

1 **WASHINGTON DEPARTMENT OF FISH AND WILDLIFE**

2 **Wolf-livestock interaction protocol**

3 Revision date ~~June 1, 2017~~ June 24, 2019

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

13 The Department completed its Wolf Conservation and Management Plan in 2011 (Wolf Plan), which
14 provides guidance on the implementation of activities, tools, and actions. This protocol outlines
15 additional measures for the outlines additional measures for implementing the wolf-livestock conflict
16 chapter of the Wolf Plan.

17 The protocol draws ~~from~~ from a diversity of perspectives expressed by people throughout the state for
18 protecting wildlife populations as a public resource and livestock. These values include achieving a
19 sustainable, recovered wolf population, supporting rural ways of life, and maintaining livestock
20 production as part of the state's cultural and economic heritage. This protocol also serves to ~~increase~~
21 provide the transparency and accountability of WDFW's activities and management actions related to
22 wolves.

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

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

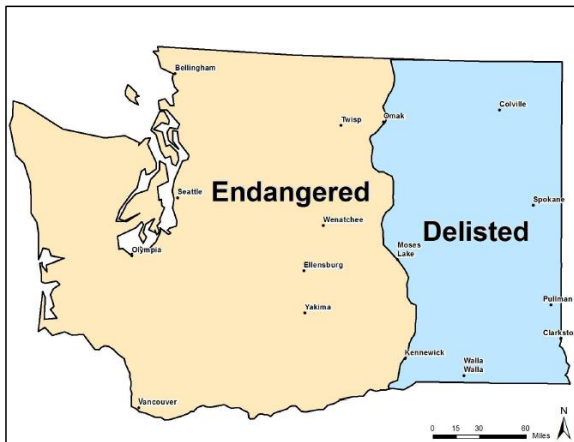


Figure 1. Federal classification of gray wolves in Washington State, 2017.

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 ~~W~~wolf ~~P~~plan was developed with the help of a multi-stakeholder working group and adopted by the Washington Fish and Wildlife Commission in 2011. The ~~W~~wolf ~~P~~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 ~~the Wolf Plan~~WDFW ~~Wolf Conservation and Management plan~~).

Under the umbrella of the ~~W~~wolf ~~P~~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 conscientiousness~~ 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

54 considers the use of responsive deterrence measures and – within established guidelines – lethal
55 removal of wolves (in areas where wolves are federally delisted) if appropriate deterrence measures
56 have first been taken to attempt to change pack behavior and reduce the potential for recurrent wolf
57 depredations on livestock.

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

63

64 **Section 2. Definitions**

65 Confirmed wolf depredation refers to any event where there is reasonable physical evidence that a wolf
66 caused the death or injury of livestock. Primary confirmation would include bite marks and associated
67 subcutaneous hemorrhaging and tissue damage, indicating that the wolf attacked a live animal, as
68 opposed to simply feeding on an already dead animal. Spacing between canine tooth punctures,
69 location of bite marks on the carcass, feeding patterns on the carcass, fresh tracks, scat, and hairs
70 rubbed off on fences or brush, and/or eyewitness accounts of the attack may help identify the specific
71 species or individual responsible for the depredation. Wolf predation might also be confirmed in the
72 absence of bite marks and associated hemorrhaging (i.e., if much of the carcass has already been
73 consumed by a predator or scavengers) if there is other physical evidence to provide confirmation. This
74 might include blood spilled or sprayed at a nearby attack site or other evidence of an attack or struggle.
75 There may also be nearby remains of other animals for which there is still sufficient evidence to confirm
76 predation, allowing reasonable inference of confirmed wolf predation on an animal that has been
77 largely consumed.

78
79 This definition is from the Department's Wolf ~~Plan~~ Conservation and Management Plan. In practice, 96
80 percent of the confirmed wolf depredations in the last 3 years have included hemorrhaging as the factor
81 that led to that determination. The Department will continue to use ~~the factor~~ evidence of
82 hemorrhaging (along with other supporting factors) for determinations of a confirmed wolf depredation.
83 (See **Section 5** for more information on factors.) ~~Also,~~ only trained WDFW staff make the final
84 determination in depredation investigations.

