Use of Infrared Camera Video Footage from a Wildlife Protection System to Assess Collision-Risk Behaviour by Deer in Kootenay National Park, British Columbia

WILDLIFE AND TRANSPORTATION

We used video footage from infrared and conventional video cameras within a Wildlife Protection System (WPS) installed along a flat, level 2-km stretch of Highway 93 in Kootenay National Park, British Columbia, Canada to assess collision-risk behaviors by deer. The study was conducted on 16 days from 29 August to 7 October, 2002. We recorded 1131 deer-minutes of behavior (number of deer multiplied by the time they were present during the sampling period). Based on marked breaks in hourly totals of deer-minutes, we stratified the 24-hour period into

--night (midnight to 7 AM),
--midday (7 AM to 7 PM),
--evening (7 PM to midnight).

Both the number of deer and the duration of their stay in the highway right-of-way were greatest during the night, intermediate during the evening, and lowest during midday, so the number of deer-minutes per hour was over 2x higher at night than evening, and over 15x higher at night than midday. Similarly, the peak in hourly rates of most collision-risk behaviors occurred during the night. However, all of the risk behaviors measured showed higher per-deer rates during midday than during the evening or at night, including

--presence at roadside,
--approaches to highway,
--running approaches to highway,
--presence on the highway surface,
--attempted highway crossings,
--running highway crossings,
--crossing in front of oncoming cars,
--aborted highway crossings.

The hazard presented by higher per-deer rates of risk behaviors during midday was compounded by greater traffic volumes during midday than evening or night. Driving in daylight increases deer visibility, but being within the line-ups of cars more typical of midday presumably decreases the driver's field of view and may increase the collision hazard associated with a driver swerving or making a sudden stop. Thus, the net risk of wildlife-related accidents during midday may be much higher than raw animal numbers would suggest. No reliable data are available for the test section indicating timing of wildlife-related accidents. In fact, "swerved-to-miss" types of accidents are not recorded as wildlife-related unless an actual animal collision occurs, making any available data potentially suspect. Systems such as the WPS, which are designed to work at all times of the day and are triggered by animal presence, offer the greatest ability to prevent wildlife-related accidents in situations similar to those we studied.

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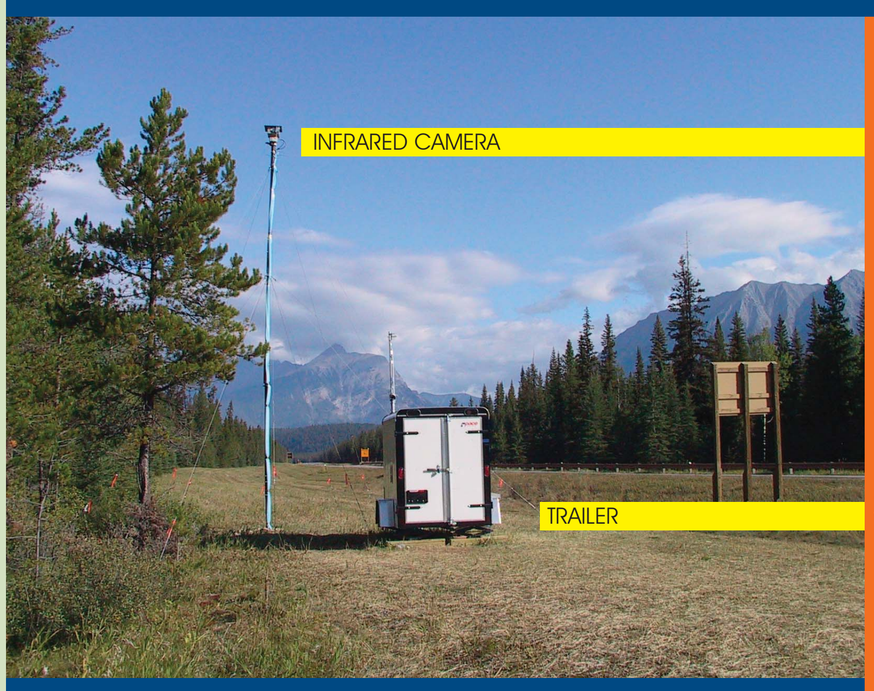
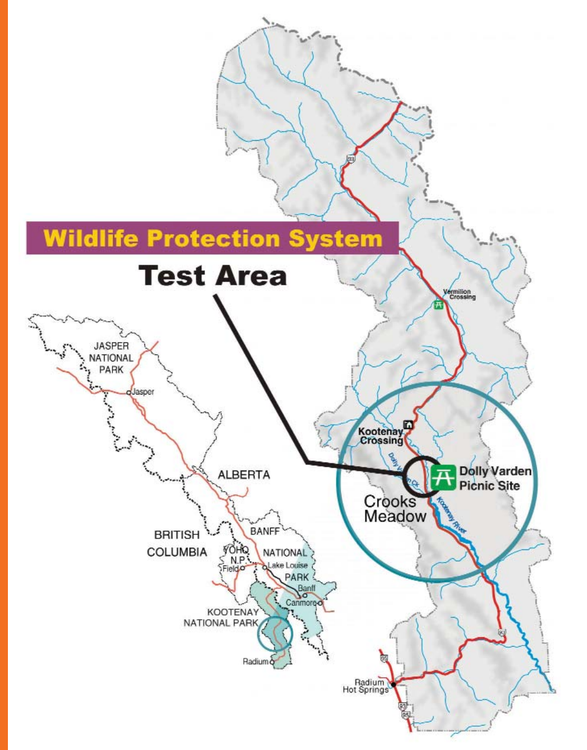


