Appendix C: Environmental Justice Analysis

Racial Equity Impact Analysis, Equity-focused Community Outreach and Public Engagement

This appendix provides more detailed information on the following aspects of racial equity impact analysis and equity-focused community engagement, including:

1) an overview of the proposed project;

2) identification of Environmental Justice Census Tracts within the project area;

3) identification of specific project elements that support our Environmental Justice (EJ) populations with improved access to safe alternative transportation options such as transit and multi-modal non-motorized options;

4) detailed community outreach and public engagement; and

5) identification of the project elements that do not harm to our EJ population but instead provide better access especially non-motorized bike and ped as well as improved transit service, providing better access to services and commercial areas for our underserved population.

Equitable Project Analysis

The Port of Grays Harbor and their partners have prepared the following analysis of the East Terminal 4 Redevelopment and Expansion Project (Project) to evaluate equitable distribution of project benefits and to identify any inequities that can be mitigated with the Project.

This network of project focuses on past inequities by addressing Climate change and Environmental Justice both the planning, design and construction of the projects. The project sponsors have used environmental justice tools such as EJSCREEN, Washington Environmental Health Disparities Map and other mapping programs and reports to identify our Environmental Justice (EJ) populations adjacent to the Project and to evaluate any disproportionate effects on such populations and neighborhoods.

The project team also aligned these projects with Governor Inslee's Climate Commitment and DNR's Plan for Climate Resilience which both give guidance on lowering greenhouse gas emissions. The planning and selection of the components align directly with these Climate Action Plans. identify inequities in our community that extends to climate, pollution risks.

1. Project Overview

The Port of Grays Harbor's T4 Expansion and Redevelopment Project includes adding rail capacity into the current T4 area to meet customer demand which will require current uses of the area under the proposed rail footprint to be located into the Expansion area to the east of the T4 Redevelopment area as shown below.

The Port of Grays Harbor is planning to expand their Terminal 4 to the east to include the 50 acre parcel that the Port purchased at auction from WSDOT in late 2018. The parcel had been used for as the SR520 Pontoon Casting Basin during the re-construction of the SR520 Floating Bridge in 2012-2014. The Casting Basin was decommissioned in 2015 and after a Highest and Best Use Analysis was completed in 2017.

The 55+/- acre site was originally purchased by WSDOT as raw land from Weyerhaeuser in 2010. Approximately 5 acres of the site was sold to the Port of Grays Harbor. Kiewit-General was awarded the contract to modify the site into a casting basin and build the SR 520 pontoon sections. The only changes made to the site from how it was used during construction, were to meet the decommissioning requirements of the contract at the end of the project. Permits for construction on the site were issued in 2011, and in 2015 the site was decommissioned.

The Terminal 4 Redevelopment and Expansion Project includes the redevelopment of the expansion site into an extension of their Terminal 4 footprint. Terminal 4 is the Port's main general cargo terminal currently used for Auto & Ro/Ro Shipping. It features over 100,000 sq. ft. of dried, covered warehouse space; a rail loop with on-dock rail access and 120 acres of paved cargo yard.

The rail yard has service to BNSF and UP railroads.

The Area is zoned as Industrial. There are homes to the north of the port properties as well as commercial uses such as Home Depot and other industrial and home repair related retail establishments.

2. Environmental Justice Analysis

Equity within Grays Harbor County

Best practices requires a review of the Equity in the distribution of benefits and impacts within the Transportation Improvements included in a Transportation Improvement Plan (TIP) or Rural Transportation Plan (RTIP).
For a Metropolitan Planning Organization (MPO)or a Rural Transportation Planning Organization (RTPO) to have their Transportation Investment Plan approved by USDOT, the region must ensure that federal funds programmed in the TIP/RTIP avoid disproportionate negative impacts or denial of benefits to disadvantaged populations. This finding is made on the program as a whole, and with the understanding that individual transportation improvements may result in negative impacts to disadvantaged

populations given proper review, avoidance and mitigation of environmental impacts through the National Environmental Policy Act (NEPA) process.

The Equity methodology displayed in the matrix below can be used to review projects:

	- IMPACTS +	
Negative Impacts Have Proportionate Impact at Community or Regional Scale	Direct Benefits to Disadvantaged Populations	+
Disproportionate Negative Impacts to Disadvantaged Populations	Benefits Limited to Non-Disadvantaged Populations	BENEFITS -

The overall result of the TIP /RTIP are evaluate through an environmental justice framework, in addition TIP/ RTIP projects can be individually evaluated in more detail prior to implementation.

Among the broad range of investment categories and transportation improvements, four specific categories ofprojects are automatically considered equitable based on the following types:

- Preservation & Maintenance projects that are prioritized based on empirical data that maximizes the lifespan of the transportation system as a whole.
- Safety improvements that are prioritized by empirical data that maximizes the reduction of risk factors and potential for injury or fatality on the transportation system as a whole, and at locations with a high frequency or severity of crashes.
- Accessibility improvements that are necessary for regulatory compliance and not in locations based on open discretion.
- Public Transportation formula funding utilized to sustain operations and asset management on a systemwide basis.

RTIP projects do not meet the criteria for automatically being deemed equitable are further reviewed. These projects were therefore evaluated on their individual merits according to the following equity considerations:

✓ Project directly benefits disadvantaged populations

✓ Project indirectly benefits disadvantaged populations

✓ Project benefits and/or impacts are proportionately distributed across the community or region.

✗ Project benefits are limited to non-disadvantaged populations

✗ Project results in disproportionate negative impacts to disadvantaged populations.

Methodology used in the East Terminal 4 Redevelopment and Expansion Project Analysis

The Project was analyzed for the Affected Environment using multiple mapping websites as well as generic mapping software such as ARCGIS On-line that can display area data.

All of these tools are very helpful in understanding the demographics and community elements. Although the scale of the map, leads the viewer to believe that there are homes in the Port area of which there are not. Thus, the map should be used as reference only

The three Environmental Justice Mapping Tools reviewed for this analysis include:

- EJSCREEN
- The Washington Environmental Health Disparities Map
- Neighborhoods at Risk

The following is a summary of the comparable data found using the Neighborhoods at Risk Tool. This is tool appears to provide the best downloadable reports for each of the project areas.

Summary of Mapping Tools:
EJSCREEN - EPA

EJSCREEN provides the same data as the other two tools with different downloadable standard reports based upon how the user describes the investment using the drawing tool on the map. For example, the Project site can be drawn on the EJSCREEN mapping tool and a buffer around the polygon can be added. For this report, the Project was added to the map. The standard reports were run for a buffer of 1 mile around the center of the Project area.

EJSCREEN uses maps and reports to present three kinds of information: Environmental indicators, demographic indicators and EJ Indexes. An EJ Index summarizes how an environmental indicator and demographics come together in the same location. To understand exactly how the EJ indexes are calculated, please see this case study.

An EJSCREEN map can display one indicator at a time. An EJSCREEN standard report which is attached to this narrative, presents all of the indicators in a single, printable report that covers any area you have selected. To understand EJSCREEN's reports and maps, it is helpful to learn more about the EJ Indexes, environmental indicators, demographic indicators as well as how they are presented in the standard report.

Purposes and Uses of EJSCREEN

EJSCREEN allows users to access high-resolution environmental and demographic information for locations in the United States, and compare their selected locations to the rest of the state, EPA region, or the nation.

- The tool may help users identify areas with:
- Minority and/or low-income populations
- Potential environmental quality issues
- A combination of environmental and demographic indicators that is greater than usual

- Other factors that may be of interest

The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes in EJSCREEN reflecting the 11 environmental indicators. The 11 EJ Index names are:

1. National Scale Air Toxics Assessment Air Toxics Cancer Risk
2. National Scale Air Toxics Assessment Respiratory Hazard Index
3. National Scale Air Toxics Assessment Diesel PM (DPM)
4. Particulate Matter (PM2.5)
5. Ozone
6. Lead Paint Indicator
7. Traffic Proximity and Volume
8. Proximity to Risk Management Plan Sites
9. Proximity to Treatment Storage and Disposal Facilities
10. Proximity to National Priorities List Sites
11. Wastewater Discharge Indicator

To calculate a single EJ Index, EJSCREEN uses a formula to combine a single environmental factor with the demographic indicator. It considers how much the local demographics are above the national average. It does this by looking at the difference between the demographic composition of the block group, as measured by the Demographic Index, and the national average (which is approximately 35%). It also considers the population size of the block group, although most block groups are similar in population size.

EJSCREEN calculates the EJ Index by multiplying together three items:

EJ Index =

> (The Environmental Indicator)
>
> X (Demographic Index for Block Group – Demographic Index for US)
>
> X (Population count for Block Group)

Demographics in the EJ Index

The demographic portions of the EJ Index can be thought of as the additional number of susceptible individuals in the block group, beyond what you would expect for a block group with this size total population. The terms "susceptible" or "potentially susceptible individuals" are used informally in these examples, as a way to think of the Demographic Index times the population count in a block group. This is essentially the average of the count of minorities and count of low-income individuals1. It is easiest to think of the average of these counts as "the susceptible individuals" in these examples.

The number of potentially susceptible individuals (Demog. Index times population count) of course is typically less than the actual number who are minority, low-income or both. The demographic

breakdown is not reported by block group –the ACS does not provide that level of resolution on the overlaps.

Overview of Demographic Indicators in EJSCREEN

EJSCREEN uses demographic factors as very general indicators of a community's potential susceptibility to the types of environmental factors included in this screening tool, as explained further in the EJSCREEN Technical Documentation. EJSCREEN has been designed in the context of EPA's EJ policies, including EPA's Final Guidance on Considering Environmental Justice During the Development of an Action (U.S. EPA, 2010). That guidance document explained EPA's focus on demographics as an indicator of potential susceptibility to environmental pollution.

There are six demographic indicators:

Percent Low-Income:

The percent of a block group's population in households where the household income is less than or equal to twice the federal "poverty level."

Percent People of Color:

The percent of individuals in a block group who list their racial status as a race other than white alone and/or list their ethnicity as Hispanic or Latino. That is, all people other than non-Hispanic white-alone individuals. The word "alone" in this case indicates that the person is of a single race, not multiracial.

Less than high school education:

Percent of people age 25 or older in a block group whose education is short of a high school diploma.

Linguistic isolation:

Percent of people in a block group living in linguistically isolated households. A household in which all members age 14 years and over speak a non-English language and also speak English less than "very well" (have difficulty with English) is linguistically isolated.

Individuals under age 5:

Percent of people in a block group under the age of 5.

Individuals over age 64:

Percent of people in a block group over the age of 64.

EJSCREEN includes an index that is based on the above demographic indicators:

A Demographic Index is based on the average of two demographic indicators; Percent Low-Income and Percent Minority.

Excess Risk

The EJ Index uses the concept of "excess risk" by looking at how far above the national average the block group's demographics are. For example, assume a block group with 1000 people in it. In that block group, one would expect 350 potentially susceptible individuals (1000 people here x US average of 35%). However, if the Demographic Index for that block group is 75%, well above the US average, then there are the equivalent of 750 potentially susceptible people in that block group, or 400 more than expected for a block group with a population of 1000.

This formula for the EJ Index is useful because for each environmental factor it finds the block groups that contribute the most toward the national disparity in that environmental factor. It can highlight which locations are driving the overall net disparity. By "disparity" in this case we mean the difference between the environmental indicator's average value among certain demographic groups and the average in the rest of the US population.

Minority and low-income individuals live in older housing more often than the rest of the US population, for example. The EJ Index for lead paint (pre-1960 housing) tells us how much each block group contributes toward this "excess population risk" or "excess number" of people in older housing, for potentially susceptible individuals. "Excess" here simply means the number of potentially susceptible individuals in older housing is above what it would be if they were in older housing at the same rate as the rest of the U.S. population.

It should be noted that the EJ Index raw value itself is not reported in EJSCREEN reports– it is reported in percentile terms, to make the results easier to interpret. If one is calculating the actual raw values using the formula, it is clear that the EJ Index value can be a positive or negative number.

A positive number occurs where the local Demographic Index is above the US average, and this means the location adds to any excess in environmental indicator values among the specified populations (minority and low-income) nationwide.

A negative value occurs where the local Demographic Index is below the US average, and it means the location offsets the other locations, reducing any excess in nationwide average environmental indicator values among minority and low-income populations relative to others.

Most EJSCREEN users will not work directly with EJ Index raw values, however, and positive raw values for an EJ Index will be presented as higher percentiles and negative raw values will appear as lower percentiles.

How to Interpret a Standard Report in EJSCREEN

Block Groups

One key output from EJSCREEN is a standard printed report that describes a selected location. Sometimes the report might focus on a single Census "block group." A block group is an area defined by the Census Bureau that usually has in the range of 600-3,000 people living in it. The US is divided into more than 200,000 block groups.

Buffers

More typically, though, an EJSCREEN report will cover a "buffer" area, an area on the map that includes everyone who lives within a certain distance of a point, line or polygon. A point might be a factory seeking an emissions permit, for example, and the report could focus on the demographics and environmental conditions within approximately 1 mile of that factory.

In EJSCREEN, buffers can be drawn up to 10 miles around a point, line or polygon. If you have selected a geographic point, the tool will apply a buffer around that point. The buffer ring will aggregate appropriate portions of the intersecting block groups, weighted by population, to create a representative set of data for the entire ring area, honoring variation and dispersion of the population in the block groups within it. For each indicator, the result is a population-weighted average, which equals the block group indicator values averaged over all residents who are estimated to be inside the buffer.

EJSCREEN's report shows:

All 11 of the EJ Indexes

All 11 of the environmental indicators

The Demographic Index

All six of the demographic indicators

The first page of EJSCREEN's report shows the state, regional and national EJ Indexes for the selected area in tabular form and in a bar chart. "Percentiles" are an important part of EJSCREEN. Every indicator in EJSCREEN is put into perspective by showing its associated percentiles.

The second page shows a map of the selected area and the third page shows:

- 11 environmental indicators
- Demographic Index
- six demographic indicators

The report includes the state, regional and national percentiles for each of the environmental and demographic indicators and for the demographic index. The state, regional and national averages for each of the environmental indicators and demographic indicators are also included as a reference point.

11 Environmental Indicators

As can be seen in the EJScreen report below, the area in the 1 mile buffer around the center of the Project when compared to the 11 EJ Environmental Indexes exceeds all USA Percentiles, and exceeds the State Percentile in all categories except Wastewater Discharge Indicator

Demographic Index

The area within the 1-mile buffer with an Demographic Index of 36% is in the 74 percentile of the State of WA and in the 75 percentile in the EPA Region and the 59 percentile of the US.

People of Color Index at 27% is closer to the State demographic mix, so is in the 50 percentile for the State, 57 percentile for the EPA Region and 44 percentile for the US.

For low income, this area of 46% is in the 50 percentile of the State of WA and in the 83 percentile in the EPA Region and the 76 percentile of the US.

Based upon these observations, it appears the Low Income demographics is the primary driver for the Demographic Index. Thus, it will be important to consider any elements of the Project that will have an undue impact on the area's low income population.

Comparison	Area within 1 mile Buffer	
		USA Percentile
Demographic Index	36%	59
People of Color	27%	44
Low Income	46%	76
Unemployment	9%	83
Linguistic Isolation	3%	63
Less Than High School Education	16%	72
% under age 5	7%	59
% over age 64	15%	53

It should be noted that the Census Tract reflects a slightly high concentration of low income and minority residents that the 1 mile buffer. This may be due to the fact that the Project is located in an Industrial area that does not have many homes as well as since the Project is on the waterfront with approximately a one quarter of the buffer being water. So, to look at the area in the buffer only may be very mis-leading when a Project sponsor is attempting to understand the nature of the surrounding neighborhoods.

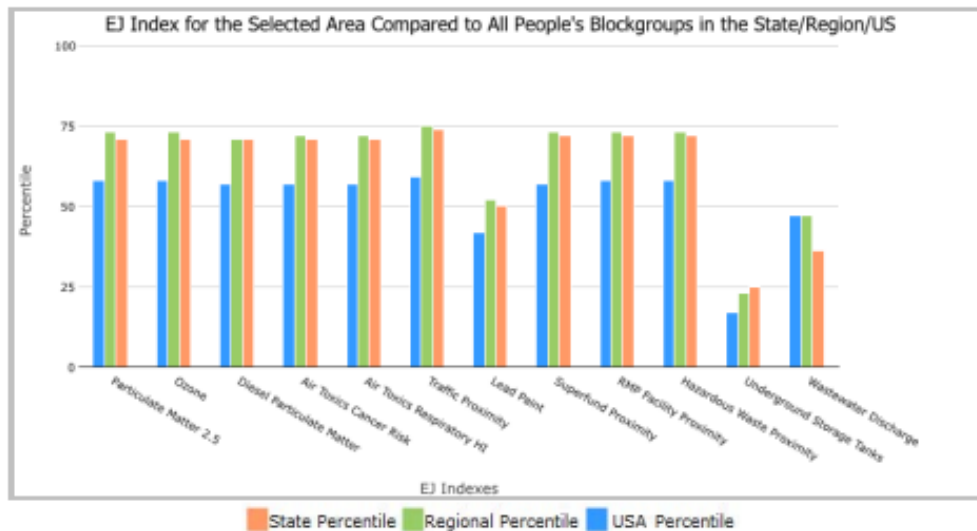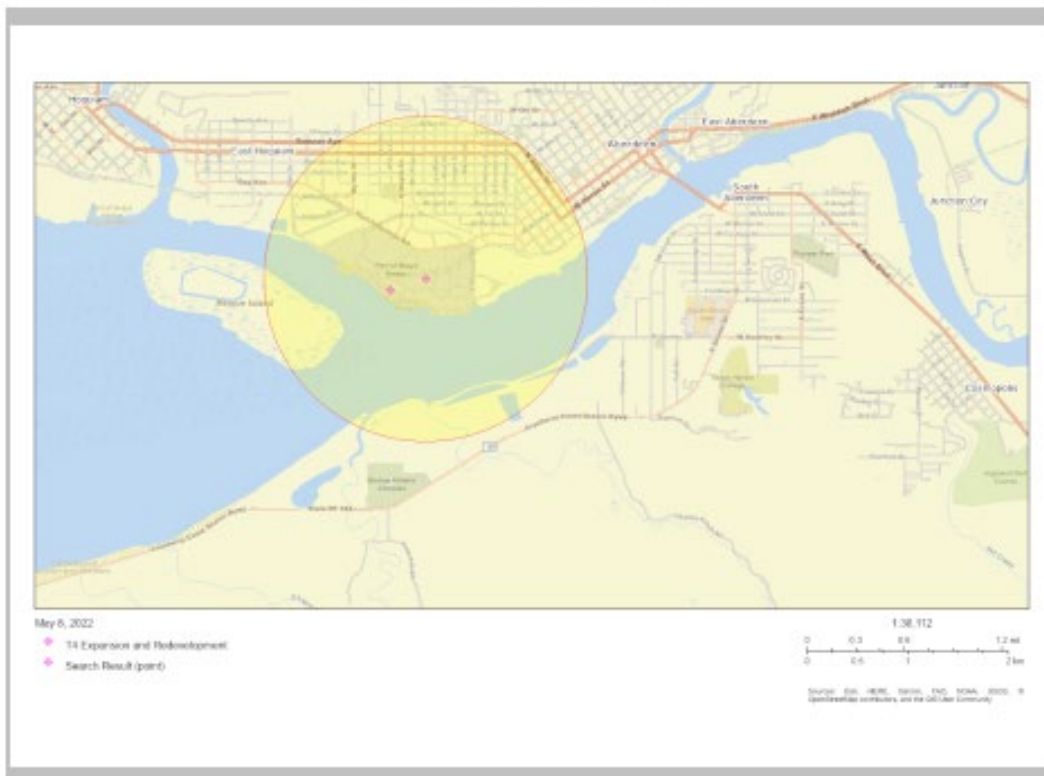**EPA** United States Environmental Protection Agency   **EJScreen Report (Version 2.0)**

1 mile Ring Centered at 46.963971,-123.842869, WASHINGTON, EPA Region 10

Approximate Population: 4,027

Input Area (sq. miles): 3.14

T4 Expansion and Redevelopment

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	71	73	58
EJ Index for Ozone	71	73	58
EJ Index for 2017 Diesel Particulate Matter*	71	71	57
EJ Index for 2017 Air Toxics Cancer Risk*	71	72	57
EJ Index for 2017 Air Toxics Respiratory HI*	71	72	57
EJ Index for Traffic Proximity	74	75	59
EJ Index for Lead Paint	50	52	42
EJ Index for Superfund Proximity	72	73	57
EJ Index for RMP Facility Proximity	72	73	58
EJ Index for Hazardous Waste Proximity	72	73	58
EJ Index for Underground Storage Tanks	25	23	17
EJ Index for Wastewater Discharge	36	47	47

EJ Index for the Selected Area Compared to All People's Blockgroups in the State/Region/US

State Percentile   Regional Percentile   USA Percentile

The buffered 1 mile area exceeds 50 USA Percentiles in the majority of the variable and is above the State 70th percentile in the majority of the variables.

