

**Sherman Wolf Pack:  
2017 Lethal removal action**

December 15, 2017



*Washington Department of*  
**FISH and WILDLIFE**

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## **Introduction**

This report describes the management actions taken by the Washington Department of Fish and Wildlife (WDFW or Department) to address recurrent livestock depredations attributed to members of the Sherman Wolf pack. While much of this information has been posted on the Department's website, this report consolidates that material and provides additional context for the Department's management activities.

This report also fulfills a provision of the collaboratively developed 2017 Wolf-livestock interaction protocol (Protocol, Appendix A), which calls for the Department to provide a final report to the public after using lethal removal to address recurrent livestock depredations.

In all wolf management activities, WDFW's actions are guided by Washington's Wolf Conservation and Management Plan (Wolf Plan). The Wolf Plan adopted by the Washington Fish and Wildlife Commission in 2011, provides a guidance toward recovery and management of wolves in the state during recovery. In 2017, WDFW developed a wolf-livestock interaction protocol in collaboration with the 18-member Wolf Advisory Group (WAG) to help guide management decisions relating to wolf-livestock interactions. This protocol was a continued refinement of the collaboratively developed protocol supported by the WAG in 2016.

Both the Wolf Plan and the 2017 Protocol prescribe a management strategy for addressing wolf-livestock interactions primarily through proactive non-lethal measures, with the recognition that in rare cases, incremental lethal removal of

depredating wolves may be necessary to address recurrent depredations.

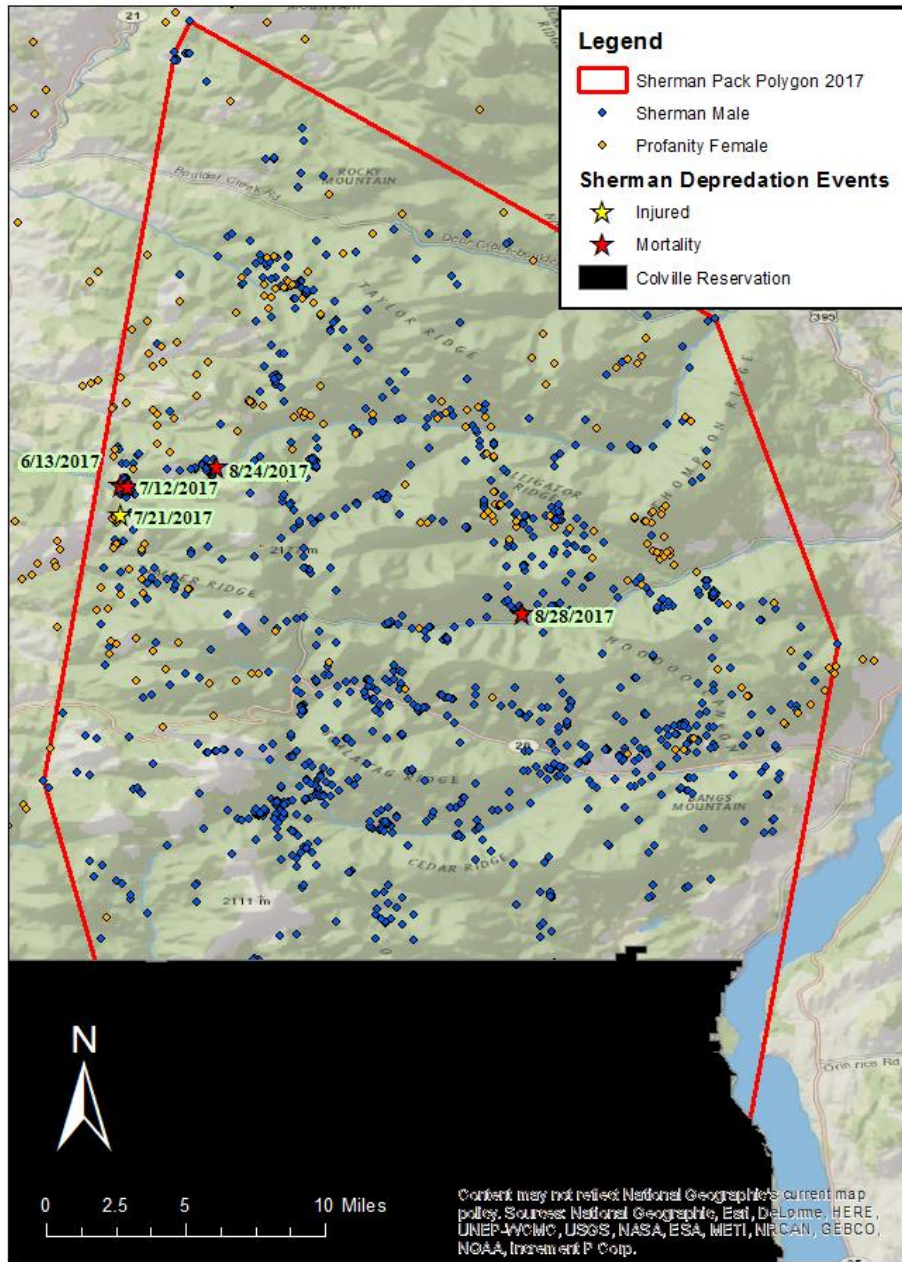
## **Background**

The Sherman pack was confirmed in the spring of 2016 after winter surveys documented that the collared wolf that had served as the breeding female for the Profanity Peak pack during 2015 had dispersed, paired with an unknown male, and were traveling together during winter, thereby forming a new pack in an adjacent area. WDFW collared that male on February 16, 2016 using a helicopter. The Sherman pack produced pups in the spring of 2016, and the pack occupied an area of roughly 235 square miles, west of the Columbia River and generally south of State Highway 20. During 2016, the Sherman pack's territory encompassed four active United States Forest Service (USFS) grazing allotments and the pack was not implicated in any livestock depredations.

The area just north of the Sherman pack's territory was occupied by the Profanity Peak pack during 2016. Over the course of the summer of 2016, the Profanity Peak pack was implicated in 15 depredations which resulted in WDFW removing the majority of the adult members of the pack. The remaining collared adult member of the Profanity Peak pack dispersed out of the territory to the west in early June of 2017.

On March 20, 2017 the Sherman pack's collared female was killed by a vehicle. The movements of the remaining Sherman pack collared male shifted north into the historic Profanity Peak territory around May of 2017. Monitoring by field staff determined that at least one uncollared wolf was traveling with the collared Sherman pack wolf, although no evidence of movements

that indicated denning behavior were observed in late spring and early summer of 2017.



**Figure 1.** Map of the Sherman Pack territory during the summer of 2017.

The territory used by the Sherman pack in Ferry County, WA, during 2017 is characterized by mountainous terrain with a mixture of dry forest and interspersed sloped meadows (Figure 1). The grazing allotment

pastures are portioned off by wood post, barb wire drift fence. The vegetation is lightly forested with interspersed ponderosa pine and Douglas fir at lower elevations to more densely forested areas of Douglas Fir,



subalpine fir, lodge pole pine and Engelmann spruce at higher elevations.

The Sherman pack territory overlapped at least 10 grazing allotments, with a maximum stocking of up to 1300 pairs of cattle for all the allotments combined. Contact between WDFW staff and producers was made throughout 2016 and

during the winter/spring 2017 through USFS range meetings, WDFW contract range riders, and WDFW staff. Five producers that grazed cattle in areas that overlapped with the Sherman pack territory were enrolled in the damage prevention cooperative agreements for livestock in 2016 and primarily due to funding only four were enrolled in 2017 (Table 1).

**Table 1.** Total funding to support Damage Prevention Cooperative Agreements for Livestock (DPCA-Ls) for the Sherman and Profanity pack areas.

Year	Number of DPCA-Ls	Total Spent
2016	5	\$45,000
2017*	4	\$35,000
<b>TOTAL</b>		<b>\$80,000</b>

\*There were at least four additional producers interested in DPCA-Ls in 2017, however funding was not available for additional contracts.

**Timeline**

In 2017, WDFW staff investigated a total of 13 livestock mortalities in the Sherman pack area including five confirmed wolf caused mortalities, three unconfirmed cause of death, three non-depredation mortalities, and two confirmed non-wolf mortalities. The information below explains each of the depredations associated with wolves and the decision process the department utilized to minimize wolf and livestock interactions in the Sherman pack territory.

Five range riders under WDFW contract were deployed in early May 2017 to conduct pre-grazing season monitoring of carnivore activity in USFS grazing allotments (Table 2). Where pertinent to minimizing interactions between cattle and wolves, WDFW provided those range riders with information regarding the Sherman collared wolf movements within the denning blackout period in May, and all contracted range riders were independently able to access wolf GPS collar location data shared by WDFW after June 1 in this area.

**Table 2.** Total cost of the range riders utilized to minimize interactions between wolves and cattle in the allotments that overlap the Sherman pack territory in Northeast Washington during 2017. Days are billed as full days (more than 6 hours) or half days (less than 6 hours) as per their contracts.

Month	Number of Range Rider Days	Amount
May	83	\$12,290
June	73/4*	\$12,880**
July	140	\$23,680
August	131	\$24,120
September	129	\$20,120
October	62	\$11,880
November	45	\$7,080
<b>TOTALS</b>	<b>667</b>	<b>\$112,050</b>

\*73 full days, 4 half days

\*\* paid by Conservation Northwest

On June 12, 2017, a range rider contracted by WDFW discovered the skeletal remains of one calf and a second, more intact, calf carcass within the historic Profanity Peak pack territory and notified WDFW staff around 7:00 pm. After conducting an investigation, the following morning, WDFW staff confirmed it as a wolf depredation. The calf had bite wounds to both hind legs. Meanwhile, GPS collar locations showed that the collared Sherman wolf had been near the site during the time of the mortality, which was located on a Bureau of Land Management grazing allotment (Appendix B). After the confirmed depredation on June 12, range riders contracted by WDFW focused more time on the allotment where cattle were located and the surrounding allotments. When cow/calf mortalities occurred for any reason, carcasses were removed from the allotments.

On July 12, 2017, a WDFW contracted range rider notified WDFW staff of another calf mortality in Ferry County, prompting an

investigation that confirmed the calf had been killed by wolves. Evidence of puncture wounds, bite marks and hemorrhaging were discovered on the rear right leg, the hide of the rear right leg, and the tail. These injuries were consistent with wounds typically associated with wolf depredation. Based on evidence from the collared Sherman pack wolf's GPS collar location data, this depredation was attributed to the Sherman pack. (Appendix C).

On July 21, WDFW staff were notified of an injured calf in the same general area of the previous two depredations. The five-month old calf had bite lacerations and puncture wounds to the upper left shoulder, left arm pit, lower left brisket, lower left rear leg, inside the upper left leg, and groin area. Based on the injuries the calf sustained, WDFW staff confirmed that it was injured by wolves (Appendix D). The calf was euthanized by the producer after the investigation. As in June, WDFW contracted range riders were focused in the

allotment where the confirmed depredations occurred and in adjoining allotments. Five range riders contracted by WDFW provided 140 days of range riding services in and surrounding these USFS allotments during July (Table 2.). WDFW staff also patrolled the area where depredations had occurred in both 2016 and 2017.

Throughout August, WDFW staff, five WDFW contracted range riders, and three Conservation Northwest range riders patrolled the Sherman pack territory allotments. WDFW contracted range riders provided 131 days of services in the area.

On August 23, 2017, one of the range riders contracted by WDFW reported the skeletal remains of a calf and a second, more intact, calf carcass found in a USFS grazing allotment. WDFW staff completed an investigation and confirmed the more intact calf was killed by wolves. Evidence to support this finding included hemorrhaging and bite wounds to the nose, groin, right front leg above the elbow, and both rear legs consistent with injuries typically incurred by wolves. GPS locations of the collared Sherman male wolf were near the site during the same time period as the depredation occurred (Appendix E). Wolf tracks and scat were also found in the immediate area of the depredation.

The 2017 wolf-livestock interaction protocol defines recurring depredations as three depredations in 30 days or four depredations within a 10-month timeframe. The depredation that occurred on August 23 in the Sherman pack territory in addition to the previous depredations in June and July met the definition of recurring depredations as well as the other criteria listed in the protocol (Appendix A), prompting WDFW

Director Unsworth, on August 25<sup>th</sup>, to authorize lethal removal of one or more Sherman pack members to change the behavior of the pack.

