013, page 20.

³⁹ Class B-10 nonresident big game combination licenses include fishing and deer, elk, and upland game bird hunting privileges.

⁴⁰ 87-1-301(4)(a), MCA.

⁴¹ Senate Fish and Game Committee Minutes, March 18, 1997, Exhibit 2, page 1.

⁴² Ibid, Exhibit 3, page 1.

⁴³ Senate Committee on Fish and Game Minutes, January 14, 2003, page 2.

The audit pointed to the public's desire to be more involved and for increased agency accountability.⁴⁴

A 2003 followup to the audit found the DFWP was implementing the recommendations. Now, biologists complete justification forms when recommending changes to hunting seasons and quotas. Proposals are discussed during public hearings before the Fish and Wildlife Commission makes a final decision. Changes to the proposals and final decisions are tracked, documented, and distributed to appropriate agency personnel and recorded in the Commission's minutes.⁴⁵

Financial Summary

Season setting cost \$166,334 in FY 2015. But because season setting is a 2-year process, the odd-numbered year of the biennium is the less expensive year. In FY 2014, the DFWP spent \$243,294 on season setting, including the costs of multiple public meetings around the state and additional staff time.

Human Dimensions

The DFWP describes human dimensions as the "people" aspect of natural resource management. In this case, "what do people think and want" as it relates to wildlife and recreational opportunities. While technical biology can dominate decision making conversations, the Wildlife Division is trying to elevate consideration of the human dimension.

The DFWP's Responsive Management Unit (RMU) conducts a variety of social science research and economic surveys as another tool for gathering public input and opinions. Recent examples include surveys on hunting access, habitat loss, hunter expenditures, chronic wasting disease, and elk brucellosis management.

In 2012, after Montana's first wolf hunting season, the DFWP conducted surveys of four types of residents (Montana households, deer/elk license holders, wolf license holders, and private landowners) in an effort to measure objectives for future seasons. Key questions included:

- overall tolerance of wolves on the landscape before and after the hunt;
- participation in the formal season setting process;
- satisfaction with the regulations;
- tolerance of the concept of wolf hunting before and after the hunt; and
- satisfaction with wolf management before and after the hunt.

The surveys found that, in general, tolerance of wolves on the landscape was low with between one- and two-thirds of respondents (depending on resident type) reporting they were "very intolerant" and less than a quarter reporting they were "very tolerant". (Other respondents were on a spectrum in between.) Meanwhile, a majority (59.3% to 82.8%) of

⁴⁴ Performance Audit 98P-11 Wildlife Division, Montana Legislative Audit Division, March 2000, page 20.

⁴⁵ Follow-up Performance Audit: Wildlife Division (98P-11), Legislative Audit Division, September 2003, pages 2-3.

respondents were “very tolerant” of the concept of wolf hunting after the first hunting season with nearly identical levels of tolerance before the season.

The Division wants to conduct a similar survey 5 years after wolf delisting to see if public perception of wolf management changes over time.

The RMU is currently asking hunters about their perception of the complexity of elk hunting regulations and landowners about how the regulations and season structure affect their ability to effectively manage elk on their property. The idea is to combine this information with baseline data gathered a couple of years ago on hunting access and then compare it to a future survey planned for 2019. The DFWP wants to use the data to help evaluate elk shoulder seasons.

Financial Summary

The RMU is not part of the Wildlife Division and has its own budget. The Wildlife Division sometimes pays for the printing and mailing of a survey; the funding sources vary depending on the purpose of the survey. But these costs are not captured in the financial details of this report.

Research

Research is needed to better understand many of Montana’s native species. The DFWP’s research objectives include:⁴⁶

- Identifying habitat needs for individual species and evaluating the impacts of a variety of land use practices;
- Studying and explaining population dynamics under varying habitat and environmental conditions;
- Evaluating the social and economic values of wildlife; and
- Educating others about the results and the needs of animals, habitat, and the public.

Current management-related research projects include:

Mountain Sheep Population Dynamics

Most mountain sheep populations are relatively small and patchily distributed across Montana, with many populations static or periodically experiencing dramatic declines despite a seeming abundance of adequate habitat. Between 2014 and 2019, the DFWP and Montana State University are studying seven mountain sheep populations across the state to improve ecological understanding of the species and inform their management and conservation.

