

# **Carnivore Coexistence Annotated Bibliography**



Providing the public and wildlife advocates with accessible and reliable scientific information on carnivore-livestock coexistence

Created by WildEarth Guardians

Last updated:  
October 2025

## Annotated Bibliography Key:

### **Search Parameters:**

*Keywords (not required):* Coexistence; Livestock Depredation; Lethal Carnivore Removal; Virtual Fences; Carnivore Culling; Human-carnivore Coexistence; Carnivore Management; Carnivores and Ranching; Carnivore-Livestock Management;

*Date Range:* 2025 - 2015; plus cases that are older but directly applicable or highly cited.

*Animals:* Gray Wolves, Mexican Wolves, Grizzlies > Cougars, Black Bears, Coyotes > Canada Lynx, Wolverines > Some interest in European Wolves, Lynx, and Bears > Some interest in South American and Central American carnivores (Pumas, Jaguars, Foxes) > African mammalian carnivores (Painted Dogs, Lions, Leopards)

*Locations:* Northern Rockies USA > American West > USA, Canadian Rockies > North America > Africa, Europe, South America

- These parameters are not an exclusive list, as helpful studies will be added even if they do not fit all 4 of these categories.

### Organizational Layout & Nomenclature:

- Organized in chronological order, starting with the oldest publications.
- Locations can be continents, countries, or states/provinces.
  - For instance, sometimes the location is Europe, Canada, or Montana.
- Animals may be broad, such as “Wolves” or “Bears,” or they may be specific, like “Mexican Wolves.”
- Mountain Lions/Pumas/Cougars → Referred to as Pumas
- All animals stated in their plural form.
  - Ex: “Grizzlies” is given as the animal of the article instead of “Grizzly.”
- Yellow highlight represents (potentially) an abnormally useful article.

---

**Publish Date:** January 13, 2011

**Animal(s):** Mexican Wolves

**Location:** Arizona, New Mexico

[Link](#)

Breck, S.W., Kluever, B.M., Panasci, M., Oakleaf, J., Johnson, T., Ballard, W., Howery, L., and Bergman, D.L. (2011). **Domestic calf mortality and producer detection rates in the Mexican wolf recovery area: Implications for livestock management and carnivore compensation schemes.** *Biological Conservation*, 144: 930-936.

**Summary:** This article looked to diagnose the cause of cattle calf mortality in the Blue Range Wolf Recovery Area (BRWRA) of Arizona and New Mexico, specifically to identify depredation by black bears, pumas, coyotes, and Mexican wolves. They also looked at how compensation schemes could be utilized to compensate for predation loss by these carnivores. The researchers stated that “narrowing the birth pulse of calves could be an important mechanism for reducing overall losses of livestock,” because the younger the calves, the higher the depredation rate was. The publication reiterated the importance of putting in the time and effort to find calves that were lost from predators, as it has a huge impact on research. The article concluded by recommending limitations on calving to seasonal behaviors in areas of higher predator density, which could be achieved by amending current husbandry practices.

---

**Acceptance Date:** September 10, 2013

**Animal(s):** Cattle

**Location:** Global

[Link](#)

Jachowski, D.S., Slotow, R., and Millsbaugh, J.J. 2013. **Good virtual fences make good neighbors: opportunities for conservation.** *Animal Conservation*, 17:187–196. doi:10.1111/acv.12082.

**Summary:** Collars have shown long-term progress, but are costly and limited technologically and logistically. There has been some success with collaring wolves and using a shock system, but that runs into animal welfare issues. Real time virtual fences (RTVFs) for livestock management have had slow progress due to costs, technological limitations, low acceptance by ranchers, and animal welfare concerns. RTVFs require GPS integration, as it is essentially a highly efficient mode of information capture. Low use of this tech has meant low priority for advancements. Limitations also include long-term time commitments to condition livestock, large batteries, satellite connection, and removal of physical barriers between livestock & wildlife.

---

**Publish Date:** 2016

**Animal(s):** Coyotes, Wolves, Bears, Big Cats

**Location:** North America, Europe

[Link](#)

Treves, A., Krofel, M., and McManus, L. (2016). **Predator control should not be a shot in the dark.** *Front Ecol Environ*, 14(7): 380–388, doi:10.1002/fee.1312

**Summary:** This publication focused on “gold-standard” and “silver-standard” review techniques in evaluating the support, use, and reliability of lethal and nonlethal interventions. The article found that out of the 12 tests that were reviewed, nonlethal techniques (night enclosures, fladry, and LGDs) were significantly more adept at preventing depredation; meanwhile, no lethal removal techniques met the “gold standard” and tended to be unpredictable in their success rate. The article concluded that continuing education in those who manage wildlife and policy is

required, and that policy must reflect the best available science. In their view, that meant strong inferences of effectiveness and comparing techniques in order to conclude what is the most effective. In this case, they found that to be nonlethal measures.

