

# **Small Area Estimates Methodology**

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# INTRODUCTION

Thurston Regional Planning Council (TRPC) has developed small area population and dwelling unit estimates since the release of the 1998/1999 Population and Employment Forecast in 1999. These estimates are updated each year by June 30, when the state Office of Financial Management (OFM) releases its April 1 Official Population Estimates for cities, towns, and counties.

As their name implies, TRPC's small area population and dwelling unit estimates are available for geographies smaller than Thurston County, including urban growth areas, planning areas, watersheds and basins, fire districts, school districts and enrollment areas, and transportation analysis zones. Estimates are used by local governments and businesses for budgeting and planning purposes. TRPC uses the estimates as well, including for its land capacity and travel demand models. While tax parcels are the building blocks of the small area estimate model, the accuracy of the estimates increases as the size — or population — of the area of interest increases.

TRPC's produces "postcensal" estimates. They are based on population and dwelling unit counts and household size and occupancy rate assumptions from the previous U.S. decennial census. As such, the uncertainty around the estimates grows with time. Postcensal estimates should generally not be compared to estimates from before the most recent census.

This report documents the methodology used to produce TRPC's small area estimates for 2020 and later.

# 2020 CENSUS

The U.S. Census Bureau’s decennial census is the most authoritative count of population and dwelling units. After each decennial census, TRPC reviews its small area estimates model to ensure that the data, assumptions, and estimates produced are consistent with census counts.

Since 1930, the U.S. Census Bureau has used a variety of disclosure avoidance strategies to protect respondents’ privacy. For the 2020 decennial census, Census employed a new strategy called “differential privacy.” Differential privacy injects a small amount of noise to census counts, meaning reported counts will differ from the actual enumeration. Small geographies — such as census blocks — and population groups — such as group quarters — are most affected by differential privacy. Dwelling unit counts at all levels of geography and state population counts are invariant, meaning reported counts match the on-the-ground enumeration.

## Differential Privacy

The U.S. Census Bureau is prohibited from disclosing personally identifiable information about respondents. Since 1930 it has used a variety of strategies to do so, most recently “differential privacy.”

Learn more about differential privacy at <https://bit.ly/3dStBYs>

## Dwelling Unit Validation

The core of TRPC’s small area estimates model is a land use table with parcel-level counts of dwelling units by type (single-family, multifamily, and manufactured homes). TRPC updates the table as needed using information from building permits, county assessor records, and aerial imagery. In the validation process, staff compare dwelling unit counts in TRPC’s land use table to census counts<sup>1</sup> to ensure that they are within an acceptable range.

In some instances, TRPC and census dwelling unit counts may not match. When discrepancies are identified, the land use table is corrected if needed. Common reasons for discrepancies include:

- **Timing for new construction.** Dwellings that have recently been permitted or where construction is underway may not be included in census counts. This is the most common reason for discrepancies.
- **Boundaries.** Parcels may be split by census block boundaries, making it difficult to validate the parcel’s dwelling unit count.

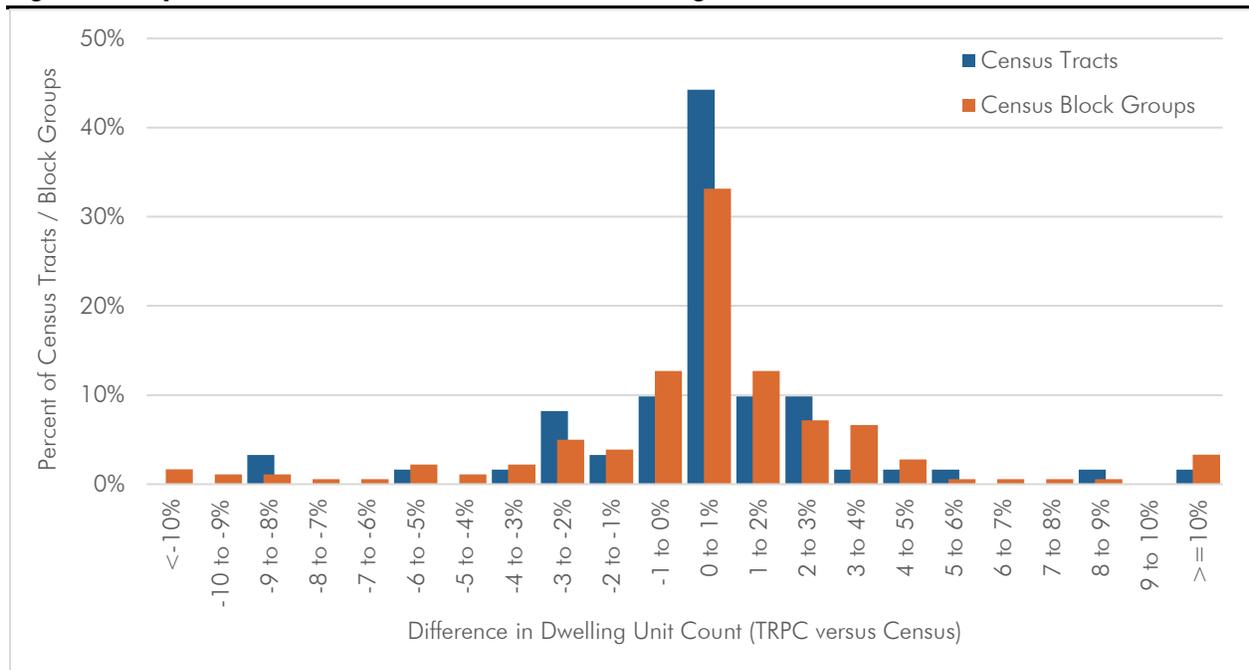
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<sup>1</sup> The decennial census does not include dwelling unit counts by type.

