

## Badger Roadkill Risk in Relation to the Presence of Culverts and Jersey Barriers

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### Abstract

The subspecies of American badger found in British Columbia (*Taxidea taxus jeffersonii*) is provincially red-listed and nationally endangered. The primary cause of mortality is roadkill. European badgers (*Meles meles*) and other carnivores are known to pass under highways using culverts, and there are indications that American badgers do also, suggesting that the presence of more culverts might be associated with lower roadkill risk for American badgers. Furthermore, it has been speculated that roadkill risk is positively associated with the presence of Jersey barriers. These concrete barriers are used along highway edges or between lanes and may trap badgers on roadways. I compared 39 1-km highway segments in which badger roadkills had occurred to 39 random segments, to see if they differed in the number of culverts and bridges useable by badgers or in the presence or distance covered by Jersey barriers.

About 18% of structures in random segments and 40% in roadkill segments were not passable by badgers. In comparison to random segments, roadkill-associated segments were less likely to have  $\geq 2$  structures/km passable by badgers (26% of roadkill segments vs. 59% of random segments;  $\chi^2 = 8.877$ ,  $P = 0.003$ ). The mean number of passable structures was apparently also lower for roadkill segments (1.33/km) than for random segments (1.62/km), although the difference was marginally significant ( $Z = -1.542$ ,  $P = 0.123$ ). Using only roadkill records with the highest accuracy (from an existing telemetry database,  $n = 6$ ), differences between roadkill and random segments were apparently greater but the limited sample size resulted in low significance. Collectively, these results support the notion that culvert or bridge frequency is negatively related to badger roadkill risk. The presence or amount of Jersey barrier was not significantly related to roadkill risk, whether considering the full roadkill sample or only those from radio-tagged animals. This may have related to the limited use of Jersey barriers in my study area and their deployment in locations where badger habitat is less abundant (steep, rocky terrain) or where there are options for passing under highways (adjacent to bridges and overpasses).

I recommend that steps be taken to maximize opportunities for badgers to use culverts to pass under highways. Recognizing the high cost of installing new culverts at a high frequency over extended lengths of highway, options include: (a) repairing or retrofitting existing structures where needed to make them more useable; (b) increasing the odds of badgers finding culverts by clearing vegetation where it obscures entrances, ensuring that marker posts are in place, and potentially installing drift nets to guide movements; (c) selectively installing more culverts, either when highway construction occurs or possibly by boring under highways; and (d) seeking opportunities to investigate culvert or landscape characteristics associated with the use of culverts by badgers.