

Aim: How do urban habitats affect animal behavior?

Do-Now: List some characteristics of urban habitats that might affect the way animals behave.

Wildlife habitats are changing

- Cities are rapidly expanding - urbanization
- Effects on wildlife behavior
- Long-range communication?
- Birds



The urban habitat

- Anthropogenic change: human-made changes to the habitat/ecosystem/biosphere
- Humans make a lot of pollution
 - Air/water pollution (climate change)
 - Light pollution
 - Noise pollution
- Do you think noise pollution affects long-distance communication? If so, how and why?

Class Share

- 1. Listen to NPR's: [To Flirt in Cities, Birds Adjust their Pitch](#)
- 2. While listening, add any additional information to your concept maps.
- 3. Separate into groups to discuss concept maps based on last night's article and today's radio segment.

Birds!

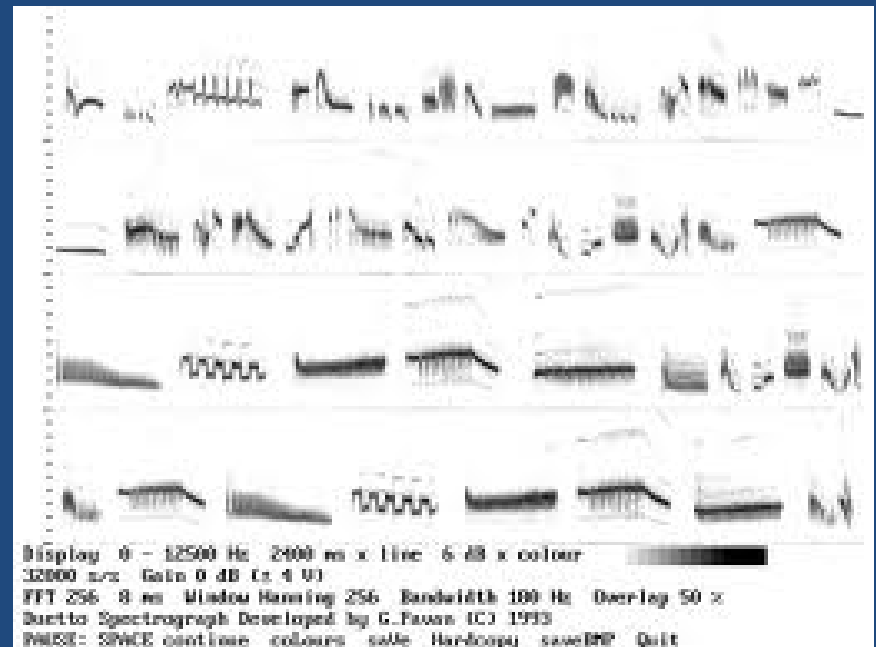
- *Do you think noise pollution affects long-distance communication? If so, how and why?*
 - Urban activities create large amounts of background noise in cities
 - Building block and warp bird calls
- Why would songbirds use songs and calls to communicate over long distance?
 - Mate attraction
 - Territory Defense

What's in a song?

- Bird songs often consist of a series of phrases, which can be broken down into individual notes (think music)
- Songs differentiated from calls by complexity/function.
- Frequency = pitch
- Amplitude = loudness

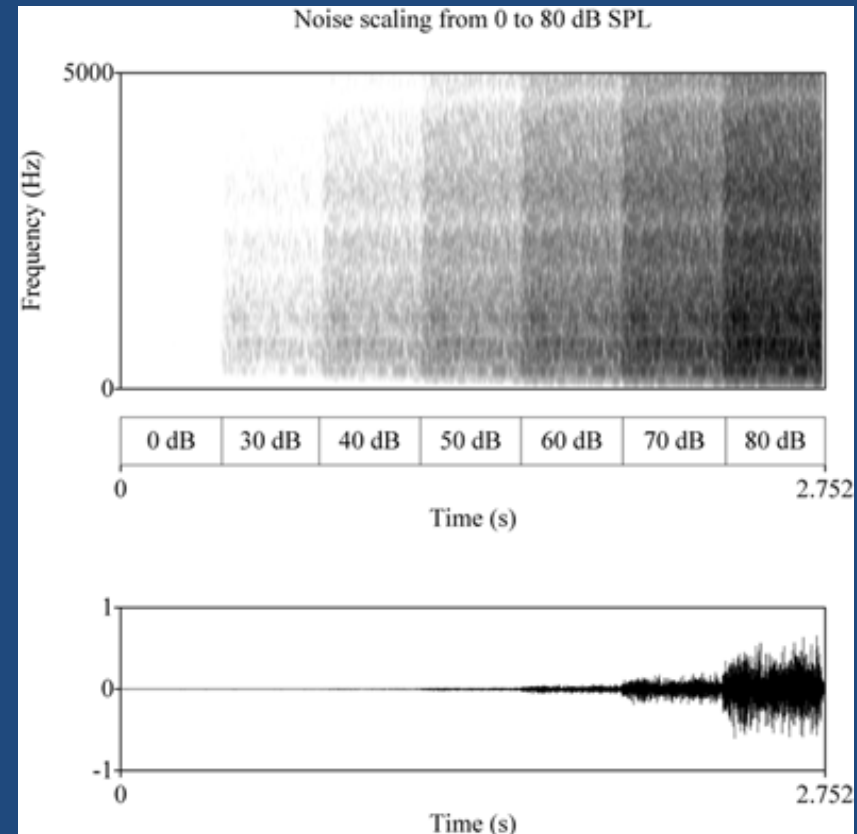
Triplet feel (♩=♩♩)