85

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

87

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

90 Event refers to the wolf-livestock conflict incident that result in one or more injured or dead livestock.
91 For depredations on large livestock (i.e., cattle, horses, mules, and donkeys), each depredated livestock

92 equals one “event,” unless there is evidence in the investigation that supports multiple livestock in one
93 event (e.g., physical proximity of livestock, reconstructive evidence). For depredations on small livestock
94 (i.e., sheep, pigs, llamas, goats, and alpacas) there may be one or more livestock in one depredation
95 event.

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

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

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

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

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

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

127 Responsive deterrence measure means a deterrent measure put into place after a confirmed or
128 probable wolf depredation has occurred. The WDFW Wildlife Conflict Specialist and the livestock

129 producer will determine which techniques are best suited for the specific livestock operation and have
130 the best chance to reduce the likelihood of future depredations.

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

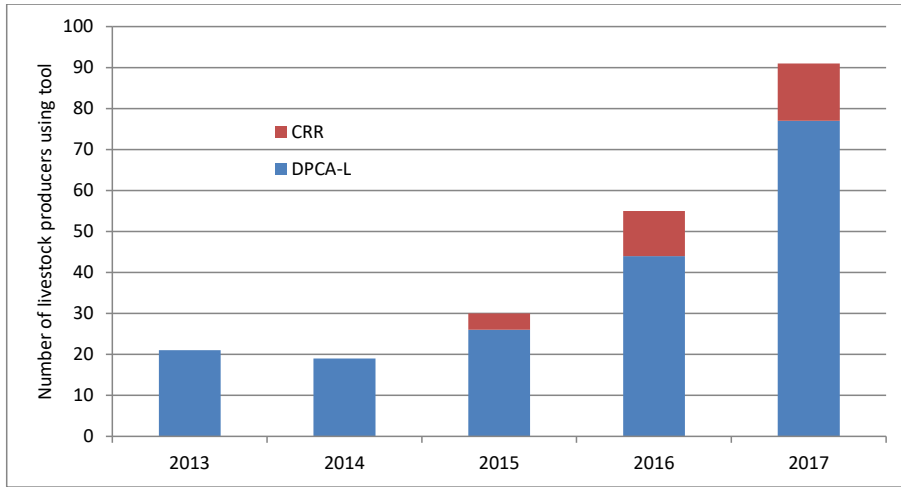
135

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

137 The Wolf ~~Plan~~Conservation and Management plan states that “any wolf-livestock management program
138 should manage conflicts in a way that gives livestock owners experiencing losses the tools to minimize
139 losses” without jeopardizing recovery efforts. (See WDFW’s ~~W~~wolf P~~lan~~, page 85.) The ~~W~~wolf P~~lan~~
140 then instructs the Department to work with livestock owners to incorporate non-lethal deterrence
141 strategies (e.g., range riders, electric fladry) into their business practices (specific strategies are
142 discussed in **Section 4**). Minimizing wolf-livestock conflicts involves identifying the factors that increase
143 risk to livestock and adaptive management at a local scale (Hanley et al. 2018b).

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

155



Commented [MD(1)]: Update table

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.
- [Manage for an ungulate prey base at or near the objectives outlined in the Game Management Plan or appropriate herd plans.](#)
- 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.
- [Communicate regularly with community leaders and elected officials prior to the start of the grazing season to provide an understanding of WDFW’s wolf-related management activities and their objectives as they relate to wolf/livestock conflicts that arise during the grazing season \(e.g., field response to reported depredations, timing of capture or lethal removal activities, etc.\).](#)

Commented [MD(2)]: WAG discussion on metrics in ungulate plans

181 Within this context, livestock producers are expected to proactively implement at least two (2)
182 deterrence measures with concurrence from the local WDFW Wildlife Conflict Specialist. The
183 Department's expectation is that livestock producers and the ~~local WDFW~~ Wildlife Conflict Specialist
184 work in collaboration to identify and plan the proactive deployment of the best suited deterrence
185 measures specific to the grazing site; ~~local~~ Wildlife Conflict Specialists are available throughout the year
186 to work with livestock producers. The proactive deterrence measures must be in place a sufficient
187 amount of time prior to a wolf depredation. The ~~local~~ WDFW Wildlife Conflict Specialist will carefully
188 consider the amount of time necessary for deterrence measures to have had an opportunity to be
189 effective. In most situations, the measures will have been in place for at least one week. Several
190 example deterrence measures with associated expectations for deployment are listed in **Section 4**.