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

May 08, 2022   1/3

Port of Grays Harbor
On Washington's Pacific Coast

EPA United States Environmental Protection Agency

EJScreen Report (Version 2.0)

1 mile Ring Centered at 46.963971,-123.842869, WASHINGTON, EPA Region 10

Approximate Population: 4,027
Input Area (sq. miles): 3.14
T4 Expansion and Redevelopment

May 8, 2022

✦ T4 Expansion and Redevelopment
✦ Search Result (point)

1:38,112

Source: Esri, HERE, Garmin, FAO, NOAA, USGS, © OpenStreetMap contributors, and the GIS User Community

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EPA United States Environmental Protection Agency

EJScreen Report (Version 2.0)

1 mile Ring Centered at 46.963971,-123.842869, WASHINGTON, EPA Region 10

Approximate Population: 4,027

Input Area (sq. miles): 3.14

T4 Expansion and Redevelopment

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 (µg/m³)	5.77	7.86	2	8.17	2	8.74	2
Ozone (ppb)	27	35.3	0	37.2	0	42.6	0
2017 Diesel Particulate Matter* (µg/m³)	0.145	0.336	20	0.312	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	20	35	9	33	<50th	29	<50th
2017 Air Toxics Respiratory HI*	0.3	0.52	9	0.47	<50th	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	700	710	74	600	78	710	76
Lead Paint (% Pre-1960 Housing)	0.73	0.22	94	0.22	95	0.28	89
Superfund Proximity (site count/km distance)	0.014	0.19	3	0.13	14	0.13	10
RMP Facility Proximity (facility count/km distance)	0.87	0.65	76	0.66	75	0.75	72
Hazardous Waste Proximity (facility count/km distance)	0.87	2.2	49	1.7	58	2.2	53
Underground Storage Tanks (count/km²)	24	6.1	93	4.5	96	3.9	97
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.00018	0.021	70	0.53	56	12	35
Socioeconomic Indicators							
Demographic Index	36%	29%	74	28%	75	36%	59
People of Color	27%	31%	50	28%	57	40%	44
Low Income	46%	26%	85	28%	83	31%	76
Unemployment Rate	9%	5%	86	5%	85	5%	83
Linguistically Isolated	3%	4%	62	3%	68	5%	63
Less Than High School Education	16%	9%	85	9%	84	12%	72
Under Age 5	7%	6%	58	6%	59	6%	59
Over Age 64	15%	15%	56	16%	54	16%	53

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

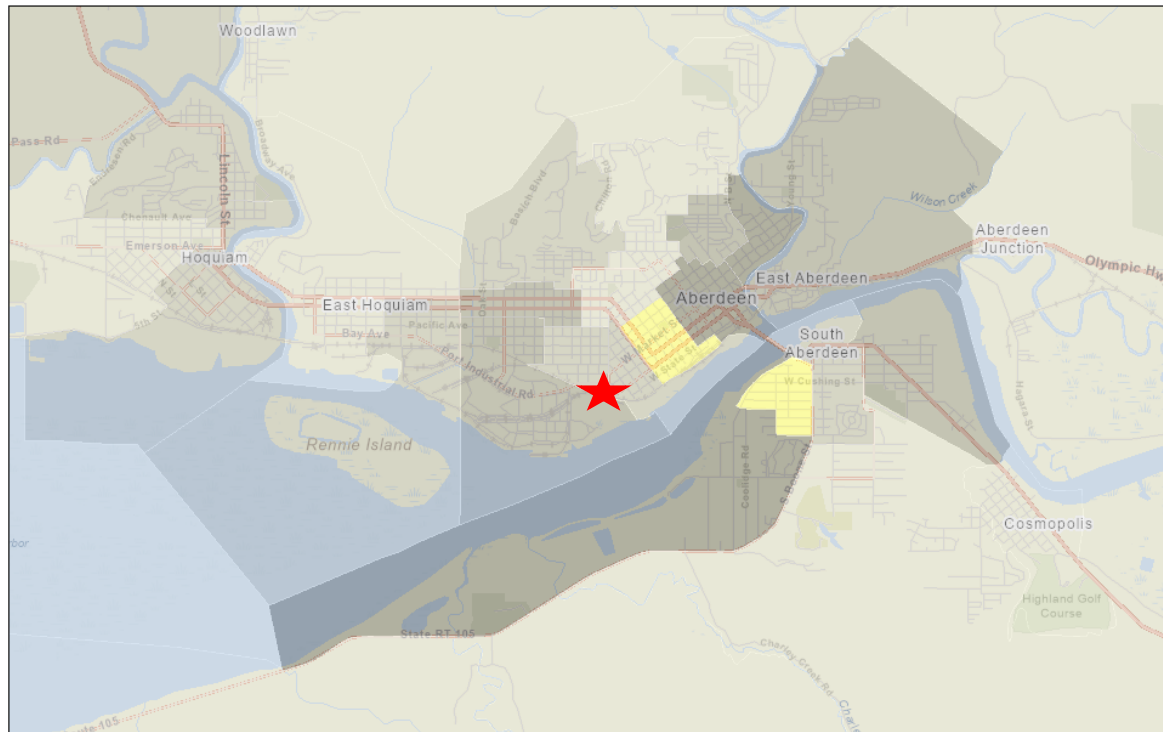For additional information, see: www.epa.gov/environmentaljustice

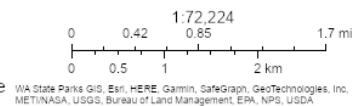May 08, 2022
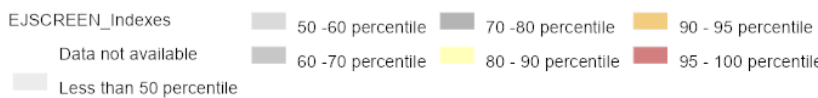
3/3

Demographic Index –

The Demographic Index in EJSCREEN is created using the two demographic indicators that were explicitly named in EO12898, low-income and minority. For each Census block group, these two indicators are simply averaged together: Demographic Index = (% minority + % low-income) / 2

Demographic Index

5/8/2022
EJSCREEN_Indexes

Data not available

Less than 50 percentile

50 -60 percentile   70 -80 percentile   90 - 95 percentile

60 -70 percentile   80 - 90 percentile   95 - 100 percentile

1:72,224

0   0.42   0.85   1.7 mi

0   0.5   1   2 km

WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc,
METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA
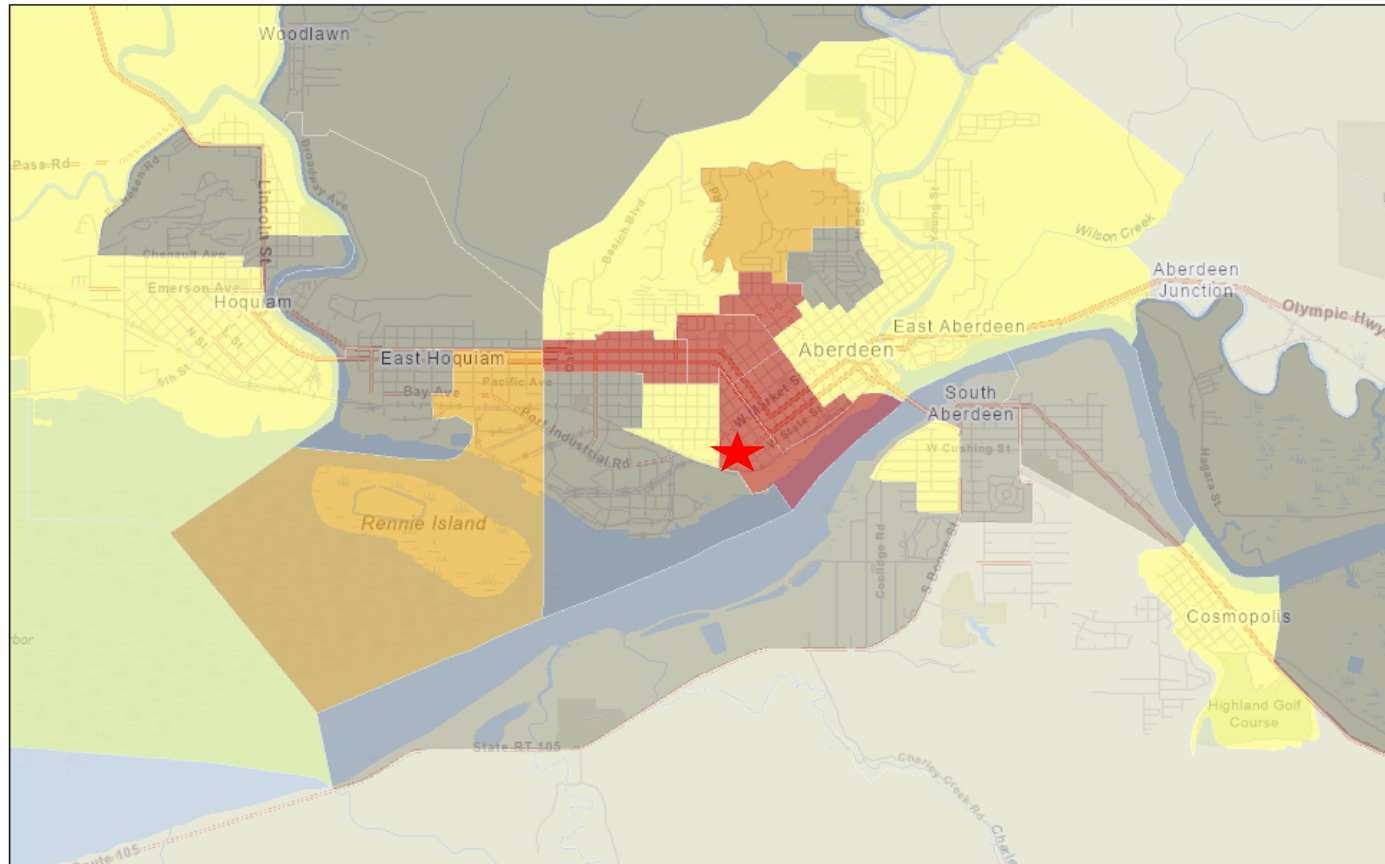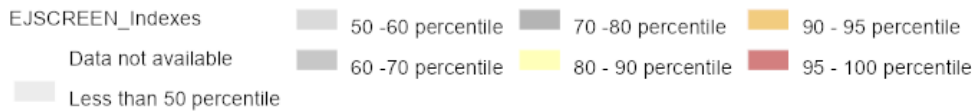
EJ Lead Index Factor

The dark red indicates the highest percentile range indicating that the homes in that area are in the 90-100 percentile for Lead Paint. These homes tend to be pre-1960's and carry the threat of lead paint in the home.

Lead Paint

5/8/2022

EJSCREEN_Indexes

Data not available

Less than 50 percentile

50 -60 percentile	70 -80 percentile	90 - 95 percentile
60 -70 percentile	80 - 90 percentile	95 - 100 percentile

1:72,224

0   0.42   0.85   1.7 mi

0   0.5   1   2 km

WA State Parks GIS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc.
METI/NASA, USGS, Bureau of Land Management, EPA, NPS, USDA

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Washington Environmental Health Disparities Map

The Washington Environmental Health Disparities Map evaluates environmental health risk factors in communities. The model was specifically adapted from CalEnviroScreen—a cumulative environmental impacts assessment mapping tool developed by CalEPA and used in California. —It estimates a cumulative environmental health impact score for each census tract reflecting pollutant exposures and factors that affect people's vulnerability to environmental pollution. Information by Location | Washington Tracking Network (WTN)

The model is based on a conceptual formula of Risk = Threat * Vulnerability, where threat and vulnerability are based on several indicators.

Threat is represented by indicators that account for pollution burden, which is a combination of environmental effects and environmental exposures in communities. Environmental effects include indicators that account for adverse environmental quality generally, even when population contact with an environmental hazard is unknown or uncertain. Environmental exposures include the levels of certain pollutants that populations come into contact with.

Vulnerability is represented by indicators of socioeconomic factors and sensitive populations for which there is clear evidence that they may affect susceptibility or vulnerability to an increased pollution burden. Indicators in socioeconomic factors measure population characteristics that modify the pollution burden itself. Sensitive populations refer to those who are at greater risk due to intrinsic biological vulnerability to environmental stressors.

In the model, threat is multiplied by vulnerability in order to reflect the scientific literature that indicates population characteristics often modify and amplify the impact of pollution exposures on certain vulnerable populations. The rankings help to compare health and social factors that may contribute to disparities in a community. You should not interpret rankings as absolute values. Do not use them to diagnose a community health issue or to label a community.

Version 1.0 Published January 2019

Version 1.1 Published December 2019 (updated measures from American Community Survey and Department of Health for 2013-2017) Did not update Threat indicators derived from EJSCREEN.

Example of mapping from Washington Environmental Health Disparities Map

This mapping tool is like EJSCREEN, although there is not an option to download a summary report for a Census Tract.
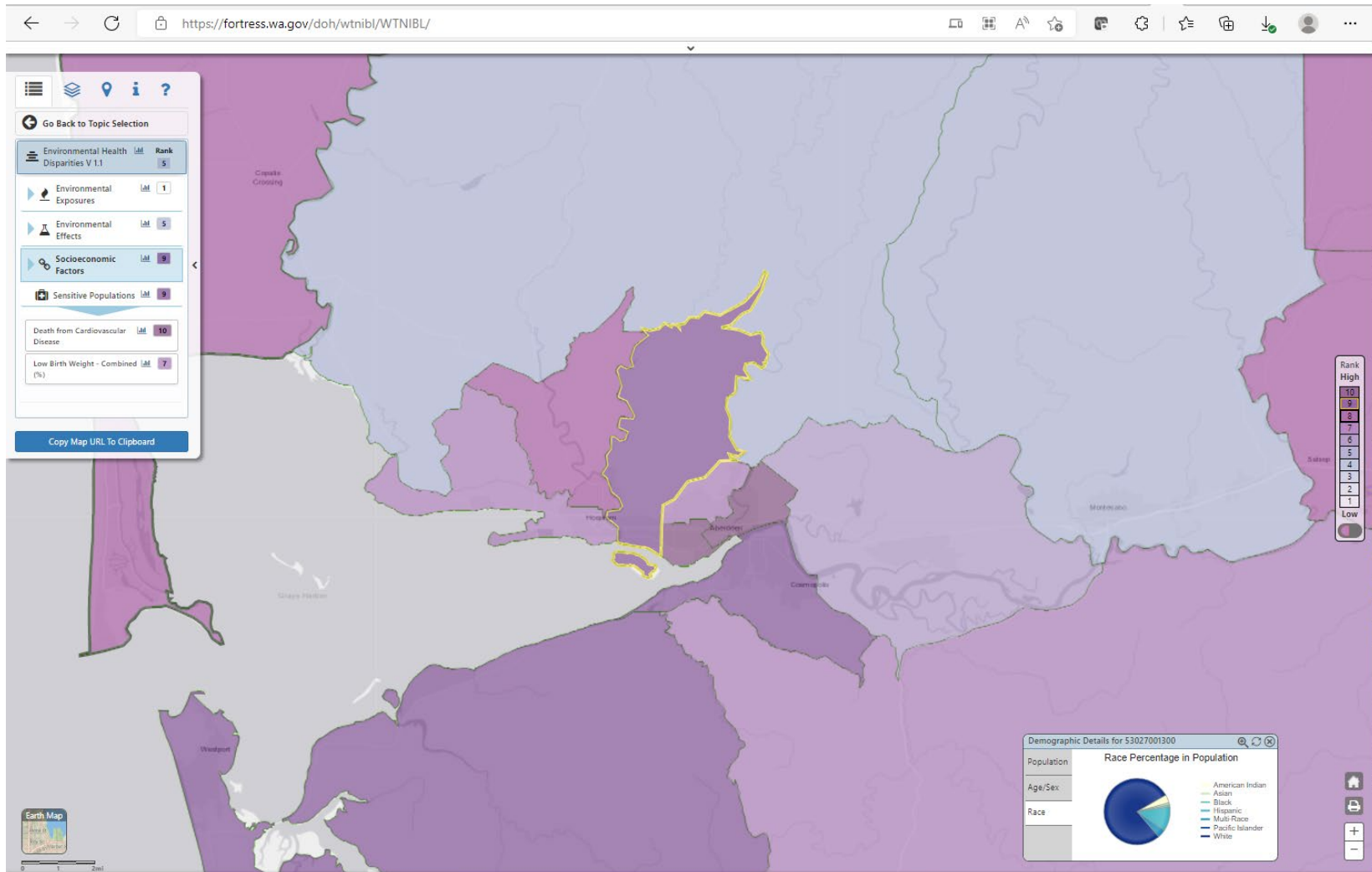
Neighborhoods at Risk Tool

Neighborhoods at Risk is designed to meet community planning needs to protect people and property from the impacts of climate change. A free, web-based tool, Neighborhoods at Risk generates customized, interactive maps and reports that describe characteristics of potentially vulnerable neighborhoods (by census tract). Additionally, Neighborhoods at Risk provides community-level climate projections for temperature and precipitation.

The Analysis below is divided into People and Climate Exposure:

Neighborhoods at Risk	Area			
	Tract 12	Tract 13	Washington	U.S.
# Selected Tracts	1	1		
Total Area Population (2019)	4,190	3,318	7,404,107	324,697,795
People				
People of color and Hispanics	13.1%	29.9%	24.6%	39.3%
Households with no car	8.6%	6.8%	2.9%	8.6%
People who don't speak English well	2.0%	0.3%	3.6%	4.3%
Families in poverty	16.8%	4.8%	6.9%	9.5%
People with Disabilities	21.5%	22.8%	12.7%	12.6%
Housing units that are rentals	43.8%	38.%	37.0%	36.0%
People under 5	5.4%	4.1%	6.1%	6.1%
People over 65 years	14.2%	19.6%	15.1%	15.6%
Educational Attainment- No High School Degree	15.4%	9.7%	8.7%	12.0%
Climate Exposure				
Area lacking tree canopy	99.7%	34.9%		
Area of impervious surface	49.2%	4.2%		
Area in 500-yr floodplain	0%	10.1%		

Source: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., as reported by Headwaters Economics' Neighborhoods at Risk. Retrieved May 2022 from https://headwaterseconomics.org/apps/neighborhoods-at-risk/

Legend

	Below US Average
	Above US Average
	Double or more than the US Average

Neighborhoods at Risk can be used to prioritize capital improvements, conduct vulnerability assessments, inform land use and policy decisions, and support FEMA Hazard Mitigation Plans and Carbon Disclosure Project reporting.

Neighborhoods at Risk reports are based on data from the U.S. Census Bureau, FEMA, Multi-Resolution Land Characteristics Consortium, First Street Foundation, and the Northeast Regional Climate Center's Applied Climate Information System.

The following is a summary of the comparable data found using the Neighborhoods at Risk Tool. This is tool appears to provide the best downloadable reports for each of the project areas.

"**People**" in Neighborhoods at Risk are indicators of populations that are potentially more vulnerable to climate risk and climate-related disasters. Not all people who fit these criteria are more vulnerable, but research shows that these populations are, on average, more likely to experience difficulty during all phases of climate-related disasters including:

- Mitigation: reducing the potential risk
- Preparedness: getting plans and resources ready
- Response: protecting and rescuing
- Recovery: rebuilding

The downloadable Neighborhoods at Risk report provides detailed information and references documenting how each variable is associated with potentially higher risk to climate change.

The four characteristics and filters included under "**Climate Exposure**" in Neighborhoods at Risk are indicators of land area that may experience more significant impacts from climate change. These variables (hurricane flood zones, floodplains, impervious surface, and lack of tree canopy) represent characteristics of our physical environment that make us more or less vulnerable to climate change by affecting the likelihood of extreme heat and flood events.

Why is this measure important?

People

People of color and Hispanics

- Race and ethnicity are strongly correlated with disparities in health, exposure to environmental pollution, and vulnerability to natural hazards.
- Research consistently has found race-based environmental inequities, including the tendency for minority populations to live closer to noxious facilities and Superfund sites, and to be exposed to pollution at greater rates than whites.
- Many health outcomes are closely related to the local environment. Minority communities often have less access to parks and nutritious food, and are more likely to live in substandard housing.
- Minorities tend to be particularly vulnerable to disasters and extreme heat events. This is due to language skills, housing patterns, quality of housing, community isolation, and cultural barriers.
- Blacks and Hispanics, two segments of the population that are currently experiencing poorer health outcomes, are an increasing percentage of the US population.

