

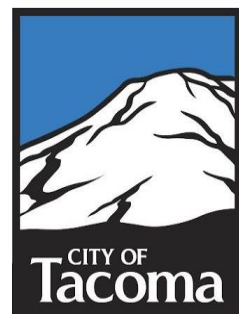
City of Tacoma Equity Index Methodology Report

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*Community Attributes Inc. tells data-rich stories about communities
that are important to decision-makers.*

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Introduction

The 2024 update of the City of Tacoma Equity Index reflects a commitment to a comprehensive equity assessment. The Index encompasses 61 indicators and five sub-indices: Accessibility, Economy, Education, Environmental Health, and Livability. This report outlines the changes and updates made in 2024, providing detailed information on each indicator or index and its calculation method.

Definition of Terms

- **Indicator:** An individual measure to assess well-being.
- **Index:** A cumulative measure of a set of defined indicators in each category.
- **Year:** The year in which the data were published.
- **Polarity:** Describes the desired outcome, reflecting preferences such as *reducing* car crashes and *increasing* park availability.
- **Unit:** Signifies the measurement unit of the indicator visible on the map.
- **Aggregation:** The method of consolidating data.
- **Scope:** Delineates the granularity of geographic data.

Calculation Methodology

A crucial aspect of the assessment involves calculating indicators based on land area. Notably, for block groups and census tracts encompassing water, this water area is excluded from the calculations. This approach ensures a focused and precise evaluation, especially when assessing factors influenced by spatial considerations.

Equity Overview and Determinant Categories

- **Demographics:** This category provides an in-depth look at the overall demographics of the region.
- **Livability:** This category includes housing cost burden, general health, crime, and crashes, this category focuses on the quality-of-life aspects within the region.
- **Accessibility:** This category delves into the ease of access to resources and services, highlighting the availability and proximity of essential facilities.
- **Economy:** This category focuses on financial factors such as jobs, poverty, and income, providing insights into the economic well-being of the community.
- **Education:** This category evaluates the educational landscape within the region and includes educational attainment, student mobility, and testing proficiency.
- **Environmental Health:** This category assesses the impact of the environment on the community's well-being.

Index Calculations

The Equity Index is composed of five indices (Accessibility, Economy, Education, Environmental Health, and Livability), shown in **Exhibit 1**. These indices are made of individual indicators. The table below shows which indicators are included in and excluded from the index calculation. Please note that all Demographic indicators are excluded from the index calculations.

2024 Updates

- **Data Refresh:** All data have been updated to reflect the most recent available information.
- **Data Source Optimization:** Sources were changed to ensure accuracy and currency, focusing on more up-to-date data from reliable outlets.
- **Positive Outcomes Approach:** The Unemployment Rate and Uninsured Rate were transformed into the Employment Rate and Insured Rate, aligning with a positive outcomes approach.
- **Indicator Refinement:** The Urban Tree Canopy indicator now utilizes data from the Multi-Resolution Characteristics Consortium for more frequent updates.
- **Food Environment Assessment:** The Healthy Food Availability Indicator was switched to the CDC's Modified Retail Food Environment Index, enabling a nuanced examination of food swamps and deserts.

This updated equity index is a valuable resource for community members invested in improving the factors that impact positive life outcomes, offering a comprehensive and detailed analysis of the City of Tacoma across determinant categories of well-being and equity.

Exhibit 1. Equity Index Components

Index Category	Included in Index	Excluded from Index
Accessibility	<i>8 indicators</i>	<i>0 indicators</i>
	Average Pavement Condition Healthy Food Availability Household Vehicle Access Households with Internet Parks & Open Space (<i>composite of Neighborhood Parks, Community Parks, and Regional Parks</i>) Transit Access Score Voter Participation Rate Sidewalks and Bikeways	
Economy	<i>4 indicators</i>	<i>1 indicator</i>
	200% of Poverty Jobs Index Median Household Income Employment Rate	Poverty Rate
Education	<i>5 indicators</i>	<i>1 indicator</i>
	Average Student Mobility Average Testing Proficiency Educational Attainment Index High School Graduation Rate Kindergarten Readiness Rate	Percent 25+ Year Olds with a Bachelor's Degree or More
Environmental Health	<i>6 indicators</i>	<i>1 indicator</i>
	Diesel Emissions Ozone Concentration PM _{2.5} Particulates Proximity to Heavy Traffic Roadways Urban Heat Island Effect Urban Tree Canopy	Toxic Releases from Facilities
Livability	<i>6 indicators</i>	<i>2 indicators</i>
	Cost-Burdened Households (<i>composite of Owner Cost Burden and Renter Cost Burden</i>) Median Home Value Pedestrian/Bicyclist Crashes Tacoma Crime Risk Insured Rate Average Life Expectancy	Tacoma Personal Crime Tacoma Property Crime

Exhibit 2. Additional Indicators Excluded from Index

Age

- Population Under 18
- Population 18 to 64
- Population 65 and Above

Race/Ethnicity

- American Indian or Alaskan Native
- Asian
- Black or African American
- Hispanic or Latino
- Native Hawaiian or Pacific Islander
- Other Race
- Two or More Races
- White

Language Spoken at Home

- Korean Speaking
- Other Asian / Pacific Island Languages Spoken
- Other than English Speaking
- Russian / Polish / Slavic Languages Spoken
- Spanish Speaking
- Tagalog Speaking
- Vietnamese Speaking

Ability

- Individual with Disabilities

Indices

Equity Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

This overall score is the average of each sub-index (Accessibility, Economy, Education, Environment, and Livability). See Exhibit 1 for a detailed breakdown of the index components.

Calculation Method

Compute the final equity index by averaging the Accessibility, Livability, Education, Economic, and Environment Indexes across the analyzed area. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Steps

Import indicators from the accessibility, economy, education, environment, and livability categories into preferred data tool.

- For each block group, calculate Z-scores for each indicator in their respective categories.
- For each block group, average Z-scores together in their respective categories.
- For each block group, average Z-scores together from all categories.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity across multiple categories.

Source

Calculated by CAI

Accessibility Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Average of Z-Scores of each of the following indicators in the Accessibility category:

- Average Pavement Condition
- Healthy Food Availability
- Household Vehicle Access
- Households with Internet
- Parks & Open Space
- Sidewalks & Bikeways
- Transit Access Score
- Voter Participation Rate

Calculation Method

This index is calculated by taking the average of the Z-scores of accessibility indicators in the geographic area of analysis. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Steps

- Import indicators in the accessibility category into preferred data tool.
- For each block group, calculate Z-scores for each indicator.
- For each block group, average Z-scores together.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity in community resource access. Greater accessibility in a community can promote economic, mental, physical, and environmental well-being.

Source

Calculated by CAI

Economy Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Average of Z-Scores of each of the following indicators in the Economy category:

- 200% of Poverty
- Jobs Index
- Median Household Income

Calculation Method

This index is calculated by taking the average of the Z-scores of Economy indicators in the geographic area of analysis. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Steps

- Import indicators in the economy category into preferred data tool.
- For each block group, calculate Z-scores for each indicator.
- For each block group, average Z-scores together.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity in community economic well-being.

Source

Calculated by CAI

Education Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Average of Z-Scores of each of the following indicators in the Education category:

- Average Student Mobility
- Average Testing Proficiency
- Educational Attainment Index
- High School Graduation Rate
- Kindergarten Readiness Rate

Calculation Method

This index is calculated by taking the average of the Z-scores of Education indicators in the geographic area of analysis. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Steps

- Import indicators in the education category into preferred data tool.
- Calculate Z-scores for each indicator.
- Average Z-scores together.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity in community education.

Source

Calculated by CAI

Environmental Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Average of Z-Scores of each of the following indicators in the Environmental Health category:

- Diesel Emissions
- Ozone Concentration
- PM_{2.5} Particulates
- Proximity to Heavy Traffic Roadways
- Urban Heat Island Effect

Calculation Method

This index is calculated by taking the average of the Z-scores of Environmental indicators in the geographic area of analysis. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Method

- Import indicators in the environment category into preferred data tool.
- For each block group, calculate Z-scores for each indicator.
- For each block group, average Z-scores together.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity in community environmental well-being. Environmental factors play a pivotal role in health.

Source

Calculated by CAI

Livability Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Average of Z-Scores of each of the following indicators in the Livability category:

- Cost-Burdened Households
- Median Home Value
- Pedestrian/Bicyclist Crashes
- Tacoma Crime Risk

Calculation Method

This index is calculated by taking the average of the Z-scores of Livability indicators in the geographic area of analysis. Text definitions are assigned based on quintile:

- Very Low (20th percentile)
- Low (21st to 40th percentile)
- Moderate (41st to 60th percentile)
- High (61st to 80th percentile)
- Very High (81st to 100th percentile)

Calculation Steps

- Import indicators in the livability category into preferred data tool.
- For each block group, calculate Z-scores for each indicator.
- For each block group, average Z-scores together.
- Distribute Z-scores into five equal percentile groupings.
- Assign appropriate text definitions to groupings.

Importance

This comprehensive indicator provides a high-level overview of equity in the livability of a community.

Source

Calculated by CAI

Indicators

Demographics: Race/Ethnicity

American Indian or Alaskan Native

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as American Indian or Alaskan Native.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"American Indian or Alaskan Native: A person having origins in any of the original peoples of North and South America (including Central America) and who maintains tribal affiliation or community attachment. This category includes people who indicate their race as "American Indian or Alaska Native" or report entries such as Navajo Nation, Blackfeet Tribe, Mayan, Aztec, Native Village of Barrow Inupiat Traditional Government, or Nome Eskimo Community."

The total population that identifies as American Indian and Alaska Native alone is divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: American Indian or Alaska Native alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Asian

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as Asian.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"Asian: A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including, for example, India, China, the Philippine Islands, Japan, Korea, or Vietnam. It includes people who indicate their race as "Asian Indian," "Chinese," "Filipino," "Korean," "Japanese," "Vietnamese," and "Other Asian" or provide other detailed Asian responses such as Pakistani, Cambodian, Hmong, Thai, Bengali, Mien, etc."

The total population that identifies as Asian alone is divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: Asian alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Black or African American

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as Black or African American.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"Black or African American: A person having origins in any of the Black racial groups of Africa. It includes people who indicate their race as "Black or African American" or report responses such as African American, Jamaican, Haitian, Nigerian, Ethiopian, or Somali. The category also includes groups such as Ghanaian, South African, Barbadian, Kenyan, Liberian, Bahamian, etc."

The total population that identifies as Black or African American alone is divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: Black or African American alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Hispanic or Latino

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as Hispanic or Latino ethnicity.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Hispanic or Latino" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Native Hawaiian or Pacific Islander

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as Native Hawaiian or Pacific Islander.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"Native Hawaiian or Pacific Islander: A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands. It includes people who indicate their race as "Native Hawaiian," "Chamorro," "Samoan," and "Other Pacific Islander" or provide other detailed Pacific Islander responses such as Palauan, Tahitian, Chuukese, Pohnpeian, Saipanese, Yapese, etc."

The total population that identifies as Native Hawaiian and Other Pacific Islander alone is divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: Native Hawaiian and Other Pacific Islander alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Other Race

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as “Other Race.”

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"Some Other Race: Includes all other responses not included in the “White,” “Black or African American,” “American Indian or Alaska Native,” “Asian,” and “Native Hawaiian or Other Pacific Islander” race categories described above. Respondents reporting entries such as multiracial, mixed, interracial, or a Hispanic, Latino, or Spanish group (for example, Mexican, Puerto Rican, Cuban, or Spanish) in response to the race question are included in this category."

The total population that identifies as some other race alone divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: Some other race alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

White

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that identifies as White.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"White: A person having origins in any of the original peoples of Europe, the Middle East, or North Africa. It includes people who indicate their race as "White" or report responses such as German, Irish, English, Italian, Lebanese, and Egyptian. The category also includes groups such as Polish, French, Iranian, Slavic, Cajun, Chaldean, etc."