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

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

- 212 • Build receptivity and encourage regular range riding ~~human presence~~ around livestock;
- 213 • Improve and facilitate opportunities for increased and improved technical capacity in human
214 presence ~~range riding~~; and
- 215 • Secure and provide resources (financial and technical), as available, to jump-start individual and
216 collective efforts of strategic, applicable, and best practices in human presence ~~deterrence~~
217 measures.
- 218 • Provide range rider training opportunities to encourage consistency in application.

219 **Section 4. Example deterrence measures**

220 This section provides common deterrence measures used to reduce the potential for wolf depredations
221 on livestock. It was developed from a review of the scientific literature on these or other deterrence
222 measures. The literature review can be found on the Department's website at
223 <https://wdfw.wa.gov/species-habitats/at-risk/species-recovery/gray-wolf/conflict-prevention> (Western
224 Wildlife Outreach 2014).

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

- 226 • <https://wdfw.wa.gov/species-habitats/at-risk/species-recovery/gray-wolf/conflict-prevention>

227

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

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

239 The efficacy of some of these deterrence measures is not limited to influencing the behavior of wolves.
240 Depending on how the deterrence measures are deployed, they may also influence the behavior of
241 livestock and further reduce the potential for recurrent depredations ([Miller et al. 2016](#), [Van Eeden, et](#)
242 [al. 2017](#), [Hanley et al. 2018b](#)).

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

258

- 259 • Monitoring Livestock (either Range Riding on large pastures/allotments or Human Presence on small
260 pastures)
- 261 o Range Riding (range riding occurs on large grazing pastures where regular monitoring of
262 livestock is needed)
- 263 i. Proactively monitor and protect livestock through working at least weekly with
264 the livestock producer and WDFW staff.
- 265 1. Watch for changes in livestock behavior, condition, and reproductive
266 status; note any interactions with cattle and pertinent details (e.g.,
267 agitation, single or grouped livestock, cows with tight bags).
- 268 2. If practical and feasible, remove sick or injured livestock from pastures
269 within a wolf territory.
- 270 3. Notify the livestock owner and/or WDFW of any dead livestock
271 immediately.
- 272 4. Manage livestock distribution to optimize herd and human deterrence,
273 and monitoring capability while minimizing wolf-livestock conflict (e.g.,
274 small groupings).
- 275 ii. Managing grazing rotations, monitoring livestock behavior, locating missing
276 livestock, removing injured or sick livestock, and watching for carnivore activity
277 around livestock.
- 278 iii. Range riding is providing consistent monitoring of livestock, particularly
279 throughout the grazing season when cattle and sheep are out on open range.
- 280 iv. Work with the local WDFW Wildlife Conflict Specialist to prioritize range riding
281 effort to cover the grazing areas and the number of livestock as effectively as
282 possible.
- 283 v. Range rider activity will be tracked using a GPS.
- 284 vi. Range riders and sheep herders who sign a sensitive-data sharing agreement
285 may monitor the location of radio-collared wolves so as to move or better
286 protect livestock.
- 287 vii. Range riding is intended to monitor and protect livestock. Following wolves or
288 other carnivores reduces this ability.
- 289 o Human Presence (human presence occurs on smaller pastures or calving areas, typically
290 on private property, during times of increased livestock vulnerability (e.g. lambing,
291 calving, injured livestock in a pen))
- 292 i. Increased and regular human presence (e.g., ranch employees, family members,
293 or sheep herders) to protect livestock by patrolling the vicinity occupied by
294 livestock on a daily or near-daily basis.
- 295 ii. Individuals providing regular human presence communicate frequently with the
296 livestock producer and WDFW about issues including livestock depredations,
297 grazing rotations, and wolf activity.
- 298 iii. Monitors livestock, protects calving/lambing areas, and uses scare devices to
299 deter wolves from approaching livestock.
- 300 i. If practical and feasible, establish calving or lambing areas away from areas
301 occupied by wolves and/or in pastures near ranch houses to provide for easier
302 and more frequent livestock checks and intervention, when necessary.
- 303 ii. Use protective fencing, fladry, or sheds around calving or lambing areas.
- 304 iii. Keep the area clean of livestock carcasses.
- 305

306 iv. Human presence is intended to monitor livestock not follow wolves or other
307 carnivores.

