

Keynote Sounds in the Tryon Creek Soundscape

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A battleground in the deep

Situating the Study

- **Visual bias** – Our society is dominated by visual modes of interpreting information (e.g. graphs, pictures, books, etc). Sound is just not as important since we lost the need to escape predators and hunt prey through the use of our ears. However, sound still has a profound power to influence our environment.
- **Human/nature dichotomies** – Despite the ever-present influence of classical conservation, modern environmentalism has outgrown the dichotomy between nature and humans. Soundscapes offer an avenue to escape this dichotomy because sounds blur together no matter what their source, which leads to a hybrid environmentalist approach to soundscapes.
- **Common problematic themes in soundscape studies**
 - Divide between:
 - Anthrophony – human-created sounds
 - Geophony – geophysical sounds like water or wind
 - Biophony – biological sounds like birds or frogs
 - Visual interpretation of data neglects importance of ear
 - Noise pollution – operates under the assumption that human-created sounds are inherently bad, hence the term “noise” instead of sound.
- **Tryon Creek** – This soundscape offers a varied urban landscape including residential streets, main highways, backyards, and Tryon Creek State Park. To analyze this soundscape an emphasis is put on keynote sounds, listening, and differing perspectives of time.

Relative loudness of low frequency keynote sounds

| Site | Time of day | Creek Loudness | Airplane Loudness | Traffic Loudness |
|-----------------------------------|-------------|----------------|-------------------|------------------|
| Mouth | morning | soft | moderate | n/a |
| Iron Mountain | morning | soft | moderate | n/a |
| High Bridge | morning | soft | moderate | n/a |
| 4 th Avenue | morning | soft | soft | n/a |
| Taylor's Ferry & 26 th | morning | soft | very soft | loud |
| Mouth | afternoon | soft | n/a | n/a |
| Iron Mountain | afternoon | soft | soft | n/a |
| High Bridge | afternoon | soft | moderate | n/a |
| 4 th Avenue | afternoon | soft | soft | n/a |
| Taylor's Ferry & 26 th | afternoon | soft | n/a | loud |
| Mouth | night | soft | soft | n/a |
| Iron Mountain | night | moderate | soft | n/a |
| High Bridge | night | moderate | very soft | n/a |
| 4 th Avenue | night | soft | n/a | n/a |
| Taylor's Ferry & 26 th | night | moderate | n/a | moderate |

Research Question

What are the keynote sounds (i.e. sounds ubiquitous to the soundscape that are highly influential to the other sounds occurring around them) of Tryon Creek, and how do the keynote sounds vary across different sites and times of day along the creek?

Thesis

Tryon Creek's keynote sounds—creek sounds, airplane sounds, and traffic sounds—play a dominant role within the soundscape. All three of these sounds occupy a low frequency range, and as such these sounds compete with each other for acoustic space in the low register. The clarity of the low frequency range of the soundscape of Tryon Creek often suffers from this competitive relationship.

Methodology

- 5 different sites
- 3 half-hour recordings taken at each site
 - Morning – 9 to 11am
 - Afternoon – 2:30 to 4:30pm
 - Night – 8 to 10pm
- October 2011 to January 2012
 - Similar season (bleak)
- Sites chosen to provide a good diversity of sounds
- Limitations
 - Inclement weather, researcher presence, and duration
- Frequency highlighting in recordings
 - Unaltered, 30Hz-1kHz, 1kHz-5kHz, and 5kHz-22kHz
- Time alterations of recordings
 - 16x faster and 8x slower
- Relative cataloguing of sounds
 - Fidelity, frequency range, duration, loudness, possible source, transients

