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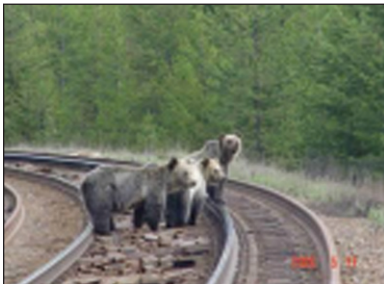
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TRAINS, GRAINS, AND GRIZZLY BEARS: REDUCING WILDLIFE MORTALITY ON RAILWAY TRACKS IN BANFF NATIONAL PARK

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Abstract: Between 2000 and 2007, the Canadian Pacific Railway emerged as the leading human-related cause of grizzly bear mortality in Banff National Park. Seven grizzlies were struck by CPR trains, and none of the five cubs orphaned by these collisions survived within the park. Other wildlife also have been struck and killed. Spilled grain, track-side attractants, and preference of animals for open travel corridors are cited as contributing to these collisions. CPR's rail lines bisect the Canadian Rockies and, along with other factors, inhibit wildlife movement and genetic connectivity. Ecologists and conservations seek to implement measures to ensure continued ecological connectivity across these man-made barriers. Railways have adopted various methods to reduce wildlife mortality, including more efficient sealing of grain cars, vacuum cars to recover spilled grain, and warnings that alert wildlife of approaching trains. Fencing and crossing structures, such as those assisting wildlife to cross highways, also are being considered. We discuss the causes of train-wildlife collisions, steps taken to reduce the number of collisions, propose further opportunities to reduce the likelihood of collisions.

Introduction



Connectivity, at a range of scales, is critical to the survival of wildlife populations. In Banff National Park in the Rocky Mountains of western Canada, Canada's main east-west highway, a principal rail line, and other natural and man-made barriers divide wildlife populations. Measures have been taken to mitigate the busy traffic on the Trans-Canada Highway, including fencing to increase motorist safety and reduce wildlife mortality, and under- and over-passes to promote safe wildlife movement. Speed limits and access are reduced on other roadways to conserve wildlife.

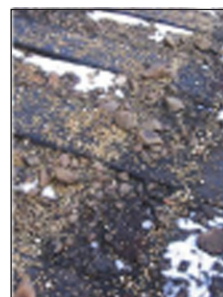
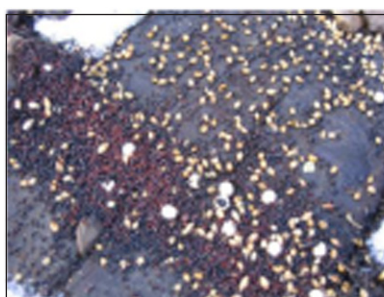
Since 2000, the Canadian Pacific Railway has emerged as "the number one known source of human-caused mortality" of grizzly bears in Banff National Park. Grizzlies and other animals are attracted to grain spilled from passing railway cars. Twelve grizzlies have been killed directly by trains or lost permanently to Banff National Park over the past seven years. This total includes four breeding age females and their seven cubs of the year. In 2006 alone, four black bears were killed. Necropsies by Parks Canada staff found grain in the stomachs of two of the black bears. More than a decade of efforts by the Railway has not meaningfully reduced the amount of grain on the tracks nor the number of animals struck and killed.

Spilled Grain

Grain spilled by rail cars has been identified by Parks Canada staff as the principal attraction that draws bears to their deaths between the rails in Canada's mountain parks. There are four major sources of spilled grain:

1. Derailments and other significant events that spill large amounts of grain;
2. Faulty, leaking, or improperly closed grain car discharge gates that spill small amounts of grain along the tracks, particularly along sections of tracks where cars are shaken in any way;
3. The temporary siding, stopping, or parking of grain trains, allowing leaking cars to spill larger amounts of grain in a single spot between the rails; and
4. The spillage of excess grain that has fallen onto flat surfaces of grain cars at the loading terminals and subsequently falls to the ground as the train moves along.