Specific objectives include assessing respiratory pathogens and herd exposure, variation in herds’ body condition, and movement patterns of adult females.⁴⁷

In FY 2015, the DFWP spent \$142,167 in federal P-R funding and \$63,240 in sheep license auction revenue on this research.

⁴⁶ <http://fwp.mt.gov/fishAndWildlife/management/managementPrinciples.html>, February 16, 2016.

⁴⁷ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/bighornSheep/population/default.html>, March 14, 2016.

Greater Yellowstone Area Mountain Ungulate Project

The Greater Yellowstone Area Mountain Ungulate Project began in the fall of 2009 to comparatively study mountain goats and sheep in the Greater Yellowstone Area (GYA). The goals are to gain insight into the ecological interactions between these two species, inform policy, and enhance conservation and management. Specific objectives of this project include investigating broad-scale spatial patterns of mountain goat and sheep occupancy to identify areas of current and potential cohabitation, developing and validating habitat suitability models, and projecting future mountain goat range expansion and populations.⁴⁸

The DFWP contributes data and information to this research, but did not expend any funding in FY 2015.

Sapphire Elk Research Project

Approximately 1,000 elk inhabit the north Sapphire Mountains in the northeastern Bitterroot Valley. Herds typically migrate between high elevation summer ranges, primarily on public and corporate timber lands, and low elevation winter ranges, primarily on private land. However, this migration may have changed in recent years, with elk spending more time on private winter ranges, resulting in crop loss and game damage and fewer public hunting opportunities. As elk become less accessible during the general season, it is more difficult to maintain elk within population objective levels.

The goal is to collect baseline information on public and landowner perceptions of current elk hunting regulations, current elk population objectives, access issues, elk movements and habitat use, forage quality, and other factors that potentially effect elk distributions and migratory behaviors.⁴⁹

The DFWP wants to identify factors contributing to problematic elk distributions and help develop effective responses to the management challenges in the area. Findings are expected to be relevant beyond the north Sapphire Mountains.

In FY 2015, the DFWP spent \$69,474 in private funding on this research.

Elkhorn Mountains Elk Research Project

The elk population within the Elkhorn Mountains south of Helena is one of the most sought-after bull elk hunting opportunities in Montana. However, the effects of a mountain pine beetle (MPB) epidemic -- with tree mortality approaching 90% -- on elk habitat and movements are unknown. In collaboration with the Elkhorn Working Group, Helena National Forest, Montana State University, and Montana Department of Military Affairs, the DFWP initiated a study to evaluate those impacts, as well as impacts on elk nutrition. Findings are expected to be relevant in other areas experiencing MPB epidemics.⁵⁰

In FY 2015, the DFWP spent \$90,321 in federal and private funding on this research.

⁴⁸ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/bighornSheep/yellowstone/default.html>, March 14, 2016.

⁴⁹ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/elk/sapphire/default.html>, March 14, 2016.

⁵⁰ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/elk/elkhorn/default.html>, March 14, 2016.

Moose Population Monitoring

Concern arose in recent years over the widespread decline of North American moose along the southern extent of their range. Aerial survey trends and hunter harvest statistics show population declines in Montana since the 1990's. But a lack of rigorous data from which to monitor population trends and prescribe management directions is also problematic.

In 2013, the DFWP began a 10-year study designed to improve understanding of:

- the most cost-effective means to monitor statewide moose populations and maximize hunter opportunity; and
- the current status and trends of moose populations and the relative importance of factors influencing moose vital rates and limiting population growth (including predators, parasites, habitat, and weather).

The DFWP is assessing which factors drive moose vital rates (e.g., adult survival, pregnancy, calf survival) and which factors are most important to annual growth of moose populations.⁵¹

In FY 2015, the DFWP spent \$230,051 on this research. Seventy-two percent was federal P-R funding, while 15% came from moose license auction revenue, 10% from the general license account, and 3% from private funds.

Rest-Rotational Grazing Impacts

The DFWP is conducting four research projects related to the impacts of rest-rotational grazing systems on prairie birds in collaboration with the University of Montana and Montana State University.