- Research has identified measurable disparities in health outcomes between various minority and ethnic communities.
- Across races, the rates of preventable hospitalizations are highest among black and Hispanic populations. Preventable hospital visits often reflect inadequate access to primary care. These types of hospital visits are also costly and inefficient for the health care system.
- Relative to other ethnicities and races, Hispanics and blacks are less likely to have health insurance, but rates of uninsured are dropping for both groups.
- Compared to other races, blacks have higher rates of infant mortality, homicide, heart disease, stroke, and heat-related deaths.
- Hispanics have higher rates of diabetes and asthma.
- American Indians have a distinct pattern of health effects different from blacks and Hispanics. Native populations are less likely to have electricity than the general population. They have high rates of infant mortality, suicide and homicide, and nearly twice the rate of motor vehicle deaths than the U.S. average.

Households with no car

Access to a car is linked with higher wages and more financial stability, and can help families relocate or evacuate in the event of emergencies.

- People who own cars are more likely to be employed, work longer hours, and earn more than those who do not.
- Access to a car has measurable benefits for those receiving public assistance. Welfare recipients with access to a car were more likely to work more hours and get higher-paying jobs, and had a greater chance of leaving welfare.
- During emergencies, natural disasters, and extreme weather events, people who do not have a car are less likely to evacuate or have access to emergency response centers.
- During heat waves, people without a car are less able to go to community cooling centers or cooler areas.
- Pedestrian fatalities are more than twice as likely in poor urban neighborhoods than in wealthier parts of cities.

People who don't speak English well

- Many aspects of life in the US assume basic fluency in English. Thus, people with limited language skills are at risk for inadequate access to health care, social services, or emergency services.
- A person's ability to take action during an emergency is compromised by language and cultural barriers.
- Poor English skills can make it harder to follow directions or interact with agencies.
- Lack of language skills can also instill lack of trust for government agencies.
- In many industries, poor English skills can make it harder for people to get higher wage jobs.
- Language barriers make it harder to obtain medical or social services; and make it more difficult to interact with caregivers.
- Limited English skills may result in isolation from other segments of the US population, and social isolation is a health risk.

- However some minority communities can be very tightly-knit and not isolated, so this risk factor cannot be generalized across all populations.

Families in poverty

Families in poverty may lack the resources to meet their basic needs. Their challenges cross the spectrum of food, housing, healthcare, education, vulnerability to natural disasters, and emotional stress.

- To save money, families with low incomes often have to make lifestyle compromises such as unhealthy foods, less food, substandard housing, or delayed medical care.
- Lack of financial resources makes families in poverty more vulnerable to natural disasters. This is due to inadequate housing, social exclusion, and an inability to re-locate or evacuate.
- Inadequate shelter exposes occupants to increased risk from storms, floods, fire, and temperature extremes.2 Households with low incomes are more likely to have unhealthy housing such as leaks, mold, or rodents.
- The expense of running fans, air conditioners, and heaters makes low-income people hesitant to mitigate the temperature of their living spaces. Furthermore, those in high-crime areas may not want to open their windows.
- Families in poverty are disproportionately affected by higher food prices, which are expected to rise in response to climate change.
- Children in poor families, on average, receive fewer years of education compared to children in wealthier families.
- Low-income residents are less likely to have adequate property insurance, so they may bear an even greater burden from property damage due to natural hazards.
- Living in poverty can lead to a lack of personal control over potentially hazardous situations such as increased air pollution or flooding. Impoverished families may be less likely to take proactive measures to prevent harm.

People with Disabilities

Disabled people are subject to health complications that make environmental risks more consequential.

- Disabled people are less likely to have health insurance, compared to the non-disabled population.
- Being confined to a bed raises heat mortality.
- Extreme weather events or natural disasters may result in limited access to medical care. This is particularly consequential for those who already have compromised health.

People younger than 5 or over 65 years

Young children and older adults both are vulnerable segments of the population. Understanding the age profile of a community can help users determine the types of services likely to be needed.

Older adults also are at increased risk of compromised health related to environmental hazards and climate change.

- Age is the single greatest risk factor related to illness or death from extreme heat.

- The elderly are more likely to have pre-existing medical conditions or compromised mobility, which reduces their ability to respond to natural disasters.
- The likelihood of chronic disease increases with age.
- Older adults are more susceptible to air pollution such as ground level ozone, particulate matter, or dust. Increased dust is associated with drought, wildfires, and high wind events.

Educational Attainment- No High School Degree

High school completion is used as a proxy for overall socioeconomic circumstances. Lack of education is strongly correlated with poverty and poor health.

- People without a high school degree are more than twice as likely to live in inadequate housing compared to those with some college education.
- A study in California[1] found the lack of a high school degree was the factor most closely related to social vulnerability to climate change.
- Thirty-eight percent of Americans without a high school degree do not have health insurance, compared to 10 percent with a college degree.
- The rate of diabetes is much greater for those without a high school degree. Incidence of this disease is more than double the rate of those who attended education beyond high school.
- Binge drinking is most severe among those without a high school degree. This demographic group had the highest risk of binge drinking across all measured categories (such as income, race, ethnicity, or disability status).[2]

Climate Exposure

These three categories for the project area represent characteristics of the physical environment that make the population within the area more or less vulnerable to climate change by affecting the likelihood of extreme heat and flood events.

- Area lacking tree canopy-
- Area of impervious surface
- Area in 500-yr floodplain

Climate Exposure	Tract 12	Tract 13	Grays Harbor County
Area lacking tree canopy	99.7%	34.9%	34.7%
Area of impervious surface	49.2%	4.2%	1.1%
Area in 500-yr floodplain	0%	10.1%	4.0%

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[1] Heather Cooley, Eli Moore, Matthew Heberger, and Lucy Allen, Social Vulnerability to Climate Change in California (California Energy Commission Pub. # CEC-500-2012-013, 2012).

[2] Centers for Disease Control and Prevention, "CDC Health Disparities and Inequalities Report — United States, 2011," Morbidity and Mortality Weekly Report 60 Suppl. (January 14, 2011). http://www.cdc.gov/mmwr/pdf/other/su6001.pdf

Note that since this is a pacific northwest location, the Climate Exposure characteristics only displays three of the four variables as hurricane flood zones, the fourth variable, is not applicable.

Based upon these three characteristics as well as land use, etc. the Neighbors At Risk Model predicts that by 2047 Grays Harbor is expected to experience a 120% increase in extremely hot days and an 6% increase in days with heavy precipitation within 25 years.

It is forecasted that Aberdeen/ Hoquiam and Grays Harbor County will experience 0.7 more days that reach above 95°F than is expected in 2022. Average Annual Temperature by 2047 is anticipated to increase 1.6°F.
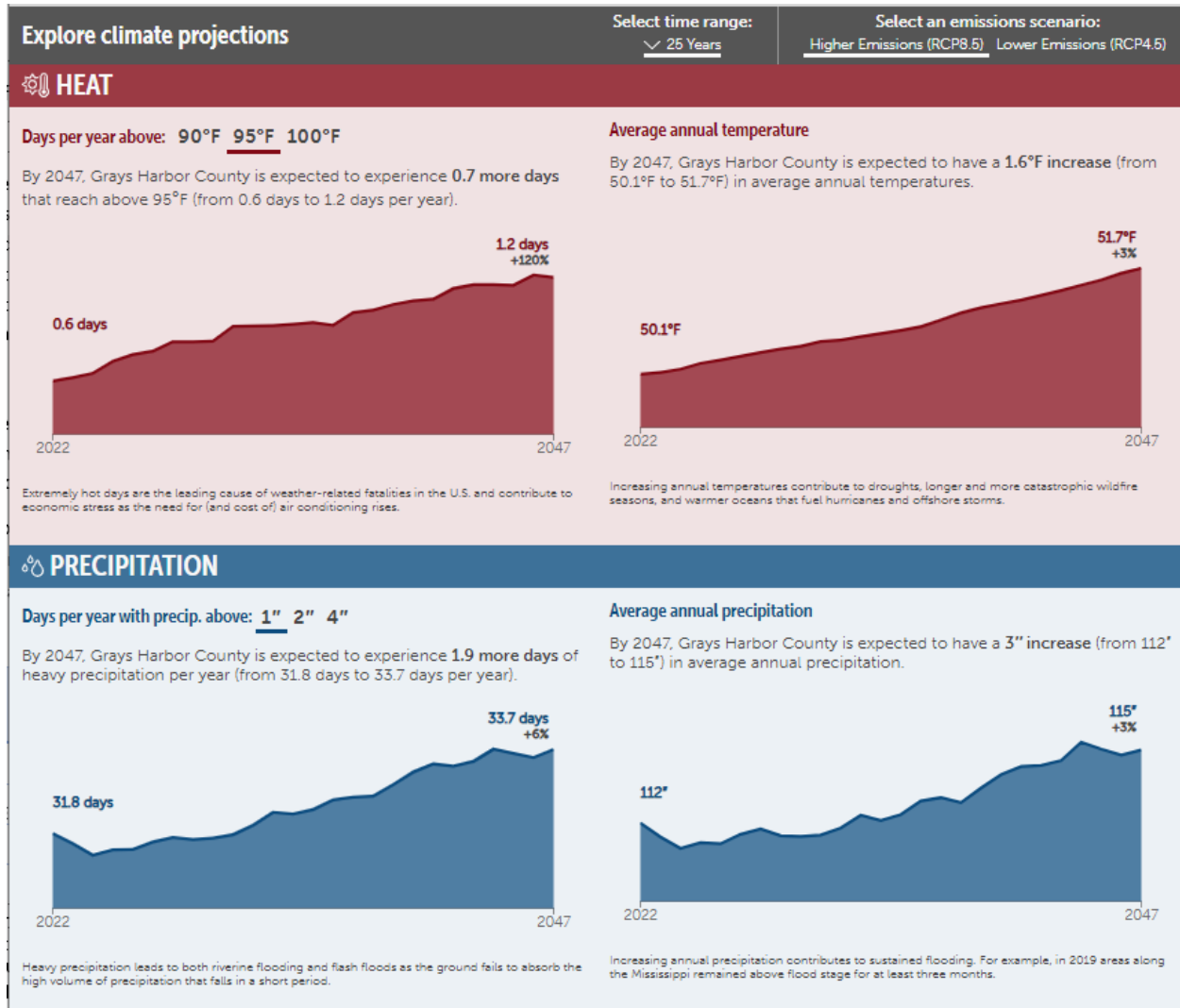
If emission can be lowered, then the projection is lowered to a 92% increase in extremely hot days and a 2% increase in days with heavy precipitation within 25 years.

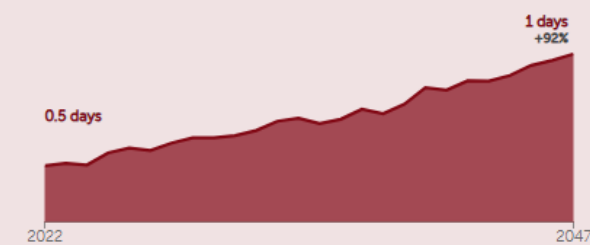**Explore climate projections**

Select time range: ⌄ 25 Years

Select an emissions scenario: Higher Emissions (RCP8.5) Lower Emissions (RCP4.5)

🌡️ HEAT

Days per year above: 90°F 95°F 100°F

By 2047, Grays Harbor County is expected to experience **0.5 more days** that reach above 95°F (from 0.5 days to 1 days per year).

1 days +92%

0.5 days

2022 — 2047

Extremely hot days are the leading cause of weather-related fatalities in the U.S. and contribute to economic stress as the need for (and cost of) air conditioning rises.

Average annual temperature

By 2047, Grays Harbor County is expected to have a **1.4°F increase** (from 49.7°F to 51.1°F) in average annual temperatures.

51.1°F +3%

49.7°F

2022 — 2047
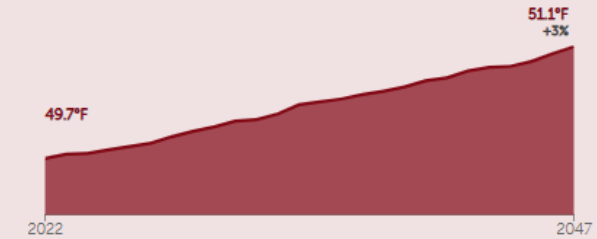
Increasing annual temperatures contribute to droughts, longer and more catastrophic wildfire seasons, and warmer oceans that fuel hurricanes and offshore storms.

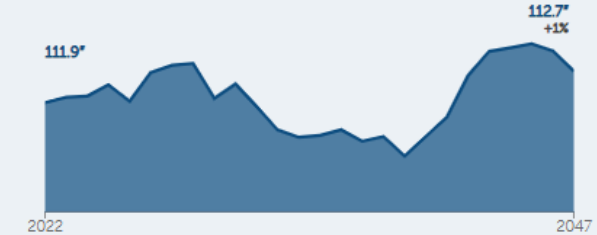## 💧 PRECIPITATION

Days per year with precip. above: 1" 2" 4"

By 2047, Grays Harbor County is expected to experience **0.6 more days** of heavy precipitation per year (from 32 days to 32.6 days per year).

32.6 days +2%

32 days

2022 — 2047

Heavy precipitation leads to both riverine flooding and flash floods as the ground fails to absorb the high volume of precipitation that falls in a short period.

Average annual precipitation

By 2047, Grays Harbor County is expected to have a **0.9" increase** (from 111.9" to 112.7") in average annual precipitation.

112.7" +1%

111.9"

2022 — 2047

Increasing annual precipitation contributes to sustained flooding. For example, in 2019 areas along the Mississippi remained above flood stage for at least three months.

Further research shows that the Project area is at a slight elevation compared to other areas in the Aberdeen/ Hoquiam area so sea level rise may have a lower impact on the Project than on other locations in these Cities.

Port of Grays Harbor
On Washington's Pacific Coast

Aberdeen, Washington

Increasing risk | 67% of properties are at risk ⓘ

Flood risk is increasing for Aberdeen.

As sea levels rise and and weather patterns change, flood risks will increase. Approximately 5,424 properties are already at risk in Aberdeen, and within 30 years, about 5,503 will be at risk.

Change in number of properties at risk ⓘ

Total annual flood damages in Aberdeen ⓘ

$6.7M　**$8.2M** +23%

This year　In 30 years

▽ Damage breakdown by Flood Factor

|	This year ($)	In 30y ($)	Change
● Minor (2)	<100	400	—
● Moderate (3-4)	2.1M	2.6M	+25%
● Major (5-6)	770.5K	996.5K	+29%
● Severe (7-9)	84K	137.3K	+63%
● Extreme (9-10)	3.9M	4.5M	+20%

SCORE MAP

Flood Factors across Aberdeen.

A property's Flood Factor is an indicator of its comprehensive flood risk, ranging from 1 (minimal) to 10 (extreme). Properties with higher Flood Factors are more likely to flood.

Learn more about the Flood Factor methodology.

Filter by Flood Factor:

☐ All
☐ Minimal (1)　　☑ Major (5-6)
☐ Minor (2)　　☑ Severe (7-8)
☑ Moderate (3-4)　☑ Extreme (9-10)

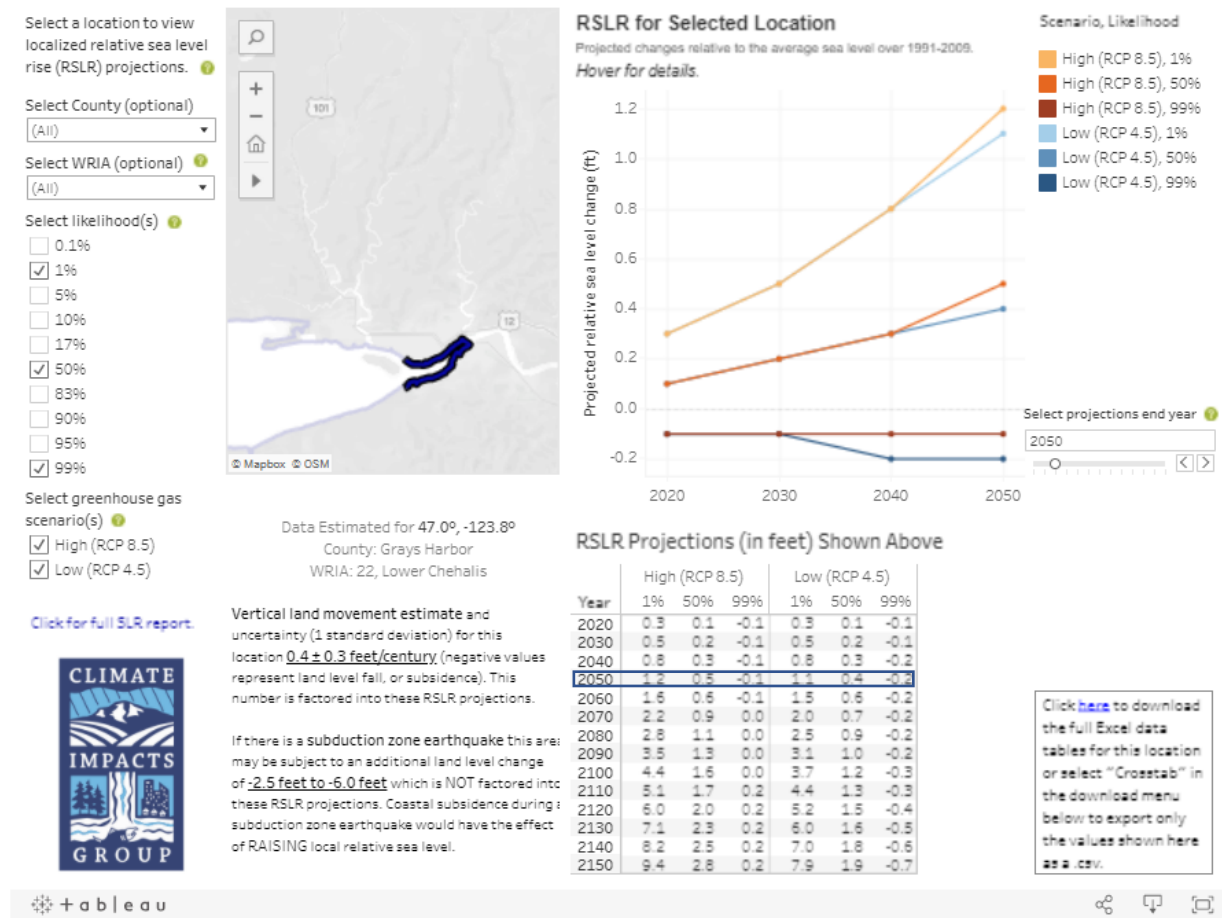**Number of properties at risk by Flood Factor**
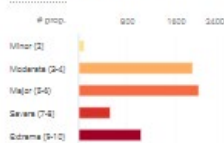
Source: https://floodfactor.com/city/aberdeen-washington/5300100_fsid

25

University of Washington Studies provide additional information on Sea Level Rise Projections.

Source: https://cig.uw.edu/our-work/applied-research/wcrp/sea-level-rise-data-visualization/

VISUALIZATION #1: Projected sea level change by year

Select a location to view localized relative sea level rise (RSLR) projections.

Select County (optional)
(All)

Select WRIA (optional)
(All)

Select likelihood(s)
☐ 0.1%
☑ 1%
☐ 5%
☐ 10%
☐ 17%
☑ 50%
☐ 83%
☐ 90%
☐ 95%
☑ 99%

Select greenhouse gas scenario(s)
☑ High (RCP 8.5)
☑ Low (RCP 4.5)

Click for full SLR report.

Data Estimated for 47.0º, -123.8º
County: Grays Harbor
WRIA: 22, Lower Chehalis

Vertical land movement estimate and uncertainty (1 standard deviation) for this location 0.4 ± 0.3 feet/century (negative values represent land level fall, or subsidence). This number is factored into these RSLR projections.

If there is a subduction zone earthquake this area may be subject to an additional land level change of -2.5 feet to -6.0 feet which is NOT factored into these RSLR projections. Coastal subsidence during a subduction zone earthquake would have the effect of RAISING local relative sea level.

