# Montana Fish, Wildlife & Parks

# Region 2 Wildlife Quarterly

July 2017

# Technical Bulletin No. 9

*Newborn lambs getting their legs in Lower Rock Creek on May 20, 2017.*

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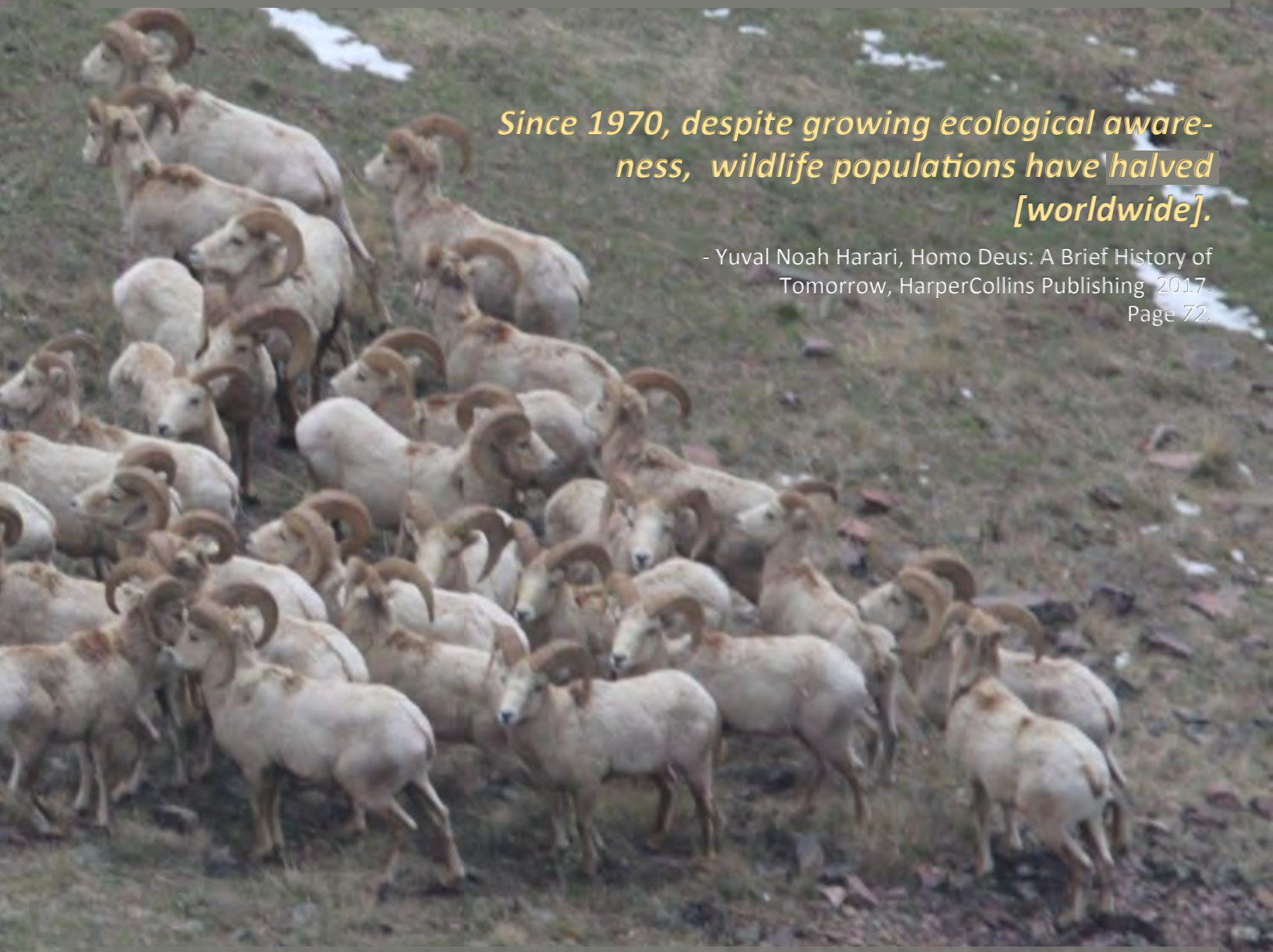
The Region 2 Wildlife Quarterly is a product of Montana Fish, Wildlife & Parks; 3201 Spurgin Road; Missoula 59804. Its intent is to provide an outlet for a depth of technical information that normally cannot be accommodated by commercial media, yet we hope to retain a readable product for a wide audience.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

# Ram Pasture

The privilege of flying, counting , photographing and managing the largest gathering of Rocky Mountain bighorn rams in west-central Montana, here in the Petty Creek drainage, is something that FWP wildlife biologist Liz Bradley doesn't take lightly. With privilege comes the burden of responsibility for the largest bighorn population to escape the pneumonia die-off that was first diagnosed in the fall of 2009, and involved the East Fork Bitterroot, Bonner, Lower Rock Creek, Upper Rock Creek, Garrison, Anaconda and Skalkaho herds. The after-effects of that die-off persist to this day, in the form of diminished lamb survival in the affected herds. A small population near Painted Rocks Reservoir, along with Petty Creek, were spared.