---

**Accepted Date:** 2018

**Animal(s):** Black Bears

**Location:** United States

[Link](#)

Lackey, C.W., S.W. Breck, B.F. Wakeling, and B. White. 2018. **Human–Black Bear Conflicts: A review of common management practices.** Human–Wildlife Interactions Monograph 2:1-68.

**Summary:** This is a comprehensive review of the cause of Human-Black Bear conflicts, management and prevention techniques, and the state of conflict reporting. This article did state and analyze Black Bear attacks on livestock, especially depredation on poultry. The article found electric fences to be effective, and supported guidance efforts for bear fences (such as those by the Montana Fish, Wildlife, and Parks). The writers also supported the use of husbandry practices, such as removing carcasses, utilizing physical barriers, and Livestock Protection Dogs. They also summarized the rare use of compensation programs for Black Bear-livestock conflicts, and how these programs do not prevent depredation.

---

**Accepted Date:** December 2, 2019

**Animal(s):** Wolves

**Location:** Germany (with data across Europe & North America)

[Link](#)

Bruns, A., Waltert, M., and Khorozyan, I. (2019). **The effectiveness of livestock protection measures against wolves (*Canis lupus*) and implications for their co-existence with humans.** *Global Ecology and Conservation*, 21: e00868.

<https://doi.org/10.1016/j.gecco.2019.e00868>

**Summary:** This article looked into the most effective non-lethal techniques to prevent wolf depredation on various livestock. They found that fences, especially electrical fences, and deterrents were the most effective techniques. Calving protections and herders were both viewed as effective, but their data on these was very low. They found translocation and lethal removal for packs and individuals to be ineffective due to failures in long-term solutions and issues in targeting problematic wolves. The article concluded by stating the most effective methods will be combinations of non-lethal techniques, such as pairing fencing with guard dogs.

---

**Publish Date:** March 6, 2020

**Animal(s):** Grizzlies, Mexican Wolves, Coyotes

**Location:** New Mexico, Arizona, Montana, Idaho, Washington, Wyoming, Colorado, Oregon, Nevada, California, Utah

[Link](#)

Lute, M.L. and Carter, N.H. (2020). **Are We Coexisting With Carnivores in the American West?** *Front. Ecol. Evol.*, 8:48. doi: 10.3389/fevo.2020.00048.

**Summary:** The article highlighted the various perspectives that impact coexistence. Coyotes have the least negative views and the highest amount of human-wildlife coexistence, regulated on a much smaller scale than the Wolves and Grizzlies. Additionally, mistrust for wolves was based more from fear in institutions, and that impacts of wolves on domestic animals drew attention over the risk to humans by wolves and bears. Management plans should be both bottom-up and top-down, but coexistence is difficult when such a small percentage of individuals actually count on livestock for their livelihood. The article ended by stating coexistence is a global issue highlighted by climate change and that solutions must stem from changing human behavior and perspectives, instead of focusing on top-down governmental regulations.

---

**Publish Date:** July 5, 2021

**Animal(s):** Gray Wolves

**Location:** Wisconsin

[Link](#)

Treves A., Santiago-Ávila, F.J., and Putrevu, K. (2021). **Quantifying the effects of delisting wolves after the first state began lethal management.** *PeerJ*, 9:e11666 doi: 10.7717/peerj.11666

**Summary:** On November 3, 2020, wolves were federally declared recovered and no longer required the protections of the ESA. This article evaluates the conservation management plans implemented by Wisconsin, the first state to authorize permitted wolf hunting, after this delisting. The article concluded that with natural, legal, and illegal wolf mortalities, Wisconsin wolf populations would decrease by 27 to 33% based on their new wolf management plans. For the first hunting season, hunters over-shot the max quota of wolf kills by 83%. The article ends by highlighting the dangers of quota's unsupported by reliable science, and that losing protections is a dangerous avenue to antagonists using wolves as political scapegoats.

---

**Publish Date:** September 27, 2021

**Animal(s):** Gray Wolves

**Location:** American West (Washington, Oregon, California, Montana, Idaho, Colorado, Utah, Wyoming)

[Link](#)

Martin, J.V., Epstein, K., Anderson, R.M., and Charnley, S. (2021). **Coexistence Praxis: The Role of Resource Managers in Wolf-Livestock Interactions on Federal Lands.** *Front. Conserv. Sci.*, 2:707068. doi: 10.3389/fcosc.2021.707068.

**Summary:** This publication looked into the view that western USFS managers have on the various definitions of “coexistence” and how those align with actual practices and perceptions. The first was that coexistence is the opposite of conflict, and that it means for livestock grazing and wolves to adjust and learn to coincide. Others saw coexistence as a term of idealism, unachievable when practically applied; meanwhile, others saw it as a large-scale concept that can only be achieved on a location-by-location basis. Many more found the idea more as coexistence between human conflict, with each side of the battle coming to a compromise in livestock and wolf management. Some rangers also saw issues with managing wildlife as a whole, stating it is the federal government’s job to “stay in its lane” and leave wildlife management up to the states.

