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Grizzly Bear, *Ursus arctos*, Usurps Bison Calf, *Bison bison*, Captured by Wolves, *Canis lupus,* in Yellowstone National Park, Wyoming

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We describe an adult Grizzly Bear (*Ursus arctos*) usurping a Bison (*Bison bison*) calf from a pack of five Wolves (*Canis lupus*) attempting to kill the Bison in Yellowstone National Park during early spring. Five Wolves grabbed the hind end and neck of the calf while it was trailing behind two adult male Bison. In 3 minutes a Grizzly Bear arrived and displaced the two Wolves attacking the hind end. For 1 minute the Grizzly Bear attacked the rear of the Bison while three Wolves attacked the front end. The Grizzly Bear subsequently pulled the struggling calf from the Wolves and made the kill. The Wolves were unable to displace the Grizzly Bear from the carcass. Our observation demonstrates the capacity for Grizzly Bears to exploit the predatory abilities of Gray Wolves restored to Yellowstone National Park. Kleptoparasitism by Grizzly Bears on Wolf-captured ungulates may be a selective pressure promoting group living in Wolves, and could provide an important new food resource to threatened Grizzly Bears in the Greater Yellowstone Ecosystem.

Key Words: Grizzly Bear, *Ursus arctos*, Wolf, *Canis lupus*, Bison, *Bison bison*, predation, kleptoparasitism.

Wolves (*Canis lupus*) and Grizzly Bears (*Ursus arctos*) commonly interact in the defense of offspring or in competition for carcasses (Murie 1944; Ballard 1982; Hornbeck and Horejsi 1986; Hayes and Mossop 1987; Hayes and Baer 1992; Servheen and Knight 1993; Kehoe 1995; Mech et al. 1998). Lent (1964) reported tolerance between a Grizzly Bear and a Wolf feeding simultaneously on a Caribou (*Rangifer tarandus*) carcass. During competition for carcasses, Murie (1944:204) observed that in general, "the Wolves are the losers and the meat-hungry bears are the gainers". The ability of Grizzly Bears to contest carcasses successfully could be a factor favoring the evolution of group living in Wolves, and may be an important consideration in the conservation of Grizzly Bears in the Greater Yellowstone Ecosystem (GYE). Here we describe the first observation of a Grizzly Bear usurping a Bison captured by Wolves.

The Wolf-Grizzly Bear interaction was observed near Pelican Valley, Yellowstone National Park, Wyoming (44° 38' N, 110° 13' W) on 24 March 2000. The interaction occurred in an open creek drainage bordered by forests composed primarily of Lodgepole Pine (*Pinus contorta*). The area lies at 2432 m and is subjected to long, cold winters, with snow thickness from 33–160 cm. To survive in Pelican Valley during winter, Bison rely upon an archipelago of snow-free and nearly snow-free areas created by geothermal activity (Meagher 1976). Thermal features (hotsprings, fumaroles, etc.) and patches of thermally influenced warm ground are scattered throughout the area. South-facing and wind-blown slopes provide additional habitat for bison. Winter forage includes various species of sedge (*Carex* spp.) and grass (Meagher 1973).

From a prominent hilltop, we observed the Wolf-Grizzly interaction using a 56× Nikon spotting scope from a distance of 6.0 km. Observations were timed with a digital stopwatch and recorded on a portable voice recorder. The pack of five adult Wolves first encountered the herd of 59 Bison on 23 March at 09:08, and a Grizzly Bear first appeared at 12:31 while running toward the Wolves as they made a failed attempt to kill a Bison. In each of two subsequent attacks observed that day, the Grizzly Bear ran immediately behind or alongside the pursuing Wolves. Two additional adult-size Grizzly Bears appeared traveling together toward the Wolves at 18:38. Subsequent play behavior suggested that the bears were a two-year-old sibling pair.

The next day, 24 March, 12:13–18:19, 1–5 ($\bar{x} = 3$) Wolves made a series of 14 attacks, alternately attacking and resting, on a Bison group containing nine adult/juvenile bulls and one 11-month-old calf of unknown sex. The group of 10 Bison had remained in the area while the remainder of the herd fled when the pack pursued a single unidentified Wolf approaching the Bison at 11:19. The unidentified Wolf was not wearing a radio-collar and was presumed to be either an unrelated trespasser or an unwelcome relative. The pack mobbed the unidentified Wolf, but allowed it to escape.

Wolf attacks on Bison lasted 2–11 minutes ($\bar{x} = 6$ minutes), and involved Wolves lunging at Bison while they stood grouped on a thermal feature ($n = 12$) or running single file through deep snow

between thermal features (n = 2). Wolves targeted the calf during all attacks. In four attacks 1–2 wolves grabbed the calf and inflicted visible damage to the rump and flanks but failed to make the kill. In all but the final attack 1–5 bulls ($\bar{x} = 2$) defended the calf by charging and kicking at the Wolves. A bull successfully kicked a Wolf in only two attacks.