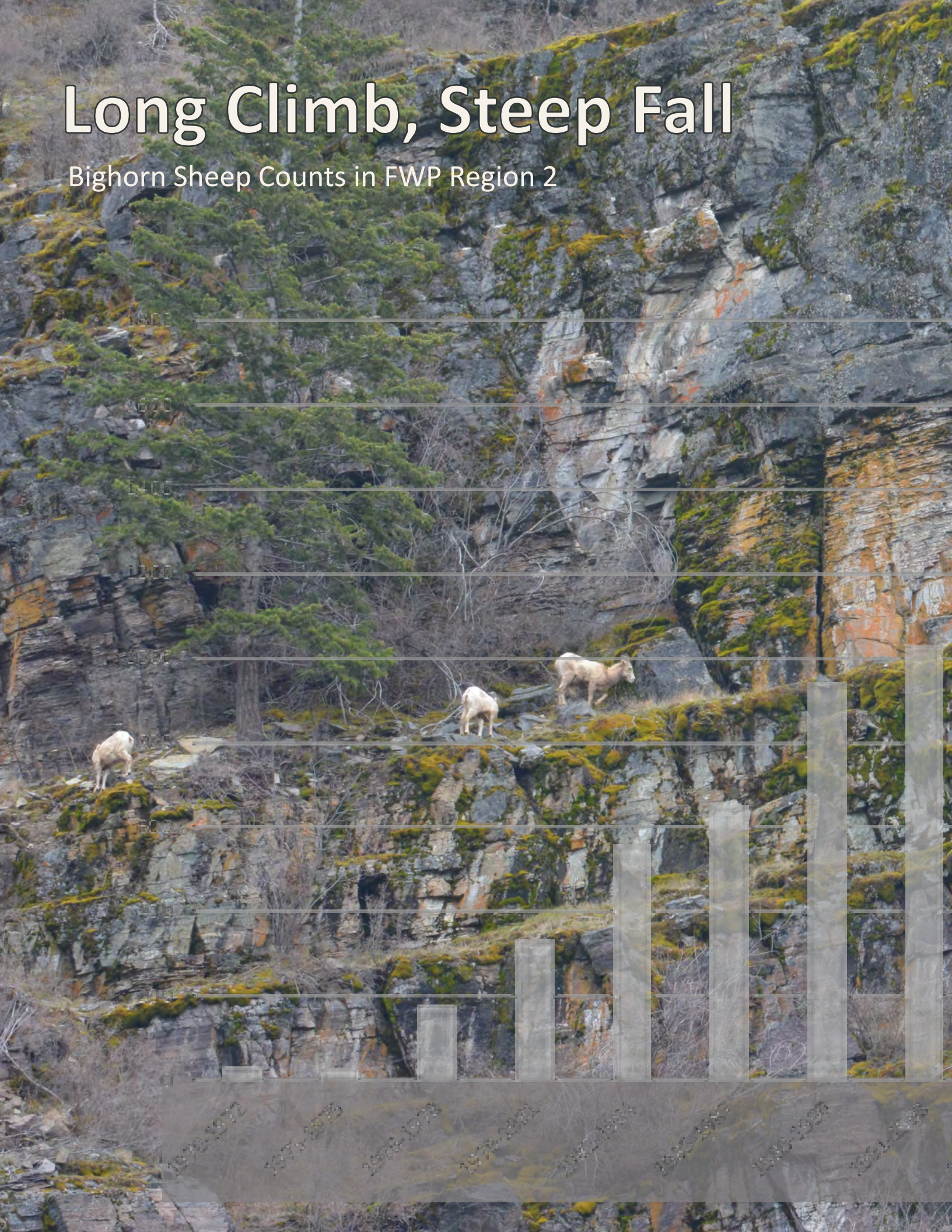
***Since 1970, despite growing ecological awareness, wildlife populations have halved [worldwide].***

- Yuval Noah Harari, Homo Deus: A Brief History of Tomorrow, HarperCollins Publishing 2017. Page 72.

This edition of the Quarterly is devoted to bighorn sheep—an update on their status in FWP Region 2. Herein, we hope to provide a context for you to reflect on how much wild bighorns mean to you. Because the story of their restoration from near-extinction is not yet concluded. Risks remain, including an incomplete scientific understanding of what bighorns need to persist and thrive in this modern world—a world rapidly changing from the one in which they evolved. Living in Montana, where wildlife conservation, management and restoration are the norm, it may come as a shock to learn that humanity has already lost most of its wildlife inheritance on earth, and continues losing it. Montana is not immune from worldwide trends, as the story of bighorn sheep warns us. No wonder Liz Bradley and many others like her are passionate about their work. Can't we spare the steepest, rockiest and most foreboding terrain in Montana for bighorns? We can. But, it turns out that wild sheep need a bit more than that. Here's a thin slice of what we know.

# Long Climb, Steep Fall

## Bighorn Sheep Counts in FWP Region 2



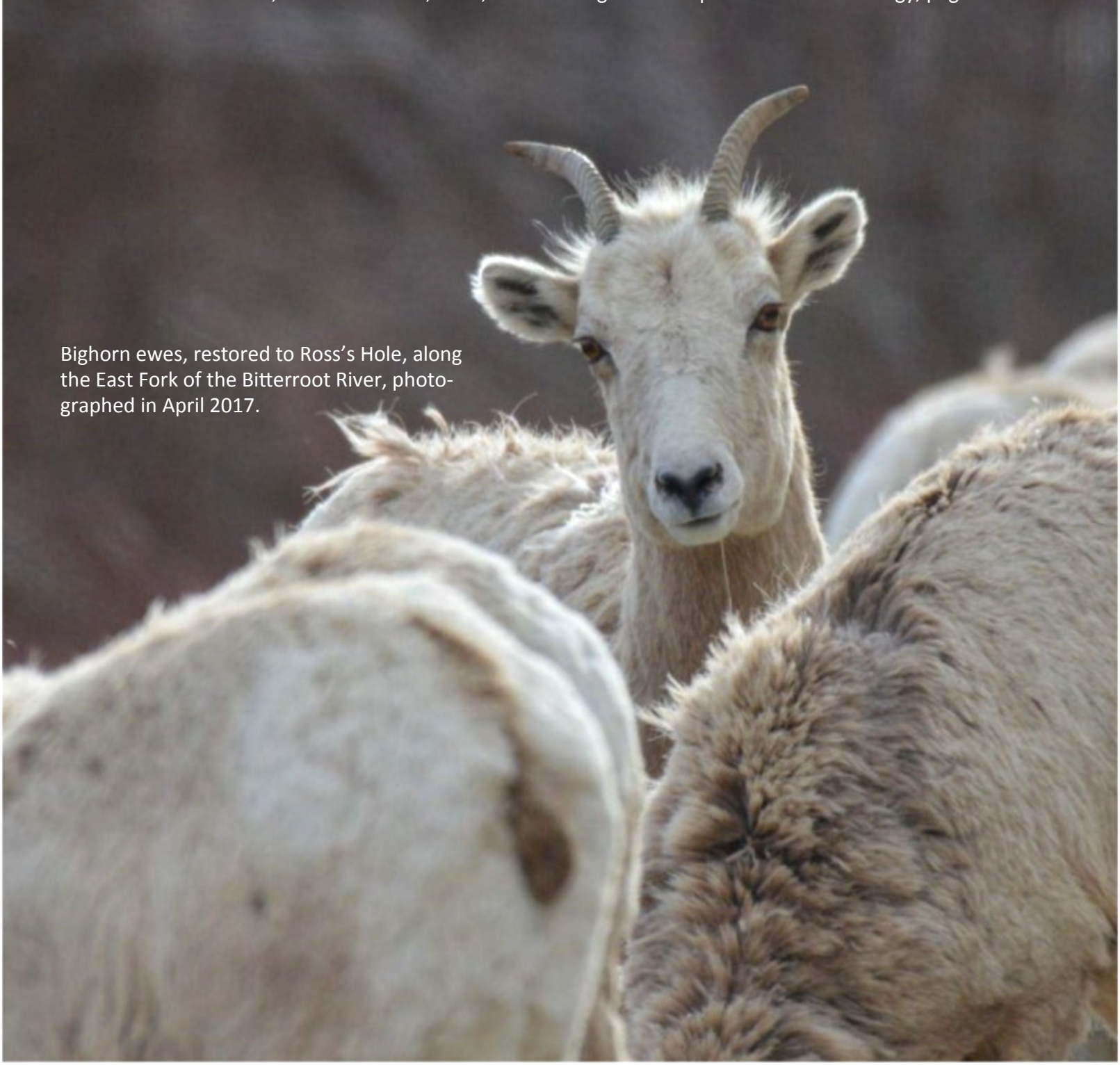
Each bar in the graph below is the sum of the highest counts in a 3-year period for each of the bighorn herds surveyed in FWP Region 2. Counts from the helicopter are variable and wild sheep can be uncooperative. Go figure. So, using the highest count in a series of 3-year periods is one approach for obtaining a clear and realistic view of the population trend.