The total population that identifies as white is divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: White alone" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Two or More Races

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Block Group

Description

Percent of block group population that selects two or more races.

Calculation Method

Race data are based on self-identification. The included racial categories reflect the social definition of race recognized in the county and do not define race biologically, anthropologically, or genetically. The categories of race include racial and national origin or sociocultural groups. Individuals can choose to report more than one race or some other race.

"Two or More Races: People may choose to provide two or more races either by checking two or more race response check boxes, by providing multiple responses, or by some combination of check boxes and other responses. The race response categories shown on the questionnaire are collapsed into the five minimum race groups identified by OMB, and the Census Bureau's "Some Other Race" category. For data product purposes, "Two or More Races" refers to combinations of two or more of the following race categories: 1. White 2. Black or African American 3. American Indian or Alaska Native 4. Asian 120 5. Native Hawaiian or Other Pacific Islander 6. Some Other Race"

The total population that identifies as two or races divided by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Hispanic or Latino Origin by Race 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the column "Not Hispanic or Latino: Two or more races" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's ethnic and racial makeup can help in understanding the culture and identifying potential racial inequalities and barriers.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B03002?q=B03002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B03002?q=B03002&g=050XX00US53053$1500000)

Demographics: General

Foreign Born

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Average	Census Tract

Description

Percent of the population that is foreign-born.

Calculation Method

The foreign-born population includes anyone who was not a U.S. citizen at birth. This includes both citizens who are a U.S citizen by naturalization and those who are not a U.S. citizen.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Place of Birth by Nativity and Citizenship Status 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the "Foreign born" column by the "Total" column.
- Multiply by 100.

Importance

Foreign-born people experience greater civil engagement barriers and social vulnerability.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B05002?q=B05002&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACSDT5Y2022.B05002?q=B05002&g=050XX00US53053$1400000)

Individuals with Disabilities

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Average	Census Tract

Description

Percentage of non-institutionalized population within the block group with a disability.

Calculation Method

“An individual with a disability is defined by the ADA as a person who has a physical or mental impairment that substantially limits one or more major life activities, a person who has a history or record of such an impairment, or a person who is perceived by others as having such an impairment. The ADA does not specifically name all of the impairments that are covered.”

This indicator is calculated by summing males and females with a disability in the age ranges under 5, 5 to 17 years, 18 to 34 years, 35 to 64 years, 65 to 74 years, and 75 years and over divided by the total civilian noninstitutionalized population.

Importance

Individuals with a disability are at a greater risk of adverse impacts from built social and environmental barriers.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Sex by Age by Disability Status estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, sum the "With a disability" column for age groups "Under 5 years", "5 to 17 years", "18 to 34 years", "35 to 64 years", "65 to 74 years", and "75 years and over" columns for males and females.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B18101?q=B18101&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACSDT5Y2022.B18101?q=B18101&g=050XX00US53053$1400000)

Total Population

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Integer	Sum	Census Tract

Description

Total count of population.

Calculation Method

Count of total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](https://www.census.gov/programs-surveys/acs/data.html)

- Download the Total Population 5-year estimates table from the Census Bureau website for all block groups in Tacoma

Importance

Data are used in some indicator calculations. It also represents how populated a block group is.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2020.B01003?q=B01003&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2020.B01003?q=B01003&g=050XX00US53053$1500000)

Demographics: Language

Korean Speaking

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks Korean as a primary language at home.

Calculation Method

The number of individuals 5 years and over who speak Korean is divided by the total number of individuals 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the column "Korean" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequently spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Limited English

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

Percent of the population with limited English proficiency.

Calculation Method

The census asked individuals aged 5 and older about their primary language spoken at home. Respondents who reported speaking a language other than English were asked to indicate their English-speaking ability based on one of the following categories: "Very well," "Well," "Not well," or "Not at all."

This indicator sums the population 5 years and over that speak Spanish, other Indo-European languages, Asian and Pacific Island languages, and speak other languages that speak English "not well" and "not at all" divided by the total population 5 years and older.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Age by Language Spoken at Home by Ability to Speak English for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the columns speak Spanish, other Indo-European languages, Asian and Pacific Island languages, and other languages that speak English "not well" and "not at all" for the age groups 5 to 17 years, 18 to 64 years, and 65 years and over.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Communities with high levels of linguistic isolation experience greater civil engagement barriers, which indicates social vulnerability.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B16004?q=B16004&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B16004?q=B16004&g=050XX00US53053$1500000)

Other Asian / Pacific Island Languages Spoken

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speak Asian / Pacific Island languages as a primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Population 5 years and over that speak other Asian and Pacific Island languages divided by the total population 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma
- For each block group, divide the column "Other Asian and Pacific Island languages" by the "Total" column
- Multiply by 100

Importance

Knowing a community's most frequently spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Other than English Speaking

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks a language other than English as their primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Total population 5 years and over minus total population 5 years and over that speak only English.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, subtract the column "Speak only English" from the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequently spoken language can help understand the culture and improve civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACSDT5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Russian / Polish / Slavic Languages Spoken

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks Russian / Polish / Slavic languages as a primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Population 5 years and over that speak Russian, Polish, or other Slavic languages divided by the total population 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the column "Russian, Polish, or other Slavic languages" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequently spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Spanish Speaking

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks Spanish as a primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Population 5 years and over that speak Spanish divided by the total population 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the column "Spanish" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequent spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACSDT5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Tagalog Speaking

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks Tagalog as a primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Population 5 years and over that speak Tagalog (including Filipino) divided by the total population 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the column "Tagalog (incl. Filipino)" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequently spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Vietnamese Speaking

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Sum	Census Tract

Description

The population that speaks Vietnamese as a primary language at home.

Calculation Method

The population 5 years and over were asked about their primary language spoken at home.

Population 5 years and over that speak Vietnamese divided by the total population 5 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Language Spoken at Home for the Population 5 Years and Over 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For each block group, divide the column "Vietnamese" by the "Total" column.
- Multiply by 100.

Importance

Knowing a community's most frequently spoken language can help in understanding the culture and improving civil engagement.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053\\$1400000](https://data.census.gov/table/ACS5Y2022.C16001?q=C16001&g=050XX00US53053$1400000)

Demographics: Age

Population Under 18

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Average	Block Group

Description

Population under 18.

Calculation Method

Data on age are based on the age of the person in complete years at the time of the interview. To calculate the most accurate age, respondents were asked to provide their age and date of birth.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](https://www.census.gov/programs-surveys/acs/data.html)

- Download the Sex by Age 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the columns "Under 7 years", "5 to 9 years", "10 to 14 years", and "15 to 17 years" for male and females.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

This population is considered a sensitive population. Sensitive populations are considered more vulnerable to the risk of exposure to environmental hazards, more sensitive to subsequent effects, and less able to recover from the effects.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053$1500000)

Population 18 to 64

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Average	Block Group

Description

Population aged 18 to 64.

Calculation Method

Data on age are based on the age of the person in complete years at the time of the interview. To calculate the most accurate age, respondents were asked to provide their age and date of birth.

This indicator is calculated by summing males and females in age ranges 18 to 19 years old, 20 years, 21 years, 22 to 24 years, 25 to 29 years, 30 to 34 years, 35 to 39 years, 40 to 44 years, 45 to 49 years, 50 to 54 years, 55 to 59 years, 60 to 61 years, and 62 to 64 years then dividing by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Sex by Age 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the columns "18 and 19 years", "20 years", "21 years", "22 to 24 years", "25 to 29 years", "30 to 34 years", "35 to 39 years", "40 to 44 years", "45 to 49 years", "50 to 54 years", "55 to 59 years", "60 to 61 years", and "62 to 64 years" for male and females.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

This population is the driving body of the work force.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053$1500000)

Population 65 and Above

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Neutral	Percentage	Average	Block Group

Description

Population aged 65 and above.

Calculation Method

Data on age are based on the age of the person in complete years at the time of the interview. To calculate the most accurate age, respondents were asked to provide their age and date of birth.

This indicator is calculated by summing males and females in age ranges 65 and 66 years old, 67 to 69 years, 70 to 74 years, 75 to 79 years, 80 to 84 years, and 85 years and over then dividing by the total population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Sex by Age 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the columns "65 and 66 years", "67 to 69 years", "70 to 74 years", "75 to 79 years", "80 to 84 years", and "85 years and over" for male and females.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

This population is considered a sensitive population. Sensitive populations are considered to be more vulnerable to risk of exposure from environmental hazards, more sensitive to subsequent effects, and less able to recover from the effects.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B01001?q=B01001&g=050XX00US53053$1500000)

Accessibility

Average Pavement Condition

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2019	Higher is better	Integer	Average	Block Group

Description

Aggregates the average quality of roads in a block group. Lower scores indicate poorer road quality resulting in higher costs of repair to the local municipality.

Calculation Method

The pavement condition index (PCI) is a numerical index between 0 and 100, which is used to indicate the general condition of a pavement section. The PCI is widely used in transportation civil engineering and asset management, and many municipalities use it to measure the performance of their road infrastructure and their levels of service. It is a statistical measure and requires manual survey of the pavement.

The City of Tacoma has a supplied pavement conditions report which details the conditions of road segments within the city boundary. The PCI value for a block group is calculated by averaging all the roads' PCI's.

This indicator represents the average PCI value of the roads that intersect a geographic area, i.e. block group. The PCI is divided into seven classes per the American Society of Testing and Materials:

- 85-100: Good
- 70-85: Satisfactory
- 55-70: Fair
- 40-55: Poor
- 25-40: Very Poor
- 10-25: Serious
- 0-10: Failed

Calculation Steps

- Download the Pavement Condition Index for Tacoma.
- Add the line shapefile into an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Summarize all roads per block groups in Tacoma.
- Calculate the average PCI for each block group using the PCI_19 column.

Importance

Maintenance of infrastructure supports community access and well-being.

Source

City of Tacoma Department of Public Works | Tacoma Road Conditions

Source URL

<https://tacoma.maps.arcgis.com/home/webmap/viewer.html?layers=c1434501708b4396acb115bd5127dab7>

Community Parks

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Decimal	Average	Block Group

Description

Proportion of block group within 1 mile of community parks.

Calculation Method

PSRC's Regional Open Space Conservation Plan defines parks as neighborhood (less than 10 acres), community (10 to 100 acres), and regional parks (area larger than 100 acres) according to the American Planning Association's Planning and Urban Design Guidelines. Park service areas were defined from the Washington State Recreation and Conservation Office's level of service guidelines. Neighborhood park service areas are considered half a mile, community park service areas are considered 1 mile, and regional park service areas are considered 10 miles. The parks' centroids were generated, and the service areas were created from those points.

Community park access was calculated by summing the acres of the community park service areas within a block group and then dividing it by the block group's total area. The unit ranges from 0 to 1, with 1 meaning a block group is completely within community park service area.

Calculation Steps

For the Puget Sound Regional Council's (PSRC) calculation methods, please see: [osplan-appendixc-methodology.pdf \(psrc.org\)](https://psrc.org/psrc-urban-planning-appendix-c-methodology.pdf)

- Download the Regional Open Space Network from PSRC.
- Add the polygon open space network shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Using the Size column attribute in the open space network shapefile, buffer community parks by 1 mile.
- For each block group, calculate the park buffered area per block group.
- For each block group, divide the block group's park buffered area by the block group's area.

Importance

Access to parks and open space positively impacts health, well being and livability.

