Wolverine Camera Survey in the Lemhi and Lost River Mountains 2017–18

IDAHO DEPARTMENT OF FISH AND GAME

Ed Schriever, Director

600 South Walnut Street
Boise, Idaho 83712

Prepared By
Diane Evans Mack

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INTRODUCTION

The Lemhi and Lost River mountain ranges are narrow peninsulas of wolverine (*Gulo gulo*) habitat between the towns of Salmon and Arco, Idaho. Both mountain ranges are separated from more continuous wolverine habitat in the Sawtooth, Boulder, and Salmon River mountains to the west and north, and from the Beaverhead Range along the Idaho-Montana border to the east. While the Beaverhead Range also is a narrow band of habitat, it is continuous to the Centennial Mountains on the edge of Yellowstone National Park. Modeled wolverine habitat covers roughly 1,975 km^2 in the Lemhi Range and 1,109 km^2 in the Lost River Range. These areas are comparable to an average male wolverine home range size in Idaho (Copeland 1996, Heinemeyer et al. 2017).

The Lemhi Range may be more connected functionally to surrounding wolverine habitat than the Lost River Range, as verified observations (photographs, specimens, DNA samples) are regularly reported from the Lemhis (Idaho Department of Fish and Game 2017). Idaho Department of Fish and Game's database of animal observations documents 9 observations of wolverine in the Lemhi Range in the last 15 years (Figure 1). Not reflected in the database or the map is the most recent detection from a camera survey in 2016–17 (see below). Three of the contemporary sightings were confirmed as the same male wolverine detected at 2 different IDFG camera bait stations and an incidental observation from the public over a 16-month period, suggesting a resident individual (Waterbury 2012, IDFG unpublished data). For the remaining reports, gender was unknown. As a result, there was no confirmed contemporary record of a female wolverine in the Lemhi Range, and insufficient data to determine if these sightings represented resident animals.

During the same 15-year period there were 3 documented observations of wolverine in the Lost River Range (Figure 1). One record was of tracks observed during a snow track survey in 2004, and the other 2 were nontarget trap occurrences in 2005 and 2019. While these records might not represent all of the wolverine activity in these mountains, they do suggest a more irregular pattern of occurrence compared with wolverine strongholds in Central Idaho.

During the winter of 2016–17, Idaho participated in the Western States Wolverine Conservation Project (WSWCP) camera survey, a coordinated 4-state effort to establish a baseline of distribution, occupancy, and genetics of wolverines in the northwestern U.S. (Lukacs et al., in prep). During that survey wolverines were detected at 24 camera stations in Idaho or along the Idaho/Montana border. One of those detections occurred in the Lemhi Range and no detections occurred in the Lost River Range. The purpose of this study was to follow up on the WSWCP camera survey with another season of focused sampling during the winter of 2017–18 to document wolverines in the Lemhi and Lost River mountain ranges. Our goal was to determine if resident animals, particularly females, could be confirmed. The larger goal was to continue to build a fundamental knowledge of where resident, breeding wolverines occur in Idaho.