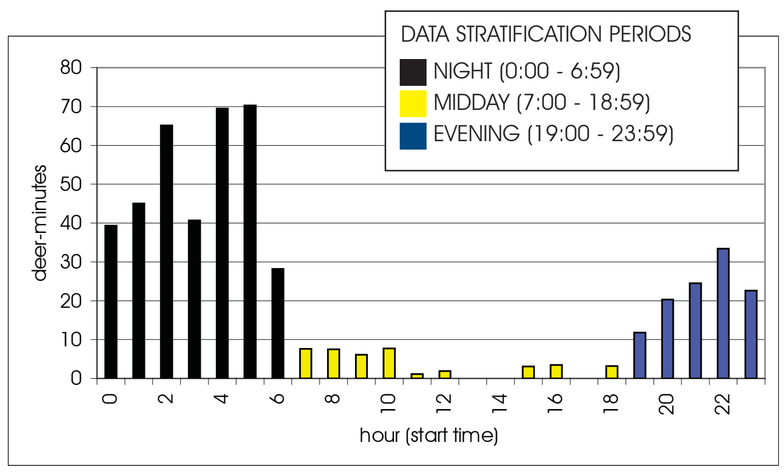
LAYOUT OF WILDLIFE PROTECTION SYSTEM EQUIPMENT USED IN THIS STUDY

INFRARED CAMERA IN PROTECTIVE HOUSING

TRAILER CONTAINING GENERATOR, COMPUTER, TRACKING SOFTWARE, RADIO CONTROLS FOR SIGNS, VIDEO CAMERA, VCR & RADAR GUNS



DEER-MINUTES (NUMBER OF DEER PRESENT MULTIPLIED BY MINUTES EACH WAS PRESENT) PER HOUR ON 16 DAYS FROM 29 AUGUST TO 7 OCTOBER, 2002. VALUES EXTRAPOLATED FROM 5-MINUTE SAMPLES TAKEN AT THE BEGINNING OF EACH HALF-HOUR, WITH DATA FROM APPROXIMATELY 1-KM SEGMENT OF THE TEST SECTION.