---

**Publish Date:** October 11, 2021

**Animal(s):** Gray Wolves

**Location:** Washington

[Link](#)

Bogezi, C., Eeden, L.M., Wirsing, A.J., and Marzluff, J.M. (2021). **Ranchers’ Perspectives on Participating in Non-lethal Wolf-Livestock Coexistence Strategies.** *Front. Conserv. Sci.*, 2:683732. doi:10.3389/fcosc.2021.683732.

**Summary:** The Washington Department of Fish and Wildlife set up a Damage Prevention Cooperative Agreement (DPCA) that allows for cost sharing between ranchers who have lost livestock due to wolf predation. This article aimed to interview ranchers about perceptions on wolves, mitigation strategies, and what discourages and motivates ranchers to participate in non-lethal techniques. The primary motivator for nonlethal techniques was prior familiarity with certain techniques, as ranchers wanted as little to change in their operations as possible. The primary reason ranchers chose not to participate in the DPCA was a shared belief that nothing positive would be gained from doing so, and it would mean increased regulations and government intervention. To compensate for this, the writers of the article recommended wildlife managers must address the intangible costs pushing ranchers away from the DPCA and a bottom-up mitigation system that utilizes rancher subgroups and entities trusted by all sides.

---

**Publish Date:** February 15, 2022

**Animal(s):** Pumas, Jaguars

**Location:** Honduras, South America

[Link](#)

Chinchilla, S., Berghe, E., Polisar, J., Arévalo, C., and Bonacic, C. (2022).

**Livestock-Carnivore Coexistence: Moving beyond Preventing Killing.** *Animals*, 12, 479. <https://doi.org/10.3390/ani12040479>.

**Summary:** This publication focused on jaguar and puma predation of livestock in Central and South America, where there was an overuse of lethal removal stemmed from widespread fear of economic loss and lack of education. They found that in low-income communities, sanitation issues and disease was the leading cause of livestock death. They also found that environmental pressure caused by human expansion and water control (along with climate change), most likely led to increased predation. Farmers reported that predation decreased when livestock was close to humans and increased when the livestock was out grazing, close to the forests, without much human supervision. Though ranchers gave positive feedback on supporting wildlife and jaguar populations, they did not practice non-lethal removal purely based on a lack of knowledge about such techniques.

---

**Accepted Date:** February 21, 2022

**Animal(s):** Gray Wolves

**Location:** Germany, Denmark

[Link](#)

Mayer, M., Olsen, K., Schulz, B., Matzen, J., Nowak, C., Thomsen, P.F., Hansen, M.M., Vedel-Smith, C., and Sunde, P. (2022) **Occurrence and Livestock Depredation Patterns by Wolves in Highly Cultivated Landscapes.** *Front. Ecol. Evol.*, 10:783027. doi: 10.3389/fevo.2022.783027.

**Summary:** This article analyzed wolf populations, settlement, and depredation rates on a peninsula in Northern Germany and Denmark. Nonresident wolves of the target area were found to prey upon livestock more, and were found in greater density closer to livestock; meanwhile, resident wolves were in greater density in forested areas, away from greater livestock densities. The article also found depredation increased in areas of less forest cover and during the winter, most likely due to less prey abundance. The researchers found that the EU's method of allowing lethal removals for specific, abnormally aggressive wolves is ineffective in reducing depredation. They concluded that coexistence measures should be more focused on geospatial patterns, such as forest cover and awareness of nonresidential wolves, and that nonlethal techniques are effective in reducing livestock depredation.

---

**Accepted Date:** April 12, 2022

**Animal(s):** Gray Wolves, Mexican Wolves

**Location:** North America

[Link](#)

Hill, J.E., Boone, H.M., Gantchoff, M.G., Kautz, T.M., Kellner, K.F., Orning E.K., Parchizadeh, J., Petroelje, T.R., Wehr, N.H., Finnegan, S.P., Fowler, N.L., Lutto, A.L., Schooler, S.L., Bosch,

M., Perez, A.Z., and Belant, J.L. (2022). **Quantifying anthropogenic wolf mortality in relation to hunting regulations and landscape attributes across North America.** *Ecology and Evolution*, 12:e8875. doi: 10.1002/ece3.8875.

**Summary:** The impacts that geographic variables have on wolf hunting and anthropogenic mortality (human-caused) is relatively unknown due to the difficulty in finding and identifying wolf deaths. Interestingly, these researchers found that anthropogenic mortality of wolves increased in areas where hunting was completely prohibited, where mixed hunting regulations were used, and where there was less plant coverage. There was no clear support that anthropogenic mortality increased in areas with an opening hunting season for wolves or with increased road density. Wolf management mortality did decrease where there was legal hunting, but that mortality did not go down in areas where illegal hunting occurred and wolf hunting was prohibited. The researchers recommended that for lethal removals, locals should be involved as to help them accept the fact that wolves are a part of the land in North America moving forward, and that regulations have more impacts than just reducing numbers, such as changing wolf behavior patterns.

