

Date: September 11, 1998

To: William J. Upton

From: Paul Waddell
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Cc: Bill Davidson
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Re: Technical Memorandum 3, Task 3E:
Preparation of Interim Year Target Data for Longitudinal Calibration

1 Overview

This technical memorandum is the last of three specifying data needed for the longitudinal calibration of the Eugene-Springfield metropolitan model. It specifies data for interim years (1981-1994) needed as targets to compare against the predictions of the metropolitan model as part of the calibration of its longitudinal-temporal dynamics. This specification differs from the first two in the sense that these data are not needed by the model to run; they will instead provide objective external measures which can be used to estimate model parameters as well as evaluating and understanding the longitudinal performance of the model.

The interim year target data needed are:

- Population by zone
- Employment by zone
- Housing units by type zone
- Nonresidential floorspace by zone
- Land and property prices by type by zone
- Land areas and densities
- Travel Characteristics

These data should be compiled for as many years as possible between 1980 and 1994. Since they are being used only for comparison to the predictions of the model, rather than as required inputs in order for the model to run, it is not critical that all these variables be produced for each year.

Two significant issues with the use of historically archived population and employment data should be assessed and documented:

- a) Zonal boundary changes: if Traffic Analysis Zones changed boundaries during the 1980-94 period, as is likely, then these boundary changes will impact our ability to directly use the data that was summarized at a zonal level under differing boundary conditions.

There are two approaches to dealing with this likely problem:

- ◆ Zones that were subject to boundary adjustments over this period could be grouped into clusters that create longitudinally comparable districts of minimum size.
 - ◆ If the underlying data used to produce these estimates are still available and are higher in resolution than zone, the original estimation methodology could be reapplied with these data using the current zone boundaries to produce a consistent set of estimates without the aggregation imposed by the first alternative. This is clearly the preferred solution, but also more demanding of data availability.
- b) Methodological changes: if the methods and/or data sources used to produce the population and employment estimates by zone changed during the 1980-94 period, then these changes could also confound the validity of the comparison of the model predictions against historically observed data.

2 Population and Employment Data

It appears that zonal-level population, employment, and housing data may be available biennially during the 1980-94 interval, which will provide a solid foundation for this analysis. The years for which these data are not available need not be estimated (e.g. interpolated). Instead, only the data that are available will be used in the comparisons.

If employment by industry, or households by income, age of head, household size, or presence of children are available, these would be useful extensions to the basic employment and population estimates.

These data should be formatted in a series of ASCII files, with one per year that the data is compiled, named PopempXX.tab (where XX is the last two digits of the year -- <the data range is before 2000>), with the following fields separated by tabs:

Name	Format	Description
Zone	Integer	Traffic Analysis Zone
Totpop	Integer	Total Population
Totemp	Integer	Total Employment

3 Housing and Non-residential Floorspace

The parcel data from the tax assessors office may provide some historical accounting of the housing units built in each zone over the historical period. These data are not likely to be sufficiently clean, however, to warrant substantial investment. Particularly if independent estimates of the housing stock had been consistently developed by LCOG over this period, at least biennially.

We do not expect that historical estimates of non-residential floorspace (square footage), are readily available from the assessors office or LCOG. However, reasonable estimates of the historical stock of nonresidential space and housing could be extracted from the 1994 parcel file, if one ignored property conversions and demolitions. The square footage data collected by LCOG for Springfield in 1994, and for Eugene more recently, were merged on to the parcel database, as was the year built for each parcel that this data was available for. Unfortunately, many parcels did not end up with a year built estimate, even where square footages were obtained. This gap will make application of this method problematic, unless the year built gaps can be overcome.