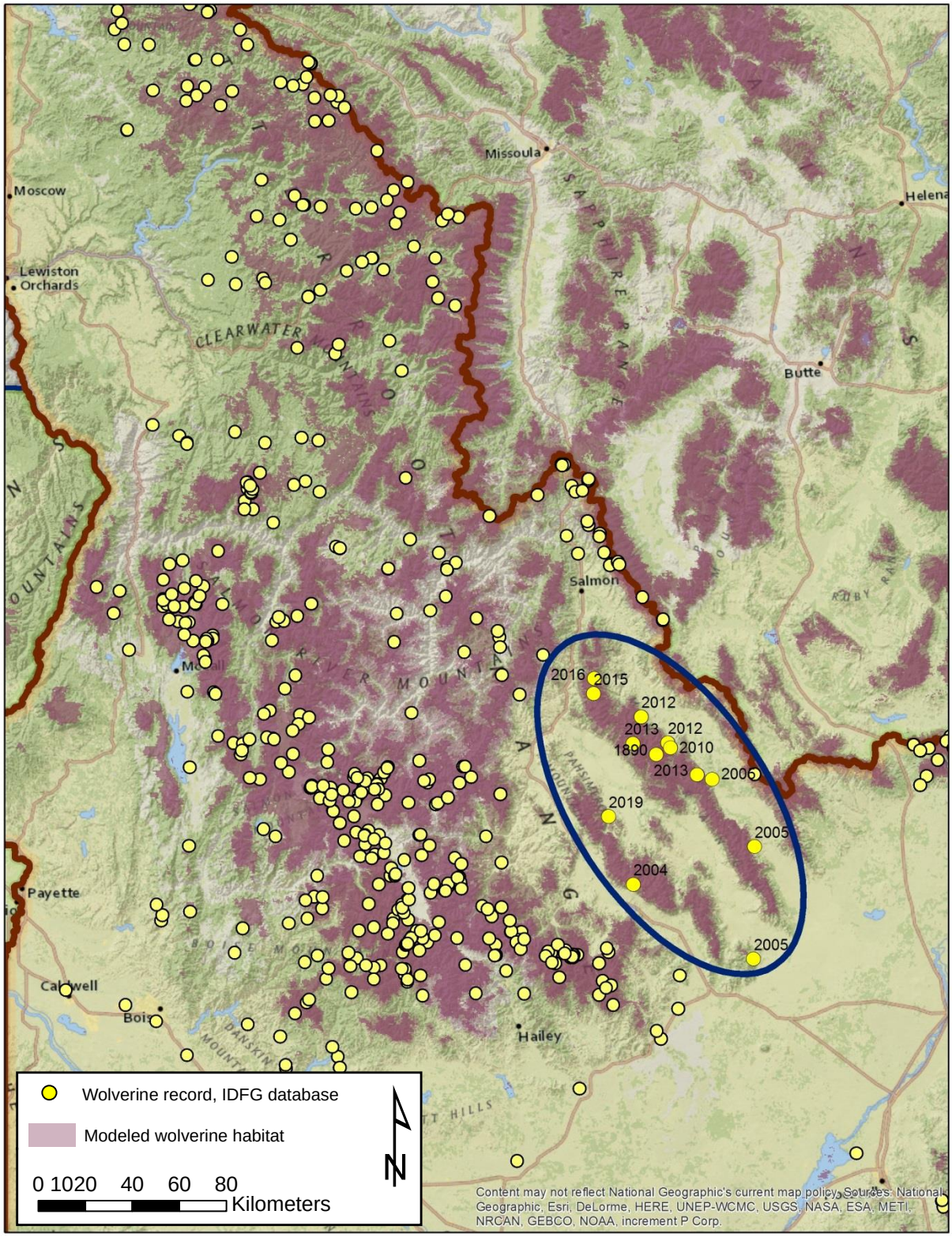

Figure 1. Wolverine observations in the Lemhi and Lost River mountain ranges compared to surrounding areas. Data from Idaho Department of Fish and Game animal observations database as of July 2019.

METHODS

We viewed this study as an extension of the WSWCP camera survey. Thus, we used the same approach except that we placed a camera in every grid cell rather than sampling from available grid cells (Western States Wolverine Working Group 2018). Specifically, we used the sampling grid developed for the WSWCP camera survey (Lukacs et al., in prep). This consisted of 15 km x 15 km grid cells that contained at least 50% wolverine habitat, defined by a composite model of persistent spring snow (Copeland et al. 2010) and primary habitat (Inman et al. 2013). Twelve grid cells overlapped the Lemhi and Lost River mountain ranges. The WSWCP survey used a Generalized Random Tessellation Stratified (GRTS) ranking (Stevens and Olsen 2004) to identify a spatially balanced random selection of grid cells to sample with cameras. From that selection, 3 of the 12 grid cells in the Lemhi and Lost River mountains were sampled in 2016–17. For this study, we sampled at a higher intensity. We did not use the GRTS ranks, but rather aimed to place a camera in all 12 grid cells in the Lemhi and Lost River mountains and/or cover the most likely suitable habitat. We deployed 13 cameras in total across 11 grid cells (Figure 2), opting to saturate the central part of the range where a wolverine had been detected during the WSWCP camera survey and to forgo sampling 1 grid cell.

Most (10 of 13) cameras deployed were Reconyx™ PC800 HyperFire™. The remaining 3 cameras were Reconyx™ HC600 HyperFire™. Cameras were programmed for infrared and motion detection and the PC800s had a daily time-lapse image at 11AM as a check that systems were operating as expected. We used 2 types of camera stations. Accessible stations (bait stations) were deployed mid–late December and used road-kill deer or elk pieces as an attractant. These stations were revisited 2 times (at approximately 6-week intervals) to refresh bait and scent, collect DNA samples, and move everything higher up the tree as snow accumulated. Accessible stations ran through late March to early April. Inaccessible stations were too remote to revisit in winter; these were deployed in late October and collected in June the following year. We substituted a scent dispenser for bait, and the station components were intentionally deployed higher in the tree in anticipation of snow. Both types of stations included a gun brush array secured to the tree with a corrugated plastic collar (P. Figura, California Department of Fish and Game, personal communication) to snag hair as animals climbed to investigate bait or scent pump.

We submitted hair samples associated with camera detections of target species (wolverine) and nontarget species of interest (fisher, marten, fox) to the National Genomics Center for Wildlife and Fish Conservation (US Forest Service, Missoula, MT). The Genomics Lab analyzed samples for species identification using mitochondrial DNA. All wolverine-positive samples were further analyzed for haplotype, gender, and individual (Pilgrim and Schwartz 2018*a*, 2018*b*). Individual profiles from this study were compared to all individual wolverines in the genomics database to determine if each individual was unique (new to the database) or a recapture (a known animal from previous studies).

Camera images were uploaded and organized with CPW Photo Warehouse (Newkirk 2016). Each image was viewed and classified to species by at least 2 independent observers. A third observer reviewed and reclassified images with conflicting species assignments. Because quality DNA was not obtained for each wolverine detected on camera, we examined all wolverine images to look for distinguishing physical characteristics that could be used to identify a unique individual. We looked for white on the legs or paws and different throat and upper chest markings. We mapped wolverine visits to camera stations by date and time, as photographs taken at the same time at different camera stations would indicate different individuals.

RESULTS

Camera Intervals and Distribution of Detections

Bait station cameras were deployed during a 9-day period from 15 December through 23 December 2017. They were active an average of 102 days (range 95–105 days) and pulled 26 March through 5 April 2018 (Appendix A, Table A-1). Scent pump stations were deployed over 4 days during 29 October through 1 November 2017. They were active an average of 225 days (range 222–227 days) and pulled 12–15 June 2018.

