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MODELING THE SPATIAL DISTRIBUTION OF THE ECONOMIC COSTS AND BENEFITS OF ILLEGAL GAME MEAT HUNTING IN THE SERENGETI

HERIBERT HOFER
Institute of Zoo Biology & Wildlife Research
Alfred-Kowalke Str. 17
D-10315 Berlin, Germany
and
Max-Planck-Institut für Verhaltensphysiologie
D-82319 Seewiesen, Germany
E-mail: Hofer@izw-berlin.de

KENNETH L.I. CAMPBELL
Natural Resources Institute
University of Greenwich
Central Avenue, Chatham Maritime
Chatham, Kent, ME4 4TB, UK
E-mail: K.L.I.Campbell@gre.ac.uk

MARION L. EAST
Institute of Zoo Biology & Wildlife Research
Alfred-Kowalke Str. 17
D-10315 Berlin, Germany
and
Max-Planck-Institut für Verhaltensphysiologie
D-82319 Seewiesen, Germany
E-mail: East@izw-berlin.dev

SALLY A. HUISH
Rose Cottage
Chartham Hatch
Canterbury, UK

ABSTRACT. Illegal game meat hunting in the Serengeti National Park, Tanzania, and adjacent game reserves provides an important source of protein and cash income to local communities. We construct a profitability model that describes the spatial distribution of the economic costs and benefits of illegal hunting in the Serengeti during the late 1980s and early 1990s. Costs included capital investment in hunting weapons, W_R, and the opportunity cost of hunting, W_O, both held to be constants; and two spatially variable components, the logistic effort of traveling to hunting areas, W_L, and the penalties incurred if arrested, W_P. Benefit was the expected income from the sale of meat from resident wildlife species. The model suggests: (1) W_R is the most important cost. (2) W_L is the

second most important cost and likely to determine the spatial distribution of hunting activity if hunters seek to minimize costs. (3) W_O and W_P are of minor importance, the former because alternative sources of income provide low pay, the latter because the overall chance of being arrested is low. (4) W_P exceeds W_L only in areas close to the boundary of protected areas. (5) Although resident wildlife contributes only a minor share of illegal offtake compared to the migratory herds, hunting resident wildlife is profitable in 68% of the area. This suggests that hunting of resident and migratory wildlife is highly profitable and may explain why the utilization of the target populations has become increasingly unsustainable.

KEY WORDS: Hunting, economics of hunting, optimality model, Serengeti, spatial heterogeneity.