The Railway and government agencies respond promptly to derailments and larger spills, and usually take measures to prohibit bears and other wildlife from feeding on the spilled grain. Fencing, 24-hour human presence, Karelian bear dogs and other deterrents have been used until all grain has been cleaned. Similarly, minor spills from stopped or sided cars generally receive prompt attention, although some reported spills have remained on the tracks for more than 36 hours.





Smaller spills—with potentially more negative impacts on wild animals within Banff National Park—occur when small amounts of grain trickle along the tracks as loaded trains move west. Grain falls from hopper car discharge gates at the bottom of grain cars that are defective, worn or not closed properly. Of course, these are the same gates that spill larger amounts of grain when the cars move more slowly or with more jerky motions, or when the train is stopped.

The second source of trickled grain originates at terminals where grain hopper cars are loaded. Careless loading causes grain to fall outside of the hopper cars and collect on virtually every flat surface, including the tops of the cars and flat decks on either end of the cars. In turn, grain falls off these surfaces as trains move along. More than 10 cm of sprouting grain, spilled grain and detritus has been observed on hopper car end decks.

In 1990, the Canadian Pacific Railway introduced a specially designed self-powered vacuum truck to remove grain spilled on the tracks. The vacuum has proven effective on larger spills, but nearly useless on the constant streams of grain that trickles from leaking discharge gates and flat surfaces.



The Canadian Pacific Railway reports increased shipments of grain each year. Tracks were recently modified to accommodate even longer trains—up to two miles in length. So, there is increasing potential for grain spillage. Parks Canada wardens noted in 2006, “this is one of the heaviest years we’ve seen [for grain on the tracks].” Supervisors reported to the media, “our wardens are saying they’re seeing more grain on the tracks.”

It has been said that some leaking grain cars arrive at the Vancouver terminal completely empty. Grain can be found scattered along the tracks, heavier in locations where cars move more slowly or are jostled along the way. In some sections, spilled grain sprouts to a thick green carpet. The Farmer Rail car coalition estimates that up to Cdn \$10 million worth of grain and pulse are spilled annually from leaking hopper cars hauled by the Canadian Pacific Railway.

The Canadian Pacific Railway leases about 6,300 grain hopper cars that are owned by the Canadian federal government. These cars have been in service for 30 to 40 years, and carry a variety of discharge gate designs. New loading and unloading equipment used at terminals is more powerful, likely stressing older discharge gates. Most cars owned by the Railway are of newer design, compatible with powerful and high-speed terminal equipment. Anecdotal evidence suggests that some of the older designs may be the most troublesome—worn or damaged, and failing to close securely.

Grain and Dead Grizzlies

According to senior Parks Canada officials, “bears frequent the tracks because they get the reward of grain.” Dr. Stephen Herrero of the University of Calgary, one of Canada’s most respected grizzly bear experts, concluded that Canadian Pacific Railway trains “are the number one known source of human caused mortality” of grizzly bears in Banff National Park.



Between the spring of 2000 and mid-summer 2007, Canadian Pacific Railway trains struck and killed seven grizzly bears in Banff National Park alone. Four of these bears were breeding age females. None of the five orphaned cubs of the year survived in the park without their mothers. In 2006 alone, four black bears were struck and killed in Banff and Yoho national parks. Grain was found in the stomachs of two of the bears.

Bears and other wildlife are attracted to railway tracks for a variety of reasons—the promise of a meal between the rails, easy passage (particularly in the heavy snows of winter), and forage vegetation growing in open sunlight. In Canada’s Mountain Parks, grain has proven to be the most fatal attraction.

According to Edward Abbott, manager of resource conservation of Parks Canada’s Lake Louise, Yoho and Kootenay field unit, “bears frequent the tracks because they get the reward of grain. Over the years bears have a very good learning ability and they know where they get rewarded. And if they have been rewarded once, often they go back again just to check to make sure if there is anything there.”

