

# APPENDIX 6: SMALL AREA POPULATION ALLOCATIONS

Population and Employment Forecast 2005, with 2007 Adjustments

## BACKGROUND

Once the regional population and employment forecast is complete it must be decided where the new growth will occur, based on the adopted plans and policies of local cities, towns, and the county. Only then can planning for roads, utilities, school sites, park sites, and other public services and facilities take place.

The basic approach used by TRPC is to translate the county-wide forecast of population into one for housing by four types: single-family, multifamily, manufactured homes, and group quarters<sup>1</sup>. The county-wide forecast of new dwelling units is then distributed to sub-county planning areas. Finally, the dwellings are “repopulated” based on assumptions of household sizes.

TRPC has developed a computer model to allocate the household population, called POPFOR. It is written in the Visual BASIC and SQL programming languages, as a series of processing modules in a Microsoft Access™ database. The methodology used by POPFOR is a two-stage process. Each stage is a variation on a common approach to small-area population forecasting. The first stage is based on the “ratio method” to divide the county-wide totals into shares for smaller sub-areas. The second stage is based on the “area method” to divide the sub-area totals into shares for our smallest areas, the assessor’s tax parcel geographies from the year 2006.

Group quarters population is updated by applying simple growth factors to the existing group quarters population.

Modifications to the small area population allocation routines for the 2004-2005 Forecast include:

1. A more interactive interface to the program.
2. The ability to model both baseline (based on existing policy and trends) and scenario (what if?) patterns of growth within one program structure.
3. Increased complexity in the accessory dwelling, family member unit, demolition, and housing stock replacement routines.
4. Increased detail in the household size and vacancy rate allocations.
5. Increased integration of the group quarters and household population allocations.
6. Increased error checking and calibration routines to automate more of the process.

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<sup>1</sup>Group quarters include college dormitories, correctional facilities, nursing homes, and various types of shelters.

In addition, the following data sets or trends were greatly improved over the 1998/1999 Forecast:

1. An inventory of planned residential projects (in various stages of application) was collected.
2. The inventory of buildable lands included commercial and industrial lands for the first time, and a much more comprehensive estimate of mixed use lands. In addition, more attention was paid to assigning current land use characteristics to every tax parcel in the County. This work was accomplished through the Buildable Lands Program<sup>2</sup>.
3. For the first time actual trends on residential net and gross densities were available to supplement the “expected” trends given by local planners in the past.
4. For the first time actual trends on accessory dwellings, family member units, demolitions, and housing swaps were able to be incorporated into POPFOR.
5. Census 2000 population and housing data provided for a solid base year.

## **METHODOLOGY AND ASSUMPTIONS**

### **Interval of Forecast**

The small area population forecast is developed in five-year intervals, building from the base year of 2006, incorporating the latest Census and land supply based on Buildable Lands Assumptions were available. A forecast end year of 2030 was chosen to ensure that the forecast would allow for a 20-25 year planning horizon until such a time when the forecast was next updated.

### **Building Sub-Area Trends**

#### **First Interval – 2006-2010**

Future population in single family and multifamily housing is assigned to areas where recent building permits were issued, and projects in the development pipeline (application stages), where these projects exceeded projected growth. Where there are little or no projects in application stages, such as in Tenino or Bucoda, population was assigned using the ration method explained below. Population in manufactured homes is assigned based on the ratio method.

#### **Remaining Intervals – 2010-2030**

With the ratio method, future population is assigned to a location based on its present share of a larger area’s population. For example, if Tumwater had five percent of Thurston County’s current population, it would be assigned five percent of the future population. POPFOR uses a variation of this approach; it relies on shares of recent growth instead of shares of the current total. Thus, if Tumwater had captured ten

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<sup>2</sup> The Buildable Lands Program is the result of an amendment to the state Growth Management Act to incorporate a review and evaluation program. TRPC is the central site for data collection and evaluation in Thurston County. Data products developed under the Buildable Lands program include an inventory of available land for future development.

percent of the County's growth during the period of 1990-2004, Tumwater would be assigned ten percent of the growth during the first forecast period as a starting point.

To be more precise, the growth shares are assigned to each of the planning sub-areas throughout the county. POPFOR uses records of building trends developed in the Buildable Lands Program to establish growth trends for each of the sub-areas. These trends take into account new development on vacant parcels, as well as demolitions and replacement (swap) units. This is a departure from previous forecasts where trends data relied solely on building permit activity. The sub-areas use the boundaries of the planning areas used by the various jurisdictions, or are subdivisions of those planning areas split by city limits or the like.

An evaluation of market behavior is critical to this stage of the calculations. The amount of land available for development during each forecast period is analyzed. An index of supply versus demand, which is named the "build-out" factor, is created. Separate build-out factors for each of the three dwelling unit types are calculated for each sub-area.

## Supply

Residential land supply was determined through the Buildable Lands Program.

## EFFECT ON DENSITY OF SEWER SERVICE IN SOUTH COUNTY

In the UGAs of Lacey, Olympia, and Tumwater, Thurston County has adopted the appropriate city's zoning designations as an effort in joint planning. This ensures that growth in the north county UGAs will occur at urban densities. Annexation of these areas into their adjacent cities is likely to have no effect on achieved densities, as all land in the UGAs must be subdivided at urban densities, regardless of whether it is within city limits or not. Sewer and municipal water is already available in some parts of the UGA, and the assumption is that as large parcels of land are subdivided they will receive sewer and water services.

