

Cougars Killed by Wolves

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IN DECEMBER 1999, we documented the first cougar mortalities due to wolves in Yellowstone National Park. In this apparently rare interaction, female cougar F107's four kittens were killed in two separate events. We were able to document all four mortalities within less than 24 hours of their occurrence because F107 and the kittens were radio marked, and because of the collaboration between the cougar and wolf projects, which provided the ability to simultaneously monitor wolves and cougars. Field efforts by both projects provided as complete an interpretation of events proceeding and subsequent to the mortalities as possible.

Each radio collar is equipped with a special feature called a mortality mode. Thus, any collar that remains stationary for longer than six hours will switch to a different pulse rate; in this case a faster pulse than when the collar is not stationary. On December 16, 1999, a check for the F107 family group indicated that two of the kitten signals (F108 and M138) were in mortality mode and in the direction of the location of the cougar family group and Druid wolf pack from the previous day. We continued to monitor the remaining kittens in the family group, and on December 21, 1999, radio signals of the remaining two kittens (M140 and M142) indicated the kittens were dead. We hiked in to the sites and collected three of the kittens and all four of the radio collars within 45–815 yards of a cow elk carcass that had been killed by F107 between December 8 and 13. Sometimes, females with kittens may stay on a large elk kill for 8–10 days.

Although details of the interaction and deaths were obscured by snow

deposition, “troughs” through the snow and the location of the bodies suggested that three of the four kittens had run through the deep snow while being pursued by wolves. In particular, M138 had run upslope, out of tree cover, and was killed on top of a small sagebrush knoll. His body was found 139 yards from the elk carcass. His ears and nose had been chewed on and his lower left front leg was missing. After removing the kittens from the field, we had project veterinarian Dr. Kathy Quigley assist with the necropsies. While few external wounds were visible, the amount of internal damage the kittens had sustained was extensive. The ribcages of three kittens had been crushed, inducing trauma to their hearts. Their lungs and livers were hemorrhaged and macerated from bite wounds, and canine punctures were evident into the stomach lining of two kittens. Kitten M138 also had a fracture of the first cervical vertebrae.

Several factors may have played a role in the cougar mortalities. Although adult cougars are proficient at seeking rock outcrop and trees as escape habitat from aggressors, kittens generally lack the experience or knowledge of their home range to seek out appropriate escape habitat. Kittens may seek cover on the ground or by climbing trees that lack ample branches for perching for long periods of time. Adult cougars typically choose to climb Douglas-fir trees with large branches when escaping pursuit by hounds during our capture efforts. Another factor that may have played a role in the deaths of the kittens was their small body mass. Kittens F108 and M138 weighed 16 pounds at death. Kittens typically weigh about

25–35 pounds at four to five months of age. The small size of the kittens may have been negatively influenced by the size of the litter and the fact that this was F107's first litter. The low body weight and snow depth may have affected the ability of the kittens to run effectively during pursuit by wolves.

In deeper snow, kittens usually follow their mother through the path she has made in the snow. However, pursuit by an aggressor generally results in separation of the family unit. Finally, the Druid pack spent an unusual amount of time in the Rose Creek area compared to their typical movements about the Lamar Valley (Rick McIntyre, Yellowstone National Park, personal communication). Whether they showed an affinity to this area because of the cougars is unknown; however, the wolves returned to the Rose Creek drainage between the times that they made two elk kills in Lamar Valley. It seems as though their foray into Rose Creek between elk kills may have been to re-investigate F107's kill site. In either case, they encountered F107 with her kittens during their travels to or near her kill.

More recently, on April 4, 2003, at 7:05 AM, Polly Buotte and Jesse Newby of the Wildlife Conservation Society's Yellowstone Cougar Project detected a mortality signal on adult female cougar F106. At 8:30 AM, Buotte and Newby contacted Daniel Stahler of the Yellowstone Wolf Project, who was conducting an aerial telemetry flight for wolves. Buotte informed Stahler of the mortality signal and inquired if Stahler could obtain a location for them. From the air, Stahler and pilot Roger Stradley located F106 on top of Mt. Everts, and

they obtained a visual of the cat lying motionless on the ground. Stahler and Stradley also located F106's two four-month-old kittens (M164 and M166) nearby; their collars were still transmitting active signals.