308
309
310 • Human Presence

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

322 • Monitoring Livestock

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

329
330 • Protecting Calving/Lambing Areas

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

336
337 • Using Scare Devices

- 338 ○ Coordinate with WDFW to develop a hazing strategy to frighten wolves away from livestock.
339 This might include installing light and noise devices, such as propane cannons, lights, radio-
340 activated guard (RAG) systems that alert the range rider/herder to the presence of wolves
341 by emitting flashing lights and loud sounds when a radio-collared wolf approaches the area.
342

343 • Guardian or Herding Dogs

- 344 ○ Guardian dogs are used to alert on-site personnel (herders or range riders) of predator
345 presence and to protect livestock.
- 346 ○ Specific dog breeds and training are required to have effective livestock guardian and
347 herding dogs.
- 348 ○ Guardian dogs and herding dogs are used in conjunction with daily human presence.
- 349 ○ For sheep, guardian dogs and herding dogs may live with the herd to provide protection 24
350 hours a day, seven days a week.

351 ○ Guarding and herding dog owners are trained in effective use of dogs specific to wolf-
352 livestock situations.

353

354 • Strategic Carcass Sanitation

355 The objective of carcass sanitation is to prevent wolves from being attracted to livestock carcasses in
356 areas frequented by livestock (corral, salt areas, calving pens, etc.) to reduce the potential for wolf-
357 livestock interactions. As such, sanitation is targeted at areas around active and adjacent pastures
358 in close proximity to livestock. Producers (or their family and/or employees) are expected to
359 remove or secure their own livestock carcasses in a timely manner. Example ways to remove or
360 secure carcasses include:

- 361 ○ Create a temporary carcass disposal site on a grazing pasture that is secured so as to not be
362 an attractant.
- 363 ○ Use fladry or electrified turbofladry around a carcass until it decomposes or until it can be
364 removed from the area. Work with WDFW to determine the best approach for using fladry.
365 The “attractant” aspect of a carcass is largely olfactory, and fladry around a carcass will not
366 dissuade wolves from being attracted to the site.
- 367 ○ Bury or burn the carcass consistent with state law, county or city ordinances, and the land
368 management agency’s guidelines.
- 369 ○ Work with WDFW to create a permanent carcass disposal site on private property.
- 370 ○ Use predator-resistant fencing as a permanent barrier around a boneyard or carcass pit on
371 private property.
- 372 ○ Develop a composting site consistent with state law, county, and city ordinances.

373

374 • Permanent and Portable Fencing (fladry, electrified turbofladry, calf panels)

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

382

383 • Delay Turnout to Forested/Upland Grazing Pastures

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

387

388 • WDFW Pack monitoring

- 389 ○ For packs that depredate, that do not have a radio collar, WDFW may attempt to deploy a
390 collar following the first depredation when feasible.

391

392 Section 5. Proactive communication

393 Coordination with Landowner

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

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

402

403 Promote a multi-land manager collaborative process to provide reserve-grazing areas

404 Work proactively with land managers to plan for reserve grazing areas when it is mutually
405 beneficial for livestock producers, livestock, and wolves. This is particularly important in cases
406 where den and rendezvous sites are expected to occur in or near active livestock grazing areas,
407 in the area of the state where wolves are federally listed and lethal removal of wolves is not an
408 available tool, and/or areas where conflict deterrence measures have been ineffective. An
409 unused plan Working proactively to promote to utilize providing reserve grazing areas is not a
410 nonlethal deterrence measure. But actually implementing a plans to use a reserve grazing
411 pasture is considered a nonlethal deterrence measure.

