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Hear We Are: Investigating Sonic Inequality within Bowling Green, Ohio

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HEAR WE ARE
INVESTIGATING SONIC INEQUALITY WITHIN BOWLING GREEN, OHIO

DECLAN WICKS

HONORS PROJECT

Submitted to the Honors College
at Bowling Green State University in partial fulfillment of the
requirements for graduation with

UNIVERSITY HONORS 2018

Dr. Sidra Lawrence: Department of Musicology, Ethnomusicology, and Theory, Advisor

Dr. Clayton Rosati: Department of Telecommunications, Advisor

Introduction

My research project, Hear We Are, models the sonic landscape of Bowling Green in relation to socioeconomic patterns within the city. Hear We Are aims to better understand how the city of Bowling Green has been spatially and sonically organized along lines of class, race, or education and is guided by two important questions: How does the soundscape of Bowling Green reflect the spatial organization and division of people? And how do the sounds of our space interact with and reflect our modern lives? In answering these two questions, this honors project offers a narrative of sound within Bowling Green while reflecting on the consequences of living within different soundscapes, i.e., sonic inequality.

Primarily, my research engages in a mixed qualitative and quantitative process of understanding the relationship between sound, space, and categorizations of identity within Bowling Green, Ohio through mapping sonic samples – field recordings – over census-derived data of race, income, and housing-occupation status. Beginning with an examination of how we “sense” the world around, this research then explores how our sense of sound within place relates to who we are, how we live, and how we are perceived to live.

Alongside this research, Hear We Are aims to engage in active and creative placemaking within the community of Bowling Green. Hear We Are promotes greater community access to the specific knowledge being generated about the respective community by creating and installing temporary, interactive exhibits in the Wood County Public Library, Bowling Green State University, and local cafe, Grounds for Thought. Through this creative placemaking that deals with sonic-inequality, Hear We Are attempts to foster creative reflection and dialogue within the community on issues that affect all members of the community. Alongside the physical exhibits, a Twitter (@HearWeAreBG) and Gmail (HearWeAreBG@gmail.com)

account have been created to further diversify who can access the information, sound samples, and research presented within this project.

To Hear, to Listen, to Know

Often, we as humans rely on the eye to explain and interpret the world. The word “Observation” comes from the Latin “observare,” meaning “to watch.” But, what happens when the eye fails to see the whole picture? The dominance of the eye – visual sensory experience - can mask the acoustic world that envelops us.² Sound hovers barely above the subconscious, mitigated by the visual cues of space. We deprive ourselves and understanding of “the significance of experience, expression and emotion as a dimension of social life” within the fully-sensed, quotidian activities within lived space.³ Thus, through a rich analysis of sound, I contend that sound can be “heard” as spectacle: “[as] a display of power which draws on and reproduces the symbolism of a place.”⁴ In structuring our landscapes, we have either consciously or unconsciously structured the accompanying sounds, reifying and reinforcing both culture and power as “natural” parts of the sonic environment. These historically-structured sounds – information rich sonic-texts – form our sonic landscape, or “soundscape”.⁵

We can use our sense of hearing to begin to interact with this “sonic-spectacled” world. Focusing on hearing allows for a transition from our ocular epistemology towards the acoustic “way of knowing” that Steven Felds calls “acoustemology”⁶. Place, as the “neutral... tabula rasa

² Murray R. Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Inner Traditions/Bear & Company), Kindle Edition. See subsection “Ears and Clairaudience” found with the introduction.

³ Susan J. Smith, “Soundscape,” *Area* 26, no. 3 (1994).

⁴ *Ibid.*, 234-235.

⁵ Soundscape studies – or acoustic ecology – while not cutting-edge, is not old either. Formalized as a discipline within the 1970s, acoustic ecology owes much of its theoretical impetus to R. Murray Schafer and his book, *The Soundscape: Our Sonic Environment and the Tuning of the World*.

⁶ Steven Feld. “Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea.” In *Senses of Place*, eds. Steven Feld and Keith H. Basso (Santa Fe, NM: School of American Research Press, 1996).

onto which the particularities of culture and history come to be inscribed,” is composed of and must be interpreted through all our senses – and thus the eye must make room for the ear.⁷ As Feld suggested in his study of the Kaluli people of Bosavi, “places make sense, senses make place.”⁸ The characteristics of a place are sensed by us, and this sensing in turn maps new understandings of that place back onto that place in a dynamic and continuous cycle. Through critically engaging with a more complete set of senses – the addition of the aural – we can form and integrate new understandings of the places and communities in which we exist.

The Acoustic Landscape: Our Soundscape

The soundscape has been studied through a menagerie of disciplines, inter alia, soundscape ecology, acoustic ecology, bioacoustics, sound studies, acoustic design, and urban environmental acoustics.⁹ Each field of research offers key terms and ways of categorizing sound, but this study draws primarily from the language of soundscape ecology and soundscape studies. Within soundscape ecology, Pijanowski et. al. suggest a tripartite definition of sonic sources: biological (animal-produced, including human organisms); anthropogenic (results of human production); and geophysical (produced by natural-process).¹⁰ Respectively, these sonic-sources contribute to “biophony,” “anthrophony,” and “geophony.”¹¹ Each of these sonic-sources, while sonically distinct, are related through human activity that affects each one. The

⁷ Edward S. Casey. “How to Get from Space to Place in a Fairly Short Stretch of Time: Phenomological Prolegomena.” In *Senses of Place*, eds. Steven Feld and Keith H. Basso (Santa Fe, NM: School of American Research Press, 1996), 14.

⁸ Steven Feld. “Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea.” In *Senses of Place*, eds. Steven Feld and Keith H. Basso (Santa Fe, NM: School of American Research Press, 1996), 91.

⁹ For examples see: Bryan C. Pijanowski et. al. “What is Soundscape Ecology? An Introduction and Overview of an Emerging New Science.”; R. Murray Schafer. *The Soundscape: Our Sonic Environment and the Tuning of the World.*; David Novak and Matt Sakakeeny. *Keywords in Sound.*

¹⁰ Bryan C. Pijanowski et. al., “What is Soundscape Ecology? An Introduction and Overview of an Emerging New Science,” *Landscape Ecology* 26, (2011).

¹¹ *Ibid*, 1214.

soundscape functions like the landscape: as “functional ecological spaces where the observed patterns reflect the interaction between natural processes and human activities.”¹² For example, the clearing of a forest would drastically diminish biophony and geophony, e.g. birdcalls and the rustling of wind through leaves.

As Karla Berrens suggests, the soundscape is more than just the collection of sounds. The soundscape is, instead, a “constant experience we live in.”¹³ It is a sonic place – as Feld suggested – in which meaning and meaning-making are intrinsically bound together and reciprocal.¹⁴ The soundscape is both “informative” *and* “orientational” not only to the soundscape ecologist, but to the people living within the soundscape.¹⁵ Whether influencing pleasure or providing opportunities for critical reflection on lived place, the soundscape is an environment constitutive of and constituted by human experience.¹⁶

In reflecting its occupants, the soundscape-as-text provides insight into cultural organization. As Brian Larkin shows in his research on sonic activities in Jos, Nigeria, the cultural landscape of religious conflict and competing identities is not only reflected, but actively negotiated through sonic demarcations of space.¹⁷ Following this line of critical examination, sound becomes a text through which conflicts and inequalities of all forms can be read. These “sonic battlegrounds” – or in terms of extant structural and spatial divisions, “sonic victories” – provide a lens to examine the ways in which race and class have been literally mapped and

¹² Antonios D. Mazaris et. al., “Spatiotemporal Analysis of an Acoustic Environment: Interactions between Landscape Features and Sounds,” *Landscape Ecology*, 24, (2009), 817.

¹³ Karla Berrens, “An Emotional Cartography of Resonance,” *Emotion, Space and Society* 20, (2016), 76.

¹⁴ Steven Feld. “Waterfalls of Song: An Acoustemology of Place Resounding in Bosavi, Papua New Guinea.” In *Senses of Place*, eds. Steven Feld and Keith H. Basso (Santa Fe, NM: School of American Research Press, 1996).

¹⁵ José Luis Carles, Isabel López Barrio, and José Vicente de Lucio, “Sound Influence on Landscape Values,” *Landscape and Urban Planning*, 43, (1998).

¹⁶ *Ibid.*

¹⁷ Brian Larkin, “Techniques of Inattention: The Mediality of Loudspeakers in Nigeria,” *Anthropological Quarterly*, 87, no.4 (2014).

relegated to industrial, noisy, and less healthy spaces within communities. When interpreted through the critical lens of Ronald R. Sundstrom, the soundscape – instead of Sundstrom’s social space – becomes a way in which the mapping of sonic space further reproduces inequalities and constructions of identity based on social categorization.¹⁸

Creative Placemaking and the Contestation of Categorizations

As Robert Lee Fleming suggests in *Place Makers: Creating Public Art that Tells You Where You are: With an Essay on Planning and Policy*, creative placemaking is a tool for beautifying, establishing, and creating community places within an already extant community.¹⁹ Working from Fleming’s definition, I argue that engaging community does not necessarily mean only representing existing communities as inherently desirable. As “Beyond the Building: Performing Arts and Transforming Place” suggests, there are an extensive amount of social issues that can be addressed with creative placemaking, e.g., public education, political issues, and artistic expression.²⁰

As the project “Hear We Are” proposes to do, communities can be engaged and stimulated through content that address possibly contentious issues. If inequalities of access and existence within space are unaddressed and made invisible – or inaudible – communities do not develop as diverse, sustainable communities, but as contested areas of existence organized by

¹⁸ Ronald R. Sundstrom, “Race and Place: Social Space in the Production of Human Kinds,” *Philosophy and Geography* 6, no. 1 (2003).