During Wolf attacks Grizzly Bears watched at a distance greater than 15 m (n = 2), approached and walked the perimeter of the attack area (n = 3), and approached and grabbed prey (n = 1). When walking the perimeter of the attack area Grizzly Bears often displaced resting Wolves not participating in the attack. Grizzly Bears were not visible in the remaining six attacks due to vegetation and topography; however, their ongoing presence was inferred when visible between attacks. For example, at 15:07, during a pause between the fifth and sixth attacks, one grizzly reappeared from behind a screen of trees and rushed the wounded calf, which stood in the center of nine resting bulls. The grizzly halted and walked back behind the trees when the nine bulls stood up and gathered around the calf.

The final attack was preceded by a 3.5 hour standoff between Wolves and Bison on a thermal feature at the foot of a small snow covered ridge. During this period Wolves made periodic attempts to grab the calf but were repelled each time by the bulls. The standoff ended when seven bulls walked away from the thermal feature and ascended the ridge, leaving two bulls to defend the calf. After a failed attempt to capture the calf, the Wolves left the thermal feature at 18:05 and trotted toward the seven bulls. Meanwhile, one Grizzly Bear appeared and began walking toward the two bulls and calf.

For clarity the events involving the final attack are listed below chronologically.

18:14 The two bulls, followed closely by the calf, walked away from the thermal feature and began ascending the ridge single file toward the seven bulls and five resting Wolves. The grizzly continued to approach the three Bison.

18:15 Sighting the oncoming Bison the pack arose and approached the two bulls and calf from the west while the grizzly approached from the east. The calf moved with difficulty through the snow and trailed 10–15 m behind the two bulls.

18:19 All five Wolves walked past the two bulls and four Wolves grabbed the calf; three grabbed the hind end and one grabbed the flank. Seconds later a fifth Wolf grabbed the neck. The two bulls continued walking and joined the seven other bulls.

18:20 The grizzly continued to approach from the east, nearing the calf and Wolves.

18:21 Three Wolves released the calf and charged the grizzly while the remaining two Wolves continued to grab the hind end of the calf. As the Wolves started to lunge at the grizzly it rose to its hind legs, quickly fell back to all four feet, and fled with the three Wolves in pursuit. Within seconds, the grizzly turned, ran past the pursuing Wolves, and back to the calf.

18:22 The grizzly forced the two Wolves from the calf's hind end and began to attack the calf with its forepaws. The two Wolves, joined by a third, then grabbed the front end of the calf.

18:23 Three Wolves bit the front end of the calf while the grizzly swatted at the hind end.

18:24 The grizzly pulled the calf from the Wolves, dragged it to the ground, and began to feed. The Wolves did not contest the carcass any longer. Four Wolves disappeared over the ridge while one Wolf stood by and watched the grizzly feed.

18:26 Two Wolves returned from behind the ridge and rested along side the other Wolf approximately 5 m from the carcass and the feeding bear. Meanwhile, the nine bulls began to walk single file back along the ridge toward the thermal area, the feeding grizzly, and the resting Wolves.

18:41 As the bulls approached to within 5 m, the grizzly abandoned the carcass and disappeared over the ridge. Nearly simultaneously, two Wolves reappeared, and all five Wolves repossessed the carcass and started feeding. The first bull to run past the carcass briefly displaced the Wolves. Once the bull was past the Wolves returned and continued to feed. Five more bulls ran past the feeding Wolves singly or in pairs. Two Wolves briefly chased a pair of Bison as they ran past and then returned to the carcass.

18:53 The pair of sibling grizzlies appeared at the thermal area and began to approach the carcass and the feeding Wolves.

18:54 The two grizzlies veered and began walking away from the carcass.

18:58 The last bull, which was also the smallest, ran past the feeding Wolves. Again, two Wolves briefly pursued the bull and returned to the carcass.

19:00 The single grizzly returned to the carcass from behind the ridge, displaced all five Wolves, and resumed feeding. Two Wolves disappeared over the ridge immediately, while three Wolves remained standing around the carcass, watching the grizzly feed.

19:06 The single grizzly continued to feed on the carcass without interruption until observation ended due to darkness.

Initial observation at 07:00 the following day 25 March, found one grizzly feeding on the carcass, while three Wolves were sleeping 25 m away. The grizzly fed until 11:51, and then walked over the ridge and out of view. During this period the Wolves approached the grizzly to within 5 m but did not actively contest the carcass. Once the grizzly left the carcass three Wolves returned and fed until at least 12:29, at which time the carcass was pulled over the ridge and out of view.