412 **Section 6. Depredation investigations**

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

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

- 428 1. The disposition and age class of the livestock;
- 429 2. The site where the incident occurred;
- 430 3. Animal sign (tracks, scat, hair) at the scene, particularly from wild carnivores;
- 431 4. Other species of wildlife in the area, particularly other carnivores (collared and uncollared);

- 432 5. Sign of a chase and/or struggle (e.g., tracks in substrate, drag marks);
- 433 6. Presence of tissue trauma and hemorrhaging with bite wounds;
- 434 7. Blood indicating livestock was alive during attack (can include dried or fresh blood);
- 435 8. A scattered or buried carcass in the event of a livestock mortality;
- 436 9. Evidence of scavenging (indicating the wildlife associated with said scavenging);
- 437 10. Wildlife bedding locations near the scene;
- 438 11. Witness accounts;
- 439 12. Producer accounts;
- 440 13. Any evidence of attack or scavenging present on the hide;
- 441 14. Bite wounds associated with attack on a live animal versus scavenging;
- 442 15. Location of bite wounds;
- 443 16. Presence of broken bones, and;

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

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

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

463
464 When a determination of "probable wolf depredation" is made, the factors and physical evidence that
465 distinguish it from non-wolf predation and non-predator determinations will be documented. Examples
466 of those distinguishing factors include sign of struggle, blood at the scene, broken branches, trampled
467 grass, or bite marks characteristic of wolves on remaining portions of the carcass (e.g. bite marks on the
468 tail bone). In addition, other factors must be present that allow for a reasonable ability to rule out other
469 predators, such as the pattern of the attack that is more characteristic of wolves than other predators.
470 When factors are absent that allow for the ability to determine if another predator was responsible, or if
471 it cannot be determined whether or not the animal died from non-predation causes, then the incident

472 would be an “unconfirmed depredation” or “unconfirmed cause of injury or death”. Alternatively, if
473 evidence suggests another predator, the classification would be “confirmed non-wild wolf depredation”,
474 or if it was clear that the animal died from something other than predation, the death would be
475 classified “non-predation.” In probable wolf depredations, WDFW’s practice in conducting investigations
476 is such that there is a reasonably high likelihood that the depredation was caused by a wolf, but
477 evidence of hemorrhaging is lacking. Also, for one probable wolf depredation to be included in a pattern
478 of confirmed wolf depredations (see **Section 6**), it must be on the same time scale, with similar periods
479 of times between depredations, as the confirmed wolf depredations, and in the same area of overlap of
480 wolves and livestock as the confirmed wolf depredations.

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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</p>	<ul style="list-style-type: none"> • Multiple factors documented at scene consistent with an attack by a wolf. • Often includes attack signature consistent with a wolf (see https://wdfw.wa.gov/publications/01581http://wdfw.wa.gov/publications/01581/wdfw01581.pdf) • 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.

|

<p>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</p>	<p>DRAFT</p>
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	inference of confirmed wolf predation on an animal that has been largely consumed.	
Probable Wolf Depredation	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	<ul style="list-style-type: none"> • Multiple factors documented at scene consistent with an attack by a wolf. • Physical evidence and factors at scene consistent with “confirmed wolf depredation”, except scene is lacking the presence of subcutaneous hemorrhaging. • Factors must be present that allow for a reasonable ability to rule out other predators and non-predation causes of death.

	occurred. These factors, and possibly others, will be considered in the investigator's best professional judgment.	
Confirmed Non-Wild Wolf Depredation	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.	<ul style="list-style-type: none"> • Multiple factors documented at scene consistent with an attack by another wildlife species. • Often includes attack signature consistent with specific carnivore (see https://wdfw.wa.gov/publications/01581http://wdfw.wa.gov/publications/01581/wdfw01581.pdf) • Includes subcutaneous hemorrhaging or other factors that provide physical evidence the livestock was alive when attacked by another species.
Unconfirmed Depredation	Any depredation where the predator responsible cannot be determined.	<ul style="list-style-type: none"> • Single or multiple factors documented at scene consistent with an attack by a predator, but the predator responsible cannot be determined. • May include subcutaneous hemorrhaging (or other factors that provide the same scrutiny of physical evidence the livestock was alive when attacked by a predator). • May include factors from multiple predators (including wolf), but predator responsible for attack cannot be discerned with physical evidence and factors.
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	<ul style="list-style-type: none"> • Factors and physical evidence indicating livestock was injured or died from something other than a predator.

|

	the carcass was subsequently scavenged by wolves.	
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">• There is no clear evidence at the scene as to what caused the injury or death of the livestock.

