

## Gray Wolves, *Canis lupus*, Killed by Cougars, *Puma concolor*, and a Grizzly Bear, *Ursus arctos*, in Montana, Alberta, and Wyoming

MICHAEL D. JIMENEZ<sup>1</sup>, VALPA J. ASHER<sup>2</sup>, CARITA BERGMAN<sup>3</sup>, EDWARD E. BANGS<sup>4</sup>, and SUSANNAH P. WOODRUFF<sup>1</sup>

<sup>1</sup>U.S. Fish and Wildlife Service, P.O. Box 2645, Jackson, Wyoming 83001 USA

<sup>2</sup>Turner Endangered Species Fund, 1875 Gateway South, Gallatin, Montana 59730 USA

<sup>3</sup>Fish and Wildlife Division, Alberta Sustainable Resource Development, Box 1420, Pincher Creek, Alberta T0K 1W0 Canada

<sup>4</sup>U.S. Fish and Wildlife Service, 585 Shepard Way, Helena, Montana 59601 USA

Jimenez, Michael D., Valpa J. Asher, Carita Bergman, Edward E. Bangs, and Susannah P. Woodruff. 2008. Gray Wolves, *Canis lupus*, killed by Cougars, *Puma concolor*, and a Grizzly Bear, *Ursus arctos*, in Montana, Alberta, and Wyoming. *Canadian Field Naturalist* 122(1): 76-78.

Four cases where large predators caused Grey Wolf (*Canis lupus*) mortality are recorded. We describe two incidents of Cougars (*Puma concolor*) killing Wolves in Montana and one incident of a Cougar killing a Wolf in Alberta. We report the first recorded incident of a Grizzly Bear (*Ursus arctos*) killing a Wolf in the western United States.

Key Words: Gray Wolf, *Canis lupus*, Cougar, *Puma concolor*, Grizzly Bear, *Ursus arctos*, predation, interspecific interactions, Montana, Alberta, Wyoming.

Cougar (*Puma concolor*), Grizzly Bear (*Ursus arctos*), Black Bear (*Ursus americanus*), and Gray Wolf (*Canis lupus*) populations coexist in the Rocky Mountains of the United States and Canada. Reports of interactions between Wolves, Cougars, and bears are limited and most observations are anecdotal (Ballard et al. 2003). Wolves periodically usurp Cougar kills (U.S. Fish and Wildlife Service 1995; Ruth and Hornocker 1996; Ruth 2001) and occasionally kill adult Cougars (Schmidt and Gunson 1985; Boyd and Neal 1992; Jimenez, unpublished data) and Cougar kittens (White and Boyd 1989; Jimenez et al. 2006). Murphy et al. (1999) predicted that because Wolves travel in packs outnumbering Cougars, it is more likely for Wolves to kill Cougars than Cougars to kill Wolves. Cougars frequently kill domestic dogs; however, reports of Cougars killing Wolves are rare (Mexican Wolf Blue Ridge Adaptive Management Oversight Committee and Inter-agency Field Team 2005). We report two incidents of Cougars killing Wolves in Montana and one incident of a Cougar killing a Wolf in Alberta.

In 1995 and 1996, 35 Wolves were relocated from British Columbia and Alberta, Canada, to the Frank Church Wilderness Area in Central Idaho. Wolf #B-4, an adult female Wolf captured on 10 January 1995 at Petit Lake, Alberta, was released on 14 January 1995 in the Corn Creek drainage near Salmon, Idaho. By the end of February 1995, Wolf B-4 was located near the town of Drummond, Montana, approximately 185 km from the release site. Radio contact was lost on 17 November 1995, but we picked up a mortality signal in mid-January 1996 in that same vicinity. The dead Wolf was buried under approximately 60 cm of hard-packed snow in mountainous terrain covered by dense timber. We sent the frozen Wolf carcass to the U.S. Fish and Wildlife Service Forensics Lab in Ashland, Oregon. A necropsy revealed head trauma and a punc-

ture from a canine tooth through the top of the Wolf's skull. The Wolf had been killed, but not fed on, by a Cougar. From the time B-4 was released in 1995 until her death in 1996, we saw the Wolf one time and she was traveling alone.

