

Density Dependence, Harvest, and Population Dynamics in New World Quail: Implications for Harvest Theory in Upland Gamebird Management

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Abstract: Long-term population declines and conservation concerns resulting from large scale habitat loss have brought into question the biological justification of fixed, liberal harvest regulations as they apply to new world quail (Odontophoridae). As available quail habitat declines, biologically justifiable and sustainable methods of harvest will become essential components of quail management. Two hypotheses, the doomed-surplus hypothesis and the additive mortality hypothesis, attempt to provide a conceptual framework regarding the nature of mortality in hunted populations (i.e., compensatory vs. additive, respectively). Recent research indicates that harvest mortality is at least partially additive, which suggests that a strategy of sustained-yield harvest management may be more appropriate than fixed, liberal harvest regulations for quail populations. Sustained-yield harvest is contingent upon having an understanding of the magnitude of density-dependent reproduction and post-hunt survival, and it requires knowledge of a currently unknown population parameter, minimum viable spring density. Evidence for density-dependent population mechanisms arose from research on northern bobwhite (*Colinus virginianus*) in northern latitudes. The nature of these mechanisms is poorly understood for bobwhites in southern latitudes and for other quail species inhabiting arid environments. We review literature regarding harvest theory and management as they relate to mortality and compensatory population mechanisms in quail and propose a research agenda designed to test the feasibility of implementing sustained-yield harvest as a strategy to regulate and sustain consumptive use of new world quail.

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