

Tutorial Contents:

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1. Introduction

The TELUM tutorial project is developed for a fictitious 20-zone California coastal region called Rancho Carne. This document and the accompanying data provided inside the ***Tutorial folder*** of the TELUM directory on your PC will walk you through the Rancho Carne project. The tutorial dataset was originally developed by graduate students Daniel Schack and Leah Wright as one of the requirements for a course on Urban Simulation Modeling taught by Dr. Stephen Putman at the University of Pennsylvania. It has since been modified to improve its teaching function.

How to use this Tutorial

This tutorial is intended to provide an overview of TELUM, assist new users in practicing the data entry and model development, and help them comprehend the model outputs. The *Tutorial* folder contains all the files and data you will need to complete a calibration and a set of model forecasts for the Rancho Carne region. The *Tutorial* folder is located inside the TELUM directory (default location is C:\TELUM 2011\Tutorial\), and includes the following files:

- ***Tutorial.pdf*** – Tutorial instructions (this document)
- “\Data” sub-folder, including the following files:
 - *RC_DOPU_DATA.xls* – File containing regional socio-economic and land use data
 - *IMPD.txt* and *IMPD15.txt* – Regional impedance data files
 - *Settings.txt* – IDEU input data
 - Set of regional ArcGIS files: *zone.shp*, *zone.shx*, and *zone.dbf*

As you work through the project, TELUM provides on-screen hyperlinks to *Help* screens that explain the various functions and data inputs in greater detail than you will see in this document. Throughout this tutorial you will see a number of screen-shots of the TELUM software screens. Please note that each TELUM screen has a number located in the upper left corner of the window frame (e.g. “TELUM P6.51”). This number will come handy (and should be referenced) when contacting TELUM user support regarding any problems or questions pertaining to specific screens.

After you have completed this tutorial you will be better prepared to build and analyze a TELUM model for your region.

2. Initial Data Entry Unit (IDEU)

In this section you will go through the following four steps:

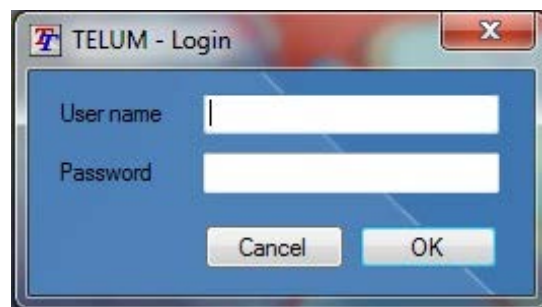
1. Install TELUM
2. Enter your TELUM username and password
3. Start the TELUM project for Rancho Carne region
4. Enter and review regional data for Rancho Carne region

Step 1: Install TELUM

Begin by performing a TELUM installation, as described in TELUM installation instructions available in your TELUM directory ([\TELUM 2011\Documentation\Install Notes.pdf](#)) or on [TELUM website](#).

Step 2: Enter TELUM Username and Password

Once you have completed the installation process, a TELUM icon will appear on your computer's desktop. Double-click on the TELUM icon. Upon entering TELUM, the program will prompt you to enter the username and password. To obtain the username and password, please contact TELUM user support or FHWA Resource Center (please refer to User's Manual, Chapter 2, Section 4 “User Support” for contact information, or go to TELUM website at <http://www.telus-national.org/general/generalContact.htm>).



Step 3: Start your TELUM project

The first time you start TELUM you must begin by clicking “NEXT” on the screen **P0.1** to enter the *Initial Data Entry Unit (IDEU)*. Later on, after you close or exit TELUM (i.e. after clicking the “EXIT” button on any of the TELUM screens) and then start TELUM again, you will begin with the Main Menu – screen **P0.2**. This screen displays a number of buttons that allow you to skip directly to specific TELUM modules, as shown in Figure 1.



Figure 1 – TELUM Main Menu Screen

Step 4: Enter and Review Regional Data

IDEU is where you input the basic information about your analysis region and organize the data. The purpose of IDEU is to help you prepare and format input files that you will use in the next

component of TELUM, *Data Organization and Preparation Unit (DOPU)*. Listed in Table 1 are the TELUM data requirements for IDEU. The rightmost column contains sample data you will use in the Tutorial project.

Entering Rancho Carne IDEU Data

The IDEU inputs shown in Table 1 contain employment and household category name abbreviations for the Rancho Carne region. Employment and household category abbreviations are user-defined and can vary from one TELUM project to another (e.g. AGR for agriculture employment, LMFG for light manufacturing employment, LI for low income households, UMI for upper-middle income households, etc.). The Table 1 below provides all required IDEU inputs, classified by the corresponding screen on which they appear. Definitions of all abbreviations are given following the table.