On 29 January 2003, the radio-collar of female Wolf #297f from the Mill Creek Pack was located on mortality mode in the Paradise Valley, north of Gardiner, Montana. The pack consisted of three adults and four pups/yearlings. Investigation the following day found tracks of two Wolves traveling in 15-20 cm of snow along a two-track road in a mixed conifer forest. A barbed wire fence paralleled the road with briar bushes grown into it. Considerable amounts of Wolf hair and blood were found on the fence and on a bush. Tracks in the snow indicated that two Wolves were walking down the road but then both began to run. One set of Wolf tracks veered into the timber. The second set went through the barbed wire fence where the blood and hair were found. Drag marks in the snow led to a pile of 10 cm deep needles that covered the dead Wolf. Tracks indicated an adult Cougar with one or possibly two kittens had fed on the Wolf carcass. Punctures in the Wolf's hide and massive hemorrhaging were found on the neck and trachea. It was unknown if capture and handling twelve days earlier hindered the Wolf's flight, but we suspect that the Wolf running through the fence contributed to the Cougar catching and killing it.

A young, healthy, male Wolf #SR1 was fitted with an Argos satellite collar 18 November 2005 west of Turner Valley, Alberta, Canada. Wolf #SR1 appeared to be moving normally following capture until late February when daily locations localized in a 10 km<sup>2</sup> area. On 16 March 2006, Fish and Wildlife staff investigated the area and located the remains of #SR1 which included all four legs, head, tail, intestines, and stom-

ach cached under leaves and grass. Tracks in the snow indicated that a Cougar had been using an old farm shed at the site for shelter. It appeared that #SR1 traveled through the abandoned farm site and investigated the small shed where the Cougar was taking refuge. The Cougar attacked the Wolf and chased it through an open grassy area for approximately 50 m. Fresh blood was found where the Cougar made contact with the Wolf near trees at the edge of the grassy area. The Wolf was dragged by the Cougar approximately 130 m northwest and was cached in an area of thicker tree cover. Wolf hair was identified in Cougar scat found in the old farm shed. A necropsy of the Wolf remains revealed massive hemorrhaging in the muscle mass of the left jaw and a large fracture of the left dorso-ventral side of the skull.

Wolves and bears normally avoid each other; however, Wolves killed Black Bears in Alberta and Minnesota (Rogers and Mech 1981; Horejsi et al. 1984) and consumed denning Black Bears in Manitoba (Paquet and Carbyn 1986). Aggressive interactions between bears and Wolves are often associated with bears usurping ungulate carcasses from Wolves (Murie 1944; Ballard 1980; MacNulty et al. 2001; Ballard et al. 2003; Smith 2005) and defending young (Joslin 1966; Hayes et al. 1992; Ballard et al. 2003). A Brown [Grizzly] Bear killed a Wolf after usurping the carcass of a Moose (*Alces alces*) killed by Wolves in Alaska (Ballard 1980). We report the first recorded incident of a Grizzly Bear killing a Wolf in the western United States.

In summer 2005, we monitored a Wolf pack consisting of four adults and four pups, near Jackson, Wyoming. We placed an Argos satellite collar on a two-year-old Wolf and collected location data 4-24 times per day. Two clusters were less than a mile apart, indicating that Wolves had been there for 48 hours. We discovered the carcass of a yearling Moose at the first cluster. At the second cluster we found the fresh carcass of a 20-22 kg female Wolf pup that had been dead approximately one day. Along the back of the Wolf were large punctures through the hide, extensive muscle tissue damage, and massive hemorrhaging on the inside of the hide. The spine was broken in several places. Fresh Grizzly Bear tracks were found at the Moose carcass and the Wolf pup carcass. Based on the presence of Grizzly Bear tracks and the injuries to the Wolf pup, we concluded the Grizzly Bear killed the Wolf pup.

After extensive literature review, Ballard et al. (2003) summarized that Wolves, Cougars, and Grizzly Bears are occasionally adversaries due to interference competition; however, exploitation competition between wolves and other large predators did not result in significant resource partitioning. Wolf mortality from Cougar and Grizzly Bear predation is rare, and therefore it does not appear to be a significant factor impacting Wolves at the population level.

