

# Grizzly Bears and Snowmobile Use

## A Summary of Monitoring a Grizzly Den on Togwotee Pass

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**D**URING WINTER 2009–2010, a grizzly bear was observed digging a den in the Squaw Basin area of Togwotee Pass, providing a unique opportunity to monitor a grizzly bear den and the bear's reaction to snowmobile use. Togwotee Pass is located on the Bridger-Teton National Forest, in the southern part of the Absaroka mountain range in northwestern Wyoming. This majestic mountain range forms a part of the southern and eastern border of Yellowstone National Park. Squaw Basin is an open meadow area, approximately 500 meters (1,640 ft) from State Highway 26/287 and 1,300 meters (4,265 ft) from the popular Continental Divide snowmobile trail. The Togwotee Pass area is well known by snowmobile recreationists and there are almost 402 kilometers (250 mi) of groomed snowmobile trails in the area. With the exception of designated Wilderness areas and a handful of ungulate winter ranges that require humans to stay on designated trails, much of the terrain on Togwotee Pass is open to off-trail snowmobile use. Squaw Basin is one of those popular places for snowmobilers to freely explore large open meadows and hillsides.

Much of the snowmobile activity in the Greater Yellowstone Ecosystem occurs on the same federal lands that are also home to the Yellowstone grizzly bear population. In order to properly manage federal lands, wildlife biologists have tried to analyze the possible effects of snowmobiling on the bears of the Greater Yellowstone Ecosystem. Studies have found that bears are potentially sensitive to disturbance by roads, human habitation, and industrial activity (Linnell et al. 2000). Also, grizzly bears may prefer den sites in remote areas with little human use or

activity within 1–2 kilometers (0.62–1.24 mi) (Goldstein et al. 2010; Craighead and Craighead 1972). While these studies may seem to point to a possible sensitivity by bears to other general disturbances, very little is known specifically about a bear's reaction to snowmobiles. Due to the scarcity of information, the US Fish and Wildlife Service recommends monitoring known grizzly bear dens in snowmobile recreation areas.

### Methods

In December 2009, the Interagency Grizzly Bear Study Team notified the Bridger-Teton National Forest of the Squaw Basin den. It was occupied when it was first reported by hunters in November and it was observed from a distance by Wyoming Game and Fish Department biologists



Camera set-up used to monitor snowmobile and grizzly bear activity at a den site on Togwotee Pass, Bridger-Teton National Forest, January–April 2010. Camera #1 on the left and Camera #2 on the right. The camera site is located approximately 175 meters north of the den.



Photo of the hillside supporting the grizzly bear den and snowmobile activity near Togwotee Pass, Bridger-Teton National Forest, taken from the camera site on January 19, 2010. The collapsed breathing hole that was observed on January 12, 2010 is circled.

throughout the next several months. In January 2010, two RECONYX® cameras were deployed on a rocky outcrop approximately 175 meters (574 ft) north of the den to remotely monitor bear and snowmobile activity in the area. The cameras were positioned to obtain a panoramic view of the den, encompassing an area of approximately 5 hectares.

The RECONYX® cameras were programmed to take pictures every 5 minutes during daylight hours. Due to their distance from the den, the cameras were not triggered by movement on the hillside that supported the den. During January through April the camera site was visited every 1–2 weeks, during which visual observations were made and memory cards were collected.

Observations and track counts were gathered using a variety of procedures. Most of the general observations were taken from the camera site, using both binoculars and plain sight. The snowmobile track counts were made using the RECONYX® photos. The photos were viewed individually and a new track was counted when it became visible. The

tracks were counted in two categories. One category was for tracks that drove directly over the den area, defined as within a 25-square-meter (83 ft<sup>2</sup>) area of the den entrance. The other category counted any tracks that could be seen around the hillside that supported the den, including those directly over the den.

Some discrepancies were found between the number of snowmobile tracks captured by the two cameras. Due to glare from the sun and snow, and camera lenses being occasionally covered by drifting snow, each camera captured close but slightly different track numbers. For consistency, only the track numbers counted by Camera #1 were used in the graphs and statistics reported in the following sections.

## Results

The den was first reported to Wyoming Game and Fish Department biologists in early November 2009. The den was then monitored from Highway 26/287 by the Wyoming



Photo of the hillside supporting the grizzly bear den near Togwotee Pass, taken from Highway 26/287 on April 21, 2010, a few days after bear emergence, showing the entrance hole and both bear and snowmobile tracks. The den entrance is circled and bear tracks are marked with an arrow.