- **Senior Housing.** Senior housing, assisted living, and memory care facilities may be permitted as multifamily housing but included in the census’s group quarters counts. Group quarters are a type of communal housing that includes dormitories, nursing homes, and correctional facilities.
- **Unpermitted Housing.** Housing that has been built without the proper permits may be missing from TRPC’s records.

TRPC’s 2020 land use table aligns very well with census dwelling unit counts. Countywide, TRPC’s land use table underestimates housing by 64 dwelling units. No jurisdiction exceeded a 5 percent difference (Table 1), except for the Nisqually Indian Reservation where TRPC’s count was 16 percent higher (35 units). TRPC’s counts were within five percent of census counts for 90 percent of census tracts and 87 of census block groups (Figure 1).

**Figure 1: Comparison of TRPC and Census Tract-Level Dwelling Unit Counts**



**Table 1: Comparison of TRPC and Census Jurisdiction Dwelling Unit Counts**

Jurisdiction		Census	TRPC	Difference
Bucoda	City	241	253	5.0%
Lacey	City	22,039	21,821	-1.0%
	City+UGA	36,604	36,234	-1.0%
Olympia	City	25,642	25,589	-0.2%
	City+UGA	30,735	30,562	-0.6%
Rainier	City	850	876	3.1%
	City+UGA	904	927	2.5%
Tenino	City	780	780	0.0%
	City+UGA	785	786	0.1%
Tumwater	City	10,847	11,022	1.6%
	City+UGA	12,274	12,408	1.1%
Yelm	City	3,455	3,305	-4.3%
	City+UGA	3,971	3,835	-3.4%
Grand Mound	UGA	424	431	1.7%
Chehalis Reservation	Total	20	20	0.0%
Nisqually Reservation	Total	220	255	15.9%
<b>Thurston County</b>	<b>Total</b>	<b>121,438</b>	<b>121,374</b>	<b>-0.1%</b>

## Population Calibration

Calibration is the process by which TRPC modifies the occupancy rates and household size estimates in the small area model so that the model’s population estimates match census counts. Unlike dwelling unit counts, the U.S. Census Bureau modifies reported population counts — particularly for small groups or geographies — to avoid disclosing respondent’s personal information (See “differential privacy,” above).

## Group Quarters Population

The Census Bureau defines group quarters as “places where people live or stay in a group living arrangement that is owned or managed by an organization providing housing and/or services for the residents.” Two percent of Thurston County’s population live in a group quarters setting. TRPC estimates the group quarters population separately from the household population.

TRPC’s land use table includes parcel-level estimates of groups quarters (either the number of beds or population depending on the data source) compiled using data from OFM, DSHS, and 2020 census block-level data. The land use table includes the following types of group quarters facility:

- Adult or juvenile correctional facilities (19 percent of groups quarters population)
- Nursing homes (19 percent of groups quarters population)
- College dormitories (23 percent of groups quarters population)
- Other noninstitutional group quarters (including adult family homes and homeless populations, 39 percent of groups quarters population)

For the small area estimates, the group quarters estimates in land use table are adjusted so that the total group quarters population in each census tract, and the countywide group quarters population by type, match census counts.

### **Household Population**

For 2020 estimates of the population in households, the small area estimates model does an initial estimate of population using census tract-level estimates of occupancy rates (the percent of dwelling units that are occupied) and household size estimates by type from the 2015-2019 American Community Survey. Population estimates are then adjusted so that totals for census tracts and jurisdiction (city, town, and county) match census counts.