Is there room in 10,500 square miles of West-Central Montana for the 1,720 sheep that FWP counted in 2006-2008? It would appear not, if the pneumonia outbreak of 2009-forward is any indication. Pneumonia has been an equalizer over many decades of bighorn restoration in Montana. But, are the 798 sheep counted in 2015-2017 enough to sustain a population?

# Ross's Hole, Then and Now

*Alexander Ross, in March 1824, subsisted chiefly on mountain sheep for about a month in Ross Hole in the Bitterroot Valley (Koch 1941). He stated that mountain sheep were plentiful in the mountains and reported one of the ram's horns measured 49 inches in length and had a circumference of 28 inches, weighing 11 pounds (Koch 1941). Bighorn sheep were also noted by Captain Mullan, a road engineer, in the peaks around the Deerlodge Valley (Koch 1941). . . Seton (1929) estimated there were one and one-half to two million bighorn sheep in the west prior to European man arrival. Based on that estimate and with an abundance of suitable bighorn habitat in Montana it is reasonable to think historic numbers of bighorns in Montana could have been well above one hundred thousand.*

- Montana Fish, Wildlife & Parks, 2010, Montana Bighorn Sheep Conservation Strategy, pages 11 & 13.



Bighorn ewes, restored to Ross's Hole, along the East Fork of the Bitterroot River, photographed in April 2017.

# Demise and Recovery

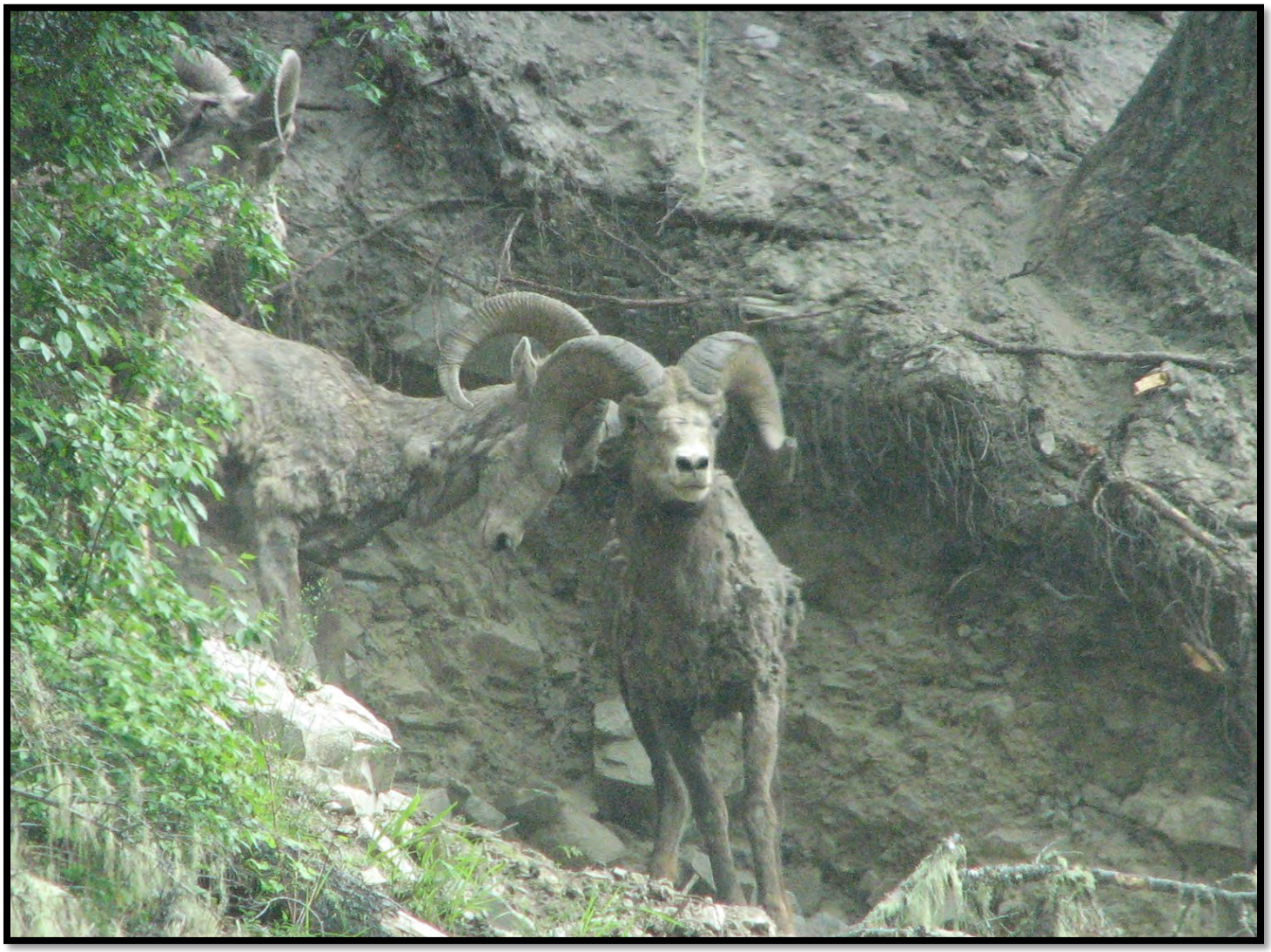
*Although bighorn sheep were numerous in Montana and were used for food and other implements by Native Americans and the early explorers, the settlement of the West led to significant declines of bighorns and other big game species (Mussehl 1971). The causes most often cited were contact with domestic sheep, range competition from livestock, contraction of diseases, and subsistence hunting. Contact between domestic sheep and wild sheep has been implicated in several large die-offs of the latter. Often poor range conditions, severe weather events, and high numbers of wild sheep were cited as concurrent factors present during reported outbreaks of scabies, anthrax, lungworm, and pneumonia-related diseases. . . The present distribution and status of bighorn sheep in Montana is due to improved range conditions, reduced competition for forage from livestock and other wildlife, reductions in domestic sheep and goats, regulated hunting, and transplanting [of wild sheep].*