Game and Fish Department several times thereafter through December 2009. The Wyoming Game and Fish Department found that the den entrance was covered by snow on December 3, 2009. A few kite-skiing tracks were observed near the den in early November and again in early December. No snowmobiles were observed near the den until the end of December, although there was some snowmobile use reported in the general Squaw Basin area during those months.

On January 12, 2010, the RECONYX® cameras were installed and monitoring with photos began. On that same day, a hole was first observed over the den entrance. This was presumed to have been caused by snow collapsing into the den hole when a snowmobile user drove directly over the den. It was the first sign of den presence since it was initially covered with snow in early December. The den entrance was subsequently covered by snow after an ensuing winter storm and there was no other sign of den occupation until bear emergence in April.

We visited the camera site on Monday, April 19, to recover photos and make visual observations of the den site. The RECONYX® photos revealed that the den entrance was first exposed by the bear at 4:36 PM on Sunday, April 18. At 2:00 PM on Tuesday, April 20, we observed a sow with one cub of the year 10 meters (32 ft) from the den entrance, prompting the Buffalo District Ranger to initiate an emergency closure of the area surrounding the den to help ensure public safety and bear security. On Wednesday, April 21 at 1:00 PM, the sow and cub were observed leaving the den area, moving west across a large (approximately 50 hectares) treeless area toward conifer cover 1 kilometer from the den.

At 9:00 AM on Thursday, April 22, we located the family's tracks leaving the den and followed them to the treed area. We also followed the tracks back to the den area where three bed sites were found on an east-facing hillside approximately 130 meters (426 ft) west of the den. We collected hair from those bed sites and sent them to the Interagency Grizzly Bear Study Team for DNA analysis. This may





The grizzly sow and cub of the year emerge from the den on April 19, 2010.

provide individual bear identification and lineage of the bear when included in the full Greater Yellowstone Ecosystem grizzly bear DNA database.

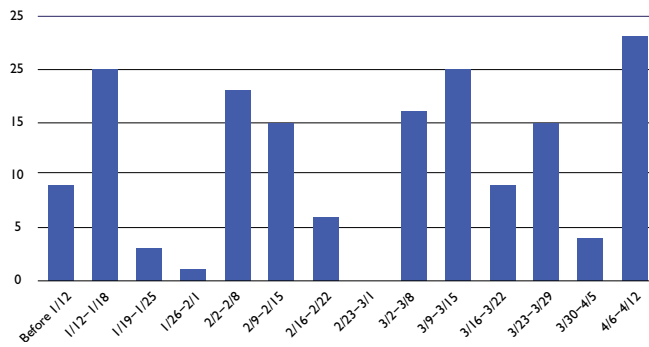
We monitored the den site intermittently from the highway for six days following emergence. There was no sign of the bears' return to the den area, despite ample fresh snow that would clearly indicate use of the site by the family. The closure was then lifted and the cameras removed.

Snowmobile use occurred in the general vicinity of Squaw Basin meadow (approximately a 370 hectares), the den hillside itself (approximately 2.5 hectares), as well as at the den entrance (figs. 1 and 2). All recreation use observed was by snowmobiles, with the exception of one snow-kite skier. Snowmobile use increased at the end of December and continued throughout the rest of the winter. There was an increase in use on weekends—65% of tracks occurred on weekend days versus weekdays. April 12 was the last time a snowmobile was observed on the den hillside—six days before bear emergence. The average number of new tracks per week was 11.5, ranging from a minimum of 0 to a maximum of 23. The total number of tracks directly over the den area for the entire winter was 48.

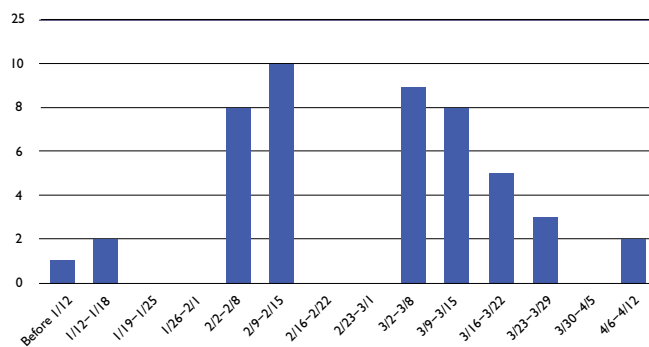
## Discussion

The denning period is a vulnerable time for bears. On average, lactating females lose 30%–40% of their body weight during the winter (Schwartz et al. 2003). Studies on black bears have shown that body weight can decrease an additional 3%–20% if dens are abandoned (Tietje and Ruff 1980). Of the potential reactions to disturbance, the abandonment of a den by a sow with a neonatal cub carries the highest energy cost (Linnell et al. 2000), since it exposes the cub to many risks and greatly decreases its chance for survival. Therefore, females with cubs should be expected to withstand the greatest levels of disturbance without abandonment (Cherry 2001), and it may be expected that maternal females may tolerate snowmobile activity, even directly on top of the den.