RSLR for Selected Location
Projected changes relative to the average sea level over 1991-2009. *Hover for details.*

Scenario, Likelihood
High (RCP 8.5), 1%
High (RCP 8.5), 50%
High (RCP 8.5), 99%
Low (RCP 4.5), 1%
Low (RCP 4.5), 50%
Low (RCP 4.5), 99%

Select projections end year
2050

RSLR Projections (in feet) Shown Above

Year	High (RCP 8.5) 1%	50%	99%	Low (RCP 4.5) 1%	50%	99%
2020	0.3	0.1	-0.1	0.3	0.1	-0.1
2030	0.5	0.2	-0.1	0.5	0.2	-0.1
2040	0.8	0.3	-0.1	0.8	0.3	-0.2
2050	1.2	0.5	-0.1	1.1	0.4	-0.2
2060	1.6	0.6	-0.1	1.5	0.6	-0.2
2070	2.2	0.9	0.0	2.0	0.7	-0.2
2080	2.8	1.1	0.0	2.5	0.9	-0.2
2090	3.5	1.3	0.0	3.1	1.0	-0.2
2100	4.4	1.6	0.0	3.7	1.2	-0.3
2110	5.1	1.7	0.2	4.4	1.3	-0.3
2120	6.0	2.0	0.2	5.2	1.5	-0.4
2130	7.1	2.3	0.2	6.0	1.6	-0.5
2140	8.2	2.5	0.2	7.0	1.8	-0.6
2150	9.4	2.8	0.2	7.9	1.9	-0.7

Click here to download the full Excel data tables for this location or select "Crosstab" in the download menu below to export only the values shown here as a .csv.

The pre-design of the Project takes into consideration potential sea rise. Additional analysis of estimated Sea rise on the property will continue throughout the design process as the Port considering what the height of the terminal should be to provide additional protection against sea level rise.

The University of Washington Climate Impacts Group evaluated sea level rise using two greenhouse gas scenarios: 1) Low (RCP 4.5) and 2) High (RCP 8.5). This modeling shows that by 2050 there is a 50% chance that sea level rise will be between 0.4 and 0.5 feet, and a 99% chance it will be -0.1 and -0.2 feet due to an increase in land level. In addition, the report Extreme Coastal Water Level in Washington State, Guidelines to Support Sea Level Rise Planning, prepared as part of the Washington Coastal Resilience Project, will be used to determine the appropriate freeboard of the terminal to address future sea level rise.

Washington Environmental Health Disparities Map Tool

Washington Tracking Network (WTN) developed the social vulnerability to hazards topic for Washington State Emergency Management Groups and groups working with vulnerable populations to use during, and for response planning of, emergencies.

All data are presented by five-year estimates at the census tract geography. In order to have census tract data on all 39 counties in Washington, ACS uses the five-year grouping. All measures are from the Census-American Community Survey (ACS).

Vulnerability is based on a combination of 11 social and economic conditions such as limited English, crowded housing, or living in poverty.

Relative rankings of communities are a comparison between all communities in Washington State with 10 being the highest vulnerability and 1 being the lowest.

Demographic profile of sex, age, race, and population is shown once a user selects a community.

The following maps of the area are few of the vulnerability maps that can be created using the WA Environmental Health Disparity Tool

Social Vulnerability

Tract 13 is rated at 9 out of 10 is one of the highest tracts in the Aberdeen/ Hoquiam area for Social Vulnerability by the Washington Tracking Network. Tract 12 is ranked at 10 out of 10 in Social Vulnerability.

Washington State Department of Health
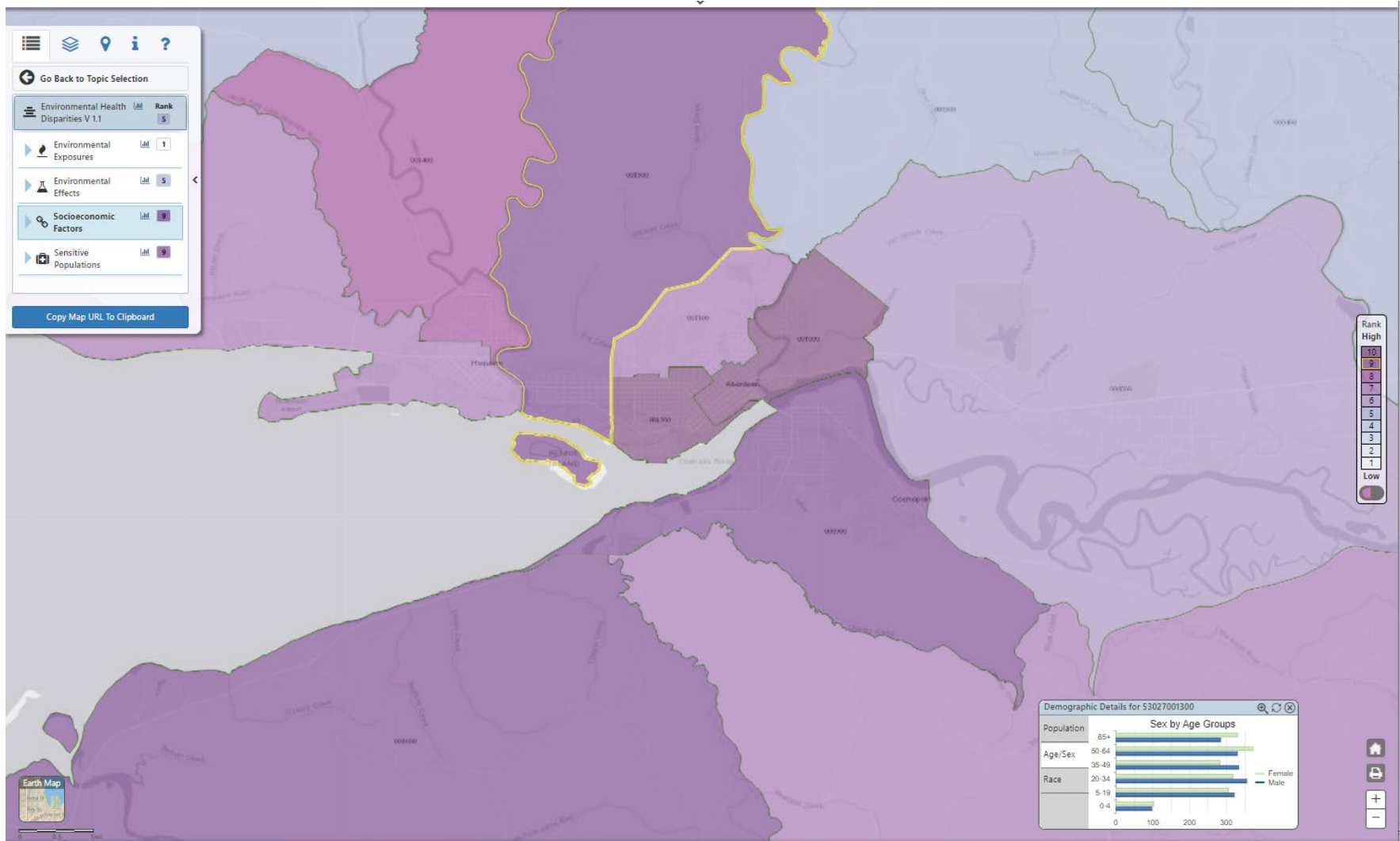
Selection: Environmental Health Disparities V1.1

Date: 05/08/2022 at 10:56 AM

Legend: (High) | 10 | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | (Low)

29
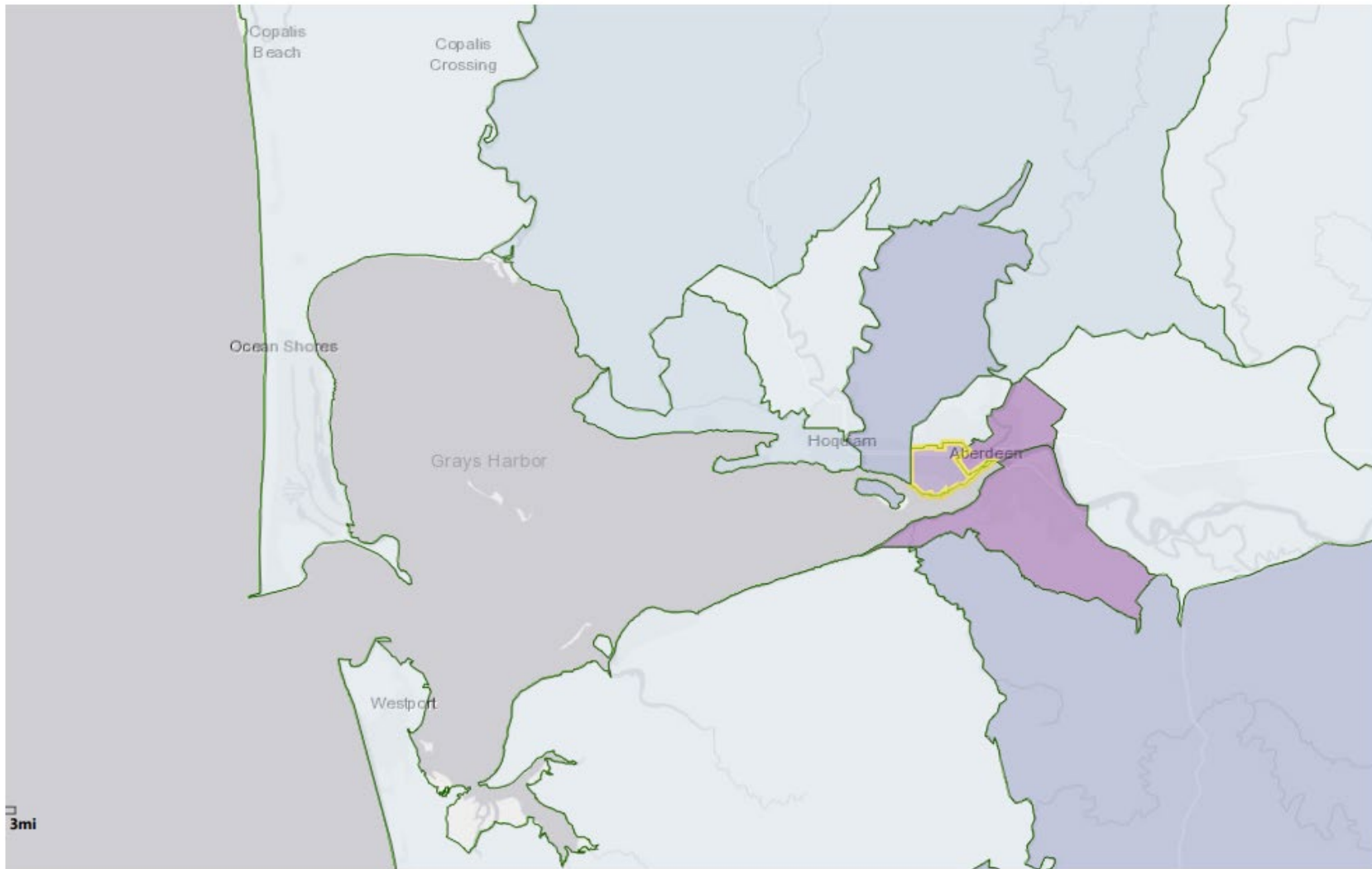
3.   Specific Project Elements that support our Environmental Justice (EJ) populations

The Project does not harm nor disapprovingly our Environmental Justice members of our community in a negative way. The Project at full built out will expand the backup lands for Cargo to be moved through the Port of Grays Harbor, which in turn will add jobs to the area. These jobs will be direct port jobs, indirect and induced jobs. Although, union jobs at the Port are primarily under ILWU jurisdiction, these job are good family wage jobs which provides family stability which in turn generation free cash flow within the family budget to purchase goods and services within the local community. Each new Port job is estimated on average to generate 0.48 indirect and 0.71 induced jobs.

Designing sea level change and other climate change related outcomes such as increased rain, GHG, etc. can be addressed by designing modern storm water systems to catch and process the increase rain, implementing Port policies that encourage the reduction of GHG through institutionalizing the use of low-energy / low emissions equipment such as electrified yard equipment, and the use of rail transportation versus trucks to move the cargo to and from the port area.

The Port will ensure that the Project meet the Cities of Aberdeen and Hoquiam, state and national Climate Change Initiatives to reduce GHG.

Since this Project is in the industrial area, pedestrian / bicycles are not the safest mode of transportation around large industrial equipment. Thus, although considered, due to potential safety issues for non-motorized transportation, non-motorized multi-modal transportation methods have not been designed into the terminal redevelopment at this time.

4.   Community Outreach and Public Engagement

Community Outreach

The Port and their partners began working with and providing ongoing outreach to agencies, tribes, businesses, and other community members in the early planning phases of the Project.

There are 7,508 residents within the two Census Tracts surrounding the Project, with 5.9% of these residents without access to a car which is 2.7 percentage points below the national average and 10% with disabilities, 2.2 percentage points above the national average, transportation options and mobility choices are a must for Quality of Life of these residents.

Although, the Project in within a Marine Terminal, the Port will work with their community partners to safeguard that outside the Terminal area there are safe active transportation options available to the surrounding neighborhoods and commercial areas so that the quality of life for residents that do not have access to an automobile is not disproportional negatively effected by any increase Port traffic generated by the Project. The availability of improved transit and non-motorized access in turn expands safe access to essential services for the residents and workers in the area. Working with the City and Transit agency to ensure mobility on the public streets near the Project area for both motorized and

non-motorized transportation methods, will ensure connectivity for the local population to critical destinations such as essential services, and their jobs. With this in mind, the Project sponsor will continue to engage the City and the community in the design activities to ensure that the Project meets the Community's needs and expectations.

Public Outreach is an on-going process which will continue through the design and implementation process of the Project. Portions of this Project has been discussed at public meetings within the Community starting before the selection of the Weyerhaeuser site in 2010. Current discussions on re-purposing the site post-SR 520 construction, started soon after the construction of the pontoons were completed in 2015. Most recently, the Project was discussed in early 2021 during the Port's Strategic Planning Discussions. With the announcement earlier this year, (2022), there have been many public conversation on the expansion of AGP. All Port meetings are publicly noticed per Washington State law including a public comment period at each meeting. Currently, there has not been any elements of the Project identified as causing any negative effects on the local Environmental Justice community. In fact, the Port hopes that this Project will bring jobs back to the local community as well seen with the SR 520 project that employed over 200 people on site, with approximately one third from the local community.

As the planning and design activities continue, the Port is committed to provide mitigation for any elements of the Project that is identified throughout the Project development that effect the Environmental Justice population within the Project area.

5.   Conclusions and Next Steps

The Project area is located in census Tracts 12 and 13 which is identified by the U.S. Department of Transportation as a Historically Disadvantaged Community. Throughout project development, the Port is-committed to ensure that the neighbors are treated fairly and are involved in a meaningful way during the development, implementation of the project and enforcement of environmental laws, regulations and policies.

As can be seem from the results of the various EJ mapping tools and data collected, it is important to understand the Project and the potential impacts it may have on specific sections of the population. Once those impacts are identified, then specific outreach can be designed to inform the affected populations and develop mitigation options as appropriate.

According to EJSCREEN, residential neighborhoods within a one-mile buffer of the project area include approximately 1,082 out of 4,027 residents (27%) are people of color, 2% of the residents speak English less than well. As noted above, the most recent public outreach efforts tried to address the potential language barrier of the Hispanic population by including a Spanish language option when requested.

The Port prepared this initial Environment Justice Analysis for the Project Area, additional analysis will be completed during the environmental review process. As noted above Public Engagement and Outreach is a continuous process that will continue throughout the planning, design and implementation of this project. The Public Engagement has informed the planning and design process and will enable the project to address past inequities relating to access and barriers to opportunity, as well as address any issue with the design as related to predicted effects of climate change.

Although, current analysis indicates that the proposed Project is contained within a Marine Terminal and will not directly improve multi-modal access within the surrounding areas or specifically to the EJ neighbor, the Port will ensure that the Project will not disproportionately impact the surrounding neighborhoods during construction. Continued analysis and monitoring will continue as the Port and its partners moves through project development. All mitigation measures identified in the design and environmental review process will be implemented and monitored post-construction for compliance and community enhancement.

The Project sponsor and partners will continue to support environmental justice populations and outreach through every stage of the design, construction and maintenance processes. The Port will continue to build on the input received to date from the community that will help shape the design and implementation of this Project. Efforts are being made to avoid, minimize and mitigate any elements that are identifies as possibly disproportionately high or adverse to human health and the environment, including social and economic effects, on minority populations and low-income populations. The Project stakeholders are committed to: 1) Ensure the full and fair participation by all potentially affected communities in the transportation decision-making process. 2) Prevent the denial of, reduction in, or significant delay in the receipt of benefits by minority and low-income populations by utilizing tools such as EJSCREEN to inform decisions that minimize the Project's impacts on EJ populations

Using the information gained through public outreach and the EJ Analysis, the Project sponsors will make every effort to design and implement the project so that it does not negatively impact the adjacent neighborhoods. This effort will ensure that the Project components addresses racial equity and reduces barriers to opportunity as they strive to bring high paying jobs to the area.

Attachments:

Neighborhoods at Risk Tool Summary Reports
- Washington and Census Tracts 12 and 13

EJSCREEN Reports
The following EJSCREEN reports were run for the Terminal 4 Expansion and Redevelopment Project with a 1 mile buffer and Tracts 12 and 13.
- Standard Reports
    – EJSCREEN Report
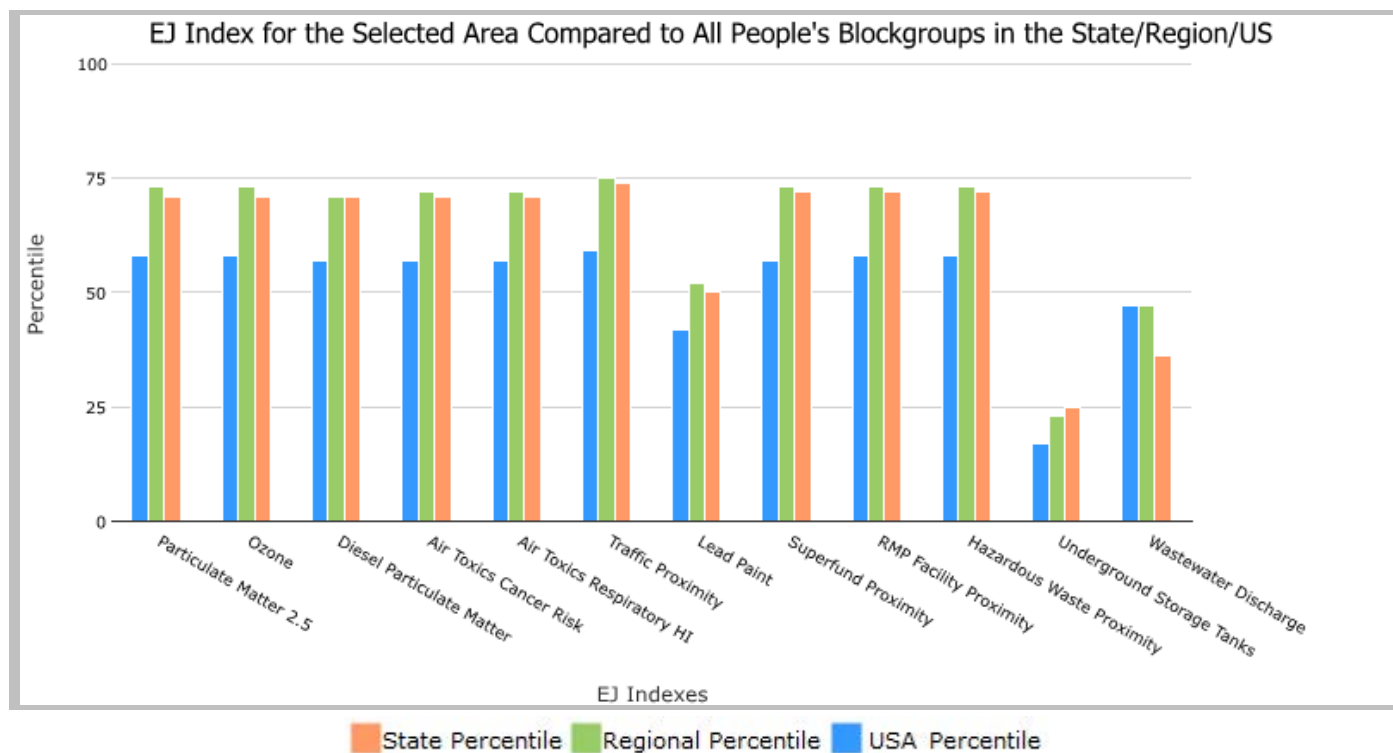   – ACS 2019 Report
    – Census 2010 sf Report

1 mile Ring Centered at 46.963971,-123.842869, WASHINGTON, EPA Region 10

Approximate Population: 4,027

Input Area (sq. miles): 3.14

T4 Expansion and Redevelopment

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	71	73	58
EJ Index for Ozone	71	73	58
EJ Index for 2017 Diesel Particulate Matter*	71	71	57
EJ Index for 2017 Air Toxics Cancer Risk*	71	72	57
EJ Index for 2017 Air Toxics Respiratory HI*	71	72	57
EJ Index for Traffic Proximity	74	75	59
EJ Index for Lead Paint	50	52	42
EJ Index for Superfund Proximity	72	73	57
EJ Index for RMP Facility Proximity	72	73	58
EJ Index for Hazardous Waste Proximity	72	73	58
EJ Index for Underground Storage Tanks	25	23	17
EJ Index for Wastewater Discharge	36	47	47

This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.
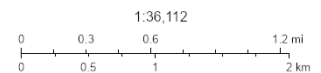
Approximate Population: 4,027
Input Area (sq. miles): 3.14
T4 Expansion and Redevelopment

May 8, 2022

✛ T4 Expansion and Redevelopment

✛ Search Result (point)

1:36,112

| 0 | | 0.3 | | 0.6 | | 1.2 mi |
| 0 | 0.5 | | 1 | | | 2 km |

Sources: Esri, HERE, Garmin, FAO, NOAA, USGS, ©
OpenStreetMap contributors, and the GIS User Community

Sites reporting to EPA	
Superfund NPL	0
Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)	1

EJScreen Report (Version 2.0)

1 mile Ring Centered at 46.963971,-123.842869, WASHINGTON, EPA Region 10

Approximate Population: 4,027
Input Area (sq. miles): 3.14
T4 Expansion and Redevelopment

Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 ($\mu g/m^3$)	5.77	7.86	2	8.17	2	8.74	2
Ozone (ppb)	27	35.3	0	37.2	0	42.6	0
2017 Diesel Particulate Matter* ($\mu g/m^3$)	0.145	0.336	20	0.312	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	20	35	9	33	<50th	29	<50th
2017 Air Toxics Respiratory HI*	0.3	0.52	9	0.47	<50th	0.36	<50th
Traffic Proximity (daily traffic count/distance to road)	700	710	74	600	78	710	76
Lead Paint (% Pre-1960 Housing)	0.73	0.22	94	0.22	95	0.28	89
Superfund Proximity (site count/km distance)	0.014	0.19	3	0.13	14	0.13	10
RMP Facility Proximity (facility count/km distance)	0.87	0.65	76	0.66	75	0.75	72
Hazardous Waste Proximity (facility count/km distance)	0.87	2.2	49	1.7	58	2.2	53
Underground Storage Tanks (count/km^2)	24	6.1	93	4.5	96	3.9	97
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.00018	0.021	70	0.53	56	12	35
Socioeconomic Indicators							
Demographic Index	36%	29%	74	28%	75	36%	59
People of Color	27%	31%	50	28%	57	40%	44
Low Income	46%	26%	85	28%	83	31%	76
Unemployment Rate	9%	5%	86	5%	85	5%	83
Linguistically Isolated	3%	4%	62	3%	68	5%	63
Less Than High School Education	16%	9%	85	9%	84	12%	72
Under Age 5	7%	6%	58	6%	59	6%	59
Over Age 64	15%	15%	56	16%	54	16%	53

*Diesel particular matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: https://www.epa.gov/haps/air-toxics-data-update.