Source

Puget Sound Regional Center | Puget Sound Regional Center Data Portal

Source URL

<https://psrc-psregcncl.hub.arcgis.com/apps/regional-open-space-network-1/explore>

Healthy Food Availability

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Percentage	Average	Block Group

Description

The mRFEI (modified Retail Food Environment Index) percentage assesses the proportion of healthy food outlets within an area, with a percentage of zero indicating a food desert lacking access to affordable nutritious options. In areas with mREI percentages above zero, lower percentage signify food swamps, characterized by an abundance of energy-dense snacks overwhelming healthier food choices.

Calculation Method

Using ESRI Business Analyst data, we download food outlet point locations by NAICS codes that are defined as healthy and non-healthy per the CDC's Modified Retail Food Environment Index (mRFEI) methodology. ESRI Business Analyst partners with Data Axle to create their business locations datasets. The mRFEI measures the number of healthy and less healthy food outlets, defined by usual food selections found in specific types of retail stores, such as supermarkets, convenience stores, or fast-food restaurants. Among the overall count of food vendors classified as either healthful or less healthful within a census tract, the mRFEI denotes the proportion that falls under the healthy category. Scores of zero correspond to the concept of food deserts ("areas that lack access to affordable fruits, vegetables, whole grains, low-fat/non-fat milk or dairy alternatives, and other foods that make up the full range of a healthy diet"). Among mREI scores greater than zero, lower scores correspond with the concept of food swamps ("areas in which large relative amounts of energy-dense snack foods, inundate healthy food options").

The number of healthy food retailers and less healthy food retailers are counted per block group. The CDC methodology considers a count of a food outlet if it is within the block group or within 0.5 miles from the block group's boundary. The mRFEI calculation is as follows:

$$mRFEI = 100 * \frac{\text{Count of healthy food outlets}}{\text{Total food outlets}}$$

Calculation Steps

For the CDC's Modified Retail Food Environment Index (mRFEI) calculation methods, please see: [Census Tract Level State Maps of the Modified Retail Food Environment Index \(mRFEI\) \(cdc.gov\)](#)

- Download CDC's designated NAICS codes for healthy and less healthy food retailers from ESRI Business Analyst for the city of Tacoma.
- Export and upload the food retailers point shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.

- Spatial join the healthy food retailers, per CDC's definition, to Tacoma block groups that are within a distance of 0.5 miles of a block group.
- Spatial join the less healthy food retailers, per CDC's definition, to Tacoma block groups that are within a distance of 0.5 miles of a block group.
- For each block group, sum the count of healthy food retailers and less healthy food retailers to calculate the total count of food retailers for a block group.
- For each block group, divide the count of healthy food retailers by the total count.
- Multiply by 100.

Importance

Access to healthy food supports economic and physical well-being.

Source

ESRI | ESRI Business Analyst

Source URL

<https://cainc.maps.arcgis.com/home/item.html?id=77a103c993a4499d81b09437c58aead0>

Household Vehicle Access

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

Percentage of block group population with access to a household vehicle.

Calculation Method

The American Community Survey (ACS) provides data on the percentage of occupied households that have access to at least one vehicle. This information is derived from Housing Question 12, which is directed to individuals residing in homes. It aims to capture the proportion of households that have cars, vans, or small trucks available for personal use. The vehicle count includes vehicles owned, rented, or leased for a month or more, as well as company and government vehicles kept at home and used for non-business purposes. However, it excludes motorcycles, recreational vehicles, dismantled or immobile vehicles, and vehicles used solely for business purposes.

The ACS data categorizes occupied households into owned and rented, but for this calculation, these categories were not differentiated in the count of total occupied households. To determine the percentage of households with access to a vehicle, the total number of occupied households with a vehicle is divided by the total number of occupied households. This calculation provides an estimate of the proportion of households that have access to a vehicle based on the available ACS data.

Importance

Access to a household vehicle increases mobility, particularly in rural areas, where transit service is less frequent.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Tenure by Vehicles Available in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "Owner occupied: 1 vehicle available", "Owner occupied: 2 vehicles available", "Owner occupied: 3 vehicles available", "Owner occupied: 4 vehicles available", "Owner occupied: 5 or more vehicles available", "Renter occupied: 1 vehicle available", "Renter occupied: 2 vehicles available", "Renter occupied: 3 vehicles available", "Renter occupied: 4 vehicles available", and "Renter occupied: 5 or more vehicles available" columns.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B25044?q=B25044&t=Transportation&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25044?q=B25044&t=Transportation&g=050XX00US53053$1500000)

Households with Internet

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

The percentage of households with access to home internet.

Calculation Method

Internet access is defined as the percentage of households that have the ability to connect to the internet. This calculation is based on data from the American Community Survey, which provides insights into the presence or availability of internet connections within households.

The focus of this calculation is on determining the extent to which households have the means to connect to the internet, without considering whether they pay for the service. It recognizes that access to the online world is a crucial aspect of modern living and encompasses the ability to use or connect to the internet, regardless of the specific payment arrangements.

By measuring access as the percentage of households with internet connectivity, we gain insights into the level of digital inclusion within a given population. This indicator allows us to assess the availability of internet services and the potential for individuals within these households to engage with online resources, services, and opportunities.

It is important to note that this calculation does not differentiate based on whether the household members pay for the internet service. Instead, it focuses on the broader aspect of access, indicating the proportion of households that have the capability to connect to the internet and take advantage of the benefits it offers.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Presence and Types of Internet Subscriptions in Household in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "With an Internet subscription" and "Internet access without a subscription" columns.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Higher percentages indicate higher access to internet usage which is beneficial to families and children.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B28002?q=B28002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B28002?q=B28002&g=050XX00US53053$1500000)

Neighborhood Parks

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Decimal	Average	Block Group

Description

Proportion of block group within 1/2 mile of neighborhood parks.

Calculation Method

PSRC's Regional Open Space Conservation Plan defines parks as neighborhood (less than 10 acres), community (10 to 100 acres), and regional parks (area larger than 100 acres) according to the American Planning Association's Planning and Urban Design Guidelines. Park service areas were defined from the Washington State Recreation and Conservation Office's level of service guidelines. Neighborhood park service areas are considered half a mile, community park service areas are considered 1 mile, and regional park service areas are considered 10 miles. The parks' centroids were generated, and the service areas were created from those points.

Neighborhood park access was calculated by summing the acres of the neighborhood park service areas within a block group and then dividing it by the block group's total area. The unit ranges from 0 to 1, with 1 meaning a block group is completely within neighborhood park service area.

Calculation Steps

For the Puget Sound Regional Council's (PSRC) calculation methods, please see: [osplan-appendixc-methodology.pdf \(psrc.org\)](https://psrc.org/psrc-transportation-planning/appendix-c-methodology)

- Download the Regional Open Space Network from PSRC.
- Add the polygon open space network shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Using the Size column attribute in the open space network shapefile, buffer neighborhood parks by 0.5 mile.
- For each block group, calculate the park buffered area per block group.
- For each block group, divide the block group's buffered park area by the block group's area.

Importance

Access to parks and open space positively impacts health, well being and livability.

Source

Puget Sound Regional Center | Puget Sound Regional Center Data Portal

Source URL

<https://psrc-psregcncl.hub.arcgis.com/apps/regional-open-space-network-1/explore>

Parks & Open Space

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Decimal	Average	Block Group

Description

Proportion of a block group's area within 1/2 mile of neighborhood parks, 1 mile of community parks, and 10 miles of regional parks divided by total block group area. Overlapping park areas yield higher totals, meaning greater park access. Park classifications per PSRC urban open space plan.

Calculation Method

PSRC's Regional Open Space Conservation Plan defines parks as neighborhood (less than 10 acres), community (10 to 100 acres), and regional parks (area larger than 100 acres) according to the American Planning Association's Planning and Urban Design Guidelines. Park service areas were defined from the Washington State Recreation and Conservation Office's level of service guidelines. Neighborhood park service areas are considered half a mile, community park service areas are considered 1 mile, and regional park service areas are considered 10 miles. The parks' centroids were generated, and the service areas were created from those points.

Park and open space access was calculated by summing the acres of the regional, community, and neighborhood park service areas within a block group and then dividing it by the block group's total area. The unit ranges from 0 to 3, with 3 meaning a block group is completely within regional, community, and neighborhood park service areas.

Calculation Steps

For the Puget Sound Regional Council's (PSRC) calculation methods, please see: [osplan-appendixc-methodology.pdf \(psrc.org\)](https://www.psrc.org/osplan-appendixc-methodology.pdf)

- Download the Regional Open Space Network from PSRC.
- Add the polygon open space network shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Using the Size column in the shapefile, buffer regional parks by 10 miles, community parks by 1 mile, and neighborhood parks by 0.5 mile.
- For each park size, calculate the park buffered area per block group.
- For each park size, divide the block group's park buffered area by the block group's area.
- For each block group, sum the regional, community, and neighborhood parks calculated proportions.

Importance

Access to parks and open space positively impacts health, well-being and livability.

Source

Puget Sound Regional Center | Puget Sound Regional Center Data Portal

Source URL

<https://psrc-psregcncl.hub.arcgis.com/apps/regional-open-space-network-1/explore>

Regional Parks

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Decimal	Average	Block Group

Description

Proportion of block group within 10 miles of regional parks.

Calculation Method

PSRC's Regional Open Space Conservation Plan defines parks as neighborhood (less than 10 acres), community (10 to 100 acres), and regional parks (area larger than 100 acres) according to the American Planning Association's Planning and Urban Design Guidelines. Park service areas were defined from the Washington State Recreation and Conservation Office's level of service guidelines. Neighborhood park service areas are considered half a mile, community park service areas are considered 1 mile, and regional park service areas are considered 10 miles. The parks' centroids were generated, and the service areas were created from those points.

Regional park access was calculated by summing the acres of the regional park service areas within a block group and then dividing it by the block group's total area. The unit ranges from 0 to 1, with 1 meaning a block group is completely within regional park service area.

Calculation Steps

For the Puget Sound Regional Council's (PSRC) calculation methods, please see: [osplan-appendixc-methodology.pdf \(psrc.org\)](https://psrc.org/psrc-urban-planning-appendix-c-methodology.pdf)

- Download the Regional Open Space Network from PSRC.
- Add the polygon open space network shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Using the Size column attribute in the open space network shapefile, buffer regional parks by 10 miles.
- For each block group, calculate the park buffered area per block group.
- For each block group, divide the block group's park buffered area by the block group's area.

Importance

Access to parks and open space positively impacts health, well being and livability.

Source

Puget Sound Regional Center | Puget Sound Regional Center Data Portal

Source URL

<https://psrc-psregcncl.hub.arcgis.com/apps/regional-open-space-network-1/explore>

Sidewalks and Bikeways

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Length of off-street existing sidewalks and bikeways, excluding trails, divided by block group area.

Calculation Method

Sum the length of the existing sidewalk and bikeways per block group divided by the block group's area.

Calculation Steps

- Filter the BikewayPhases attribute to Planned and download the Tacoma Bikeways shapefile.
- Add the bikeways line shapefile to an ArcGIS Pro map.
- Obtain Tacoma's existing sidewalks shapefile.
- Add the sidewalks line shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- Summarize the existing bikeways per block groups in Tacoma.
- Summarize the existing sidewalks per block group in Tacoma.
- For each block group, sum the lengths of the existing bikeways and sidewalks to calculate the total existing length.
- For each block group, divide the total existing length by the block group's area.

Importance

Access to pedestrian and bike facilities promotes health, access to amenities and employment without cost of car.

Source

City of Tacoma GIS | City of Tacoma Existing and Planned Bikeways, City of Tacoma GIS | City of Tacoma Existing and Missing Sidewalks

Source URL

<https://data.cityoftacoma.org/datasets/tacoma::bikeways-tacoma/about>

Transit Access Score

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Decimal	Average	Block Group

Description

Acreage of a block group's area within 1/4 mile of rail and bus service stops, within 3 miles of park and ride locations, and within micro transit service areas divided by total block group area. Overlapping transit areas yield higher totals, meaning greater transit access.