We logged 1,796 images of wolverines. We detected wolverines with photographs at 5 of the 13 camera stations (38%). Four of these stations were in adjacent grid cells in the northern end of the Lemhi Range. The 5th location was in the central portion of the Lost River Range (Figure 2, Table 1). The earliest wolverine detection was on 10 December at station 218. The quickest wolverine detection occurred 6 days after deployment at station 197 (Table A-2).

Wolverines were detected at 2 of 4 scent pump stations and 3 of 9 bait stations. We obtained far more photos of wolverines (up to 53x as many) at bait stations than scent pump stations. The 2 scent pump stations logged a total of 57 images of wolverine (avg = 29) whereas the 3 bait stations logged 1,739 images (avg = 580). Bait stations clearly attracted more frequent and longer visitation because of the food reward.

We submitted 24 hair samples collected at 10 of the 13 camera stations. Fourteen samples were associated with positive camera detections of wolverine and 10 samples were associated with non-target species detections (marten and red fox). Ten of the 14 likely wolverine samples were confirmed as wolverine (Pilgrim and Schwartz 2018*a*). No wolverine DNA was confirmed at any camera where we did not also have photographic evidence of wolverine presence. All of the DNA samples confirmed as wolverine belonged to haplotype Wilson-A. This was consistent with results from the WSWCP camera survey, which found that all wolverine samples from Idaho, Montana, and Wyoming were Wilson-A. Haplotype Wilson-A is the most common and widely distributed

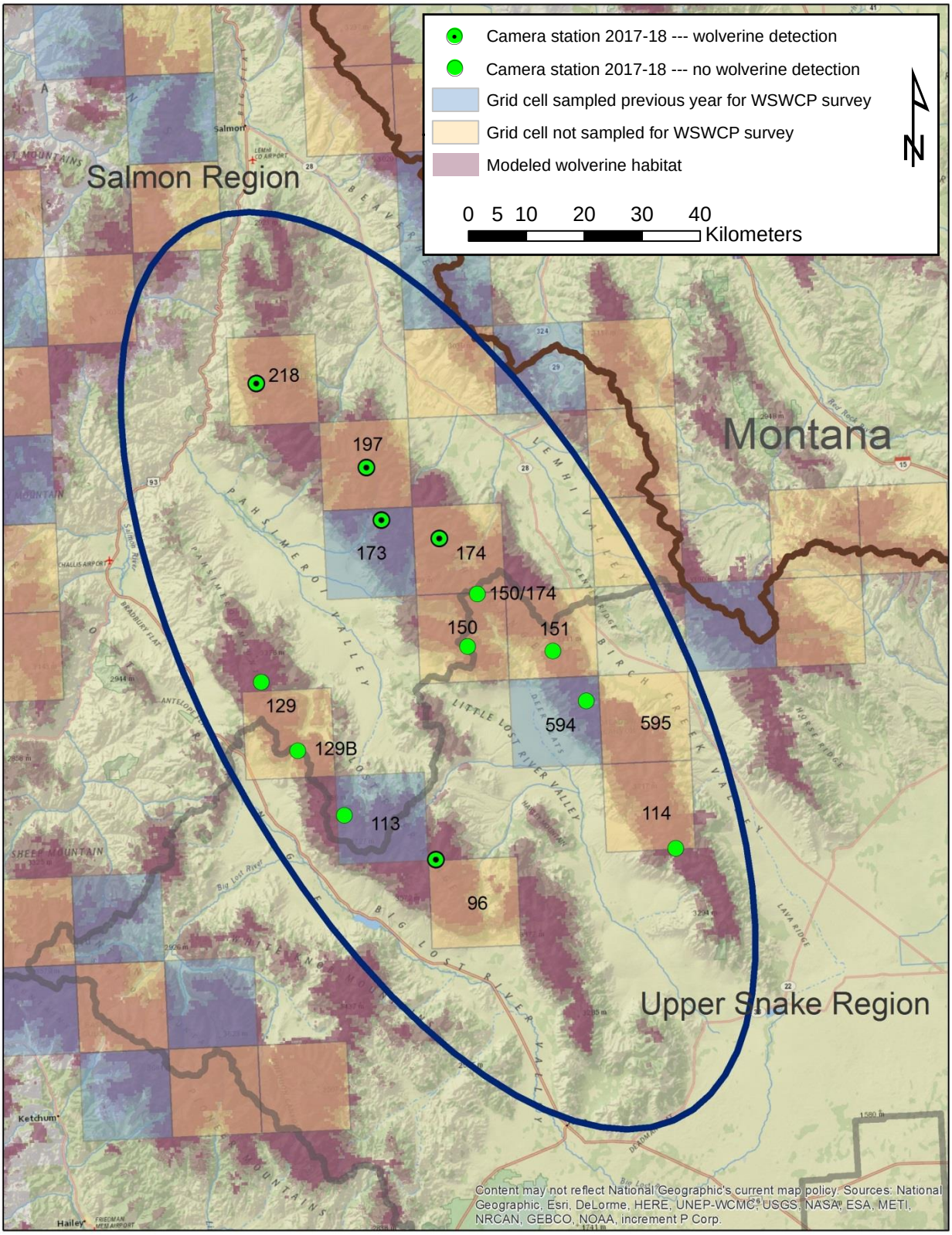

Figure 2. Distribution and results of camera stations in the Lemhi and Lost River mountains, winter 2017–18, relative to Western States Wolverine Conservation Project's sampling grid.

haplotype in North America (McKelvey et al. 2014). Poor quality DNA (inability to yield gender and individual) occurred at both bait and scent pump stations.