- Montana Fish, Wildlife & Parks, 2010, Montana Bighorn Sheep Conservation Strategy, page 12.

A bighorn ewe, descended from transplants of sheep to Lower Rock Creek (begun in 1979), and photographed in May 2017.

# Last of the 500

Above: A partial history of sheep abundance in Upper Rock Creek, adapted from Berwick (1968), MS Thesis, Univ. of Montana.



Rams on a mineral lick on a slope above Rock Creek, May 29, 2015. Opposite page: Upper Rock Creek sheep habitat near Kyle Bohrnsen Memorial Bridge, on June 28, 2017.

## Upper Rock Creek Herd

With few exceptions across Montana, bighorn sheep were extirpated from their native ranges by the midpoint of the last century. Rare among the bighorn sheep that have been reintroduced to historic ranges since that time are descendants of the very sheep that survived the initial impacts of white settlement on their native grounds. Included among these few, perhaps more in our imaginations than any distinction in their DNA, are the bighorns overlooking the Upper Rock Creek drainage, in Granite County. Although supplemented by a transplant of 31 sheep from the Sun River in 1975, sheep native to Upper Rock Creek never died out entirely. The 200-or-so sheep that inhabit Upper Rock Creek today are a mix of the bloodlines that survived a colorful history in that location, and of those that similarly never ceded the ramparts of the Rocky Mountain Front. Following is the briefest possible recounting of their story, from the first explorations of Europeans to the present day:

*Reports from early explorers suggest that bighorn sheep were abundant throughout the Rock Creek drainage prior to extensive settlement and exploration of the area. After the discovery of silver deposits in Granite County in 1864,*

*market hunting, competition with domestic livestock, and possibly disease-related die-offs resulted in near extirpation of the species from the drainage. By 1905, only 5 bighorns were observed on winter ranges (Berwick 1968). Following the silver bust, regulation of and ultimately a ban on hunting bighorn sheep, the species began to recover. About 200 bighorns were thought to be in Upper Rock Creek before the die-off in 1967. Following the die-off (likely [disease] induced), only 15 were observed on winter ranges. Typical of a disease-mediated die-off, lamb production was very low for years following the event. However, by 1981, the population had rebuilt itself to 128 observed sheep. The herd has continued to grow, with intermittent declines, over the last quarter century, and a high of 347 bighorns were observed during a spring survey flight in 2007.*

- FWP, 2010, Montana Bighorn Sheep Conservation Strategy, page 149.

A pneumonia outbreak was detected in Upper Rock Creek in early 2010. During an aerial survey shortly thereafter, FWP observed 60% fewer sheep than in 2009, totaling 136 with only 13 lambs per 100 ewes. FWP collected 28 sick bighorns during the die-off for the purpose of diagnosing the disease; these collections accounted for about 14% of the total mortality that was estimated. That summer (2010), lamb ratios declined from a high of 32 per 100 ewes, soon after lambing, to zero by August. A local resident reported observing dead and dying lambs over the summer. This is consistent with the lingering effects of some pneumonia die-offs; lambs are born, but die in the first months after birth, presumably as they contract the latent pneumonia-causing agents and as the protective colostrum in the ewes' milk wanes. High counts in Upper Rock Creek were 342 during 2009-2011 (just before the die-off), 168 in 2012-2014 (immediately post-die-off) and 197 in 2015-2017. Once again, Upper Rock Creek sheep persevere. Is it habitat that explains the resilience of Upper Rock Creek sheep?

# Lower Rock Creek

May 20, 2017

# Balancing Births and Deaths

Evidence suggesting the onset of a wild sheep die-off, due to pneumonia, in Lower Rock Creek dates back to the fall of 2009. With the birthing season of 2017 behind us, as photo-documented on May 20, 2017 and displayed on the preceding pages, the Lower Rock Creek bighorn population has had eight birthing cycles to replenish the one-year loss of approximately 100 sheep, which occurred between Fall 2009 and Spring 2010. FWP surveys suggest that the sheep population has declined slightly since 2010, rather than increasing.