Calculation Method

The Sound Transit Open Transit Data initiative brings together schedule and data from various transit agencies including King County Metro, Pierce Transit, InterCity Transit, Community Transit, Sound Transit, Washington State Ferries, Seattle Center Monorail, and Everett Transit. The consolidated data set, known as the GTFS Schedule File Set, combines regional GTFS bundles and addresses any overlapping data conflicts found in shapes, routes, stops, and trips across the agencies.

To determine transit service areas, a 1/4 mile radius is assigned to rail and bus stops. This distance is commonly used in public transit research and represents an average five-minute walk. It helps assess the reach of public transportation within neighborhoods and access to nearby destinations. Additionally, park and ride locations are assigned a 3-mile service area to accommodate commuters, especially those traveling longer distances. These areas allow commuters to conveniently park their vehicles or bikes and complete their journey using alternative transportation modes. Micro transit areas for Spanaway, Tideflats, and Ruston were provided by Pierce County Transit and Paratransit service, which allows agencies to offer riders an on-demand option that is more flexible than designated fixed routes and appointment-like paratransit and allows for individual service in response to demand.

To calculate transit access for a block group, we sum all service areas of all transit and divide by the block group's total area. The presence of overlapping transit service areas contributes to higher totals, indicating greater transit access within the block group.

Calculation Steps

For the SoundTransit calculation methods, please see: [osplan-appendixc-methodology.pdf \(psrc.org\)](#)

- Download the consolidated transit stops text file from SoundTransit
- Add the stops to an ArcGIS Pro map using the XY coordinate data from the stops text file.
 - Buffer the stops by 0.25 mile.

- Do not dissolve.
- Add the park and ride point locations from Pierce County Open Data Portal.
 - Buffer the stops by 3 miles.
 - Do not dissolve.
- Obtain the micro transit area polygon shapefiles for Spanaway, Tideflats, and Ruston.
- Add the Tacoma block groups shapefile to the ArcGIS Pro map.
- For each block group, calculate the transit stops buffered area.
- For each block group, calculate the park and ride stops buffered area.
- For each block group, calculate the block group's intersecting area with each of the three micro transit areas.
- For each block group, sum the transit and park and ride stops buffered areas.
- For each block group, sum the transit stops buffered area, park and ride stops buffered area, and the three micro transit areas to calculate the total transit access area.
- For each block group, divide the block group's total transit access area by the block group's area.

Importance

Access to transit promotes health, access to amenities and employment without cost of car while decreasing environmental impacts.

Source

Sound Transit | Open Transit Data, Pierce County | Pierce County Open Data Portal, Pierce County | Pierce County Transit

Source URL

<https://www.soundtransit.org/help-contacts/business-information/open-transit-data-otd/otd-downloads>, <https://open.piercecountywa.gov/dataset/Park-and-Ride-Lots/7ipt-5vHz>

Voter Participation Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

The percent of voters who voted in the general election divided by the number of eligible voters in the block group for the year 2022. This evaluates voter participation and can be used to determine access to civic processes.

Calculation Method

The American Community Survey provides detailed information on citizens aged 18 and above, serving as the basis for determining eligibility within the voting population. The dataset includes individuals aged 18 years or older at the time of the interview, and the information is obtained using data on age and citizenship status. The Washington State Secretary of State Elections maintains a list of address point locations for ballots that have been returned for the general election every year, which we subsequently geocode.

To calculate the voting participation percentage, we aggregate the number of returned geocoded ballots per census tract. This total is then divided by the citizen voting-age population, as determined by the data derived from the American Community Survey. The voter participation percentage at the census tract level is applied to the corresponding block groups within the census tract. Utilizing the broader geographic scope of the census tract allows for better representation of the citizen voting-age population compared to the block group area. The resulting percentage provides an indication of the level of voting participation within each block group.

By using this calculation, we gain insights into the extent to which eligible citizens exercise their voting rights. It allows us to evaluate the level of civic engagement and participation in the electoral process at the block group level.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Citizen, Voting-Age Population by Age in the Past 12 Months 5-year estimates table from the Census Bureau website for all census tracts in Tacoma.
- For this analysis, use only the "Total" column.
- Download the Ballot Status Report zip file for Kitsap-Pierce.
- In the Ballot Status Report excel file, quality check the data so only voters that live in Pierce County, WA, USA are included.
- Geocode the Ballot Status Report excel file using the Address column.

- Calculate the number of geocoded voter points per census tract.
- For each census tract, divide the count of voters by the ACS "Total" column from earlier and multiply by 100.
- Apply the census tract voter percentage to the census tracts corresponding block groups.

Importance

Voting is a significant measure of participation in civic life. This indicator captures both the barriers to registration, and level of civic engagement.

Source

Washington Secretary of State | Election Results and Voters' Pamphlets, U.S.
Census Bureau | American Community Survey 5-Year Estimates

Source URL

<https://www.sos.wa.gov/elections/data-research/2022-general-election>,
[https://data.census.gov/table/ACSDT5Y2022.B29001?q=B29001&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B29001?q=B29001&g=050XX00US53053$1500000)

Economy

200% of Poverty

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

Percent of individuals within block group earning less than 200% of Federal Poverty Level.

Calculation Method

If a family's total income falls below a specific threshold, as determined by the Federal Poverty Level, the family and each individual within it are considered to be in poverty. The Federal Poverty Level is a standard used by the federal government to determine eligibility for various subsidies and assistance programs. It relies on census data to estimate the number of people living in poverty and establishes a threshold that qualifies households or individuals as living in poverty.

Poverty status is determined for all individuals except those who are institutionalized, in military group quarters, in college dormitories, or unrelated individuals under 15 years old. These specific groups are excluded from the calculation of poverty rates.

The 2021 federal poverty line for one person is \$12,880. That income threshold increases by \$4,540 for each additional person within the family/household. A ratio is used to assign individuals to a poverty level designation.

The poverty rate indicator is calculated by subtracting the number of individuals in the 2.00 and over poverty range from the total population for whom poverty status is determined and dividing by the total population for whom poverty status is determined.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Ratio of Income to Poverty Level in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, subtract the "2.00 and over" column from the "Total" column.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Higher percentage indicates which individuals are struggling economically.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.C17002?q=C17002&g=050XX00US53053\\$150000](https://data.census.gov/table/ACS5Y2022.C17002?q=C17002&g=050XX00US53053$150000)

Employment Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

Employed percentage within a block group of the total eligible workforce over 16 years of age.

Calculation Method

The employment status data used to calculate the indicator was obtained from the American Community Survey (ACS). The employment status questions in the ACS are designed to capture detailed information about individuals aged 15 years and older.

The data from the ACS allows us to determine the employment status of individuals by following a specific sequence of questions as recommended by the Census Bureau. This sequence includes identifying individuals who worked at any time during the reference week, those on temporary layoff who were available for work, individuals who were temporarily absent from their jobs or businesses (excluding layoff), individuals actively looking for work in the last four weeks and available for work during the reference week, and individuals not in the labor force. All these categories are summarized to represent the total number of unemployed individuals.

ACS also provides information regarding the total civilian labor force. The employment rate is determined by dividing the number of employed individuals by the civilian labor force.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Employment Status for the Population 16 Years and Over 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, divide the "Employed" column by the "Total" column.
- Multiply by 100.

Importance

Employed people have sources of income, which makes them able to access basic amenities like quality healthcare, education and nutrition.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B23025?q=B23025&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B23025?q=B23025&g=050XX00US53053$1500000)

Jobs Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2021	Higher is better	Decimal	Average	Block Group

Description

The Jobs Index comes directly from the Longitudinal Employer-Household Dynamics (LEHD) program, operated by the U.S. Census Bureau's Center for Economic Studies. The index counts jobs in area, based on place of work, among three wage categories: 1) Less than \$15,000, 2) \$15,000 - \$40,000, 3) More than \$40,000. The index ranges in value from 0.01 to 161; a greater share of quality jobs drives the index to the upper end of the range.

Calculation Method

The Longitudinal Employer-Household Dynamics (LEHD) program, operated by the U.S. Census Bureau's Center for Economic Studies, provides valuable data on employers and employees through the Local Employment Dynamics Partnership. As part of this program, the LEHD Origin-Destination Employment Statistics (LODES) dataset is accessible through OnTheMap, a web-based mapping and reporting application. This dataset allows us to examine the geographic distribution of where people work.

To analyze job characteristics within specific areas, the LODES dataset is utilized. The job points layer, representing the location of workers' employment, is examined. Within each block group, the total number of jobs falling into different income categories is calculated. To provide context to the job figures, the American Community Survey Employment Status for the Population 16 Years and Over dataset is utilized to provide the total count of employed individuals within each block group.

The quality job index is computed by assigning weights to the various income categories and normalizing the values based on the total employed individuals. Income ranges and weightings are as follows:

- less than \$1250/ month is assigned weighting of 1
- between \$1250 and \$3333/ month is assigned weighting of 2
- more than \$3333/ month is assigned weighting of 4

This calculation assigns higher weights to higher-paying jobs, acknowledging their significance in the overall job landscape. It allows for a standardized measure of job quality based on the employed individuals within each block group.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](https://www.census.gov/programs-surveys/acs/data.html)

For the OnTheMap data overview, please see: [OnTheMap Data Overview Document \(census.gov\)](#)

- Download the Employment Status for the Population 16 Years and Over 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For this analysis use only the "Total" column.
- Go to OnTheMap and search for Tacoma City, WA and perform analysis on selection area.
- Set the home/work area to work, analysis type to area profile for all workers, and job type to all jobs.
- Export the geography as a point shapefile and upload into ArcGIS Pro.
- Perform a spatial join of job points to block groups.
- Sum the job points by the columns jobs earning less than \$1250/month or less (ce01), jobs earning between \$1250/month to \$3333/month (ce02), and jobs earning more than \$3333/month (ce03).
- Bring in the ACS "Total" column from earlier.
- Perform the following calculation per block group to assign higher weights to higher-paying jobs.

$$Jobs\ Index = \frac{\{([ce01] * 1) + ([ce02] * 2) + ([ce03] * 4)\}}{Total}$$

Importance

Wages provide a picture of the standard of living for individuals. It is also a good indicator of the local economies by highlighting areas with higher densities of good paying jobs compared to other areas. Higher wages correlate to higher living standards.

Source

U.S. Census Bureau | Longitudinal Employer-Household Dynamics (LEHD) On The Map, U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

<https://cainc.maps.arcgis.com/home/item.html?id=8fd2f976f0f64eceb2c61c4fd2be3195>,
[https://data.census.gov/table/ACSDT5Y2022.B23025?q=B23025&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B23025?q=B23025&g=050XX00US53053$1500000)

Median Household Income

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Currency (USD)	Average	Block Group

Description

The median household income in a given area.

Calculation Method

Median household income is a measure that divides the income distribution into two equal parts. It represents the income level at which half of the households have income below that amount, while the other half have income above it. This calculation includes all households, including those with no income.

The median income for households, families, and individuals is determined by analyzing the distribution of total households and families. It is based on a standard distribution and is rounded to the nearest whole dollar.

The American Community Survey data calculates median household income in the past 12 months according to the method described above and is used directly for this indicator.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

Download the Median Household Income in the Past 12 Months (in 2022 Inflation-Adjusted Dollars) 5-year estimates table from the Census Bureau website for all block groups in Tacoma.

Importance

Household income provides a picture of the standard of living of various households. It is also a good indicator of the local economies. Higher household income also correlates to higher living standards.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B19013?q=B19013&g=050XX00US53053\\$150000](https://data.census.gov/table/ACS5Y2022.B19013?q=B19013&g=050XX00US53053$150000)

Poverty Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

Percent of population within the block group earning less than the Federal Poverty Limit.