Table 1 – IDEU Inputs

<i>Screen</i>	<i>TELUM IDEU Data Category</i>	<i>Sample Data for Rancho Carne, CA</i>
P2.3	Name of your Region	Rancho Carne
P2.4	Number of Zones	20
P2.4	Total Regional Population	62,819
P2B.7	Current Data Year	2005
P2B.7	Lag Data Year	2000
P2B.8.1	Number of Employment Categories	5
	Name of Employment Category 1	AGR
	Name of Employment Category 2	LMFG
	Name of Employment Category 3	PROF
	Name of Employment Category 4	RTL
	Name of Employment Category 5	FIRE
P2B.9.1	Number of Household Categories	4
	Name of Household Category 1	LI
	Name of Household Category 2	MI
	Name of Household Category 3	UMI
	Name of Household Category 4	HI
P2B.12	Total Land Area of Region	184,332
P2B.12.1	Total Land	Available

Screen	TELUM IDEU Data Category	Sample Data for Rancho Carne, CA
P2B.12.1	Usable Land	Available
	Unusable Land	Available
	Land Used for Basic Employment	Available
	Land Used for Commercial Employment	Available
	Residential Land	Available
	Streets	Available
	Vacant Developable	Available
P3.13.1	Number of Forecast Time Periods	6
P3.15	Employment to Household Conversion Ratio	PUMS Ratio
P3.16.1	Employment per Household by Income	EHIC Ratio
P3.17	Unemployment	UR Ratio
P3.18	Net Commutation Rate	RNCR Ratio
P3.19	Regional Jobs per Employee	Select "Do Not Know"

Explanation of Abbreviations:

AGR	- Agriculture	UMI	- Upper Middle-income Households
LMFG	- Light Manufacturing	HI	- High-income Households
PROF	- Professional/Scientific/Management	PUMS	- Public-Use Microdata Sample
RTL	- Retail	EHIC	- Employees per Household by Income
FIRE	- Finance/Insurance/and Real Estate	UR	- Unemployment Rates
LI	- Low-income Households	RNCR	- Regional Net Commuting Ratio
MI	- Middle-income Households		

After entering the data in IDEU, TELUM provides a summary report of the data you entered as shown in Figure 2. Please compare this report to your data to ensure accuracy. Then click "OK" to proceed to DOPU module.

Current Project: **RANCHO CARNE**

Initial Data Entry Unit Report

Name of the Region: **RANCHO CARNE** Number of Zones: **20** Total Land Area of the Region: **184332**

Estimated Total Population: **62819** Current Year: **2005** Lag Year: **2000**

Employment Data Available

Current Year: ☒ By Type ☐ By Total ☐ None

Lag Year: ☒ By Type ☐ By Total ☐ None

Number of Employment Categories: **5**

Employment Categories

AGR RTL
LMFG FIRE
PROF

Household Data Available

Current Year: ☒ By Type ☐ By Total ☐ None

Lag Year: ☒ By Type ☐ By Total ☐ None

Number of Household Categories: **4**

Household Categories

LI HI
MI
UMI

Land Use Data Available for Your Project

Forecast Time Periods: **6**

Empl-to-HH Conversion: ☒ PUMS Ratio ☐ Default Ratio

Empl per HH by Income: ☒ Empl per HH Ratio ☐ Default Ratio

Unemployment Rate: ☒ UR Ratio ☐ Default Ratio

Net Commutation Rate: ☒ NCR Ratio ☐ Default Ratio

Regional Jobs Per Employee: ☐ RJPE Ratio **1** ☐ Default Ratio

☒ Usable
☒ Unusable
☒ Basic
☒ Commercial
☒ Residential
☒ Street/ Highway
☒ Vacant Developable Land

PRINT SCREEN **OK**

Figure 2 – IDEU Initial Data Entry Unit Report

3. Data Organization and Preparation Unit (DOPU)

In this section you will:

1. Work in the Data Preparation Workbook
2. Check the consistency between IDEU data and the zonal GIS files in MAP IT

Working in the DOPU Workbook

In DOPU module you will enter zonal employment, household, and land use data for the Rancho Carne region. The zonal data for Rancho Carne is available in the *RC_DOPU_DATA.xls* file located in the [TELUM 2011\Tutorial\Data\](#) folder. The data is distributed in multiple worksheets, similar to the format used in the TELUM DOPU Data Preparation Workbook (*Dataprep Workbook*).