These data should be formatted in a series of ASCII files, with one per year that the data is compiled, named BuiltSpaceXX.tab (where XX is the last two digits of the year), with the following fields separated by tabs:

Name	Format	Description
Zone	Integer	Traffic Analysis Zone
UnitsSF	Integer	Single Family Housing Units
UnitsR24	Integer	Residential 2-4 Housing Units
UnitsMF	Integer	Multi-family Housing Units
SQFTInd	Integer	Square Feet of Industrial Floorspace
SQFTWhs	Integer	Square Feet of Warehouse Floorspace
SQFTRet	Integer	Square Feet of Retail Floorspace
SQFTOff	Integer	Square Feet of Office Floorspace
SQFTSpc	Integer	Square Feet of Special Purpose Floorspace

The unit counts and floorspace estimates are for each of the ALU land use groupings used in the model.

4 Land and Property Prices by Type

The least likely of these target data to be readily available are historical land and improvement value estimates for each land use (ALU) and zone. Since these are principally intermediate variables used to inform the interaction of demand and supply of space across zones, the failure to produce a significant level of detail in these data would not be critical. However, the analysis would benefit from access to as much data as can be made available, even if it is only at the aggregate, or metropolitan, level.

As noted in the second memorandum (3E-2), all prices will be treated in constant 1994 dollars, so any price data obtained need to be inflation-adjusted to 1994.

These data should be formatted in a series of ASCII files, with one per year that the data is compiled, named *PriceXX.tab* (where XX is the last two digits of the year), with the following fields separated by tabs:

Name	Format	Description
Zone	Integer	Traffic Analysis Zone
PriceSF	Integer	Single Family Price per Housing Unit
PriceR24	Integer	Residential 2-4 Price per Housing Unit
PriceMF	Integer	Multi-family Price per Housing Unit
PriceInd	Integer	Price per Square Foot of Industrial Floorspace
PriceWhs	Integer	Price per Square Foot of Warehouse Floorspace
PriceRet	Integer	Price per Square Foot of Retail Floorspace
PriceOff	Integer	Price per Square Foot of Office Floorspace
PriceSpc	Integer	Price per Square Foot of Special Purpose Floorspace

5 Land Areas and Densities

The land area in each use by zone provides the final set of target data, and allows the computation of net and gross densities by zone and land use. These data are simply acreage measurements within each zone for each land use. These historical data are likely to come from aerial photography interpretation done at various points between 1980 and 1994. If so, then the classification of land use may be difficult to match, and zonal boundary adjustments may confound the comparison. It is possible that these land use inventories were digitized, in which case they could be overlaid as GIS layers on the current zonal boundary system, to obtain the desired measurements. An alternate source of these estimates is

from tax assessor records, but this is not likely to be as feasible as using some other form of land use inventory.

These data should be formatted in a series of ASCII files, with one per year that the data is compiled, named *AreaXX.tab* (where XX is the last two digits of the year), with the following fields separated by tabs:

Name	Format	Description
Zone	Integer	Traffic Analysis Zone
AcresSF	Integer	Single Family Acres
AcresR24	Integer	Residential 2-4 Acres
AcresMF	Integer	Multi-family Acres
AcresInd	Integer	Industrial Acres
AcresWhs	Integer	Warehouse Acres
AcresRet	Integer	Retail Acres
AcresOff	Integer	Office Acres
AcresSpc	Integer	Special Purpose Acres
AcresVac	Integer	Vacant Acres
AcresUnd	Integer	Undevelopable Acres

6 Travel Characteristics

In addition to the comparison of modeled vs observed land use characteristics, the integration of the land use and travel models suggests making additional comparisons of a small set of modeled vs observed travel characteristics. The following are suggestions for calibration targets related to transport for any years between 1980 and 1994 as available:

- Trip-length frequency distribution
- Vehicle Miles Traveled
- Transit Loadings
- Mode shares.

Any other readily available information on travel conditions or behavior during the period 1980-1994 should also be provided.

These observed data would need to be compared to travel model predictions, so there needs to be a synchronization of the travel model runs with years for which some or all of these observed travel characteristics exist.