Calculation Method

If a family's total income falls below a specific threshold, as determined by the Federal Poverty Level, the family and each individual within it are considered to be in poverty. The Federal Poverty Level is a standard used by the federal government to determine eligibility for various subsidies and assistance programs. It relies on census data to estimate the number of people living in poverty and establishes a threshold that qualifies households or individuals as living in poverty.

Poverty status is determined for all individuals except those who are institutionalized, in military group quarters, in college dormitories, or unrelated individuals under 15 years old. These specific groups are excluded from the calculation of poverty rates.

The 2021 federal poverty line for one person is \$12,880. That income threshold increases by \$4,540 for each additional person within the family/household. A ratio is used to assign individuals to a poverty level designation. Less than 100% indicates the population that falls below the federal poverty level.

The poverty rate indicator is calculated by adding the number of individuals with an income range less than 100% of the defined poverty level and dividing it by the total population for whom poverty status is determined.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Ratio of Income to Poverty Level in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "Under .50" and ".50 to .99" columns.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Higher percentage indicates which individuals are struggling economically.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.C17002?q=C17002&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.C17002?q=C17002&g=050XX00US53053$1500000)

Education

Average Student Mobility

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Percentage	Average	Block Group

Description

The percentage of students who enroll in the beginning of the school year but did not stay enrolled in the same school throughout that school year (continuity rate). Data was calculated based on the percentage of a block group within a corresponding school attendance zone. Calculation included elementary, middle, and high schools.

Calculation Method

The data used for this indicator is sourced from the State of Washington Open Data Portal, specifically the Report Card enrollment data for school years. This dataset provides detailed information on student enrollment at various levels, including individual schools, school districts, and the state. The enrollment data are categorized by different groups, such as grade level, gender, race/ethnicity, and student programs and special characteristics.

The continuity rate measures the percentage of students enrolled at the beginning of a school year but did not remain in the same school throughout the year. This rate provides insights into student mobility and the stability of enrollment within specific geographic areas.

The data for this indicator is attributed to actual schools, and to relate it to specific geographical areas, Tacoma provided school attendance zones.

The appropriate continuity rates were attached to the matching elementary, middle, and high school attendance zones based on the corresponding schools. The acres of each elementary, middle, and high school attendance zone were calculated and divided by the block group's total area to calculate the percentage of each elementary, middle, and high school's attendance area per block group. The continuity rates were multiplied by the percentage of the associated elementary, middle, and high school's attendance area per block group. All continuity rates are then averaged per block group.

Calculation Steps

- Obtain elementary, middle, and high school attendance zones for Tacoma and add them to an ArcGIS Pro map.
- Calculate the mobility rate for all elementary, middle, and high schools from the Report Card Enrollment Excel file.
 - Filter DistrictName to Tacoma School District.
 - Filter SchoolName to elementary, middle, and high schools within Tacoma and save into new tabs or files.

- For each school in the SchoolName column, divide the Mobile column by the All Students column to obtain the mobility rate.
- Import the elementary, middle, and high school mobility rate Excel files into ArcGIS Pro.
- Join the school mobility rate files to the appropriate school attendance zones based on the school name.
- Check for missing data for the attendance zones once joined.
 - If data are missing, filter it out and make a note.
- Calculate each block group's intersecting area with the school attendance zones.
- Divide each block group's intersecting school attendance area by its area to calculate the attendance area percentages.
- Multiple the school mobility rate by the attendance area percentage to calculate the school attendance mobility rates.
- Aggregate the block groups based on their block group ID and sum the school attendance mobility rates.
- Once these steps are completed separately for elementary, middle, and high school attendance zones, average the three calculations together for each block group.

Importance

School systems with higher student mobility have more challenges.

Source

State of Washington | Access Washington, Tacoma Public Schools | Public School Boundaries

Source URL

<https://data.wa.gov/education/Report-Card-Enrollment-2022-23-School-Year/dij7-mbxg>, <https://www.tacomaschools.org/schools-and-learning-sites/boundaries>

Average Testing Proficiency

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Percentage	Average	Block Group

Description

Combined average of 3rd grade reading and 7th grade math scores within Tacoma elementary and middle school attendance zones. Data was calculated based on the percentage of a block group within a corresponding school attendance zone. Calculation included elementary and middle schools.

Calculation Method

The data used for this indicator is obtained from the Washington State Office of Superintendent of Public Instruction Report Card Assessment. The assessment provides information on the percentage of students who have met grade-level standards in English Language Assessment, Math, and Science. Specifically, we focus on the scores of 3rd grade reading and 7th grade math to create an average test rate.

The data for this indicator is attributed to actual schools, and to relate it to specific geographical areas, Tacoma provided school attendance zones.

The appropriate testing proficiencies were attached to the matching elementary and middle school attendance zones based on the corresponding schools. The acres of each elementary and middle school attendance zone were calculated and divided by the block group's total area to calculate the percentage of each elementary and middle school's attendance area per block group. The elementary ELA and middle school math testing proficiency is multiplied by the percentage of the associated elementary and middle school's attendance area per block group. All testing proficiency rates are then averaged per block group.

By linking the student achievement data with census block groups, we can analyze the average test rates of students within specific geographic areas and across different demographic groups.

Calculation Steps

- Obtain elementary and middle school attendance zones for Tacoma and add them to an ArcGIS Pro map.
- Calculate the testing proficiency rates for all elementary and middle schools from the Report Card Assessment Excel file.
- For the elementary school reading standards:
 - Filter SchoolName to elementary schools in Tacoma School District.
 - Filter StudentGroup to All Students.
 - Filter GradeLevel to 3.
 - Filter TestSubject to ELA.
 - Use the PercentMetStandard column.

- For the middle school math standards:
 - Filter SchoolName to elementary schools in Tacoma School District.
 - Filter StudentGroup to All Students.
 - Filter GradeLevel to 7.
 - Filter TestSubject to Math.
 - Use the PercentMetStandard column.
- Import the elementary and middle school testing proficiency rates excel files into ArcGIS Pro.
- Join the school testing proficiency rates files to the appropriate school attendance zones based on the school name.
- Check for missing data for the attendance zones once joined.
 - If data is missing, filter it out and make a note.
- Calculate each block group's intersecting area with the school attendance zone.
- Divide each block group's intersecting school attendance area by its area to calculate the attendance area percentage.
- Multiple the school testing proficiency rate by the attendance area percentage to calculate the school attendance testing proficiency rate.
- Aggregate the block groups based on their block group ID and sum the school attendance testing proficiency rates.
- Once these steps are completed separately for elementary and middle school attendance zones, average the two calculations together for each block group.

Importance

Performance on 3rd grade reading and 7th grade math tests is correlated with overall student achievement.

Source

State of Washington | Access Washington, Tacoma Public Schools | Public School Boundaries

Source URL

<https://data.wa.gov/education/Report-Card-Assessment-Data-2022-23-School-Year/xh7m-utwp>, <https://www.tacomaschools.org/schools-and-learning-sites/boundaries>

Educational Attainment Index

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Decimal	Average	Block Group

Description

Weighted average index educational attainment in population 25+

$$\text{Educational attainment index} = (1 * \text{Associates Degree}) + (1.2 * \text{Bachelor's Degree}) + (1.5 * \text{Master's} + \text{PhD Degree})$$

Calculation Method

The data used for this indicator is obtained from the American Community Survey (ACS) through Question 11, which collects information on educational attainment. This question is asked to all respondents aged 18 years and older, and individuals are categorized based on their highest level of education completed.

To calculate this indicator, only individuals who have completed an associate, bachelor's, master's, or PhD degree are included. These higher education achievement levels are assigned different weights: an associate's degree is weighted as 1, a bachelor's degree is weighted as 1.2, and a master's or PhD degree is weighted as 1.5.

The indicator is calculated by summing the weighted values for each educational achievement level and dividing it by the total population aged 25 years and older. This calculation estimates the proportion of the population that has achieved higher education levels, reflecting the overall higher educational attainment in the specified area or population.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Educational Attainment for the Population 25 Years and Over 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, multiply the "Associate's degree" column by 1, "Bachelor's degree" by 1.2, "Master's degree" and "Doctorate degree" columns each by 1.5.
- Sum those weighted columns together.
- Divide by the "Total" column.

Importance

Higher education leads to greater access to opportunity.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B15003?q=B15003&g=050XX00US53053\\$150000](https://data.census.gov/table/ACSDT5Y2022.B15003?q=B15003&g=050XX00US53053$150000)

High School Graduation Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Percentage	Average	Block Group

Description

The 4-year adjusted cohort graduation rate. This is the number of students who completed high school in four years, divided by the number of students who are in their "cohort"; those that started 9th grade at the same time. "Adjusted" refers to the fact that some students may have moved in or out of the school, and the cohort size needs to be adjusted to accurately track those students. Data was calculated based on the percentage of a block group within a corresponding school attendance zone. Calculation included high schools.

Calculation Method

Washington State School Report Cards provides the 4-year adjusted cohort graduation rate per high school. This is the number of students who completed high school in four years, divided by the number of students who are in their "cohort"; those that started 9th grade at the same time. "Adjusted" refers to the fact that some students may have moved in or out of the school, and the cohort size needs to be adjusted to accurately track those students.

The data for this indicator is attributed to actual schools, and to relate it to specific geographical areas, Tacoma provided school attendance zones.

The high school graduation rate was attached to the high school attendance zone based on the corresponding high school. The acres of each high school attendance zone was calculated and divided by the block group's total area to calculate the percentage of each high school's attendance area per block group. The high school graduation rate is multiplied by the percentage of the associated high school's attendance area per block group. All graduation rates are then summed per block group.

Calculation Steps

- Obtain high school attendance zones for Tacoma and add them to an ArcGIS Pro map.
- Calculate the graduation rate for all high schools from the Report Card Graduation Excel file.
- For the high school graduation rates:
 - Filter County to Pierce.
 - Filter OrganizationLevel to School.
 - Filter StudentGroup to All Students.
 - Filter Cohort to Four Year.
- Use the GraduationRate column.
- Import the high school graduation rates Excel file into ArcGIS Pro.

- Join the high school graduation rates file to the high school attendance zones based on the school name.
- Check for missing data for the attendance zones once joined.
 - If data are missing, filter it out and make a note.
- Calculate each block group's intersecting area with the school attendance zone.
- Divide each block group's intersecting school attendance area by its area to calculate the attendance area percentage.
- Multiple the high school graduation rate by the attendance area percentage to calculate the high school attendance graduation rates.
- Aggregate the block groups based on their block group ID and sum the high school attendance graduation rates.

Importance

Higher high school graduation rate correlates to greater access to opportunity.

Source

State of Washington | Access Washington, Tacoma Public Schools | Public School Boundaries

Source URL

https://data.wa.gov/education/Report-Card-Graduation-2022-23/kigx-4b2d/about_data, <https://www.tacomaschools.org/schools-and-learning-sites/boundaries>

Kindergarten Readiness Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Higher is better	Percentage	Average	Block Group

Description

Percent of students entering Kindergarten that achieve at least 5 out of 6 readiness measures within elementary school attendance zones. Data was calculated based on the percentage of a block group within a corresponding school attendance zone. Calculation included elementary schools.

Calculation Method

The WaKids data, obtained from the State of Washington Open Data Portal, provides valuable insights into kindergarten readiness through the Washington Kindergarten Inventory of Developing Skills assessment. This assessment is administered to kindergarten students within the first two months of the school year and evaluates their development and learning across six key areas: Social-Emotional, Physical, Language, Cognitive, Literacy, and Math. While the primary requirement for kindergarten is age eligibility (five years old by August 31), children who demonstrate readiness in all six areas tend to have a higher likelihood of success not only in kindergarten but also in their educational journey.

This indicator represents a percentage of kids entering kindergarten that have achieved at least five of the six readiness measures.

The data for this indicator is attributed to actual schools, and in order to relate it to specific geographical areas, Tacoma provided school attendance zones.