Annual production of lambs and their survival are relatively easy to track in Lower Rock Creek—casually, at least, if not with scientific rigor. It's easy because the main surviving group of reproductive ewes can be viewed along Rock Creek Road, and as summer progresses, the ewes lead their lambs to feed in green pastures and lawns on the valley floor. Residents and FWP biologists compare notes on the numbers of lambs seen as the weeks and months go by. It's an opportunity to combine recreational wildlife watching and photography with chance observations and guesses about the biology and ecology playing out before us.

*A maternal ewe in May 2017 with numerous indistinct horn rings, which suggest it might be one of the last survivors of the 2009-2010 pneumonia outbreak.*

In the early years after the die-off, we would observe an encouraging number of newborns in May and June, but by fall, we could only account for a couple of survivors. On occasion, we would witness a lamb coughing in the fall, exhibiting symptoms of the deadly pneumonia lingering. Gradually—very gradually—we've seen numbers of surviving lambs increase in recent years, still numbering only a few, rather than dozens.

The math of the situation is worrisome. Ewes may be reproductively active for roughly ten years. Already, the Lower Rock Creek sheep herd has endured nearly that length of time without producing enough surviving young to replace the ewes that have died of old age since 2010. It's not only a matter of hoping that every passing year will be the one when every ewe has a lamb that survives to become an adult. The problem is compounded by the fact that the herd loses members of its reproductive stock every year as well. The population just keeps digging a deeper hole with age. Each year, we observe groups of nonreproductive ewes, which seem to band together, sometimes babysitting for maternal females when moms move from the rocks to the irrigated bottoms to feed.

It remains to be seen whether the Lower Rock Creek population will ultimately overcome the pneumonia outbreak that occurred 9 years ago.

Encouragement comes from the presence of more-than-a-few, young-adult ewes and rams, which obviously were born, survived and appear healthy since the pneumonia outbreak. So, we can document some "recruitment," as it's called—the addition of young animals into the breeding-age population. They will determine the future.

# Lower Rock Creek Herd

*An approximately 4-year-old ewe (above) and apparently similarly aged ewes (below) with a young ram in November 2016.*

# Cumulative Effects

Healthy wildlife populations absorb incidental deaths without major consequences. However, when populations are compromised—in numbers, health, habitat, and other detrimental factors—every accidental death suddenly becomes important, placing the population's tenuous hold on persistence at elevated risk.

*Thanks to Trout Bums on Lower Rock Creek Road for their vigilance and efforts to prevent sheep deaths, in the wake of some devastating roadkill events in recent years. Seven lambs were killed in one swipe by a pickup truck, about four years ago.*

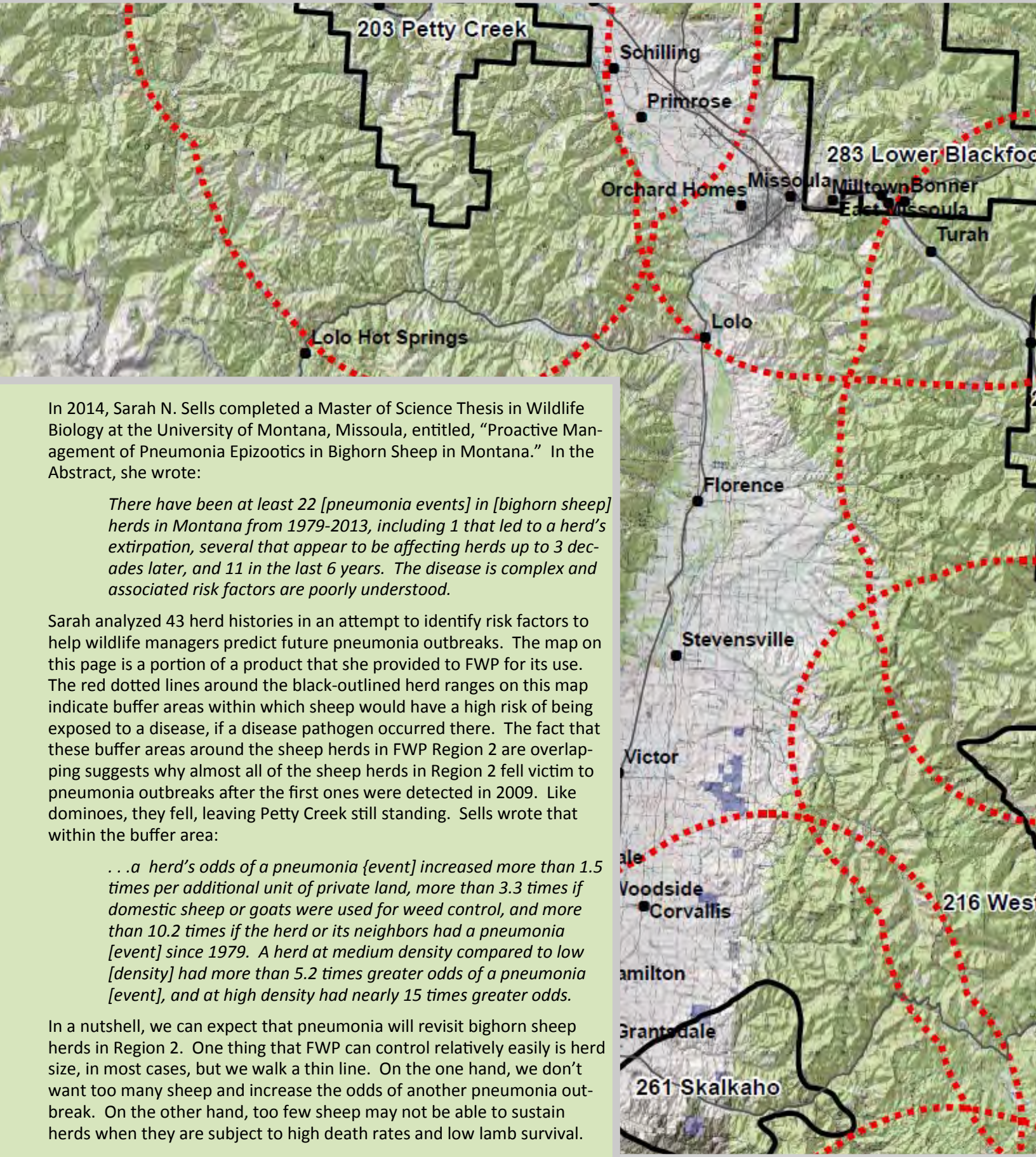
Roadkills of bighorn sheep are an example of individual deaths that have a cumulative effect nowadays. Sheep are attracted to salt on roadways, and are struck by vehicles. Sheep numbers are low and sheep populations impacted by pneumonia are relatively unhealthy, compared with their general condition and performance prior to the pneumonia events. Every lamb counts toward a viable population now—every reproductive ewe. Impacted sheep populations face serious roadkill risks on Highway 93 S, East Fork Road, West Valley of Anaconda, Rock Creek Road, Highway 200 at Bonner and Skalkaho Road. Signage—official, and unofficially contributed by local residents—is one attempt to reduce deaths of sheep on roadways.