To implement lethal removal, the department attempted to utilize traps in the vicinity of the most recent depredation. The calf that was killed August 23 was left on site where it was killed and traps were deployed in the allotment. Harper et al. (2008) found that the act of trapping alone, regardless of success, can potentially reduce recurrent depredations via the same approach. WDFW began trapping efforts August 25 (within two days of the fourth depredation) to help ensure that any removals occurred within the 14-day window from when the depredation occurred as this has been shown to be most effective at reducing reoccurring depredations (Bradley et al. 2015).

On August 25, while placing traps, WDFW staff located a dead adult cow in the same allotment where the calf was killed by wolves on August 23. Because it was starting to get dark, the staff recorded the location and covered the carcass with a tarp so they could perform a depredation investigation the following day. The determination from the investigation on August 26, 2017 was unknown/non-wolf (Appendix F). The adult cow carcass was also left in the allotment as it was in the general area where the traps were deployed.

On August 28, 2017 WDFW confirmed another depredation on a calf in a separate allotment within the Sherman Pack territory, but several miles east of where WDFW staff were trapping. (Appendix G). Again, GPS collar locations placed the collared Sherman male at the site when the depredations likely

occurred. Due to the continuing depredations, the extended distance between those depredations and no sign of wolf activity near the trap line in six days of trapping, field staff determined that the wolves were unlikely to return to the allotment where the fourth depredation occurred within the 14-day window. At that point department staff determined that aerial removal would be the most effective and efficient option to remove a wolf and alter wolf behavior.

The decision was made to remove one animal with the recognition that there was at least one additional individual in the area. Prior to removal, staff decided to remove whichever animal was encountered. If both were encountered, the decision was to remove the collared animal. The GPS data indicated the collared male wolf was likely involved in all of the confirmed wolf depredations in the area and because removing an adult male has been shown to have the greatest potential to reduce the chances of future depredations (Harper et al.

2008). On September 1, 2017, WDFW removed the collared adult male wolf from the Sherman pack, seven days after initiating lethal removal and four days after the last confirmed depredation. No other wolves were observed during the removal operations.

The total cost for the Sherman pack lethal removal was \$15,097, which included the helicopter contract (\$9,868.00) and other WDFW expenses (\$5,229) such as staff time and travel. In 2017, the total cost of the DPCA-L's and range rider activities used to minimize interactions between wolves and livestock in the area of the Sherman pack territory was \$147,050.

As of December 15, 2017 there have been no depredations in the Sherman or Profanity Peak territories. The Department will continue to monitor wolf activity throughout the winter, and collaborate with livestock producers to ensure that proactive measures are in place before the 2018 grazing season begins.

## Literature Cited

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# **Appendix A**

## Wolf-Livestock Interaction Protocol

# WASHINGTON DEPARTMENT OF FISH AND WILDLIFE

## Wolf-livestock interaction protocol

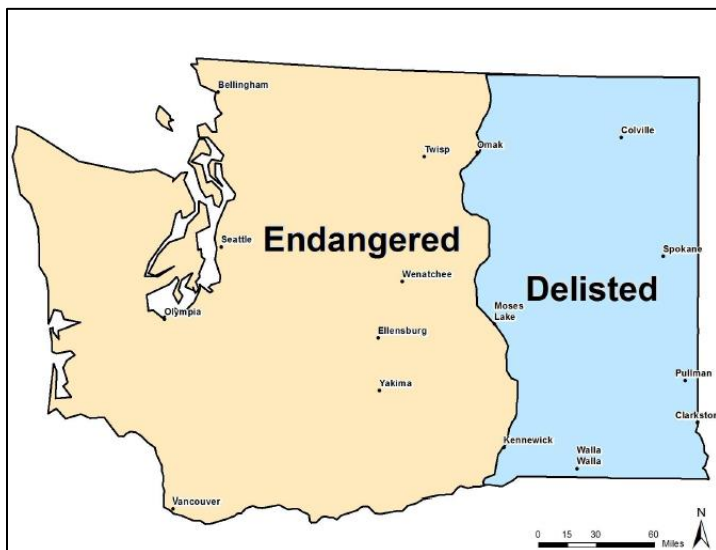
Revision date June 1, 2017

This protocol was jointly developed by the Washington Department of Fish and Wildlife (WDFW or Department) and its Wolf Advisory Group to guide the Department's efforts to reduce conflicts between wolves and livestock. The Wolf Advisory Group has expressed a strong value to reducing the likelihood of the loss of both wolves and livestock from adverse interactions. The protocol prescribes a variety of proactive measures livestock producers can take to reduce the probability of wolf-livestock conflicts and establishes a framework for WDFW's response when conflicts between wolves and livestock do occur.

The protocol draws on a diversity of perspectives expressed by people throughout the state for protecting wildlife populations as a public resource and livestock. These values include achieving a sustained recovered wolf population, supporting rural ways of life, and maintaining livestock production as part of the state's cultural and economic heritage. This protocol also serves to increase the transparency and accountability of the Department's activities and management actions related to wolves.

### **Section 1. Background and purpose of protocol**

Gray wolves are listed as endangered under the federal Endangered Species Act (ESA) of 1973 in the western two-thirds of Washington, but are federally delisted in the eastern-third of the state (Fig. 1). Under Washington State rule, gray wolves as endangered statewide. Under the Federal listing status, the U.S. Fish and Wildlife Service (USFWS) is the lead agency for managing wolves in the western two-thirds of Washington, and WDFW has full management authority for wolves in the eastern third.



**Figure 1.** Federal classification of gray wolves in Washington State, 2017.



The Department developed a Wolf Conservation and Management plan (wolf plan) under the requirements of WAC 220-610-110, which requires that listed species be managed to attain “survival as a free-ranging population” (Section 1.1). This requirement is consistent with Department’s responsibility to manage wildlife in trust for the citizens of Washington. Recovery plans need to include target population objectives, de-listing criteria, and an implementation plan for reaching population objectives “which will promote cooperative management and be sensitive to landowner needs and property rights” (WAC 220-610-110, Sections 11.1.1, 11.1.2, and 11.1.3).

The wolf plan was developed with the help of a multi-stakeholder working group and adopted by the Washington Fish and Wildlife Commission in 2011. The wolf plan has four goals, in accordance with state law and regulations: 1) recovery of the species, 2) reducing wolf-livestock conflict, 3) addressing interactions between wolves and native ungulates, and 4) promoting coexistence of livestock and wolves and public understanding of wolf management (see page 14 of WDFW Wolf Conservation and Management plan).

Under the umbrella of the wolf plan, this protocol outlines the various tools and actions WDFW uses to reduce wolf-livestock interactions in order to support wolf recovery and maintain the long-term coexistence of wolves and livestock. ***The goal of the tools and approaches described in this protocol is to influence/change wolf pack behavior to reduce the potential for recurrent wolf depredations on livestock while continuing to promote wolf recovery.*** In addition, some tools have the ancillary benefit of increasing human awareness and/or influencing livestock behavior to increase the coexistence of wolves and livestock.

At this stage of recovery in Washington, most wolf packs share a portion of their territory with livestock on the rural landscape. WDFW encourages livestock producers in those environments to use proactive deterrence measures to reduce the probability for conflict. If conflict should occur, the Department considers the use of responsive deterrence measures and – within established guidelines – lethal removal of wolves (in areas where wolves are federally delisted) if appropriate deterrence measures have first been taken to attempt to change pack behavior and reduce the potential for recurrent wolf depredations on livestock.

This protocol describes a variety of livestock damage deterrence measures and the expectations for their use. While no single deterrence measure or combination of measures will guarantee that zero conflict between wolves and livestock occurs, the Department believes careful application of these techniques will help reduce conflict. This protocol also describes the criteria for and implementation of lethal removal of wolves.

## **Section 2. Definitions**

Confirmed wolf depredation refers to any event where there is reasonable physical evidence that a wolf caused the death or injury of livestock. Primary confirmation would include bite marks and associated subcutaneous hemorrhaging and tissue damage, indicating that the wolf attacked a live animal, as opposed to simply feeding on an already dead animal. Spacing between canine

tooth punctures, location of bite marks on the carcass, feeding patterns on the carcass, fresh tracks, scat, and hairs rubbed off on fences or brush, and/or eyewitness accounts of the attack may help identify the specific species or individual responsible for the depredation. Wolf predation might also be confirmed in the absence of bite marks and associated hemorrhaging (i.e., if much of the carcass has already been consumed by a predator or scavengers) if there is other physical evidence to provide confirmation. This might include blood spilled or sprayed at a nearby attack site or other evidence of an attack or struggle. There may also be nearby remains of other animals for which there is still sufficient evidence to confirm predation, allowing reasonable inference of confirmed wolf predation on an animal that has been largely consumed.

This definition is from the Department's Wolf Conservation and Management Plan. In practice, 96 percent of the confirmed wolf depredations in the last 3 years have included hemorrhaging as the factor that led to that determination. The Department will continue to use the factor of hemorrhaging (along with other supporting factors) for determinations of a confirmed wolf depredation. (See **Section 5** for more information on factors.) Also, only trained WDFW staff make the final determination in depredation investigations.

Depredation means any death or injury of livestock caused by a carnivore.

Dispersal generally refers to the natural movement of an animal from one area to another area outside its natal territory.

Incremental removal refers to a period of active wolf removal (or attempt to remove wolves) followed by a period of evaluation. If, during this evaluation period, wolf depredations continue, the Department may resume removal of additional wolves from the pack as part of the continuation of a series of periods of active removal and periods of evaluation.

Livestock means cattle, pigs, horses, mules, sheep, llamas, goats, donkeys, alpacas, guarding animals, and herding dogs (this definition is derived from WDFW's wolf plan and WAC 220-440-020).

Proactive deterrence measure refers to an action taken to discourage wolf depredation that has been in place long enough prior to a confirmed wolf depredation that the local WDFW Wildlife Conflict Specialist can be confident that it had time to be effective. In most situations, the measures will have been in place for at least one week. The WDFW Conflict Specialist and the livestock producer will determine which techniques are best suited for the specific livestock operation and have the best chance to reduce the likelihood of wolf depredations on livestock.

Probable wolf depredation means there is sufficient evidence to suggest that the cause of death or injury to livestock was a wolf, but not enough evidence to clearly confirm that the depredation could only be caused by a wolf. A number of factors can help in reaching a conclusion, including (1) recently confirmed predation by wolves in the same or nearby area, and (2) evidence (e.g., telemetry monitoring data, sightings, howling, fresh tracks, etc.) to suggest that wolves may have been in the area when the depredation occurred. These factors, and possibly others, will be considered in the investigator's best professional judgment.

This definition is from the Department’s Wolf Conservation and Management Plan. In probable wolf depredations, WDFW’s practice in conducting investigations is such that there is a reasonably high likelihood that the depredation was caused by a wolf, but evidence of hemorrhaging was lacking (See **Section 5** for an explanation of all the factors that go into making a probable determination and how these are distinguished from non-wolf predation or non-predation causes of death). Only trained WDFW staff make the final determination in depredation investigations.

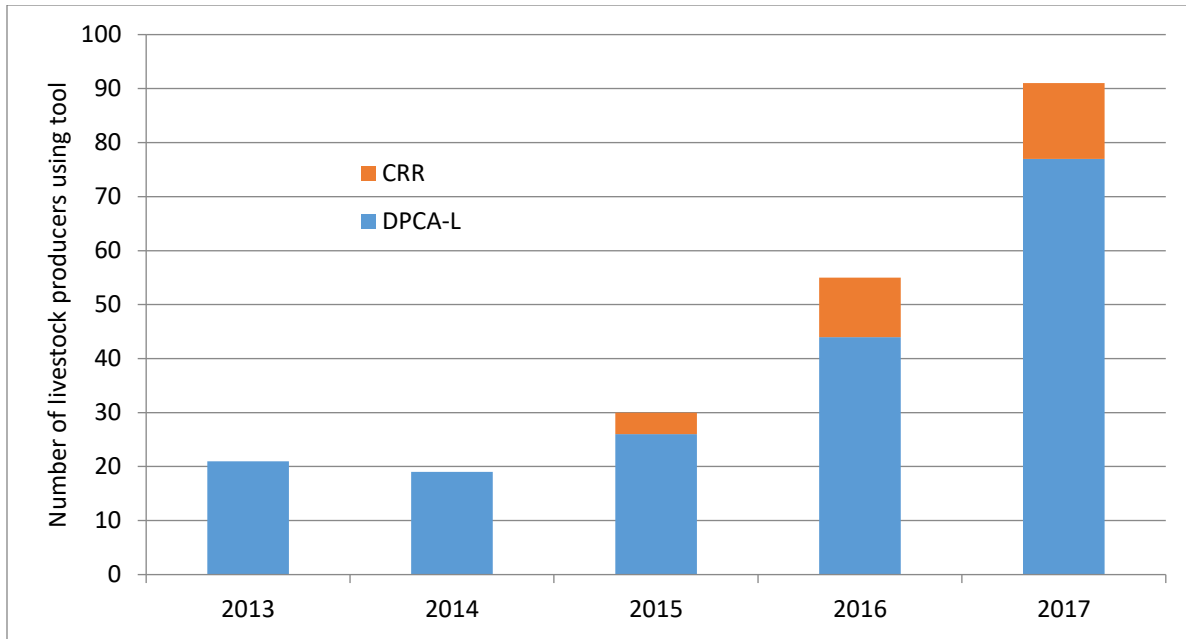
Responsive deterrence measure means a deterrent measure put into place after a confirmed or probable wolf depredation has occurred. The WDFW Conflict Specialist and the livestock producer will determine which techniques are best suited for the specific livestock operation and have the best chance to reduce the likelihood of future depredations.