Individual Wolverines

Of the 10 wolverine-positive DNA samples, 6 were of sufficient quality to yield gender and individual profile (Pilgrim and Schwartz 2018*b*). From the combination of DNA analyses and photographs, we detected 3 individual wolverines across the 13 camera stations (detailed below). Two were females identified from DNA. Both of these females were new to the wolverine genomics database (Table 1). We identified a third individual from photographic evidence only; thus, its gender remains unknown. We had no photographs with >1 wolverine together at a camera station, nor did we find evidence (DNA or photographs) of multiple animals visiting the same camera station at different times.

IDFG18_197_F1 ('F1') ---F1 was identified as a unique individual through DNA collected at station 197 in the Lemhi Range. This female's DNA profile was obtained from 4 different hair samples collected in January, February, and March 2018. Thus, she was confirmed by DNA to have visited the camera station throughout the 3^{+}-month sampling period. Comparing photographs, we concluded that F1 appeared to be the same individual seen at stations 173 and 174 (Table A-2, Figure A-1). We did not get DNA confirmation from hair samples at stations 173 and 174. We collected and submitted 1 hair sample from each visit from both stations, but only 3 samples were identified to species as wolverine and all 3 had poor quality DNA that precluded gender and individual. However, distinctive chest markings and the absence of white on the legs and paws were evident in photographs from all 3 camera stations.

Stations 197, 173, and 174 formed a triangle bounded by Mill Creek to the north and Rock Creek to the south and were 9 km, 10 km, and 17 km apart, respectively (Figure 2). These distances define an area comparable in size to female home ranges documented with radio collars in Central Idaho during 2010–2015 (Heinemeyer et al. 2017, Heinemeyer unpublished data). In fact, camera station 150/174 (on the border between grid cells 150 and 174) also could have been encompassed by a female's theoretical home range in this area, but no wolverine was detected at station 150/174, nor were wolverine tracks observed in any of the photographs.

F1 was detected on camera at least 5 times at each of the 3 stations over the course of the winter (Table A-2). There was no overlap in dates, which supported our determination that this was the same animal based on photographs. Prior to 8 February she appeared at 1 of the cameras at least every 8 days. There was a noticeable gap in detections from 9–26 February (18 days). The timing of this gap was very similar to that of 3 denning females in Central Idaho during the wolverine–winter recreation study (Heinemeyer et al. 2010). In that study female wolverines entered dens in mid to late February and did not leave dens for 6-10 days after giving birth. While we have no confirmation that F1 denned, the pattern of activity was similar to that observed elsewhere for denning females.

Based on photographs, F1 is the same individual detected the previous winter (2016–17) during the WSWCP camera survey in grid cell 173 (Figure A-1). Our camera station in grid cell 173 was placed <300 m from the WSWCP station location the previous year. At the time, the WSWCP wolverine remained unidentified due to poor-quality DNA, but the chest pattern visible in photographs matches across the 2 years (Figure A-1). More surprising is that F1 appears to be the same individual detected at a camera bait station in Mill Creek in February and March 2012 (Waterbury 2012; Figure A-2) and from a camera bait station on Portland Mountain in July 2013 (B. Waterbury, R7 files; Figure A-3). Neither of these records was confirmed by DNA, but photographs match. Results from 3 different camera surveys now suggest a resident female occupied the mid-northern portion of the Lemhi Range for at least 2, and likely 6, years.

IDFG18_96_F2 ('F2') ---F2 was identified from DNA at station 96 in the Lost River Range near Shadow Lakes. Of the 4 cameras deployed in the Lost River Range, station 96 was the only one at which a wolverine was detected. The individual detected in camera images was a distinctly colored wolverine (Figure A-4) and would be relatively easy to identify from most photographs. We assume the wolverine in the images was the same that left the DNA signature identified as F2, but this camera was knocked out of alignment during deployment and the detection zone was away from the tree bole. Thus, we had no images of any animal on the tree itself, although clearly a wolverine climbed the tree and left hair in the gun brushes that was identified to species, gender, and individual. F2 appeared on camera late in the sampling period, first on 11 April and again on 17 May (Table A-2). Tracks were visible in the snow in photographs taken on 3 November, 7 November, and 8 December, although they could not be confirmed as wolverine. We confirmed wolverine tracks in the vicinity of the station on the day of deployment (29 October) and the day we retrieved the camera (14 June). In summary, F2 was the only wolverine confirmed in the Lost River Range but her status as resident or transient remains unclear. DNA analysis showed that F2 was not the animal incidentally trapped in the northern part of the Lost River Range in January 2019 (Pilgrim and Schwartz 2019).

Wolverine #3 ---This wolverine was detected from photographs at station 218 in the Lemhi Range. Station 218 was 23.5 km north of station 197, which was the northern-most location of F1's cluster of detections. The individual detected in photographs at station 218 appeared to be different from F1 (Figures A-1 and A-4). This wolverine appeared at station 218 on 1 day. It climbed to the scent pump and left hair, but from these 2 hair samples we got confirmation to species only. Unfortunately the DNA was of insufficient quality to obtain gender and individual. Photographs of the animal's movements around the tree illustrated that the camera placement was good, and a later detection of a coyote at the base of the tree confirmed that that camera should have detected other animals that approached the tree from either direction. Nevertheless, there were 4 instances (24 December, 29 January, 9 February, and 20 February) where large tracks were visible in 11 AM daily time-lapse photographs but the camera had not been triggered. Thus, we can't be certain that this wolverine visited the station only once.