---

**Accepted Date:** December 28, 2022

**Animal(s):** Grizzlies

**Location:** Montana

[Link](#)

Nesbitt, H.K., Metcalf, A.L., Metcalf, E.C., Costello, C.M., Roberts, L.L., Lewis, M.S., and Gude, J.A. (2022). **Human dimensions of grizzly bear conservation: The social factors underlying satisfaction and coexistence beliefs in Montana, USA.** *Conservation Science and Practice*. 2023;5:e12885. <https://doi.org/10.1111/csp2.12885>.

**Summary:** This article looked into the social aspects of coexistence, examining the public's perception of grizzly bear recovery and management. Their hypothesis, which they affirmed, was that those who believed grizzly populations were too low or too high would be dissatisfied with bear management, while those who found populations to be adequate would support current management. There was no real correlation with wildlife support between urban and rural individuals, but older generations tended to lean more towards there being too many grizzlies. Meanwhile, many negative opinions on grizzlies were correlated more to occupations, such as farming. The article concluded by recommending that campaigns and changes should focus on emotional perspectives of grizzlies, and that a shift towards wider knowledge of successful coexistence stories will shift the public perception on grizzly management.

---

**Publish Date:** February 10, 2023

**Animal(s):** Grizzlies, Black Bears, Pumas, Coyotes, Gray Wolves

**Location:** Southwest Alberta

[Link](#)

Louchouart, Naomi and Treves, Adrian. (2023). **Low-stress livestock handling protects cattle in a five-predator habitat.** *PeerJ*, 11:e14788 <http://doi.org/10.7717/peerj.14788>.

**Summary:** This article is an analysis on the effectiveness of low-stress livestock handling (L-SLH), a non-lethal coexistence technique that utilizes range riders and lowers livestock stress levels. The experiment found that L-SLH was highly effective in reducing predation and that single variable changes in number and experience level of riders had no noticeable effect. The researchers emphasized that having attentive riders allows for in-the-moment knowledge of livestock deaths and importance of removing livestock away from carcasses and poisonous plants. There was no difference in predator sightings between herds that were less-protected and those with more protection, contrary to known impacts of lethal removal. The other notable conclusion is that wolves were more active in the autumn, either from that being the time of year pups have grown big enough to start hunting or strictly based on wolf curiosity with new range riders.

---

**Publish Date:** May 24, 2023

**Animal(s):** Wolves

**Location:** Latvia

[Link](#)

Šuba, J., Žunna, A., Bagrade, G., Done, G., Ornicāns, A., Pilāte, D., Stepanova, A., and Ozoliņš. (2023). **Does Wolf Management in Latvia Decrease Livestock Depredation? An analysis of Available Data.** *Sustainability*, 15, 8509. <https://doi.org/10.3390/su15118509>.

**Summary:** This article looked at correlations between depredation rates, wolf density (especially juveniles), culling, and wild prey density. The article states that hunting/culling does reduce depredation; however, this is only a short-term impact that does not cure the issue in the long-term and in some scenarios leads to an increase in depredation due to impacts on wolf behavior and reproduction rates. The researchers also found that increases in wild prey led to impacts on wolves, depending on the prey. Interestingly, depredation went up as numbers of large, red deer went up due to the red deer out competing the wolves primary target, the smaller roe deer, for shared resources. The article concluded by emphasizing the need to change perspectives of herders and ranchers, which should be pioneered by the introduction of more practical and nonlethal coexistence measures.

---

**Acceptance Date:** August 14, 2023

**Animal(s):** Cattle

**Location:** US, UK, Norway, New Zealand

[Link](#)

Waterhouse, Tony. August 14, 2023. **Virtual fencing systems: balancing production and welfare outcomes.** *Farm Practice*, 28:5.

**Summary:** Virtual fences (VFs) are a technology growing exponentially within the livestock world, with four major producers around the globe. VFs have been shown to be effective in controlling small paddock or strip grazing systems, such as cattle, sheep, and goats. The techniques for using VF are not as labor intensive as physical electrical wires, and the use of mobile phone apps have increased this. Errors do occur, but since every head of livestock has its own virtual fence, ranchers don't lose the entire herd when one of the collars malfunction. Herding is a bit more complicated and the specific technique depends on the VF manufacturer. That said, VFs can change in real-time, allowing for high manipulation.

---

**Publish Date:** October 6, 2023

**Animal(s):** Lions, Cheetahs, Hyenas, Leopards, Painted Dogs

**Location:** Zimbabwe

[Link](#)

Kuiper, T., MacDonald, D., Sibanda, L., Mathe, L.J., Mahdlamoto, D., and Loveridge, A. (2024) **The behaviours of different carnivore and livestock species shape spatial patterns of humans - carnivore conflict.** *British Ecological Society: People and Nature*, 6 (3): 1248-1261. <https://doi.org/10.1002/pan3.10633> (2024).