*Lambs on Rock Creek Road pay no attention to signage, and rely on motorists to be aware.*

*Above: Road rut. (Photo taken on Highway 93, between the Duncan Gilchrist Memorial viewing area and Sula, on November 11, 2016.)*

*Right and below: We assume that sheep on highways are "licking" road salt, but are they really licking? The close-up below shows the sheep licking and gravel on its tongue. (These sheep were on the East Fork Bitterroot Road on April 15, 2017.)*

# Lessons Learned



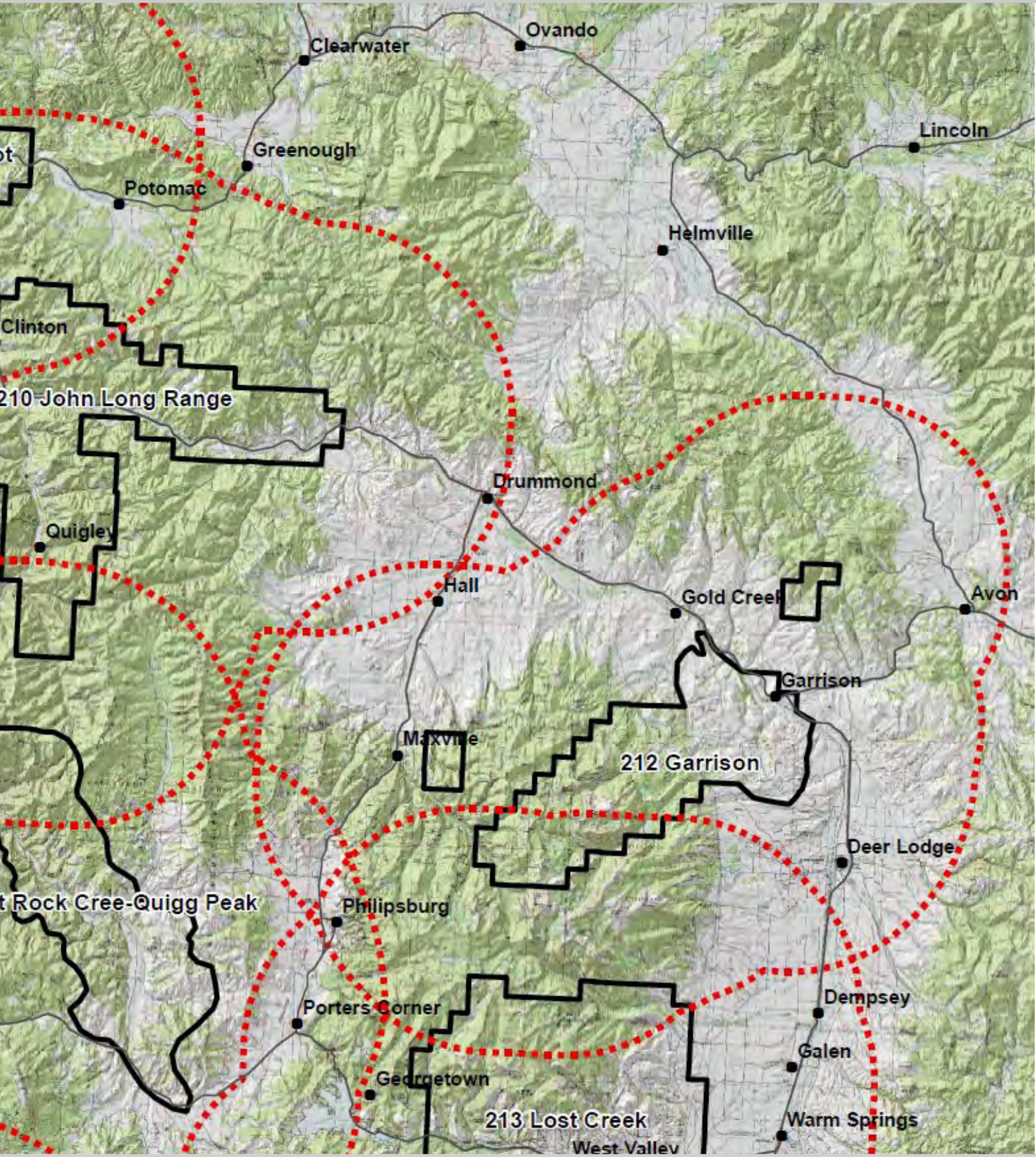

In 2014, Sarah N. Sells completed a Master of Science Thesis in Wildlife Biology at the University of Montana, Missoula, entitled, "Proactive Management of Pneumonia Epizootics in Bighorn Sheep in Montana." In the Abstract, she wrote:

> *There have been at least 22 [pneumonia events] in [bighorn sheep] herds in Montana from 1979-2013, including 1 that led to a herd's extirpation, several that appear to be affecting herds up to 3 decades later, and 11 in the last 6 years. The disease is complex and associated risk factors are poorly understood.*

Sarah analyzed 43 herd histories in an attempt to identify risk factors to help wildlife managers predict future pneumonia outbreaks. The map on this page is a portion of a product that she provided to FWP for its use. The red dotted lines around the black-outlined herd ranges on this map indicate buffer areas within which sheep would have a high risk of being exposed to a disease, if a disease pathogen occurred there. The fact that these buffer areas around the sheep herds in FWP Region 2 are overlapping suggests why almost all of the sheep herds in Region 2 fell victim to pneumonia outbreaks after the first ones were detected in 2009. Like dominoes, they fell, leaving Petty Creek still standing. Sells wrote that within the buffer area:

> *. . .a herd's odds of a pneumonia {event] increased more than 1.5 times per additional unit of private land, more than 3.3 times if domestic sheep or goats were used for weed control, and more than 10.2 times if the herd or its neighbors had a pneumonia [event] since 1979. A herd at medium density compared to low [density] had more than 5.2 times greater odds of a pneumonia [event], and at high density had nearly 15 times greater odds.*

In a nutshell, we can expect that pneumonia will revisit bighorn sheep herds in Region 2. One thing that FWP can control relatively easily is herd size, in most cases, but we walk a thin line. On the one hand, we don't want too many sheep and increase the odds of another pneumonia outbreak. On the other hand, too few sheep may not be able to sustain herds when they are subject to high death rates and low lamb survival.


Clearwater
Ovando
Lincoln
Greenough
Potomac
Helmville
Clinton
210 John Long Range
Drummond
Quigley
Hall
Gold Creek
Avon
Garrison
Maxville
212 Garrison
Deer Lodge
Rock Cree-Quigg Peak
Philipsburg
Porters Corner
Dempsey
Galen
Georgetown
213 Lost Creek
Warm Springs
West Valley

# Conserv

*L. F. "Lorry" Thomas "in the chair" at the head of the Anaconda Sportsmen's Club, October 21, 2015.*

*The future of the Anaconda herd: a lamb surviving into November 2016.*

For every population of bighorn sheep restored to its native range in FWP Region 2, there's a story to be told, and one worth hearing. And with every story, names. Names like:

L. F. "Lorry" Thomas

Jim Weatherly

Duncan Gilchrist

Adam McNevich

Larry and Barbara Clark

Monte Ishler

We'd love to hear from you about the names that we failed to list as champions of wild sheep restoration in western Montana.

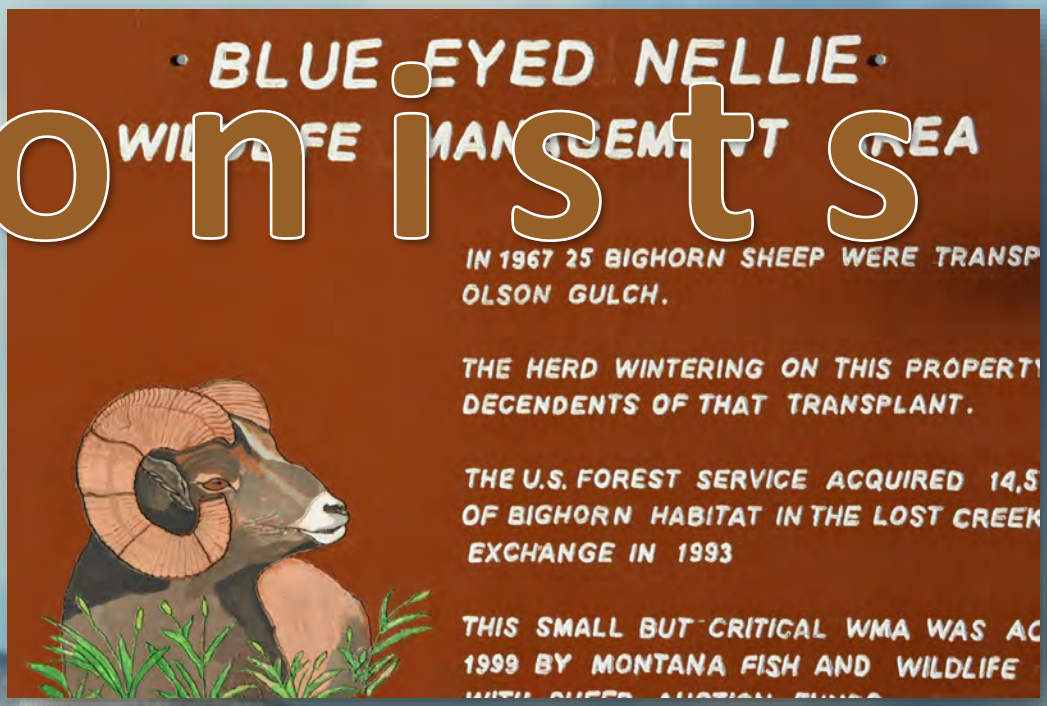
It's no accident that bighorn sheep are part of our modern world. It's because of the passion and tireless work of people, working on behalf of countless other people who benefit from having wild sheep to show their children and grandchildren. FWP serves as the agent of the public's will, and as the managers of the resource entrusted to our care.

The Anaconda herd, also known as the Lost Creek herd, is descended from a transplant of 25 sheep to Olson Gulch, in the West Valley of Anaconda, in 1967. Lorry Thomas was instrumental in the original transplant, along with the Anaconda Sportsmen's Club.

Lorry witnessed extremes in the fortunes of the sheep that he and others brought back. By 1989 the population had grown to over 361 sheep before a pneumonia outbreak reduced the herd to a number closer to 144 head in 1991. Sheep numbers continued declining until 1999, and then rebounded to a high of 314 in 2008 prior to a second pneumonia outbreak in 2010. The highest sheep count since 2011 has been 80 sheep in 2014.

The Anaconda Sportsmen's Club and Wild Sheep Foundation have partnered with FWP and the Natural Resource Damage Program to acquire thousands of acres of bighorn habitat over the years. These lands are managed by the U. S. Forest Service, in some cases, and FWP in the cases of the Wildlife Management Areas that were established.

# a ti o n i s t s




*Overlooking bighorn sheep habitat down the West Valley toward Anaconda, Fall 2016.*

# Peaks

## 2006-2008

1,720 The sum of the high counts in each of 9 herds in Region 2 during this 3-year period—a record high.

