

Phenology of Vocalization and Drumming of the Nuttall's Woodpecker in Urban Sacramento, California

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ABSTRACT

I collected data on vocalizations and drumming of the Nuttall's Woodpecker (*Picoides nuttallii*) in an urban area of east Sacramento, California over a two-year period. Month-by-month analyses of territorial drumming and of the two most common vocalizations, Rattle Calls and Kweek Calls, were used to assess the frequency of use of these sounds during the year. Rattles were used year-round with no seasonality. Kweeks were also used year-round, but showed a peak each year from January to April, corresponding to the pre-breeding and breeding seasons. Drumming showed a significant peak in March and was never heard in summer or fall.

Nuttall's Woodpecker (*Picoides nuttallii*) is endemic to California and Baja California. While mainly associated with oak woodlands throughout most of its range (Lowther 2000), this species also has adapted to urbanized habitats (Glover 1968, Unitt 2004). In Sacramento it is a common resident in riparian habitats as well as urban and suburban residential areas, often in areas with few or no oaks.

Acoustic Repertoire of Nuttall's Woodpecker

Throughout, I use the terminology of Winkler and Short (1978) to characterize the acoustic repertoire of Nuttall's Woodpecker. The predominant sounds and known information on their function are summarized below. Examples of these three sounds can be heard on the Central Valley Bird Club web site (<http://cvbirds.org/audio-gallery.html>).

Drumming (Figure 1): Nuttall's Woodpeckers, like nearly all members of their genus, use drumming (i.e., regularly spaced series of raps on a solid surface, rather than the irregular taps given during foraging) to establish territory and communicate with members of the opposite sex. Both males and females drum. The precise role of woodpecker drumming is somewhat controversial, with some proposing that it is the functional equivalent of song in passerines (Lawrence 1967) and others arguing that it is not analogous to passerine song (Winkler and Short 1978). One argument given against drumming as song is that it lacks enough controllable variety to send species-specific information. Stark et al. (1998) confirmed through statistical analyses that drumming lacked sufficient variables to distinguish between all eleven woodpecker species found in California. However, when drumming from

sympatric species (species whose breeding ranges overlap) was compared, there was sufficient variation to theoretically transmit species identity. Dodenhoff et al. (2001) tested species recognition in the field by assessing responses to recorded drums and showed that, among sympatric woodpecker species, drumming cadence (number of raps per second) did encode species-specific information. Nuttall's Woodpeckers drum consistently at a cadence of about 20-21 raps/second (Short 1971), and there is little variation between sexes as well as little regional variation (Stark et al. 1998).

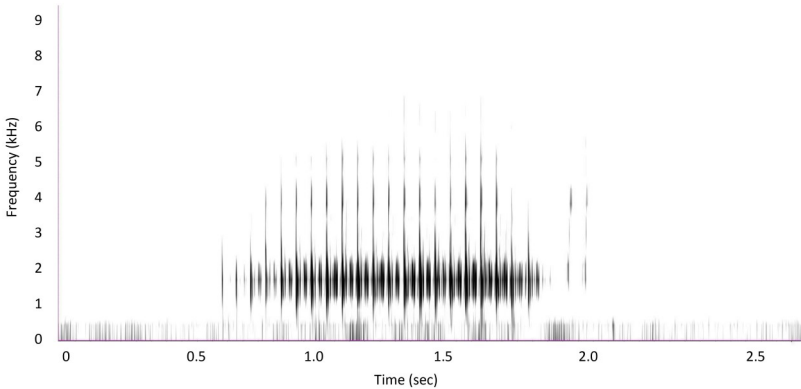


Figure 1. Sonogram of drumming of Nuttall's Woodpecker recorded on Perimeter Road, Nevada County, 4 April 2008 by B. Kroeger.

Rattle Call (Figure 2): This rapid series of sharp notes seems to function both to help establish territory and as a contact call between individuals (Lowther 2000), with some role in aggressive encounters (Short 1971). Individuals often give call notes that consist of a single note or a pair of notes very similar or identical to the notes used for the Rattle Call.