Table 1. Camera survey stations in the Lemhi and Lost River mountains, winter 2017–18, with results for wolverine detection and DNA analysis of wolverine-positive samples to gender and individual.

Grid Cell_ID[a]	IDFG Region	Mountain Range	Station Type[b]	Gulo Detection	Gulo Gender[c]	Gulo ID	New to Wolverine Genetics Database?	Min # Indiv Identified at Station[d]
218	7	Lemhi	SP	Yes	Unk	Wolverine #3	n/a	1
197	7	Lemhi	B	Yes	F	IDFG18_197_F1	Yes	1
173	7	Lemhi	B	Yes	F[e]	IDFG18_197_F1[e]		1
174	7	Lemhi	B	Yes	F[e]	IDFG18_197_F1[e]		1
150/174	6	Lemhi	SP	No				
150	6	Lemhi	B	No				
151	6	Lemhi	B	No				
594	6	Lemhi	B	No				
114	6	Lemhi	B	No				
129	7	Lost River	B	No				
129B	7	Lost River	B	No				
113	7	Lost River	SP	No				
96	6	Lost River	SP	Yes	F	IDFG18_96_F2	Yes	1

[a] See Figure 2 for grid cell location.
[b] SP=Scent Pump, B=Bait
[c] F=Female, M=Male, Unk=Unknown. 'Unknown' gender due to (1) no wolverine DNA collected at camera station or (2) DNA was poor quality and could not yield gender and individual.
[d] Minimum number of individuals at each camera station based on genetics and examination of physical appearance of wolverines in photos. This column cannot be summed across sites, as 1 individual visited multiple sites.
[e] Based on photographic evidence, not DNA.

Other Species

We detected 17 other species at camera stations, including elk, mule deer, fox, coyote, and 8 species of birds. Species not detected on camera included wolf, black bear, moose, and fisher. Red fox was the most-photographed species (2,747 images) and occurred at 9 of the 13 stations (Table 2). Marten was the most ubiquitous animal, detected at 10 stations. Two species of marten are now recognized in North America: American marten (*Martes americana*) and Pacific marten (*M. caurina*; Pilgrim and Schwartz 2018*a* and cites therein). All of the hair samples we collected that had sufficient DNA to test for species were *M. caurina*. This aligns with results from the WSWCP camera survey, which also found that all marten samples collected from Idaho were *M. caurina* except 1 station in the Panhandle where *M. americana* was detected and 2 stations in the Clearwater that yielded genetic signatures for both species. Hybridization is known to occur between these 2 marten species in the northern Rocky Mountains.

Table 2. A sample of other species detected at camera stations deployed in the Lemhi and Lost River mountains, winter 2017–18.

Grid_ID	Pacific Marten[a]	Unk Marten[b]	Fox	Snowshoe Hare	Bobcat	Golden Eagle	Coyote	Mt Lion
218			●	●			●	
197		●		●				
173	●		●					
174	●		●	●				
150/174		●	●	●	●			
150	●		●			●		
151	●			●				
594	●		●					
114	●		●				●	●
129		●	●					
129B								
113								
96		●	●					

[a] Marten-positive DNA samples identified as Pacific Marten (*M. caurina*).
[b] Marten presence documented by photograph but quality DNA not obtained to test for species.

DISCUSSION

We entered into this study questioning whether the Lemhi and Lost River ranges could support resident wolverines because of the position of these mountain ranges near the southern periphery of wolverine occurrence in North America, the narrow peninsular configuration of the habitat, and the break in connectivity from habitat elsewhere in Idaho. We were curious if the frequent confirmed reports of wolverines in the Lemhi Range represented resident animals or transients. The area of modeled wolverine habitat along the length of the Lemhi Range is roughly 1,975 km^2. Based on average male wolverine home range sizes documented in Central Idaho to the Idaho/Montana border (Copeland 1996, Heinemeyer et al. 2017) and the fact that male wolverines have non-overlapping territories, essentially 1 male adult wolverine could occupy the Lemhi Range. Several females could occupy the same area, assuming adequate prey, denning habitat, and other essential resources were available.

After examining records more closely, it became clear that IDFG Salmon Region had documented a probable resident male wolverine (IDFG-Gulo_12_M2) during 2010–13. DNA from a hair sample collected at a baited camera station in Little Timber Creek identified this male during winter 2011–12 (Waterbury 2012), and that same individual was documented by an incidentally collected photograph in June 2013 in Patterson Creek (IDFG data). DNA confirmation came again at a camera station in July 2013 at Portland Mountain (Pilgrim and Schwartz 2013). This individual male was similar in appearance to a wolverine detected multiple times on a trail camera at a bear baiting site near Big Timber Creek in June 2010. Given the territorial nature of wolverines, these sightings over 3 consecutive years suggest this male was resident. According to the records and our results, a male wolverine has not been confirmed in the Lemhi Range since the last confirmed sighting of M2 in 2013.