Wildlife conflict specialists are WDFW staff members who are responsible for working with local livestock producers to implement deterrence measures designed to reduce the probability of wolf-livestock conflict. Wildlife conflict specialists are the primary contact and staff that respond to and conduct depredation investigations.

### **Section 3. Expectations for deterrence measures**

The Wolf Conservation and Management plan states that “any wolf-livestock management program should manage conflicts in a way that gives livestock owners experiencing losses the tools to minimize losses” without jeopardizing recovery efforts. (See WDFW’s wolf plan, page 85.) The wolf plan then instructs the Department to work with livestock owners to incorporate non-lethal deterrent strategies (e.g., range riders, electric fladry) into their business practices (specific strategies are discussed in **Section 4**).

The Department envisions a future where livestock producers and their communities work individually and collaboratively to reduce the potential for wolf-livestock conflict, develop innovative solutions, and advance efforts to coexist with wolves while preserving the economic viability and character of Washington’s agricultural communities. To facilitate that, experience shows the best approach for expanded use of voluntary proactive deterrence measures is fostering relationships between independent producers and local Wildlife Conflict Specialists, and building receptivity through respectful mutual learning and collaboration. Research also supports the proposition that individuals who feel autonomous and competent are more likely to support and participate in conservation activities (Decaro and Stokes 2008; Dedeurwaerdere et al., 2016). Recent trends in Washington indicate that recognizing and supporting livestock producer’s cultural independence leads to the increase the use of applicable proactive measures (Fig. 2)



**Figure 2.** Trend in use of WDFW’s damage prevention cooperative agreements for livestock (DPCA-Ls) and contract range riders (CRR) for northeast Washington, the Blue Mountains, and Okanogan from 2013 to 2017.

WDFW’s role is to:

- Implement the wolf plan to ensure recovery of wolves in Washington State and reduce wolf-livestock conflict.
- Collaborate with livestock producers on the implementation of deterrence measures;
- Provide information on wolf behavior, pack dynamics, population status, etc.;
- Foster mutual learning to build knowledge, trust, and respect;
- Support and promote expansion of use of deterrence measures that follow best management practices and provide high applicability for specific operations and landscapes;
- Facilitate and provide technical assistance to livestock producers and rural communities;
- Support increased receptivity to best management practices in proactive deterrence measures;
- Provide local communities with interim resources for deterrence measures; and
- Recognize that adjusting to wolves on the landscape and expanded use of proactive deterrence measures across all of Washington will be an ongoing process.

Within this context, livestock producers are expected to proactively implement at least two (2) deterrence measures with concurrence from the local WDFW Wildlife Conflict Specialist. The Department’s expectation is that livestock producers and the local WDFW Wildlife Conflict Specialist work in collaboration to identify and plan the proactive deployment of the best suited deterrence measures; local Wildlife Conflict Specialists are available throughout the year to work with livestock producers. The proactive deterrence measures must be in place a sufficient amount

of time prior to a wolf depredation. The local WDFW Wildlife Conflict Specialist will carefully consider the amount of time necessary for deterrence measures to have had an opportunity to be effective. In most situations, the measures will have been in place for at least one week. Several example deterrence measures with associated expectations for deployment are listed in **Section 4**.

Following a confirmed or probable wolf depredation, the local Wildlife Conflict Specialist will work with the livestock producer to assess the local on-the-ground conditions and risk to determine which responsive deterrence measures should be employed (i.e., which techniques are best suited for the specific livestock operation, have the best chance to reduce the likelihood of future depredations, and are the most feasible). The local Wildlife Conflict Specialists will guide or facilitate the implementation of the responsive deterrence measures by increasing the frequency of engagement with the affected producer(s), deploying additional deterrence measures, and coordinating with producers and other government agencies. The local Wildlife Conflict Specialist will evaluate the timing of de-escalation or lengthier deployment of responsive deterrence measures contingent upon wolf behavior, pack size, pack structure, landscape conditions and the proximity of livestock. Wildlife Conflict Specialists will attempt to manage the use of responsive deterrence measures consistently across packs and regions of the state.

Influencing pack behavior to reduce the potential for recurrent depredations is challenging, especially on allotment-type operations where livestock are dispersed on large landscapes that overlap with a wolf pack territory. In these situations, the Department recommends regular human presence (including range riders, sheep herders, livestock producer employees and family members) around livestock. Regular human presence aids in early detection of sick or injured livestock, monitoring of livestock behavior, and identifying signs of wolf-livestock conflict. As such, WDFW is working to help facilitate human presence as a proactive deterrence measure in priority areas with individual producers and community-based organizations to:

- Build receptivity and encourage regular human presence around livestock;
- Improve and facilitate opportunities for increased and improved technical capacity in human presence; and
- Secure and provide resources (financial and technical), as available, to jump-start individual and collective efforts of strategic, applicable, and best practices in human presence.

#### **Section 4. Example deterrence measures**

This section provides common deterrence measures used to reduce the potential for wolf depredations on livestock. It was developed from a review of the scientific literature on these or other deterrence measures. The literature review can be found on the Department's website at [http://wdfw.wa.gov/conservation/gray\\_wolf/livestock/wolf\\_livestock\\_conflict\\_avoidance\\_literature\\_review\\_11\\_2014\\_final\\_submitted\\_version.pdf](http://wdfw.wa.gov/conservation/gray_wolf/livestock/wolf_livestock_conflict_avoidance_literature_review_11_2014_final_submitted_version.pdf) (Western Wildlife Outreach 2014).

Additional resources describing non-lethal methods can be found at:

- [http://wdfw.wa.gov/conservation/gray\\_wolf/livestock/](http://wdfw.wa.gov/conservation/gray_wolf/livestock/)
- [http://www.dfw.state.or.us/Wolves/non-lethal\\_methods.asp](http://www.dfw.state.or.us/Wolves/non-lethal_methods.asp)
- <http://wp.peopleandcarnivores.com/wp-content/uploads/2017/03/WolfResourcesGuide.pdf>
- [http://www.defenders.org/publications/livestock\\_and\\_wolves.pdf](http://www.defenders.org/publications/livestock_and_wolves.pdf)

The tools best suited for a particular livestock operation will depend on many factors associated with the operation, such as the species of livestock, number of livestock, terrain, landscape conditions, and time of year.

The Department's expectation is that livestock producers and the local WDFW Wildlife Conflict Specialist will work in collaboration to identify and plan the proactive deployment of the best suited deterrence measures. Local Wildlife Conflict Specialists are available throughout the year to work with livestock producers so the measures can be implemented a sufficient amount of time prior to when a wolf depredation is more likely to occur. In most situations, the measures will have been in place for at least one week. Also, there may be strategies on the timing and duration of particular deterrence measures, or deterrence measures may be periodically changed or varied to increase their effectiveness.

The efficacy of some of these deterrence measures is not limited to influencing the behavior of wolves. Depending on how the deterrence measures are deployed, they may also influence the behavior of livestock and further reduce the potential for recurrent depredations.

### 1. Human Presence

- Engage regular human presence (e.g., range riders, ranch employees, family members, or sheep herders) to protect livestock by patrolling the vicinity occupied by livestock on a daily or near-daily basis.
- Human presence includes monitoring livestock, protecting calving/lambing areas, and using scare devices to deter wolves from approaching livestock.
- Individuals providing regular human presence communicate frequently with the livestock producer and WDFW about issues including livestock depredations, grazing rotations, and wolf activity. They must be able to accurately identify wolves and wolf sign, and have livestock avoid known den and rendezvous sites.
- Range riders and sheep herders who sign a sensitive-data sharing agreement may monitor the location of radio-collared wolves.

### 2. Monitoring Livestock

- Watch for changes in livestock behavior, condition, and reproductive status.
- If practical and feasible, remove sick or injured livestock from pastures within a wolf territory.
- Notify the livestock owner and/or WDFW of any dead livestock immediately.
- Manage livestock distribution to optimize human deterrence and monitoring capability while minimizing wolf-livestock conflict.

### 3. Protecting Calving/Lambing Areas

- If practical and feasible, establish calving or lambing areas away from areas occupied by wolves and/or in pastures near ranch houses to provide for easier and more frequent livestock checks and intervention, when necessary.
- Use protective fencing, fladry, or sheds around calving or lambing areas.
- Keep the area clean of livestock carcasses.

#### 4. Avoiding Den and Rendezvous Sites

- Identify areas of concentrated wolf sign that might be an indication of an active den or rendezvous site.
- Work with WDFW Conflict Specialists prior to grazing season to evaluate the potential for overlap and develop a plan to avoid these areas if the current or potential grazing area overlaps with active den or rendezvous sites.
- Work with WDFW and the appropriate land management organization to seek time-based and/or geographical separation of livestock and wolves, such as alternative grazing areas, change in route, or delayed turn-out dates.
- Increase vigilance and time spent guarding livestock in pastures with active den and rendezvous sites in the vicinity.
- Incorporate strategies to reduce the likelihood of a depredation based on the specific circumstance of the situation (e.g., use of range riders to move grazing livestock out of the high risk areas, place watering sites or mineral blocks to localize livestock to a desired area away from active and known denning or rendezvous sites).

#### 5. Using Scare Devices

- Coordinate with WDFW to develop a hazing strategy to frighten wolves away from livestock. This might include installing light and noise devices, such as propane cannons, fox lights, radio-activated guard (RAG) systems that alert the range rider/herder to the presence of wolves by emitting flashing lights and loud sounds when a radio-collared wolf approaches the area.

#### 6. Guardian or Herding Dogs

- Guardian dogs are used to alert on-site personnel (herders or range riders) of predator presence and to protect livestock.
- Specific dog breeds and training are required to have effective livestock guardian and herding dogs.
- Guardian dogs and herding dogs are used in conjunction with daily human presence.
- For sheep, guardian dogs and herding dogs may live with the herd to provide protection 24 hours a day, seven days a week.
- Guarding and herding dog owners are trained in effective use of dogs specific to wolf-livestock situations.

#### 7. Strategic Carcass Sanitation

The objective of carcass sanitation is to prevent wolves from being attracted to livestock carcasses in areas frequented by livestock (corral, salt areas, calving pens, etc.) to reduce the potential for wolf-livestock interactions. As such, sanitation is targeted at areas around



active and adjacent pastures in close proximity to livestock. Producers (or their family and/or employees) are expected to secure their own livestock carcasses. Example ways to secure carcasses include:

- Create a temporary carcass disposal site on a grazing pasture that is secured so as to not be an attractant.
- Use fladry or electrified turbofladry around a carcass until it decomposes or until it can be removed from the area.
- Bury or burn the carcass consistent with state law, county or city ordinances, and the land management agency's guidelines.
- Work with WDFW to create a permanent carcass disposal site on private property.
- Use predator-resistant fencing as a permanent barrier around a boneyard or carcass pit on private property.
- Develop a composting site consistent with state law, county, and city ordinances.

