Moving from Moose to Mice

The evolution of highway passages structures for creatures great and small in British Columbia

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British Columbia Ministry of Transportation

Roads and Ecopassages Forum
Toronto Zoo
March 21, 2007
Provincial Statistics
- Capital City: Victoria
- Provincial Population: 4 Million (13.2% of Canada)
- 95 Million hectares (9.5% of Canada) – 3rd largest province in Canada
- Larger land area than Texas, or France and Germany combined
- Major Industries: Oil/Gas, Logging, Fishing, Mining, Tourism, Agriculture & Hi-Tech
British Columbia Highway System
BC Highway Infrastructure

Total System - 84,225 Total Lane Km

- Northern Roads: less than 5,000 vehicles per day
- Interior Roads: over 30,000 vehicles per day
- Commuter Routes: over 100,000 vehicles per day
British Columbia Terrestrial Mammals

Photo Credits:
Badger and Bears - Government of British Columbia (copyright)
Caribou - Larry Halverson (copyright); Fox – Tourism BC; All Others - Tom Hall (copyright)
Highway/Wildlife Habitat Interface
Relative Size of Wildlife

Adapted from: Maine Interagency Work Group on Wildlife/Motor Vehicle Collisions, 2001
Impact of Large Ungulates
Wildlife Accident System (WARS)

Since the late 1970’s, wildlife accident data has been systematically collected on a daily basis on BC Provincial numbered highways under the Ministry of Transportation’s jurisdiction.
<table>
<thead>
<tr>
<th>Time of Kill</th>
<th>Location of Killed Animal</th>
<th>Animal Type</th>
<th>Comments</th>
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<tbody>
<tr>
<td>4</td>
<td>Hwy 1375 2932 Kitchener</td>
<td>Deer</td>
<td>Big nose, small brain</td>
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<tr>
<td>4</td>
<td>Hwy 1365 203</td>
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<td>4</td>
<td>Hwy 1365 12.64</td>
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<td>4</td>
<td>Hwy 1365 30.74</td>
<td>Deer</td>
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<td>4</td>
<td>Hwy 1375 11.65</td>
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<tr>
<td>4</td>
<td>Hwy 1375 2836</td>
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<tr>
<td>4</td>
<td>Hwy 1375 3215 Kitchener</td>
<td>Bear</td>
<td></td>
</tr>
</tbody>
</table>

Please provide the following information to assist in report follow-ups:

V.S.A.
Maintenance Contractor Contact (Please Print)

Bill Ogden
Ministry District Contact (Please Print)

Within 30 days of completion, please send this form to:
Ministry of Transportation and Highways
Central Kootenay District
2nd Floor, 310 Ward Street
Nelson BC V1L 5S4

Note: If you suspect that an animal has been the target of poachers, please contact your local Conservation Officer or call the ORR (Observe, Record, Report) Line at 1-800-661-9453.
Wildlife Accident Mitigation

- Warning Signs
- Wildlife Exclusion Systems
- Integrated Wildlife Management
Wildlife Warning Sign Inventory

[Various wildlife warning signs with different animals depicted]
Warning Signs
Photo Credits: Painted Turtle and Badger - BC Ministry of Forests and Range (copyright)
Wildlife Exclusion Systems

- Program initiated in 1987
- 15 installations extending over 230 km on 4 highways
- Installed on high speed, limited access freeways and expressways
- 97% to 98% effective, subject to an effective design, good construction and regular maintenance.
Exclusion System Components

1. Barrier
   a) Wall or Fence

2. Passages
   a) Animals – one-way gates
   b) Vehicles – ungulate guards

3. End Points
ENCAPSULATION

One-way gate

Access to Underpass

Tied-down to natural barrier or natural underpass

HIGHWAY

Animal movement away from highway

Animal movement through underpass

Access to Overpass
Fencing
Innovative Animals
One-way Gates
One-way Gate Use
Unexpected Design Defects

Bad Design

Do Not Use
Design Advancements

ONE-WAY GATE METAL TYNE DESIGN EVOLUTION

**Straight Tyne** (Late 1980s)
Warning – Impalement Hazard

**Loop Tyne** (Early 1990s)
Warning – Leg Ensnarement Hazard

**Disk Tyne** (Late 1990s)
Metal Disk should be 4 cm or greater in diameter

**Ball Tyne** (Late 1990s)
Metal ball should be 4 cm or greater in diameter

Source: Leonard Sielecki, 2005 British Columbia Ministry of Transportation

Shari Eco-Road
Hokkaido, Japan
Roe Deer Jump - Belgium

Ezo Deer Jumpout - Japan

Elk Jump - Arizona

One-way Gate Alternatives
Predator Opportunity?
Ungulate Guards
Wildlife Underpass Evolution
Multi-use Underpass
Trepanier Wildlife Overpass

Highway 97C
Wildlife Exclusion Systems

- Coquihalla Freeway (retrofit)
- Okanagan Connector (designed)
- Vancouver Island Highway (designed)
- Highway 97 (retrofit)
Okanagan Connector

- Fencing and structures designed for moose and deer
- Total installation distance: 82 km

Photo Credit: Moose - BC Parks (copyright)
Impact of Wildlife Exclusion Systems

Deer Accident Comparisons
Highway 3 vs Highway 97C
(1991 to 2003)
Design Under Development

AT-GRADE WILDLIFE CROSSING

- Fence
- Clear Zone
- Opening
- Ungulate Guard
- Painted Lines
- Clear Zone
- Opening

Conceptual design for discussion purposes only

BRITISH COLUMBIA Ministry of Transportation
Reasons to address needs of smaller mammal, amphibians and reptiles

1. Increased recognition of the ecological significance of smaller mammals, amphibians and reptiles during environmental assessments.
2. Species-at-Risk legislation.
3. Growing public interest in the welfare of small mammals, amphibians and reptiles.
4. Mandate to support Provincial environmental stewardship goals.
Newt Crossings
Vancouver Island Highway

Photo Credit: Rough Skinned Newt - PRBO Conservation Science, 2007 (copyright)
Badger Tunnel
Highway 93/95

Photo Credits: Badger - BC Ministry of Forests and Range (copyright); Badger Tunnel – Sylvan Consulting Ltd. (copyright)
Painted Turtle Fence
Highway 3

Photo Credit: Painted Turtle – BC Ministry of Environment (copyright)
Western Toad Fence
Highway 6

Photo Credit: Western Toad – BC Ministry of Forests and Range (copyright)
Red Legged Frog Migration Study
Vancouver Island - Highway 4

Amphibian Fences
- Power Pole
- Highway #4
- National Park Reserve Boundary
- National Park Reserve Land

Map Credits: Amphibian Fence Map Barb Beasley (copyright); Provincial Insert Map – BC Ministry of Environment
Vancouver Island Highway 4

Photo Credits: Barb Beasley (copyright)
AMPHIBIAN CROSSING SKYLIGHT

Textured clear plexiglass for vehicle traction
Textured plexiglass
Supporting metal grate
Steel casing
Retaining ring
Textured clear plexiglass
Supporting metal grate
Steel casing

Conceptual design for discussion purposes only
Integrated Wildlife Management

Multi-species Underpass

Wildlife Habitat Ponds
Contact Information

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