**Summary:** This paper focused on livestock predation spatial patterns of large carnivores in rural communal areas near a national park in Zimbabwe. The article stated predation increases as livestock get closer to areas of higher carnivore concentration. The article summarized its findings by stating there were more predator attacks on livestock closer to humans because there was more livestock, but that livestock in grazing pastures had a higher percentage of being killed due higher densities of predators and lower densities of livestock. The article also stated how herding patterns can be adjusted based on the time of year and hunting behaviors of specific predators. The publication ended by emphasizing that more coexistence measures are required for those who live and have their livestock closer to areas of higher predator concentration, such as grazing pastures.

---

**Publish Date:** October 30, 2023

**Animal(s):** Wolves

**Location:** Slovakia

[Link](#)

Kutal, M., Dul'a, M., Selivanova, A.R., and López-Bao, J.V. (2024). **Testing a conservation compromise: No evidence that public wolf hunting in Slovakia reduced livestock losses.** *Conservation Letters*, 17:e12994. <https://doi.org/10.1111/conl.12994>

**Summary:** This article analyzed permitted wolf hunting in Slovakia and the impacts that had on predation numbers of domestic ungulates. The researchers concluded that the hunting system in Slovakia had no noticeable impact on depredation levels due to issues in organization, especially in regards to their being no system highlighting areas where depredation was higher and lethal

removal was needed. They also found that removing portions of wolf packs also had no impact on depredation, even within two weeks of a depredation event by that specific pack. The article concluded by stating that their results were most likely impacted by the diets of the wolves in Slovakia, which primarily are comprised of nondomestic, wild ungulates.

---

**Publish Date:** December 5, 2023

**Animal(s):** Pumas, Jaguars

**Location:** Colombia

[Link](#)

Valderrama-Vasquez, C., Hoogesteijn, R., Payán, E., Quigley, H., and Hoogesteijn. (2023).

**Predator-friendly ranching, use of electric fences, and creole cattle in the Colombian savannas.** *European Journal of Wildlife Research*, 70:1

<https://doi.org/10.1007/s10344-023-01754-3>

Summary: Jaguars and pumas are federally protected in Colombia, yet the primary cause of death is illegal killings by ranchers fearful of the large carnivores killing their cattle. This publication found predation mitigation methods (PMMs) to be both highly effective in reducing depredation by pumas and jaguars and at a low cost, regardless of the PMM or type of livestock. The involved ranchers supported the use of creole cattle and electric fences, and stated that lethal removal had no impact on depredation. The researchers also stated that due to the ranchers overall support for preserving the large carnivores, plus the low cost and effort of the utilized PMMs, the ranchers were highly supportive of implementing PMMs.

---

**Publish Date:** February 14, 2024

**Animal(s):** Wolves, Lynx

**Location:** Europe

[Link](#)

Barroso, Patricia and Gartázar, Christian. (2024). **The coexistence of wildlife and livestock.** *American Society of Animal Science*, 14 (1). <https://doi.org/10.1093/af/vfado64>

Summary: This paper focused on the European goals in combating the effects of greenhouse gases and global climate change. The bulk of the article emphasized the importance of biodiversity and allowing for natural grasslands to repopulate, with some discussion on increases of predation with expansion of predatory habitat. They spoke a bit about fencing, and concluded the article by highlighting the discrepancy in who will bear the brunt of coexistence measures. At the end of the day, the rural communities and ranchers are the ones who must change the most, and that needs to be recognized at some level.

---

**Publish Date:** March 2024

**Animal(s):** Wolves

**Location:** Italy

[Link](#)

Primi, R., Viola, P., Girotti, P., Danieli, P.P., Ronchi, B., and Spina, R. (2024). **Performance evaluation of a prototype for the defence against wolves on livestock animals.** *ACTA IMEKO*, 13 (1): 1-7. doi: 10.21014/actaimeko.v13i1.1650

**Summary:** Over the last decade wolf populations in Italy have grown exponentially, and so has livestock-wolf conflicts. Though strategies such as fences, financial mitigation, and guard dogs are useful, they each pose various flaws that provide avenues for illegal killings of wolves and loss of livestock. The team of researchers in this article designed an acoustic microphone system in an attempt to monitor wolf predation on sheep and create a system in which farmers could be notified of wolf predation much quicker than currently possible. The team ultimately found the calibration of the system to routine noises to be more challenging than expected, but concluded the project very optimistic with future implementation of artificial intelligence and technology that utilizes more than just sound.