8. Permanent and Portable Fencing (fladry, electrified turbofladry, calf panels)

- Use predator-resistant or electric fencing as a permanent or temporary barrier to confine livestock and deter predators.
- Create night pens under open grazing conditions.
- Confine a sick or injured animal until it can be transported off range.
- Confine calves born on an allotment under a fall calving operation.
- Use fladry or electrified turbofladry around livestock as a temporary deterrent to wolves.
- Protect a carcass until a depredation investigation can be conducted.

9. Delay Turnout to Forested/Upland Grazing Pastures

- Turnout when livestock calves reach at least 200 lbs (e.g., early calving so calves are older and heavier at turn-out).
- Turnout after wild ungulates are born (approximately mid-June).

10. Coordination with Landowner

Coordination between livestock producer and landowner on potential steps to reduce the likelihood of wolf-livestock conflict, such as:

- Timing of turn-out.
- Grazing areas and restricted areas.
- Pasture/allotment rotation.
- Sanitation.
- Water and mineral block sites.
- And other annual allotment plan instructions related to wolf-livestock interactions.

## **Section 5. Depredation investigations**

Suspected wolf depredations on livestock are reported to the WDFW by the livestock owner (or their family members or employees), local law enforcement, or by other local entities.

Department staff respond to these reports usually within 24 hours after a report is made. The reported incident site is treated as a crime scene in order to preserve the physical evidence. The investigation is conducted by a two-person WDFW team (in most situations) with training and experience in wolf depredation investigations. WDFW may coordinate with local law enforcement (as agreed to with local law enforcement agencies) to be present at the investigation to facilitate mutual learning. In areas where wolves are listed under the Federal ESA, WDFW will coordinate with the USFWS on the findings from depredation investigations and seek agreement on the determination of the investigation. WDFW may seek input from other non-WDFW experts. However, the final determination of the investigation will be made by the WDFW staff members who conducted the investigation.

Each investigation is unique based on habitat, time of year, and location of the incident. While performing the depredation investigation, WDFW staff use many different factors to determine if a carnivore(s) was involved in the livestock injury or mortality. These factors could include (but are not limited to) documenting the characteristics of or the presence and/or absence of:

1. The disposition and age class of the livestock;
2. The site where the incident occurred;
3. Animal sign (tracks, scat, hair) at the scene, particularly from wild carnivores;
4. Other species of wildlife in the area, particularly other carnivores (collared and uncollared);
5. Sign of a chase and/or struggle (e.g., tracks in substrate, drag marks);
6. Presence of tissue trauma and hemorrhaging with bite wounds;
7. Blood indicating livestock was alive during attack (can include dried or fresh blood);
8. A scattered or buried carcass in the event of a livestock mortality;
9. Evidence of scavenging (indicating the wildlife associated with said scavenging);
10. Wildlife bedding locations near the scene;
11. Witness accounts;
12. Producer accounts;
13. Any evidence of attack or scavenging present on the hide;
14. Bite wounds associated with attack on a live animal versus scavenging;
15. Location of bite wounds;
16. Presence of broken bones, and;

Based on the factors and physical evidence documented during the investigation, the Department staff who conducted the investigation makes the final determination. In some situations, staff may seek input from individuals or a subset of WDFW staff that did not participate in the investigation. WDFW staff who participated in the investigation may also reach out to non-WDFW experts for further review of the investigation, however the final determination and rationale will be made by WDFW who participated in the investigation.

Once a depredation investigation has been completed (which may take up to 48 hours), the WDFW staff that conducted the investigation make a determination based on classifications from the Wolf Conservation and Management Plan. The classification of the final determination includes 1) confirmed wolf depredation, 2) probable wolf depredation, 3) confirmed non-wild wolf depredation, 4) unconfirmed depredation, 5) non-depredation, or 6) unconfirmed cause of injury or death. Please see **Table 1** and the Department's document, "Livestock injury and mortality investigation: A reference guide for WDFW field personnel" for more information on the investigation process, principles, and factors and physical evidence (online at <http://wdfw.wa.gov/publications/01581/wdfw01581.pdf>).

In an investigation, the level of certainty in the determination of the cause of an injury or mortality of livestock is critically important. As such, the Department will include a description of the "factors" that were and/or were not present and how they contributed to the final determination in the written narrative in the depredation investigation report (See **Section 8** for information communicated to the public).

When a determination of "probable wolf depredation" is made, the factors and physical evidence that distinguish it from non-wolf predation and non-predator determinations will be documented. Examples of those distinguishing factors include sign of struggle, blood at the scene, broken branches, trampled grass, or bite marks characteristic of wolves on remaining portions of the carcass (e.g. bite marks on the tail bone). In addition, other factors must be present that allow for a reasonable ability to rule out other predators, such as the pattern of the attack that is more characteristic of wolves than other predators. When factors are absent that allow for the ability to determine if another predator was responsible, or if it cannot be determined whether or not the animal died from non-predation causes, then the incident would be an "unconfirmed depredation" or "unconfirmed cause of injury or death". Alternatively, if evidence suggests another predator, the classification would be "confirmed non-wild wolf depredation", or if it was clear that the animal died from something other than predation, the death would be classified "non-predation." In probable wolf depredations, WDFW's practice in conducting investigations is such that there is a reasonably high likelihood that the depredation was caused by a wolf, but evidence of hemorrhaging is lacking. Also, for one probable wolf depredation to be included in a pattern of confirmed wolf depredations (see **Section 6**), it must be on the same time scale, with similar periods of times between depredations, as the confirmed wolf depredations, and in the same area of overlap of wolves and livestock as the confirmed wolf depredations.

**Table 1.** WDFW classifications for investigation on reported injured or dead livestock.

Classification	Definition from the Wolf Conservation and Management Plan	Principles for determination
Confirmed Wolf Depredation	<p>There is reasonable physical evidence that a wolf caused the death or injury of livestock. Primary confirmation would include bite marks and associated subcutaneous hemorrhaging and tissue damage, indicating that the wolf attacked a live animal, as opposed to simply feeding on an already dead animal. Spacing between canine tooth punctures, location of bite marks on the carcass, feeding patterns on the carcass, fresh tracks, scat, and hairs rubbed off on fences or brush, and/or eyewitness accounts of the attack may help identify the specific species or individual responsible for the depredation. Wolf predation might also be confirmed in the absence of bite marks and associated hemorrhaging (i.e., if much of the carcass has already been consumed by a predator or scavengers) if there is other physical evidence to provide confirmation. This might include blood spilled or sprayed at a nearby attack site or other evidence of an attack or struggle. There may also be nearby remains of other animals for which there is still sufficient evidence to confirm predation, allowing reasonable inference of confirmed wolf predation on an animal that has been largely consumed.</p>	<ul style="list-style-type: none"> <li>• Multiple factors documented at scene consistent with an attack by a wolf.</li> <li>• Often includes attack signature consistent with a wolf (see <a href="http://wdfw.wa.gov/publications/01581/wdfw01581.pdf">http://wdfw.wa.gov/publications/01581/wdfw01581.pdf</a>)</li> <li>• Includes subcutaneous hemorrhaging. In practice, 96% of the confirmed wolf depredations in the last 3 years have included hemorrhaging as the factor that led to that determination. The Department will continue to use the factor of hemorrhaging (along with other supporting factors) for determinations of confirmed wolf depredation.</li> </ul>
Probable Wolf Depredation	<p>There is sufficient evidence to suggest that the cause of death or injury to livestock was a wolf, but not enough evidence to clearly confirm that the depredation could only be caused by a wolf. A number of factors can help in reaching a conclusion, including (1) recently confirmed predation by wolves in the same or nearby area, and (2) evidence (e.g., telemetry monitoring data, sightings, howling, fresh tracks, etc.) to suggest that wolves may have been in the area when the depredation occurred. These factors, and possibly others, will be considered in the investigator’s best professional judgment.</p>	<ul style="list-style-type: none"> <li>• Multiple factors documented at scene consistent with an attack by a wolf.</li> <li>• Physical evidence and factors at scene consistent with “confirmed wolf depredation”, except scene is lacking the presence of subcutaneous hemorrhaging.</li> <li>• Factors must be present that allow for a reasonable ability to rule out other predators and non-predation causes of death.</li> </ul>
Confirmed Non-Wild	<p>There is clear evidence that the depredation was caused by another species (coyote, black bear, cougar, bobcat, domestic dog), a wolf hybrid, or a pet wolf.</p>	<ul style="list-style-type: none"> <li>• Multiple factors documented at scene consistent with an attack by another wildlife species.</li> </ul>

Wolf Depredation		<ul style="list-style-type: none"> <li>• Often includes attack signature consistent with specific carnivore (see <a href="http://wdfw.wa.gov/publications/01581/wdfw01581.pdf">http://wdfw.wa.gov/publications/01581/wdfw01581.pdf</a>)</li> <li>• Includes subcutaneous hemorrhaging or other factors that provide physical evidence the livestock was alive when attacked by another species .</li> </ul>
Unconfirmed Depredation	Any depredation where the predator responsible cannot be determined.	<ul style="list-style-type: none"> <li>• Single or multiple factors documented at scene consistent with an attack by a predator, but the predator responsible cannot be determined.</li> <li>• May include subcutaneous hemorrhaging (or other factors that provide the same scrutiny of physical evidence the livestock was alive when attacked by a predator).</li> <li>• May include factors from multiple predators (including wolf), but predator responsible for attack cannot be discerned with physical evidence and factors.</li> </ul>
Non-Depredation	There is clear evidence that the animal died from or was injured by something other than a predator (e.g. disease, inclement weather, or poisonous plants). This determination may be made even in instances where the carcass was subsequently scavenged by wolves.	<ul style="list-style-type: none"> <li>• Factors and physical evidence indicating livestock was injured or died from something other than a predator.</li> </ul>
Unconfirmed cause of injury or death	There is no clear evidence as to what caused the depredation of the animal.	<ul style="list-style-type: none"> <li>• There is no clear evidence at the scene as to what caused the injury or death of the livestock.</li> </ul>

## **Section 6. Lethal removal criteria**

The Department's Wolf Conservation and Management Plan indicates that "lethal removal may be used to stop repeated depredations if it is documented that livestock have clearly been killed by wolves, non-lethal methods have been tried but failed to resolve the conflict, depredations are likely to continue, and there is no evidence of intentional feeding or unnatural attraction of wolves by the livestock owner" (See WDFW wolf plan, page 88).

The Department considers the use of lethal removal only in areas of the state where the Department has full management authority for wolves. As noted in **Section 1**, USFWS is currently the lead agency for managing wolves in the western two-thirds of the state. The purpose of lethal removal is to change pack behavior to reduce the potential for recurrent depredations while continuing to promote wolf recovery. The strategy is to attempt to change pack behavior by removing a minimum but sufficient number of wolves before that behavior is reinforced by additional depredations on livestock.

There are a number of variables and complexities related to implementing lethal removal, including the history and pattern of depredations, recovery objectives within a region, estimated pack size (total number, number of adults and pups), the number and timing of depredations, classification of depredations, current year and previous year circumstances, use of deterrence measures (including appropriateness and timing), time of year, and type of livestock.

The Department may consider lethal removal of wolves to attempt to change pack behavior to reduce the potential for recurrent depredations while continuing to promote wolf recovery when all the following criteria are met:

1. Department has documented at least 3 depredation events within a 30-day rolling window of time, or at least 4 depredation events within a 10-month rolling window of time. Stipulations include:
  - At least 1 of the depredation events is a confirmed wolf kill of livestock.
  - One (1) of the depredation events may be a probable wolf depredation if it is a part of a pattern of confirmed wolf depredations (i.e., the probable wolf depredation is on the same time scale, with similar periods of times between depredations, as the confirmed wolf depredations, and in the same area of overlap of wolves and livestock as the confirmed wolf depredations).
2. At least two (2) proactive deterrence measures and responsive deterrence measures have been implemented and failed to meet the goal of influencing/changing pack behavior to reduce the potential for recurrent wolf depredations on livestock. Stipulations include:
  - If proactive deterrence measures are not in place a sufficient amount of time prior to the wolf depredations the Department will only consider lethal removal at a higher

number of wolf depredation events and after deterrence measures have been tried and failed at resolving the conflict.

3. WDFW expects depredations to continue (e.g., deterrence measures have not changed pack behavior, and overlap between wolves and livestock is expected to continue in near future),
4. The Department has documented the use of appropriate deterrence measures and notified the public of wolf activities in a timely manner as outlined in **Section 8**, and
5. The lethal removal of wolves is not expected to harm the wolf population's ability to reach recovery objectives statewide or within individual wolf recovery regions.

