HRS|CDR Health and Retirement Study
Contextual Data Resource

Documentation for

National Park Service Geospatial Sound Modeling Files

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Requested Acknowledgment

If you used the Contextual Data Resource data in a written analysis, please include the following acknowledgement:

> This analysis uses data or information from the Contextual Data Resource (CDR): National Park Service Geospatial Sound Modeling Files by Census Tract, 2013/15, as of April 2024, developed by Jennifer Ailshire, Kate Vavra-Musser, and Calley E. Fisk at the USC/UCLA Center on Biodemography and Population Health. The development of the CDR was funded by the National Institute on Aging (R21 AG045625, P30 AG017625).

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Data Sources

National Park Service (NPS). Geospatial Sound Modeling, https://irma.nps.gov/DataStore/Reference/Profile/2217356

Linking CDR Data with HRS Respondent Data

The Contextual Data Resource is designed to be linked with the Health and Retirement Study Cross-Wave Geographic Information (Detail) file, which is available as restricted data. See https://hrs.isr.umich.edu/data-products/restricted-data for more information about accessing the HRS restricted data. All geographic identifiers are in string format, and match the geographic identifiers in the HRS Cross-Wave Geographic Information (Detail) file.

- To link census tract level data, merge using the 11-digit LINKCEN2010 geographic identifier, which is the 2-digit state + 3-digit county + 6-digit census tract FIPS code. The LINKCEN2010 geographic identifier has been harmonized to the 2010 census tract boundaries.

Note on HRS Cross-Wave Geographic Information File

Respondent locations are carried forward to the next wave and they appear for waves in which the interview may not have occurred. xIWTYPE in the Tracker file indicates whether someone was actually interviewed in that wave, in which case, the location would have been confirmed.

If users want to limit analyses to waves in which the R was interviewed, keep waves of observations where xIWTYPE = 1. In summary, a location appearing on a given line does not indicate that an interview took place in that wave; it is simply the location that was on record at the time.

Dataset Overview

The NPS Geospatial Sound Monitoring Files include georeferenced maps of expected environmental sound level across the United States, Alaska, and Hawaii. Maps are generated from Random Forest machine learning models that include long term measurements of ambient sounds pressure levels and various geospatial features. The Geospatial Sound Monitoring Files includes three measurements; expected existing sound levels calculated using all recorded sounds, natural levels calculated by subtracting out all human sounds, and impact levels calculated as the difference between existing and natural levels and adjusted to account for how the human ear perceives sound. NPS predicts these measurements for a typical summer daytime hour using input from 2013-2015.

Data Summary

Dataset Name: Geospatial Sound Monitoring Files

Data Source: United States National Park Service (NPS)

Data Source URL: https://irma.nps.gov/DataStore/Reference/Profile/2217356

Data Collection Method: Audio measurements and geospatial data compiled by NPS.

Years Collected: Final estimates based on 2013-2015 data.

Geographic Coverage: NPS Geospatial Sound Monitoring Files cover the contiguous U.S, Alaska, and Hawaii.

Technical Information about Environmental Quality Index

NPS calculates Geospatial Sound Monitoring estimates using the L50 sound pressure level (*dBA re 20μPa*) and adjusts for how the human ear perceives sound using "A-weighting", a commonly used method for combining sounds across the entire audio spectrum. Estimates are predicted for a typical daytime hour during the summer with calm weather conditions.

Input for the Geospatial Sound Monitoring estimates come from audio measurements compiled by NPS technicians in national parks over 25 days and includes additional measurements from urban and suburban areas. The final model is based on 966 observations from 479 unique site locations.

More information can be found on the Mapping Sound Frequently Asked Questions page: https://www.nps.gov/subjects/sound/mapfaq.htm

For further information on the Geospatial Sound Monitoring files, please see the following references:

D. J. Mennitt and K. Fristrup, "Influential factors and spatiotemporal patterns of environmental sound levels," Proceedings of INTER-NOISE 2015 San Francisco, CA (2015).

D. J. Mennitt, K. Fristrup, and K. Sherrill, "A geospatial model of ambient sound pressure levels in the contiguous United States," The Journal of the Acoustical Society of America, 135, pp. 2746-2764, 2014. http://dx.doi.org/10.1121/1.4870481

D. J. Mennitt, K. Fristrup, K. Sherrill, and L. Nelson, "Mapping sound pressure levels on continental scales using a geospatial sound model," Proceedings of INTER-NOISE 2013, Innsbruck, Austria (2013).

D. J. Mennitt, K. Fristrup, and L. Nelson, "Mapping the extent of noise on a national scale using geospatial models," Presented at the 166th meeting of the Acoustical Society of America, San Francisco, USA (2013).

Variable List

Name	Definition	Geography	Years
	Geographic Identifiers		
linkcen2010	2010 Census Tract FIPS code (11 digits: 1-2 state, 3-5 county, 6-11 tract)		
	Geospatial Sound Monitoring Census Tract Estimates		
nntr	Average noise level from natural sources	Tract	2013/15
intr	Average noise level from impact sources	Tract	2013/15
entr	Average noise level from all existing sources	Tract	2013/15

Variable Summary

Variable	Label	Mean	SD	Min	Max	N
linkcen2010	2010 Census Tract FIPS code	.	.			72765
nntr	Mean Noise Level Natural Sources	33.380	2.616	21.23427	37.13821	72757
intr	Mean Noise Level Impact Sources	13.147	5.553	.0701318	32.71917	72757
entr	Mean Noise Level All	46.526	5.675	25.43448	62.50264	72757