Where the Grass Grows Greener: The Impacts of Urban Greening on Housing Prices and Neighborhood Stability - Webtool Variable Documentation

Variable name	Description
Degree of greenness	The 2019 Normalized Difference Vegetation Index (NDVI) was calculated at 30-meter spatial resolution using near-infrared (NIR) and red surface reflectance data from Landsat[1] 8 Level 2, Collection 2, Tier 1 satellite data in Google Earth Engine. The raster layer in the webtool shows the NDVI for each individual pixel, while the bivariate map layers that include this variable use the median of these values for all pixels in each census tract.
Trend in 'degree of greenness'	This layer was created using a pixel-wise linear trend analysis of the Landsat 5/8 Level 2, Collection 2, Tier 1 Normalized Difference Vegetation Index (NDVI) between 1990 and 2020 at 30-meter spatial resolution. At each pixel location, the annual median NDVI value was calculated using Landsat's NIR and red surface reflectance data. For each year between 1990 and 2020, median NDVI pixel values were stored as bands in an ImageCollection using Google Earth Engine, where each band represented one year's median NDVI values.
	The slope of the linear trend between NDVI (independent) and time (dependent) was calculated at each pixel location. The raster layer in the webtool shows these slopes for each individual pixel, while the bivariate map layers that include this variable use the median of these slopes for all pixels in each census tract.
Land surface temperature	The 2019 median land surface temperature (LST) measurements were obtained at 120-meter spatial resolution through Band 10 of Landsat 8 Level 2, Collection 2, Tier 1 satellite data in Google Earth Engine. The raster layer in the webtool shows the LST for each individual pixel, while the bivariate map layers that include this variable use the median of these values for all pixels in each census tract.
Land surface temperature trend	This layer was created using a pixel-wise linear trend analysis of Landsat 5/8 Level 2, Collection 2, Tier 1 LST between 1990 and 2020 at 120-meter spatial resolution. At each pixel location, the annual median LST value was obtained through Landsat's surface temperature band (Landsat 5 - Band 6; Landsat 8 - Band 10). For each year between 1990 and 2020, median LST pixel values were stored as bands in an ImageCollection using Google Earth Engine, where each band represented one year's median LST values.
	The slope of the linear trend between LST (independent) and time (dependent) was calculated at each pixel location. The raster layer in the webtool shows these slopes for each individual pixel, while the bivariate map layers that include this variable use the median of these slopes for all pixels in each census tract.
Green space classification	This raster layer designates individual pixels as green space, water, or urban at 5-meter spatial resolution using geographic object-based image analysis (GeOBIA) and image classification algorithms. This analysis uses satellite-derived indices and surface

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[1] Landsat 5 and Landsat 8 are modern iterations of NASA's flagship optical Earth observation satellites that provide time series data of the Earth's surface reflectance and land surface temperature at approximately two-week revisit intervals.

	reflectance data from the National Agricultural Imagery Program[2] (NAIP) between 2020 and 2022, and Sentinel-2 [3]satellite data between 2015 and 2023. A detailed list of the bands and indices used in the GeOBIA image classification algorithm and further geospatial processing details can be found here.
Percent classified green space	This tract-level vector layer represents the percentage of each census tract' geographic area that is classified as green space in the 'Green space classification' layer.
Displacement risk	This data comes directly from the Urban Displacement Project (UDP)'s Estimated Displacement Risk Model (EDR) for California. The levels of displacement risk shown in this webtool correspond with the 'Overall Displacement' layer shown in the webtool on UDP's website. The highest level of displacement risk represents the '2 income groups' category; the middle level represents the '1 income group' category, and the lowest level of displacement risk represents the 'Probable Displacement' category. See the original EDR on UDP's website for more information about the methodology.
Social vulnerability	The Center for Disease Control's Social Vulnerability Index assigns scores to tracts based on 15 variables from the U.S. census, including unemployment, minority status, and disability. Higher indices represent higher levels of social vulnerability. The layer shown in the webtool uses 2018 data.
Housing price trend	Zip code-level housing price trend data comes from the Zillow Home Value Index (ZHVI), which is a *"measure of the typical home value and market changes across a given region and housing type"* and *"reflects the typical value for homes in the 35th to 65th percentile range."* The percent change in yearly average housing price between 2000 and 2020 was calculated by subtracting the average monthly ZHVI in 2000 from the average monthly ZHVI in 2020, and dividing that value by the average monthly ZHVI in 2000.

Link to web-tool: https://nasa-eej.projects.earthengine.app/view/wherethegrassgrowsgreener

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[2] NAIP data, which is acquired every 3 years in California by the United States Department of Agriculture, is available at 1-meter spatial resolution.

[3] Sentinel-2, the European Space Agency's flagship optical Earth observation satellite, provides time series data of the Earth's surface reflectance in visible and near infrared at approximately two-week intervals. Sentinel-2 data is available at its native 10-meter spatial resolution.