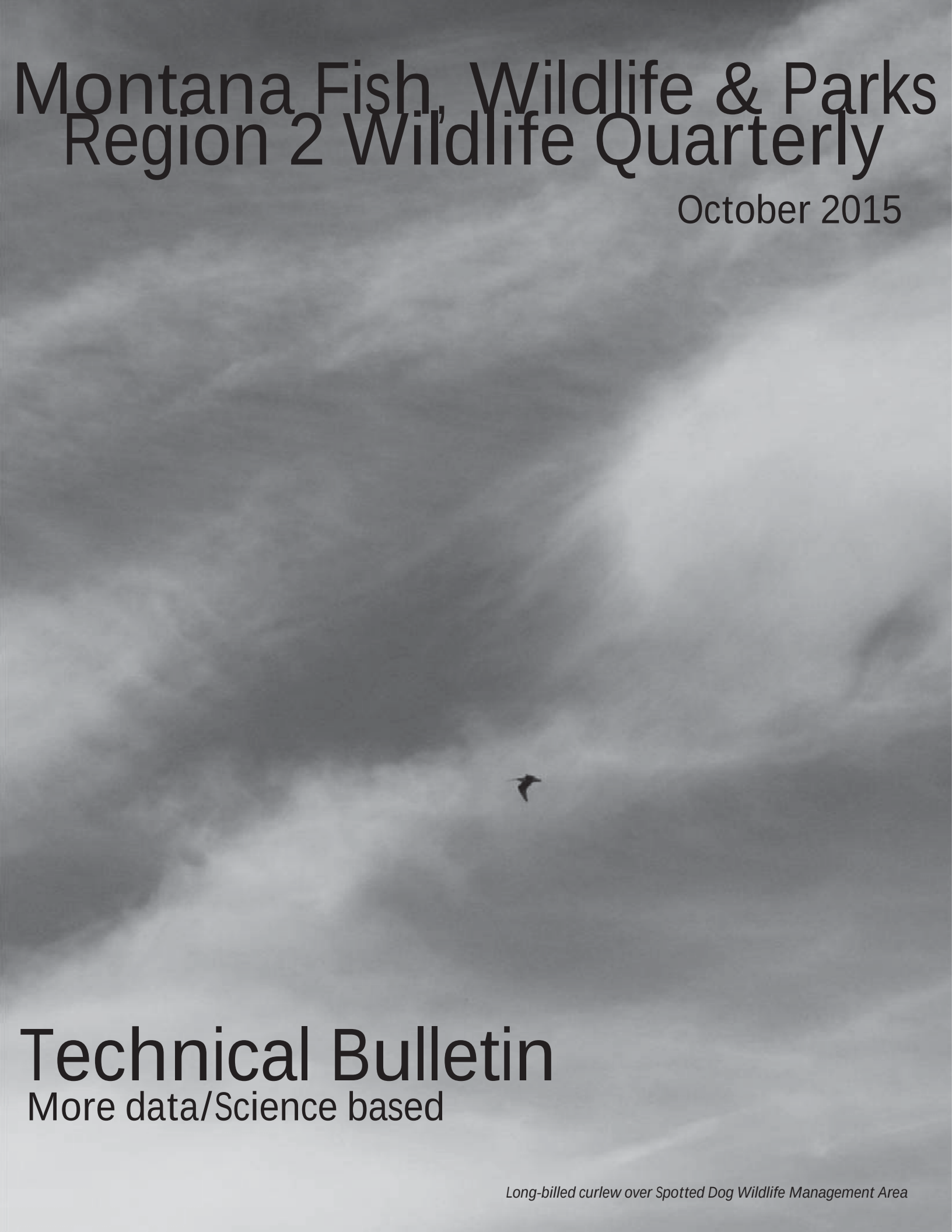
Montana Fish, Wildlife & Parks
Region 2 Wildlife Quarterly

October 2015



Technical Bulletin

More data/Science based

Long-billed curlew over Spotted Dog Wildlife Management Area

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Region 2, 3201 Spurgin Road, Missoula MT 59804, 406-542-5516

Region 2 Wildlife Staff

Liz Bradley, Wildlife Biologist, Missoula-West, **lbradley@mt.gov**, 406-542-5515
Dave Dickson, Wildlife Management Areas Maintenance, **ddickson@mt.gov**, 406-542-5500
Kristi DuBois, Wildlife Biologist, Nongame, **kdubois@mt.gov**, 406-542-5551
David Dziak, Wildlife Management Areas Manager, **ddziak.fwp@gmail.com**, 406-693-9083
Scott Eggeman, Wildlife Biologist, Blackfoot, **seggeman@mt.gov**, 406-542-5542
Chris Hagen, Wildlife Management Areas Maintenance, 406-693-9083
James Jonkel, Bear and Cougar Management Specialist, **jjonkel@mt.gov**, 406-542-5508
Kendra McKlosky, Hunting Access Coordinator, **kmcklosky@mt.gov**, 406-542-5560
Rebecca Mowry, Wildlife Biologist, Bitterroot, **rmowry@mt.gov**, 406-363-7141
Tyler Parks, Wolf Management Specialist, 406-542-5500
Tyler Rennfield, Conservation Specialist, **trennfield@mt.gov**, 406-542-5530
Craig Sundberg, Wildlife Management Areas Maintenance, 406-693-9083
Mike Thompson, Regional Wildlife Manager, **mthompson@mt.gov**, 406-542-5516
Ray Vinkey, Wildlife Biologist, Upper Clark Fork, **rvinkey@mt.gov**, 406-859-1704
Bob White, Wildlife Management Areas Maintenance, 406-542-5500
Bob Wiesner, Cougar and Bear Management Specialist, 406-542-5508

Statewide Research Staff Housed at Region 2 Headquarters:
Nick DeCesare, Wildlife Biologist, Moose Research Project, ndecesare@mt.gov, 406-542-5500
Ben Jimenez, Research Technician, bjimenez@mt.gov, 406-542-5500

The Region 2 Wildlife Quarterly is a product of Montana Fish, Wildlife & Parks; 3201 Spurgin Road; Missoula 59804. Its intent is to provide an outlet for a depth of technical information that normally cannot be accommodated by commercial media, yet we hope to retain a readable product for a wide audience. While we strive for accuracy and integrity, this is not a peer-refereed outlet for original scientific research, and results are preliminary. October 2015 is the inaugural issue.

