



CHAPTER 3

POTENTIAL ACOUSTIC MASKING OF GREATER SAGE-GROUSE (*CENTROCERCUS UROPHASIANUS*) DISPLAY COMPONENTS BY CHRONIC INDUSTRIAL NOISE

JESSICA L. BLICKLEY¹ AND GAIL L. PATRICELLI

Department of Evolution and Ecology, University of California-Davis, One Shields Avenue, Davis, California, USA

ABSTRACT.—Anthropogenic noise can limit the ability of birds to communicate by masking their acoustic signals. Masking, which reduces the distance over which the signal can be perceived by a receiver, is frequency dependent, so the different notes of a single song may be masked to different degrees. We analyzed the individual notes of mating vocalizations produced by Greater Sage-Grouse (*Centrocercus urophasianus*) and noise from natural gas infrastructure to quantify the potential for such noise to mask Greater Sage-Grouse vocalizations over both long and short distances. We found that noise produced by natural gas infrastructure was dominated by low frequencies, with substantial overlap in frequency with Greater Sage-Grouse acoustic displays. Such overlap predicted substantial masking, reducing the active space of detection and discrimination of all vocalization components, and particularly affecting low-frequency and low-amplitude notes. Such masking could increase the difficulty of mate assessment for lekking Greater Sage-Grouse. We discuss these results in relation to current stipulations that limit the proximity of natural gas infrastructure to leks of this species on some federal lands in the United States. Significant impacts to Greater Sage-Grouse populations have been measured at noise levels that predict little or no masking. Thus, masking is not likely to be the only mechanism of noise impact on this species, and masking analyses should therefore be used in combination with other methods to evaluate stipulations and predict the effects of noise exposure.

Key words: acoustic masking, *Centrocercus urophasianus*, Greater Sage-Grouse, industrial noise.

Enmascaramiento Acústico Potencial de Componentes del Despliegue de *Centrocercus urophasianus* por Ruido Industrial Crónico

RESUMEN.—El ruido antropogénico puede limitar la habilidad de las aves para comunicarse al enmascarar sus señales acústicas. El enmascaramiento, que reduce la distancia a la que la señal puede ser percibida por el receptor, es dependiente de la frecuencia, por lo que diferentes notas de un solo canto pueden ser enmascaradas en diferentes grados. Analizamos las notas individuales de las vocalizaciones de apareamiento emitidas por *Centrocercus urophasianus* y el ruido producido por la infraestructura del gas natural para cuantificar el efecto potencial de tal ruido para enmascarar las vocalizaciones de *C. urophasianus* sobre distancias cortas y largas. Encontramos que el ruido producido por la infraestructura del gas natural estuvo dominado por frecuencias bajas y presentó una superposición considerable con la frecuencia de los despliegues acústicos de *C. urophasianus*. Tal superposición predice un enmascaramiento sustancial, que reduciría el espacio activo de detección y discriminación de todos los componentes vocales, y afectaría particularmente las notas de baja frecuencia y de baja amplitud. Tal enmascaramiento podría incrementar la dificultad de evaluar las potenciales parejas en las asambleas de cortejo

¹E-mail: jlblinkley@ucdavis.edu