The work started with research on the effects of rest-rotational grazing on sage grouse populations, habitat (vegetation), and habitat use. The involved lands comprise over 80,000 hectares near Roundup. They are primarily private lands with some enrolled in the Natural Resource Conservation Service's Sage-grouse Initiative.

The DFWP's second research project evaluates the influence of grazing on ground- and plant-dwelling insects that serve as food sources for sage grouse chicks and migratory songbirds. This second project also looks at the influence of grazing on known West Nile virus vectors.

The third research project uses the same lands near Roundup but evaluates how grazing affects migratory songbirds, which respond quickly to habitat changes and may serve as an initial barometer.

The fourth project is on 25,000 acres south of Glendive and focuses on the effects of rest-rotational grazing on sharp-tailed grouse populations, habitat (vegetation), and habitat use. Songbird and food insect project components are in place at this location.

In FY 2015, the DFWP spent \$181,937 on this research. Seventy-five percent of the funding was P-R money, while the rest was general license revenue.

⁵¹ <http://fwp.mt.gov/fishAndWildlife/diseasesAndResearch/research/moose/populationsMonitoring/default.html>, March 14, 2016.

Wolf Monitoring Development

Since the wolf was delisted, Montana is required to monitor its population to ensure the number of wolves and breeding pairs do not fall below established minimums.⁵² Beyond meeting federal criteria for monitoring, the DFWP says understanding the relative size and recruitment of a wolf population is essential to effective management.

Previous studies used pack size to estimate breeding pairs and hunter observations to estimate wolf packs. The DFWP is now studying an enhanced version of the latter, known as patch occupancy modeling (POM). The hope is to develop a more time- and cost-effective method of monitoring wolf populations.

POM uses the patterns of detections and nondetections of a species over multiple visits to a particular portion of a landscape, known as a patch. The reliability of POM is contingent on accurate information on territory size, degree of territory overlap, and pack size. The DFWP says the current study will refine its understanding of how those are affected by harvest.

The DFWP uses a P-R grant to fund the POM research. The department spent \$41,027 in FY 2015.

Challenges

The DFWP identifies several factors that will influence wildlife management in the future. They include the increasing cost of delivering the present level of services, a growing human population, and increasing demand for opportunities to enjoy wildlife, including new services beyond traditional hunting and trapping activities.⁵³

Other challenges identified in the department's strategic plan include:⁵⁴

- Nationwide trend of reduced hunter participation resulting in reduced revenue, reduced ability to manage game species, and reduced political clout for conservation;
- Fragmentation of habitat due to residential and energy development;
- Securing adequate access for recreational hunting, especially as it relates to managing population numbers;
- Increased frequency and severity of wildlife diseases, as well as public knowledge of and reaction to diseases;
- Long-term warming and drying trends that impact species distribution and status;
- Secure, predictable funding sources;
- Retirement of a large number of staff; and
- Increasing emphasis on trophy wildlife and the potential for commercialization of trophy wildlife.

The DFWP says wildlife must be managed comprehensively to benefit entire systems. Wildlife Division programs are encouraged to explore new funding and management opportunities to address the needs of all wildlife and their habitats.

⁵² The minimums established by the U.S. Fish and Wildlife Service are 150 total wolves and 15 breeding pairs.

⁵³ The Road Ahead: Strategic Plans, Montana Fish, Wildlife, and Parks, Updated March 2008, page 11.

⁵⁴ Ibid, page 16.

The data collected by DFWP to help identify and address those needs is a double-edged sword. The growing number of information requests are time-consuming to fill. Examples include data for marketing, litigation, and other purposes on sage grouse lek locations, bobcat harvest sites, mountain sheep, and grizzly bears traveling in out and of Yellowstone National Park. The DFWP responds to the requests under Montana's open records requirements and requires payment of fees depending on the extent of the request.

Litigation and legislation affect wildlife management as well. Some examples include:

- the federal delisting of wolves, which took Congressional action to implement;
- concerns that Canada lynx, which are listed as threatened under the ESA, could be incidentally taken during trapping seasons;
- the federal decision not to list wolverines under the ESA, of which a judge recently ordered reconsideration; and
- a proposed ballot initiative would ban trapping on public lands.