Our observations suggest tolerance by some bears to disturbance from both highway and snowmobile traffic. The sow and her cub experienced high levels of disturbance by snowmobiles during the winter—an average of 11.5 snowmobile tracks on the den hillside per week. Although significant snowmobile use likely did not occur until mid-late



**Figure 1.** The weekly number of total snowmobile tracks observed within a 2.5 hectare area around the grizzly bear den at Togwotee Pass, including tracks directly over the den entrance. The number of snowmobile machines associated with the weekly counts was not estimated.



**Figure 2.** The weekly number of snowmobile tracks observed within 25 square meters of the den entrance, Togwotee Pass.

December, when the sow had already selected the site and built the den, the highway was in use at the time the den was selected and dug by the sow. Bears may be more likely to abandon dens if disturbed shortly after entry rather than in mid-winter (Craighead and Craighead 1972; Linnell et al. 2000).

While the sow did not abandon the den, lesser responses to disturbances, such as increased heart rate, waking and movement in the den, among others, are possible and also have the potential to increase energy costs (Linnell et al. 2000). The presence or absence of these responses could not be determined by this monitoring.

One factor contributing to the successful over-wintering may be that the snow covering the den may have significantly diminished the sound and vibrations from snowmobiles and the highway. Studies with polar bears in Alaska have found dry arctic snow to be a good sound insulator (Blix and Lentfer 1992).

After emergence, the amount of time spent by grizzly bears in the vicinity of the dens is variable (Judd et al. 1983). However, it is not uncommon, particularly for sows with

cubs of the year, to spend several weeks in the vicinity of the den after emergence (Craighead and Craighead 1972). Haroldson et al. (2002) found that females with cubs often stay within 3 kilometers (1.8 mi) of the den until late May. This den was apparently abandoned within about 24 hours of emergence. At the time of the bears' emergence there was no known snowmobile use in the nearby area for the 24 hours they remained close to the den. Therefore, we were not able to assess any potential reactions to snowmobile use close by the den. Disturbances by traffic along the highway may have contributed to an apparent early departure from the den area. While this sow and cub may have abandoned the den site proper, it is possible they remained within a 3 kilometers (1.8 mi) radius.

A considerable amount of glare on the camera lens resulted from the sun and snow. During most cloudless days, this glare was strong enough to completely block photos of activity on the hillside for significant lengths of time. Drifting snow also periodically covered the camera and/or lens. This happened with both cameras, although it was more frequent with Camera #2, which was located in the corner of a large rock outcrop which may have contributed to the drifting snow. These difficulties likely explained the discrepancies in track numbers observed between the two cameras.

## Management implications

This example suggests tolerance by a bear to large amounts of snowmobile use and disturbance during her denning period. However, as noted by other researchers (Craighead and Craighead 1972; Mace and Waller 1997; Haroldson et al. 2002), perhaps the greatest potential for negative consequences of direct disturbance for females with newborn cubs is directly after emergence. This case does not amend that hypothesis; the sow selected the site long before snowmobile use occurred, and having a cub of the year present



The den area directly after den excavation, November 2009.



KERRY MURPHY

Author Sarah Hegg following the tracks of the sow and cub on April 22, 2010, after they left the den vicinity.

would have greatly increased the potential costs of moving the den site. Monitoring dens in high disturbance situations and taking cautionary measures after emergence is important to protect bears and better understand their reactions to human activity. However, because grizzly bears rarely reuse a den site, particularly one dug into a hillside (Judd et al. 1986), providing extended area protections in a situation such as this is likely unnecessary. As the grizzly bear population in the Greater Yellowstone Ecosystem increases, conflicts with recreationists may also increase. Observations such as this can be referenced to evaluate anthropogenic effects on grizzly bears and future research and management actions.

## Acknowledgements

Thanks to Kerry Murphy for his patient mentorship. Thanks to the Bridger-Teton National Forest Buffalo Ranger District staff, specifically Wade Undem and Rick Taylor, for their assistance in monitoring the den. Thanks also to Gordon Ash, Tom Hill, Jim Ramirez, Ray Spencer, and Mike Boyce for their quick response in implementing the closure and assisting den monitoring post-emergence. Dan Bjornlie and Dan Thompson (WGFD) helped provide the remote cameras and set up the monitoring

site. Thank you to Mark Haroldson of the Interagency Grizzly Bear Study Team for his valuable advice and counsel. Thanks to Lynn Wells for the useful and entertaining photos.



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