¹⁹ Robert Lee Fleming, *Place Makers: Creating Public Art that Tells You Where You are: With an Essay on Planning and Policy* (Boston: Harcourt, 1987)

²⁰ Jenna Moran, Jason Schupback, Courtney Spearman, and Jennifer Reut, *Beyond the Building: Performing Arts and Transforming Place*, PDF, 2015, accessed May 1, 2016, <https://www.arts.gov/sites/default/files/beyond-the-building-performing-arts-transforming-place.pdf>, 33

those with structural power.²¹ Thus, the community *as a whole* can be engaged and empowered through creative placemaking that directly addresses extant inequalities within the community.

The three exhibits were placed within local institutions with high foot-traffic – The Wood County Public Library, the Bowling Green State University Library, and Grounds for Thought, a local café. Each installation was publicized via a combination of internet-based social media and physical flyers posted around Bowling Green. Each installation contained a write-up of the project [appendix 2], a 3D-printed sound box that plays nine field-collected samples of sound [appendix b], and a map of Bowling Green showing from where those nine sounds were collected [appendix 3]. The installations were located around Bowling Green from the 15th of April until the 30th of April. Each location included a link to the twitter account, @HearWeAreBG, through which daily “snippets” of the project – a sound sample, map of its location, and corresponding census data – were tweeted once a day from April 15th through April 30th.

When we discover or listen to sound in a physical location, the aural characteristics of what we hear amplify our memory of the physical space around us.²² This idea coincides with the way in which Fleming discusses placemaking’s actual effect on the person: “crystallization.”²³ Crystallization is the process through which physical, and I suggest aural, objects in the environment reinforce and imprint themselves onto mental and imagined landscapes.²⁴ Through the work of Stokes and Fleming, we can see that the acousmatic sound of

²¹ For an excellent read on the “right to the city” and the ways in which “problems” like homelessness are made invisible, but not addressed, I recommend Don Mitchell and Nik Heynen’s “The Geography of Survival and the Right to the City: Speculations on Surveillance, Legal Innovation, and the Criminalization of Intervention.”

²² Martin Stokes, *Ethnicity, Identity, and Music: The Musical Construction of Place* (Oxford, U.K.: Berg, 1994), 3

²³ Robert Lee Fleming, *Place Makers: Creating Public Art that Tells You Where You are: With an Essay on Planning and Policy* (Boston: Harcourt, 1987), 16

²⁴ *Ibid*, 16

the exhibits can create and engage with personal and locational identity through creative placemaking that “displaces sound” to highlight our “emotional cartographies” – leading to new understanding of how sonic space within Bowling Green is formulated and distributed.²⁵ As a final note, even though the Hear We Are exhibit is temporary, the potential for change is still present. Even if the event is noticeably temporary, the memories, stories, and community identity that are created during the event will continue to shape the lives of those who participate long after the event is over.²⁶

The City to be Heard: Bowling Green, Ohio

While Bowling Green, Ohio – an urban cluster²⁷ - did not and does not develop along the same religious divisions of Jos or the racial and class segregations of large, urban centers in America,²⁸ Bowling Green does contain a structured history that has led to spatial divisions between disparate communities. Whether examining the racial and economic divide marked by the railroad tracks within the community or walking through the allocation of parks alongside that same divide (four to the more affluent west, one to the east), Bowling Green is a community in which divisions exist. These divisions are then intensified through the sonic objects – and thus soundscapes – that exist through Bowling Green.

To the east of town runs Interstate-75, a busy and truck-laden highway that whips past two apartment communities. The local airport, bustling with twin-engine planes, sends novice

²⁵ Karla Berrens, “An Emotional Cartography of Resonance,” *Emotion, Space and Society* 20, (2016), 79.

²⁶ Jenna Moran, Jason Schupback, Courtney Spearman, and Jennifer Reut, *Beyond the Building: Performing Arts and Transforming Place*, PDF, 2015, accessed May 1, 2016, <https://www.arts.gov/sites/default/files/beyond-the-building-performing-arts-transforming-place.pdf>. 29

²⁷ “...A densely settled core of census tracts and/or census blocks... of at least 2,500 and less than 50,000 people.” As defined by the US Census Bureau: <https://www.census.gov/geo/reference/ua/urban-rural-2010.html>

²⁸ For an excellent read on the structural history of segregation and urban development, see *Family Properties: How the Struggle Over Race and Real Estate Transformed Chicago and Urban America*, by Beryl Satter.

pilots over the heads of the mobile homes park at Parkview. Route 6, with its more local, but still heavy traffic buttresses the Gypsy Lane Estates Mobile Homes Park. The indomitable train divides the city in half – parallel to the equally divisive Main Street – rushing past the student and family renters whose apartments surround the tracks. Multiple times per day, and at least twice per night, the train roars through town with its horn penetrating the the walls of nearby apartments. On the other hand, the large nature-spaces of Wintergarden Nature Preserve, Simpson Garden Park, and City Park form a parallelogram of leisure space and natural settings within the west side of the city. Each park surrounded by houses, schools, and sidewalks. In contrast, the large Carter park, the one East-side park, is buffeted by Interstate 75 and apartments – largely inaccessible to those without access to a private vehicle..

The picture of Bowling Green that I proceed to paint is not as straightforward as I suggest. The fairgrounds on the Westside of town hosts the International Tractor Pulling Competition, creating a gamut of sounds that can be heard up to eight miles away.²⁹ One of Bowling Green’s two fire-stations is located on the Westside, along with the busy Wood County Hospital which includes the noise of a life-flight helicopter. It should be noted that although these are structural sounds – they are very temporary in nature, happening infrequently and based on “demand” for service rather than structural noises like highways, trains, and airplanes that continue unabated day and night. For a more intricate and nuanced of Bowling Green, Ohio, the research below will have to suffice until further sonic case-studies are undertaken.

Methodology

²⁹ Deegingerkid. Writer. Youtube Comments, in “Just how big is Bowling Green, Ohio’s tractor pull?” Retrieved from <https://www.youtube.com/watch?v=84bXnqfpHxY>.

The bulk of data collection consists of field recordings taken through a Zoom H5 with an XY oriented microphone. After dividing the city of Bowling Green into zones based on the city engineer’s map [*appendix 1*], each zone that contained residents was sampled. The sampling took place from April 2nd to April 9th, 2018 and occurred from 11:00hr to 19:00hr. In terms of sampling technique, the X/Y microphone allowed for 90 degrees of direct stereo sampling, collecting a large slice of the soundscape.³⁰ In terms of placement, the microphone was directed towards the loudest audible sound source at each location, thus capturing what Schafer would call the “keystone sound” – or defining sound – of each location.³¹ After collection, the data was edited (normalized in Audacity) and posted to SoundCloud. From Soundcloud, the sonic samples were uploaded to a google map over which estimated 2016 census data – race, income, and renter-status, was overlaid. It was from this combination of mapped sound samples and census data that the following narrative of sound inequality within Bowling Green was drawn.

Census Data:

The Census data referenced – income, race, and tenure – were organized by their smallest published unit: the block group [*appendix 4*]. The block group is a “statistical division” used by the United States census to organize groups of 300-6000 people into controlled data sets³². However, the delineation of block groups is arbitrarily decided by local census volunteers. Although arbitrarily designed, the block groups still offer the most intricate views of

³⁰ PSW Staff, “In The Studio: Stereo Microphone Techniques” last modified February 15, 2016. https://www.prosoundweb.com/topics/production/stereo_microphone_techniques/#

³¹ Murray R. Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Inner Traditions/Bear & Company), Kindle Edition. Found within the “Features of the Soundscape” subsection of the introduction.

³² United States Census Bureau, “Geographic Terms and Concepts – Block Groups” accessed April 22, 2018. https://www.census.gov/geo/reference/gtc/gtc_bg.html.

demographics within the urban cluster of Bowling Green. The data were taken from the US Census Bureau’s “2012-2016 American Community Survey 5-Year Estimates.”³³

Median household income³⁴ – organized by block group³⁵ – for Bowling Green, readily paints a picture of structured division [figure 1]. With a top-end median income of \$97,434 for western CT219.01:BG 1 and low-end median income of \$15,956³⁶ for eastern CT219.02:BG1, Bowling Green is generally divided into a higher-income western side and a lower-income eastern side with an average income of \$33,562.³⁷ The block groups with the lowest levels of income are centered predominantly around the Bowling Green State University campus and the more industrialized North and South sections of Main Street (Route 25). Furthermore, the lowest-income block groups closest in proximity to large infrastructural transportation routes: the CSX railway, the Wood County Regional Airport, and Interstate-75.

³³ United States Census Bureau, “American FactFinder: 2012-2016 American Community Survey 5-Year Estimates,” Accessed April 22, 2018. <http://factfinder.census.gov>.

³⁴ Total income includes all income collected by persons 15 years or more in age. Gloria G. Guzman, “Household Income: 2016 – American Community Survey Briefs,” *United States Census Bureau* (2017).

³⁵ When block group is written, it is referenced first by census tract (CT) and the block group (BG). For example, “CT216.00:BG5.”

³⁶ Noticeably, only \$3800 above the 2018 Federal Guidelines on poverty. Ohio Department of Education: Office of Early Learning and School Readiness, “United States Department of Health and Human Services 2018 Federal Poverty Guidelines” Updated March 20, 2018. <http://education.ohio.gov/getattachment/Topics/Early-Learning/Early-Childhood-Education-Grant/Early-Childhood-Education-Grants-for-Administrator/Federal-Poverty-Guidelines.pdf.aspx?lang=en-US>.

