FutureGrowth

FutureGrowth is a custom module of the FresnoABM that projects future socioeconomic growth.

This document was last updated 6/23/2021 by Seth Scott.

# Setup

FutureGrowth has the same requirements to run as PopulationSim. The only additional requirement is the openmatrix custom library. To install, run pip install openmatrix from command line.

Visit <https://github.com/osPlanning/omx-python> for more information.

# Datasets

The following represent the primary datasets used by the module. They can be found in the Data folder from the root directory. More details on these datasets can be found in Data/Data Dictionaries.

## Base\_MAZ\_2019.csv

This table contains base socioeconomic information for each microzone (MAZ) in the Fresno County region. The current base year for this dataset is 2019.

## Base\_MAZ\_2019\_VMT.csv

Same as Base\_MAZ\_2019.csv, with legacy data consistent with the most recent version of the SB 743 screening map. Use this file for traffic impact studies for which it is important that VMT analysis be consistent with this map.

## Communities.csv

This file provides the share of unincorporated residential (SOI\_HU\_P) and employment (SOI\_EMP\_P) growth that should go toward each community. The sum of each of these columns should not exceed (but need not necessarily add up to) 1.0. Any percentage of growth not allocated to a community will be proportionally applied to the remaining unincorporated area.

## CubeGrowth\_19\_35.csv

This table provides residential (Cube\_HU\_TAZ) and commercial (Cube\_EMP\_TAZ) growth targets by TAZ, according to the Cube Land model. These values represent projected growth from 2019 to 2035.

## Demographic\_Forecast.csv

Socioeconomic forecasts by agency (sphere of influence) by year, from 2019 to 2050.

## DevTypes.csv

Characteristics of development types, which represent classifications of new land use growth types. Parcels in planned development areas are assigned development types based on the closest match to the planned land use designation. These data are based on the Fresno County Envision Tomorrow model.

## Parcel\_Data.csv

Subset of the parcel feature class, representing the County parcels that are eligible for new growth (CONSIDERED=1).

# Parameters File

Future growth scenarios are defined primarily by the coefficients in the file Setup/parameters.csv. Changing the values in this file will affect the region’s growth pattern. For details on this file, please refer to the data dictionary: Data/Data Dictionaries/parameters\_dict.csv

# Running the Model

Once the coefficients in parameters.csv have been set to the user’s satisfaction, RunAll.bat will run the model. Below are the modules called in this batch file; setting any of these variables to NO will skip the corresponding module.

SET RUN\_CONTROLS=YES  
This module translates and prepares data from Demographic\_Forecast.csv. This should almost always be run, but could be skipped if you perform back-to-back runs with the same target year, same Cube Land value, and same regional adjustment variables.

SET RUN\_SKIMS=YES  
This module reads the ABM skim matrices and uses them to generate accessibility indexes, by mode. This only needs to be run once per skim result and can be skipped if the skims have not been updated.

SET RUN\_SCORING=YES  
This module calculates development scores for all eligible parcels in the region, based on the coefficients in parameters.csv. There is virtually no reason why this step would ever be skipped.

SET RUN\_ALLOCATION=YES  
This step flags parcels for development or redevelopment, based on the growth targets and the parcel development scores. This step should always be run.

SET RUN\_PERFORMANCE=YES  
This analyzes the results of the growth allocation and reports some basic performance indicators to provide a snapshot of the regional characteristics of the growth pattern. This step could be skipped if immediate performance feedback is not needed.

SET RUN\_ABM\_INPUTS=YES  
This module translates the growth result into PopulationSim and FresnoABM input files. This step can be skipped if an immediate PopSim/FresnoABM run is not intended—for instance, if the user is actively calibrating model parameters to achieve targeted results.

## Running Multiple Years

The FutureGrowth model assumes a “vision year” of 2035. Any time a vision year run is performed, all results of previous runs are overwritten. It is assumed (for now) that every scenario run with FutureGrowth will begin with a vision year 2035 run.

When FutureGrowth is run for a non-vision year, it will build upon the results of prior runs. These subsequent years can be performed in any order, with identical results.

*Example: A 2035 run is made, generating a new development table. A 2025 run is performed next—for this run, the model will consider only parcels allocated for new growth in 2035 and allocate some of them for 2025. If a 2040 run is then performed, it will use the results from the 2035 run (including those allocated for 2025) as a starting point, and will develop new parcels for 2040. If a 2030 run is then performed, it will use the 2025 results as a starting point, consider only parcels allocated to 2035, and allocate some of those to 2030.*

In this manner, it is possible to create annual parcel-based development information for every year in the demographic forecast. See information about devtable.csv under **Model Results and Outputs** below.

# Model Results and Outputs

The following are the main outputs of the FutureGrowth model:

## PopulationSim & ABM Inputs

Setup/Outputs contains the necessary files to run PopulationSim and the FresnoABM. These files will always represent the year of the most recent model run. The PopulationSim input files are:

countyData.csv  
gq\_maz.csv  
mazData.csv  
tazData.csv

The following files are inputs directly into the FresnoABM:

FCxx\_Base\_SE\_Detail.csv  
maz\_20xx\_parks.csv

where “xx” will be replaced by the 2-digit target year.

## Development Table

Parcel-level development information can be found in Setup/Data/devtable.csv. Using GIS software, this file can be joined to Data/GIS/parcels.shp via parcelid to perform spatial and visual analysis of growth patterns. The scope of the data in this file depends on the nature of the most recent FutureGrowth run(s):

* When FutureGrowth is run with a vision year (i.e. 2035) target, the existing development table is overwritten; the DEV column will be populated with 9999, and parcels projected to develop will be given a DEV value of 2035.
* When FutureGrowth is run with a non-vision year, the existing devtable.csv file will be preserved and updated with information from the most recent run. As such, running FutureGrowth several times with various target years will continue to refine the development table.

You can create a fully annualized development dataset by populating Setup/parameters.csv with the appropriate values (including a targetYear of 2035), running the model, then repeating the model run for every year in the planning horizon in any order (excluding 2035, of course, as this would reset the model). The result would be a development table that indicates the year each parcel is projected to develop, in the DEV column.

## Log Files

Basic regional performance indicators for the latest run can be reviewed here: Setup/Logs/performance.log

A summary of allocated growth, by sphere of influence and unincorporated community, can be reviewed here: Setup/Logs/allocateGrowth.log