# ANNUAL UPDATES

Once the land use table is calibrated to the 2020 census, it can be used to develop annual estimates (2021 to present).

## Dwelling Units

Dwelling unit counts are calculated using building permit data collected from jurisdiction planning and building departments each spring. Permit information — including parcel number, issuing jurisdiction, type of permit (Table 2), and the number of dwelling units permitted — is entered into a Microsoft Access database table. TRPC also maintains a GIS version of this table with the geographic location of each permit.

**Table 2: TRPC Building Permit Types**

Permit Type	Description
Single-family	Detached single-family residences
Multifamily	Condominiums, townhomes (attached single-family residences, duplexes, triplexes, fourplexes, and five plus unit apartments. Also includes accessory dwelling units.
Manufactured Homes	Manufactured and mobile homes. Also includes boats, RVs, and other units counted by U.S. Census.

TRPC staff may make changes to the permit information received from jurisdictions. Typical changes include:

- **Parcel numbers.** If a building permit is issued before a subdivision has been recorded with the county auditor, TRPC will flag the permit and update the parcel number once the subdivision has been finalized.
- **Demolitions and Reissues.** If a permit for a single-family residence is issued on a parcel that already has a record of a single-family residence, TRPC will flag the permit. If it appears that the original structure was demolished, TRPC will add a demolition permit to the database. If it appears the original permit expired without construction, the permit will be flagged as having been reissued.
- **Swaps/Replacements.** In the rural unincorporated county, no more than two residences are typically allowed on a parcel: the main residence and a family member unit. If a manufactured home is issued on one of these parcels, it is assumed that one of the existing units is being replaced and a demolition permit will be added to the database.

- **Other.** Other corrections may be made as needed, such as corrections to typos in parcel numbers or addresses, or verifying and correcting the number of units permitted for large apartment projects.

The small area estimates model includes a lag time between when a permit is issued and when it is occupied. This lag time is based on the type of unit and location, shown in Table 3.

**Table 3: TRPC Building Permit Types**

Permit Type	Location	Lag Time / Occupancy Date
Single-family	Countywide	Two months after permit issue date
Accessory Dwelling	Countywide	Two months after permit issue date
Multifamily	Lacey, Olympia, and Tumwater (including UGAs)	Eight months after permit issue date
Multifamily	All other areas	Three months after permit issue date
Manufactured Homes	Countywide	Same as issue date
Family Member Units	Countywide	Same as issue date
Demolitions	Countywide	Same as issue date

TRPC does not calibrate its yearly housing unit estimates with OFM’s estimates for cities, counties, and towns. While TRPC and OFM rely on the same sources of information for housing units, they use different methods to calculate the lag time between permitting and occupancy date.

TRPC provides a summary of permit data on its website at [www.trpc.org/480](http://www.trpc.org/480) (see Table 6). A web map showing the location of permits issued is available at <https://bit.ly/33kR1DT>.

## Population

### Group Quarters Population

The annual group quarters population is calculated using data provided by OFM. OFM surveys larger group quarters annually as part of their April 1 Official Population Estimates program. TRPC ties each OFM group quarter location to a parcel and calculates the change in groups quarters population from 2020. This is added to TRPC’s calibrated 2020 group quarters population estimate.

### Household Population

Household population is estimated separately for census tracts and by housing unit type, then adjusted to match OFM estimates.

Tract level population estimates are calculated by multiplying housing unit counts by U.S. Census occupancy and average household size estimates. The most recent 5-year American Community Survey (ACS) estimates of occupancy rates and average household size are used if they are significantly different from the decennial census values.

Countywide population in single-family, multifamily, and manufacture homes is estimated by multiplying the total number of each type of dwelling unit by 2015-2019 ACS average household size estimates for each type (2.68, 1.91, and 2.39 persons per household, respectively).

Iterative proportional fitting is used to align the census tract and housing type estimates with OFM's Official April 1 Population Estimates of cities, towns, and counties. OFM is required by law to produce these estimates for the allocation of state resources. They are release each year by June 30<sup>th</sup>.

## AVAILABILITY

TRPC publishes its population and housing estimates at <https://www.trpc.org/480>. Estimates are available by June 30<sup>th</sup> of each year, alongside OFM's Official April 1 Population Estimates. Estimates are included for the following commonly requested geographies:

- Cities, towns, tribal reservations, and urban growth areas
- Fire districts
- School districts
- County, state, and federal legislative districts
- Planning districts
- Census tracts and block groups

Estimates for geographies not listed on that page are available on request.