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Avian Communication and Noise

- Signal to noise ratio (STN)
- Urban noise = lots of low frequency noise
- Important parts of the song are lost, especially at lower frequencies
- Communication compromised



Behavioral adaptations

- Adaptation - hereditary trait that:
 - Spread because of natural selection in the past and has been maintained by selection to the present OR
 - Is currently spreading relative to alternative traits because of natural selection
 - Behavioral changes
 - Morphological changes
- Habitat change can lead to adaptations!

Avian behavioral adaptations

- Potential behavioral adaptations to cities
 - Increase frequency (pitch)
 - Decrease song length!
- How/why does this enhance signal transmission?

Slabbekoorn study

- Study species: The Great Tit (*Parus major*)
- Small songbird
- Common in Europe and Asia
- Omnivores
 - Insects, seeds, fruit



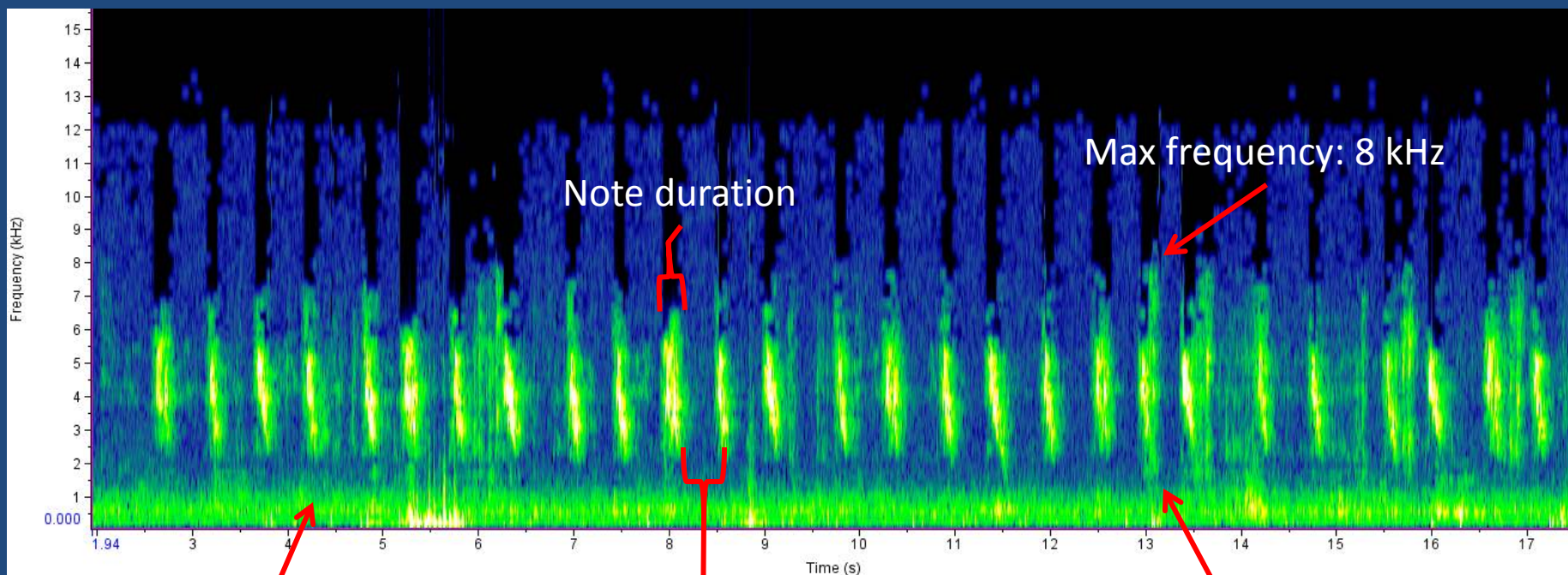
Methods

- Song:
 - Repeated phrases of 2 – 4 notes; rarely 1 or 5 notes long
 - Mate attraction
- Recorded songs in 10 cities across Europe, matched to 10 forest sites near each city

Results

- Compared to forest birds, urban birds had:
 - more variable in # of phrases
 - One bird in Rotterdam had a 16 phrase-long song
 - Shorter average song length
 - Shorter inter-song interval
 - Higher minimum frequency
- Does this enhance signal transmission?

A look at a song spectrogram: How we measure recorded songs



Background noise

Inter-note interval

Min frequency: 1.5 kHz

Total # notes = 27

Song duration = 17 sec – 2.5 sec = 14.5 sec

Questions for discussion

- Create new species (speciation)
 - Population interactions
 - Communication issues
 - Dialects?
- Energy demands on city birds w/ respect to songs?
- What would happen if I took an egg from the forest and moved it to a nest in the city?
 - What would the chick's song sound like?