The kindergarten readiness rate was attached to the elementary school attendance zone based on the corresponding elementary school. The acres of each elementary school attendance zone was calculated and divided by the block group's total area to calculate the percentage of each elementary school's attendance area per block group. The elementary school kindergarten rate is multiplied by the percentage of the associated elementary school's attendance area per block group. All kindergarten readiness rates are then summed per block group.

This information is crucial for identifying areas of strengths and areas that may require additional support in promoting kindergarten readiness and ensuring equitable educational opportunities for all students.

Calculation Steps

- Obtain elementary school attendance zones for Tacoma and add them to an ArcGIS Pro map.
- Calculate the kindergarten readiness rate for all elementary schools from the Report Card WaKids Excel file.
- For the high school graduation rates:

- Filter OrganizationLevel to School.
- Filter StudentGroupType to All Students.
- Filter MeasureValue to 5 and 6.
- Filter ESDName to Puget Sound Educational Service District 121.
- Filter DistrictName to Tacoma School District.
- Filter SchoolName to elementary schools in Tacoma.
- Insert a pivot table:
 - Rows: SchoolName, SchoolCode
 - Columns: Values
 - Values: Sum of Numerator, Average of Denominator
 - Divide the Numerator column by the Denominator column to calculate the kindergarten readiness rate.
- Import the elementary school kindergarten readiness rates Excel file into ArcGIS Pro.
- Join the elementary school kindergarten readiness rates file to the elementary school attendance zones based on the school name.
- Check for missing data for the attendance zones once joined:
 - If data are missing, filter it out and make a note.
- Calculate each block group's intersecting area with the school attendance zone.
- Divide each block group's intersecting school attendance area by its area to calculate the attendance area percentage.
- Multiple the elementary school kindergarten readiness rate by the attendance area percentage to calculate the elementary school attendance kindergarten readiness rates.
- Aggregate the block groups based on their block group ID and sum the elementary school attendance kindergarten readiness rates.

Importance

Kindergarten readiness correlates to educational success later in life.

Source

State of Washington | Access Washington, Tacoma Public Schools | Public School Boundaries

Source URL

<https://data.wa.gov/education/Report-Card-WaKids-2022-23-School-Year/3ji8-ykgj>,
<https://www.tacomaschools.org/schools-and-learning-sites/boundaries>

Percent 25+ Year Olds with Bachelor's Degree or More

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

Percentage of population over 25 years of age with a Bachelor's degree or more.

Calculation Method

The data used for this indicator is obtained from the American Community Survey (ACS) through Question 11, which collects information on educational attainment. This question is asked to all respondents aged 18 years and older, and individuals are categorized based on their highest level of education completed.

The indicator is calculated by dividing the sum of the population 25 years and over with a bachelor's degree, master' degree, professional school degree, and doctorate degree by the total population 25 years and over.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see:

[American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Educational Attainment for the Population 25 Years and Over 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "Bachelor's degree", "Master's degree", "Professional school degree", and "Doctorate degree" columns.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Education is a major factor in economic development, quality of life, and opportunity. Higher education leads to greater access to opportunity.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B15003?q=B15003&g=050XX00US53053\\$150000](https://data.census.gov/table/ACS5Y2022.B15003?q=B15003&g=050XX00US53053$150000)

Environment

Diesel Emissions

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

Diesel and Nitric Oxide emissions average for the area (Annual Tons/Km²), estimated by EPA modeling.

Calculation Method

The analysis incorporates data from EJScreen, an environmental justice mapping and screening tool developed by the Environmental Protection Agency (EPA). EJScreen utilizes nationally consistent datasets and a comprehensive methodology to integrate environmental and demographic socioeconomic indicators, providing valuable insights into environmental justice issues.

The AIRPACT model (air-quality forecasting computerized system for the Pacific Northwest), defines the methodology for assigning measured emissions to geographic units. The model uses 4km by 4km grid cells to map measured emissions. Point source emissions are allocated to the grid cell they directly correspond to. Point source emissions are defined as emissions that come from a single, identifiable source. Other emission sources (non-point source and mobile emissions) are allocated to the grid cells based on spatial surrogates developed for the model. Non-point source emissions are defined as emissions that diffuse through the environment that do not originate from a discrete source.

For this specific indicator, the estimates of diesel NO_x emissions from the Washington State Department of Ecology's Comprehensive Emissions Inventory are used. Census tract values are calculated by mapping all diesel emissions according to the grid cell measurement allocations described above. The emissions are combined and allocated to census tracts based on an area-weighted spatial interpolation. Each block group within a census tract is assigned the same Diesel emissions value.

By leveraging the calculations and data provided by EJScreen, this analysis directly utilizes the method described above to assess the impact of diesel NO_x emissions on the affected areas.

Calculation Steps

For the EPA EJScreen calculation methods, please see: [EJScreen Technical Documentation for Version 2.2 July 2023 \(epa.gov\)](#).

- Download the EPA EJScreen 2023 Block Groups geodatabase.
- Connect to the geodatabase in ArcGIS Pro.

- Add the EPA EJScreen block groups shapefile to the map.
- Select Tacoma's block groups either by attribute via block group ID's or location and export to desired location.
- Column titled "DSLPM" is diesel particulate matter.

Importance

Exposure to diesel NOx is negatively correlated with health.

Source

Environmental Protection Agency | EJScreen

Source URL

<https://gaftp.epa.gov/EJScreen/2023/2.22SeptemberUseMe/>

Ozone Concentration

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

Ground level ozone concentration, as estimated by EPA.

Calculation Method

The analysis incorporates data from EJScreen, an environmental justice mapping and screening tool developed by the Environmental Protection Agency (EPA). EJScreen utilizes nationally consistent datasets and a comprehensive methodology to integrate environmental and demographic socioeconomic indicators, providing valuable insights into environmental justice issues.

This analysis focuses on the annual fourth-highest daily maximum 8-hour concentration (D8M) of ozone, averaged over three years. Ozone design value is a statistic that relates the air quality measured at an air quality monitoring station relative to the level of the National Ambient Air Quality Standards (NAAQS). To calculate the ozone design value for each block group, a relationship was established between ozone design values measured at air quality agency monitoring sites and the median D8M of ozone from the AIRPACT forecast model. The AIRPACT forecast model is a air-quality forecasting computerized system for the Pacific Northwest, which uses 4km by 4km grid cells. The interpolated ozone design value of the most populated grid cell that intersects each block group was then assigned to it.

By leveraging the calculations and data provided by EJScreen, this analysis directly utilizes the described method to assess the impact of ozone concentration on the affected areas.

Calculation Steps

For the EPA EJScreen calculation methods, please see: [EJScreen Technical Documentation for Version 2.2 July 2023 \(epa.gov\)](#).

- Download the EPA EJScreen 2023 Block Groups geodatabase.
- Connect to the geodatabase in ArcGIS Pro.
- Add the EPA EJScreen block groups shapefile to the map.
- Select Tacoma's block groups either by attribute via block group ID's or location and export to desired location.
- Column titled "OZONE" is ozone.

Importance

Ground level ozone concentration is negatively correlated with health.

Source

Environmental Protection Agency | EJScreen

Source URL

<https://gaftp.epa.gov/EJScreen/2023/2.22SeptemberUseMe/>

PM_{2.5} Particulates

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

Concentration of fine particulate matter estimated based on air quality monitors and atmospheric circulation and dispersion models from the US EPA.

Calculation Method

The analysis incorporates data from EJScreen, an environmental justice mapping and screening tool developed by the Environmental Protection Agency (EPA). EJScreen utilizes nationally consistent datasets and a comprehensive methodology to integrate environmental and demographic socioeconomic indicators, providing valuable insights into environmental justice issues.

This indicator focuses on assessing the concentration of fine particulate matter known as PM_{2.5}, which refers to particles with a diameter of 2.5 micrometers or less. PM_{2.5} particles can penetrate deep into the respiratory system, reaching the lungs and potentially entering the bloodstream, posing health risks.

To estimate PM_{2.5} concentrations, EJScreen uses data provided by the EPA's Office of Air Quality Planning Standards (OAQPS), which is a combination of monitoring data and Community Multiscale Air Quality (CMAQ) air quality modeling data by census tract. Tract values are calculated by utilizing the mean and 98th percentile daily PM_{2.5} concentrations estimated at 4km x 4km grid cells. The 3-year mean PM_{2.5} concentration represents an annual average, while the 3-year 98th percentile represents the highest daily concentrations. Each census tract is assigned the maximum interpolated mean and 98th percentile PM_{2.5} value from any intersecting grid cells. The mean and 98th percentile values are normalized to a scale of [0-1] for each census tract and then summed to generate a single PM_{2.5} score for each census tract. Block groups receive their census tract value so all block groups within each tract have the same PM_{2.5} values as the tract.

By leveraging the calculations and data provided by EJScreen, this analysis directly utilizes the described method to assess the impact of PM_{2.5} concentration on the affected areas, providing valuable insights into environmental justice.

Calculation Steps

For the EPA EJScreen calculation methods, please see: [EJScreen Technical Documentation for Version 2.2 July 2023 \(epa.gov\)](#).

- Download the EPA EJScreen 2023 Block Groups geodatabase.
- Connect to the geodatabase in ArcGIS Pro.
- Add the EPA EJScreen block groups shapefile to the map.

- Select Tacoma's block groups either by attribute via block group ID's or location and export to desired location.
- Column titled "PM25" is particulate matter 2.5.

Importance

Exposure to particulate matter is hazardous because the small particles penetrate the bloodstream and are absorbed into organs, resulting in poor health outcomes.

Source

Environmental Protection Agency | EJScreen

Source URL

<https://gaftp.epa.gov/EJScreen/2023/2.22SeptemberUseMe/>

Proximity to Heavy Traffic Roadways

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

The distance-weighted traffic along major roadways for each block group.

Calculation Method

The analysis incorporates information from EJScreen, an environmental justice mapping and screening tool developed by the Environmental Protection Agency (EPA). EJScreen utilizes nationally consistent datasets and a comprehensive methodology to integrate environmental and demographic socioeconomic indicators.

This is calculated by using the AADT count (average annual daily traffic) at major roads divided by the distance in meters from a census block centroid. For the proximity scores, a distance of 500 meters from a census block centroid was selected in order to be large enough to capture the majority of road segments. Inverse distance weighting was used to give closest traffic more weight and distant traffic less weight. These weighted scores are then multiplied by the AADT count to calculate the final census block scores. This data are aggregated to the parent block group based on the population weight for each block within a block group.

By leveraging the calculations and data provided by EJScreen, this analysis directly utilizes the method described above to assess the impact of heavy traffic roadways on the affected areas.

Calculation Steps

For the EPA EJScreen calculation methods, please see: [EJScreen Technical Documentation for Version 2.2 July 2023 \(epa.gov\)](#).

- Download the EPA EJScreen 2023 Block Groups geodatabase.
- Connect to the geodatabase in ArcGIS Pro.
- Add the EPA EJScreen block groups shapefile to the map.
- Select Tacoma's block groups either by attribute via block group ID's or location and export to desired location.
- Column titled "PTRAF" is traffic proximity.

Importance

High traffic roadways are correlated with higher incidence of certain types of disease and pollutants.

Source

Environmental Protection Agency | EJScreen

Source URL

<https://gaftp.epa.gov/EJScreen/2023/2.22SeptemberUseMe>

Toxic Releases from Facilities

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

The toxicity-weighted concentrations of chemical releases to air from facility emissions and off-site incineration. Air releases from Risk Screening Environmental Indicators (RSEI) are modeled by the Toxics Release Inventory (TRI) program.

Calculation Method

The analysis incorporates data from EPA's Risk-Screening Environmental Indicators (RSEI), a screening-level, multi-media model that integrates information from the Toxics Release Inventory (TRI). The RSEI data represents the toxicity-weighted concentrations of chemical releases to the air from facility emissions and off-site incineration within a block group.