North Sapphire Elk Research Project—*Progress Report, Fall 2015*

by Kristin Barker, Masters Candidate at The University of Montana, kristin.barker@umontana.edu

Montana Fish, Wildlife and Parks (FWP), in collaboration with several other project partners, initiated a 2-year elk research project in the North Sapphire Mountains with the goals of better understanding elk movements and hunter and landowner opinions about elk management in the northern Sapphire area, primarily in Hunting District 204. FWP will use this information to identify and develop effective responses to management challenges within the hunter and landowner communities of the northern Sapphire range. The project was initiated in February 2014. Currently, the research team is monitoring elk movements and survival, and evaluating elk diet and forage quality across the northern Sapphire range. Elk radio-collars are scheduled to fall from the collared animals in February 2016 and field work will end with the collar retrieval in late-February. This report summarizes the work conducted during spring and summer 2015.

Elk Monitoring and Survival

Since the February 2015 elk capture, we have monitored survival of 42 adult female and 14 bull elk. No mortalities have occurred, and we will continue survival monitoring until collars release in February 2016.

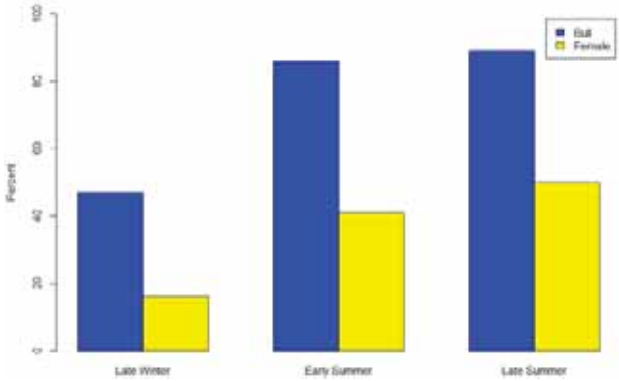


Figure 1. Percent of bull and adult female elk locations occurring on public land in late winter (March-April), early summer (May-June), and late summer (July-August) 2015.

Elk Movements

During late winter (March - April), 16% of adult female elk locations and 47% of bull locations occurred on public lands (Figure 1). During early summer (May - June), 41% of adult female elk locations and 86% of bull locations occurred on public lands. During late summer (July - August), 50% of adult female elk locations and 89% of bull locations occurred on public lands. This seasonal increase in use of public land corresponds to a general movement from lower elevation lands in winter, which are typically privately owned, to higher elevation areas in the summer, which tend to be either public land or corporate timber land. No radioed elk have been documented crossing Highway 93 since May 2015. Six radioed elk crossed the highway previously, typically at night during the winter.

Elk Habitat and Vegetation Monitoring

During summer 2015, we sampled vegetation composition and biomass at 295 locations in order to assess the availability and abundance of elk forage plants across the study area. We also repeatedly sampled 10 phenology plots every 3 weeks from May to September to examine seasonal changes in forage availability. Additionally, we collected samples of key elk forage plants at each phenological stage (emerging, flowering, seeding, and cured) and will have these samples analyzed to estimate nutritional content of each species in each phenophase. Samples and data from the field season are currently being prepared for analysis.

To gain insight about the relationship between phenology, forage quality, and elk nutrition, we collected forage plant samples and elk fecal pellet samples biweekly throughout the growing season. We collected a total of 51 samples from migratory and resident female elk in 2014. Forty-three (43) additional samples have been collected in 2015, and collection will continue through late September. The protein content of forage species and fecal nitrogen levels will be estimated. We will use this information to evaluate the relationship between remotely sensed vegetation indices, forage quality, and elk nutrition, as well as potential differences in these relationships between migratory and resident elk.

Acknowledgements

We thank the summer 2015 field teams for their hard work in collecting the vegetation data, plant samples, and fecal samples. We thank Becca Durham, Craig Jourdonnais, and Teagan Hayes of MPG Ranch for coordinating fieldwork and ensuring a successful and productive field season.

We thank the landowners that have allowed access for fieldwork and provided logistical support. We also thank the organizations and individuals that have provided financial support for this project: Ecosystem Research Group, Montana Department of Transportation, Montana Department of Fish, Wildlife and Parks, Montana's Outdoor Legacy Foundation, MPG Ranch, Ravalli County Fish and Wildlife Association, Rocky Mountain Elk Foundation, Roseburg Forest Product Company, Burnt Fork Ranch, Missoula Community Foundation, First Security Bank of Missoula, Old Bulls for the North Sapphires Group, and Sun Mountain Lumber. Additional funding was provided by revenues from the sale of Montana hunting and fishing licenses and matching Federal Aid in Wildlife Restoration grants to Montana Fish, Wildlife and Parks.

Doing Something—*Elk Management, South of Drummond, MT*

by the Region 2 Wildlife Staff

Elk interrupted while attempting to cross Interstate 90, near the Jens exit.

New Hunting Regulations in 2014

In 2014 Montana Fish, Wildlife & Parks (FWP) tried a new and unusual set of elk hunting regulations in the northwest quarter of Hunting District (HD) 212, south of Drummond, in hopes of balancing the elk population with a wide range of public interests, including the local ranching lifestyle. Known as Dunkleberg, for the ridge and the creek bearing that name, this area generally is bounded by Douglas Creek and Gold Creek, and is mostly privately owned.