For additional information, see: www.epa.gov/environmentaljustice

EJSCREEN ACS Summary Report

Location: User-specified point center at 46.963971, -123.842869

Ring (buffer): 1-miles radius

Description: T4 Expansion and Redevelopment

Summary of ACS Estimates	2015 - 2019
Population	4,027
Population Density (per sq. mile)	2,255
People of Color Population	1,082
% People of Color Population	27%
Households	1,415
Housing Units	1,694
Housing Units Built Before 1950	1,008
Per Capita Income	21,648
Land Area (sq. miles) (Source: SF1)	1.79
% Land Area	60%
Water Area (sq. miles) (Source: SF1)	1.19
% Water Area	40%

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Race			
Total	4,027	100%	408
Population Reporting One Race	3,893	97%	762
White	3,568	89%	394
Black	17	0%	31
American Indian	220	5%	175
Asian	30	1%	29
Pacific Islander	0	0%	20
Some Other Race	58	1%	113
Population Reporting Two or More Races	134	3%	152
Total Hispanic Population	731	18%	252
Total Non-Hispanic Population	3,295		
White Alone	2,944	73%	342
Black Alone	17	0%	31
American Indian Alone	218	5%	175
Non-Hispanic Asian Alone	30	1%	29
Pacific Islander Alone	0	0%	20
Other Race Alone	0	0%	12
Two or More Races Alone	86	2%	120
Population by Sex			
Male	2,064	51%	251
Female	1,963	49%	243
Population by Age			
Age 0-4	263	7%	161
Age 0-17	979	24%	186
Age 18+	3,048	76%	226
Age 65+	600	15%	87

May 08, 2022

EJSCREEN ACS Summary Report

Location:	User-specified point center at 46.963971, -123.842869	
Ring (buffer):	1-miles radius	
Description:	T4 Expansion and Redevelopment	

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population 25+ by Educational Attainment			
Total	2,743	100%	297
Less than 9th Grade	228	8%	78
9th - 12th Grade, No Diploma	213	8%	59
High School Graduate	900	33%	137
Some College, No Degree	810	30%	160
Associate Degree	290	11%	76
Bachelor's Degree or more	301	11%	118
Population Age 5+ Years by Ability to Speak English			
Total	3,764	100%	379
Speak only English	3,189	85%	278
Non-English at Home[1+2+3+4]	575	15%	176
[1]Speak English "very well"	185	5%	96
[2]Speak English "well"	305	8%	143
[3]Speak English "not well"	58	2%	68
[4]Speak English "not at all"	27	1%	50
[3+4]Speak English "less than well"	85	2%	68
[2+3+4]Speak English "less than very well"	390	10%	148
Linguistically Isolated Households*			
Total	42	100%	36
Speak Spanish	37	87%	34
Speak Other Indo-European Languages	0	0%	12
Speak Asian-Pacific Island Languages	5	13%	12
Speak Other Languages	0	0%	12
Households by Household Income			
Household Income Base	1,415	100%	115
< $15,000	197	14%	77
$15,000 - $25,000	255	18%	71
$25,000 - $50,000	252	18%	69
$50,000 - $75,000	390	28%	87
$75,000 +	321	23%	81
Occupied Housing Units by Tenure			
Total	1,415	100%	115
Owner Occupied	767	54%	85
Renter Occupied	648	46%	102
Employed Population Age 16+ Years			
Total	3,194	100%	326
In Labor Force	1,900	59%	253
Civilian Unemployed in Labor Force	177	6%	66
Not In Labor Force	1,293	41%	184

Data Note: Datail may not sum to totals due to rounding. Hispanic population can be of anyrace.

N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS)

*Households in which no one 14 and over speaks English "very well" or speaks English only.

Location: User-specified point center at 46.963971, -123.842869

Ring (buffer): 1-miles radius

Description: T4 Expansion and Redevelopment

	2015 - 2019 ACS Estimates	Percent	MOE (±)
Population by Language Spoken at Home*			
Total (persons age 5 and above)	4,070	100%	494
English	3,475	85%	532
Spanish	534	13%	229
French	11	0%	17
French Creole	N/A	N/A	N/A
Italian	N/A	N/A	N/A
Portuguese	N/A	N/A	N/A
German	5	0%	17
Yiddish	N/A	N/A	N/A
Other West Germanic	N/A	N/A	N/A
Scandinavian	N/A	N/A	N/A
Greek	N/A	N/A	N/A
Russian	N/A	N/A	N/A
Polish	N/A	N/A	N/A
Serbo-Croatian	N/A	N/A	N/A
Other Slavic	N/A	N/A	N/A
Armenian	N/A	N/A	N/A
Persian	N/A	N/A	N/A
Gujarathi	N/A	N/A	N/A
Hindi	N/A	N/A	N/A
Urdu	N/A	N/A	N/A
Other Indic	N/A	N/A	N/A
Other Indo-European	0	0%	17
Chinese	6	0%	18
Japanese	N/A	N/A	N/A
Korean	0	0%	17
Mon-Khmer, Cambodian	N/A	N/A	N/A
Hmong	N/A	N/A	N/A
Thai	N/A	N/A	N/A
Laotian	N/A	N/A	N/A
Vietnamese	0	0%	17
Other Asian	11	0%	32
Tagalog	11	0%	23
Other Pacific Island	N/A	N/A	N/A
Navajo	N/A	N/A	N/A
Other Native American	N/A	N/A	N/A
Hungarian	N/A	N/A	N/A
Arabic	4	0%	35
Hebrew	N/A	N/A	N/A
African	N/A	N/A	N/A
Other and non-specified	0	0%	17
Total Non-English	595	15%	726

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.

N/A means not available. **Source:** U.S. Census Bureau, American Community Survey (ACS) 2015 - 2019.

*Population by Language Spoken at Home is available at the census tract summary level and up.

EJSCREEN Census 2010 Summary Report

Location: User-specified point center at 46.963971, -123.842869
Ring (buffer): 1-miles radius
Description: T4 Expansion and Redevelopment

Summary	Census 2010
Population	4,296
Population Density (per sq. mile)	2,415
People of Color Population	1,268
% People of Color Population	30%
Households	1,549
Housing Units	1,781
Land Area (sq. miles)	1.78
% Land Area	60%
Water Area (sq. miles)	1.19
% Water Area	40%

Population by Race	Number	Percent
Total	4,296	-------
Population Reporting One Race	4,092	95%
White	3,302	77%
Black	43	1%
American Indian	225	5%
Asian	58	1%
Pacific Islander	10	0%
Some Other Race	454	11%
Population Reporting Two or More Races	204	5%
Total Hispanic Population	850	20%
Total Non-Hispanic Population	3,446	80%
White Alone	3,028	70%
Black Alone	33	1%
American Indian Alone	176	4%
Non-Hispanic Asian Alone	55	1%
Pacific Islander Alone	10	0%
Other Race Alone	3	0%
Two or More Races Alone	141	3%

Population by Sex	Number	Percent
Male	2,118	49%
Female	2,178	51%

Population by Age	Number	Percent
Age 0-4	382	9%
Age 0-17	1,200	28%
Age 18+	3,096	72%
Age 65+	475	11%

Households by Tenure	Number	Percent
Total	1,549	
Owner Occupied	812	52%
Renter Occupied	736	48%

Data Note: Detail may not sum to totals due to rounding. Hispanic population can be of any race.
Source: U.S. Census Bureau, Census 2010 Summary File 1.

Populations at Risk

Combined Neighborhoods (Census Tracts)

Selected Geographies:

Census Tract 12, Grays Harbor County; Washington; Census Tract 13, Grays Harbor County

Benchmark Geography:
U.S.

Report Date:
May 12, 2022

Headwaters Economics

Headwaters Economics is an independent, nonprofit research group that works to improve community development and land management decisions: **headwaterseconomics.org**.

Populations at Risk

Populations at risk are more likely to experience adverse social, health, and economic outcomes due to their race, age, gender, poverty status, and other socioeconomic measures.

Free and easy-to-use
Quickly create reports of current socioeconomic data in convenient formats, including Excel and PDF.

Available nation-wide
Build reports for geographies from states to census tracts. Aggregate multiple geographies into custom study areas.

Updated continuously
Make use of reliable, published government data. The Populations at Risk report always shows the latest available data and trends.

headwaterseconomics.org/par

Economic Profile System

The Economic Profile System (EPS) generates reports on a range of topics including local economics, demographics, and income sources while providing historic context and trends.

Free and easy-to-use
Like Populations at Risk, EPS is free, updated continuously, and easy-to-use.

Integrates federal data sources
Access data from many sources, including the Census, Bureaus of Economic Analysis, Labor Statistics, and others.

Widely used
For more than a decade, EPS has been used by researchers, economic developers, grant writers, elected officials, cities, planners, federal agencies, reporters, and others.

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Click the links above for quick access to report sections.

Young & Elderly Populations

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total Population, 2019*	4,190	7,404,107	3,318	7,508	324,697,795
Under 5 years old	228	454,364	137	365	19,767,670
65 years and older	597	1,117,673	649	1,246	50,783,796
80 years and older	53	128,733	89	142	6,269,017
Percent of Total, 2019*					
Under 5 years old	5.4%	6.1%	4.1%	4.9%	6.1%
65 years and older	14.2%	15.1%	19.6%	16.6%	15.6%
80 years and older	1.3%	1.7%	2.7%	1.9%	1.9%
Change in Percentage Points, 2010*-2019*					
For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.					
Under 5 years old	-2.2	-0.4	0.1	-1.6	-0.5
65 years and older	4.8	3.2	-0.5	4.7	2.9
80 years and older	-0.4	0.1	-1.9	0.2	0.2

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Population by Group, Percent of Total, 2019*

- Washington has the largest share of people under 5 years old (6.1%).

- Census Tract 13, Grays Harbor County has the largest share of people 80 years and older (2.7%).
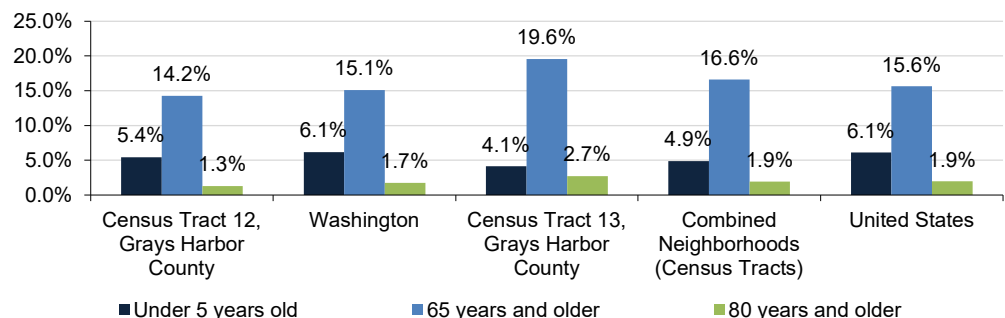
Population by Group, Change in Percentage Points, 2010*-2019*

- The largest change in the share of people under 5 years old occurred in Census Tract 12, Grays Harbor County, which went from 7.6% to 4.1%.

- The largest change in the share of people 80 years and older occurred in Census Tract 13, Grays Harbor County, which went from 4.6% to 2.7%.
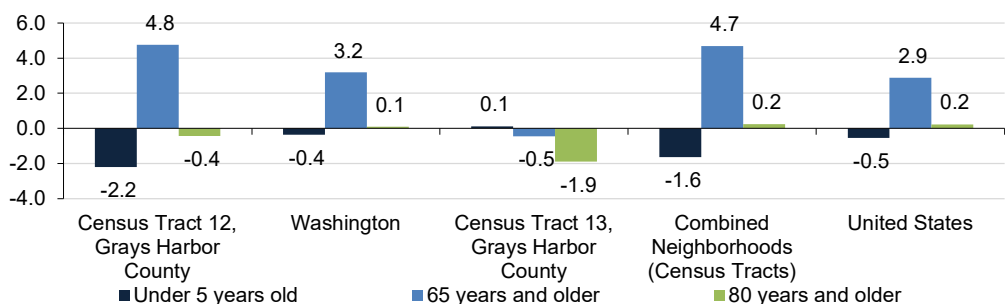
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Young & Elderly Populations

What do we measure on this page?

This page describes the number of people by specific age category.

The "Under 5 years old" category includes individuals younger than 5 years old. The "65 years and older" category includes individuals age 65 and older and the "80 years and older" category includes individuals age 80 and older. The "80 years and older" category is a subset of the "65 years and older" category.

Why is it important?

Young children and older adults both are vulnerable segments of the population. Understanding the age profile of a community can help users determine the types of services likely to be needed.[1]

Children's developing bodies makes them particularly sensitive to health problems and environmental stresses.[1]

Childhood lays the foundations for lifelong health. Poor health during childhood increases the likelihood of problems throughout adulthood.[2]

Because so many factors of a child's life are determined during pregnancy, infancy, and early childhood, children in poverty are an especially vulnerable population. Lack of adequate care through the early phases of life is more prevalent in poor populations.[2]

Children spend more time outside and have a faster breathing rate than adults, so they are more at risk for respiratory problems related to ground level ozone, airborne particulates, wildfire smoke, and allergens. Allergens are associated with climate change due to changing plant communities and longer pollen seasons.[3,4]

Because their immune systems are not fully developed, children are more sensitive to infectious diseases. Natural disasters can breach public water supplies, compromise sanitation, and spread illness. Children are more vulnerable to these hazards compared to adults.[3]

Older adults also are at increased risk of compromised health related to environmental hazards and climate change.

Age is the single greatest risk factor related to illness or death from extreme heat.[4]

The elderly are more likely to have pre-existing medical conditions or compromised mobility, which reduces their ability to respond to natural disasters.[3]

The likelihood of chronic disease increases with age.[1,5]

Older adults are more susceptible to air pollution such as ground level ozone, particulate matter, or dust. Increased dust is associated with drought, wildfires, and high wind events.[3,6]

Superscript numbers refer to references provided at the end of the report.

CHANGES IN BOUNDARIES: Data describing change over time can be misleading when geographic boundaries have changed.
The Census provides documentation about changes in boundaries at this site: www.census.gov/geo/reference/boundary-changes.html

Race & Ethnicity

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total Population, 2019*	4,190	7,404,107	3,318	7,210	324,697,795
White alone	3,641	5,581,128	3,020	**6,661**	235,377,662
All other races	549	1,822,979	**298**	**847**	89,320,133
Black or African American	**17**	281,683	**13**	**30**	41,234,642
American Indian	**279**	94,449	**97**	**376**	2,750,143
Other races	253	1,446,847	**188**	**441**	45,335,348
Hispanic ethnicity	650	937,579	228	878	58,479,370
Non-Hispanic ethnicity	3,540	6,466,528	3,090	6,630	266,218,425

Percent of Total, 2019*

White alone	86.9%	75.4%	91.0%	**92.4%**	72.5%
All other races	13.1%	24.6%	9.0%	**11.7%**	27.5%
Black or African American	**0.4%**	3.8%	**0.4%**	**0.4%**	12.7%
American Indian	**6.7%**	1.3%	**2.9%**	**5.2%**	0.8%
Other races	6.0%	19.5%	**5.7%**	**6.1%**	14.0%
Hispanic ethnicity	15.5%	12.7%	6.9%	12.2%	18.0%
Non-Hispanic ethnicity	84.5%	87.3%	93.1%	92.0%	82.0%

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Non-White Population by Race, Percent of Total, 2019*

- United States has the largest share of non-whites (27.5%).
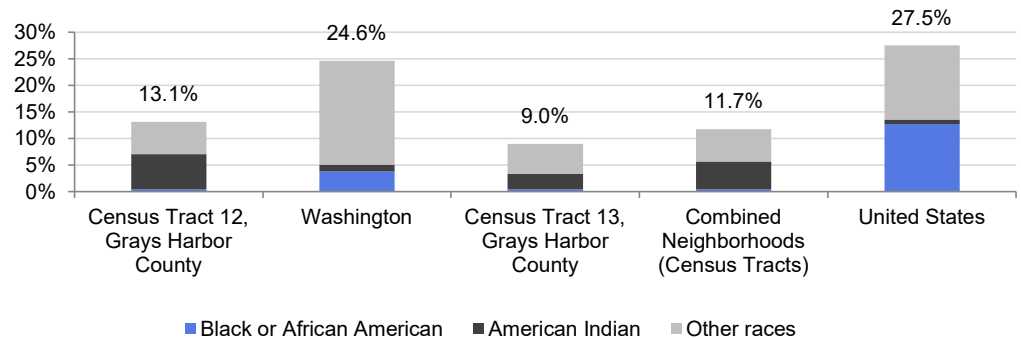
Hispanic Population, Percent of Total, 2019*

- United States has the largest share of hispanics (18.0%).
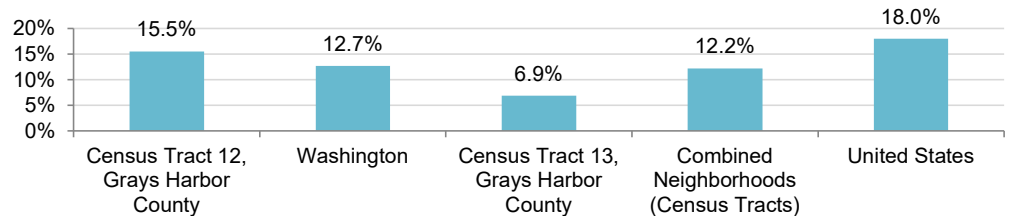
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Race & Ethnicity

What do we measure on this page?

Race is self-identified by Census respondents who choose the race or races with which they most closely identify. Included in "Other Races" are "Asian," "Native Hawaiian or Other Pacific Islander," and respondents providing write-in entries such as multiracial, mixed, or interracial.

Ethnicity has two categories: Hispanic or Latino, and Non-Hispanic or Latino. The federal government considers race and Hispanic origin to be two separate and distinct concepts. Hispanics and Latinos may be of any race.

Why is it important?