## Acknowledgments

We thank our pilots Roger Stradley, Bill Stewart, and Bob Ream, Western Air Research, USDA Wildlife Service specialist Jim Rost, and our field crew Karen Colclough, Lydia Dixon, Dylan Taylor, and Rebecca Hansen for their dedication and tireless efforts.

## Literature Cited

- Ballard, W. B.** 1980. Brown Bear kills Gray Wolf. *Canadian Field-Naturalist* 94 (1): 91.
- Ballard, W. B., L. N. Carbyn, and D. W. Smith.** 2003. Wolf interactions with non-prey. Pages 259-271 in *Wolves: Behavior, Ecology, and Conservation*. Edited by L. D. Mech and L. Boitani. The University of Chicago Press, Chicago, Illinois.
- Boyd, D. K., and G. K. Neal.** 1992. An adult Cougar, *Felis concolor*, killed by Gray Wolves, *Canis lupus*, in Glacier National Park, Montana. *Canadian Field-Naturalist* 106: 524-25.
- Hayes, R. D., and A. Baer.** 1992. Brown Bear, *Ursus arctos*, preying upon Gray Wolf, *Canis lupus*, pups at a Wolf den, *Canadian-Field Naturalist* 106: 381-382.
- Horejsi, B. L., G. E. Hornbeck, and R. M. Raine.** 1984. Wolves kill female Black Bear, *Ursus americanus*, in Alberta. *Canadian Field-Naturalist* 98: 368-369.
- Jimenez, M. D., S. P. Woodruff, S. Cain, and S. Dewey.** 2006. Wolf-Elk interactions on winter range and state-managed feed grounds in Wyoming. 2005 progress report. U.S. Fish and Wildlife Service, Jackson, Wyoming 83001.
- Joslin, P. W.** 1966. Summer activities of two timber Wolf (*Canis lupus*) packs in Algonquin Park. M.S. thesis, University of Toronto, Toronto, Ontario. 99 pages.
- MacNulty, D. R., N. Varley, and D. W. Smith.** 2001. Grizzly Bear, *Ursus arctos*, usurps Bison, *Bison bison*, captured by Wolves, *Canis lupus*, in Yellowstone National Park, Wyoming. *Canadian-Field Naturalist* 115: 495-498.
- Mexican Wolf Blue Range Adaptive Management Oversight Committee and Interagency Field Team.** 2005. Mexican Wolf Blue Range Reintroduction Project 5-Year Review. U.S. Fish and Wildlife Service, Albuquerque, New Mexico, and Arizona Game and Fish Department, Phoenix, Arizona.
- Murie, A.** 1944. The Wolves of Mount McKinley. U.S. National Park Service, Fauna Series 5. 238 pages.
- Murphy, K. M., P. I. Ross, and M. G. Hornocker.** 1999. The ecology of anthropogenic influences on Cougars. Pages 77 to 101 in *Carnivores in Ecosystems, The Yellowstone Experience*. Edited by T.W. Clark, A. P. Curlee, S. C. Minta, and P. M. Kareiva. Yale University Press, New Haven, Connecticut.
- Paquet, P. C., and L. N. Carbyn.** 1986. Wolves, *Canis lupus* killing Black Bears, *Ursus americanus*, in the Riding Mountain National Park area. *Canadian Field-Naturalist* 100: 371-372.
- Rogers, L. L., and L. D. Mech.** 1981. Interactions of Wolves and black bears in north-eastern Minnesota. *Journal of Mammalogy* 62: 434-436.
- Ruth, T. K.** 2001. Cougar-Wolf interactions Yellowstone National Park: competition, demographics and spatial relationships. Cumulative Annual Technical Report. Hornocker Wildlife Institute, Bozeman, Montana.
- Ruth, T. K., and M. G. Hornocker.** 1996. Interactions between Cougars and Wolves (and a bear or two) in the North Fork of the Flathead River, Montana (abstract). Fifth

- Mountain Lion Workshop, California Department of Fish and Game, Sacramento. 28 pages.
- Schmidt, K. P., and J. R. Gunson.** 1985. Evaluation of Wolf-ungulate predation near Nordegg, Alberta. Second Year Progress Report, 1984-85. Alberta Energy and Natural Resources, Fish and Wildlife Division, Edmonton.
- Smith, D. W.** 2005. Ten years of Yellowstone Wolves, 1995-2005. *Yellowstone Science* 13: 7-33.
- U.S. Fish and Wildlife Service.** 1995. Annual report of the Rocky Mountain Interagency Wolf Recovery Program. U.S. Fish and Wildlife Service, Helena, Montana 213 pages.
- White, P. A., and D. K. Boyd.** 1989. A Cougar, *Felis concolor*, kitten killed and eaten by Gray Wolves, *Canis lupus*, in Glacier National Park, Montana. *Canadian Field-Naturalist* 103: 408-409.