For depredations on large livestock (i.e., cattle, horses, mules, and donkeys), each depredated livestock equals one "event," unless there is evidence in the investigation that supports multiple livestock in one event (e.g., physical proximity of livestock, reconstructive evidence). For depredations on small livestock (i.e., sheep, pigs, llamas, goats, and alpacas) there may be one or more livestock in one depredation event.

Guarding and herding dogs are also included in the definition of small livestock if, based on the investigation by Department staff, the dog was actively guarding or herding its assigned livestock herd when it was killed by one or more wolves. The same is true for guarding and herding dogs injured by wolves, provided there was one or more confirmed wolf depredations to the other livestock species in the assigned herd, indicating that the dog's injury as part of a pattern of depredations in the assigned herd.

Management approaches for addressing wolf-livestock conflict are based, in part, on the status of wolves within wolf recovery regions and statewide to ensure recovery or long-term sustainability of wolf populations. See appendix G and H in the state's Wolf Conservation and Management plan and Maletzke et al. 2015 for an analysis of anticipated impacts of periodic wolf removal on the status of wolves within wolf recovery regions and statewide.

The decision to implement or not implement lethal removal of wolves is made by the Director.

### **Section 7. Implementation of lethal removal of wolves**

The objective of lethal removal is to change pack behavior to reduce the potential for recurrent depredations while continuing to promote wolf recovery. WDFW's approach is incremental removal, which has periods of active removals or attempts to remove wolves, followed by periods of evaluation.

Periods of an active removal or attempts to actively remove may vary in length of time based on factors such as the number of wolves to remove, the ruggedness of the terrain, the removal method(s) used, and resource availability (e.g., contracted helicopter vendor availability). In most situations, a period of attempting active removal will be two-weeks or less. If no wolves are



removed during a period of attempted incremental removal, a period of evaluation will still occur to determine any shifts in the behavior of the pack; the act of attempting to lethally remove wolves may result in meeting the goal of changing the behavior of the pack (Harper et al. 2008).

This protocol recognizes that periods of evaluation are needed to determine if the lethal removal effort met the goal of changing pack behavior. The duration of a period of evaluation will vary in length and is largely based on the depredation behavior of wolves. If there is a documented wolf depredation(s) after a period of active removal, the Department may initiate another lethal removal action, depending on the estimated date of the depredation incident related to the previous period of active removal. As such, the period of evaluation will typically be a minimum of a week unless the pattern of depredations resumes.

The evaluation period may also serve to allow the pack to re-group and possibly allow the next incremental effort to be more effective. Because wolves quickly learn to avoid aircraft and traps (whether used for capture or lethal removal); the extended use of some methods may reduce their efficacy. During evaluation periods, deterrence measures will be re-instituted.

If the Department initiates the lethal removal of wolves, the first incremental removal action will be to remove or attempt to remove 1-2 wolves, followed by an evaluation of the situation to see if the goal of changing pack behavior was met. If depredations continue, the Department may remove additional wolves in the subsequent period(s) of active removal. Under an incremental removal approach, WDFW does not explicitly set as a desired outcome of the removal of the entire pack; however, the removal of the entire pack may occur as a result of repeated incremental removals. In situations such as a relatively small pack, the loss of the pack could potentially occur in two removal attempts (i.e., removal periods). In packs where the lethal removal of wolves is a concern for the recovery of wolves, the number of wolves to remove may be reduced in number or removals may not occur.

The Department will use methods that lethally remove wolves in a humane manner consistent with state and federal laws (e.g., trap types and sizes, trap check requirements, potential impacts to non-target species, etc.). The objective in terms of methodology is to use the best method available that balances human safety, humaneness to wolves, swift completion of the removal, weather, efficacy, and cost. Likely options include shooting from a helicopter, trapping, and shooting from the ground. All methods for removal are consistent with those used by other states and federal jurisdictions. Removal methods are evaluated collaboratively by our wildlife biologists and veterinarian and are consistent with the American Veterinarian Medical Association (AVMA) standards.

## **Section 8. Communication with public**

The Department will notify the public when a confirmed or probable wolf depredation occurs. The notice will include the date the depredation occurred, the name of the wolf pack, what proactive and responsive deterrence measures are deployed (including when they were deployed and information on how the Department assessed the suitability of the measures), and the rationale for the Department's classification of the depredation (i.e., confirmed or probable). This information will be provided in narrative form for each reported wolf depredation and posted on the Department's website. In addition to notifying the public about wolf depredations, the Department will also notify the public when a wolf pack has met the criteria for consideration of lethal removal and will include the Director's decision to remove or not remove wolves along with the rationale for that decision. This notice will occur prior to any lethal removal action.

The Department will also provide a monthly update about ongoing activities related to wolf conservation and management. These updates will also be posted on the Department's website and will include items such as:

- Known wolf occurrence areas (i.e., packs and non-dispersing lone wolves wearing an active radio collar) including updates to wolf pack maps on the WDFW website.
- Wolf collaring activities.
- Known wolf mortalities.
- WDFW field staff wolf-related work activities.
- WDFW outreach and information, including visual media of wolf related activities and wolves in Washington.
- Relevant information on wolf ecology, terms used, and coexistence measures.
- WDFW activities related to implementation of deterrence measures.
- A narrative of all reported wolf livestock depredation investigations
- For a wolf pack with confirmed or probable wolf depredations, a narrative about the chronology of events including details about which proactive and responsive deterrence measures were deployed.
- WDFW annual wolf report and other wolf related reports or WDFW wolf publications.

To ensure the safety of livestock producers, members of the public, and WDFW personnel, the Department will identify the pack in which the removal will occur, but will not disclose the specific location of the removal, the number of wolves to remove, days of operation, or the method of removal until the end of the grazing season. Once a removal operation has begun, the Department will update the public weekly on the number of wolves removed. Department will provide a final report to the public on any lethal removal action after the operation has concluded.

All wolf related notices and updates will be available on the Department's website at [http://wdfw.wa.gov/conservation/gray\\_wolf/](http://wdfw.wa.gov/conservation/gray_wolf/). Any member of the public can request to be

notified by email about new updates by signing up for an email notification at [http://wdfw.wa.gov/conservation/gray\\_wolf/email\\_notices.html](http://wdfw.wa.gov/conservation/gray_wolf/email_notices.html).

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# **Appendix B**

June 13, 2017 Depredation Investigation

## WDFW Injury/Mortality Investigation Report Form

**Database record #:** 2017-06-13ShermanPack calf confirmed

**Date report received:** 06-12-2017    **Date investigated:** 06-13-2017

**WDFW personnel:** W942, W188

**Summarize initial report:** On 06-12-2017, around 7:00pm, a WDFW Contract Range Rider contacted WDFW staff to notify them that a calf carcass and skeletal remains of another calf were discovered. The WDFW Contracted Range Rider stayed with the carcass and remains until WDFW staff were able to attend. On 06-13-2017, WDFW staff members responded to the report of two possible wolf/calf depredations located in Ferry County. The Ferry County Sheriff's Office was notified prior to the depredation investigation. The carcass of calf number one and the remains of calf number two were discovered by a WDFW Contract Range Rider using GPS telemetry map locations of the collared Sherman Pack wolf. This report will show the results of the depredation investigation conducted on Hereford calf depredation number one. It was determined that the Hereford calf had been deceased less than 24 hours and was fully intact. The carcass had not been scavenged on by any other wildlife.

**Location of incident:** Ferry County

**Datum:** WGS84    **GPS coordinates are:**     Actual     Approximate

**Land status:**  USFS     BLM     State     Private     Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?** The immediate area consists of open/range land with scattered to lightly forested timber land. Some brush in nearby draws. The nearest occupied residence is three miles away.

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**General cover classification:**  Open/Rangeland     Brush     Lightly forested     Heavily forested

**Are attractants present near location of incident?** There were no attractants present.

**Affected animal(s) and status:** Three-and-a-half-month old Hereford calf. Deceased.

**Site description/physical evidence present:**

The site the Hereford calf was discovered in was an open grassy area with scattered timber. The grass is tight to the ground and the dirt along the main road was compact. This made it difficult to locate wildlife tracks. The area was completely searched for any sign of wildlife scat or tracks. One older coyote track was detected. Evidence discovered at the scene consisted of visible injuries to the deceased Hereford calf. Other evidence consisted of several GPS telemetry data map locations recovered from a WDFW GPS collared wolf from the Sherman Pack. All indications show that the Hereford calf was attacked at a separate location and died where it was discovered. A field necropsy was conducted on the Hereford calf. The Hereford calf suffered bite wounds to both hindquarter areas. WDFW GPS data locations from the collared Sherman Pack

wolf show the wolf was at the scene on 06-11-2017, at 5:01am in an area 2.2 miles south of calf carcass number one. Also on 06-11-2017, at 7:00am, a second data location showed the collared Sherman Pack wolf one-mile north of the calf carcass number one.

**Description and location of injuries:**

The Hereford calf showed oxygenated bite lacerations and bite puncture wounds to the groin, the inside of both hindquarters, the outside of both hamstrings and both hocks. Some of the bite wounds showed the canines and incisors. There was also one bite wound and bruising to the upper portion of the tail. All of the obvious wounds were shaved with a battery powered set of clippers and photographed. Some of the bite wounds on the inside areas of the right and left hindquarters showed early stages of infection. Other areas shaved, examined and photographed were high target areas consistent with a wolf attack. They were both flanks, both arm pit areas and both sides of the neck. No wounds were detected. The Hereford calf carcass was then carefully skinned in an effort to examine the underlying tissue adjacent to the bite lacerations and puncture wounds. The left hindquarter showed major swelling under the hide. Present on the inside of the left hindquarter was severe underlying hemorrhaging and tissue damage adjacent to the infected puncture wounds. There was also underlying hemorrhaging and tissue damage to the left hock and showed underlying hemorrhaging and tissue damage to the lower left hamstring. The lower inside right hindquarter showed hemorrhaging and damage to the underlying tissue. The outside of the right hamstring also showed hemorrhaging and damage to the tissue. All of the injuries detected during the depredation investigation are consistent with a signature style wolf attack.

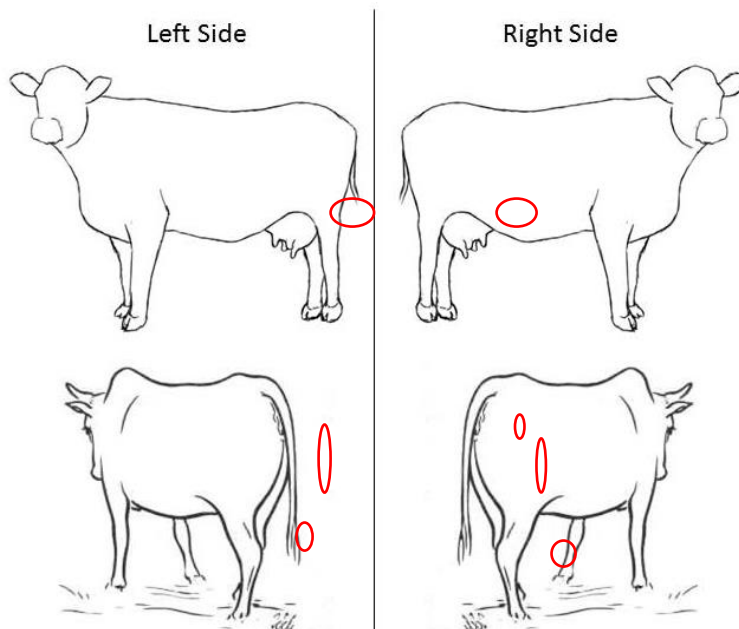


Figure 1. Locations of injuries to a calf discovered dead in Ferry County June 12, 2017.

**Source of injuries.**  Black bear    Cougar    Wolf    Dom canine    Structural     
Unknown  
(check one)    Grizzly bear    Bobcat    Coyote    Unk predator    Other \_\_\_\_\_

**Injury/mortality classification:** Confirmed Wolf Depredation

**Classification justification:** The wolf/calf event was confirmed following the guidelines set forth in the 2017 classification for Confirmed Wolf Depredation. The oxygenated bite lacerations and bite puncture wounds indicates the calf was still alive during the attack. The underlying hemorrhaging and adjacent tissue damage confirm the same. WDFW GPS data from the collared Sherman Pack wolf indicates the wolf was there during the critical time frame when the Hereford calf was attacked. The bite locations and injuries are consistent with historic wolf attack depredations in NE Washington. The grazing allotment the Hereford calf was discovered in has historic confirmed and probable wolf/cattle depredation events.



