Chasing Shadows: Analysing Data from Camera Trap Studies

Greg Distiller\textsuperscript{a}, David Borchers\textsuperscript{b}, Rebecca Foster\textsuperscript{c} and Bart Harmsen\textsuperscript{c}

\textsuperscript{a}Department of Statistical Sciences
University of Cape Town
CREEM, University of St Andrews
Greg.Distiller@uct.ac.za

\textsuperscript{b} School of Mathematics and Statistics
CREEM
University of St Andrews

\textsuperscript{c} Environmental Research Institute (ERI)
University of Belize
Panthera, New York

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\textbf{Abstract:} Advances in technology have led to new ways of "capturing" animals including DNA analysis and camera traps that are especially useful for monitoring rare and elusive animals. Traditional capture-recapture (CR) and spatially explicit capture-recapture (SECR) models are based on a discrete sampling process that leads to well defined sampling occasions, but camera traps are continuous-time samplers which record the exact time of capture.

We develop continuous-time models for camera trap surveys, discuss their strengths and weaknesses relative to discrete-time models, and suggest aspects of the models that would benefit from further development. We use a continuous-time estimator to estimate jaguar density from a camera trap survey in Belize and investigate estimator properties by simulation.