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Section 7. Lethal removal criteria

The Department director has the authority under RCW 77.12.240 to lethally remove wolves that are destroying or injuring property, or when it is necessary for wildlife management or research. The Wolf Plan describes two situations when lethal removal may occur: to address wolf-livestock conflict and an at-risk ungulate population when wolf predation is determined to be a primary limiting factor.

The Department's Wolf Plan provides the following guidance and context:

- "Any wolf-livestock management program should manage conflicts in a way that gives livestock owners experiencing losses the tools to minimize losses, while at the same time not harming the recovery or long-term sustainability of wolf populations."
- "Management approaches are based on the status of wolves, ensuring that recovery objectives are met. Non-lethal management techniques will be emphasized throughout the recovery period and beyond....lethal control will be used only as needed after case-specific evaluations are made, with use becoming less restrictive as wolves progress toward delisting." 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 where they are federally listed as endangered.

Currently, the Eastern Washington recovery region has achieved its regional recovery objective identified in the Wolf Plan. The lethal removal provisions in this guidance currently apply only to the Eastern wolf recovery region.

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 (Brainerd et al. 2008, Borg et al. 2015, Bradley et al. 2015, Decesare et al. 2018, and Hanley et al. 2018a)-, 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. As such, the Department considers lethal removal on a case-by-case basis, with the Wolf Plan and protocol serving as guiding documents.

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 ~~three~~³ depredation events within a 30-day rolling window of time, or at least ~~four~~⁴ depredation events within a 10-month rolling window of time; see exceptions below in #6. Stipulations include:
 - At least ~~one~~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).
 - Although the Department tracks the total number of depredations, this count is not the only factor used when considering the use of lethal removal.
2. At least two ~~(2)~~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.
 - Proactive non-lethal deterrents are expected regardless of recovery or listing status.
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 10**, 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. On an annual basis, the Department will assess whether lethal removal of wolves is expected to jeopardize the wolf population's ability to reach recovery objectives both in the recovery region and statewide.
6. In regions at or above the local recovery objective, the Department has more flexibility when considering and implementing deterrent measures and lethal removal, and may use any of the range of approaches or tools described in the Wolf Plan. Examples may include issuance of kill permits or flexibility in the thresholds listed above.
7. WDFW will consider the implementation of deterrence measures and lethal removal on a case-by-case basis.

6.8.

Recognizing that breeding pairs are the building blocks of a wolf population and source for dispersal, 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. Lethal removal will be used only as needed after case-specific evaluations are made with use being more conservative in areas below recovery objectives. See appendix G and H in the Wolf Plan 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 8. 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. Generally, the evaluation period corresponds to the 10-month rolling window. 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

Commented [MD(3)]: For WAG discussion – what if it's the last increment of removal that could result in the removal of the pack?

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.

Ground-based methods are preferred for conducting lethal removal actions because they involve less risk to human safety and generally lower costs; however, these methods can be ineffective or impossible in some scenarios due to accessibility, difficulty of trapping, etc. A helicopter may be used on an as-needed basis. -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 9. Chronic depredation zones

In pack territories where proactive non-lethal deterrents have been implemented, wolf depredations on livestock have occurred, and the department has lethally removed wolves for two or more consecutive years, WDFW staff will work with affected producers, associated landowners, and land management agencies to seek creative alternatives to reduce or eliminate additional loss of livestock and attempt to break the cycle of lethal removal of wolves in these areas. For example, these discussions might be associated with innovations in non-lethal tools or changes in how they are deployed. Another example may be discussions associated with increased understanding of local ungulate and predator abundance and management, with an effort to draw connections between various management plans (elk herd plans, deer herd plans, Game Management Plan, and Wolf Plan).

Commented [MD(4)]: WAG discussion definition of chronic depredation zones

This is in recognition that repeated livestock loss and wolf removals is likely to cause significant hardship for producers and their animals, as well as their communities, the wolf advocate community, WDFW staff, and wolves. Implementation of this recommendation for coordination between the producer, WDFW staff, and landowners does not direct a specific outcome other than the commitment to work on creative solutions, with the intent to keep producers in business, wolf packs intact, and social tensions around wolf management at a minimum.

Section 10. 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. [A final report on lethal removal operations will be included in the Department's Annual Wolf Conservation and Management Report.](#)

All wolf related notices and updates will be available on the Department's website at 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.

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