In the UGAs of Tenino, Rainier, and Yelm, Thurston County has retained rural zoning categories, rather than adopt those of the adjacent city or town. Until the land in the UGA is annexed it is likely to develop at rural densities. The most common zoning district in the rural UGAs is the Rural Residential Resource 1/5, which is likely to see a residential density of 1 unit to 5 acres.

At some time in the future, between now and 30 years from now, these rural UGAs (aside from Grand Mound UGA) are likely to be annexed into their adjacent city. When that occurs, the density assumptions in the Forecast must change.

## Timing

Yelm has a sewer system servicing the city. The UGA is assumed to annex evenly over the next twenty years. At that time zoning will change from rural to urban.

Grand Mound UGA has a sewer.

Tenino is breaking ground on a sewer system. All new development, with existing city limits or in the UGA is expected to occur at sewer densities.

Rainier isn't likely to have a sewer until after 2015. It is likely that development will continue to occur at lower densities until that time.

Bucoda isn't likely to have a sewer until after 2020, maybe 2025.

## **DEMAND**

### **Dwelling Unit Demand**

Growth in household population is determined from the regional forecast. The forecast of population growth is converted into an estimate of demand in dwelling units (housing units) to accommodate population growth over each five year interval. Dwelling units are estimated by type: single-family, multifamily, and manufactured homes.

### **Demolitions**

Demolitions represent those units that have been demolished or removed from a site and no replacement unit has been built within the time of assessment. These demolitions may represent a change from residential to commercial. Demolitions are assessed by dwelling type and reflect a five year rate.

### **Changes in Dwelling Unit Type (swap of one type of dwelling for another)**

Swaps represent the demolition of a manufactured home, and permitting of a new single family or multifamily home on the same site. Swaps occur frequently in Thurston County. As swaps originate with a manufactured home, the swap rate is applied to the existing inventory of manufactured homes at the beginning of the evaluation period. The rate is then allocated to single family and multifamily. If the new unit is multifamily, it is assumed that there is a net doubling in dwelling units, i.e., one manufactured home is replaced by a duplex. This may need adjustment as new data become available.

### **Accessory Dwelling Units and Family Member Units**

Accessory Dwelling Units (ADUs) and Family Member Units (FMUs) are additional units added to a previously developed parcel. For the most part, these units are added to parcels that contain a single family home, and therefore the rate at which they are built is dependent on the existing number of single family homes at the beginning of the evaluation period.

## **BUILD-OUT FACTOR**

The build-out factor is a simple ratio of the sub-area's development capacity (in dwellings) divided by the demand or number of dwellings allocated to that sub-area during a given five-year forecast period. As a sub-area begins to fill up, its build-out factor rises. The aim is to keep the build-out factor fairly even between planning areas.

## **ASSIGNING POPULATION DOWN TO THE TAX PARCEL LEVEL**

### **Dwellings**

The second stage in POPFOR uses the "area method" to assign the growth forecast to the smallest of the forecast units, the 2006 Tax Parcel Structure. With the area method, growth is assigned according to available area for development. In this

approach, more growth is assigned to those tax parcels with more capacity. A tax parcel with ten acres of buildable or redevelopable residential land, therefore, will be given ten times the growth of an adjacent parcel containing one acre of buildable or redevelopable land, assuming they fall within the same planning sub-area and zoning district.

POPFOR assigns future growth into some 100,000 tax parcels. These tax parcels range represent a “lowest common denominator” in terms of categorizing a given area of land in terms of its existing land use and structures, and development potential. By linking the tax parcels with other geographies such as Census tracts, block groups, and blocks, school districts and service areas, fire district boundaries, basin and watershed boundaries, and any other geography available in a GIS format, population and dwelling unit estimates can be summarized to provide information for numerous planning purposes. This represents a great improvement over the previous forecast, where the output at different geographies was confined to pre-defined structures.

The model then assigns growth from demolitions, swaps, ADUs, and FMUs to the appropriate Tax Parcel based on existing dwellings. Finally, any existing dwellings are added to the new growth to provide an estimate of the total number of dwellings on the tax parcel.

## **Household Population**

Once the estimate of dwelling units is determined at the tax parcel level, future population is determined based on household sizes and vacancy rates. These are derived from the 2000 Census for each Census Tract, and linked to the parcels through the GIS. Household sizes and vacancy rates are determined for each of the three types of dwelling units.

POPFOR is also programmed to account for declining household sizes. This is a trend that has been going on for decades. It has two implications for population figures at the neighborhood level. First, neighborhoods that are already built out will have a declining population, as fewer people occupy a fixed number of houses. Second, additional dwellings would be needed to house even a stable population. For example, if 200,000 residents need 80,000 dwellings today, the same number may need 90,000 in the year 2030. This adds to housing construction in newly developing areas. Household size decline, and changes in vacancy rate, are applied at the Census tract level in POPFOR.

## **Group Quarters**

Group Quarters were identified at the parcel level during the Buildable Lands Data gathering effort. Group quarters are assumed to remain in place during the planning horizon, and increase at a steady rate determined by an analyst.

## **Total Population**

Total population is the sum of household population and the population in group quarters. Once this has been determined at the parcel level, it is summed to the county-wide level to be compared to the original county-wide forecast for population.

As this original forecast of population growth was converted into an estimate of demand in dwelling units (housing units) to accommodate population growth over

each five year interval at the beginning of the process, any differences in household size and vacancy rates throughout the county will result in the final population forecast being slightly out of calibration with the targeted totals. The target and estimate are compared, and an adjustment factor is calculated and applied to either increase or decrease the original dwelling unit demand. The model is then rerun for the forecast interval. After one or two iterations, the small area population forecast is calibrated to the regional population forecast.