Race and ethnicity are strongly correlated with disparities in health, exposure to environmental pollution, and vulnerability to natural hazards.[1]

Research consistently has found race-based environmental inequities across many variables, including the tendency for minority populations to live closer to noxious facilities and Superfund sites, and to be exposed to pollution at greater rates than whites.[7, 1]

Many health outcomes are closely related to the local environment. Minority communities often have less access to parks and nutritious food, and are more likely to live in substandard housing.[1]

Minorities tend to be particularly vulnerable to disasters and extreme heat events. This is due to language skills, housing patterns, quality of housing, community isolation, and cultural barriers.[8, 4]

Blacks and Hispanics, two segments of the population that are currently experiencing poorer health outcomes, are an increasing percentage of the US population.[1,9]

Research has identified measurable disparities in health outcomes between various minority and ethnic communities.

Across races, the rates of preventable hospitalizations are highest among black and Hispanic populations. Preventable hospital visits often reflect inadequate access to primary care. These types of hospital visits are also costly and inefficient for the health care system.[5]

Relative to other ethnicities and races, Hispanics and blacks are less likely to have health insurance, but rates of uninsured are dropping for both groups.[10]

Compared to other races, blacks have higher rates of infant mortality, homicide, heart disease, stroke, and heat-related deaths.[5]

Hispanics have higher rates of diabetes and asthma.[5]

American Indians have a distinct pattern of health effects different from blacks and Hispanics. Native populations are less likely to have electricity than the general population.[2] They have high rates of infant mortality, suicide and homicide, and nearly twice the rate of motor vehicle deaths than the U.S. average.[5]

CHANGES IN BOUNDARIES: Data describing change over time can be misleading when geographic boundaries have changed. The Census provides documentation about changes in boundaries at this site: www.census.gov/geo/reference/boundary-changes.html

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Populations at Risk

Educational Attainment

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total Population 25 years or older, 2019*	2,830	5,101,624	2,371	5,201	220,622,076
No high school degree	435	442,449	229	**664**	26,472,261
No high school degree, percent	15.4%	8.7%	9.7%	**12.8%**	12.0%
No high school degree, change in percentage points**, 2010*-2019*	-9.4	-1.8	-7.7	2.3	-3.0

**For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Population with Less than High School Education, Percent of Total, 2019*

- Census Tract 12, Grays Harbor County has the largest share of people with less than a high school education (15.4%).
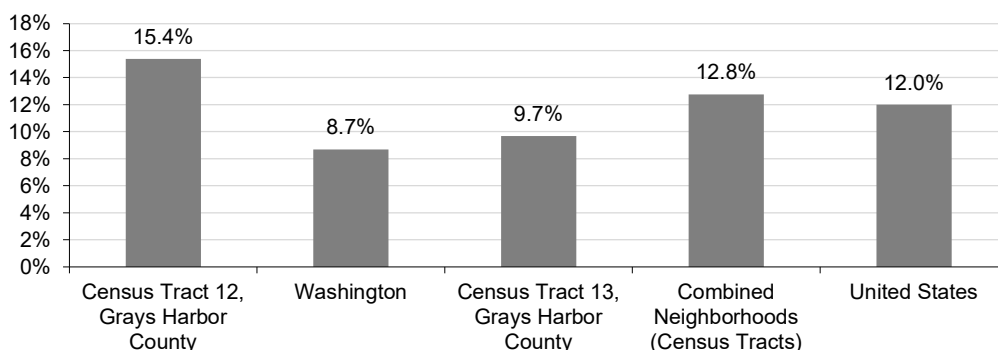
Population with Less than High School Education, Change in Percentage Points, 2010*-2019*

- The largest change in the share of people with less than a high school degree occurred in Census Tract 12, Grays Harbor County, which went from 24.7% to 15.4%.
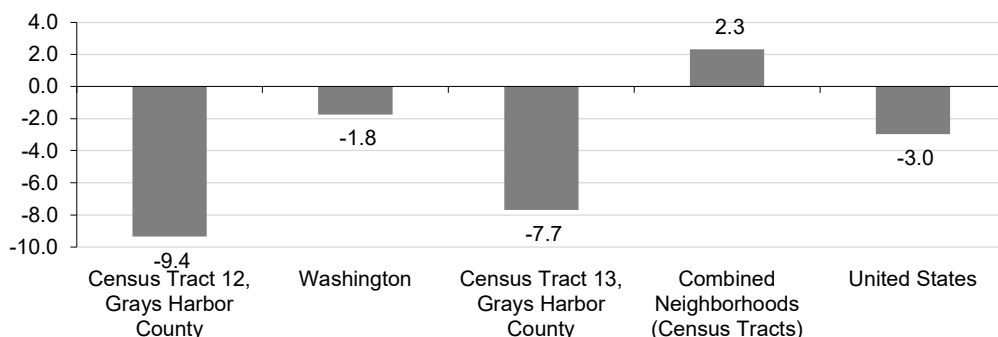
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Educational Attainment

What do we measure on this page?

This page describes levels of educational attainment, which refers to the highest degree or level of schooling completed by people 25 years and over.

Why is it important?

High school completion is used as a proxy for overall socioeconomic circumstances. Lack of education is strongly correlated with poverty and poor health.

People without a high school degree are more than twice as likely to live in inadequate housing compared to those with some college education.[5]

A study in California found the lack of a high school degree was the factor most closely related to social vulnerability to climate change.[4]

Thirty-eight percent of Americans without a high school degree do not have health insurance, compared to 10 percent with a college degree.[7]

The rate of diabetes is much greater for those without a high school degree. Incidence of this disease is more than double the rate of those who attended education beyond high school.[5]

Binge drinking is most severe among those without a high school degree. This demographic group had the highest risk of binge drinking across all measured categories (such as income, race, ethnicity, or disability status).[5]

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Language Proficiency

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Population 5 years or older, 2019*	3,962	6,949,743	3,181	7,143	304,930,125
Speak English "not well"***	**78**	251,866	**9**	**87**	13,193,113
Speak English "not well"***, percent	**2.0%**	3.6%	**0.3%**	**1.2%**	4.3%
Speak English "not well"***, change in percentage points**, 2010*-2019*	-5.5	-0.4	-1.1	-2.8	-0.4

**For example, if the value is 3% in 2010* and 4.5% in 2015*, the reported change in percentage points is 1.5.

*** Includes "not well" and "not well at all".

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

People Who Speak English "Not Well", Percent of Total, 2019*

- United States has the largest share of people who speak English "not well" (4.3%).
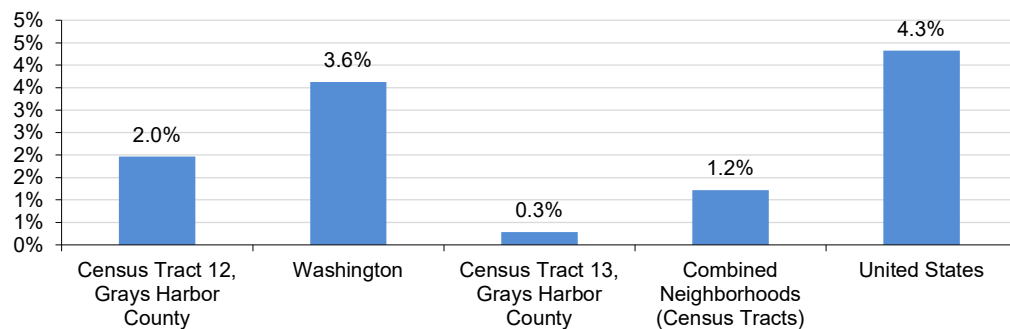
People Who Speak English "Not Well", Change in Percentage Points, 2010*-2019*

- The largest change in the share of people who speak English "not well" occurred in Census Tract 12, Grays Harbor County, which went from 7.4% to 2.0%.
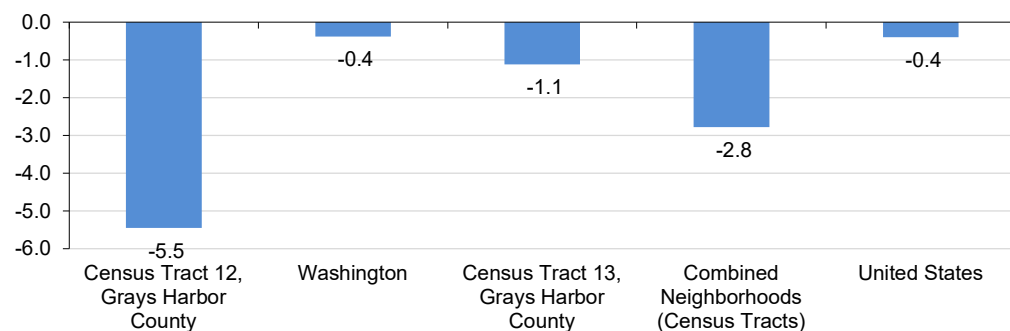
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Language Proficiency

What do we measure on this page?

This page reports the results of self-rated English-speaking ability questions in the American Community Survey.

Why is it important?

Many aspects of life in the US assume basic fluency in English. Thus, people with limited language skills are at risk for inadequate access to health care, social services, or emergency services.

A person's ability to take action during an emergency is compromised by language and cultural barriers.[4]

Poor English skills can make it harder to follow directions or interact with agencies.[4]

Lack of language skills can also instill lack of trust for government agencies.

In many industries, poor English skills can make it harder for people to get higher wage jobs.[1]

Language barriers make it harder to obtain medical or social services; and make it more difficult to interact with caregivers.[1]

Limited English skills may result in isolation from other segments of the US population, and social isolation is a health risk.[1] However some minority communities can be very tightly-knit and not isolated, so this risk factor cannot be generalized across all populations.

CHANGES IN BOUNDARIES: Data describing change over time can be misleading when geographic boundaries have changed.
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Individuals in Poverty

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total population for whom poverty status is determined, 2019*	4,152	7,266,810	3,231	7,383	316,715,051
People in poverty	780	785,244	320	**1,100**	42,510,843
People in "deep-poverty"**	401	363,835	240	**641**	18,957,462
Both in poverty and over 65	**50**	82,719	**53**	**103**	4,587,432
Percent of Total, 2019*					
People in poverty	18.8%	10.8%	9.9%	**14.9%**	13.4%
People in "deep-poverty"**	9.7%	5.0%	7.4%	**8.7%**	6.0%
Both in poverty and over 65	**1.2%**	1.1%	**1.6%**	**1.4%**	1.4%
Change in Percentage Points, 2010*-2019*					
For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.					
People in poverty	0.8	-1.3	-13.2	2.8	-0.4
People in "deep-poverty"**	3.3	-0.3	**0.0**	3.3	0.0
Both in poverty and over 65	0.5	0.2	1.2	0.5	0.2

** Deep poverty is defined by the Census as earning less than half of the federal poverty level.

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.
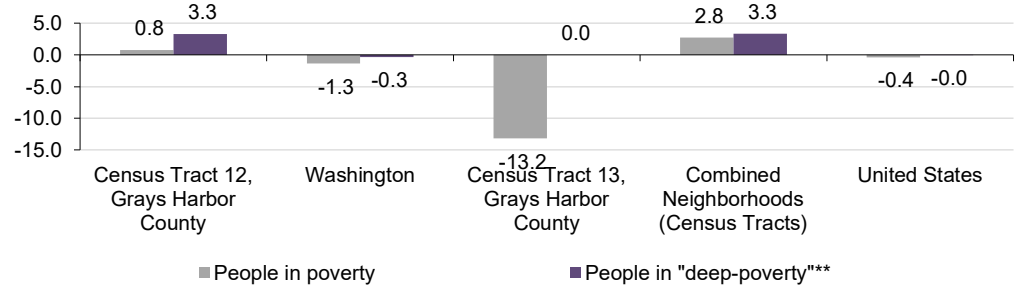
People in Poverty, Percent of Total, 2019*

- Census Tract 12, Grays Harbor County has the largest share of people in "deep poverty" (9.7%).
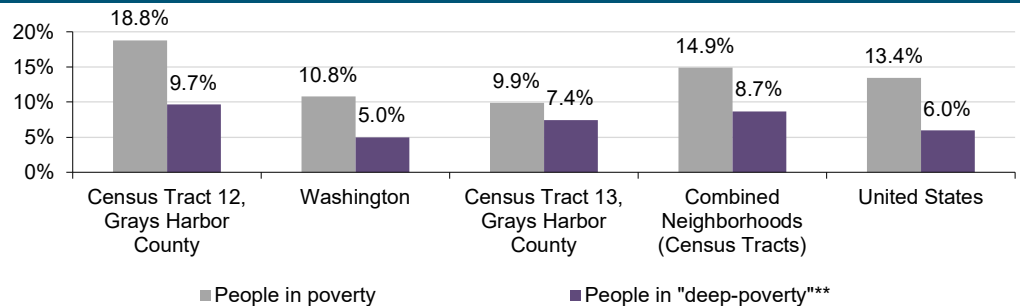
People in Poverty, Change in Percentage Points, 2010*-2019*

- The largest change in the share of people in "deep poverty" occurred in Combined Neighborhoods (Census Tracts), which went from 5.4% to 8.7%.

* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Individuals in Poverty

What do we measure on this page?

This page describes the number of people living below the poverty line, those in deep poverty, and individuals 65 and older in poverty. Poverty status is determined for all people except those institutionalized, in military group quarters, in college dormitories, and unrelated individuals less than 15 years old. The total population in the poverty table is slightly smaller than the overall population.

Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of income thresholds that vary by family size and composition to define who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, the family or an unrelated individual is classified as being "below the poverty level."

Why is it important?

Low income is one of the strongest predictors for compromised health and ability to recover from disruptions.[1] This is true across many types of risk, including general health as well as risks from extreme weather, climate change, and environmental stresses.

Natural disasters disproportionally impact the poor because of factors such as inadequate housing, social exclusion, a diminished ability to evacuate, lack of property insurance, and more acute emotional stress.[2,11] Low-income people also are more likely to be overlooked during emergency response following disasters.[11]

Low-income people are more likely to live or work in areas with greater exposure to environmental hazards such as particulate matter or ozone. They also are more likely to work outdoors, with greater exposure to climate-related risks.[2]

The relationship between lower income and poor health outcomes is most pronounced for the poorest. Additional income for the poorest tends to improve health outcomes more than for those in other income groups.[12]

A lack of resources is only part of the reason for poor health outcomes. Income inequality within a community also is associated with poor health outcomes.[12]

Residents living in low-income neighborhoods tend to have worse physical and mental health -such as asthma, depression, diabetes, heart conditions, and emotional stress- compared to higher-income areas.[1,5]

People with lower income have higher rates of preventable hospitalizations, usually related to insufficient access to primary health care.[5]

The poor are least likely to have health insurance [5,10], and poor health outcomes related to environmental risks like air pollution are exacerbated for those who do not have health insurance.[2]

Those who are disabled and living in poverty have even greater risk from environmental hazards.

Lack of mobility makes evacuation difficult.[1,2]

In 2009, households with at least one person with a disability had a 20 percent higher chance of living in inadequate housing compared to households without a disabled person.[5]

CHANGES IN BOUNDARIES: Data describing change over time can be misleading when geographic boundaries have changed. The Census provides documentation about changes in boundaries at this site: www.census.gov/geo/reference/boundary-changes.html

Families in Poverty

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total families for whom poverty status is determined, 2019*	957	1,841,954	798	**1,755**	79,114,031
Families in poverty	161	127,119	**38**	**199**	7,541,196
Families with children in poverty	144	94,642	**32**	**176**	5,581,063
Single mother families in poverty	**64**	55,074	**32**	**96**	3,385,236

Percent of Total, 2019*

Families in poverty	16.8%	6.9%	**4.8%**	**11.3%**	9.5%
Families with children in poverty	15.0%	5.1%	**4.0%**	**10.0%**	7.1%
Single mother families in poverty	**6.7%**	3.0%	**4.0%**	**5.5%**	4.3%

Change in Percentage Points, 2010*-2019*

For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.

|					
Families in poverty	5.5	-1.3	-13.5	3.1	-0.5
Families with children in poverty	5.2	-1.3	-11.2	3.5	-0.8
Single mother families in poverty	6.4	-0.8	-7.1	1.7	-0.5

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.
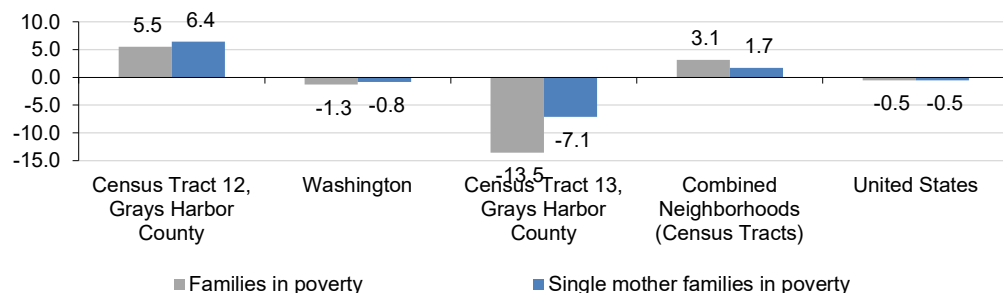
Families in Poverty, Percent of Total, 2019*

- Census Tract 12, Grays Harbor County has the largest share of single mother families in poverty (6.7%).
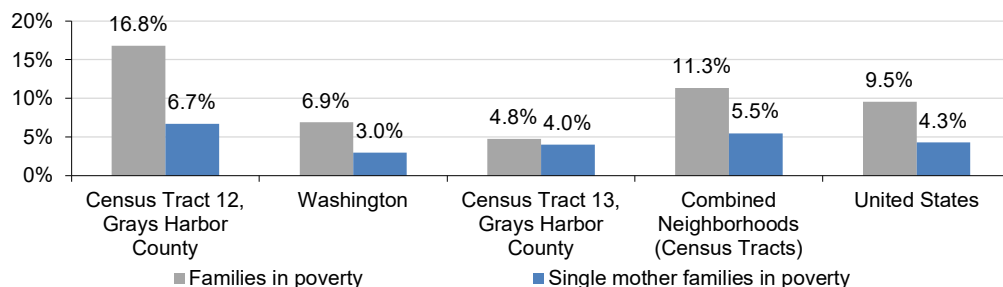
Families in Poverty, Change in Percentage Points, 2010*-2019*

- The largest change in the share of single mother familes in poverty occurred in Census Tract 13, Grays Harbor County, which went from 11.1% to 4.0%.

* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Families in Poverty

What do we measure on this page?

This page describes the number of families living below the poverty line, and separately reports families with children and single mother families with children.

The Census defines a family as a group of two or more people who reside together and who are related by birth, marriage, or adoption.

The Census Bureau uses a set of income thresholds that vary by family size and composition to define who is poor. If the total income for a family or an unrelated individual falls below the relevant poverty threshold, then the family or an unrelated individual is classified as being "below the poverty level."

Why is it important?

Families in poverty may lack the resources to meet their basic needs. Their challenges cross the spectrum of food, housing, health care, education, vulnerability to natural disasters, and emotional stress.

To save money, families with low incomes often have to make lifestyle compromises such as unhealthy foods, less food, substandard housing, or delayed medical care.[1]

Lack of financial resources makes families in poverty more vulnerable to natural disasters. This is due to inadequate housing, social exclusion, and an inability to re-locate or evacuate.[11, 2]

Inadequate shelter exposes occupants to increased risk from storms, floods, fire, and temperature extremes.[2] Households with low incomes are more likely to have unhealthy housing such as leaks, mold, or rodents.[5]

The expense of running fans, air conditioners, and heaters makes low-income people hesitant to mitigate the temperature of their living spaces.[1, 2] Furthermore, those in high-crime areas may not want to open their windows.[2]

Families in poverty are disproportionately affected by higher food prices, which are expected to rise in response to climate change.[1]

Children in poor families, on average, receive fewer years of education compared to children in wealthier families.[12]

Low-income residents are less likely to have adequate property insurance, so they may bear an even greater burden from property damage due to natural hazards.[2]

Living in poverty can lead to a lack of personal control over potentially hazardous situations such as increased air pollution or flooding. Impoverished families may be less likely to take proactive measures to prevent harm.[11]

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Households Receiving Public Assistance

|	Census Tract 12, Grays	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods	United States
Total Households, 2019*	1,480	2,848,396	1,353	**2,833**	120,756,048
Households receiving:					
Supplemental Security Income (SSI)	137	132,736	85	**222**	6,443,122
Cash public assistance income	70	85,956	85	**155**	2,853,791
Food Stamp/SNAP	384	338,160	393	**777**	14,171,567
Percent of Total, 2019*					
Supplemental Security Income (SSI)	9.3%	4.7%	6.3%	**7.8%**	5.3%
Cash public assistance income	4.7%	3.0%	6.3%	**5.5%**	2.4%
Food Stamp/SNAP	25.9%	11.9%	29.0%	**27.4%**	11.7%
Change in Percentage Points, 2010*-2019*					
For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.					
Supplemental Security Income (SSI)	1.8	0.9	-4.8	4.1	1.3
Cash public assistance income	-3.5	-0.6	1.9	1.8	-0.1
Food Stamp/SNAP	-0.2	2.1	12.1	17.6	2.5
Median Household Income (MHI), 2019* (2021 $s)	$54,968	$78,201	$54,828	na	$66,614
Change in MHI, 2010*-2019* (2021 $s)	**$6,573**	$7,047	**$8,017**	na	$2,085

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Percent of Households Receiving Earnings, by Source, 2019*

- Census Tract 12, Grays Harbor County has the largest share of households receiving Supplemental Security Income (9.3%).