We have observed and filmed a number of bears feeding between the rails and collected grain-filled bear scat along the tracks. More than a dozen bears have been seen in a single morning feeding at open railway tracks at Bath Creek Flats, near the border of Banff and Yoho national parks. When asked, some senior Parks Canada staff tell close friends and relatives that the best place to see grizzly bears in Banff National Park is along these tracks, as bears forage for grain. This is relatively open country, where the tracks offer no singular advantage of other forage or open travel. The bears are there because this is one of the very best dining areas along the “world’s longest bird feeder.”

Bears aren’t the only animals that seek grain and are killed between Canadian Pacific rails. According to Parks Canada figures, 564 elk, 9 moose, 51 deer were killed on CPR tracks between 1982 and 2001 in Banff and Yoho national parks. In turn, many of these carcasses attracted scavengers. During the same time period, 9 coyote and 9 wolves were killed by trains.

Management Responses by The Canadian Pacific Railway

The Railway conducted a wildlife mortality study in 1997. In 1999, the Canadian Pacific Railway, Parks Canada and other parties contributed to a seminal paper on railways and wildlife mortalities (Wells, P. et al. 1999, Wildlife mortalities on railways: monitoring methods and mitigation strategies. 11 pp. Unpublished.). The paper identified seven promising mitigation strategies: 1) concentrate mitigation strategies on identified problem areas; 2) instruct train crews to report wildlife incidents; 3) remove carcasses from right-of-way to reduce scavenging; 4) remove spilled attractants (e.g., grain) in a timely manner; 5) reduce chronic grain spills through car maintenance and loading/handling procedures; 6) reduce attractant vegetation on right-of-way; and, 7) share data among jurisdictions.



In the year this study was completed, the Canadian Pacific Railway put the industry's first vacuum truck into service, marking a major and innovative investment. The truck was designed to respond to reported spills and to clean spilled grain from the tracks. At the same time, the Railway instituted a program to train and encourage grain handlers at loading terminals. The intent was to reduce the amount of grain spilled on hopper car tops and end plates, and to ensure that discharge gates were fully closed and operating properly.

Prior to train departure, faulty discharge gates are to be noted and reported as "bad order cars." These cars are to be pulled from service and repaired. To date, the Canadian Pacific Railway has refused to release "bad order car" reports or to conduct public tests to document the spillage of grain or the effectiveness of its vacuum operations. And the Railway has declined to release the results of any tests it may have conducted.

The Railway has an agreement with Parks Canada to report grain spills and collisions with wildlife. Most reports are timely and adequate, but the process falls short on occasion. Parks Canada also agreed to allow the Railway to remove struck carcasses from the right-of-way onto park lands, reducing the likelihood that predators would be struck.

In a presentation to the American Association of Railroads in Urbana-Champaign, Illinois, USA in 2000, a representative of the Canadian Pacific Railway indicated that the company would carry out a number of measures to investigate and reduce the number of wildlife collisions, including trials of lights and sounds to alert wildlife, observations of wildlife behaviour, limited fencing, and programs to educate train crews and grain terminal operators. In addition, the Railway pointed to possible "future directions" including aversive conditioning, "science-based decision-making," "integrated research and planning" and crossing structures. The Railway has not reported any progress on these possible directions.

Under Canadian law, contracts and other agreements between government and private parties are governed by legal principles which consider the agreements as "privileged" in favour of the private party. As a result, the terms of the grain car lease, reports filed and other communications between the parties, and other documents are not—or in some cases, not easily—available to the public.