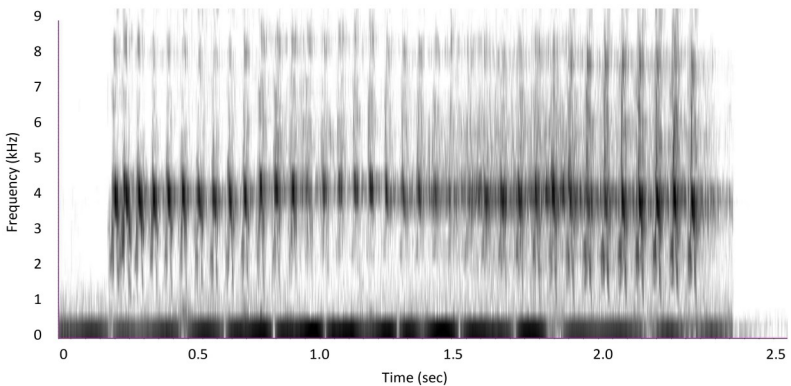


Figure 2. Sonogram of the Rattle Call of Nuttall's Woodpecker recorded on Perimeter Road, Nevada County, 4 April 2008 by B. Kroeger.

Kweek Calls (Figure 3): This somewhat strident call, often given in a short series, appears to have a role in communication between members of a pair, possibly to solicit approach and to avoid aggression (Short 1971, Winkler and Short 1978), but it also may be used as part of a threat display (Short 1971).

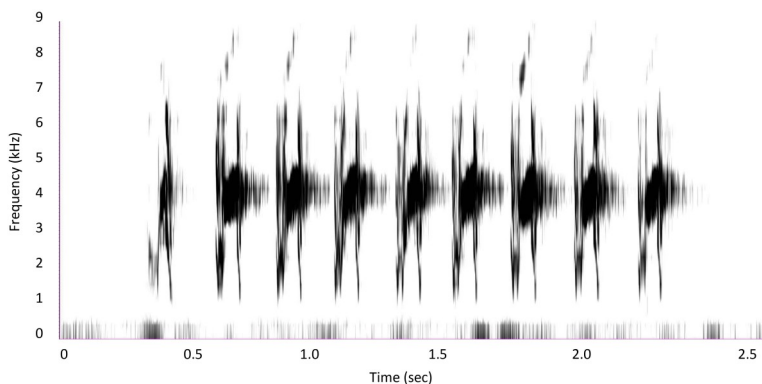


Figure 3. Sonogram of the Kweek Calls of Nuttall's Woodpecker recorded on Perimeter Road, Nevada County, 4 April 2008 by B. Kroeger.

Calling and Drumming Phenology: The seasonal pattern of use of Nuttall's Woodpecker drumming and vocalizations has not been systematically studied throughout the year, and most information is anecdotal in nature. Lowther (2000) reported, presumably based on unpublished data, that Rattle Calls are given from October through May; Kweeks used February through May; and drumming mostly occurred from December through June, peaking in March. Short (1971) reported Rattle Calls in winter to late spring, a peak in Kweek Calls in March, and characterized drumming as occurring from late winter into early spring with no drumming heard in November. Short's (1971) study of the species was conducted only from late fall through early spring. The most complete, year-round study of the species (Miller and Bock 1972), did not address the seasonal timing of vocalizations or drumming. Miller and Bock (1972) observed that aggression between males occurred most frequently in March and May and was often accompanied by drumming and rattles. These authors also describe "sucking sounds" and "wheezes" but, without sonograms it is not possible to determine whether either of these vocalizations were Kweeks or some other type of vocalization.

SURVEY AREA AND METHODS

I conducted all surveys on a transect approximately 1.3 km in length within an older, dense urban residential area of east Sacramento and adjacent East Portal Park (Figure 4). Based on the frequency of observations of Nuttall's Woodpeckers, I believe the transect crossed at least four year-round home

ranges of at least four Nuttall's Woodpecker pairs (presumed boundaries shown in Figure 4). The relatively dense tree canopy in the residential areas was composed mainly of non-native deciduous trees with only one small valley oak (*Quercus lobata*) present. The park included several large coast redwoods (*Sequoia sempervirens*), a few eucalyptus trees (*Eucalyptus* spp.), several non-native deciduous trees, a few large non-native live oaks (*Quercus* spp.), a few large non-native pines (*Pinus* spp.), and one large valley oak.