Prior to this study there was no confirmed contemporary record of a female wolverine in the Lemhi Range. Our camera stations, combined with a retrospective comparison of photographs from previous camera surveys, confirmed that a female wolverine (IDFG18_197_F1) occupied the north-central portion of the Lemhi Range (Mill Creek to Yellow Peak) for at least 2 winters, and likely was resident for at least 6 years. The first 2 years overlapped temporally and spatially with the male described above. These 2 animals accounted for 5 of the 9 wolverine sightings in the Lemhi Range since 2005 and defined an area of activity from Mill Creek south to Portland Mountain in the center of the Lemhi Range.

We detected a wolverine in the northern end of the Lemhi Range during our winter 2017–18 study that, from external appearance, was neither the male nor the female described above. According to our camera records this wolverine visited only 1 day, possibly influenced by the lack of bait at this scent pump station. Two additional incidental wolverine observations the previous 2 summers occurred within 3 km and 7 km, respectively, of this location. Photographs were not available for comparison so the status of the wolverine we detected remains unknown.

No wolverine detections occurred at 5 camera stations south of Portland Mountain in the Lemhi Range during our study, or at a station run the previous year as part of the WSWCP camera survey. All but 1 of these 6 stations was a bait station. While additional effort could yield a different

conclusion, our results suggest that contemporary wolverine activity in the Lemhi Range is limited to north of Sheep Mountain.

Compared to the Lemhi Range, few wolverine records exist from the Lost River Range. This could be attributed in part to less focused effort (e.g., camera surveys) to detect wolverine compared with the Lemhis. To our knowledge, our camera survey was the only systematic survey that has sampled the length of the mountain range. The WSWCP camera survey in 2016–17 had only 1 camera in the entire range due to the sampling design. The amount of modeled wolverine habitat encompassed within the Lost River Range could support 1 resident male at most, based on average home range sizes documented in Idaho (Copeland 1996, Heinemeyer et al. 2017). The wolverine we detected in the Lost River Range was a female. Including the camera detections and the tracks we confirmed while deploying and retrieving the camera, we documented wolverine activity at this location at several different times of year. Nevertheless, the residency status of this female, or whether she was the only animal present, remains inconclusive.

Both the Lost River Range and the Lemhi Range occur on the landscape as narrow, peninsular mountain ranges separated by broad valleys. Wolverine habitat occurs as isolated "islands" of high-elevation alpine and subalpine habitats (Waterbury 2012). Not only is the total amount of available wolverine habitat limited, but the configuration of habitat creates potential vulnerabilities. Habitat fragmentation reduces connectivity among wolverine subpopulations, and the narrow, linear configuration of habitat increases proximity to front-country human activity from both sides. It is notable that half of the documented occurrences of wolverine in the Lost River Range came from nontarget trapping incidents. Projections for increasing temperatures and reduced snowpack could amplify the fragmented nature of habitat and further reduce connectivity (Idaho Department of Fish and Game 2017).

Our results suggest that 1 male and 1^{+} female could maintain territories in the Lemhi Range and possibly the Lost River Range. Habitat will remain limited and potentially become more so under current climate scenarios. Over time, the ability of wolverines to move between these isolated mountain ranges and more continuous habitat to the north and west will influence the persistence of wolverines at this southern edge of occurrence in Idaho.

ACKNOWLEDGMENTS

This camera survey was a collaboration among IDFG Salmon Region, McCall Subregion, and Upper Snake Region. Beth Waterbury and Jason Husseman were integral in selecting camera locations, providing local knowledge regarding access, overall logistics, and interpreting records of wolverine occurrence. Erik Peterson and Chris Gratton were lead technicians on the project, deploying and monitoring bait stations, organizing photo data, and reviewing photos. Curt Mack helped deploy and retrieve scent pump stations. Madison Ficca and Kaytlyn Goodwin reviewed photos to assign species ID. Amanda Pays assigned species ID and examined every wolverine image to determine number of individuals. Salmon Region provided office space and administrative support. Field housing was provided by the Pahsimeroi Hatchery (Doug Engemann). Hurbert Miller allowed access across his property to the Allison Creek site. Tempe Regan compiled records and reports from

Salmon Region files to help clarify records of past wolverine sightings. This project was funded by the Federal Aid to Wildlife Restoration (Pittman–Robertson) program.

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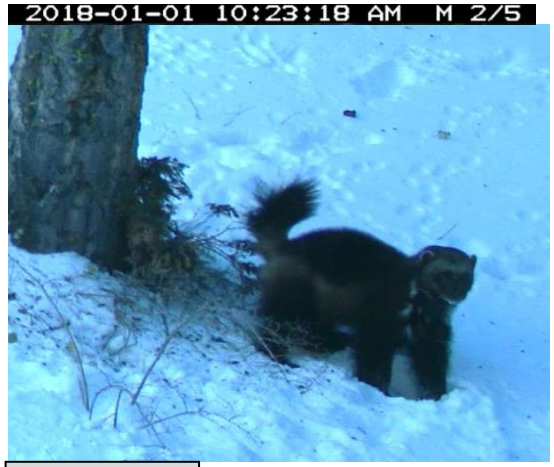
APPENDIX
Camera Stations and Individual Wolverines

Table A-1. Locations and dates of camera stations in the Lemhi and Lost River mountain ranges, Idaho, winter 2017–18.

