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Monitoring Northern Bobwhite Populations Reduces Uncertainty About Management Effectiveness: A Paradigm of Empiricism and Hope

Adam W. Green
Green Ecological Consulting

Dallas P. Grimes
Georgia Department of Natural Resources

Greg Hagan
Florida Fish and Wildlife Conservation Commission

Richard Hamrick
Mississippi Department of Wildlife, Fisheries, and Parks

Craig Harper
University of Tennessee, Knoxville

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Monitoring Northern Bobwhite Populations Reduces Uncertainty About Management Effectiveness: A Paradigm of Empiricism and Hope

Authors

Adam W. Green, Dallas P. Grimes, Greg Hagan, Richard Hamrick, Craig Harper, Patrick Keyser, John J. Morgan, I. B. Parnell, Reggie Thackston, Theron M. Terhune II, and James A. Martin

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Adam W. Green

Green Ecological Consulting, Thornton, Colorado 80241, USA

Dallas P. Grimes

Wildlife Resources Division, Georgia Department of Natural Resources, 116 Rum Creek Drive, Forsyth, GA 31029

Greg Hagan

Florida Fish and Wildlife Conservation Commission, 13093 Henry Beadel Dr., Tallahassee, FL 32312, USA

Richard Hamrick

Mississippi Department of Wildlife, Fisheries, & Parks, 1505 Eastover Drive, Jackson, MS 39211

Craig Harper

University of Tennessee, 280 Ellington, 2431 Joe Johnson Drive, Knoxville, TN 37996

Patrick Keyser

University of Tennessee, 280 Ellington, 2431 Joe Johnson Drive, Knoxville, TN 37996

John Morgan

Kentucky Department of Fish and Wildlife Resources, #1 Sportsman's Lane Frankfort, KY 40601

I.B. Parnell

Wildlife Resources Division, Georgia Department of Natural Resources, Thompson, GA 30824

Reggie Thackston

Tall Timbers Research Station and Land Conservancy, 13093 Henry Beadel Dr., Tallahassee, FL 32312, USA

Theron M. Terhune II

Tall Timbers Research Station and Land Conservancy, 13093 Henry Beadel Dr., Tallahassee, FL 32312, USA

James A. Martin¹

Warnell School of Forestry and Natural Resources, University of Georgia, 180 E. Green St., Athens, GA 30602, USA

ABSTRACT:

Northern bobwhite (*Colinus virginianus*) populations have been declining across their range for decades because of habitat loss, degradation, and fragmentation. Habitat restoration and management—sometimes coupled with other cultural practices—has long been the paradigm for bobwhite conservation. However, the lack of peer-reviewed empirical evidence supporting the success of active management to increase bobwhite density and growth rates has created skepticism and uncertainty among some conservationists and user groups. Thus, our objectives were to test the basic prediction that active management can increase bobwhite populations across a large spatial extent and highlight the importance of population monitoring to refine management through adaptive feedback. We developed a Bayesian N-mixture model to estimate bobwhite densities and population growth rates at 17 Wildlife Management Areas (WMAs) in four Southeastern US states. Based on expert opinion, we classified WMAs into two groups—actively managed (e.g., bobwhite specific management) and passively managed (land management in a non-specific species fashion)—to test our prediction. Populations significantly increased across the survey periods at 4 WMAs and significantly decreased at 1 WMA. Populations on actively

¹Email: jmart22@uga.edu

managed WMAs grew at an average of 13% per year, while populations on passively managed WMAs had stable trends. Mean bobwhite densities ranged from 0.145 (95% CrI: 0.025, 0.435) to 2.853 (95% CrI: 2.131, 3.914) birds/ha—typical of estimates in the literature. On WMAs where bobwhites are a management objective, continued population monitoring is vital to reduce uncertainty and make optimal management decisions to maintain recreationally viable populations. We provide a robust approach to estimate bobwhite densities and population trends in response to management so managers can make well-informed decisions and adapt in the future. We offer the conservation community some of the first empirical evidence of positive growth rates in bobwhite populations that should stimulate hope in bobwhite restoration.

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Key words: adaptive management, Bayesian, *Colinus virginianus*, growth rates, monitoring, habitat management, uncertainty