The Wolves' failure to seriously challenge the grizzly once the Bison was usurped may have been influenced by the tearing of the carcass into two or more parts during the struggle for possession. This explanation is supported by our inspection of the kill site, which revealed the remains of a front and rear leg over the ridge where the Wolves and the grizzly disappeared. It is possible that the grizzly fed on these parts when it was displaced from the carcass by the nine passing bulls. Likewise, when the grizzly was feeding on the carcass and only one to three Wolves were visible, the remaining Wolves were probably feeding on these same parts. Based on examination of two mandibles found at the kill site the age of the Bison was confirmed to be 11 months.

The sequence of events that led to the Grizzly Bear usurping the Bison calf from the Wolves began with the unusual association between the calf and the bulls. While bulls are known to defend calves from Wolves (Carbyn and Trottier 1988; Carbyn et al. 1993), the occurrence of a calf within a Bison group composed exclusively of bulls has not been previously reported for a wild Bison population. Bison calves are usually found in large mixed herds containing females of all ages, yearlings, and most males two to three years old (Meagher 1986). Explanations include (1) random association, (2) calf was orphaned, and (3) if a male, the calf deliberately joined the bull group. The cow-calf bond breaks earlier for males than for females (Lott and Minta 1983; Green et al. 1989), and calves not associating with a cow are subject to more aggression than calves with cows (Coppedge et al. 1997). Frequent feeding displacement during early spring food scarcity (Rutberg 1986) may have led the 11-month-old calf to join the smaller bull group.

Kleptoparasitism by Grizzly Bears and other scavengers on Wolf-captured ungulates could be a factor favoring the evolution of group living in Gray Wolves. In African Wild Dogs (*Lycaon pictus*) kleptoparasitism by Lions (*Panthera leo*) and Spotted Hyenas (*Crocuta crocuta*) is considered an important factor in the evolution of group living (Fanshawe and FitzGibbon 1993; Creel and Creel 1996; Carbone et al. 1997). Wolves might respond to kleptoparasitism from Grizzly Bears by increasing group size and thereby increase access time at carcasses. Future studies should attempt to assess whether larger packs of Wolves are more successful at defending carcasses from Grizzly Bears and whether increases in access time fully compensate for reductions in per capita intake due to larger pack size (Schmidt and Mech 1997). Interestingly, the Wolves reported in this observation rejected an opportunity to increase the size of their group when they ran off an unidentified Wolf, suggesting that factors unrelated to prey capture or carcass defense may be more important to group formation.

While an earlier assessment predicted that Wolves restored to Yellowstone National Park would not affect the Yellowstone Grizzly Bear population (Servheen and Knight 1993), the capacity for Grizzly Bears to usurp Wolf-killed ungulates suggests the potential for a positive effect. Wolf-killed ungulates may be an important new high-quality food resource for Grizzly Bears in the GYE, where the future of many traditional Grizzly Bear foods is uncertain (Mattson and Reid 1991). An increase in the availability of meat to Grizzly Bears could positively influence several population parameters including adult female body mass, litter size, and population density (Hilderbrand et al. 1999).

Whether Yellowstone Grizzly Bears realize a population level benefit from Wolf-killed ungulates may largely depend on seasonal and demographic variation in access to Wolf-killed ungulates. Grizzly Bear population densities have been found to correlate positively with fall meat availability, in part because meat consumed in fall is more important for successful cub production and hibernation than meat consumed in spring (Hilderbrand et al. 1999). Fall is also a period when Wolf persistence at kills may be greater due to lower kill rates compared to spring (Smith unpublished), thus potentially limiting grizzly access to Wolf-killed ungulates. The ability of Grizzly Bears to usurp and maintain possession of a Wolf-killed ungulate may also be affected by Grizzly Bear age, sex, and reproductive status. Specifically, females with offspring or smaller bears of either sex may be less capable than adult males in usurping a carcass from Wolves, and subsequently keeping the carcass from other grizzlies. Adult male grizzlies are more aggressive than other age and sex classes and tend to dominate localized high-quality food resources (Craighead et al. 1995). As a result, adult male grizzly dominance at Wolf-killed ungulates may restrict access to Wolf-killed ungulates among other members of the GYE grizzly population (i.e., reproductive females).

If Wolf-killed ungulates are unavailable to grizzlies in the fall and/or consumed mainly by adult male grizzlies, a population level benefit to GYE

Grizzly Bears due to Wolf-killed ungulates seems unlikely. However, further research is necessary to understand the seasonal and demographic variation in Grizzly Bear access to Wolf-killed ungulates.

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