Elk Trend Counts

FWP's annual counts of elk wintering in the Dunkleberg area increased steadily from 391 in 2007 to 1,353 in 2013, before decreasing to 1,142 in January 2014. Elk commonly move in and out of this area across the Clark Fork River and Interstate 90, meriting special signage on the Interstate to alert traffic. FWP can only speculate whether the decline in the elk count in 2014 represented a decline in elk numbers due to harvest, or merely a coincidence of variable elk distribution. Similarly, it's unknown whether the high count of 1,443 elk in Dunkleberg on February 24, 2015 reflected population growth or different distribution from winter to winter. Regardless, more elk were counted in 2015 in this one-quarter of HD 212 than the management objective of 800-1,200 elk for the whole hunting district.

Region 2 Hunting Access Coordinator, Kendra McKlosky, posts Block Management signs on an elk damaged fence in the Dunkleberg Block Management Area.

Collaboration With Landowners

Traditional hunting regulations that were in place prior to 2014 did not result in adequate harvest to keep up with elk reproduction and population growth, and a change was needed to reduce elk numbers to a level

more compatible with a ranching way of life on private lands. FWP's Region 2 Hunting Access Coordinator, Bart Morris, reached out to Dunkleberg landowners in 2012-2013 to learn their needs and concerns, and Bart's successor, Kendra McKlosky, continued working toward assisting a mutual understanding among landowners, others in the hunting public, and with FWP. The result was a well intentioned set of new hunting regulations for the Dunkleberg portion of HD 212 in 2014. These regulations remain in effect for the 2015 hunting season.

Strategy For Managing Hunting Pressure

The experimental strategy was to create a "soft spot" by reducing hunting pressure on the public lands where FWP and the public desired elk to live. At the same time, FWP and the landowners cooperated to increase hunting pressure for antlerless elk on private lands. The hope was to reverse the trend resulting from traditional elk management, where more elk meant more antlerless licenses valid for public and open private lands, which ensured that elk would seldom leave more lightly hunted private lands. The more antlerless permits and licenses that FWP issued for the hunting district, the more adamant landowners became about their intent to protect elk from potential shootouts. FWP listened and learned that landowners with elk on their property never would agree to a hunting situation on their land that would stampede elk through fences and into hunters around the perimeter. FWP, landowners and many hunters found common ground built on the ethics of elk hunting and management, and the right of private landowners to enjoy their properties, as well as the elk's place as a resource held in the public trust.

Looking across the lower Flint Creek valley from the upper reaches of Dunkleberg Creek.

FWP created the soft spot by eliminating elk hunting without a special license or permit in the portion of HD 212 located north of Boulder Creek and west of Gold Creek. One-hundred permits for brow-tined bulls were issued for the public and private lands in that area to provide a high quality hunting experience without compromising the soft spot. Unlimited B-licenses for antlerless elk were made available for hunters to purchase over-the-counter at any license agent and use on private lands within that area, thus creating the desired pressure on private land. The cooperators did not intend to stampede elk off private lands, but instead hoped to conduct ethical hunts on private lands, with pressure adequate to make elk uncomfortable enough to disperse over time. FWP also administered early damage hunts and a late elk management hunt on cooperating ranches to place harvest pressure on elk that foraged on crops in late summer and to achieve additional harvest for population control in the early winter.

First-Year Results

Large numbers of elk moved off the ranches and onto public land and the Block Management Area in Thanksgiving Week of 2014. Whether that movement was due to weather conditions or the new