³⁷ United States Census Bureau, “Bowling Green city, Ohio: QuickFacts” accessed April 22, 2018. <https://www.census.gov/quickfacts/fact/table/bowlinggreencyohio/PST045216>.

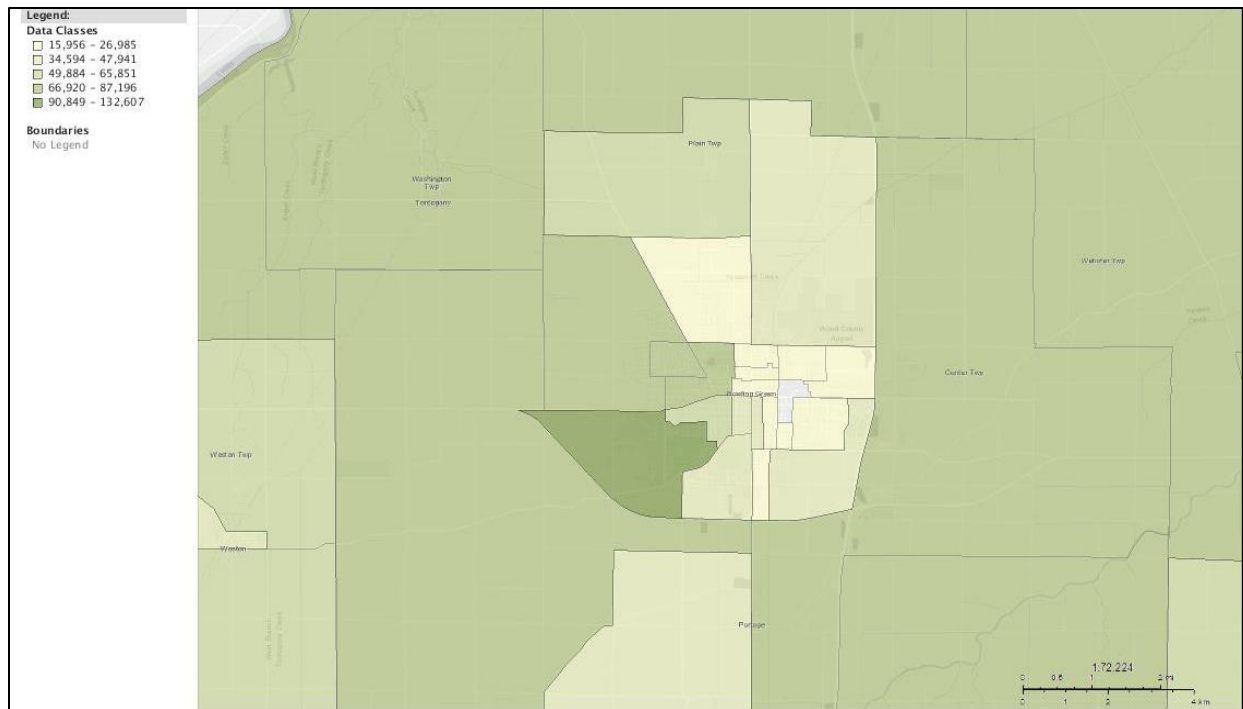


Figure 1

Leisure spaces – viewed through the lens of proximity to parks³⁸ – is also stratified. All but one park in Bowling Green is located within a block group that contains an above-average median income: St. John’s Nature Preserve³⁹ (CT219.01:BG1, \$97,434); Simpson Garden Park, Conneaut Park, and City Park (CT216.00:BG4, \$68,2500); Bellard Park, the Slippery Elm Trail, and the Black Swamp Nature Preserve (CT219.01:BG2, \$41,548); Raney Playground (CT217.02:BG1, 39,375); Carter Park (CT219.02:BG1, \$43,750); and Dunbridge Road Soccer Fields⁴⁰ (CT225.00:BG2, \$70,000). Ridge Park alone is located in CT217.01:BG2 that has a median income of \$18,192. However, an important caveat to note is that there are more green spaces than just parks, with green spaces (unoccupied and *de facto* accessible lots with fauna) located in, but not limited to: BGSU (CT218.00:BG2, N/A); on Ridge and Thurstin

³⁸ Parks were examined as a benchmark for leisure space because they are purely public spaces reserved explicitly for leisure.

³⁹ Locally known as Wintergarden park.

⁴⁰ Inaccessible except by personal vehicle.

(CT217.01:BG2, \$18,192); at Crim Elementary School (CT219.02:BG2, \$15,956); and on Clough and Manville⁴¹ (CT217.02:BG3, \$22,014). In itself, it is important to note that officially sanctioned (open and protected) leisure spaces are predominantly within higher income block groups and green spaces are relegated to lower-income block groups. Thus, places of leisure are a sanctioned activity for higher-income neighborhoods and a question of access for lower-income neighborhoods.

Racial divisions⁴² follow similar patterns within Bowling Green. Most of the non-white populations are concentrated along the same divisions represented by income [figures 2, 3]. Only two block groups (CT219.02:BG1; CT219.01:BG2) contain above-average income and a *total* non-white population above 10%. CT219.02:BG1 is located on the Southside of Bowling Green adjacent to Route 6 and Gypsy Lane Road. Also included within this block group is the Gypsy Lane Mobile Home Park. However, the mobile home park's specific statistical content is not available and thus unable to be examined in relation to income and race. The larger CT219.01:BG2 is also located on the southside adjacent to the busy Napoleon road, the CSX railroad, I-75, and the Mid-Wood grain silos. Of the ten lowest-income block groups, only two (CT217.01:BG3, 98.9%; CT217.02:BG3, 97.5%) have a white population above 90% of the population.

⁴¹ Soon to be developed into housing by Habitat for Humanity. Bill Ryan, "Habitat for Humanity Surprises Two Future BG Homeowners," *The Sentinel-Tribune* (Bowling Green, OH), March 30, 2018.

⁴² "The Census Bureau defines race as a person's self-identification with one or more social groups." Importantly, this does not include ethnicity – which is defined in the US as either not-Hispanic/latin@ or Hispanic/latin@. United States Census Bureau, "Race and Ethnicity," last modified January, 2017. <https://www.census.gov/mso/www/training/pdf/race-ethnicity-onepager.pdf>

