

Cummings, Laurie

From: Simpson, Dan
Sent: Friday, March 09, 2007 1:51 PM
To: Cummings, Laurie
Subject: FW: Campbell Creek Bridges

From: Rick J Sinnott [mailto:rick_sinnott@fishgame.state.ak.us]
Sent: Friday, March 09, 2007 11:48 AM
To: 'Jerry Ruehle'; 'Stewart Seaberg'; 'Mariam McCulloch'
Cc: 'Jim Childers'; 'Bill Ballard'; 'Mark Fink'; 'Christine Ballard'; 'Tobish Thede'; 'Tim Haugh'; 'Al Ott'
Subject: RE: Campbell Creek Bridges

I've attached the literature review specific to moose (in red type) from my previous letter to Stewart Osgood (DOWL), dated March 3, 2004, on adequate dimensions for wildlife underpasses. The research is preliminary, but it does not appear that a 13-foot high underpass is adequate for Scandinavian moose, and Alaskan moose are larger. Much more research has been conducted on deer and elk, which are considerably smaller than moose. Some of this research shows that deer and elk are also reluctant to use underpasses less than 13 feet high. I've attached relevant excerpts from my previous memo (in blue type). You can find the cited references in my March 2004 letter.

I've measured the Ship Creek underpass. The height is 11.8 feet. This is inadequate, according to recent research on moose and other large ungulates. Our study on moose use of the underpass used old technology. Radio-collared moose were located twice a week, at best, as I recall. Although moose crossed the Glenn Highway, it was unclear whether many of them used the underpass or merely walked around the ends of the fence, which was only 3.5 miles long at the time of the study. The researcher, Mike McDonald, had to pile cabbages in the underpass to coax the first moose through. He looked for tracks on a few occasions and found some sign that moose used the underpass, but the number of moose and proportion of the population using the structure was unknown. Since the Glenn Highway fencing was extended, our aerial counts in early winter have found substantially less moose in the corner of Fort Richardson just west of the underpass compared to aerial counts in the 1970s and 1980s. My pilot remarks on the difference in moose numbers every time we count that area.

Another interesting thing about the Ship Creek underpass is that it is partially blocked by several feet of overflow ice in winter, which reduces the effective height. I'll try to take a photo for you.

The fact that a few moose have been documented using the Ship Creek underpass is not sufficient evidence that the underpass is effective. The goal of a wildlife underpass is not to allow a few moose to cross the road, it is supposed to allow all, or at least the vast majority of, moose that opportunity.

Moose. Moose (*Alces alces*) tracks were observed at two specially designed underpasses and three viaducts along a fenced, 2-lane highway in Sweden (Seiler et al. in press). The 32-kilometer (20-mile) section of highway, designed for traffic loads above 6,000 vehicles per average day, was completed in 1997. Both specially designed underpasses were 4 meters (13 feet) high, 5 meters (16.4 feet) wide, and 26 meters (85 feet) long (openness ratio = 0.77). The smallest viaduct (no dimensions given) was apparently not used by moose; the other viaducts had spans of 200 meters (656 feet) and 435 meters (1,427 feet). Researchers checked for moose tracks in sand or snow once or twice every second week for 4 years, amounting to 119 intervals representing 1,040 days of accumulated tracks. During the 4 years after construction of the new highway, there was a substantial decline in the number of moose tracks across the fenced highway or beneath the two underpasses and two viaducts. Crossing rates across the 9-kilometer (5.6-mile) study section dropped from 19.2 recorded moose per month in 1998 to zero in 2001. Due to the small sample size, no statistical test was applied; therefore, conclusions were tentative. Deep snow in 1998 appeared to facilitate moose jumping the barrier fence. Significantly more moose went through the two "moose underpasses" (1.6 tracks

per average month) than under the viaducts (0.6 and 1.0 tracks per average month); however, the overall use of all the underpasses and viaducts was low. Moose tracks repeatedly approached an underpass or viaduct, hesitated to move through, then turned back or attempted to cross the fence near the underpasses. Other researchers have suggested that large herbivores such as moose are highly reluctant to use relatively small underpasses (Olbrich 1984, Bekker 1991). Researchers concluded that the design of the moose underpasses and the conventional viaducts observed in this study was suboptimal.

Bekker, H. 1991. Ecodukten worden gebruikt. *Zoogedier* 2:20-33. (In Dutch; cited in Seiler et al. in press.).

Olbrich, P. 1984. Untersuchung der Wirksamkeit von Wildwarnreflektoren unter der Eignung von Wilddurchlässen. *Z. Jagdwiss.* 30:101-116. (In German; cited in Seiler 2003 and Seiler et al. in press.).