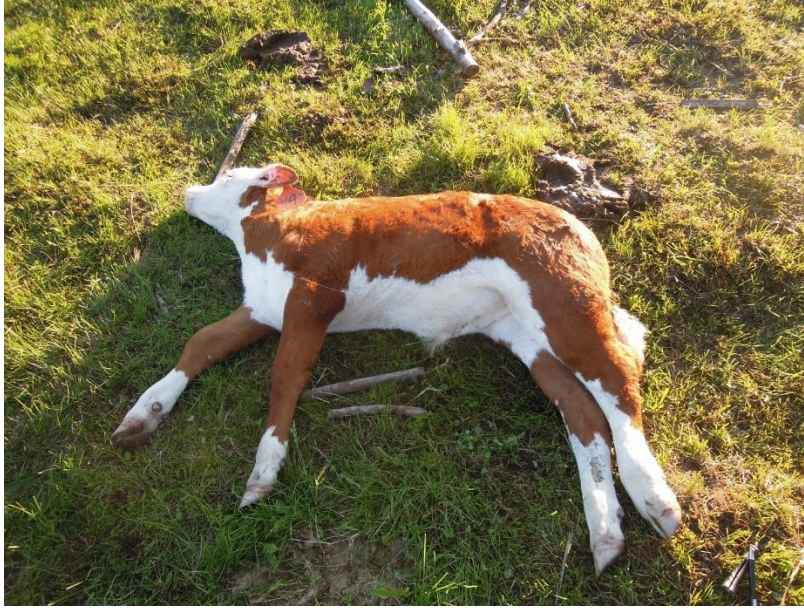


Figure 2. Shows the condition of the Hereford calf when discovered by the WDFW Contract Range Rider, on the evening of 06-12-2017.



Figure 3. Shows the Hereford calf from a rear angle.





Figure 4. Shows the first wolf bite lacerations detected during the field examination.



Figure 5. Shows wolf bite wounds to the lower inside left hindquarter. The photograph also shows early stages of infection and severe swelling.



Figure 6. Shows wolf bite puncture wounds to the inner left hamstring and left groin areas of the Hereford calf.



Figure 7. Shows wolf bite lacerations and bite puncture wounds to the inside right groin and the lower right hindquarter of the Hereford calf.





Figure 8. Shows a close up of the wolf bite lacerations to the right groin area of the Hereford calf.



Figure 9. Shows a close up of the shaved lower left hindquarter and the wolf bite lacerations and bite punctures to the Hereford calf.



Figure 10. Shows a different angle from Photograph No 8.





Figure 11. Shows wolf bite lacerations to the lower right hindquarter and right groin areas of the Hereford calf. The arrows show the early stages of infection.



Figure 12. Shows a close up of Figure 11. The infected wolf bite lacerations and bite puncture wounds to the right groin and lower right hindquarter areas.



Figure 13. Shows wolf bite lacerations and wolf bite punctures to the shaved left hamstring and outer left leg of the Hereford calf.



Figure 14. Shows a shaved close up of wolf bite laceration along with canine and incisor bite wounds.



Figure 15. Show a single wolf bite puncture and bruising near the head of the Hereford calf's tail.





Figure 16. Shows wolf bite lacerations and wolf bite punctures wounds to the lower right hindquarter of the Hereford calf.



Figure 17. Shows wolf bite lacerations and wolf bite punctures to the shaved left hamstring area of the Hereford calf.



Figure 18. Shows one of many wolf bite puncture wounds to the lower left hindquarter of the Hereford calf. Also note to severe hemorrhaging to the underlying tissue adjacent to the puncture wounds.



Figure 19. Shows a close up of the wolf bite puncture wound to the lower left hindquarter. The canine teeth punctured the hide and penetrated the underlying tissue causing hemorrhaging and tissue damage.





Figure 20. Shows wolf bite puncture wounds through the calf's hide causing bruising to the inner hide along with underlying tissue damage and hemorrhaging. This is a continuation from Figure 5.



Figure 21. Shows wolf bite puncture wounds and wolf bite lacerations to the lower outside left hindquarter of the Hereford calf.



Figure 22. Shows the skinned inside view of Figure 21. The photograph shows a large wolf bite puncture wound along with underlying tissue damage and hemorrhaging.



Figure 23. Shows hemorrhaging and the underlying tissue damage to the inside left leg and hock areas of the Hereford calf.





Figure 24. Shows the skinned view of Figure 12. The photograph shows the lower right hamstring area of the Hereford calf with hemorrhaging and underlying tissue damage.



Figure 25. Shows underlying tissue damage and hemorrhaging to both of the skinned hindquarters and hamstrings of the Hereford calf.

# **Appendix C**

July 12, 2017 Depredation Investigation

## WDFW Injury/Mortality Investigation Report Form

**Database record #:** 2017-07-12ShermanPack calf confirmed

**Date report received:** 07-12-2017, 12:10    **Date investigated:** 07-12-2017, 16:30

**WDFW personnel:** W988, W188, W862

**Summarize initial report:** On July 12, 2017 a WDFW contracted range rider (CRR) notified WDFW of a calf mortality in Ferry County. The CRR reported that there were tracks and scat in the area where the carcass was found. The calf carcass consisted of the head, most of the hide, three of the four legs, and the spinal column with attached rib cage. The CRR contacted the local Sheriff. WDFW contacted the USFS representative. A Deputy, the producer, the CRR, and WDFW responded to the location.

**Location of incident:** Ferry County

**Datum:** WGS84    **GPS coordinates are:**     Actual     Approximate

**Land status:**  USFS     BLM     State     Private     Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?** The immediate area consisted of open range land with scattered to lightly forested timber land. Some brush in nearby draws. The nearest occupied residence was at least three miles away.

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**General cover classification:**     Open/Rangeland     Brush     Lightly forested     Heavily forested

**Are attractants present near location of incident?** There were no known attractants present.

**Affected animal(s) and status:** Approximately five month old Hereford calf. Deceased.

**Site description/physical evidence present:**

The site where the carcass was discovered consisted of numerous wolf tracks in pocket gopher earth mounds (Figure 2-3), three different piles of scat from canids and a bear (Figure 4-6), two locations of signs of a struggle (Figure 7-8), one bird down feather (possibly from a gray jay), some gray mammal fur (not ungulate, possibly canid) and the carcass remains (some fragmented bones scattered near the main carcass; Figure 1, 9-18).

**Description and location of injuries:**

The calf carcass consisted of the head and hide (detached from the main carcass), most of the hide, three legs (one front leg detached, one rear leg detached, and one rear leg attached to the hide), and the spinal column with attached ribs (also detached from the main carcass). A few

bone fragments were discovered within 100 yards of the main carcass (two rib bones, remains of front leg, and a hip joint).

The head of the calf consisted of the hide being pulled over the skull with noticeable rostral damage and the right eye had been scavenged by birds (Figure 11). The skull had been removed at the second cervical vertebrae (Figure 12). Approximately 60% of the hide and a rear right leg were found still attached to the hide (Figure 13). Evidence of puncture wounds and canine tooth raking was discovered on the rear right leg between the hip joint down to the tarsal joint between the pin and the hock (Figure 14). Hemorrhaging was also noted on the hide associated with the wounds on the rear right leg (Figure 13). Evidence of bite marks on the tail down to the caudal vertebrae was also discovered (Figure 15).

Other carcass remains (three legs, the spinal column with attached ribs, and hip joint) were examined, but only evidence of scavenging was observed (Figure 16-18). A detached front leg bone had a broken humerus bone from scavenging (Figure 16).

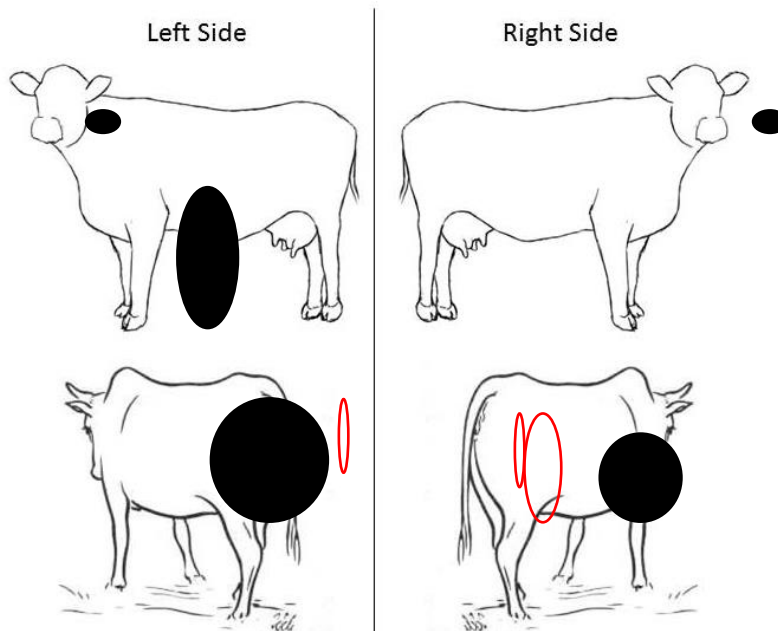


Figure 1. Locations of injuries to a calf discovered dead in Ferry County July 12, 2017. Red indicates were injuries when the calf was alive were discovered and black indicates missing portions of the carcass.

**Source of injuries:**  Black bear    Cougar    Wolf    Dom canine    Structural    Unknown  
(check one)    Grizzly bear    Bobcat    Coyote    Unk predator    Other \_\_\_\_\_

**Injury/mortality classification:** Confirmed Wolf Depredation

**Classification justification:** After a thorough investigation of the scene and a field necropsy of the carcass remains, this incident is classified as a confirmed wolf depredation. The combination

of evidence at the scene (tracks, scat, possible gray canid hair, and signs of a struggle), injuries on the carcass that occurred while the calf was still alive (hemorrhaging on right rear leg associated with bite wounds on leg and tail, and broken humerus bone), wolf collar location data, and another depredation investigation completed within 200 yards of this carcass on June 13, 2017 clearly indicate a wolf depredation. Wolf GPS collar data also showed that a Sherman Pack wolf was at the scene during the estimated time that the calf was attacked (June 10-12).

Bear (Figure 6) and bird scavenging was also noted at the location, but both were determined not to be involved while the calf was alive.



Figure 2. Wolf track discovered in Ferry County at a calf carcass on July 12, 2017.





Figure 3. Wolf track discovered in Ferry County at a calf carcass on July 12, 2017.



Figure 4. Canid scat discovered in Ferry County near a calf carcass on July 12, 2017.





Figure 5. Canid scat discovered in Ferry County near a calf carcass on July 12, 2017.



Figure 6. Bear scat discovered in Ferry County near a calf carcass on July 12, 2017.



Figure 7. Signs of a struggle were noted near a calf carcass discovered in Ferry County on July 12, 2017.





Figure 8. A second location where signs of a struggle were noted near a calf carcass discovered in Ferry County on July 12, 2017.





Figure 9. Main carcass remains prior to a field necropsy of a calf from Ferry County discovered on July 12, 2017.



Figure 10. Eartag from a calf carcass discovered in Ferry County on July 12, 2017.





Figure 11. The head of a calf carcass discovered in Ferry County on July 12, 2017.



Figure 12. View of the cervical vertebrae of a calf carcass skull discovered in Ferry County on July 12, 2017.





Figure 13. Inside of hide from a calf carcass discovered in Ferry County on July 12, 2017.





Figure 14. Rear right leg of a calf carcass after being shaved during a field necropsy in Ferry County on July 12, 2017.



Figure 15. Tail of a calf carcass after being shaved during a field necropsy in Ferry County on July 12, 2017.





Figure 16. Detached leg of a calf carcass found in Ferry County on July 12, 2017.



Figure 17. Detached spinal column with attached ribs from a calf carcass discovered in Ferry County on July 12, 2017.





Figure 18. Detached hip joint from a calf carcass discovered in Ferry County on July 12, 2017.