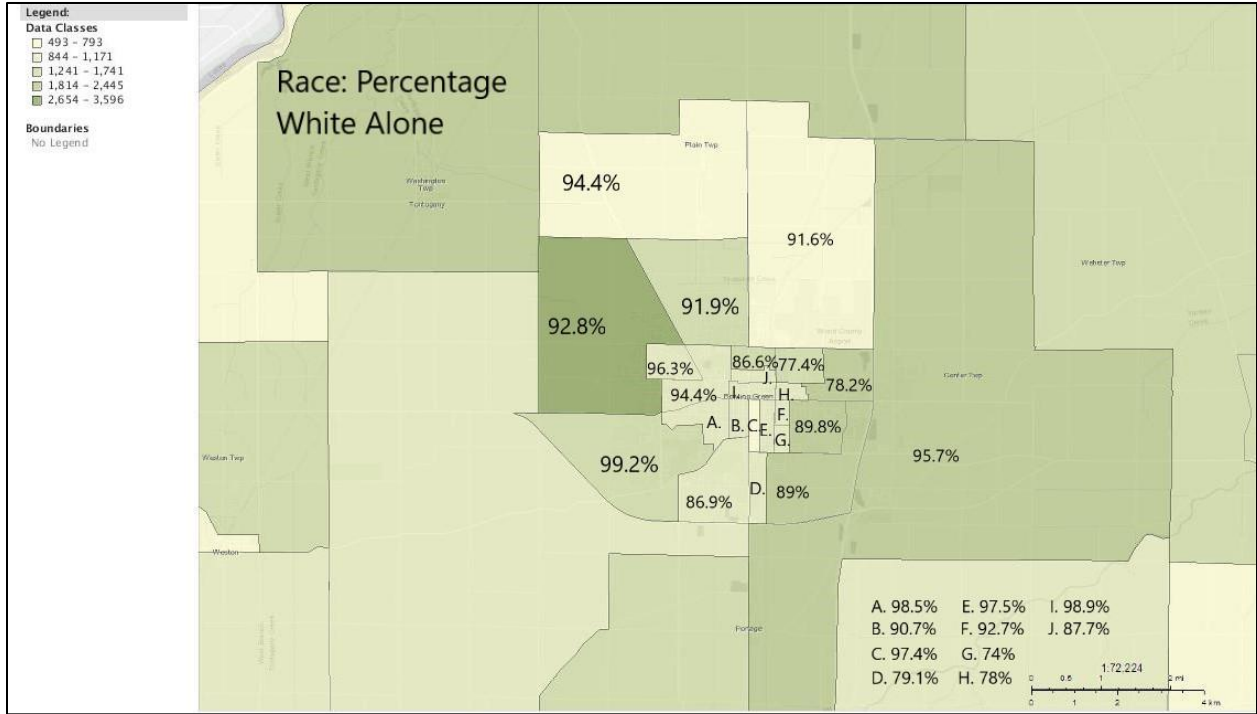


Figure 2

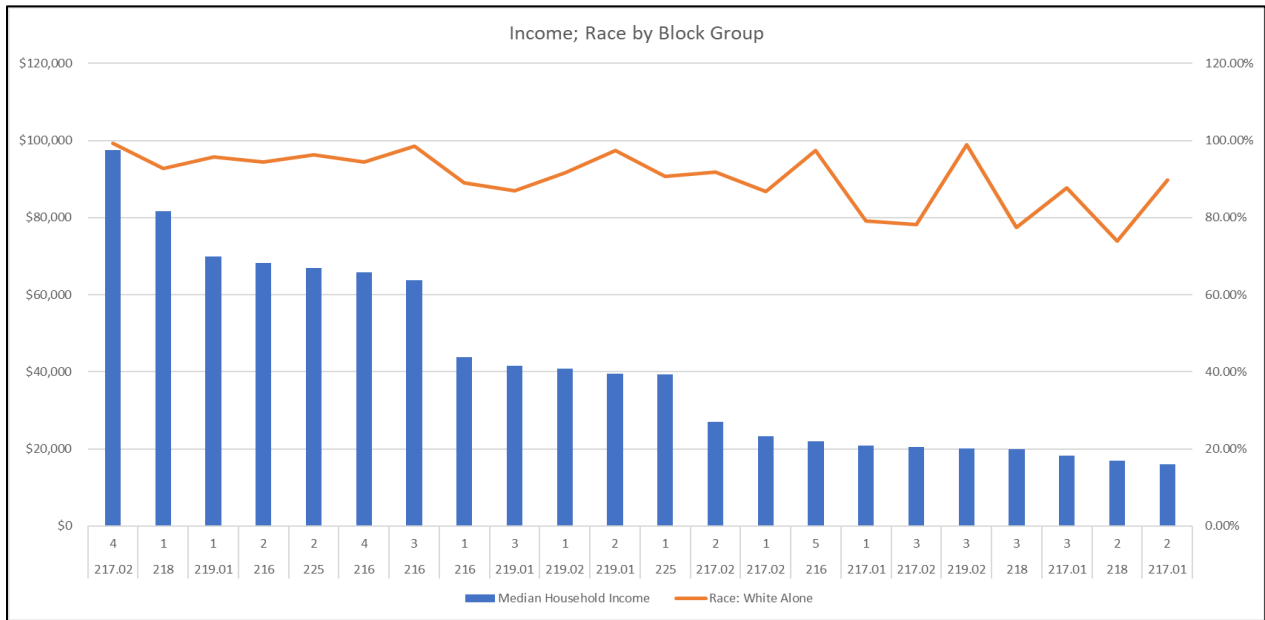


Figure 3

Although Bowling Green has an owner-occupied population of only 39.3%⁴³, tenure follows the same spatial trends as income and race [Figure 4, 5]. Of the 10 block groups with incomes lower than average, 9 of them have an owner-occupancy rate of less than 25%. Furthermore, four of the block groups have an owner-occupancy rate of 0% (219.02:BG3; 218.00:BG2; 218.00:BG3; 217.02:BG5). When looking at tenure, CT216.00:BG5 – with its above 90% white-population and below average income – has the lowest owner-occupancy level of all western Bowling Green block groups. As an outlier, CT225.00:BG2 has a median income of \$70,000, a white population above 90%, and an owner-occupancy of only 50.4%. This strange combination of high income and low racial diversity is most likely the result of two different possibilities. First, most of the block group exists outside of Bowling Green and thus does not follow the same urban structuring. Second, this block group contains the apartment complex Copper Beech which holds 616⁴⁴ people of the estimated 2347 people who live within the block group.⁴⁵

⁴³ United States Census Bureau, “Bowling Green city, Ohio: QuickFacts” accessed April 22, 2018. <https://www.census.gov/quickfacts/fact/table/bowlinggreencityohio/PST045216>.

⁴⁴ Campus Crest Communities, INC. Form 10-K 2014. Retrieved from SEC EDGAR website. https://www.sec.gov/Archives/edgar/data/1490983/000114420415020341/v404434_10k.htm#a_016.

⁴⁵ United States Census Bureau, “American FactFinder: 2012-2016 American Community Survey 5-Year Estimates,” Accessed April 22, 2018. <http://factfinder.census.gov>.

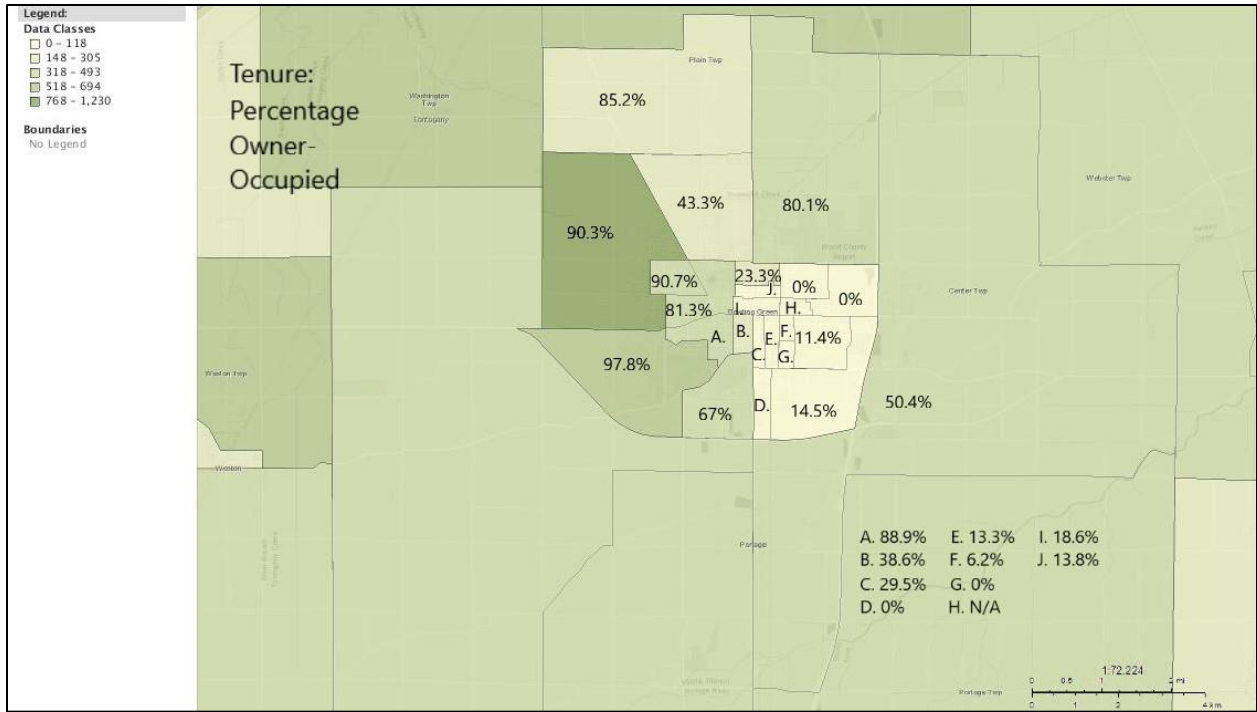


Figure 4

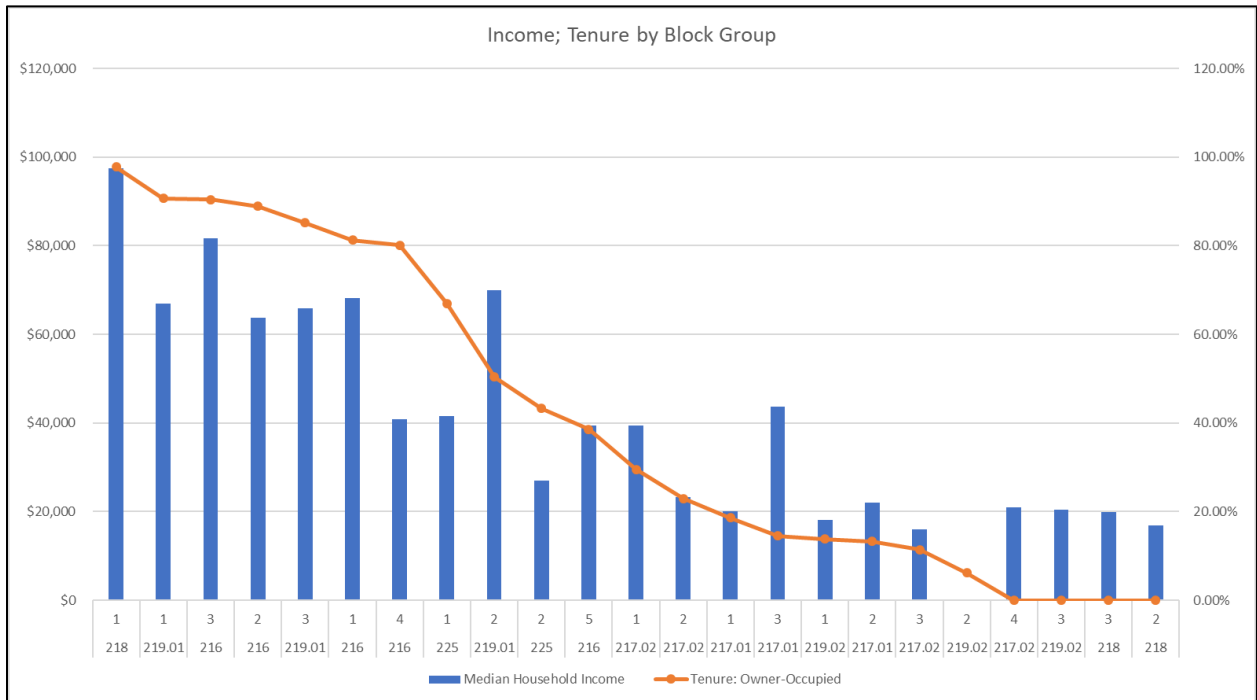


Figure 5

Sound Samples:

51 sound samples⁴⁶ were collected across Bowling Green Because of the separate methodologies used to demarcate space across Bowling Green,⁴⁷ I was able to sample every block group (some multiple times) except for CT217.01:BG2, CT217.02:BG3, and CT218.00:BG3. However, due to the arbitrary nature of the block groups, alongside the amount of sound samples taken, I do not believe that the absence of samples within these three block groups represents significant absence of data.