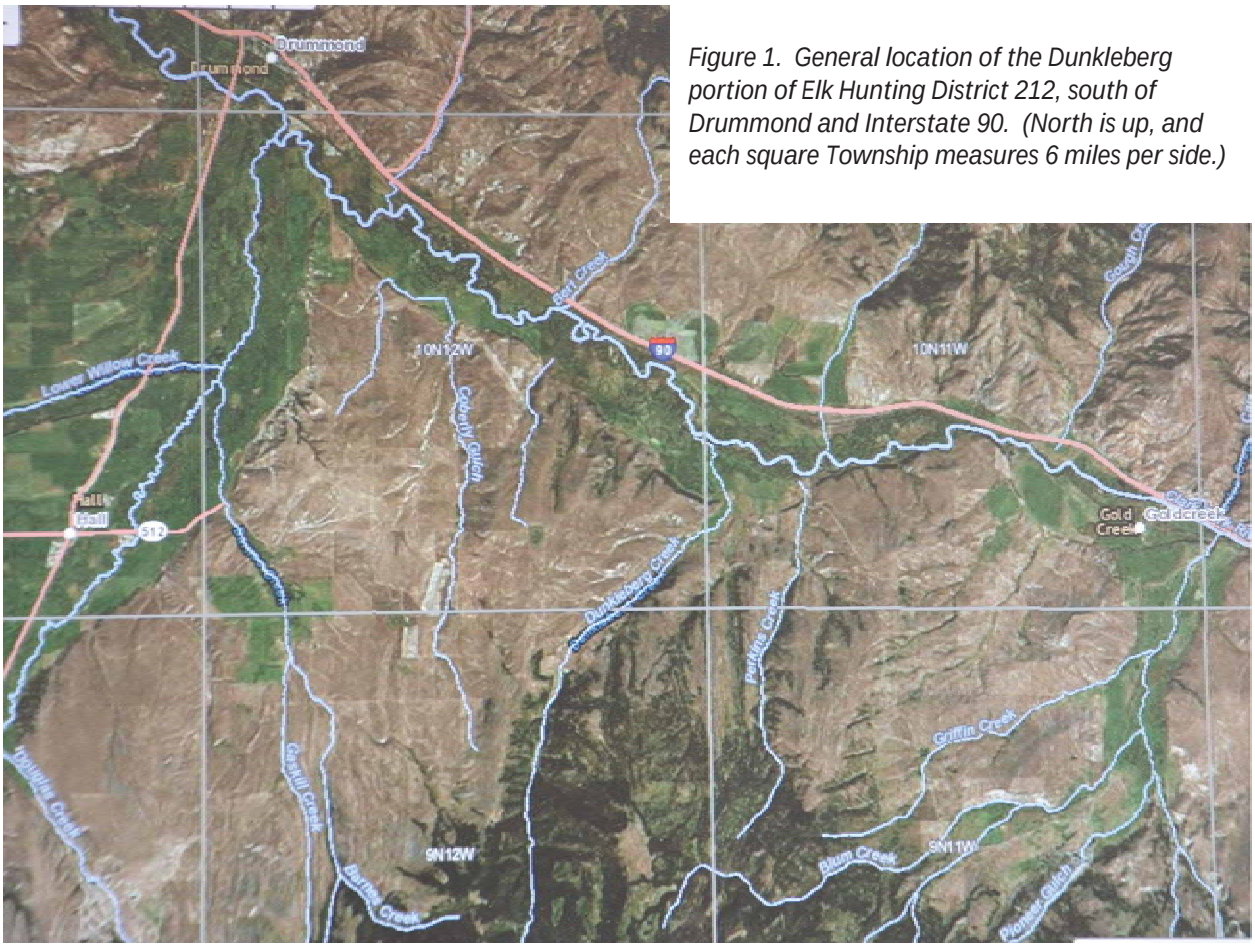


Figure 1. General location of the Dunkleberg portion of Elk Hunting District 212, south of Drummond and Interstate 90. (North is up, and each square Township measures 6 miles per side.)

hunting regulations is debatable; almost certainly it was a combination of both factors at play. FWP Enforcement and Block Management personnel reported that elk hunting activity in response to the shift in elk distribution was dispersed and ethical, compared with the more unethical outcomes in memory. Quite a few antlerless elk were harvested as a result.

Elk Harvest in 2014

In total, FWP was able to document a minimum harvest in 2014 of at least 142 elk, mostly antlerless, in the Dunkleberg area. An estimated 17 bulls were harvested by bull-permit holders in the Dunkleberg area, according to FWP's statewide harvest survey. FWP counted 210 9-month-old calves during its February 2015 survey of the Dunkleberg area, which suggests that a minimum of 105 antlerless elk should be harvested to match recruitment into the population. These data indicate that antlerless harvest equaled or exceeded recruitment, which was a start at decreasing elk numbers, albeit gradually.

The recruitment of bulls exceeded harvest, with 142 brow-tined bulls and 137 spikes visible during the February 2015 survey. Increased numbers of bulls is a result of the strategy to create a soft spot on public lands in the Dunkleberg area. Hunters should benefit in the long run with the enjoyment of an

expanded bull-hunting opportunity, when drawing a special permit for the Dunkelberg area, and when hunting with a general elk license in surrounding portions of HD 212. FWP's general experience with radio-collared elk suggests that bulls disperse at two years of age and that about half do not return to their natal home ranges. So, more bulls conserved in the Dunkleberg area should mean more bulls to hunt on public and private lands in the future, primarily south and east of Dunkleberg.

Public Response in the First Year

This experiment in elk management is controversial. The requirement that hunters possess a permit to hunt bulls displaced many hunters from their favorite spots, and FWP heard some of the strongest reactions after the regulations booklets were printed and became available to hunters who had not participated in the biennial season-setting process. While elk harvest on the Dunkleberg Block Management Area had been little to none in the years leading up to the new regulation, it came to FWP's attention later that some hunters had found success on the peripheries, especially in the archery only season. The new hunting regulations were confusing for hunters to read in the regulations booklet, and FWP received a number of suggestions for improvements. Landowners' concerns were centered on the slow pace of elk population reduction, and ranchers suggested regulations adjustments to increase annual harvest. FWP will propose hunting regulations for the 2016-2017 biennium to the Fish and Wildlife Commission in December 2015, and gather public comment in January 2016 at public meetings to be held in Drummond, Deer Lodge, Philipsburg and Missoula, among other locations in FWP Region 2. The public will also be provided the opportunity to comment online at fwp.mt.gov.

Postscript—Highway Underpasses for Elk

FWP recently inspected four existing underpasses beneath Interstate 90, between Highway 1 and the Jens exit. Working in collaboration with the Montana Department of Transportation and local landowners, FWP hopes that the underpasses in their existing condition, or modified, could provide safe passage for elk to move back and forth if the Interstate was fenced in the future to prevent elk from accessing the highway. Without elk fencing, elk crossing the Interstate pose a continuing hazard to human life, elk and property in the area just east of Drummond.

Typical existing underpass for livestock and ranch traffic that may serve for elk someday.

Who Owns the Wildlife?—*A practical view of the Public Trust Doctrine*

by the Region 2 Wildlife Staff

Montana Fish, Wildlife & Parks (FWP) employees are often called upon by teachers to speak to their classes, and in those circumstances we try to begin at the beginning. "Who owns the wildlife?" is one of our common ice-breakers. By the fifth grade-level, we can carry on some deeper, philosophical conversations with students, fueled by their responses to this foundational question, which may include: no one, everyone, "me," the State, government, "you," the wildlife, the president and God.

FWP employees are more often called upon to speak and listen to adult constituents, yet we seldom, if ever, begin at the beginning in those settings. For the sake of time and efficiency, we assume a common understanding of foundational values, or more likely we assume and hope that the differences in our foundational values are irrelevant to the immediate topic at hand, whether that be a hunting regulation or some other FWP proposal. As more years have become experience, we've wondered whether our differing ideas about "who owns the wildlife" require attention and exploration if we hope to sustain our wildlife legacy into the future.