- Census Tract 13, Grays Harbor County has the largest share of households receiving cash public assistance (6.3%).

- Census Tract 13, Grays Harbor County has the largest share of households receiving Food Stamps/SNAP (29.0%).
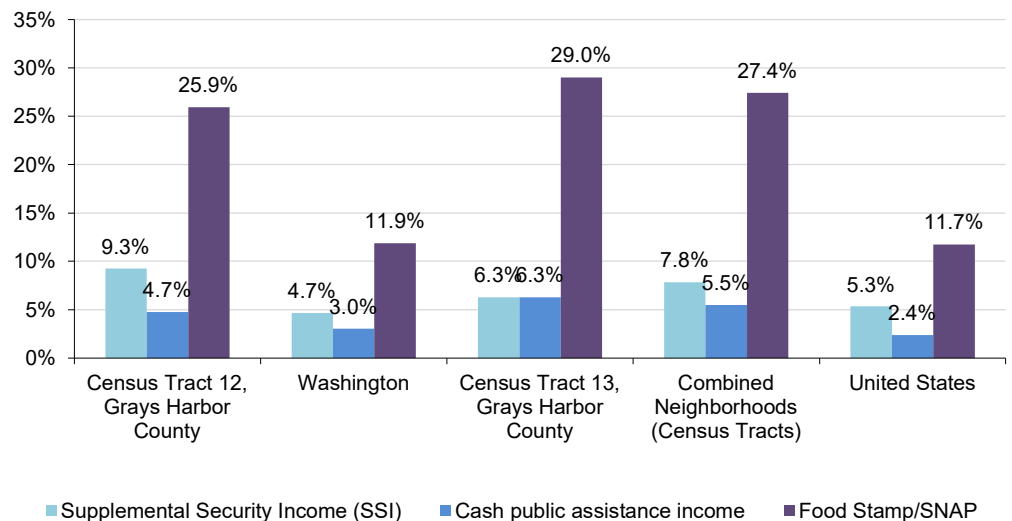
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Households Receiving Public Assistance

What do we measure on this page?

This page describes the number of households receiving public assistance.

Supplemental Security Income, or SSI, provides financial assistance to people with limited income who are aged, blind, or disabled. Unlike Social Security benefits, which are determined by the recipient's lifetime earnings, SSI benefits are not based on prior work.[13]

Cash public assistance can be from the Federal program, Temporary Assistance for Needy Families (TANF), or various state-level cash assistance programs. It does not include separate payments received for hospital or other medical care (vendor payments) or SSI or noncash benefits such as the Supplemental Nutrition Assistance Program.

The Supplemental Nutrition Assistance Program, or SNAP, (formerly known as food stamps), provides benefits to those who are unemployed, have no or low incomes, are elderly, are disabled with low incomes, or are homeless. The income threshold for SNAP varies with household size and other factors. SNAP benefits can be used to purchase grocery items such as breads, cereals, fruits, vegetables, meats, and dairy products.[14]

Median income can be used to identify areas of high or low income, but care should be taken to consider regional differences in cost of living.

Why is it important?

The number of households receiving public assistance are indicative of households living in poverty or with insufficient resources.

In 2011, families receiving public assistance spent 77 percent of their household budget to meet the basic necessities of housing, food, and transportation.[15]

Payments associated with economic hardship are associated with lower household income and educational attainment, higher poverty and unemployment. They are often high in communities that are losing population.[16]

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Labor Participation

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total Population 16 to 64 years, 2019*	2,773	4,823,608	2,079	4,852	208,879,084
People that did not work	790	1,022,446	656	**1,446**	48,480,278
People that did not work, percent	28.5%	21.2%	31.6%	**29.8%**	23.2%
People that did not work, change in percentage points**, 2010*-2019*	-5.0	0.6	2.0	9.2	0.8

**For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.

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Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

People that Did Not Work, Percent of Population (16-64 Years), 2019*

- Census Tract 13, Grays Harbor County has the largest share of the population that did not work (31.6%).
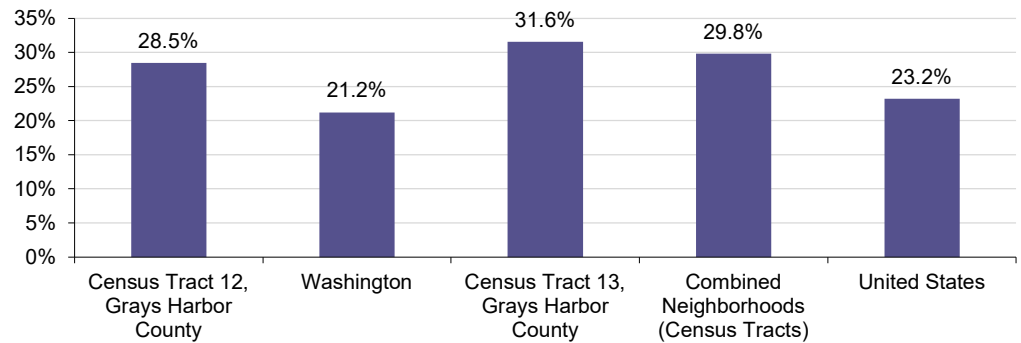
People that Did Not Work, Change in Percentage Points, 2010*-2019*

- The largest change in the share of the population that did not work occurred in Combined Neighborhoods (Census Tracts), which went from 20.6% to 29.8%.
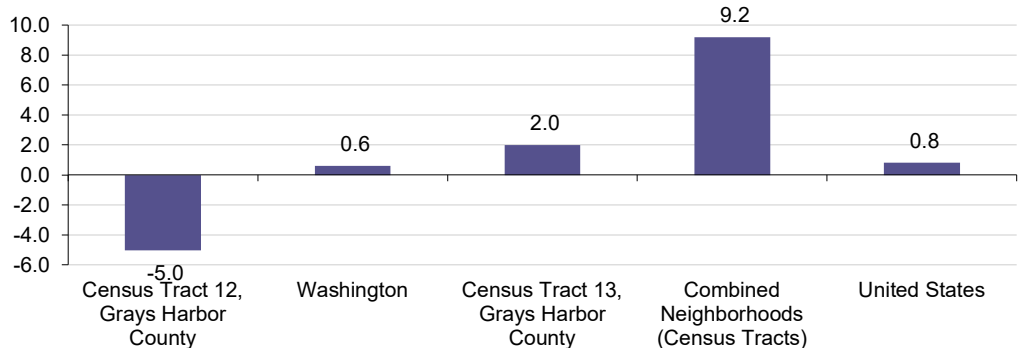
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Labor Participation

What do we measure on this page?

This page shows the share of the working age population that did not work. This value differs from the unemployment rate, which is more narrowly defined as the share of individuals who did not work and were actively seeking work.

Why is it important?

In general, robust participation in the labor force is indicative of vibrant local and regional economic development.[17] Not working can limit access to health insurance and health care, and has been linked with impaired health. Low labor force participation may indicate a high proportion of discouraged workers no longer seeking employment, but it can also indicate a high proportion of students or retirees.

Low labor force participation is closely associated with high unemployment, although labor force participation can be low in places like retirement destinations that are otherwise economically successful.[18]

Compared to labor force participation, unemployment figures may under-represent the magnitude of economic burden, because they do not include those who have stopped seeking work, those who are involuntarily employed part-time, or people with disabilities that prevent them from working.[17]

Unemployed people are a subset of those who are not in the labor force. Research relating work status to social outcomes focuses on the unemployed.

Unemployment is strongly linked with adverse health outcomes such as cardiovascular disease, suicide, compromised mental health, and alcohol use. Unemployed people have higher rates of hospitalizations, medication use, and health care visits.[19]

Being without a job limits lifestyle choices and is linked with behaviors that contribute to poor health, such as disrupted social relationships, unhealthy diet, increased alcohol use, and greater stress.[17,19]

High, persistent joblessness within a community, places an additional burden on social services, and resources may be more scarce because they are spread thinly.[17]

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Housing Affordability

|	Census Tract 12, Grays	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods	United States
Total owner-occupied, mortgaged homes, 2019*	421	1,227,595	424	845	48,416,627
Mortgage cost >30% of household income	120	354,597	140	260	13,400,012
Total renter-occupied units, 2019*	648	1,055,157	524	1,172	43,481,667
Rent >30% of household income	265	477,435	202	467	20,002,945
Percent of Total, 2019*					
Mortgage cost >30% of household income	28.5%	28.9%	33.0%	30.8%	27.7%
Rent >30% of household income	40.9%	45.2%	38.5%	39.8%	46.0%
Change in Percentage Points, 2010*-2019*					
For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.					
Mortgage cost >30% of household income	-6.7	-11.7	-15.0	-10.1	-9.7
Rent >30% of household income	-14.0	-1.1	-3.7	-10.1	-1.0
Median Monthly Housing Costs in 2021 $s					
Mortgage cost, 2019*	$1,208	$1,999	$1,330	na	$1,691
Change in mortgage cost, 2010*-2019*	-$40	-$179	$169	na	-$203
Gross rent, 2019*	$789	$1,333	$781	na	$1,126
Change in gross rent, 2010*-2019*	-$268	$237	-$44	na	$81

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Housing Costs as a Percent of Household Income, 2019*

- Census Tract 13, Grays Harbor County has the largest share of unaffordable housing for homeowners, with 33.0% spending over 30% of household income on mortgage costs.

- United States has the largest share of unaffordable housing for renters, with 46.0% spending over 30% of household income on rental costs.
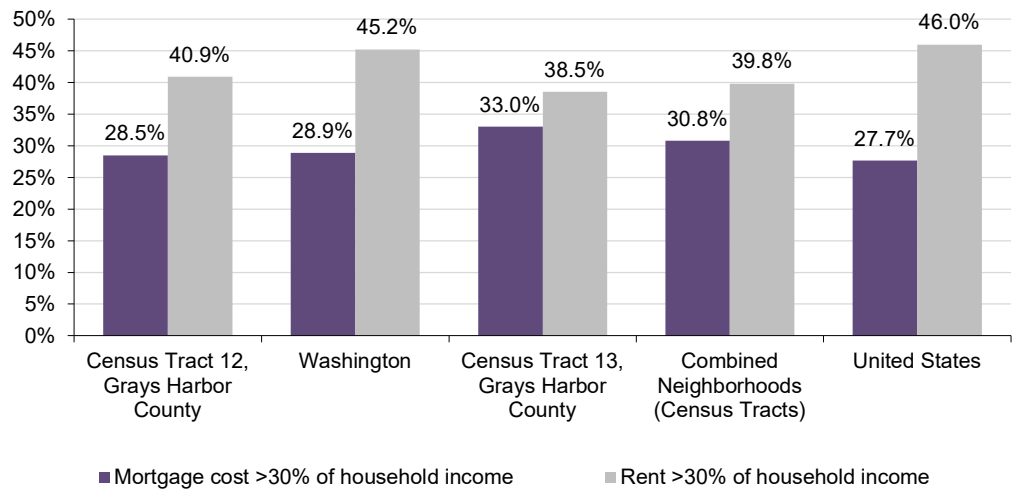
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CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Housing Affordability

What do we measure on this page?

This page describes whether housing is affordable for homeowners and renters.

The use of the ratio of income to housing costs was formalized in the US Housing and Development Act. The 30 percent threshold was established in 1981, is used currently to determine rent prices for most rent assistance programs.[20]

"Mortgage cost" is defined as the sum of payment for mortgages, real estate taxes, insurances, utilities, fuels, mobile home costs, and/or condominium fees.

"Gross rent" is defined as the amount of the contract rent plus the estimated average monthly cost of utilities and fuels if these are paid for by the renter.

Why is it important?

The government considers families with housing costs exceeding 30 percent of income to be "housing-cost burdened." [20,21] Families who are housing cost burdened may need to make financial sacrifices in other aspects of their life, which may lead to negative health and social outcomes.

The 30 percent ratio reflects both housing cost and income. In areas with high housing prices, even families with high incomes can approach or exceed the 30 percent threshold.

High housing costs may create financial difficulty in paying for other necessities such as food, health care, and transportation.[21] Thus families may have to sacrifice, compromise, or delay other essential needs.[1]

Families living in affordable housing are more stable and less likely to move frequently. This stability is linked to several positive health outcomes in children and young adults, such as improved emotional and behavioral problems, fewer pregnancies, reduced drug use, and a lower risk for depression.[1]

Housing costs do not affect all income groups equally. For low-income families, the money that remains after household expenses may not be sufficient to cover their needs. But for high wage-earners, paying a high proportion of their income for housing may not pose any financial burden.[20]

Housing cost burden is more common for renters. In 2006, 46 percent of U.S. renters had housing costs that exceeded 30 percent of their income.[20] Cost-burden renters are especially prevalent in large cities.[22] The high proportion of household costs for renters has further increased over the past 25 years.

To live in more affordable housing, some people may opt to live outside of metropolitan areas, which lowers housing cost but increases transportation cost.

In 2006, housing cost burden was more prevalent for racial and ethnic minorities and was lowest for whites.[20]

Financial insecurity for a home -such as foreclosure, eviction, or uncertainly about one's ability to afford housing- is a source of emotional stress.[23] This effect is heightened by people's emotional attachment to their home and their neighborhood.[24]

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Populations at Risk

Rental & Mobile Homes

|	Census Tract 12, Grays	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods	United States
Total Occupied Housing Units, 2019*	1,480	2,848,396	1,353	2,833	120,756,048
Rental Units	648	1,055,157	524	1,172	43,481,667
Mobile Homes	**15**	170,307	84	99	6,681,368
Percent of Total, 2019*					
Rental Units	43.8%	37.0%	38.7%	37.0%	36.0%
Mobile Homes	**1.0%**	6.0%	6.2%	6.0%	5.5%
Change in Percentage Points, 2010*-2019*					
For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.					
Rental Units	4.1	5.2	10.9	5.2	4.4
Mobile Homes	0.3	-0.4	-6.3	-0.4	-0.3
Median Home Value (MHV), 2019* (2021 $s)	$89,994	$359,340	$125,716	na	$230,550
Change in MHV, 2010*-2019* (2021 $s)	-$61,528	$4,588	**$3,405**	na	-$3,631

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**Low Reliability**: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

Rental Units and Mobile Homes as a Percent of Total Housing Units, 2019*

- Census Tract 12, Grays Harbor County has the largest share of rental units (43.8%).

- Census Tract 13, Grays Harbor County has the largest share of mobile homes (6.2%).
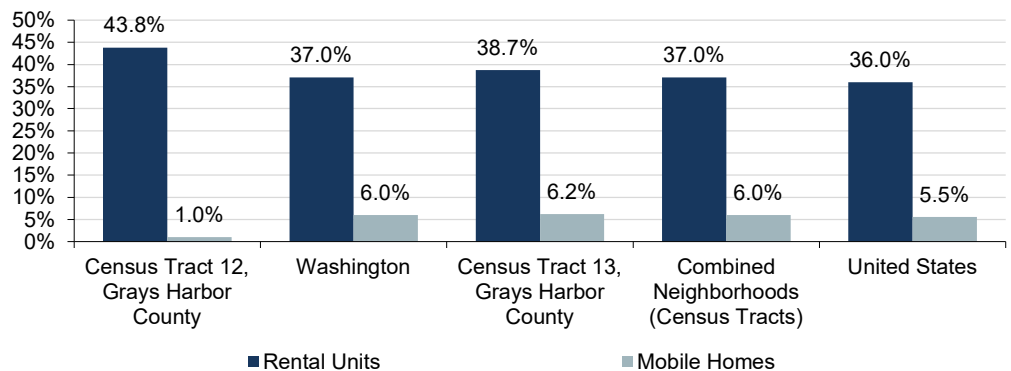
Change in Median Home Value, 2010*-2019* (2021 $s)
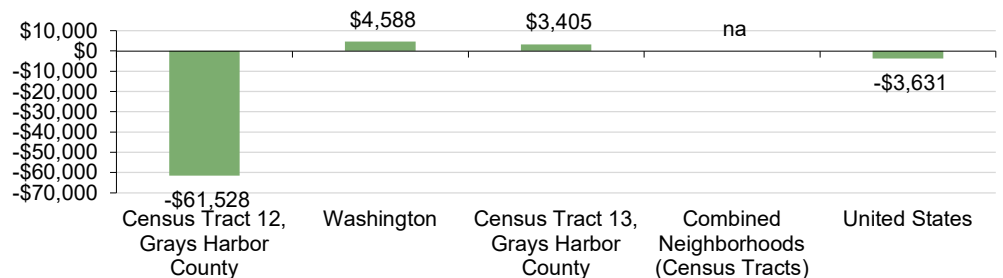
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Rental & Mobile Homes

What do we measure on this page?

This page reports the numbers of housing units that are either rental units or mobile homes, and provides median home value.

Why is it important?

In general, home ownership contributes to well-being and stability. However, each type of living situation has its own risks and health concerns.

Home ownership is often associated with mental health benefits such as high self-esteem, a sense of control over one's living situation, and financial stability.[23]

The financial stress associated with losing one's home is heightened by people's emotional attachment to their home and their neighborhood.[24]

Homeowners typically pay a greater overall housing cost, but renters pay a larger proportion of their income. The high proportion of household costs for renters has further increased over the past 25 years.[25]

Rental homes are generally not maintained as well as those that are owned. Substandard housing conditions like dampness, mold, and exposure to toxic substances or allergens are linked with compromised health outcomes.[23]

Areas with high-density residences, such as urban areas, tend to have a greater proportion of renters.[1] High density living conditions and large, multistory apartment buildings exacerbate heat-related health stresses.[4]

Mobile homes are more likely to be damaged in extreme weather, which poses a risk for both the structure and the occupants.[4,11]

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Potentially Vulnerable Households

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total Occupied Households, 2019*	1,480	2,848,396	1,353	**2,833**	120,756,048
People > 65 years & living alone	**45**	108,506	**19**	**64**	4,527,381
Single female households	181	279,091	132	313	15,016,964
with children < 18 years	96	177,520	**81**	**177**	9,427,068
Households with no car	127	194,383	**39**	**166**	10,395,713

Percent of Total, 2019*

People > 65 years & living alone	**3.0%**	3.8%	**1.4%**	**2.3%**	3.7%
Single female households	12.2%	9.8%	9.8%	**11.0%**	12.4%
with children < 18 years	6.5%	6.2%	**6.0%**	**6.2%**	7.8%
Households with no car	8.6%	6.8%	**2.9%**	**5.9%**	8.6%

Change in Percentage Points, 2010*-2019*

For example, if the value is 3% in 2010* and 4.5% in 2019*, the reported change in percentage points is 1.5.

|					
People > 65 years & living alone	2.4	0.6	-2.0	**-0.9**	-0.8
Single female households	1.9	-0.3	-0.2	**1.0**	-0.2
with children < 18 years	-0.9	-0.9	-1.7	**-0.9**	0.0
Households with no car	2.9	0.3	-9.7	**-0.7**	-77.3

High Reliability: Data with coefficients of variation (CVs) < 12% are in black to indicate that the sampling error is relatively small.
Medium Reliability: Data with CVs between 12 & 40% are in orange to indicate that the values should be interpreted with caution.
Low Reliability: Data with CVs > 40% are displayed in red to indicate that the estimate is considered very unreliable.

### People > 65 Yrs and Living Alone as a Percent of Total Households, 2019*

- Washington has the largest share of households with people over 65 living alone (3.8%).
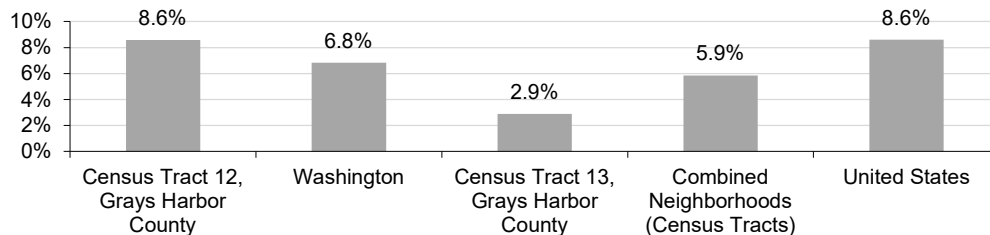
Single Female Households as a Percent of Total Households, 2019*

- United States has the largest share of single female households (12.4%).