The sound samples were recorded over both the weekend and workweek (to account cycles of leisure and labor) from 11:00 to 19:00. An average of 14 samples was recorded per day. Each day was necessarily marked by fair weather which allowed for my sampling outdoors. Each recording was taken on public property, e.g., sidewalks, city easements, roads, and parks.

To analyze the sounds found within the recordings, each sound recording was broken into three sections: biophony, anthrophony, and geophony.⁴⁸ Biophony includes all sounds created by animals – including physically produced human sounds, e.g., speaking, walking – and was further broken into three sound-source⁴⁹ categories: birds, humans, and animals. Anthrophony includes all sounds produced by objects that humans have created and was separated into 18 sound-source categories: Car, Car Horn/Alarm, Distinct Traffic Hum, Indistinct Traffic Hum, Train, Train Horn, Airplane (local), Airplane (non-local), Machinery / Household Appliance,

⁴⁶ Accessible at https://drive.google.com/open?id=1Cw0YgEtN4M2vMhDoCF8_ezhuf40VswQG&usp=sharing

⁴⁷ My project sampled from 46 sections of equal area rather than the fewer and irregular block group organizations of space.

⁴⁸ As suggested in, Bryan C. Pijanowski et. al., “What is Soundscape Ecology? An Introduction and Overview of an Emerging New Science.” *Landscape Ecology* 26, (2011): 1214.

⁴⁹ “Sound Source,” “Sound Descriptor,” and “Soundscape Descriptor” are three analytical tools for categorizing sounds. They respectively refer to: object that emits sound, description of that sound, and description of the effect of all sounds in one area. William J. Davies et. al., “Perception of Soundscapes: An Interdisciplinary Approach,” *Applied Acoustics* 74, (2014). 228-229.

Housework, Bus, Golf Cart, Bike, Skateboard / Scooter, Music, Wind Chimes, Clock Tower, and Sport. Each category of anthrophony was created to account for the diversity of sounds within each of the sound recordings and are explained in [appendix 5]. Geophony includes all sounds that are produced by physical processes, e.g., rivers, wind, thunder. For my sampling of Bowling Green, the only pertinent geophonic sounds were wind and leaves in the wind. For a complete list of recorded sounds, see [appendix 5].

Discussion

As can be seen in the census data, the city of Bowling Green is divided by income, race, and tenure. In general terms, west of Main street is owner-occupied, above-average income, and comprised of mainly white populations of people.⁵⁰ East of Main street is renter-occupied, below-average, and slightly more diverse populations. The center of Main street is nebulous while the north and south of Bowling Green tend to mimic the characteristics of the eastside of Bowling Green. It is not the focus of this research to ask how this division of the city occurred, but to examine how the soundscapes of Bowling Green are organized in terms of income, race, and tenure. Furthermore, do these soundscapes reflect, and how can they contribute, to the inequalities inherent in separated cities? The data collected through this study is germinal – it is meant to allow for a greater audience to “tune in” – to inculcate our positions as citizens within Bowling Green as “earwitnesses.”⁵¹ Thus, I would like to use the sound samples to narrate a story on what sound and the greater soundscapes are like within Bowling Green.

⁵⁰ In terms of racial division within Bowling Green, this research examines the white, non-white divide due to the extent with which white populations constitute Bowling Green.

⁵¹ Murray R. Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Inner Traditions/Bear & Company), Kindle Edition. Found within the “earwitness” subsection of the introduction.

There are three “macrostructures” of sound sources that dominate their immediate surroundings while being audible within soundscapes that are miles away: the train and the Wood County Regional Airport. Traffic-heavy thoroughfares, like Main Street, I-75, and Route 6, while not a single macrostructure per se, constitute the third “type” of macrostructure – vehicular transportation. Each of these structures defines and obscures the soundscape of spaces relatively close to them. I also muse on the effects that “miscellaneous sounds,” like wind chimes and the sounds of the human voice have on the inhabitants of different soundscapes.

With each of my listenings to the three macrostructures of the soundscape, I consider the consequences to health that each set of sounds creates. The negative effects of sustained and loud sound (often called noise) on hearing is well documented.⁵² Alongside aural health problems, excessive and continuous noise can contribute to increased risk of cardiovascular disease,^{53,54,55} depression,⁵⁶ and negative behavioral changes.⁵⁷ Furthermore, in 2011, the World Health Organization – in response to a call by policy-makers for a better evaluation of environmental sound and its health impacts – released a meta-study that suggests noise also affects cognitive development in children, annoyance, and disrupted sleep.⁵⁸

⁵² Centers for Disease Control and Prevention, “What Noises Can Cause Hearing Loss?” last modified Feb. 6, 2017. https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html.

⁵³ Wolfgang Babisch, “Updated Exposure-Response Relationship between Road Traffic Noise and Coronary Heart Diseases: A Meta-Analysis,” *Noise and Health* 16, no. 68 (2014): 1-9.

⁵⁴ Wendee Nicole, “Not All Noise is the Same: Fluctuation in Transportation Noise Levels and Arterial Stiffness,” *Environmental Health Perspectives*, (2018). doi:10.1289/EHP2477.

⁵⁵ Mette Sørensen et. al., “Road Traffic Noise and Incident Myocardial Infarction: A Prospective Cohort Study,” *PLoS One* 7, no. 6 (2012). doi:10.1371/journal.pone.0039283.n

⁵⁶ Andreas Seidler et. al., “Association between Aircraft, Road and Railway Traffic Noise and Depression in a Large Case-Control Study based on Secondary Data,” *Environmental Research* 152, (2017): 263-271.

⁵⁷ Kenneth E. Mathews Jr., and Lance Kirkpatrick Canon, “Environmental Noise Level as a Determinant of Helping Behavior,” *Journal of Personality and Social Psychology* 32, no. 4 (1975): 571-577.

⁵⁸ World Health Organization: Regional Office for Europe, *Burden of Disease from Environmental Noise: Quantification of Healthy Life Years Lost in Europe*, 2011. (Joint publication of WHO and JRC European Commission).

I follow the suggestion of Davies et. al. in “Perceptions of Soundscapes: An Interdisciplinary Approach,” and argue that the soundscape is more than just noise and volume. Our perception of where we live is not only influenced by how *loud* something is, but also by how sounds mold our behavior, how they draw us into our memories, and how they are interpreted through conceptual lenses.⁵⁹ Finally, as Davies et. al. mention, what eventually distinguishes sound from noise is us and our emotions.⁶⁰ Thus, keeping in mind that personal perception is an equally important guide to the soundscape, I examine the following sounds through their potential health consequences, potential effects on identity, and representational ability.

The train that runs through Bowling Green – using the city as only a throughway, inaccessible to the public of the city it divides – creates 75-85 decibels in just moving along the tracks.⁶¹ The train horn itself averages 95-115 decibels.⁶² While the risk of hearing damage is low considering that 2 minutes of constant sound are required for risk to hearing,⁶³ the continual passing of the train could lead to increased levels of risk for heart disease⁶⁴ – especially considering that the CSX train runs through Bowling Green intermittently with an approximate two trains around noon and two trains that pass after midnight.⁶⁵ While the train horn was audible as far away as CT216.00:BG2, the horn barely affected the soundscape – adding a

⁵⁹ For example, Karlo Filipan et. al., “The Personal Viewpoint on the Meaning of Tranquility Affects the Appraisal of the Urban Park Soundscape,” *Applied Sciences* 7, no. 91 (2017). Doi:10.3390/app7010091.

⁶⁰ William J. Davies et. al., “Perception of Soundscapes: An Interdisciplinary Approach,” *Applied Acoustics* 74, (2014). 230.

⁶¹ United States Department of Transportation: Federal Railroad Administration, “Horn Noise FAQ” accessed April 22, 2018. <https://www.fra.dot.gov/Page/P0599>.

⁶² Ibid.

⁶³ Centers for Disease Control and Prevention, “What Noises Can Cause Hearing Loss?” last modified Feb. 6, 2017. https://www.cdc.gov/nceh/hearing_loss/what_noises_cause_hearing_loss.html.

⁶⁴ Wendee Nicole, “Not All Noise is the Same: Fluctuation in Transportation Noise Levels and Arterial Stiffness,” *Environmental Health Perspectives*, (2018). doi:10.1289/EHP2477.

⁶⁵ Based on observations taken by author who lives and attends university near the railroad.

whisper of sound that was almost smothered by the more immediate birdcall (recording “Teal Trail”). However, in communities living within 1000 feet of the railroad – found within CT219.02:BG1,3; CT217.02:BG2-5; CT218.00:BG1-2; 217.01:BG1-3; and CT225.00: BG1 – the sound of both the train cars and horn obscure most other sounds (recordings “Railroad Avenue” and “Scott Hamilton 2”). Except for CT225.00:BG1 and CT219.02:BG1, these block groups have a majority of their area within a 1500-foot radius of the train tracks. Notably, these block groups have an average median-household income of \$22,595, an average white population of 86.95%, and an owner-occupancy of 11.60% - with income and tenure rates well below city average.