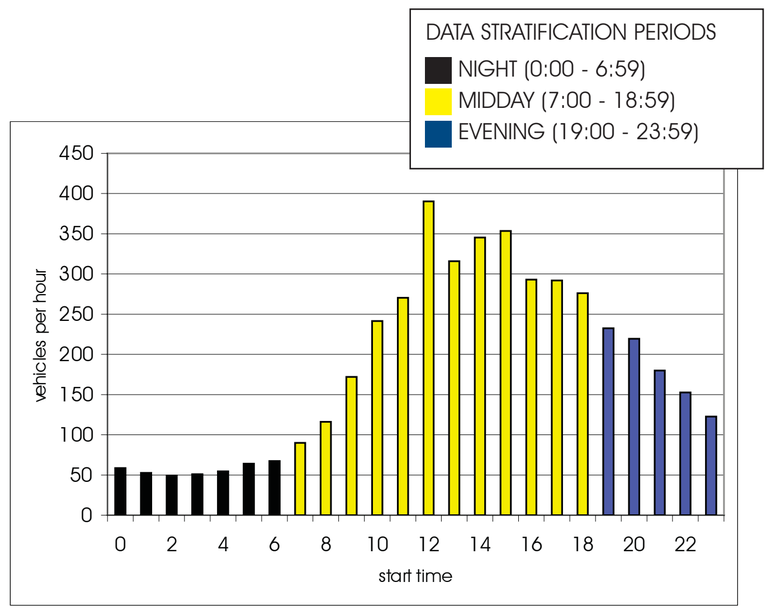
DEER ACTIVITY OVER 1 KM DURING STUDY

Measure	Night	Midday	Evening
Mean number of deer in ROW per 5-minute sample	1.08	0.25	0.60
Mean duration of stay (min) per deer in ROW per 5-min sample	3.92	1.40	2.81
Mean deer-minutes in ROW, extrapolated to hourly rates	51.3	3.5	20.7

INFRARED IMAGE OF DEER IN DITCH WITHIN HIGHWAY RIGHT-OF-WAY.

CROSS-SECTIONAL VIEW OF ONE SIDE OF THE TEST SECTION RIGHT-OF-WAY. DITCH AND ROADSIDE COMBINED ARE 18 M WIDE ON EACH SIDE OF HIGHWAY PHOTO COURTESY OF ALAN DIBB/PARKS CANADA

VEHICLE NUMBERS (2-WAY) PER HOUR IN TEST SECTION DURING STUDY. VALUES EXTRAPOLATED FROM 5-MINUTE SAMPLES TAKEN AT THE BEGINNING OF EACH HALF-HOUR, WITH DATA FROM APPROXIMATELY 1-KM SEGMENT OF THE TEST SECTION



MEASURES OF DEER BEHAVIOR OVER 1 KM DURING STUDY
SHADED NUMBERS ARE THE HIGHEST VALUES FOR EACH CATEGORY

	Mean Occurrence per 5-Minute Sample Period			Mean Occurrence per Deer Observed		
Measure	Night	Midday	Evening	Night	Midday	Evening
Present in ditch (total)	0.90	0.25	0.61	*0.83	1.00	*0.94
Present at roadside (total)	0.61	0.16	0.36	0.56	0.62	0.55
Approaches to highway (run/walk)	0.47	0.18	0.39	0.43	0.70	0.60
Running approaches to highway	0.04	0.11	0.06	0.03	0.42	0.09
Present on highway (total)	0.11	0.04	0.07	0.10	0.14	0.10
Attempted highway crossing	0.09	0.03	0.05	0.08	0.12	0.08
Highway crossing running	0.02	0.01	0.00	0.02	0.04	0.00
Highway cross. in front of vehicle	0.03	0.01	0.00	0.02	0.05	0.00
Highway crossing aborted	0.02	0.01	0.00	0.01	0.04	0.00
Wildlife-vehicle collision	0.00	0.00	0.00	0.00	0.00	0.00

* ALL DEER MUST HAVE OCCURRED IN THE DITCH AT SOME POINT IN ORDER TO ENTER THE ROW (I.E. OCCURRENCE IN REALITY IS 1.00/DEER), BUT SOME WERE OBSERVED ONLY ON HIGHWAY OR ROADSIDE DURING SOME 5-MINUTE SAMPLES FOR EVENING AND NIGHT, SO OCCURRENCE VALUES FOR THE DITCH ARE < 1.00/DEER DURING THOSE PERIODS

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