Received 2 August 2006  
Accepted 2 January 2009

## Dytiscid Beetle Remains Discovered in a Pellet from a Great Gray Owl, *Strix nebulosa*, Nest

KEVIN C. R. KERR

Department of Integrative Biology, University of Guelph, Guelph, Ontario N1G 2W1 Canada

Kerr, Kevin C. R. 2008. Dytiscid beetle remains discovered in a pellet from a Great Gray Owl, *Strix nebulosa*, nest. *Canadian Field-Naturalist* 122(1): 78-79.

On 18 July 2007, near Goose Creek, south of Churchill Manitoba, a Great Gray Owl, *Strix nebulosa*, pellet that contained the pronotum and elytra of a predacious diving beetle, *Dytiscus alaskanus*, was discovered at a nest.

Key Words: Great Gray Owl, *Strix nebulosa*, predaceous diving beetle, *Dytiscus alaskanus*, pellet, Goose Creek, Churchill, Manitoba.

On 18 July 2007, an owl pellet was recovered from the base of an active Great Gray Owl, *Strix nebulosa*, nest south of Churchill, Manitoba (58°40'28"N, 94°08'56"W). The pellet was within the size range reported for this species (Cramp 1985) and contained both the pronotum and elytra from an adult predacious diving beetle (Figure 1). The beetle parts were identified as belonging to *Dytiscus alaskanus* (Coleoptera: Dytiscidae). This large (22-30 mm) species is known to be fairly common in the area (Larson et al. 2000; R. E. Roughley, personal communication).

The nest was located on the rafters of a dilapidated cottage adjacent to Goose Creek Road, approximately 5 km south of Akudlik Village in Churchill. This is at the northern range limit in Manitoba for this species (Lang et al. 1991). Only three pellets were recovered from the nest site. Few pellets fell to ground level due to the structure the nest was sitting on; no additional pellets could be recovered without disturbing the nest. Neither of the other two pellets collected contained any beetle parts. All three pellets were comprised mostly of small rodent remains.

Great Gray Owls feed primarily on voles and the remainder of their diet largely consists of other rodents and small mammals (Bull et al. 1989; Bull and Duncan 1993). Other items tend to include moderately-sized vertebrates (Bull and Duncan 1993). Bull et al. (1989) observed the remains of only five insects after analyzing 1923 pellets from Great Grays nesting in Oregon. Species of insects previously observed in Great Gray Owl pellets have been of questionable origin, as they could have been accidentally ingested with

other prey items. The beetle remains discussed here suggest that the insect was actively hunted.

Great Horned Owls have been observed hunting dytiscid beetles in southern Manitoba (Duncan and Lane 1988). Although these owls are commonly regarded as generalist predators, they feed primarily on small mammals (Marti and Kochert 1996). *D. alaskanus* can reach high population densities in early summer and adults are attracted to lights (Aiken and Wilkinson 1985). These factors, combined with its large size, could make these beetles a viable food source at certain times of the year. Nero (1980) relays anecdotal evidence that a Great Gray Owl once captured a dragonfly beneath a bright light. These findings suggest that Great Gray Owls might opportunistically supplement their diet with non-typical prey items when they are abundant.

### Acknowledgments

I thank Jim Duncan for helpful suggestions on this manuscript, Rob Roughley for identifying the beetle remains, Anaïs Renaud for showing me the nest site, and also my advisor, Paul Hebert, for first bringing the pellet to my attention.

### Document Cited (marked \* in text)

**Bull, E. L., and J. R. Duncan.** 1993. Great Gray Owl (*Strix nebulosa*). The Birds of North America Online. Edited by A. Poole. Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: <http://bna.birds.cornell.edu.bnaproxy.birds.cornell.edu/bna/species/041doi:bna.41>