These diverse – according to Bowling Green averages – and poorer neighborhoods bear the brunt of sound from the train. The question, then, is how do they respond? Without surveying the community, it is impossible to know exact response. However, the information on the consequences to health, I suggest that the noise from the train could lead to elevated levels of stress, risk for heart disease, and complications with mental cognition. Furthermore, the possibility of viewing their train-dominated soundscape positively – thus increasing positive attachment to the soundscape – is most likely diminished by the lack of control,⁶⁶ i.e., the unpredictability of the train, alongside the inability of renters to structurally modify their apartments to combat noise. At best, these communities could engage in a type of “learned helplessness” in which the exercise of control over soundscapes is deemed impossible.⁶⁷ As one could imagine, this learned helplessness (even if just in adjustment to soundscapes) and increased risk of medical conditions does not favorably impact already low-income communities.

⁶⁶ William J. Davies et. al., “Perception of Soundscapes: An Interdisciplinary Approach,” *Applied Acoustics* 74, (2014). 228.

⁶⁷ *Ibid.* 228.

Furthermore, the divisions of race and tenure within the city suggest that entire populations – non-white, renter-occupied – are distinctly subjected to these noises while block groups with higher white populations and owner-occupancy are not subjected to the same soundscape. Even if the health consequences suggested are not present, one can imagine that these soundscapes signify and reaffirm the characteristics of specific populations. To hear the train at such close proximity is an ironic reminder of the population’s distance from being able to participate in shaping the city’s soundscape.

While both local and non-local airplanes were audible across the entire city of Bowling Green, local-airplanes had an audibility that greatly changed across distance.⁶⁸ The local airplanes – centered around the Wood County Regional Airport (WCRA) – were more audible across Bowling Green than the train. For example, compare recordings “Teal Trail”⁶⁹ (approximately 2 miles from the railroad) to “Waterford Drive 2” (approximately 2 miles from the WCRA). At a radius of two miles, the airplane is very audible in all block groups except CT216.00:BG2⁷⁰ (\$81,719; 92.8% white; 90.4% owner-occupied), CT219.01:BG2 (\$41,548, 86.9% white, 67% owner-occupied), and CT219.01:BG1 (\$97,434; 99.2% white; 97.8% owner-occupied). For examples of the sound-level of local airplanes in these distant block groups, listen to “Brownwood” and “Anna Lane.”

While the sound from the airplane does have the ability to be more affective – if the trajectory of the plane were to fly directly over the aforementioned block groups – the audibility

⁶⁸ Predominantly because local-airplanes departed and landed in Bowling Green while non-local airplanes tended to fly over at distances that affected the city equally. If anything, the ability to hear non-local airplanes suggests that the listener is in a relatively calm and quiet soundscape.

⁶⁹ A careful listening to “Teal Trail” reveals both a recording of the train horn and a local-airplane. However, the difference is easier to hear between the two recordings – and the distance from sound-sources is equal between recordings.

⁷⁰ A small portion of each of these block groups is included within the two-mile radius, but the majority of the block group falls outside of the 2-mile radius.

of the plane is not guaranteed like it is for those populations living closer (within a mile) to the airport runway (CT225.00:BG1; 217.01:BG1; CT218.00:BG2; CT216.00:BG5⁷¹; 216.00:BG1⁷²). For examples of the sound levels near the airport, listen to “Parkview 2,” “Dale St.,” and “Frazee Avenue.” Dale Street and Parkview contained louder samples of the airplane because of their location directly under the flight path while Frazee is quieter due to its adjacency to the airport runway. For these communities (CT225.00:BG1; 217.01:BG1; CT218.00:BG2; CT216.00:BG5; 216.00:BG1), the average median household income is \$32,790 alongside an average white population of 86.58% and owner occupancy rate of 38.60%.

It is telling that the “average population” of Bowling Green is treated to the loud, continual rumbling of passing airplanes. In the same vein as the train, one could imagine a situation in which the “average” Bowling Green citizen is subjected to excess sound and thus suffers consequences in health alongside irritation and a perceived lack of agency and control. While the airplane noise affects fewer block groups than the train, it worth noting that three block groups in which the soundscape is significantly altered by airplanes also reside within close proximity to the train tracks (CT225.00:BG1, 218.00:BG1-2). As Seidler et. al. conclude, the prevalence of various traffic sounds within soundscapes, e.g., trains and airplanes, leads to an even higher risk of depression.⁷³

The third “macrostructure” of sound within Bowling Green, is also created by transportation. Unlike the local airplanes the CSX railroad, Route 25 (Main street) is accessible

⁷¹ Although most of CT216.00:BG5 exists outside of the 1-mile radius, one of the two communities (Bowling Green Estates) within CT216.00:BG5 does reside within the 1-mile radius and under the take-off path of the airport runway.

⁷² Although CT216.00:BG1 is outside of the 1-mile radius, it deserves to be placed into the closer category because of the tendency of planes to fly northwards (and over this block group) after lift-off.

⁷³ Andreas Seidler et. al., “Association between Aircraft, Road and Railway Traffic Noise and Depression in a Large Case-Control Study based on Secondary Data,” *Environmental Research* 152, (2017): 263-271.

to a general populace of drivers. However, this accessibility comes with a cost – high levels of sound production. The consistent sound of tire on road is oppressively audible in “Carr Avenue” and “Four Corners,”⁷⁴ while creating a background din for recordings “Leroy Avenue” and “Augusta Drive 2.” It is important to note that different levels of sound were also created depending on speed – the higher the speed limit, the louder the sound. For example, compare “Carr Avenue” (35mph) to “Four Corners” (25mph). The type of vehicle – such as a semi-truck or a small Prius – also affected audibility and quality of the sound. Extenuating circumstances like the lack of a muffler also added to the soundscape. Finally, time of day also greatly influences amount of traffic. While my recordings – taken between 11:00 and 18:00 – did not capture the silence of the roads at night, it is a noteworthy shift.

For the hours of the day in which traffic is at a higher level, however, it affects block groups CT225.00:BG1, CT216.00:BG5, CT217.01:BG1-3, CT217.02:BG2-3, CT219.01:BG2, and CT219.02:BG1,3. For these block groups, average median household income is \$3,000 below average at \$29,704; the white population averages 90.68% of each block group; and owner occupancy is below-average at 30.31%. However, traffic – which has is quickly less audible over small distances (compare recordings “Carr Avenue” and “Leroy Avenue”) – would most likely have a greater effect at closer distances to the street. Thus, it would be more pertinent to look at block by block data – which is unfortunately unavailable through the census.

However, I suggest that looking at “busy” streets (inter-neighborhood and larger streets) provides a worthwhile glimpse in sound structuring. Main Street (as mentioned), Wooster, I-75, Route 6, Napoleon Road, Wintergarden Road, Sand Ridge Road, and Poe Road are louder and

⁷⁴ The local name for where Wooster St. and Main. St intersect.

busier thoroughfares through Bowling Green. However, in including each of these roads, every single block group is included. Perhaps it is ironic that vehicular traffic becomes the great sonic equalizer within Bowling Green, allowing for greater mobility across town alongside increased noise levels for all populations with access to a vehicle.

As I suggested earlier, though, the soundscape should not be thought of as just the presence or absence of sound. Instead, I would like to engage in “textual” readings of sound across Bowling Green. The following section, unlike the previous section, should be considered an interpretation of data grounded in personal interpretations and potential viewpoints. To guide this sonic reading, I work from R. Murray Schafer’s definition of a “keynote” sound: “Keynote is a musical term; it is the note that identifies the key or tonality of a particular composition.”⁷⁵ What are the nigh-unconscious sounds that create the soundscape we live in? Sounds that tell us where we are, and who lives here? If hearing the train and airplane lets us know we live in a poorer, more diverse, and rental-heavy part of town, what do other sound-sources of the soundscape impart upon us?

For example, what does the sound of wind chimes tell us? Perhaps it suggests that you live in a neighborhood with fewer renters, with larger plots of land for hanging wind chimes, with higher incomes that allow for discretionary spending. For my sound sampling, I heard wind chimes in CT216.00:BG3, 216.00:BG5,⁷⁶ CT225.00:BG1, and 219.01:BG2. These block groups have an average income of \$44,077, an average white population of 91.68%, and an owner-

⁷⁵ Murray R. Schafer, *The Soundscape: Our Sonic Environment and the Tuning of the World* (Inner Traditions/Bear & Company), Kindle Edition. Found within the “Features of the Soundscape” subsection of the introduction.

⁷⁶ I heard the wind chimes in the gated community with the “no-trespassing” sign, not the Bowling Green Estates apartment complex.

occupied rate of 70.28%. Does homeownership and higher income correlate (and perhaps produce) with typically pleasing soundscapes?

The sounds of leisure – children playing, sports, and general outdoor activity – also suggest specific types of neighborhood. CT216.00:BG3-4, CT217.01:BG1, CT217.02:BG4, CT218.00:BG1,⁷⁷ CT219.01:BG1-3, and CT219.02:BG1-2 all contained a biophony of human voices – often engaged in conversation or play. These block groups together average a median household income of \$52,603, an average white population of 91.16%, and an owner-occupancy rate of 53.42% - with income and owner-occupancy well above town averages. More importantly, how do we understand the audibility of human voice? Perhaps it suggests safety – especially when the voice belongs to a child (“Madison Court”) – or spaces of tightly-knit communities – as with neighbors talking and walking (“Madison Court” and “Pin Oak Court”) – or spaces of leisure – as with “City Park” or the golf courses (“Pine Valley Drive” and “Murfield Drive”). As discussed earlier, these places of leisure are concentrated within richer, more affluent parts of Bowling Green.