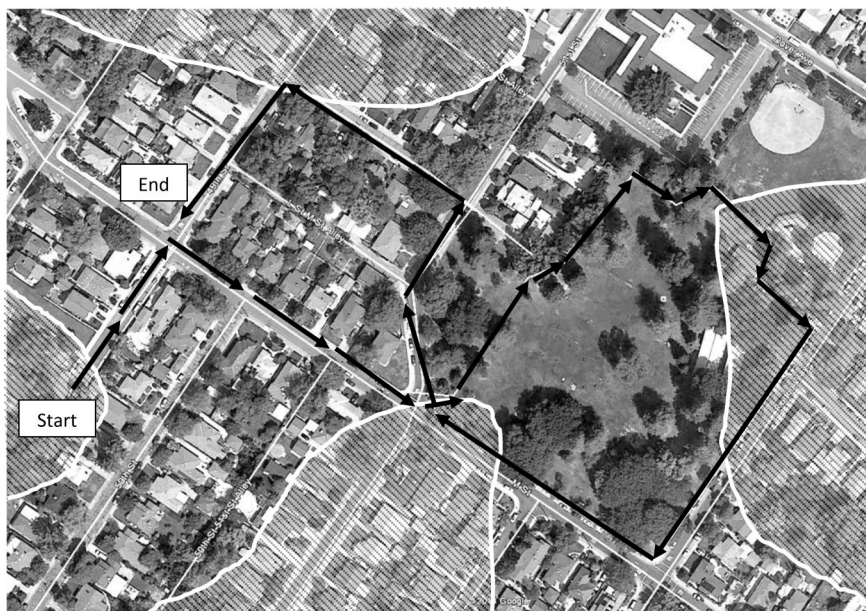


Figure 4. Aerial map of the study area in east Sacramento, California. Black arrows show the transect route and white lines show the approximate boundaries of the presumed home ranges of Nuttall's Woodpeckers.

Surveys were conducted between 30 minutes and 90 minutes after sunrise throughout a continuous two-year period. The average number of surveys per month was 12 ± 3 (range 7-21). The average time per survey was 30 ± 2 minutes (range 27-33). Surveys were not conducted on days with rain, fog, or winds exceeding 15 mph. I recorded the number of Nuttall's Woodpeckers observed and whether drumming, Rattle Calls, or Kweek Calls were heard. I did not attempt to determine how many different birds may have been giving calls or drumming or how many calls were made, but simply recorded whether each sound was heard or not on that survey. In order to maintain a fairly constant survey time, I did not attempt to locate and determine the sex of the bird drumming or calling, but I noted over the survey period that both sexes gave both call types and drummed.

RESULTS AND DISCUSSION

I detected Nuttall's Woodpeckers on 95% of all surveys with a mean number of 2 ± 1 birds per survey. Figure 5 shows the percent of surveys on which Rattle Calls, Kweek Calls, or drumming was heard month-by-month during the two years of the surveys. Rattle Calls were heard throughout the year with no discernible pattern of seasonality. Rattle Calls were, by far, the most common vocalization and were heard on 92% of all surveys. Kweek Calls showed a moderate pattern of seasonality with the highest frequencies recorded from January through April. Kweeks were heard in every month during both years with the single exception of September 2013. Drumming showed a clear seasonal pattern, beginning in December or January, peaking sharply in March each year, then decreasing rapidly in April and May. Drumming was not heard between June and November in either year.

My observation that Rattle Calls were heard more or less consistently year-round contrasts with Lowther (2000) who reported those calls being used mainly from fall through spring. His observation that Kweek Calls were most frequent from February through May and Short's (1971) report that this call peaks in March are roughly consistent with my observations. The late winter to early spring peak in drumming reported by Short (1971) and Lowther (2000) is also consistent with my observations, as is their observation that March is the month with the highest use of drumming. My observation that Rattle Calls showed no seasonality and drumming ceased altogether from June through fall are generally inconsistent with the observations of Lowther (2000) and Short (1971). They suggested that drumming occurs in nearly every month and Rattle Calls are more closely associated with the pre-breeding season. This inconsistency could be due to the fact that I simply recorded the occurrence or non-occurrence of each sound, and not how frequently the birds were giving the sound on each survey. My surveys were also restricted to the early morning and, perhaps, drumming or some vocalizations are used differently during the course of the day.

