



CHAPTER 4

BEHAVIORAL RESPONSES BY TWO SONGBIRDS TO NATURAL-GAS-WELL COMPRESSOR NOISE

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ABSTRACT.—Several urban-adapted species sing at a higher frequency in noisy urban areas than in quiet locations. Yet it remains unclear whether the ability to adjust signals in response to noise is related to an ability to persist in noisy areas, because signal change and habitat use are infrequently measured within a single study. We investigated occupancy and signal change in response to noise in the Blue-gray Gnatcatcher (*Poliioptila caerulea*) and the Spotted Towhee (*Pipilo maculatus*) using a study system that eliminates uncontrolled effects of habitat features that may influence song frequency or habitat use and controls for the negative effect of noise on bird surveys. We predicted that species that alter the frequency of their vocalizations in response to noise would use noisy and quiet areas similarly, and that species that do not adjust their vocalizations in response to noise may avoid noisy areas. Both study species were uninfluenced by noise in their habitat occupancy, but only Spotted Towhees sang at a higher frequency with increased noise exposure. This may be explained by low-frequency noise having a greater acoustic masking potential for low-frequency Spotted Towhee songs than for higher-pitched Blue-gray Gnatcatcher songs. These findings suggest that an ability to shift song frequency may not directly correspond to an ability to remain in noisy areas. Although many factors can influence habitat use by birds, habitat occupancy in noisy areas may depend on whether the noise has acoustic energy at frequencies that can mask a species' song; if so, signal flexibility may be important.

Key words: acoustic masking, anthropogenic noise, Blue-gray Gnatcatcher, frequency change, habitat occupancy, New Mexico, *Pipilo maculatus*, *Poliioptila caerulea*, Spotted Towhee.

Respuestas en el Comportamiento de Dos Aves Canoras al Ruido de los Compresores de Pozos de Gas Natural

RESUMEN.—Muchas especies adaptadas a ambientes urbanos cantan a una frecuencia más alta en áreas urbanas que en localidades silenciosas. Sin embargo, todavía no es claro si la habilidad de ajustar las señales como respuesta al ruido se relaciona con la habilidad de persistir en áreas ruidosas porque el cambio en las señales y el uso del hábitat frecuentemente no son medidos en un solo estudio. Investigamos la ocupación y el cambio en las señales como respuesta al ruido en *Poliioptila caerulea* y *Pipilo maculatus* usando un sistema de estudio que elimina los efectos no controlados de las características del hábitat que pueden afectar la frecuencia del canto o el uso del hábitat y controla el efecto negativo del ruido en los censos de aves. Predijimos que las especies que alteran la frecuencia de sus vocalizaciones en respuesta al ruido podrían usar áreas ruidosas y silenciosas de manera similar,

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