If sound is consequential for health and behavior, as with the noise of transportation, how do pleasing sounds affect our life? Does the quality of sound (not just the noise, or quantity of sound) explain to us where we live and affect our behavior? Do wind chimes and the sounds of children playing provoke communal relationships. If high levels of noise diminish helping behavior – as suggested by Mathews and Canon⁷⁸ – then perhaps ambient and “calm” noises

⁷⁷ BGSU campus

⁷⁸ Kenneth E. Mathews Jr., and Lance Kirkpatrick Canon, “Environmental Noise Level as a Determinant of Helping Behavior,” *Journal of Personality and Social Psychology* 32, no. 4 (1975). 571-577.

could encourage helping behavior. These questions are of course speculative – backed by only a loose-knit collection of sound samples around Bowling Green.

Conclusion

Through my research, I suggest that there are extent sonic “inequalities,” which we can see and locate concretely in the case of Bowling Green. Poorer, more racially diverse, and renter-occupied neighborhoods are besieged by noise and sounds that dominate the aesthetic quality of their soundscapes, affect health, and modify behavior. Furthermore, I suggest – in the vein of Ronald R. Sundstrom – that much like in the way place reifies social differentiation and racial divides, sound reinforces these structural divides within Bowling Green.⁷⁹ Those who live in soundscapes that could be classified as “unpleasant” could have negative consequences to health and wellbeing that accumulate across the lifespan. These same soundscapes suggest an exclusionary sense of space in which inhabitants are unwelcome and left without a “sense of place:”⁸⁰ a lack of agency within one’s sonic environment hardly renders one with a feeling of “belonging.” Finally, the sound qualities of these specific block groups become mentally-mapped in relationship to the socioeconomic qualities. Poor quality sounds and noise become associated with specific neighborhoods – and these negative qualities run the risk of being mapped onto the inhabitants of these spaces – not just the space itself.⁸¹ “Sonic inequalities” within Bowling Green are not just unpleasant, but are a part of a multitude of effects that shape how we live our lives, both individually and communally.

⁷⁹ Ronald R. Sundstrom, “Race and Place: Social Space in the Production of Human Kinds,” *Philosophy and Geography* 6, no. 1 (2003).

⁸⁰ *Ibid.* 91.

⁸¹ *Ibid.* 92.

This honors project hoped to accomplish more than research, however. At the heart of any research should be a question. The heart of the question should be forged in responsibility – why I am asking this question and whom does this question affect? The exhibits posted around Bowling Green, alongside the social media account, provided opportunities for citizens to interact with the basic concepts at the core of this research: where do I live? How does *where* I live affect *how* I live? Is it possible that this small city could be structurally inequitable? And finally, how does sound play into all of this?

In looking to the future, if sonic inequality is to be actively grappled with, I recommend that this honors project form only the seed of placemaking and research. Better methodologies and more location-specific data, i.e., surveys, are needed to understand how people perceive and interact with quotidian sounds. Creative placemaking that wants to engage community members in difficult questions of inequality must be attractive, approachable, accessible, and widely-promoted. If this conversation on sound is going to enter the “soundscape” of Bowling Green itself, it cannot end hear.

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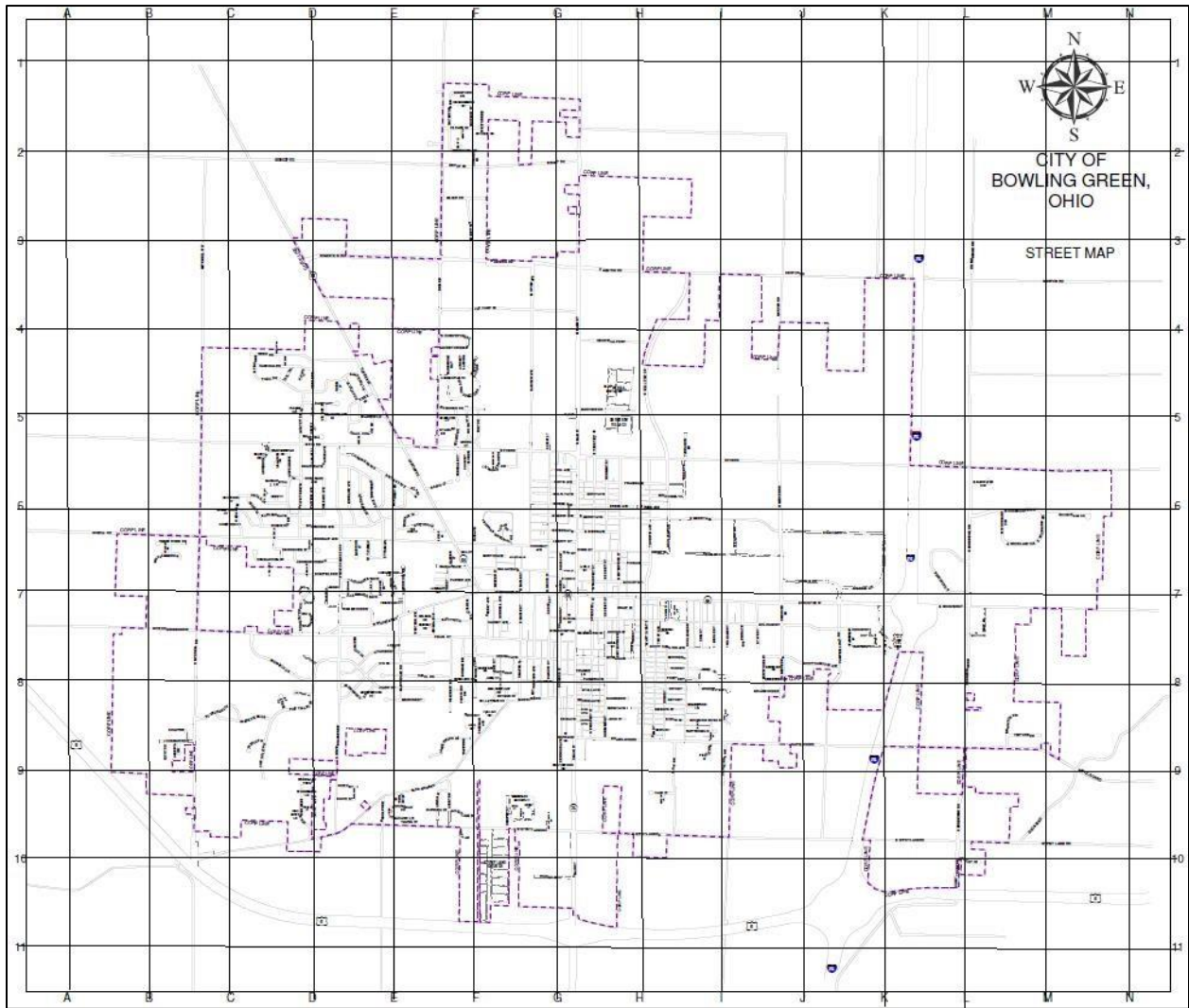
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Appendix



Appendix 1

Dear Audience,

When you listen to the world around you, do you ever wonder what someone else in Bowling Green, Ohio is also hearing in a different place? Take a moment to listen to the attached recordings. You don't have to close your eyes, but just listen. What did you hear?

Maybe you heard the symphony of spring birds. How often do you hear these birds? Where are these birds most likely to be heard? Are these birdcalls calming or perhaps unwanted?

Did you hear the train rattle past? Do you normally hear the train where you live? Who normally hears the warning chord of the horn? How often do they hear it? Is the sound of the train intrusive, or enjoyable?

The project before you, *Hear We Are*, models the sonic landscape of Bowling Green in relation to divisions within the city. In wanting to better understand how the city of Bowling Green has been spatially and sonically organized – whether along lines of class, race, or education – *Hear We Are* asks two important questions: How does the soundscape of Bowling Green reflect the spatial organization and division of people? And how do the sounds of our space interact with and reflect our modern lives?

Often, we as humans rely on the eye to explain the world to us. “Observation” itself comes from the Latin “observare,” meaning “to watch.” But, what happens when the eye fails to see the whole picture? We can use our sense of hearing to begin to interact with the world – what Steven Felds would call “acoustemology”. Through engaging with the complete set of sounds – the sonic landscape – we can form a richer understanding of the places and communities in which we exist.

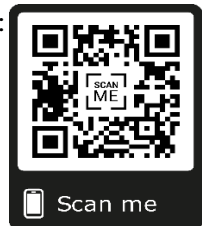
There is no question that specific populations within Bowling Green are located next to loud sources of sound – whether it is student rentals and the train tracks, or the location of Gypsy Lane Estates Mobile Homes Park next to Route 6 – whereas other populations share space with quieter spaces such as Wintergarden Nature Preserve or the City Park. When you listened to the recording, did you notice sounds that you do not hear daily? Think about who hears these sounds, and why are they located next to them. Are people of a certain income, or educational status, or race located near different soundscapes within Bowling Green? How is your identity affected by the sounds around you, and how are the sounds around you determined by your identity?