Station Id	Mtn Range	Lat_ DDWGS84	Long_ DDWGS84	Station type	Deploy	Revisit 1	Revisit 2	Pull	Effort (days)
218	Lemhi	44.78309	-113.89094	Inaccessible/SP	10/31/2017			6/15/2018	227.04
197	Lemhi	44.64878	-113.66431	Accessible/B	12/15/2017	1/10/2018	2/15/2018	3/26/2018	100.78
173	Lemhi	44.56826	-113.63684	Accessible/B	12/21/2017	1/31/2018	3/5/2018	4/2/2018	101.78
174	Lemhi	44.53632	-113.51572	Accessible/B	12/16/2017	1/15/2018	2/14/2017	3/27/2018	100.80
150/174	Lemhi	44.44989	-113.44050	Inaccessible/SP	11/1/2017			6/12/2018	222.78
150	Lemhi	44.37084	-113.46585	Accessible/B	12/27/2017	1/30/2018	3/13/2018	4/2/2018	95.72
151	Lemhi	44.35836	-113.28575	Accessible/B	12/20/2017	1/17/2018	3/7/2018	4/4/2018	104.70
594	Lemhi	44.28005	-113.22012	Accessible/B	12/17/2017	1/16/2018	3/6/2018	3/28/2018	100.82
114	Lemhi	44.04975	-113.04588	Accessible/B	12/23/2017	2/5/2018	3/14/2018	4/5/2018	102.85
129	Lost River	44.32961	-113.90466	Accessible/B	12/18/2017	1/29/2018	3/12/2018	4/3/2018	105.78
129B	Lost River	44.22290	-113.83368	Accessible/B	12/19/2017	1/29/2018	3/7/2018	4/3/2018	105.05
113	Lost River	44.12232	-113.74020	Inaccessible/SP	10/30/2017			6/13/2018	225.74
96	Lost River	44.04855	-113.55170	Inaccessible/SP	10/29/2017			6/14/2018	227.07

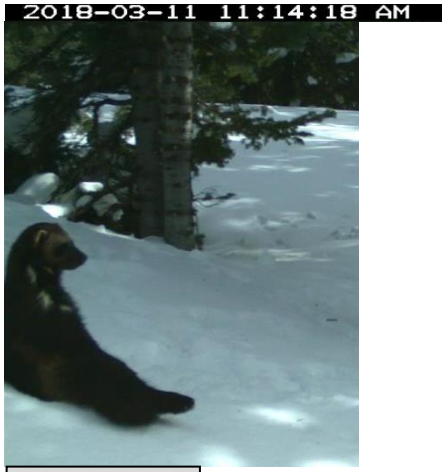
Table A-2. Dates and identities of wolverines visiting camera stations in the Lemhi and Lost River mountain ranges, Idaho, during winter 2017–18.

Station Id	Gulo?	Gulo Visit Dates	Individual	Comment
218	Y	12/10/17	Wolverine #3	climbed tree 3x
197	Y	12/21-12/25/17 1/8/18 1/29/18 3/1-3/5/18 3/24/18	F1	bait bone present bait bone present bait bone present stole a big chunk of meat bait bone present
173	Y	1/1-1/3/18 1/21/18 2/8/18 2/28/18 3/12/18	F1	stole big chunk of meat bait gone bait gone bait gone bait gone
174	Y	1/4/18 1/16-1/17/18 1/30/18 2/27/18 3/11/18 3/21/18	F1	got most of bait fresh bait – got much of it bait bone present big chunk of bait present thin bone left bone left – not interested
150/174	N			
150	N			
151	N			
594	N			
114	N			
129	N			
129B	N			
113	N			
96	Y	4/11/18 5/17/18	F2	camera out of position



