MULTISPECIES SNOWTRACKING SURVEYS

RATIONALE

Monitoring wildlife populations in the backcountry of BNP can be challenging: much of the area is remote, rugged and forested; many species are elusive and exist at low densities; and aerial surveys are costly and ineffective for many species. Emerging track survey techniques from India (tigers) and Africa (hyenas) offer hope of overcoming these challenges. To assess their effectiveness we redesigned Banff's longstanding Sensitive Species Survey (1995-2008) and, after 600+km of snowtracking in 2012, analyzed the results.

OBJECTIVES

Estimate late-winter occupancy rates (i.e. distribution) of wolverine, lynx, cougar, wolf, fox, coyote and ungulate populations throughout BNP.

Lynx (Photo: K. Heuer)

METHODS

Over 400 km of terrain was surveyed on skis in Banff's backcountry in spring 2012. Surveyors classified all mammal tracks to species and estimated percent snow cover and sample time for each 1 km-long segment. Results from each 1 km segment were used to determine probability of detection and occupancy for each species in a 100 km^2 grid cell laid over the Park. Three types of occupancy models were compared to account for spatial correlation created by wildlife use of trails. We estimated occupancy for each species using the model that made the most statistical and biological sense.

RESULTS

A total of 419 one-km-long intervals were surveyed in 2012, 36% of which were surveyed multiple times (n = 153) for a total of 630 km of sampling. These surveys sampled 37 100 km^2 hexagons within Banff National Park.

Wolverine tracks were detected in all higher elevation regions of the study area (Figure 1). Lynx had concentrated distribution in the Bryant, Brewster, Cascade, and Red Deer Valleys (Figure 1). Cougar were only detected along the lower Cascade and Clearwater Valleys. Fox were detected in both the Cascade and Panther Valleys. Wolves and coyotes were detected in all lower elevation areas sampled. Deer were detected in low elevation areas near the Bow Valley and sparsely detected in the lower Red Deer and Clearwater Valleys. Moose were concentrated in the Spray, Bryant, Brewster, and Clearwater Valleys (Figure 1).

Models with spatial correlation best predicted wolverine, cougar, fox, and coyote occurrence. Spatial models also predicted higher occupancy estimates for these species than the independent model.

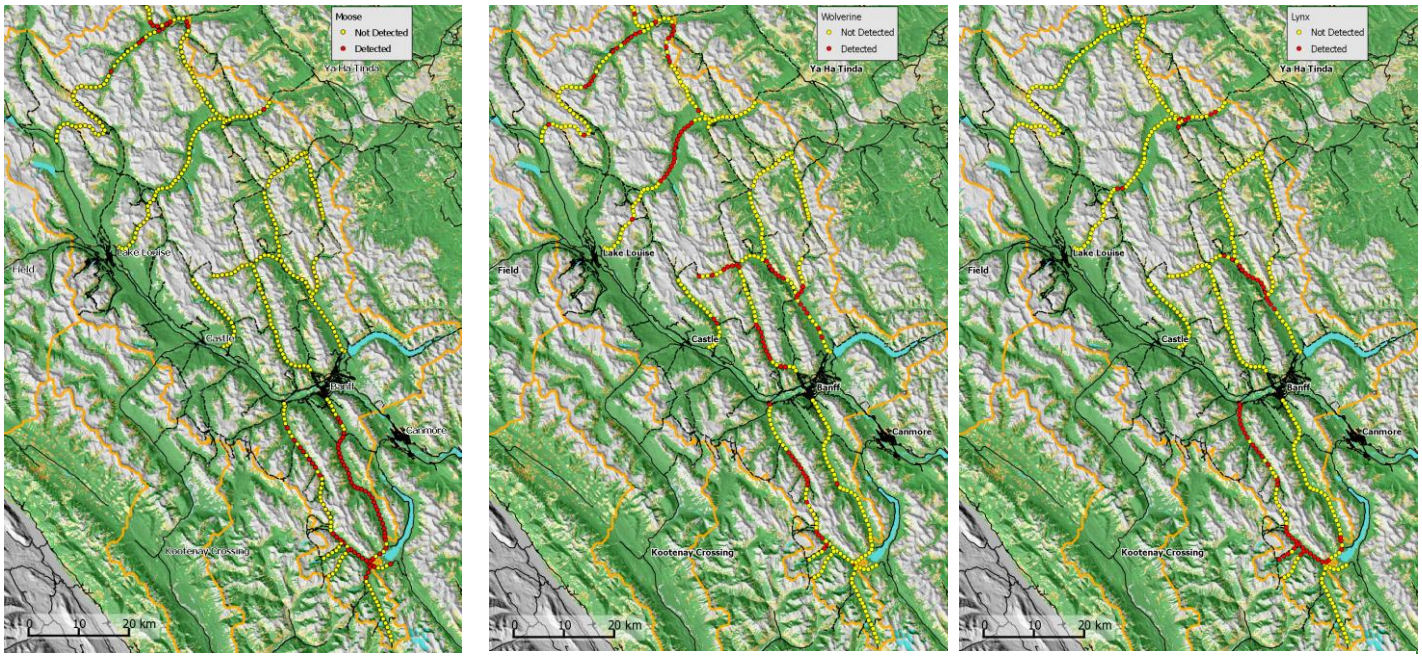

Figure 1. Moose, wolverine and lynx detections, 2012.

Occupancy estimates were highest for wolverine and lowest for cougar. An estimated 31 of the 37 cells (95% CI = 26 -37) were occupied by wolverine and approximately 13 (95% CI = 11 - 16) of the cells were occupied by lynx. The number of cells occupied for other species were: cougar (n = 7.3, 95% CI = 2 - 29), fox (n = 9.6, 95% CI = 4 - 24), coyote (n = 16, 95% = 10 - 26), deer (n = 12.4, 95% CI = 8 - 24), moose (n = 12.3, 95% CI = 13 – 21). Confidence intervals were reasonably tight for wolverine, lynx, deer, and moose.

Monitoring programs work best for species with high detection probabilities because fewer spatial and temporal replicates are required to achieve precise occupancy estimates. Power analysis based on 2012 survey effort shows at least 80% power to detect a 30% decline in occupancy for species with detection probabilities greater than 0.15 (i.e. everything except cougar). This low-cost and noninvasive technique shows great promise for long term monitoring of wildlife populations in Banff National Park.

YEARS OF DATA

2012

FUNDING

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