# **Appendix D**

July 21, 2017 Depredation Investigation

## WDFW Injury/Mortality Investigation Report Form

Database record #: XX IRF reference #: XX

Date report received: 07-21-2017 Date investigated: 07/21/2017

WDFW personnel: W942, W101

**Summarize initial report:** On July 21, 2017, WDFW Staff were notified of a severely injured calf in Ferry County. The calf was discovered by the producer while gathering cattle. WDFW responded to the scene and made contact with the producers. The Ferry County Sheriff's Office was notified but could not respond. The area in question is also a travel corridor for the Sherman Wolf Pack as noted through collar data collected from a WDFW GPS collar on one of the members. The producer has had two confirmed wolf depredation events in the immediate area since the middle of June 2017.

**Location of incident:** Ferry County.

**Datum:** WGS84 **GPS coordinates are:**  Actual  Approximate

**Land status:**  USFS  BLM  State  Private  Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?** The area the calf was discovered is made up of sparse timbered draws with brushy hillsides and flat benches. The nearest occupied dwelling is 3 miles away.

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**General cover classification:**  Open/Rangeland  Brush  Lightly forested  Heavily forested

**Are attractants present near location of incident?** There were no attractants present.

**Affected animal(s) and status:** 5 month old Hereford calf. Injured/Deceased. The calf was euthanized after the physical examination revealed mortal injuries.

**Site description/physical evidence present:** The area consisted of small patches of trees with brushy draws. The terrain is steep with areas of small benches. Wolf tracks were discovered near the injured calf. Wolf tracks were also discovered along the main road and a nearby cattle trail. WDFW GPS collar data also showed the collared Sherman Wolf in the area during the critical time frame of the attack. No attack scene was discovered.

**Description and location of injuries:** The Hereford calf received bite lacerations and bite puncture wounds to the upper left shoulder, the left arm pit area, the lower left brisket, the lower left rear leg, the left hip and the inside of the upper left leg and groin. The areas severely injured during the attack and showed massive hemorrhaging were the left front shoulder, the left arm pit, the lower left leg and the groin. The injuries are consistent with a signature style wolf attack. The calf also suffered a broken right shoulder. The attack occurred over night.

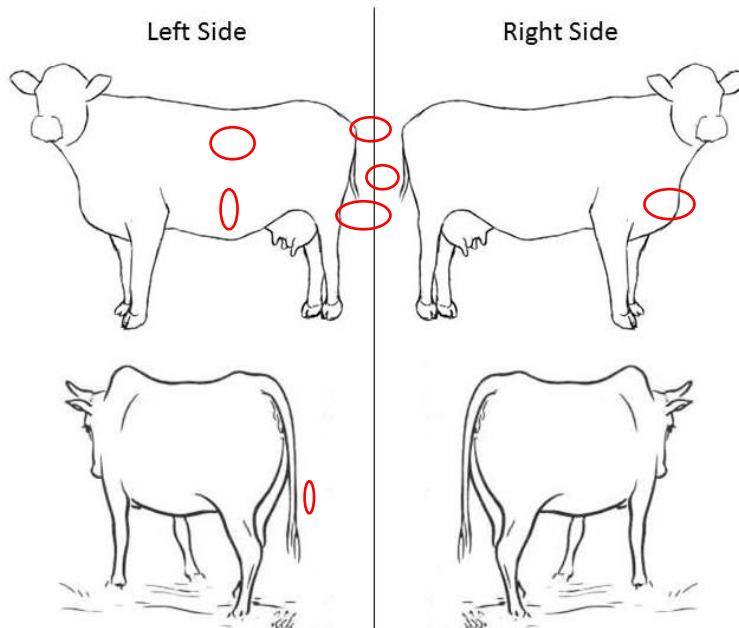


Figure 1. XX

**Source of injuries:**  Black bear    Cougar    Wolf    Dom canine    Structural    Unknown  
 (check one)    Grizzly bear    Bobcat    Coyote    Unk predator    Other \_\_\_\_\_

**Injury/mortality classification:** Confirmed Wolf Depredation.

**Classification justification:** A physical examination was conducted on the injured (live) calf. The results of the examination showed that the Hereford calf received bite lacerations and bite puncture wounds to the upper left shoulder, the left arm pit area, the lower left brisket, the lower left rear leg, the left hip and the inside of the upper left leg and groin. The calf also suffered a broken right shoulder. The calf was euthanized due to the severity of the injuries. A necropsy on the severely injured areas was conducted on the (deceased) calf. The necropsy showed massive hemorrhaging to the underlying tissue adjacent to the bite lacerations and bite puncture wounds. WDFW GPS collar data also showed the Sherman Wolf in the area during the critical time frame of the attack. Wolf tracks at or near the scene showed at least two wolves were present in the area. The Sherman Wolf Pack is responsible for two confirmed depredation events in the last two months approximately 1 mile away. The deceased calf was removed due to the close proximity to a salting area and taken to the WDFW Compost Facility.





Photograph No 1. Shows the condition of the Hereford calf when discovered.



Photograph No 2. Shows bite lacerations to the left arm pit area of the Hereford calf.





Photograph No 3. Shows a bite puncture to the left shoulder of the Hereford calf.



Photograph No 4. Shows two bite puncture wounds to the upper left hip and lower left leg of the Hereford calf.





Photograph No 5. Shows a large bite puncture wound to the inside of the upper left leg and groin area of the Hereford calf.



Photograph No 6. Shows the shaved area of the left shoulder with bite lacerations, large puncture wound and several smaller bite punctures on the Hereford calf.





Photograph No 7. Shows bite puncture wounds to the shaved brisket area of the Hereford calf.



Photograph No 8. Shows bite lacerations and bite puncture wounds to the shaved area on the left rear leg of the Hereford calf.





Photograph No 9. Shows a close up of bite puncture wounds and bite lacerations to the shaved area on the lower left hamstring of the Hereford calf.



Photograph No 10. Shows bite puncture wounds and bite lacerations to the shaved area on the inside left leg and groin areas of the Hereford calf.





Photograph No 11. Shows a large bite wound and hemorrhaging to the inside upper left leg of the Hereford calf.



Photograph No 12. Shows the injured left hip and leg of the Hereford calf.





Photograph No 13. Shows a continuation of photograph No 12. The photograph shows massive hemorrhaging to the underlying tissue adjacent to the bite puncture wounds and bite lacerations to the Hereford calf.



Photograph No 14. Shows the injured left arm pit area and brisket of the Hereford calf.





Photograph No 15. Shows a continuation of photograph No 14. The photograph shows massive hemorrhaging to the underlying tissue adjacent to the bite puncture wounds and bite lacerations to the Hereford calf.





Photograph No 16. Shows one of several wolf tracks discovered near the attack site of the Hereford calf.

# **Appendix E**

August 24, 2017 Depredation Investigation

## WDFW Injury/Mortality Investigation Report Form

**Database record #:** 2017-08-24ShermanPack\_calf\_confirmed

**Date report received:** 08-24-2017    **Date investigated:** 08-24-2017

**WDFW personnel:** W988, W188

**Summarize initial report:** On August 24, 2017 a WDFW contracted range rider reported the skeletal remains of a calf and a second calf carcass found in a US Forest Service grazing allotment. This report will include information on the second calf carcass discovered and a subsequent report will address the skeletal remains of the first calf. The Ferry County Sheriff and WDFW management staff were notified of the pending depredation investigation as per the 2017 Wolf-Livestock Interaction Protocol. A representative from Conservation Northwest was present during the investigation.

**Location of incident:** Ferry County

**Land status:**  USFS    BLM    State    Private    Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?** The grazing allotment pasture where the calf carcass was discovered consisted of mostly open range with a wood posted barb wire drift fence.

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**General cover classification:**  Open/Rangeland    Brush    Lightly forested    Heavily forested

**Are attractants present near location of incident?** Another calf carcass was discovered within the open hillside where this carcass was found.

**Affected animal(s) and status:** calf. dead

**Site description/physical evidence present:**

Canid tracks (Figure 2), scat (Figure 3), and GPS wolf collar data were noted at the scene.

**Description and location of injuries:**

The calf carcass discovered was mostly intact with visible bite lacerations on the nose, in the groan, right front leg above the elbow, and both rear legs between the pin and the hock. Bite wounds on the nose and right front leg indicated slight hemorrhaging in the epidermis. Severe hemorrhaging was documented primarily in the groan area and rear legs.



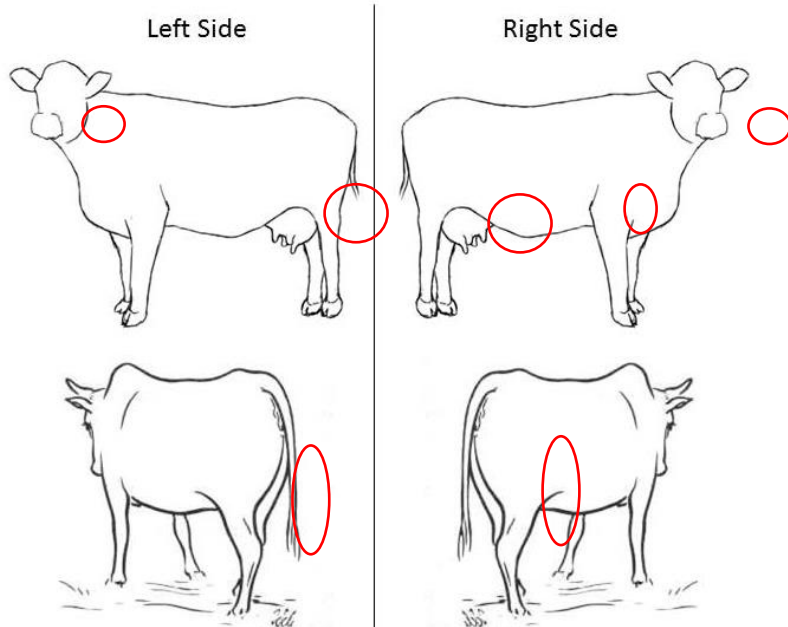


Figure 1. Locations of injuries (red circles) to a calf carcass discovered in Ferry County on August 24, 2017.

**Source of injuries:**  Black bear    Cougar    Wolf    Dom canine    Structural    Unknown  
 (check one)    Grizzly bear    Bobcat    Coyote    Unk predator    Other \_\_\_\_\_

**Injury/mortality classification:** Confirmed Wolf Depredation

**Classification justification:** After a thorough investigation of the scene and a field necropsy of the injuries to the calf, it was determined to be a Confirmed Wolf Depredation. The determination was based on tracks, scat, GPS collar data, previous depredations since June 2017 involving this same collared wolf pack, and bite marks with associated hemorrhaging.



Figure 2. Canid scat discovered in Ferry County on August 24, 2017 near skeletal remains of a calf.



Figure 3. Canid track discovered in Ferry County on August 24, 2017 near skeletal remains of a calf.





Figure 4. The second dead calf discovered in Ferry County on August 24, 2017.



Figure 5. Trauma indicated on the nose of a calf in Ferry County on August 24, 2017.





Figure 6. Bite laceration in the groin of a calf discovered in Ferry County on August 24, 2017.



Figure 7. Bite wounds found in the right armpit of a calf in Ferry County on August 24, 2017.



Figure 8. Left rear leg of a calf discovered in Ferry County on August 24, 2017.



# **Appendix F**

August 26, 2017 Depredation Investigation

## WDFW Injury/Mortality Investigation Report Form

Database record #: 2017-08-26FerryCounty\_cow

Date report received: 8/25/2017 Date investigated: 8/26/2017

WDFW personnel: W921, W932, W966

### Summarize initial report:

While in the field, WDFW personnel were looking for a different calf depredation from 8/24/2017, staff came across a dead cow in the USFS Lambert grazing allotment. Information from the producer and WDFW range rider on the cow was unknown.

**Location of incident:** South facing hillside 150 meters from NF Trail 47 and the Kettle Crest Trail.

**Datum:** WGS84 **GPS coordinates are:**  Actual  Approximate

**Land status:**  USFS  BLM  State  Private  Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?**

Open rangeland approximately 5 miles from nearest occupied structure.

---

**General cover classification:**  Open/Rangeland  Brush  Lightly forested  Heavily forested

**Are attractants present near location of incident?** A calf carcass from 8/24/2017 was approximately 200-300 meters south of carcass.

**Affected animal(s) and status:** One cow, dead.

**Site description/physical evidence present:** There were no predator tracks or signs of scavenging found in the immediate vicinity around the cow carcass. One set of coyote tracks were found 50 meters south of the carcass. The cow appeared to have rolled down hill and was found on her back. Broken tree limbs and disturbed earth was present a few feet up hill of the animal. A small patch of trees stopped the cow from rolling any further.