Station 173

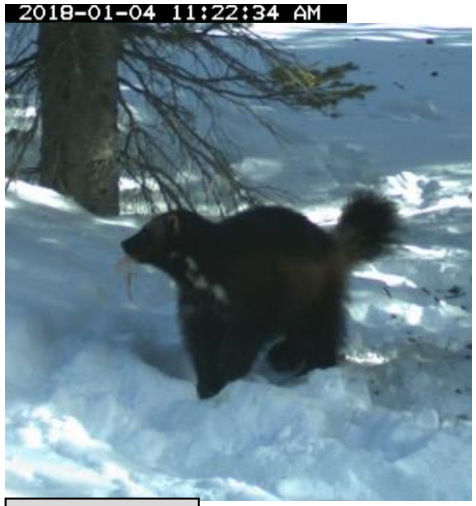
Station 197



Station 174

Grid Cell 173 – WSWCP camera survey previous year

Station 197

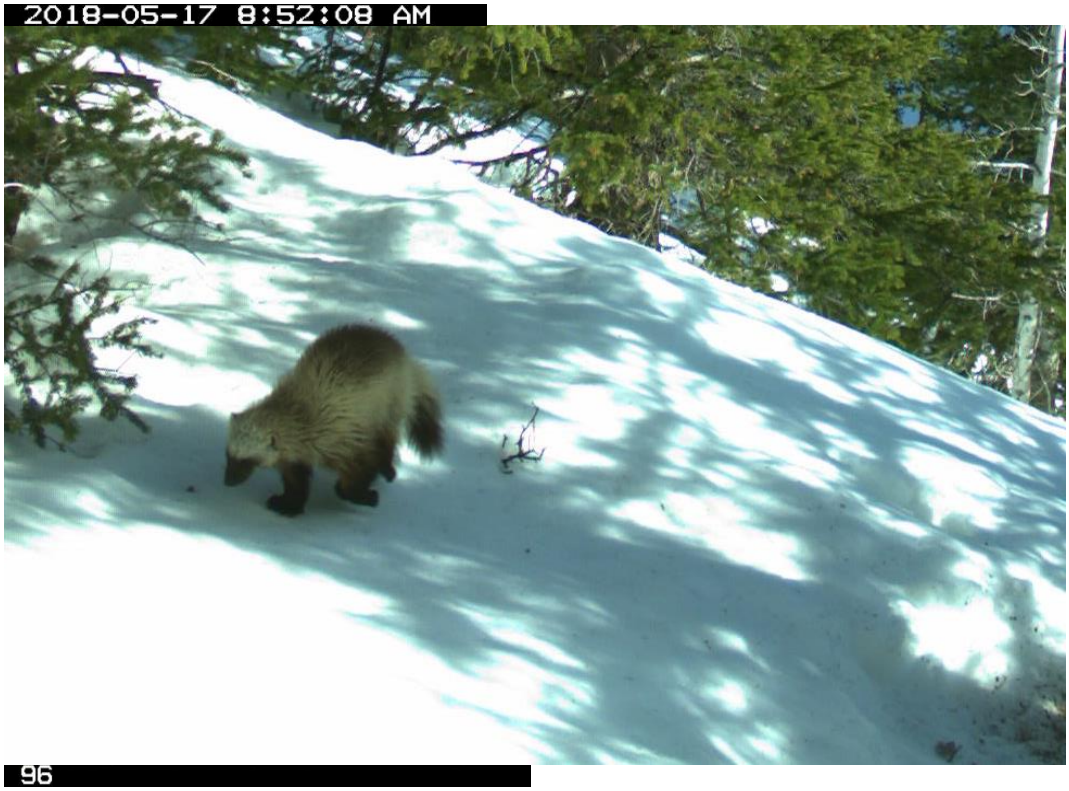


Station 174

Figure A-1. Wolverine IDFG18_197_F1 at 3 camera stations across 2 consecutive years in the Lemhi Range.

Figure A-2. Unidentified wolverine at Mill Creek camera & hair-snag station during winter 2012 (top; B. Waterbury, R7 files) likely was female wolverine IDFG18_197_F1 (bottom).

Figure A-3. Unidentified wolverine from Portland Mountain camera & hair-snag station in July 2013 (B. Waterbury, R7 files) likely was female wolverine IDFG18_197_F1 (bottom).



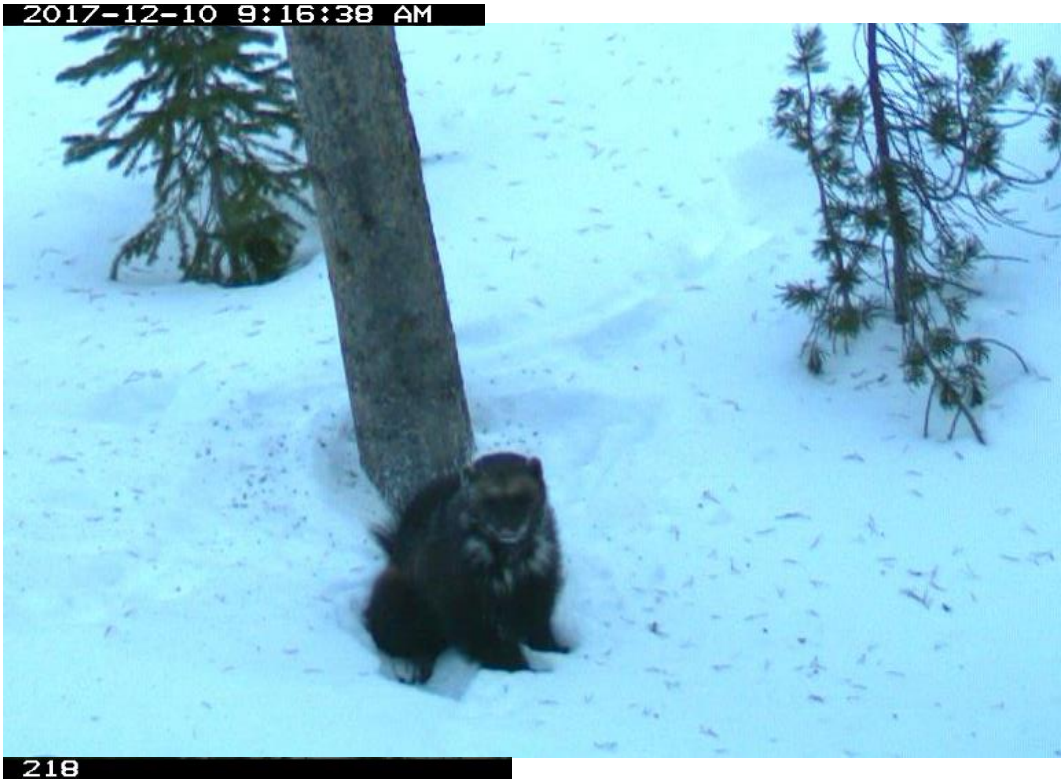


Figure A-4. Wolverine IDFG18_96_F2, Lost River Range (top) and Wolverine #3, northern Lemhi Range (bottom).

Submitted by:

Martha Wackenhut
Federal Aid Coordinator

Approved by:

IDAHO DEPARTMENT OF FISH AND GAME

Toby Boudreau, Chief
Bureau of Wildlife