Missoula-area school class attending the FWP wildlife station at Forest Discovery Days in May 2015.

"In essence, the Public Trust Doctrine holds that certain natural resources, such as water, fish, and wildlife, are held in trust by the government for the benefit of the people," writes Christian A. Smith, formerly of FWP and currently with The Wildlife Management Institute, in the Journal of Wildlife Management (2011, volume 75, number 7, pages 1539-1543). "The U.S. Supreme Court ruled in *Martin v. Waddell*, 41 U.S. 367 (1842) that the trust responsibility under the Public Trust Doctrine passed from the English crown or parliament to the states upon secession of the colonies in 1776," Smith reported.

It turns out that the schoolchildren are almost always right, when answering the question of "who owns the wildlife." No one, as an individual, owns wildlife. Everyone holds a stake in the resource—is a beneficiary of the trust. The State is the Trustee, the entity accountable for stewardship of the trust—government, if you will.

We tell the kids that FWP takes care of their wildlife for them. Then we ask them, "Who do we work for? Who does FWP work for?" And, we navigate a variety of guesses until, with great pleasure and surprise, we all discover that FWP works for them—for the people, the public. Actually, we work for their surrogates--the legislature and governor that the people elect to represent them. FWP's very

existence is established and occasionally revised in statute by the Montana Legislature. There would be no FWP without an imperative for wildlife stewardship and allocation shared by you, the public.

The enabling legislation for FWP, in part, is preserved as follows in the Montana Code Annotated:

> *87-1-201. Powers and duties. (1) Except as provided in subsection (11), the department shall supervise all the wildlife, fish, game, game and nongame birds, waterfowl, and the game and fur-bearing animals of the state and may implement voluntary programs that encourage hunting access on private lands and that promote harmonious relations between landowners and the hunting public. The department possesses all powers necessary to fulfill the duties prescribed by law and to bring actions in the proper courts of this state for the enforcement of the fish and game laws and the rules adopted by the department.*
>
> *(2) Except as provided in subsection (11), the department shall enforce all the laws of the state regarding the protection, preservation, management, and propagation of fish, game, fur-bearing animals, and game and nongame birds within the state.*
>
> *(3) The department has the exclusive power to spend for the protection, preservation, management, and propagation of fish, game, fur-bearing animals, and game and nongame birds all state funds collected or acquired for that purpose, whether arising from state appropriation, licenses, fines, gifts, or otherwise. Money collected or received from the sale of hunting and fishing licenses or permits, from the sale of seized game or hides, from fines or damages collected for violations of the fish and game laws, or from appropriations or received by the department from any other sources is under the control of the department and is available for appropriation to the department.*

Most to least carnivorous mammals, as arranged by students at the Montana Natural Resources Youth Camp in 2015.

If we do our jobs well, we strive to learn what you want from your wildlife resource and we try to produce that for you. We are responsible for warning you when you, the public, want things that the resource cannot sustain, and then we are responsible for working with you to identify alternative solutions that would work within the resource's sustainable capacity. Ultimately, your wildlife is in your hands. You pilot the ship in a number of ways. You elect your trustees—your representatives and governor. If you hunt, you decide what species to hunt, whether to harvest a female animal (if legally allowed), whether to harvest a large buck or small one, whether to hunt the farmer's field or the backcountry, or whether to hunt at all, and with those and other decisions you exercise your personal choices over the management of your resources. Regulations are only the broad boundaries within which the hunting and trapping publics make known their harvest preferences. Within the framework set in regulations, we all register our own ethical choices—whether to feed wildlife, whether to let domestic cats roam at large, whether to inform ourselves and conduct ourselves honorably when granted the privilege of access to private lands. If we at FWP do our jobs well, our preferences for the wildlife resource are the reflections of yours. They should be one in the same.

Status of Bighorn Sheep in Region 2—*after the die-offs*

by the Region 2 Wildlife Staff

Pneumonia continued to impact bighorn sheep populations in Montana Fish, Wildlife & Parks (FWP) Region Two in 2015, 6 years after initial detection of all-age die-offs that eventually affected 8 of 10 herds across the region from 2009 through 2014. Only the Petty Creek (Hunting District (HD) 203) and West Fork Bitterroot (HD 250) herds escaped any noticeable pneumonia occurrence through October 2015.

Maternal ewes cracking horns along the roadside in Lower Rock Creek on 26 July 2015.

Pneumonia History

Dead and dying sheep were first documented by FWP in November 2009 in the East Fork Bitterroot (HD 270) herd, and in January 2010 in the Bonner (HD 283), Lower Rock Creek (HD 210) and Upper Rock Creek (HD 216) herds. Ewes or lambs have not been seen near Bearmouth since the Bonner and Rock Creek die-offs, where a small, unhunted subpopulation of sheep had survived since the late 1980s. Pneumonia was detected in the Anaconda (HD 213) herd in August 2010, the Garrison (HD 212) herd in February 2011, and the Skalkaho (HD 261) herd in September 2011.

Sheep Population Declines

FWP biologists counted 1,531 sheep in the Region Two herds (excluding Bearmouth) in 2008, 2009 or 2010, prior to the die-offs. In 2015 (2013 for the West Fork Bitterroot), biologists counted 770 sheep in the same herds. This represents a 50% reduction in bighorn sheep in Region Two, 6 years into the die-off event. Considering only the 7 herds (excluding Bearmouth) that were

Locations of bighorn sheep hunting districts in FWP Region 2. Also see an article by Victoria L. Edwards and coauthors entitled, "Situational agency response to four bighorn sheep die-offs in western Montana," in the Proceedings of the 17th Biennial Symposium of the Northern Wild Sheep and Goat Council, online at http://www.nwsgc.org/contents/2010contents.html

affected by pneumonia prior to 2015, a count of 1,335 sheep was reduced to a count of 551 sheep over the course of the same 6 years—a 59% reduction. (Biologists conducted these surveys on spring greenup each year, generally from a helicopter, and typically before lambing season.)