Seiler, A., G. Cederlund, H. Jernelid, and P. Grängstedt. In press. The barrier effect of highway E4 on migratory moose (*Alces alces*) in the High Coast area, Sweden. Proceedings of the IENE conference on "Habitat fragmentation due to transport infrastructure," Brussels, 13-14 November 2003 (URL: http://www-grimso.slu.se/research/infrastructure/Documents/HighCoast_IENE2003.pdf)

Mule deer (*Odocoileus hemionus*) were observed using a concrete box underpass under Interstate 70 in Colorado for 4 years following construction in 1970 (Reed et al. 1975). The crossing structure—3.05 meters (10 feet) high, 3.05 meters wide, and 30.48 meters (100 feet) long—was designed for mule deer and sited in a natural drainage with well-established migration trails. A 2.44-meter (8-foot) high fence was constructed on both sides of the highway to direct deer through the underpass. Although the deer were highly motivated to migrate between summer and winter ranges, and the underpass permitted most of the migration to continue, the number of approaches per entrance and the frequencies of selected behavioral responses indicated an initial and continued reluctance to use a highway underpass of this size, setting, or design. Two 0.5 x 0.9-meter "skylights" covered with grating were disadvantageous in that they admitted traffic noise and because precipitation that froze into ice mounds may have discouraged passages. The researchers recommended larger and more open underpasses of at least 4.27 meters (14 feet) high and wide, with minimal lengths.

Based on field inventories on 788 road underpasses and overpasses in western Germany from 1979 to 1983, Olbrich (1984) concluded that effective wildlife passages should exceed an openness ratio of 0.75 for roe deer (*Capreolus capreolus*) and 1.5 for red deer (*Cervus elaphus*; same as North American elk) and fallow deer (*Dama dama*). These species preferred a minimum height and width of 4 meters (13 feet), with the shortest length possible. The average time required to overcome reluctance to use underpasses and overpasses was about 6 months for roe deer and 2-3 years for red deer, fallow deer, sika deer (*Cervus nippon*), and mouflon (*Ovis musimon*).

A broad range of French experts reviewed wildlife use of existing underpasses and recommended minimum dimensions of height \geq length / 10 and width \geq height x 2 for large fauna (European Commission Directorate General Transport 2000). The minimum recommended height x width was 3.5 meters (11.5 feet) x 8-12 meters (26-39 feet) for roe deer and 4 meters (13 feet) x 12-25 meters (39-82 feet) for red deer.

A broad range of experts from 20 European countries recently developed a handbook for identifying conflicts and designing solutions for wildlife and traffic (luell et al. 2003). For large and medium-sized animals, the handbook recommended a minimum height of 3-4 meters (10-13 feet), a minimum width of 15 meters (49 feet), and an openness ratio of >1.5 .

From: Jerry Rühle [mailto:jerry_ruehle@dot.state.ak.us]

Sent: Wednesday, March 07, 2007 10:30 AM

To: 'Stewart Seaberg'; 'Mariam McCulloch'

Cc: 'Jim Childers'; 'Bill Ballard'; 'Rick J Sinnott'; 'Mark Fink'; 'Christine Ballard'; 'Tobish Thede'; 'Tim Haugh'; 'Al Ott'

Subject: RE: Campbell Creek Bridges

Thanks for your comments Stewart. As we have requested previously from OHMP and ADF&G, please provide us with the research that indicates that moose will not utilize crossings lower than 13-foot high. This seems to contradict ADF&G's own studies on the Glenn Highway bridge over Ship Creek where moose were documented using a crossing with a minimum of ten

feet clearance. Both of the Seward Highway project and West Dowling projects are going into the Design phase so there will be ample opportunity to explore various bridge design details with more site specific information in the near future. We look forward to working with you on this issue during the Design phase.

From: Stewart Seaberg [mailto:stewart_seaberg@dnr.state.ak.us]

Sent: Tuesday, March 06, 2007 3:26 PM

To: Jerry Ruehle; Mariam McCulloch

Cc: Jim Childers; Bill Ballard; Rick J Sinnott; Mark Fink; Christine Ballard; Tobish Thede; Tim Haugh; Al Ott

Subject: Campbell Creek Bridges

Please find attached your copy of OHMP's memo on the Campbell Creek bridge projects in Anchorage.

We are using this format to speed distribution and reduce copying and mailing costs. Unless you are the memo recipient *you will not be receiving a hard copy in the mail (unless you request one)*. In order to view the attachment, you will need to have an updated version of Adobe Reader (at least 6.x). Contact me if you have any problems viewing or printing this file.

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Stewart Seaberg, Habitat Biologist
ADNR, Office of Habitat Mgmt. & Permitting
550 West 7th Avenue, Suite 1420
Anchorage, AK 99501-3566
(907) 269-6987
(907) 269-5673 [fax]