---

**Publish Date:** March 18, 2024

**Animal(s):** Gray Wolves, Mexican Wolves

**Location:** California, Idaho, Wyoming, Montana, Washington, Oregon

[Link](#)

Anderson, R.M., Charnley, S., Martin, J.V., and Epstein, K. (2024). **Large, rugged and remote: The challenge of wolf-livestock coexistence on federal lands in the American West.** *British Ecological Society: People and Nature*, 00:1 -13. DOI: 10.1002/pan3.10713

**Summary:** This is an analysis on how geographic features within USFS allotments across the western US impacted the effectiveness of wolf-livestock lethal and non-lethal coexistence measures. The study discussed how the most effective coexistence measures had to be combinations of lethal, husbandry, and non-lethal measures. They emphasized human presence was significantly more effective and practical over stationary technology, and that reducing livestock vulnerability and manipulating behavioral deterrents appeared to make a larger impact over “complete prevention of attacks.” The article recommended larger changes in husbandry techniques implemented in permitting could have significant impacts, and that increasing flexibility along with “fostering adaptive grazing management” could greatly impact the use of husbandry practices. They ended by emphasizing the importance of social views, and that coexistence techniques must be based on a case-by-case basis.

---

**Publish Date:** March 26, 2024

**Animal(s):** Grizzlies

**Location:** Montana

[Link](#)

Young, Julie K., and Sarmiento, Wesley. (2024). **Can an old dog learn a new trick? Efficacy of livestock guardian dogs at keeping an apex predator away from people.** *Biological Conservation*, 292: 110554. <https://doi.org/10.1016/j.biocon.2024.110554>

Summary: This article expanded upon the effectiveness of livestock guard dogs (LGDs) and their impacts to grizzly activity in farmsteads of Central Montana. The researchers found that the LGDs were highly effective in deterring grizzlies, in that their presence reduced activity from grizzlies by 95%. They noted that the LGDs were not hostile towards pets of the farmsteads (even forming bonds with them) and continued to protect the farmsteads through each night. Both of these were concerns by the homestead owners. Since the researchers had multiple bears with GPS collars, they were able to log how close the bears got to the homesteads, and concluded that the bears learned which homesteads had LGDs and which did not (the control homesteads).

---

**Publish Date:** March 29, 2024

**Animal(s):** Wolves, Coyotes

**Location:** United States, Canada

[Link](#)

Plotsky, K., Alexander, S.M., and Musiani, M. (2024). **Canid livestock predation research has become robust, but gaps remain.** *Global and Ecology and Conservation*, 51: e02923.

Summary: This article analyzed the history and robustness of research and predation prevention technique evaluations on livestock predation by canids (wolves, coyotes, and foxes) in the US and Canada. They found that research publications on both lethal and nonlethal were very inconsistent, with an even amount of publications saying either lethal or non-lethal predation prevention had positive outcomes. Additionally, half of all the strategies that had been researched or evaluated were never evaluated more than a second time. There were four strategies that had been evaluated six or more times: fencing, combination lethal removal, conditioned taste aversion, and livestock protection dogs. The article concluded that many of the reasons for research inconsistencies stem from both scientific and personal biases.

---

**Publish Date:** April 1, 2024

**Animal(s):** Grizzlies

**Location:** Montana

[Link](#)

Smith, A.P., Sundstrom, A., and Burnham, M. (2024). **Understanding diverse perspectives on grizzly-livestock conflict and conflict-reduction tools across southwest Montana ranching communities.** *The Journal of Wildlife Management*, DOI: 10.1002/jwmg.22709.

Summary: This article interviewed ranchers in GYE and NCDE grizzly recovery areas, looking into the social framework of livestock-grizzly conflict and coexistence measures. The article

found that three distinct perspectives arose, ultimately emphasizing how polarizing range riders are and the need for more research. The first perspective is that the major issues driving conflict are disputes arising from a social divide among ranchers, and how constant changes in land ownership means constant changes in how wildlife should be regulated. Their second perspective pertains to the idea that governance of land in Montana should be left to the state, that the federal government has too much control, and that effective tools (like hunting and lethal removal) are being restricted. The final perspective is based in a belief that solutions must be multifaceted and “require consideration of the entire ecosystem.”

---

**Publish Date:** May 9, 2024

**Animal(s):** Gray Wolves

**Location:** Idaho, Montana, California, Colorado

[Link](#)

Martin, JV. (2024). **Conservation and conviviality in the American West.** *Elem Sci Anth*, 12: 1. DOI: <https://doi.org/10.1525/elementa.2023.00073>

**Summary:** This article highlights the divide between the livestock industry and the growing support in replenishing biodiversity in the West. Numerous modern factors, such as shrinking grazing lands for golf courses and increased taxation, are driving uncomfortability and frustration for farmers and herders. Top-down regulations have acted as a catalyst in driving a wedge between environmentalists and ranchers, and the political differences in governmental regulation have allowed this wedge to expand into a crater. The article states this political conflict must be attacked head on, and that the author recommended “commoning” as a means to bridge the crater that divides the West. “Commoning presents a bottom-up, hybrid alternative to enclosure, private property, and market relations, as well as a means for producing commoners: those with intimate relationships with the commons as more-than-human, life-sustaining systems.”