Recurring Lamb Mortality

Lamb production and survival is often suppressed for a period of years following a bighorn sheep die-off. Biologists assume that newborn lambs die because the colostrum in the ewes' milk declines in mid-summer, and the lambs then come into contact with the latent pneumonia-causing agent lacking the benefit of immunity transferred in the milk. Considering only the 7 herds (excluding Bearmouth) that were affected by pneumonia prior to 2015, a count of 197 lambs (~10 months of age at the time of the survey) in 2008, 2009 or 2010 was reduced to a count of 58 lambs in 2015, a 71% reduction in lamb counts over the course of 6 years. The level of lamb survival observed in 2015 would replace the annual mortality of only 29 adult ewes—or 4 ewes on average in each affected herd--assuming a 50:50 sex ratio among the surviving lambs. While 58 lambs is the minimum count (because not all sheep are observed or classified), this may be more than offset by the increasing average age of ewes in the bighorn population; a higher-than-normal and increasing adult mortality rate may be expected with each passing year of low lamb survival and recruitment into the breeding population. Unless lamb survival improves,

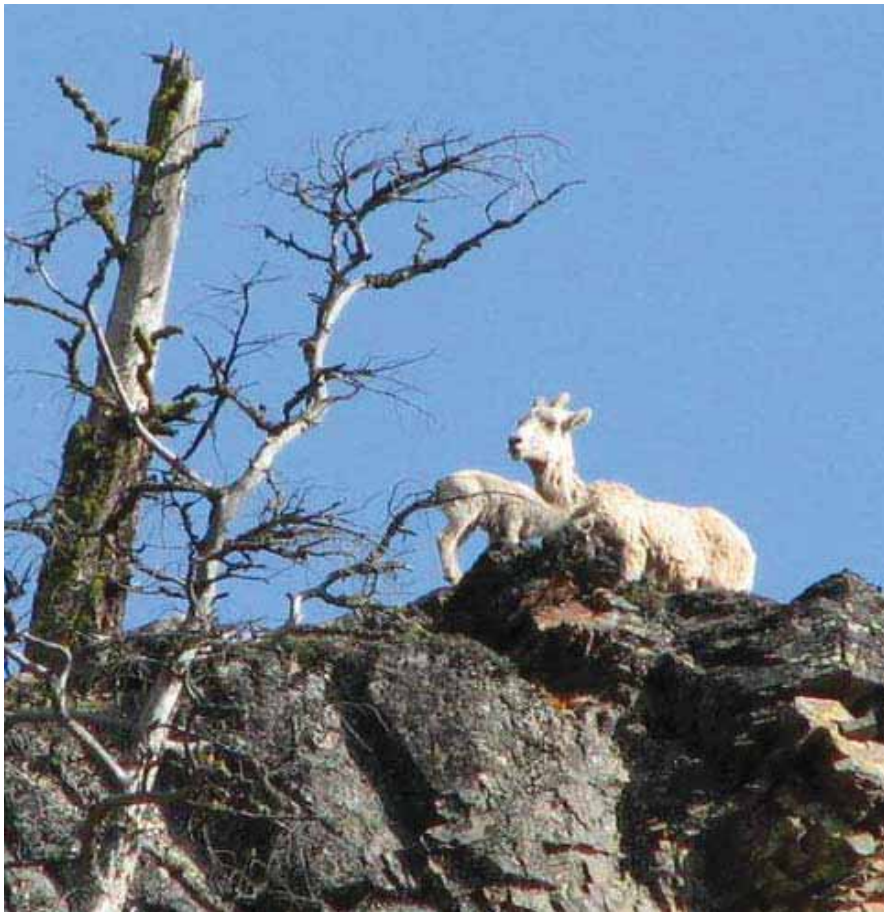
Bighorn sheep cross Rock Creek Road while FWP biologists were recovering 6 lambs killed in a single vehicle strike.

some of the smaller sheep populations in Region Two may be at risk of dying out in the coming years. In 2015, FWP biologists and wardens found pneumonia in necropsied sheep in the Bonner, East Fork Bitterroot, Anaconda and Lower Rock Creek herds. In the East Fork Bitterroot, nearly all lambs-of-the-year died in their first 1-2 months of life, leaving only 2 observable lambs among at least 70 adult ewes by 22 June 2015. This appeared to be a new event separate from the 2009-10 die-off in the East Fork. In Lower Rock Creek, FWP received anecdotal reports of at least 26 lambs-of-the-year in July 2015, followed by several calls from the public of coughing and dying lambs in which pneumonia was confirmed in August 2015. Vehicle collisions have been continuing causes of lamb mortality in the Lower Rock Creek and Bonner herds throughout the course of the 6-year event, so far.

Risk of Future Pneumonia Outbreaks

FWP has not detected pneumonia in the Petty Creek or West Fork Bitterroot sheep herds to date. FWP considers these herds to be highly vulnerable to a future pneumonia event, if for no other reason than their straight-line proximity to neighboring affected herds. The die-offs of 2009-2010 spawned a research collaboration between FWP and the Montana Cooperative Wildlife Research Unit at The University of Montana to identify factors predictive of future pneumonia events across Montana. Sarah Sells and coauthors reviewed data on 43 Montana herds that experienced 22 die-offs from 1979-2013.