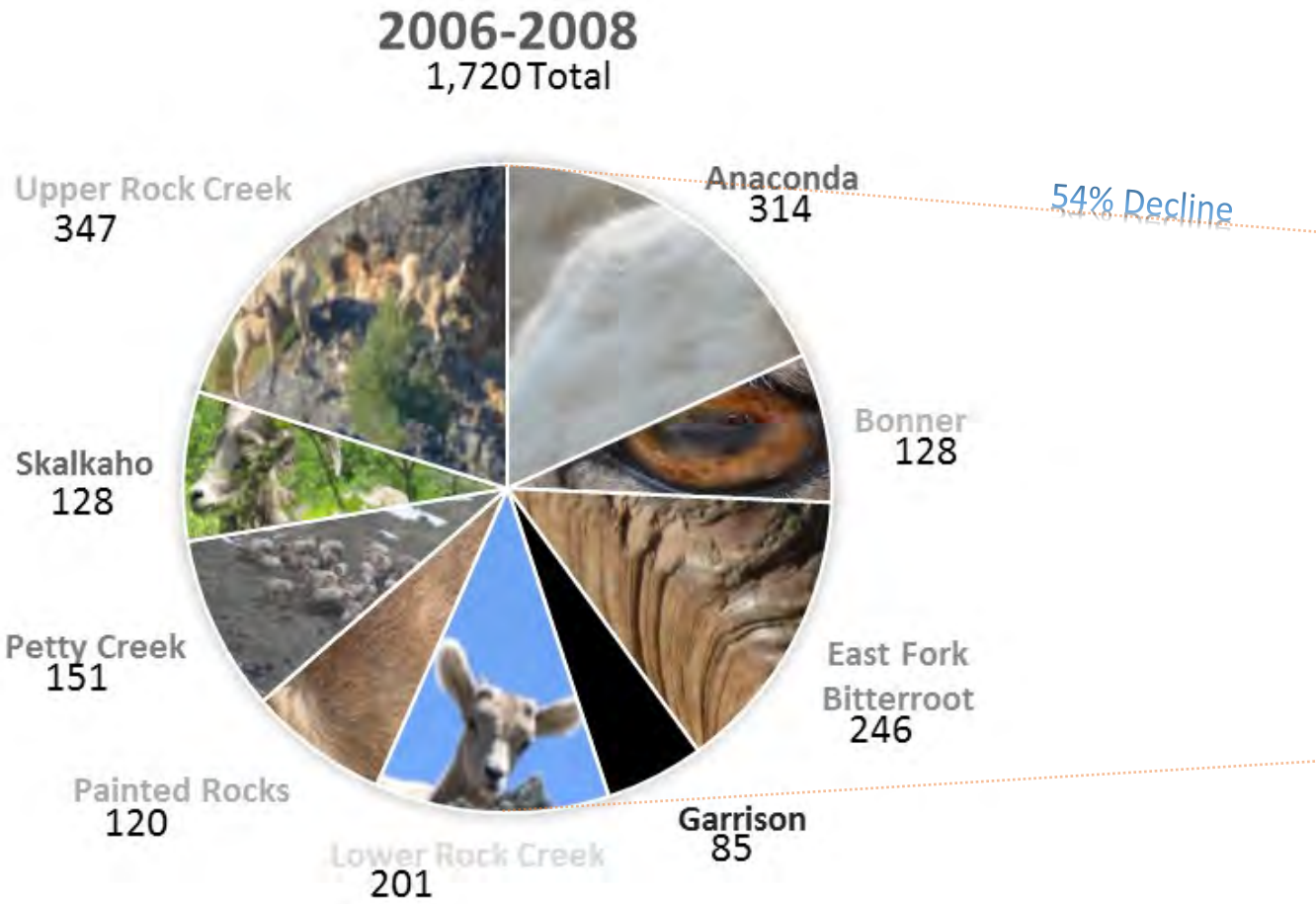
347 The high count in any single herd—Upper Rock Creek

85 The lowest 3-year high count in any herd—Garrison

4 The number of herds in Region 2 with at least 200 members

8 The number of herds in Region 2 with at least 100 members

## Where Bighorn Sheep Lived in Region 2 During the Population Peak . . .



# & Valleys

## 2015-2017

798 The sum of the high counts in each of 9 herds in Region 2 during this 3-year period—lowest since 1987.

197 The high count in any single herd—Upper Rock Creek

18 The lowest 3-year high count in any herd—Garrison

0 The number of herds in Region 2 with at least 200 members

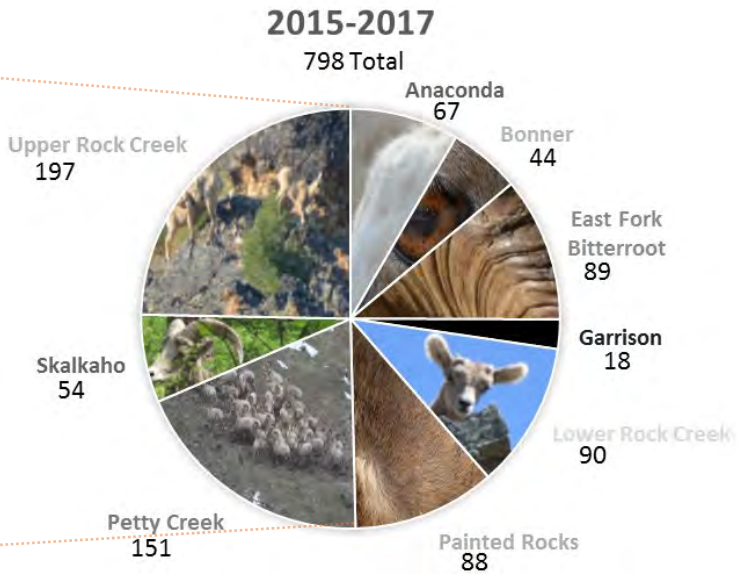
0 The number of herds in Region 2 with at least 100 members

Petty Creek herd high counts were unchanged—151—in 2006-2008 and 2015-2017, and Petty Creek was the only herd in Region 2 that did not decline between those time periods.

The Upper Clark Fork herd ranked highest in numbers among the 9 herds in Region 2 in 2006-2008 and in 2015-2017.

# . . . And, Where Sheep Live Now—After the Population Decline

54% Decline



Lower Rock Creek, October 2016