It utilizes a geographic microdata model where air pollution releases are mapped on 810 by 810-meter grid cells, focusing specifically on toxic releases into the air rather than water or soil deposition of toxic releases for 2021. Each grid cell is given a location "address" in terms of latitude and longitude coordinates in order to assign facility and population data to a grid cell.

Census bureau population data at the census block geographic level were overlaid on the grid and each block was mapped to the grid cells that it overlaid. The percentage of the block's total area falling within each cell was calculated. The block populations were multiplied by the percentage of that block assigned to each grid cell then summed over each grid cell.

Facilities are assigned to a grid cell based on their latitude and longitude coordinates. Calculated emission concentrations (estimate dose) and their toxicity weights are applied to the center of each grid using an inverse distance-weighted averaging. The final calculation is the sum of the risk-related scores of the cells in the block group (estimated dose *toxicity weight *exposed population).

By leveraging the calculations and data provided by RSEI, this analysis directly utilizes the described method to assess the impact of toxic releases from facilities on the affected areas. This approach provides valuable insights into environmental justice considerations, highlighting the potential environmental and health impacts associated with these releases.

Calculation Steps

For the EPA EJScreen calculation methods, please see: [EJScreen Technical Documentation for Version 2.2 July 2023 \(epa.gov\)](#).

- Download the EPA EJScreen 2023 Block Groups geodatabase.
- Connect to the geodatabase in ArcGIS Pro.

- Add the EPA EJScreen block groups shapefile to the map.
- Select Tacoma's block groups either by attribute via block group ID's or location and export to desired location.
- Column titled "RSEI_AIR" is toxic releases to air.

Importance

High levels of toxic TRI emissions lead to poor health outcomes, such as cancers and cardiovascular mortality.

Source

Environmental Protection Agency | EJScreen

Source URL

<https://gaftp.epa.gov/EJScreen/2023/2.22SeptemberUseMe/>

Urban Heat Island Effect

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2020	Lower is better	Integer	Average	Block Group

Description

Average morning, afternoon, and evening temperature during a single day measurement to gauge relative island effects throughout the city.

Calculation Method

Data was collected by Dr. Vivek Shandas of Capa Strategies on 7/25/2018. Urban Heat Island images were taken morning, afternoon, and evening using vehicle-based temperature measurements. The three temperatures were averaged to create a combined temperature attribute to gauge relative island effects throughout the city.

The data provided used the 2010 census block groups. In order to normalize geography to 2020 census block groups, the 2010 block groups were mapped to the 2020 geographies based on their intersection. The average combined temperature was calculated from the intersections.

Calculation Steps

For Dr. Vivek Shandas data collection methodology please see: [Climate | Free Full-Text | Towards Systematic Prediction of Urban Heat Islands: Grounding Measurements, Assessing Modeling Techniques \(mdpi.com\)](#)

- Download Tacoma's publicly available UHI Index data.
- Add UHI Index block group shapefile to the map, which is already at Tacoma's extent.
- Map the 2010 block groups to the 2020 block groups based on their intersections.
- Since the UHI Index block group data uses 2010 census geography it must be normalized to 2020 census geography.
- Aggregate the new intersected shapefile based on the 2020 block group IDs and average the "Combtmp" column.

Importance

As climate change increases temperature variations within the NW, heat waves become more common, and combined with lack of central A/C due to historically mild climate, this can have dramatic impact on livability of a neighborhood and exacerbate other equity factors.

Source

Earth Economics | Urban Heat Island Analysis

Source URL

<https://data.cityoftacoma.org/datasets/tacoma::urban-heat-island-uhi-index-2018-portland-state-university/about>

Livability

Cost-Burdened Households

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

The total percentage of all owners and renters in a block group spending 30% or more of their income on housing costs.

Calculation Method

The data for this indicator is derived from the American Community Survey (ACS), specifically from the Monthly Owner Costs and Gross Rent as a Percentage of Household Income.

To determine the gross rent as a percentage of household income, the monthly gross rent is divided by the monthly household income. The monthly household income is calculated by dividing the total household income by 12. This calculation is performed for each housing unit, resulting in a ratio that represents the percentage of monthly household income allocated towards rent payments.

Similarly, to calculate the monthly mortgage as a percentage of household income, the monthly mortgage cost is divided by the monthly household income. Again, the monthly household income is obtained by dividing the total household income by 12. This calculation is performed for each owner-occupied housing unit, resulting in a ratio that represents the percentage of monthly household income allocated towards mortgage payments.

It's important to note that units where no rent is paid or units occupied by households with no reported income or a net loss are categorized as "Not computed" and are excluded from the calculations.

The resulting ratios are then categorized into specific groups, such as Renter Gross Rent 30.0 to 34.9 Percent of Household Income, Renter 35.0 to 39.9 Percent, Renter 40.0 to 49.9 Percent, Renter 50.0 Percent or More, Owner Costs 30.0 to 34.9 Percent of Household Income, Owner 35.0 to 39.9 Percent, Owner 40.0 to 49.9 Percent, and Owner 50.0 Percent or More.

To calculate the overall indicator, the values for each category are summed, and the result is divided by the total number of renter-occupied and owner-occupied housing units. This calculation provides valuable insights into the percentage of households in different income ranges that allocate a certain percentage of their income towards rent or housing costs.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](https://www.census.gov/programs-surveys/acs/data.html)

- Download the Gross Rent as a Percentage of Household Income in the Past 12 Months and Mortgage Status by Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "Renter: 30.0 to 34.9 percent", "Renter: 35.0 to 39.9 percent", "Renter: 40.0 to 49.9 percent", "Renter: 50.0 percent or more", "Owner: Housing units with a mortgage 30.0 to 34.9 percent", "Owner: Housing units with a mortgage 35.0 to 39.9 percent", "Owner: Housing units with a mortgage 40.0 to 49.9 percent", "Owner: Housing units with a mortgage 50.0 percent or more", "Owner: Housing units without a mortgage 30.0 to 34.9 percent", "Owner: Housing units without a mortgage 35.0 to 39.9 percent", "Owner: Housing units without a mortgage 40.0 to 49.9 percent", and "Owner: Housing units without a mortgage 50.0 percent or more" columns to calculate total cost-burdened households.
- For each block group, sum the "Renter: Total" and "Owner: Total" columns to calculate the total households.
- For each block group, divide total cost-burdened households by total households.
- Multiple by 100.

Importance

Housing cost-burden is a barrier to opportunity.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B25070?q=B25070&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25070?q=B25070&g=050XX00US53053$1500000),

[https://data.census.gov/table/ACSDT5Y2022.B25091?q=B25091&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25091?q=B25091&g=050XX00US53053$1500000)

Insured Rate

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Percentage	Average	Block Group

Description

Percent of a block group with health insurance.

Calculation Method

The data for this indicator is obtained from Question 16 in the American Community Survey (ACS). Respondents are asked to report their current health insurance coverage and indicate "yes" or "no" for each of the eight types listed.

In the ACS and other Census Bureau surveys, health insurance coverage includes plans and programs that provide comprehensive health coverage. Individuals are considered insured if they report at least one "yes" response to any of the listed types of coverage.

The types of coverage include:

1. Insurance through a current or former employer or union (for the respondent or another family member)
2. Insurance purchased directly from an insurance company (for the respondent or another family member)
3. Medicare, for individuals aged 65 and older or those with certain disabilities
4. Medicaid, Medical Assistance, or any government-assistance plan for low-income individuals or those with disabilities
5. TRICARE or other military health care
6. VA (including individuals who have ever used or enrolled for VA health care)
7. Indian Health Service
8. Any other type of health insurance or health coverage plan

To calculate this indicator, the number of individuals with one type and with two or more types of health insurance coverage in specific age ranges is summed. The age ranges include: Under 19 years, 19 to 34 years, 35 to 64 years and 65 years and over. The sum of individuals with one type and with two or more types of health insurance coverage in these age ranges is then divided by the total civilian noninstitutionalized population to obtain the percentage of individuals with health insurance coverage.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Types of Health Insurance Coverage by Age 5-year estimates table from the Census Bureau website for all block groups in Tacoma.

- For each block group, sum the "Under 19 years: With one type of health insurance coverage", "Under 19 years: With two or more types of health insurance coverage", "19 to 34 years: With one type of health insurance coverage", "19 to 34 years: With two or more types of health insurance coverage", "35 to 64 years: With one type of health insurance coverage", "35 to 64 years: With two or more types of health insurance coverage", "65 years and over: With one type of health insurance coverage", and "65 years and over: With two or more types of health insurance coverage" columns to calculate the total civilian noninstitutionalized population with health insurance coverage.
- For each block group, divide by the "Total" column.
- Multiply by 100.

Importance

Higher values represent block group's with more access to health care services.

Scope

Block Group

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACS5Y2022.B27010?q=B27010&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACS5Y2022.B27010?q=B27010&g=050XX00US53053$1500000)

Median Home Value

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Higher is better	Currency (USD)	Average	Block Group

Description

Median home value in a block group of all owner-occupied housing units.

Calculation Method

The data used for this indicator was obtained from Housing Question 18 in the American Community Survey (ACS). This question was asked to respondents residing in housing units owned, being bought, vacant for sale, or sold but not occupied at the time of the survey. It aims to capture the estimated value of the property, including the house and lot, mobile home and lot (if lot owned), or condominium unit.

For properties where the house was owned or bought but not, respondents were asked to estimate the combined value of the house and the land. In the case of noncondominium multi-unit buildings where the respondent lives in one of the units, such as duplexes and small apartment buildings, the value should include the building, the land, and any additional buildings on the same plot of land.

For vacant units, the value represents the price asked for the property. The data distinguishes between owner-occupied units and vacant-for-sale and sold, not occupied units, as well as owner-occupied mobile homes.

The median value divides the distribution of property values into two equal parts, with one-half of the cases falling below the median value and the other half above it. The value of a home provides insights into neighborhood quality, housing affordability, and wealth. Some Median Home Values will be blank, listed as a 0, or listed as a -. To fix this issue as no block group would ever have this value, we assign blank, listed as a 0, or listed as a - values for Median Home Value in the block group geography with the census tract value.

The American Community Survey data utilizes the described method to calculate the median home value and is directly used for this indicator. It serves as a valuable resource for understanding neighborhood characteristics and housing-related indicators.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

Download the Median Value (Dollars) 5-year estimates table from the Census Bureau website for all block groups in Tacoma

Importance

Higher values lead to higher wealth accumulation and correlate with better city services and neighborhood quality.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B25077?q=B25077%20&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25077?q=B25077%20&g=050XX00US53053$1500000)

Owner Cost Burden

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

Percentage of owners paying more than 30% of income on monthly housing cost expenses.

Calculation Method

Monthly housing costs as a percentage of household income is computed by taking the ratio of selected monthly owner costs to monthly household income. The data are further disaggregated by units with a mortgage and units not mortgage. This provided information on monthly housing costs for owners.

This indicator is calculated by summing the owner-occupied housing units that have monthly owner cost ranges of 30.0 to 34.9 percent, 35.0 to 39.9 percent, 40.0 to 49.9 percent, and 50.0 percent or more for housing units with a mortgage and housing units without a mortgage then dividing by the total owner-occupied housing units.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](#)

- Download the Mortgage Status by Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "Owner Housing units with a mortgage: 30.0 to 34.9 percent", "Owner Housing units with a mortgage: 35.0 to 39.9 percent", "Owner Housing units with a mortgage: 40.0 to 49.9 percent", "Owner Housing units with a mortgage: 50.0 percent or more", "Owner Housing units without a mortgage: 30.0 to 34.9 percent", "Owner Housing units without a mortgage: 35.0 to 39.9 percent", "Owner Housing units without a mortgage: 40.0 to 49.9 percent", and "Owner Housing units without a mortgage: 50.0 percent or more" columns to calculate total cost-burdened households.
- For each block group, divide total cost-burdened households by the "Total" column.
- Multiple by 100.