Their findings were published in the February 2015 issue of The Journal of Wildlife Management, in an article entitled, *Modeling Risk of Pneumonia Epizootics in Bighorn Sheep*. They found that pneumonia outbreaks in bighorn sheep were more likely as the amount of private land increased within and close by the herd's home range. Outbreaks also were more likely if domestic sheep or goats were used for weed control in proximity, if there was a history of pneumonia in or near the bighorn sheep herd, or when the bighorn sheep herd was at high density. Density had the greatest effect of any factor on the risk of a future pneumonia outbreak, followed by a history of pneumonia in the herd or in a nearby herd.



Ewe and lamb on lambing cliffs in Lower Rock Creek in 2015

Pneumonia-Free Herds

FWP counted 149 sheep in the Petty Creek herd in 2015. Previous high counts in Petty Creek were 152 in 2011, 151 in 2007, and 149 in 1993. While the 2015 count is high, it is not unprecedented. However, it is likely significant that population counts have fluctuated to levels near or below 100 individuals in the intervals between historic highs. Cycling the sheep population through periodic lowered population levels may be important for maintaining its resistance to disease in the future. Past experience has shown that cycling the Petty Creek herd downward is easier than achieving a rebound upon command, and we are reminded that bighorn sheep management is an inexact science. Sheep populations at low population levels are less resilient to a wide range of weather events, predation, road kills and other background levels of mortality, and there is risk in moving sheep populations downward to reduce the probability of a pneumonia event. The objective of also generating a harvestable surplus in isolated populations is challenging.

The West Fork Bitterroot sheep herd benefits from the preponderance of public land within and surrounding its home range, but its population density is difficult to monitor because of the herd's low observability. FWP counted 120 sheep in the West Fork in January 2006, but has never counted more than 82 sheep before or since. Recent counts have hovered in the 70s, but do not inspire confidence as reflections of true population density. Both the West Fork and Petty Creek benefit from never having experienced a pneumonia event in their history.

Opportunity in Upper Rock Creek

In 2015, the largest sheep count in FWP Region Two belongs to the Upper Rock Creek herd, where FWP counted 197 sheep in March. The herd peaked at 347 sheep in 2007 and held at 342 in 2008 and 2009 before crashing to 136 in the pneumonia event of 2010. Lamb survival has been low, but slowly increasing since 2010, with 17 lambs per 100 ewes observed in 2015. Upper Rock Creek has the longest history of pneumonia in Region Two, and must be considered to be extremely vulnerable in the future, yet the advantage of a strong, residual, adult population increases the herd's capacity for persistence and recovery through the sheer numbers of lambs it can produce for an extended period of years. The possibility of a resistance or immunity developing in Upper Rock Creek may be greater than in any other herd in Region Two.

Ewes and lamb in Lower Rock Creek on May 16, 2015.

Ewes and yearling ram in Lower Rock Creek on July 26, 2015.

Elk and Deer Harvests—*in FWP Region 2*

by the Region 2 Wildlife Staff

Hunter Check Stations

Every fall, Montana Fish, Wildlife & Parks (FWP) reports elk and deer harvests inspected at the four check stations across Region 2: Anaconda, Bonner, Darby and Fish Creek. While these reports provide the opportunity to make year-to-year harvest comparisons in real time—as the harvest is occurring—they paint a potentially misleading picture of total harvest. Totals of animals checked through the check stations usually number in the dozens or hundreds, but the actual harvests amount to thousands of animals when all of the harvest in Region 2 is considered, including the great majority of harvest that does not pass through a check station.

Statewide Harvest Survey

FWP conducts a statewide telephone survey of hunters after the hunting season to obtain an estimate of deer and elk harvest annually. FWP has collaborated with other states and organizations in the development and evaluation of harvest survey techniques, and in 2011 published an article entitled, "Evaluating Cost Efficiency and Accuracy of Hunter Harvest Survey Designs" in The Wildlife Society Bulletin (Paul M Lukacs and coauthors, http://onlinelibrary.wiley.com/doi/10.1002/wsb.61/pdf). According to Lukacs et al., self-reporting, followed up by a survey of hunters who did not report was found to give the best estimate of harvest, but was also the most expensive way to estimate harvest. Self-reporting without a follow-up survey introduced bias into harvest surveys, and expense increased with reporting rate. FWP's method of random sampling was the most cost efficient of the methods evaluated, but was not the most accurate method. Harvest estimation represents a balance between cost and accuracy, and the wildlife agency must be cognizant of the level of accuracy required—and not required—to manage wildlife populations reliably.

Elk in the Blackfoot in 2015.

Region 2 Elk Harvests

According to results of the statewide hunter harvest survey, hunters harvested 3,810 elk in FWP Region 2 in 2014. Region 2 (Missoula) ranked third among the 7 FWP regions in elk harvest, behind Region 3 (Bozeman) at 12,213 and Region 4 (Great Falls) at 5,133 elk harvested. In Region 2, the elk harvest estimate in 2014 was up from 2,847 in 2013, 3,086 in 2012 and 3,633 in 2011, but down from 3,974 elk harvested in 2010. Archers harvested an estimated 536 elk in Region 2 in 2014, or 14% of the regional elk harvest. An estimated 737 bulls with 6 or more points on at least one antler were killed in Region 2 in 2014, compared with 1,456 bulls with fewer than 6 points on either antler. An estimated 1,604 antlerless elk were harvested in Region 2 in 2014.

White-tailed buck along Highway 200.

Region 2 White-tailed Deer Harvests

Hunters harvested an estimated 6,778 white-tailed deer in Region 2 in 2014. Region 2 ranked third among the 7 FWP regions, behind Region 1 (Kalispell) at 10,394 and Region 3 (Bozeman) at 9,583 white-tailed deer harvested. In Region 2, the estimated whitetail harvest in 2014 was up from 5,631 in 2013, 6,038 in 2012, 5,382 in 2011, 6,073 in 2010 and 5,253 in 2009. Archers harvested an estimated 929 white-tailed deer in Region 2 in 2014, or 14% of the regional white-tailed deer harvest. An estimated 2,905 whitetail bucks in the regional harvest had at least 4 points on at least one antler, while 2,147 bucks had fewer than 4 points on either antler, and 1,726 whitetails were antlerless.