At 2:30 PM, Buotte, Newby, Sawaya, and Stahler hiked in to the site to investigate the cause of F106's death. The kittens, which were still alive, were in the vicinity of F106's carcass, but a few hundred meters away. The investigation revealed that F106 had been killed in a fight with a wolf pack. Evidence to suggest this included visible bite wounds on her neck, entrails pulled from her body, wolf hair in her claws and teeth, wolf tracks in the area, and clumps of both wolf and cougar hair. Extensive snow tracking suggests that F106 had been in the area hunting without her kittens, though we found no evidence of a kill. At least eight sets of wolf tracks came into the area at a walk; at one point, ~40 meters out, all the wolves were bounding toward the fight scene. They came in from several directions, at ~45° to F106. A swath of snow ~30 m wide was trampled and contained large clumps of both cougar and wolf hair, blood, and other body fluids. A depression in the snow

~15 m away seemed to be where F106 lay down, severely injured. This area was melted and contained large clumps of cougar hair frozen into the snow. Her body was found ~10 m further away, which seems to indicate the wolves left her barely alive, then she crawled a short distance and died.

On the morning of April 3 at 9 AM, 10 members of the Swan Lake pack were seen crossing the road below Mt. Everts, heading towards the Beaver Ponds (Phil Perkins, YNP personal communication). One of the wolves was lagging far behind its pack mates and was limping badly from an injury to its left front leg. It seems very likely that these wolves were the ones involved in the altercation with F106, and they happened to be spotted as they were leaving the area. The Leopold wolf pack, which also uses this area, was known to be further east during this time (Dan Stahler, YNP, personal communication).

While monitoring for radio signals on the afternoon of April 2, cougar project personnel heard an active VHF signal on F106 from "Bear Rock" along the Jardine Road. With a directional antenna, her signal seemed to be coming from the top of Everts, where she was

later found dead. We did not hear F106's signal on April 3; however, we did not listen from Bear Rock that day. We did hear her kittens on April 2 and April 3. Given the sighting of the Swan Lake pack in the area on April 3, it seems likely this interaction occurred during the night of April 2 or the morning of April 3. F106's two male kittens eventually died after being orphaned at 4½ months of age.

Since the initiation of our study, these seven cougar mortalities have been the only ones directly linked to wolves. If direct interactions such as this tend to be rare events, the loss of six kittens may not be significant to the actual population size of cougars in Yellowstone. However, if all the kittens had survived to dispersal (an unlikely scenario), the five male kittens would have been highly likely to have dispersed to other areas and potentially contributed to other populations. If dispersal success is lower for cougars living with wolves, immigration rates to other populations may be affected, and harvest of cougars outside source areas such as Yellowstone may need to be altered. Our long-term study is focusing on trying to answer questions such as these.

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Wolves Killed by Cougars

ON JANUARY 12, 2000, male wolf #163M, under two years old, died in a ravine in the Crandall Creek area northeast of the park. When the site was examined by Dr. Kerry Murphy (Yellowstone Wolf Project) on February 5, 2000, cougar scats and tracks of a family group were present, as was a dead bighorn sheep. It is possible that wolf #163M was killed by a cougar after scavenging the cougar-killed bighorn sheep. However, no canine puncture marks were seen in the neck or skull of wolf #163M, and the carcass was heavily scavenged. Also, it could not be established that the bighorn was killed by cougars or by #163M, as there were too few bighorn remains to establish cause of death.

ACONFIRMED COUGAR KILL of a wolf occurred on January 29, 2003, in the Mill Creek area north of the park. Val Asher (Turner Endangered Species Fund) examined the site the following day. Female yearling wolf #297F was found near a fence line in the timber. The wolf was dragged up hill about 50–60 yards and cached under a pine tree, a classic indicator of a cougar kill. Most of her shoulder and back were consumed, then the carcass was covered with about six to eight inches of pine needles, leaving only the hind paws sticking out. Although tracks in the snow were slightly melted, lion tracks were present near the cache site, and it's possible the lion had a cub. There may have been another wolf on scene, but tracks showed it continuing down the road and off into the timber. The necropsy exam showed bite marks on the wolf's head only.