---

**Accepted Date:** June 11, 2024

**Animal(s):** Cattle

**Location:** United States

[Link](#)

Hoag, D., Vorster, A.G., Ehlert, K., Evangelista, P., Edwards-Callaway, L., Mooney, D.F., and Virene. (2024). **Beef Cattle Producer Perspectives on Virtual Fencing.** *Rangeland Ecology & Management*, 96. 143–151.

**Summary:** Producers see a lot of value in virtual fencing (VF), but there is hesitance within the community on VF cost efficiency. There seems to be a 50/50 split on VF cost over physical fences. Whether VF is less expensive hinges on a multitude of factors, including (but not limited to) infrastructure conditions, terrain, business model, recent events (e.g., wildfire), and property size. Producers voiced support that VF could be highly useful in predator management and protecting critical habitat and ecologically sensitive areas. Nonusers were concerned about cost

and reliability, while Users voiced that they overcame this. Both groups had concerns on topography impacts, wildlife interactions, and controlling livestock behavior.

---

**Publish Date:** August 5, 2024

**Animal(s):** Patagonian Foxes

**Location:** Chile

[Link](#)

Ugarte, C.S., Saavedra, C., and Simonetti, J.A. (2024). **Olfactory repellents as perceptual traps for mesocarnivores immersed in livestock systems.** *ELSEVIER: Perspectives in Ecology and Conservation*, 22(3): 232 - 239. <https://doi.org/10.1016/j.pecon.2024.04.005>.

**Summary:** This article examined the use of whole-body odor (WBO) from livestock guardian dogs (LGD) to lower Patagonian fox predation on sheep. The goal was to correlate livestock with fear in the brains of predators in order to lower predation. The survey found that the olfactory “traps” did decrease predation, and the decrease correlated with increases in plant coverage. The article concluded that this technique is effective, but has limitations based on coverage in a requirement that predators already be familiar with LGDs. It is yet another instance of the importance of creating coexistence strategies that are specific to the region, predator, and livestock.

---

**Publish Date:** August 6, 2024

**Animal(s):** Gray Wolves

**Location:** Western Alps

[Link](#)

Grente, O., Bauduin, S., Santostasi, N.L., Chamaillé-Jammes, S., Duchamp, C., Drouet-Hoguet, N., and Gimenez, O. (2024). **Evaluating the effects of wolf culling on livestock predation when considering wolf population dynamics in an individual-based model.** *Wildlife Biology*, 2024: e01227. doi: 10.1002/wlb3.01227.

**Summary:** This article was simply looking into the impacts culling has on gray wolf livestock predation in the West Alps. The research project utilized a simulation where they added different variables, including selective and random culling, rates of natural mortality, and other environmental factors. They ultimately found culling to be effective in their simulation to reduce both wolf populations and livestock predation, and recommended the simulation for future studies.

---

**Publish Date:** September 2024

**Animal(s):** Cattle

**Location:** US, New Zealand, Australia

[Link](#)

Wätzold, F., Jauker, F., Komainda, M., Schöttker, O., Horn, J., Sturm, A., and Isselstein, J. (2024). **Harnessing virtual fencing for more effective and adaptive agri-environment schemes to conserve grassland biodiversity.** *Biological Conservation*, 297. 110736.

**Summary:** This article looked into using electrical collars on grazing livestock in European pastures, and the impacts on local diversity with this new information system. Ranchers received continuous info, and were alerted of any stray animals when they got close to fence boundaries and surpassed them. As an animal approached a boundary the collar would make a noise and then shock them if they stepped beyond the VF. This system worked best with cattle and sheep. As time goes on, they do become accustomed to the warning system and recordings of electrical shocks were reduced over time. VF was found to be more cost effective and less labor intensive than agri-environment schemes (AES) (traditional methods in conserving the environment on grazing land). A key characteristic was that VF costs are almost entirely upfront, with no cost on changing pasture boundaries. Additionally, the flexibility of VFs is well suited for wildlife corridors and connected habitats. Issues with VFs are worse if ranchers are not employing AES's, as the initial cost is considerable. Additionally, blackouts do occur and the legal system has yet to adjust for the regulation of such technology and liability for negative consequences that stem from VFs.

---

**Publish Date:** September 11, 2024

**Animal(s):** Pumas, Foxes, “Wildcats”

**Location:** Northern Chile

[Link](#)

Núñez, C., Roco, L., and Moreira, V. (2024). **Factors Affecting the Adoption of Anti-Predation Measures by Livestock Farmers: The Case of Northern Chile.** *Diversity*, 16, 567. <https://doi.org/10.3390/d16090567>

**Summary:** This article peered into what factors positively or negatively impact ranchers/herders choice in implementing/changing coexistence techniques. They found that the more livestock present, the more difficult it was to implement coexistence measures. The publication also found that age, gender, and memberships in organizations (such as breeding committees) of ranchers had no impact; however, revenue and workforce had positive correlations to implementing new techniques. Additionally, farms and ranches with more livestock and higher predation were more likely to have more coexistence measures, but that did not mean they were more willing to implement new measures. Finally, veterinary advice and management negatively influenced both the adoption and the intensity of the measures, likely because healthy animals are less likely to be targeted by predators or the fact that ranchers who can afford veterinary assistance have the funds to implement coexistence measures.