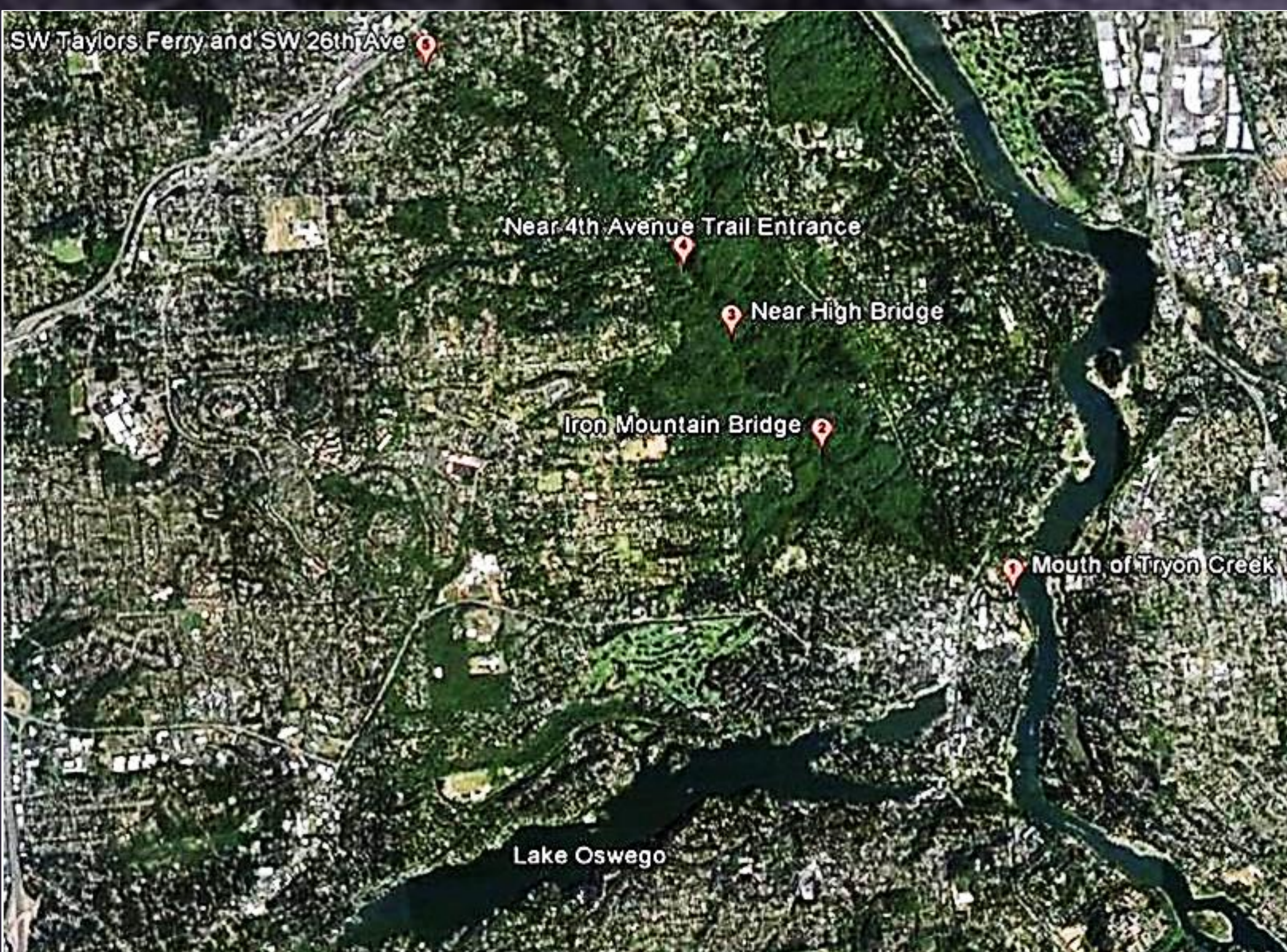
Keynote sounds

- **The creek** – by far the most ubiquitous sound found in all the recordings. This is rather obviously due to the location of each site.
- **Airplanes** – found in all but four of the fifteen recordings. While birdsong is a close second in terms of how frequently it occurs during the recordings, the duration of birdsong is very fleeting. In comparison, airplane sounds can last for minutes on end.
- **Traffic** - While traffic only occurred at the intersection of Taylor's Ferry and SW 26th, it was so prevalent at this site that it was of great significance. The traffic served as a constant whoosh in the background, which sets the tone of the soundscape.

- **Competition of keynotes** – When keynote sounds occur at the same time, the low frequency range of the soundscape becomes muddled. For instance, sometimes the creek will become louder at night, which covers up the sound of airplanes overhead (see table above for more examples).

Conclusions

- **Acoustic space** – It is much easier to conceptualize visual space than aural space. However, just like visual space, there is only so much aural space that can go around. Acoustic actors must either adapt and make room for one another or get lost amongst a series of competitions.
- **The Tryon Creek case** – With the acoustic space of the low frequency ranges so muddled, there are many opportunities found in the space above. The middle and upper frequency ranges of Tryon Creek contain a lot of room for acoustic actors to spread out. In these ranges humans communicate, birds sing, dogs bark territorially, and insects stridulate.
- **Flowing bodies of water** – The combination of flowing water and combustion engines is not singular to Tryon Creek. Further research is necessary to determine whether there are characteristics of other soundscapes that allow for clarity in low frequencies in the presence of water and engines.



Above: Sample site locations

Further Reading

- Kang, Jian. 2007. *Urban Sound Environment*. Taylor & Francis.
- Miller, Nicholas P. 2008. "US National Parks and Management of Park Soundscapes: A Review." *Applied Acoustics* 69 (2) (February): 77–92.
- Pijanowski, Bryan C., Luis J. Villanueva-Rivera, Sarah L. Dumyahn, Almo Farina, Bernie L. Krause, Brian M. Napoletano, Stuart H. Gage, and Nadia Pieretti. 2011. "Soundscape Ecology: The Science of Sound in the Landscape" 61 (March): 203–216.
- Truax, Barry, and World Soundscape Project. 1978. *The World Soundscape Project's Handbook for Acoustic Ecology*. A.R.C. Publications.
- Schafer, R. Murray. 1977. *The Soundscape: Our Sonic Environment and the Tuning of the World*. Destiny Books..



Above: Sign by Tryon Creek