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Mason H. Cline
University of Georgia

Richard B. Chandler
University of Georgia

Clinton T. Moore
University of Georgia

James A. Martin
University of Georgia

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UNCERTAINTY AND THE ENTANGLEMENT OF HABITAT LOSS AND FRAGMENTATION EFFECTS IN THE MANAGEMENT OF NORTHERN BOBWHITE

Mason H. Cline¹

Warnell School of Forestry and Natural Resources, University of Georgia, 180 East Green Street, Athens, GA 30602, USA

Richard Chandler

Warnell School of Forestry and Natural Resources, University of Georgia, 180 East Green Street, Athens, GA 30602, USA

Clinton T. Moore

U.S. Geological Survey, Georgia Cooperative Fish and Wildlife Research Unit, Warnell School of Forestry and Natural Resources, University of Georgia, 180 East Green Street, Athens, GA 30602, USA

James A. Martin

Warnell School of Forestry and Natural Resources, University of Georgia, 180 East Green Street, Athens, GA 30602, USA

ABSTRACT

There is a need to understand the effects of habitat loss and fragmentation on northern bobwhite (*Colinus virginianus*) and other grassland bird species and relate this to conservation action and delivery, especially in areas of intensive anthropogenic development. Through our research, we investigated the factors contributing to habitat loss and fragmentation in order to prioritize management within the Gulf Coast Prairie Landscape Conservation Cooperative (GCP LCC) region of Texas, USA. For this geographic region, we completed these objectives: analyzed grassland bird habitat loss and fragmentation resulting from oil and gas development, which has become especially rapid in this region beginning in 2008, projected future habitat loss under possible future economic scenarios, modeled the outcomes of potential management alternatives, and identified drivers of habitat loss and fragmentation to direct management action toward minimizing threats to high-risk habitats. Using a modeling approach, we identified suitable bobwhite habitat and prioritized high-risk areas, particularly focusing on the best candidate areas for successful restoration. Briefly, point count data were related to patch- and landscape-level habitat characteristics using a modeling technique that formally estimated the scale of the landscape effect on bobwhite abundance. Thereafter, we identified possible management alternatives with the guidance of the GCP LCC and other stakeholders and modeled the consequences of these alternatives. Using results from this modeling, we produced an extinction risk map for northern bobwhite in this region. Our research adds to the understanding of the relationship between northern bobwhite populations and the expansion of energy extraction and also uses modeling informed by data to support a decision-making framework that incorporates uncertainty about this system to prioritize the conservation of high-risk and high-value areas of bobwhite habitat.

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Key words: *Colinus virginianus*, habitat loss and fragmentation, oil and gas development, northern bobwhite, grassland birds, management alternatives, spatial modeling

¹E-mail: mccline@uga.edu