**Description and location of injuries:** Initial examination showed no signs of predation. There were, however, signs of an apparent prolapsed anus (Fig. 1). After using hair trimmers on the tail, hind legs, and front arm pits, investigators found no signs of puncture wounds or lacerations. Back legs, hind end, front legs, neck, and chin were skinned and no signs of hemorrhaging or lacerations were found. A 3/4" X 1/4" bullet (possible .357) was found in the subcutaneous layer of the upper right shoulder region (Fig 2). There was no evidence of hemorrhaging or puncture wounds in or out of the body. The right ear tag number was K459.

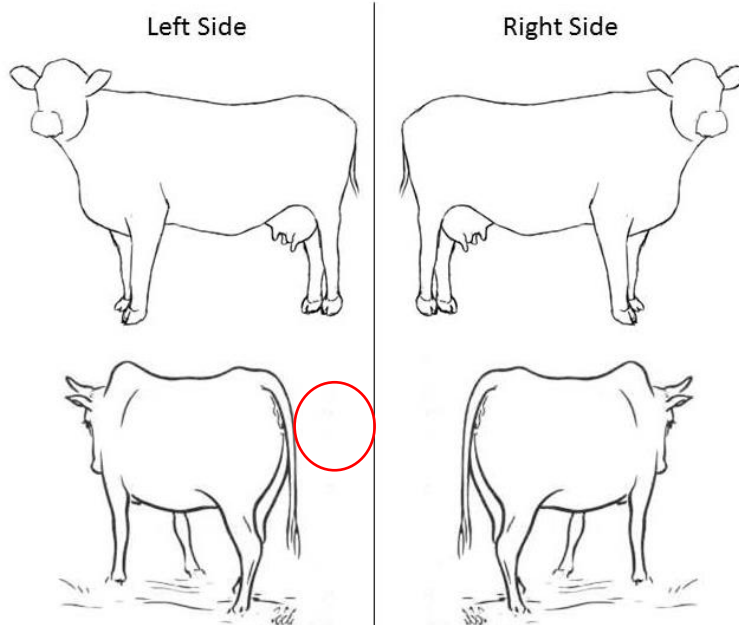


Figure 1. Prolapsed Anus on deceased cow found in Ferry County on August 26<sup>th</sup> 2017.

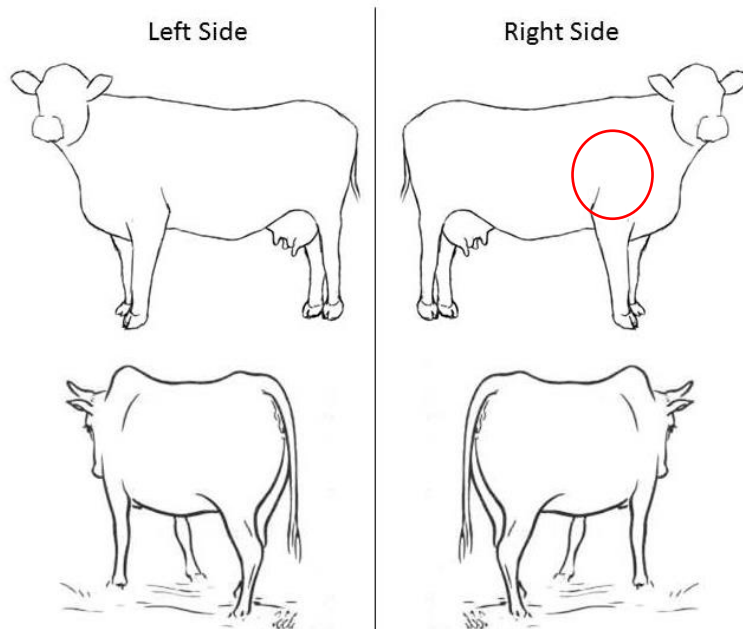


Figure 2. Location of bullet found in deceased cow in Ferry County on August 26<sup>th</sup> 2017.

**Source of injuries.**  Black bear  Cougar  Wolf  Dom canine  Structural  Unknown



(check one)  Grizzly bear  Bobcat  Coyote  Unk predator  Other: Non-depredation

**Injury/mortality classification:** Non-Depredation

**Classification justification:**

The cow carcass was thoroughly examined by WDFW staff in the field. Other than signs of a prolapsed anus, there were no signs of physical injuries located anywhere on the cow. Close attention was emphasized to the neck, front and hind legs, armpits, and tail. No injuries were detected that would indicate that wildlife were involved in the death of this cow



**Figure 3:** Prolapsed anus of deceased cow in Ferry County on August 26<sup>th</sup> 2017.

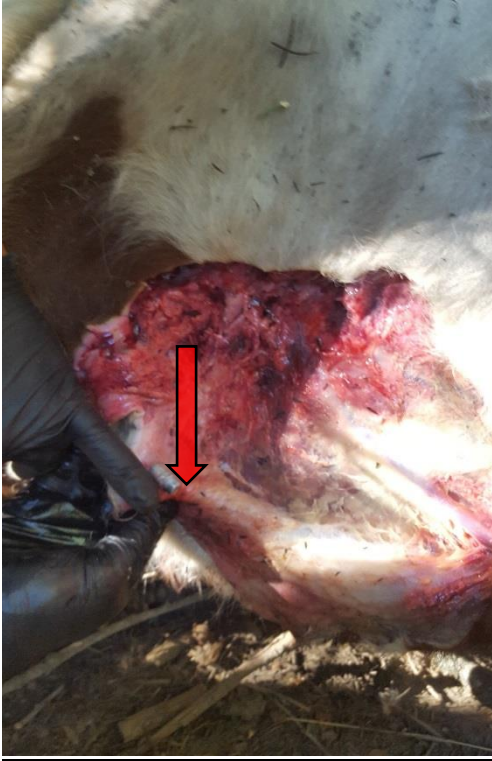


Figure 4: Bullet found in deceased cow in Ferry County August 26<sup>th</sup> 2017.

# **Appendix G**

August 28, 2017 Depredation Investigation



## WDFW Injury/Mortality Investigation Report Form

**Database record #:** 2017-08-28ShermanPack\_calf\_confirmed

**Date report received:** 08-28-2017    **Date investigated:** 08-28-2017

**WDFW personnel:** W942, W988

**Summarize initial report:**

On 08-28-2017, WDFW staff responded to a report of a wolf/calf depredation event in Ferry County. The deceased calf was discovered using WDFW GPS data from a collared member of the Sherman wolf pack. The GPS collar data showed two days of activity in one central location. The Ferry County Sheriff's Office and the USFS Range Manager were both notified of the event. Present during the field investigation were the producers, WDFW Contracted Range Riders and WDFW staff.

**Location of incident:** Ferry County

**Land status:**  USFS    BLM    State    Private    Other:

**Type of pasture/enclosure incident occurred in and estimated distance to nearest occupied structure?**

The area is a large USFS Grazing Allotment. The terrain is brushy and steep with heavy timber. The Hereford calf was discovered in a steep brushy creek bottom. The area is five miles from the nearest residence.

---

**General cover classification:**  Open/Rangeland    Brush    Lightly forested    Heavily forested

**Are attractants present near location of incident?**

There were no known attractants present.

**Affected animal(s) and status:**

Seven month old, 400 lb. Hereford calf.

**Site description/physical evidence present:**

Evidence at the scene indicated the Hereford calf was chased down a steep brushy hillside into the creek bottom. The rumen and the pelvic bone were separate from the mostly consumed calf carcass discovered in the stream. An exact area of attack could not be determined due to the extensive feeding and matting down of the vegetation along the stream. WDFW GPS collar data from the Sherman Pack wolf were present along with wolf tracks and wolf scat. Other evidence consisted of bite lacerations and bite puncture wounds on the hide which are consistent with a signature style wolf attack. Evidence at the scene shows at least two wolves were involved in the

depredation event. Minimal scavenging by birds (eye removed) and no evidence of other large predators at the scene.

**Description and location of injuries:**

The Hereford calf had bite lacerations and bite puncture wounds to the left flank, left shoulder, left rear leg, left side of the brisket, lower left front leg, left upper neck, right hock, right rear leg, right front leg and the nose. Several injured areas had hemorrhaging to the underlying tissue associated with the bite wounds indicating the calf was alive during the depredation event.

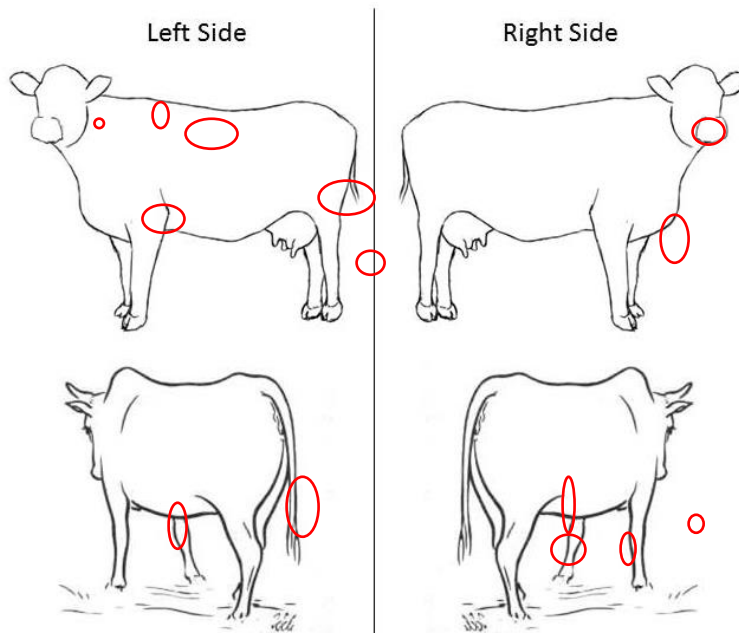


Figure 1. Diagram of injuries discovered on a calf in Ferry County.

**Source of injuries.**  Black bear    Cougar    Wolf    Dom canine    Structural    Unknown  
(check one)    Grizzly bear    Bobcat    Coyote    Unk predator    Other \_\_\_\_\_

**Injury/mortality classification:** Confirmed Wolf Depredation

**Classification justification:** Based on a thorough field investigation and necropsy, this depredation investigation was classified as a Confirmed Wolf Depredation by the Sherman Pack. Evidence at the scene including wolf tracks, scat, matted down vegetation, and GPS collar data coupled with evidence on the calf carcass included bite lacerations, bite puncture wounds and hemorrhaging to the underlying tissue adjacent to the injuries are consistent with a wolf depredation. The Sherman wolf pack has shown a repeated pattern of attacks on cattle in the neighboring grazing allotment during 2017.



Photograph No 1. Shows the condition of the calf in the stream when first discovered.



Photograph No 2. Shows bite lacerations to the inside lower left leg.





Photograph No 3. Shows bite lacerations to the upper right shoulder area.



Photograph No 4. Shows bite lacerations and tear to the left ear.





Photograph No 5. Shows bite lacerations to the outer portion of the upper right leg.



Photograph No 6. Shows a bite laceration o the lower right rear leg.





Photograph No 7. Shows bite lacerations to the inside left rear leg.



Photograph No 8. Shows hemorrhaging to the underlying tissue adjacent to the bite lacerations to the lower inside right leg.





Photograph No 9. Shows hemorrhaging to the underlying tissue adjacent to the bite lacerations to the upper right shoulder.



Photograph No 10. Shows hemorrhaging to the underlying tissue on the lower left leg.





Photograph No 11. Shows a close-up of the hemorrhaged tissue in Photograph No 10.



Photograph No 12. Shows a puncture wound to the lower right neck area.





Photograph No 13. Shows the hemorrhaged area adjacent to the puncture wound in photograph No 12.





Photograph No 14. Shows two puncture wounds on the inside of the hide of Photograph No 12. Lower right side of the neck.



Photograph No 15. Shows bite lacerations to the nose of the calf.



Photograph No 16. Shows a bite laceration to the lower left side of the neck of the calf.





Photograph No 17. Shows a puncture wound to the underlying tissue and hemorrhaging to the lower left side of the neck as shown in Photograph No 16.



Photograph No 18. Shows a wolf track near the calf carcass.



Photograph No 19. Shows a wolf track slightly smaller than Photograph No 18.



Photograph No 20. Shows wolf scat discovered near the calf carcass. The wolf scat contained red Hereford hair.