- United States has the largest share of single female households with children (7.8%).
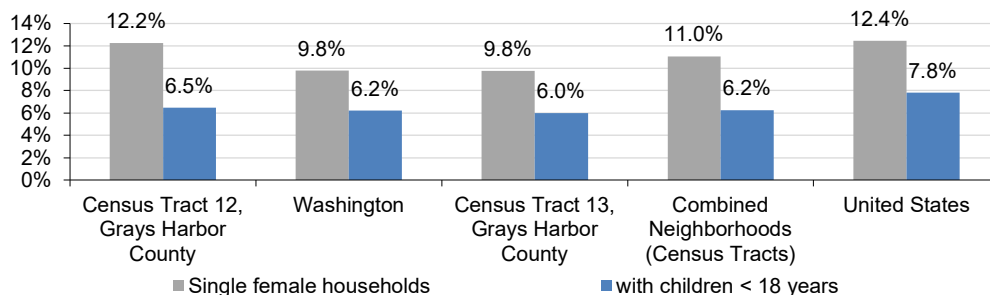
* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Potentially Vulnerable Households

What do we measure on this page?

This page describes household types that are associated with increased hardship, including the elderly living alone, single female households, single female households with children, and households without a car.

Why is it important?

Older adults are more likely to have compromised health and are less able to overcome disease. Living alone exacerbates health risks, and many health outcomes are worsened by social isolation.

> Social isolation is strongly linked to poor health such as premature death, smaller chances of survival after a heart attack, depression, and greater levels of disability from chronic diseases.[2]

> People 65 and older are particularly vulnerable to heat-related illness,[4] which is exacerbated by social isolation.

Households headed by women face challenges related to income, education, and food security. These factors make it more difficult to respond to health, environmental, or climate risks.

> Female-headed households are more likely to be living in poverty. This is most prevalent among black, Hispanic, and Native American households.[26]

> In 2014, 35 percent of female-headed households were food insecure, compared to 14 percent of all households.[27] Single mothers may be burdened by providing basic needs such as food and housing, which can make the urgency of other risks seem less important.[28]

> Single-mother families are disproportionally exposed to hazardous levels of air pollution.[4]

> Single mothers tend to be less educated and less affluent than the general population, which puts them at greater risk during natural disasters.[28]

Access to a car is linked with higher wages and more financial stability, and can help families relocate or evacuate in the event of emergencies.

> People who own cars are more likely to be employed, work longer hours, and earn more than those who do not.[29]

> Access to a car has measurable benefits for those receiving public assistance. Welfare recipients with access to a car were more likely to work more hours and get higher-paying jobs, and had a greater chance of leaving welfare.[30]

> During emergencies, natural disasters, and extreme weather events, people who do not have a car are less likely to evacuate or have access to emergency response centers.[4]

> During heat waves, people without a car are less able to go to community cooling centers or cooler areas.[4]

> Pedestrian fatalities are more than twice as likely in poor urban neighborhoods than in wealthier parts of cities.[31]

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Populations at Risk

Potentially Vulnerable People

	Census Tract 12, Grays Harbor County	Washington	Census Tract 13, Grays Harbor County	Combined Neighborhoods (Census Tracts)	United States
Total civilian noninstitutionalized population, 2019*	4,155	7,293,096	3,235	7,390	319,706,872
People w/ disabilities	894	924,708	736	**1,630**	40,335,099
People w/o health insurance	522	457,854	216	**738**	28,248,613

Percent of Total, 2019*

|					
Percent of people w/ disabilities	21.5%	12.7%	22.8%	**22.1%**	12.6%
Percent of people w/o health insurance	12.6%	6.3%	6.7%	**10.0%**	8.8%

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People with Disabilities, Percent of Total, 2019*

- Census Tract 13, Grays Harbor County has the largest share of the noninstitutionalized population that is disabled (22.8%).
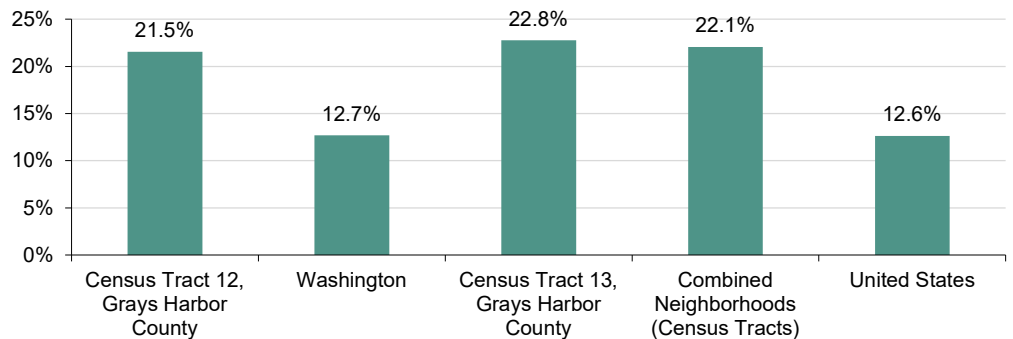
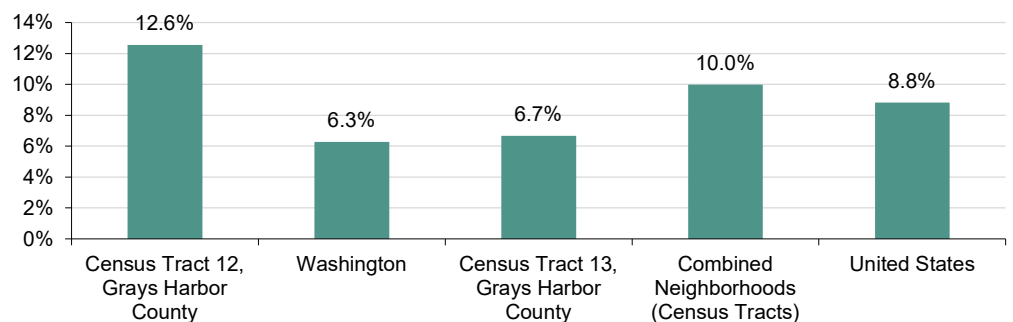### People without Health Insurance, Percent of Total, 2019*

- Census Tract 12, Grays Harbor County has the largest share of the noninstitutionalized population without health insurance (12.6%).

* ACS 5-year estimates used. 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

Potentially Vulnerable People

What do we measure on this page?

This page describes groups of people that are associated with increased hardship, including people with disabilities and people without health insurance.

Why is it important?

Disabled people are subject to health complications that make environmental risks more consequential.

Disabled people are less likely to have health insurance, compared to the non-disabled population.[5]

Being confined to a bed raises heat mortality.[2]

Extreme weather events or natural disasters may result in limited access to medical care. This is particularly consequential for those who already have compromised health.[3]

People who lack health insurance are disadvantaged by several different mechanisms. They may avoid or delay diagnoses, treatment, and/or medication and thus may increase their odds of poor health. They do not have a regular place of care, and they are not benefitting from the standard of care that is afforded many Americans.

Households living in poverty are more likely to be uninsured. More than one quarter of uninsured households live in poverty.[10]

People with lower educational attainment are more likely to be uninsured.[5]

People without health insurance are less likely to have a regular source of care, and less likely to receive preventive, primary, and specialty care services.[32,33] This risk is particularly evident among racial and ethnic minorities.[5]

People without health insurance are more likely to use the hospital emergency department for standard health care needs.[5]

About 25% of uninsured adults report having either delayed or gone without care in the past year because of costs.[33]

Uninsured people are more likely to skip medications due to the costs, and some providers are less likely to prescribe medications to uninsured patients.[34,34]

People who do not have health insurance suffer greater health consequences from air pollution compared to those with insurance.[4]

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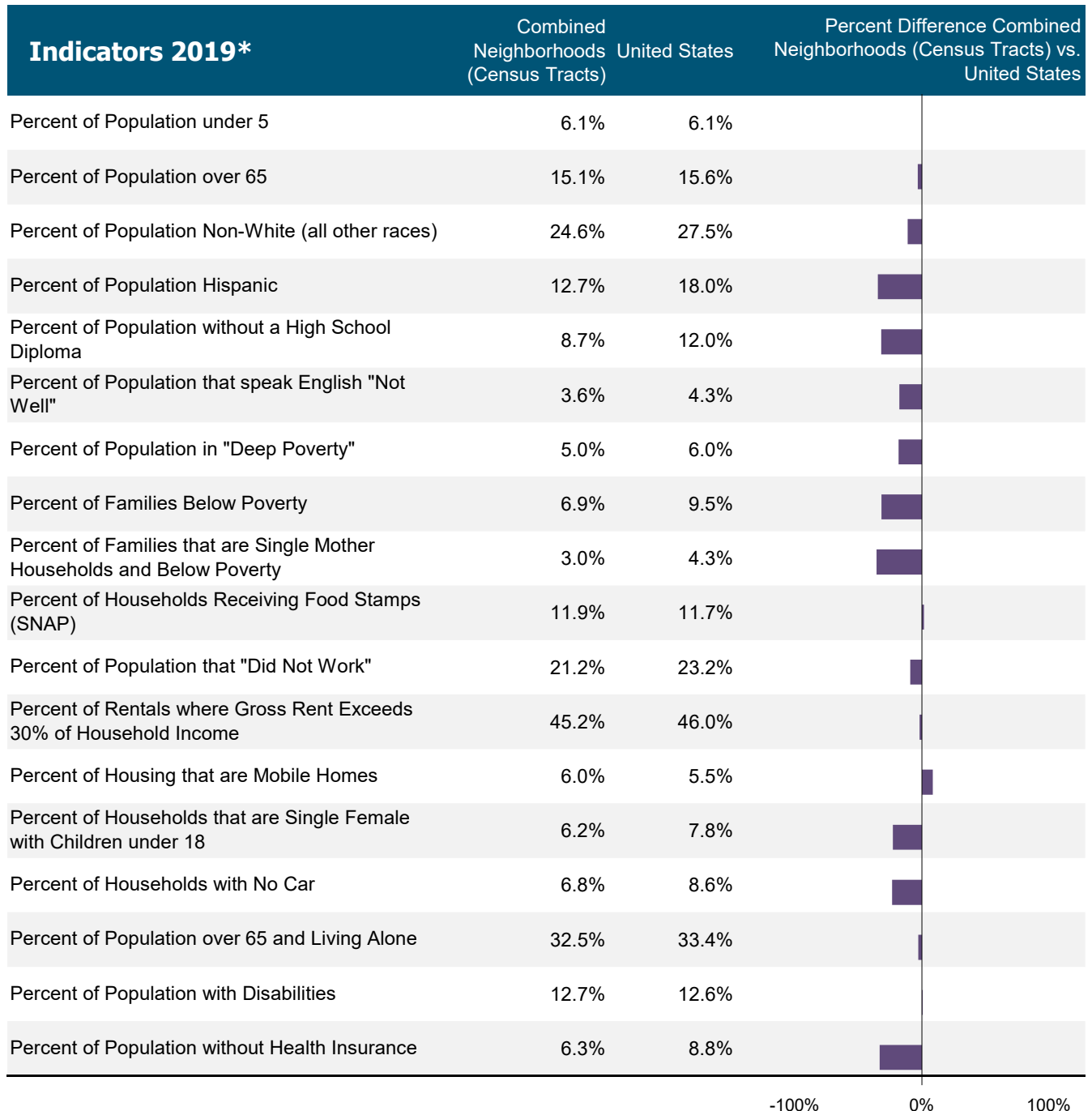
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Benchmarks

Indicators 2019*	Combined Neighborhoods (Census Tracts)	United States	Percent Difference Combined Neighborhoods (Census Tracts) vs. United States
Percent of Population under 5	6.1%	6.1%	
Percent of Population over 65	15.1%	15.6%	
Percent of Population Non-White (all other races)	24.6%	27.5%	
Percent of Population Hispanic	12.7%	18.0%	
Percent of Population without a High School Diploma	8.7%	12.0%	
Percent of Population that speak English "Not Well"	3.6%	4.3%	
Percent of Population in "Deep Poverty"	5.0%	6.0%	
Percent of Families Below Poverty	6.9%	9.5%	
Percent of Families that are Single Mother Households and Below Poverty	3.0%	4.3%	
Percent of Households Receiving Food Stamps (SNAP)	11.9%	11.7%	
Percent of Population that "Did Not Work"	21.2%	23.2%	
Percent of Rentals where Gross Rent Exceeds 30% of Household Income	45.2%	46.0%	
Percent of Housing that are Mobile Homes	6.0%	5.5%	
Percent of Households that are Single Female with Children under 18	6.2%	7.8%	
Percent of Households with No Car	6.8%	8.6%	
Percent of Population over 65 and Living Alone	32.5%	33.4%	
Percent of Population with Disabilities	12.7%	12.6%	
Percent of Population without Health Insurance	6.3%	8.8%	

-100%   0%   100%

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* ACS 5-year estimates: 2019 represents average characteristics from 2015-2019; 2010 represents 2006-2010.

CITATION: U.S. Department of Commerce. 2020. Census Bureau, American Community Survey Office, Washington, D.C., reported by Headwaters Economics' Populations at Risk, headwaterseconomics.org/par.

Benchmarks

What do we measure on this page?

This page shows a quick comparison for most of the indicators covered in this report to highlight how the region differs from the selected benchmark geography.

The percent, or relative, difference between the selected geography and the benchmark is calculated by dividing the difference between the values by the arithmetic mean of the values.

Why is it important?

These indicators are all measures of a population more likely to experience adverse outcomes from disruptions due to extreme weather events, climate change, pollution, or limited health care access.

Particularly high percentages for any of these indicators may highlight populations that are at higher risk and in need of outreach from disaster planning, public health, or social service organizations.

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Literature Cited

1 - County of Los Angeles Public Health, Health Atlas for the City of Los Angeles (Los Angeles, CA, June 2013). https://wattscommunitystudio.files.wordpress.com/2013/06/healthatlas.pdf

2 - Richard G. Wilkinson and Michael Gideon Marmot, Social determinants of health: The solid facts (World Health Organization, 2003). http://www.euro.who.int/__data/assets/pdf_file/0005/98438/e81384.pdf

3 - John M. Balbus and Catherine Malina, "Identifying vulnerable subpopulations for climate change health effects in the United States," Journal of Occupational and Environmental Medicine 51, no. 1 (2009): 33-37.

4 - Heather Cooley, Eli Moore, Matthew Heberger, and Lucy Allen, Social Vulnerability to Climate Change in California (California Energy Commission Pub. # CEC-500-2012-013, 2012).

5 - Centers for Disease Control and Prevention, "CDC Health Disparities and Inequalities Report — United States, 2011," Morbidity and Mortality Weekly Report 60 Suppl. (January 14, 2011). http://www.cdc.gov/mmwr/pdf/other/su6001.pdf

6 - Michelle L. Bell, Antonella Zanobetti, and Francesca Dominici, "Who is more affected by ozone pollution? A systematic review and meta-analysis," American Journal of Epidemiology (2014): kwu115.

7 - Evan J. Ringquist, "Assessing evidence of environmental inequities: A meta-analysis." Journal of Policy Analysis and Management 24, no. 2 (2005): 223-247.

8 - Alice Fothergill, Enrique G.M. Maestas, and JoAnne DeRouen Darlington, "Race, ethnicity and disasters in the United States: A review of the literature," Disasters 23, no. 2 (1999): 156-173.

9 - Sandra L. Colby and Jennifer M. Ortman. Projections of the Size and Composition of the US Population: 2014 to 2060 (U.S. Census Bureau, March 2015). https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf

10 - Jessica C. Smith and Carla Medalia, Health Insurance Coverage in the United States: 2013 (U.S. Census Bureau, September 2014). https://www.census.gov/library/publications/2014/demo/p60-250.html

11 - Alice Fothergill and Lori A. Peek, "Poverty and disasters in the United States: A review of recent sociological findings," Natural Hazards 32, no. 1 (2004): 89-110.

12 - North Carolina Institute of Medicine, Prevention for the Health of North Carolina: Prevention Action Plan (October 2009): Chapter 11 Socioeconomic Determinants of Health. http://www.nciom.org/publications/?prevention

13 - "Understanding Supplemental Security Income (SSI) Overview -- 2015 Edition," U.S. Social Security Administration. https://www.ssa.gov/ssi/text-over-ussi.htm

14 - "Facts about SNAP," USDA Food and Nutrition Service, last modified September 29, 2015, http://www.fns.usda.gov/snap/facts-about-snap

15 - Ann C. Foster and William R. Hawk, "Spending patterns of families receiving means-tested government assistance," U.S. Bureau of Labor Statistics, December 2013. http://www.bls.gov/opub/btn/volume-2/spending-patterns-of-families-receiving-means-tested-government-assistance.htm

16 - Lawson, M.M., R. Rasker, and P.H. Gude. 2014. The importance of non-labor income: an analysis of socioeconomic performance in western counties by type of non-labor income. Journal of Regional Analysis and Policy 44(2): 175-190.

17 - Joel A. Halverson and Greg Bischak, Underlying socioeconomic factors influencing health disparities in the Appalachian region (Washington, DC: Appalachian Regional Commission, 2008).

18 - Andreas Hornstein, "Why labor force participation (usually) increases when unemployment declines," Economic Quarterly 99, no. 1 (2013): 1-23.

Literature Cited (cont.)

19 - Robert L. Jin, Chandrakant P. Shah, and Tomislav J. Svoboda, "The impact of unemployment on health: a review of the evidence," Canadian Medical Association Journal 153, no. 5 (1995): 529.

20 - Mary Schwartz and Ellen Wilson, "Who can afford to live in a home? A look at data from the 2006 American Community Survey," U.S. Census Bureau. http://www.census.gov/housing/census/publications/who-can-afford.pdf

21 - "Rental Burdens: Rethinking Affordability measures." U.S. Department of Housing and Urban Development. https://www.huduser.gov/portal/pdredge/pdr_edge_featd_article_092214.html

22 - Mike Maciag, "Where do people spend the most of their paycheck on housing?" Governing Magazine (February 20, 2014). http://www.governing.com/topics/urban/gov-housing-affordability-burden-state-report.html

23 - William M. Rohe and Mark Lindblad, "Reexamining the Social Benefits of Homeownership after the Housing Crisis" (presentation, Homeownership Built to Last: Lessons from the Housing Crisis on Sustaining Homeownership for Low-Income and Minority Families–A National Symposium, Cambridge, MA, April 2013).

24 - Craig Evan Pollack, Beth Ann Griffin, and Julia Lynch, "Housing affordability and health among homeowners and renters," American Journal of Preventive Medicine 39, no. 6 (2010): 515-521.

25 - Adam Reichenberger, "A comparison of 25 years of consumer expenditures by homeowners and renters," U.S. Bureau of Labor Statistics: Beyond the Numbers: Prices and Spending 1, no. 15 (October 2012). http//www.bls.gov/opub/btn/volume-1/a-comparisonof-25-years-of-consumer-expenditures-by-homeowners-and-renters.htm

26 - Anastasia R. Snyder, Diane K. McLaughlin, and Jill Findeis, "Household composition and poverty among female-headed households with children: Differences by race and residence," Rural Sociology 71, no. 4 (2006): 597-624.

27 - Nicholas T. Vozoris and Valerie S. Tarasuk, "Household food insufficiency is associated with poorer health," Journal of Nutrition 133, no. 1 (2003): 120-126.

28 - William Donner and Havidán Rodríguez, "Population composition, migration and inequality: The influence of demographic changes on disaster risk and vulnerability," Social Forces 87, no. 2 (2008): 1089-1114.

29 - Steven Raphael and Lorien Rice, "Car ownership, employment, and earnings," Journal of Urban Economics 52, no. 1 (2002): 109-130.

30 - Tami Gurley and Donald Bruce, "The effects of car access on employment outcomes for welfare recipients," Journal of Urban Economics 58, no. 2 (2005): 250-272.

31 - Mike Maciag, "Pedestrians dying at disproportionate rates in America's poorer neighborhoods," Governing Magazine (August 2014). http://www.governing.com/topics/public-justice-safety/gov-pedestrian-deaths-analysis.html

32 - Marsha Lillie-Blanton and Catherine Hoffman, "The role of health insurance coverage in reducing racial/ethnic disparities in health care," Health Affairs 24, no. 2 (2005): 398-408.

33 - Karlen E. Luthy, N.E. Peterson, J. Wilkinson, "Cost-efficient treatment for uninsured or underinsured patients with hypertension, depression, diabetes mellitus, insomnia, and gastroesophageal reflux," Journal of the American Academy of Nurse Practitioners 20, no. 3 (2008): 136-143.

34 - Edward P. Havranek, "Unseen consequences: The uninsured, foctors, and cardiovascular Disease," Journal of the American College of Cardiology 61, no. 10 (2013): 1076-1077.