---

**Accepted Date:** September 20, 2024

**Animal(s):** Grizzlies

**Location:** Washington

[Link](#)

Easter, T.S., Santo, A.R., Sage, A.H., Carter, N.H., Chan, K.M.A., and Ransom, J.I. (2024).

**Divergent values and perspectives drive three distinct viewpoints on grizzly bear reintroduction in Washington, the United States.** *People and Nature*, 7: 127-145. DOI: 10.1002/pan3.10748.

Summary: This article looked to define the different viewpoints and insights around grizzly reintroduction in Washington so that this information could be used by wildlife management in addressing issues, concerns, and building trust with stakeholders. The first insight concluded by the team was that there were a lot more opinions and perspectives based from a practicality standpoint, instead of an even split between right and wrong. Where there was a hard divide between those who support and those who oppose, it was based on relational values (the second insight). The third insight was that there were three key concerns of risk: harm by bears, harm to bears, and risk of not enough management resources. Finally, the fourth and last insight was that political backgrounds did not create a clear-cut line between support and opposition.

---

**Publish Date:** January 22, 2025

**Animal(s):** Wolves

**Location:** Europe (Netherlands, Germany, Slovakia, etc.)

[Link](#)

Ostermann-Myashita, E., Kirkland, H., Eklund, A., Hare, D., Jansman, H. A., Kiffner, C., Linell, J. D., Rigg, R., Stone, S. A., Uthes, S., von Arx, M., & König, H. J. (2025). **Bridging the gap between science, policy and stakeholders: Towards sustainable wolf-livestock coexistence in human-dominated landscapes.** *British Ecological Society: People and Nature*, 00: 1-8. <https://doi.org/10.1002/pan3.10786>

Summary: This is a scientific analysis examining coexistence measures within multiple European countries where both introduced and historical populations of wolves are growing. The article emphasized the importance of educating stakeholders in alleviating coexistence biases, while elaborating on the difficulty in producing (or lack of) scientific publications between introduced wolf populations and the effectiveness of lethal control techniques. Proper, evidence-based management of wolves must be grounded in the sharing of ecological information, collaborative techniques stemming from centuries of human-wolf coexistence, and an understanding in the human dimension of the issue, especially in regards to common biases against wolves. The article concluded by highlighting the importance of communication and cooperation between policy, stakeholders, and science, as well as promoting a shift towards large-scale, long-term management projects and scientific evaluations.

---

**Publish Date:** February 2, 2025

**Animal(s):** Gray Wolves

**Location:** Michigan, Montana, Oregon

[Link](#)

Brooke Jacobs, Peter Kareiva and Christopher Schachtschneider, **The expanding use and effectiveness of nonlethal methods for mitigating wolf-cattle conflict**, *Rangelands*, <https://doi.org/10.1016/j.rala.2025.02.002>.

**Summary:** This was an analysis on the effectiveness of lethal and nonlethal techniques in reducing the risk of wolf depredation on livestock. An issue found in this article was a lack of data on both lethal and nonlethal techniques, especially with lethal because there was only 1 article in this analysis that analyzed one specific livestock group. The writers explained that proper analysis requires comparing the same technique to the same mon-group of livestock, not mixed species herds. In summary, the risk reduction for nonlethal techniques was 91%, while lethal resulted in 39% risk reduction. The article then dove into the USDA WS's Nonlethal Initiative, and broke down how often specific coexistence techniques were used on public lands in Montana, Michigan, and Oregon.

---

**Publish Date:** August 20, 2025

**Animal(s):** Gray Wolves

**Location:** Northwestern US

[Link](#)

Merz, L.M., Clemm von Hohenberg, B., Bergmann, N.T., Bruskotter, J.T., and Carter, N.H. (2025). **Elusive effects of legalized wolf hunting on human-wolf interactions**. *Sci. Adv.* 11, eadu8945.

**Abstract:** Using difference-in-differences and structural equation modeling of data from the northwestern US between 2005 and 2021, these researchers analyzed impacts of wolf hunting on livestock predation by wolves and government removal of wolves in the same year and with a 1-year time lag while controlling for social and environmental variables. They found that public wolf hunting had a small negative effect on livestock predation but had no effect on government lethal removal of wolves in the same or subsequent years. Their findings challenge the assumption that wolf hunting is an effective management strategy for reducing livestock predation and lethal removal.

---