Another factor that could help explain differences in behaviors I observed compared to others is the general lack of other woodpecker species during the breeding season in my area. Other Nuttall's Woodpecker studies were conducted in natural settings such as oak woodland and riparian areas in southern California and in Monterey County (Short 1971, Miller and Bock 1972). Other species of woodpeckers such as Downy Woodpecker (*Picoides pubescens*), Northern Flicker (*Colaptes auratus*), or Acorn Woodpecker (*Melanerpes formicivorus*) may have been breeding in the same habitats during these studies and their presence could have altered the use of some of these acoustic signals. Both Short (1971) and Miller and Bock (1972) noted that Nuttall's Woodpeckers used vocalizations and drumming during interspecific interactions. In my study area, no other woodpeckers were present between April and August. Northern Flickers arrived in September,

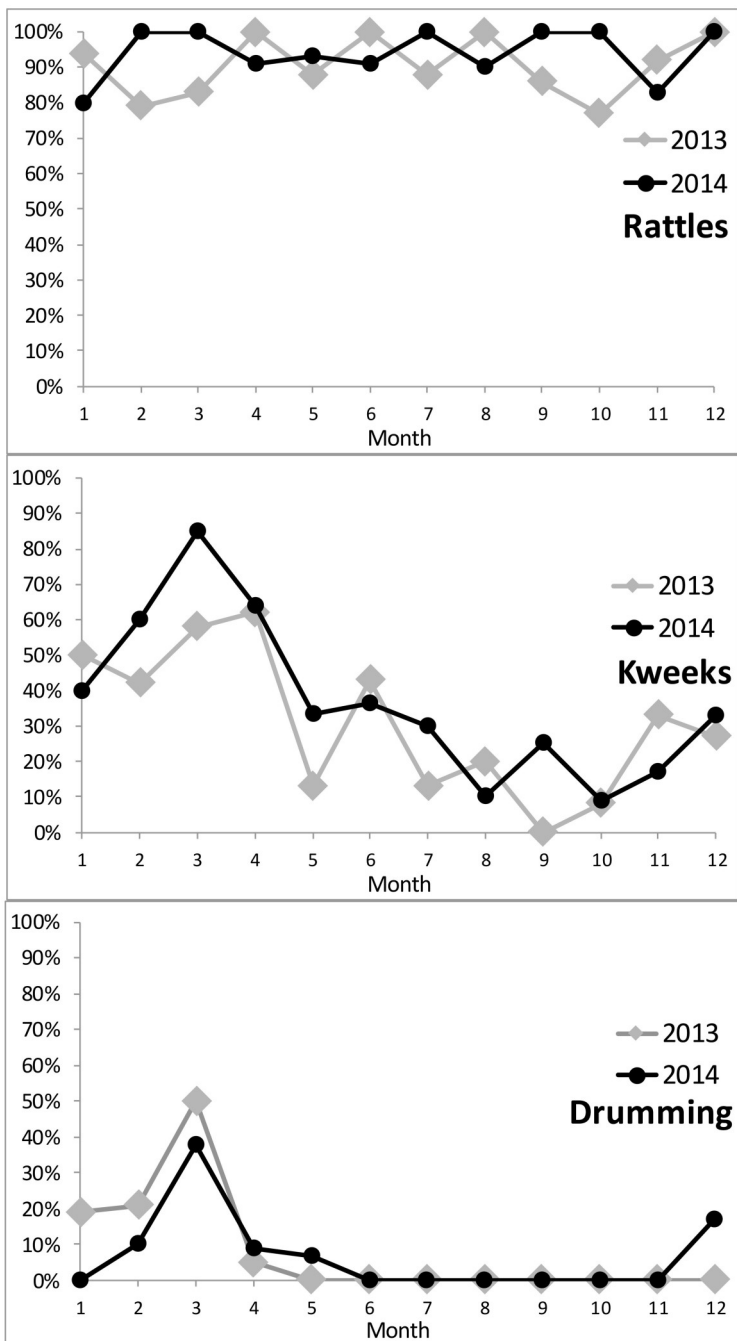


Figure 5. Percent of surveys on which the acoustical elements Rattle, Kweek, or Drumming, was heard over the two-year survey period. Month 1 is January.

were common from October through February, and gone by late March. Downy Woodpeckers and Red-breasted Sapsuckers (*Sphyrapicus ruber*) were present on only a handful of occasions from mid-fall through late winter.

Miller and Bock (1972) noted that pre-breeding behaviors such as courtship and pair-bonding were concentrated in February and March and aggression between males occurred most frequently in March. The corresponding peak in drumming and Kweek Calls in these months, as confirmed in this study, suggests that one or both sounds play a role in pair formation, pair-bond maintenance, and/or territorial defense for Nuttall's Woodpeckers.

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