Media Responses by The Canadian Pacific Railway

Through most of this century, spokespersons for the Canadian Pacific Railway asserted the company was doing the best it could and that spilled grain was not a significant factor in the deaths of grizzly bears in the region. A sample of their responses, as recorded in local media, includes:

"[The vacuum truck] does a good job of making the tracks as clean as possible so [the grain] is not evident. It has proven very effective." (August 5, 2004)

"Look as a company at what we have tried to do to avoid contact with bears – we're trying our best." (Aug 25, 2005)

"This is a bigger picture issue, not just a railway issue. It's the entire growth of human activity in that area. We're just one of the stakeholders. This is more of a community bear management issue." (Aug. 25, 2005)

"But this is a bigger issue than just the railway..." (May 11, 2006)

"I don't think grain is the issue here." (June 22, 2006)

"We aren't a major contributor to bear mortality." (June 27, 2006)

"We do have stringent measures in terms of our hopper maintenance and repair process that has been enhanced over the past year or two." (June 27, 2006)

The Big Breakthrough

On May 3, 2007, the Canadian Pacific Railway announced a new operating agreement with Canada's Ministry of Transport, Infrastructure and Community. The Railway's announcement read, in part (emphasis added):

Under the agreement with Transport Canada, CP will, in addition to its normal maintenance practices, undertake over the next five years an extensive hopper car inspection and refurbishment program to ensure a quality fleet. **This will include the replacement of poor-performing discharge gates with technologically superior units as well as a general refurbishment program for the other gates on these cars.**

“Canadian Pacific is pleased to have completed these extended negotiations with the federal government as it will ensure a secure hopper car supply for farmers and enhance operational fluidity,” said Fred Green, President and CEO. **“This initiative will also strongly support our wildlife protection efforts by reducing grain and other wildlife attractants along our tracks.”**

The refurbishment program on more than 6,300 hopper cars will take five years to complete at a cost of Cdn\$20 million. The Railway expects to repair 70 percent of the cars by the end of 2010. The Canadian National Railway Company also agreed to invest Cdn\$20 million in the 6,300 hopper cars it leases from the federal government.

Next Steps

Repairing leaking grain cars is a necessary—but not sufficient—step to reduce wildlife mortality on railway tracks. Animals will stray onto the tracks, even if grain is not present. And Banff’s wild animals are habituated to finding grain on the tracks. As many as three generations of grizzly bears in Banff and Yoho national parks are accustomed to finding meals between the rails. For 15 years after open dumps were closed at Yellowstone National Park, bears returned looking for a meal. Additional steps will need to be taken as defective cars are repaired and as trains continue to move through Canada’s premier national parks.

We suggest these steps to reduce wildlife collisions on CP Railway tracks:

1. Characterize sites where animals are struck, killed or frequently seen. The first step in understanding and reducing vehicle-wildlife collisions is to investigate the situations where animals are seen and struck. Was the incident on a straight or curved section? Does vegetation—particularly edible forage—grow close to the tracks? Is escape blocked by steep slopes, rivers, or embankments? Is there a known wildlife movement corridor in the vicinity?
2. Document wildlife incidents. Train crews should record location, time of day, weather conditions and speed of train. How far ahead of the train was the animal when spotted; what was it doing? How did the train crew respond (whistle, horn, lights, other)? How did the animal react and what was the outcome?
3. Test the effectiveness of lights to alert and deter bears and other wildlife. Train crews have reported that flashing lights appear to scare bears from the tracks.
4. Proceed as quickly as possible with the car repairs. “Bad order cars” should be pulled from service immediately. Measure the amounts of grain spilled at various locations to document the effectiveness of the repairs. In addition, measure the effectiveness of the vacuum truck.
5. Convene a workshop of wildlife managers, animal behaviour specialists, railway experts and others to address the causes and solutions to train-wildlife collisions.

While collisions with animals can have serious consequences for wildlife populations, relatively few trains strike wildlife on the tracks. To gather sufficient data for analysis, a larger data set likely will be needed. We suggest that the Canadian National Railway Company and the Burlington Northern Santa Fe Railway be engaged to contribute to the incident site characterizations and the collision incident reports.