Importance

Housing cost-burden is a barrier to opportunity. This burden indicates that a household may not be able to afford other critical and nondiscretionary costs such as health, food, and transportation.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B25091?q=B25091&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25091?q=B25091&g=050XX00US53053$1500000)

Pedestrian/Bicyclist Crashes

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Integer	Sum	Block Group

Description

Count of serious or fatal crashes in last two years involving bicyclists or pedestrians.

Calculation Method

The Washington State Department of Transportation (WSDOT) compiles reports on pedestrian and bicyclist injuries, categorized by injury type, year, and location. The data represents the total number of injuries reported per block group. The calculation includes various injury categories such as fatalities at the scene, fatalities upon arrival, fatalities in hospitals, and suspected serious injuries. These injury categories encompass both fatal and serious injuries resulting from crashes involving pedestrians and bicyclists.

Crash data are geocoded and then the number of crashes is summed per block group.

Calculation Steps

- Make a data request to WSDOT Crash Data Portal.
- Submit the following data request:
 - Report category: Pedestrian and Bicyclists
 - Report name: Pedestrian by injury type and bicyclists by injury type
 - Report year: Desired year
 - Location: Tacoma
 - Jurisdiction: All
- Add the requested crash point shapefile to an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the map.
- Using the MOST_SEVER attribute in the crash point shapefile, select points that are dead at scene, or dead at arrival, or dead in hospital, or suspected serious injury.
- Join the crash point shapefile to Tacoma block groups.

Importance

Access to safe pedestrian and bike routes promotes health, access to amenities and livability. A higher count means more serious or fatal crashes.

Source

Washington Department of Transportation | Crash Data Portal

Source URL

<https://remoteapps.wsdot.wa.gov/highwaysafety/collision/data/portal/public/>

Average Life Expectancy

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2015	Higher is better	Integer	Average	Block Group

Description

Average life expectancy of those residing within a particular census tract mapped to block groups. Seen as a bellwether indicator on health conditions in a particular neighborhood. Calculation MethodThe abridged life tables are generated using a combination of data sources and statistical modeling techniques. Specifically, the data used for this analysis includes six years of mortality data from the National Vital Statistics System (NVSS) spanning from 2010 to 2015. Population counts from the 2010 decennial census and the American Community Survey (ACS) 5-year estimates from 2011 to 2015 are also incorporated.

To link the mortality data with specific geographic areas, the residential addresses of the deceased individuals are geocoded to identify their corresponding census tract codes. The mortality records successfully geocoded to census tracts are then matched back to the NVSS mortality data files for the years 2010 to 2015. Only records of high quality, which are determined based on census-tract codes derived from accurate street address or 9-digit zip code matches, are utilized in producing the abridged life tables at the census tract level.

To estimate age-specific death rates, statistical modeling techniques are employed. These models utilize the available data to make predictions about mortality rates within specific age groups. Additionally, to calculate the average life expectancy for each census tract, the block groups within the tract are identified and the mean average life expectancy of census tract that intersect the block group is calculated.

By employing these methods and utilizing the intersecting data from block groups within census tracts, this analysis provides insights into the average life expectancy at the local level.

Calculation Steps

- Download the Life Expectancy excel file for Washington and upload into ArcGIS Pro.
- Add the Tacoma census tracts 2010 shapefile to the ArcGIS Pro map.
- Join the life expectancy excel file to Tacoma's 2010 census tracts using the census tract ID.
- Map the 2010 census tracts to the 2020 block groups based on their intersections.
- Since the life expectancy uses 2010 census geography it must be normalized to 2020 census geography.
- Aggregate the new intersected shapefile based on the 2020 block group IDs and average the "e(0)" column.

Importance

Life expectancy is a result of a number of different factors and serves as an overall indicator of health and livability.

Source

Centers for Disease Control & Prevention | U.S. Small-area Life Expectancy Estimates Project – USALEEP

Source URL

<https://www.cdc.gov/nchs/nvss/usaleep/usaleep.html#life-expectancy>

Renter Cost Burden

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2022	Lower is better	Percentage	Average	Block Group

Description

Percentage of renters paying more than 30% of income on the monthly housing cost expenses.

Calculation Method

Gross rent as a percentage of household income is computed by taking the ratio of monthly gross rent to monthly household income, which is the total household income divided by 12. This provided information on monthly housing costs for renters.

This indicator is calculated by summing the renter-occupied housing units that have gross rent ranges of 30.0 to 34.9 percent, 35.0 to 39.9 percent, 40.0 to 49.9 percent, and 50.0 percent or more then dividing by the total renter-occupied housing units.

Calculation Steps

For the American Community Survey (ACS) calculation methods, please see: [American Community Survey and Puerto Rico Community Survey 2022 Subject Definitions \(census.gov\)](https://www.census.gov/programs-surveys/acs/data-tables.html)

- Download the Gross Rent as a Percentage of Household Income in the Past 12 Months and Mortgage Status by Selected Monthly Owner Costs as a Percentage of Household Income in the Past 12 Months 5-year estimates table from the Census Bureau website for all block groups in Tacoma.
- For each block group, sum the "30.0 to 34.9 percent", "35.0 to 39.9 percent", "40.0 to 49.9 percent", and "50.0 percent or more" columns to calculate total cost-burdened households.
- For each block group, divide total cost-burdened households by the "Total" column.
- Multiple by 100.

Importance

Housing cost-burden is a barrier to opportunity. This burden indicates that a household may not be able to afford other critical and nondiscretionary costs such as health, food, and transportation.

Source

U.S. Census Bureau | American Community Survey 5-Year Estimates

Source URL

[https://data.census.gov/table/ACSDT5Y2022.B25070?q=B25070&g=050XX00US53053\\$1500000](https://data.census.gov/table/ACSDT5Y2022.B25070?q=B25070&g=050XX00US53053$1500000)

Tacoma Crime Risk

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Decimal	Average	Block Group

Description

All crime reports scored based on Part I or Part II Offenses ranked in the UCR Handbook. Incidences of violent crimes are scored higher. This is the sum of the crime scores within the past year (2023).

Calculation Method

Crime data are recorded by the City of Tacoma and can be downloaded as a point shapefile. Data contains information about case number, open and updated date, crime type, and other information.

Crime types are defined by the Uniform Crime Reporting Program National Incident-Based Reporting System handbook. Crime seriousness, referred to as the crime score, was developed by Sellin and Wolfgang to score crimes by their seriousness by looking at crime rates and the nature of the act, such as specifying the amount of injury, theft, and damage characterizing the event. The Sellin-Wolfgang index has been used to establish a national benchmark. Crime scores assigned use the geometric mean of the Sellin-Wolfgang scores to simplify the complexity of the scoring process.

Crime data are geocoded to generate crime points. Crime scores are assigned based on the crime type per the Sellin-Wolfgang scoring. Crime scores are summed by block group.

Calculation Steps

- Download City of Tacoma's Reported Crime.
- Add the crime points to an ArcGIS Pro map using the Latitude and Longitude attribute fields.
- Create a new field in the crime points shapefile to assign a seriousness weight score.
- Using the Description attribute field, assign seriousness weight scores based on the crime type.
- Add the Tacoma block groups shapefile to the map.
- Calculate the sum of the seriousness weight scores per block group.

Importance

A higher score means more violent crime or serious reports in general.

Source

City of Tacoma GIS | City of Tacoma Reported Crime

Source URL

<https://data.cityoftacoma.org/datasets/tacoma::city-of-tacoma-reported-crime-tacoma/explore>

Tacoma Personal Crime

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Integer	Sum	Block Group

Description

Count of personal crimes within the past year, based on respective categories.

Calculation Method

Crime data are recorded by the City of Tacoma and can be downloaded as a point shapefile. Data contains information about case number, open and updated date, crime type, and other information.

Per the Uniform Crime Reporting Program National Incident-Based Reporting System handbook, personal crimes are defined as a crime that cause physical, emotional, and psychological harm to the victim. They are offenses against a person. Crimes are categorized as personal crimes according to the handbook. Examples include murder, kidnapping, and sex offenses.

Crime data are geocoded to generate crime points. Crimes defined as personal are summed by block group to get the count.

Calculation Steps

- Download City of Tacoma's Reported Crime.
- Add the crime points to an ArcGIS Pro map using the Latitude and Longitude attribute fields.
- Using the Crimes_Against attribute field, select personal crimes.
- Add the Tacoma block groups shapefile to the map.
- Calculate the count of the personal crime points per block group.

Importance

Lower crime counts indicate safer neighborhoods.

Source

City of Tacoma GIS | City of Tacoma Reported Crime

Source URL

<https://data.cityoftacoma.org/datasets/tacoma::city-of-tacoma-reported-crime-tacoma/explore>

Tacoma Property Crime

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2023	Lower is better	Integer	Sum	Block Group

Description

Count of property crimes within the past year, based on respective categories.

Calculation Method

Crime data are recorded by the City of Tacoma and can be downloaded as a point shapefile. Data contains information about case number, open and updated date, crime type, and other information.

Per the Uniform Crime Reporting Program National Incident-Based Reporting System handbook, property crimes are defined as a crime that creates interference with another person's right to use and enjoy a property. They are offenses against property. Crimes are categorized as property crimes according to the handbook. Examples include robbery, arson, and vandalism.

Crime data are geocoded to generate crime points. Crimes defined as property are summed by block group to get the count.

Calculation Steps

- Download City of Tacoma's Reported Crime.
- Add the crime points to an ArcGIS Pro map using the Latitude and Longitude attribute fields.
- Using the Crimes_Against attribute field, select property crimes.
- Add the Tacoma block groups shapefile to the map.
- Calculate the count of property crime points per block group.

Importance

Lower crime counts indicate safer neighborhoods.

Source

City of Tacoma GIS | City of Tacoma Reported Crime

Source URL

<https://data.cityoftacoma.org/datasets/tacoma::city-of-tacoma-reported-crime-tacoma/explore>

Urban Tree Canopy

<i>Year</i>	<i>Polarity</i>	<i>Unit</i>	<i>Aggregation</i>	<i>Scope</i>
2021	Higher is better	Percentage	Average	Block Group

Description

The percentage of a block group that is covered by an urban tree canopy.

Calculation Method

The Multi-Resolution Land Characteristics Consortium is a group of federal agencies that generate land cover information at the national scale. The National Land Cover Database (NLCD) tree canopy cover is a 30m resolution raster dataset generated by the USDA Forest Service. This raster dataset contains percent tree canopy estimates as a continuous variable for each pixel across all land covers and types. Multi-spectral satellite imagery was used to derive the tree canopy percentages.

The raster dataset is converted to a vector dataset to create individual polygons for each pixel from the raster dataset, with the associated tree canopy percentage. The polygons within each block group are summarized and used to calculate the average tree canopy percentage.

Calculation Steps

For the Multi-Resolution Land Characteristics Consortium (MRLC) calculation methods, please see: [US Forest Service Landscape Change Monitoring System Methods; Version: 2021.7; Mapping Areas: Conterminous United States and Southeastern Alaska \(usda.gov\)](#)

- Download the NLCD 2021 USFS Tree Canopy Cover (CONUS) from MRLC.
- Import the raster CONUS file into an ArcGIS Pro map.
- Add the Tacoma block groups shapefile to the map.
- Convert the raster CONUS file to a vector polygon file.
- Calculate the mean for the Value attribute (percent tree canopy cover) per block group.

Importance

Higher percentages indicate a healthier canopy and provide additional positive environmental and health effects in the surrounding area.

Source

Multi-Resolution Land Characteristics (MRLC) Consortium | NLCD Tree Canopy Cover (CONUS)

Source URL

<https://www.mrlc.gov/data/nlcd-2021-tree-canopy-cover-conus>