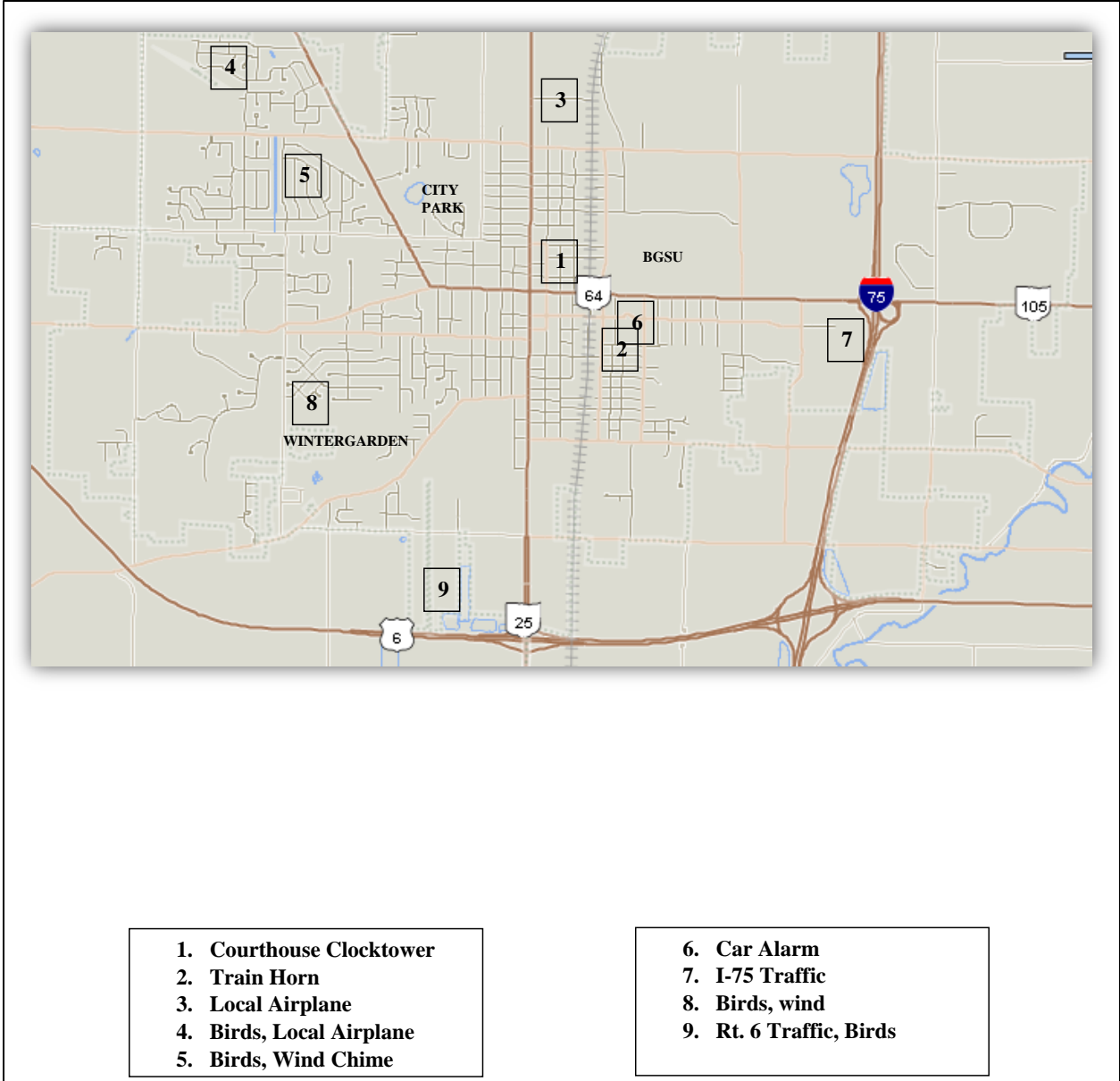
The answer to these questions – among many others – begins with a simple act: remembering to hear where you are and where you are not.

To find more samples of recorded sound, review the thesis and research paper, or engage with and contribute sounds and stories to this evolving project, please contact Declan Wicks through twitter or email:

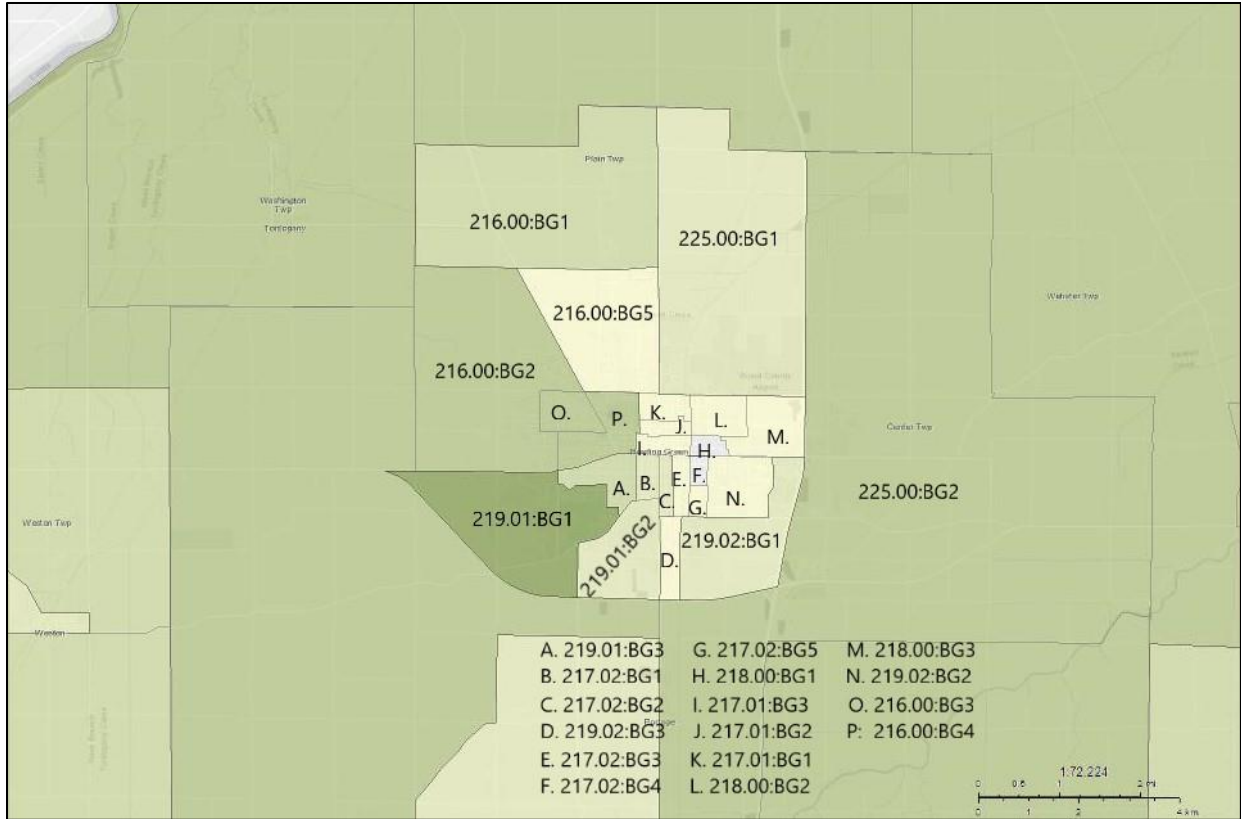
Twitter: @HearWeAreBG or #HearWeAreBG
Email: HearWeAreBG@gmail.com

Google Map of Data:





Appendix 3



Appendix 4

Sound-Source	Sound-Description
Bird	Birdcall, counting of birdcalls was based on distinct birds-species.
Human	Talking, walking, and general person-to-person interaction.
Animal	Any sounds emitted by a non-human, non-bird animal. For this study, this included on the chatter of squirrels and the barking of dogs.
Car	The general noise of passing cars: wind and tires on surface. Each passing car was counted if possible.
Car horn / alarm	The honking of a car horn or the constant honking of a car alarm. Each car (not honk) was counted.
Distinct Traffic Hum	The car-noise (see above) generated in rapid, often-continuous passing of cars. It is considered distinct because each passing car could be counted.
Indistinct Traffic Hum	The car-noise (see above) generated in rapid, often-continuous passing of cars. It is considered indistinct because each passing car could not be counted.
Train	The rattle of the body of the train against the railroad. Often heard as a steady hum with continual metal-on-metal clinking. Counted by train.
Train (horn)	The chord of a train horn. Counted per train, not be horn signaled.
Airplane (local)	The engine-sounds associated with planes having departed from the Wood County Regional Airport. Counted per plane.
Airplane (not-local)	The engine-sound associated with planes passing over Bowling Green and having not originated from Bowling Green. Often present as a low rumble. Counted per plane.
Machinery / Household Appliance	The presence and continuous whine of electric machinery, e.g., general factory components, air-conditioners, etc... Counted per sound.
Housework	The sounds of human-induced activity around the house, e.g., leaf-blowing. Counted per person.

Bus	The loud passing of a bus as distinct from a personal car. Counted per bus.
Golf Cart	The slow moving and softer sound of a golf cart as distinct from a personal car. Counted per golf cart.
Bike	The flutter of bike tires and pedaling. Counted per bike.
Skateboard / Scooter	The roll of the wheels in contact with the surface or the hit of the skateboard on a surface. Counted by skateboard / scooter.
Music	Organized sounds generally recognized by audience as having the qualities of music. Considered to be anthroponic when produced by instrument or speaker, not voice. Counted per speaker / musician.
Wind Chimes	The chiming of the wind pipes. Counted per “wind chime” – set of wind chime bells.
Clock Tower	The loud ringing of bells. Counted per tower.
Sport	The sounds associated with sports. In this study, the bouncing of a basketball and the tossing of a softball. Counted per sport.

Appendix 5