Region 2 Mule Deer Harvests

Mule deer numbers are down in Region 2 and hunting seasons for mule deer have been restrictive. In 2014, hunters harvested an estimated 1,894 mule deer in Region 2. Region 7 (Miles City) led the other FWP regions in 2014 with 8,232 mule deer harvested, followed closely by Region 4 with 8,184. Region 2 ranked sixth, ahead of 1,100 mule deer harvested in Region 1. The 2014 mule deer harvest in Region 2 was down from 1,932 in 2013, 2,094 in 2012, 1,972 in 2011 and 2,349 in 2010. Only an estimated 88 mule deer were harvested by archers in 2014 in Region 2, or about 5% of the regional mule deer harvest. An estimated 773 mule deer bucks with at least 4 points on at least one antler were killed in Region 2 in 2014, while 953 bucks had fewer than 4 points on both antlers. Only 168 antlerless mule deer were estimated in the Region 2 harvest in 2014, as expected, due to the continued restrictive hunting regulations for mule deer.

Mule deer coming through the winter in the Garnets in 2015.

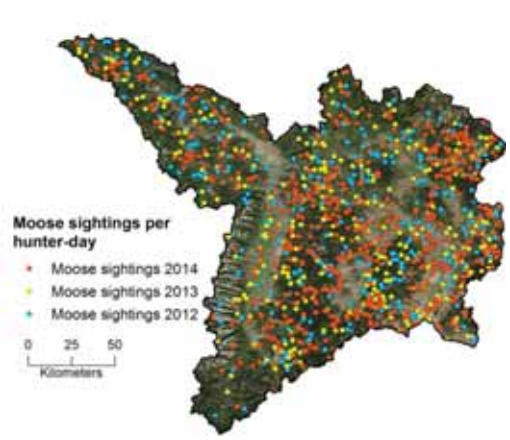
Remarks

Interestingly, the harvests of elk and deer do not vary widely from year to year at a regional scale, and they indicate trends in harvest that appear to reasonably reflect trends in wildlife populations. However, regional harvests and trends are the sums of varying local situations. While elk and white-tailed deer harvests are increasing gradually at a regional scale, portions of Region 2 are experiencing elk and whitetail declines. Similarly, as mule deer harvest declines at a regional scale, mule deer numbers appear to be increasing on agricultural crops and in residential subdivisions.

Montana Moose Research—*Its Early Relevance in FWP Region 2*

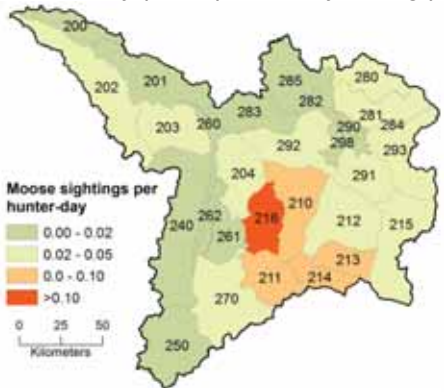
by the Region 2 Wildlife Staff

Nick DeCesare is an FWP research wildlife biologist and leader of Montana's statewide moose research project. This article is a review of information presented in the latest annual report of the moose project, dated September 1, 2015, entitled, "Vital Rates, Limiting Factors and Monitoring Methods for Moose in Montana" (Federal Aid in Wildlife Restoration Grant W-157-R-3), authored by DeCesare and Jesse Newby. While perhaps the most glamorous aspects of the research are centered on radio-collared moose in FWP Regions 1, 3 and 4, the purpose of this article is to glean information relevant to an understanding of moose status in Region 2. All results are preliminary and subject to change at this early stage of the research—a 10-year project that began in 2013.



Moose sightings in Region 2 by Montana deer and elk hunters in the 2012-2014 hunting seasons, reprinted from DeCesare and Newby (2015, preliminary findings).

In one aspect of the research, a sample of Montana deer and elk hunters was asked about their moose sightings while hunting in 2012, 2013 and 2014. Nearly 14,000 moose sightings were reported by this method from across the state over the 3 hunting seasons, including multiple sightings of the same animals. DeCesare and Newby presented a plot of these moose sighting locations across Montana, and we superimposed a rough outline of FWP Region 2 upon this scatter to view the regional distribution of moose sightings. Clusters of moose sightings occurred in the Sapphire Mountains and Rock Creek, and in parallel bands along the Flint Creek Range and the Continental Divide. Moose sightings seemed more scattered where they occurred west and south of Missoula.



Moose sightings per hunter-day by Montana deer and elk hunters in the 2012-2014 hunting seasons, reprinted from DeCesare and Newby (2015, preliminary findings). Red depicts the highest moose sighting rates, orange is next, yellow is next, and green depicts the lowest sighting rates.

DeCesare and Newby (2015) also presented a map of moose sightings per hunter-day, as reported by the Montana deer and elk hunters sampled in their survey. The highest rate of moose sightings in Region 2 generally occurred in Rock Creek and along the southern Continental Divide. Moose sighting rates were somewhat lower along the eastern Continental Divide and the Sapphire Mountains and western Bitterroot Mountains. Moose sighting rates were lowest in the southern Bitterroot Mountains and in the Seeley-Swan.

Region 2 allows very limited harvest opportunities for moose, and does not allow antlerless moose harvest. Data collected by DeCesare and Newby as part of the statewide moose research project indicate that bull moose harvested in Region 2 in 2012-2014 spanned a broad age distribution, including ages of every year from 1.5 to 14.5, remarkably.

Readers are encouraged to email Nick DeCesare at ndecesare@mt.gov for a copy of the full report.