Opening DOPU Dataprep Workbook

Upon entering the DOPU module you will be taken through several screens providing information about DOPU and software requirements that will ensure a proper functionality of the Dataprep Workbook. When finished with reviewing this information please click “NEXT” on each screen.

First Time in Dataprep Workbook or Reviewing Existing Data

After clicking “NEXT” on the screen **P4.24**, TELUM will open the DOPU Dataprep Workbook (in Microsoft Excel). Before entering the Dataprep Workbook spreadsheet you will be prompted to indicate whether you are starting a new model (this is your first time in Dataprep for the current project), or you wish to view, add, or change the existing Dataprep data. To proceed with the tutorial project, click “YES” in the dialog box (indicating this is your first time in Dataprep).

Working with your DOPU Workbook

Next you should enter the Rancho Carne data into the appropriate worksheets of the Dataprep Workbook (Employment, Household, Land Use, Projection, and Conversions worksheets). You can enter the data manually (by typing the numbers in each cell) or by using the “copy/paste” function. As mentioned earlier, all input data can be found in *RC_DOPU_DATA.xls* file.

*****NOTE:** The data will paste correctly only if you use the “Paste Special” option in Excel, and specify to paste the data as “Values”.

The data fields you need to populate in the Dataprep Workbook are the fields with the [blue font](#). Once your data is correctly imported, your zonal household, population, and employment numbers will appear in the worksheet. An example of these worksheets, as you will first see them before the data entry, are shown in Figure 3 and Figure 4.

*****NOTE:** The data will paste correctly as values only if both *DOPU Dataprep Workbook* and *RC_DOPU_DATA.xls* are open in the same instance of Excel. You can do this by opening the *DOPU Dataprep Workbook* through TELUM as instructed. Then open *RC_DOPU_DATA.xls* by clicking **File -> Open** in the current Excel workbook and browsing to the *RC_DOPU_DATA.xls* file (by default located in \TELUM 2011\Tutorial\Data\).

After copying and pasting inputs from *RC_DOPU_DATA.xls*, save your *DOPU Dataprep Workbook* by clicking **File -> Save**.

Employment: 2005								Employment: 2000						
Zone	AGR	LMFG	PROF	RTL	FIRE	Total Current Employment	2005 Total Employed Residents	Zone	AGR	LMFG	PROF	RTL	FIRE	Total Lag Employment
1	0	0	0	0	0	0	0	1	0	0	0	0	0	0
2	0	0	0	0	0	0	0	2	0	0	0	0	0	0
3	0	0	0	0	0	0	0	3	0	0	0	0	0	0
4	0	0	0	0	0	0	0	4	0	0	0	0	0	0
5	0	0	0	0	0	0	0	5	0	0	0	0	0	0
6	0	0	0	0	0	0	0	6	0	0	0	0	0	0
7	0	0	0	0	0	0	0	7	0	0	0	0	0	0
8	0	0	0	0	0	0	0	8	0	0	0	0	0	0
9	0	0	0	0	0	0	0	9	0	0	0	0	0	0
10	0	0	0	0	0	0	0	10	0	0	0	0	0	0
11	0	0	0	0	0	0	0	11	0	0	0	0	0	0
12	0	0	0	0	0	0	0	12	0	0	0	0	0	0
13	0	0	0	0	0	0	0	13	0	0	0	0	0	0
14	0	0	0	0	0	0	0	14	0	0	0	0	0	0
15	0	0	0	0	0	0	0	15	0	0	0	0	0	0
16	0	0	0	0	0	0	0	16	0	0	0	0	0	0
17	0	0	0	0	0	0	0	17	0	0	0	0	0	0
18	0	0	0	0	0	0	0	18	0	0	0	0	0	0
19	0	0	0	0	0	0	0	19	0	0	0	0	0	0

Figure 3 – TELUM Dataprep, Employment Worksheet for Current and Lag Year Zonal Data

Year	Population	Employment					
	Total Population	AGR	LMFG	PROF	RTL	FIRE	Total Employment
2000	0	0	0	0	0	0	0
2005	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0

Figure 4 – TELUM Dataprep, Projections Worksheet

After you have finished entering data into each of the *Dataprep* worksheets and saved the file, go back to the first worksheet, labeled “**Data Check**”. You should see an **X** next to each workbook name, as shown in Figure 5.

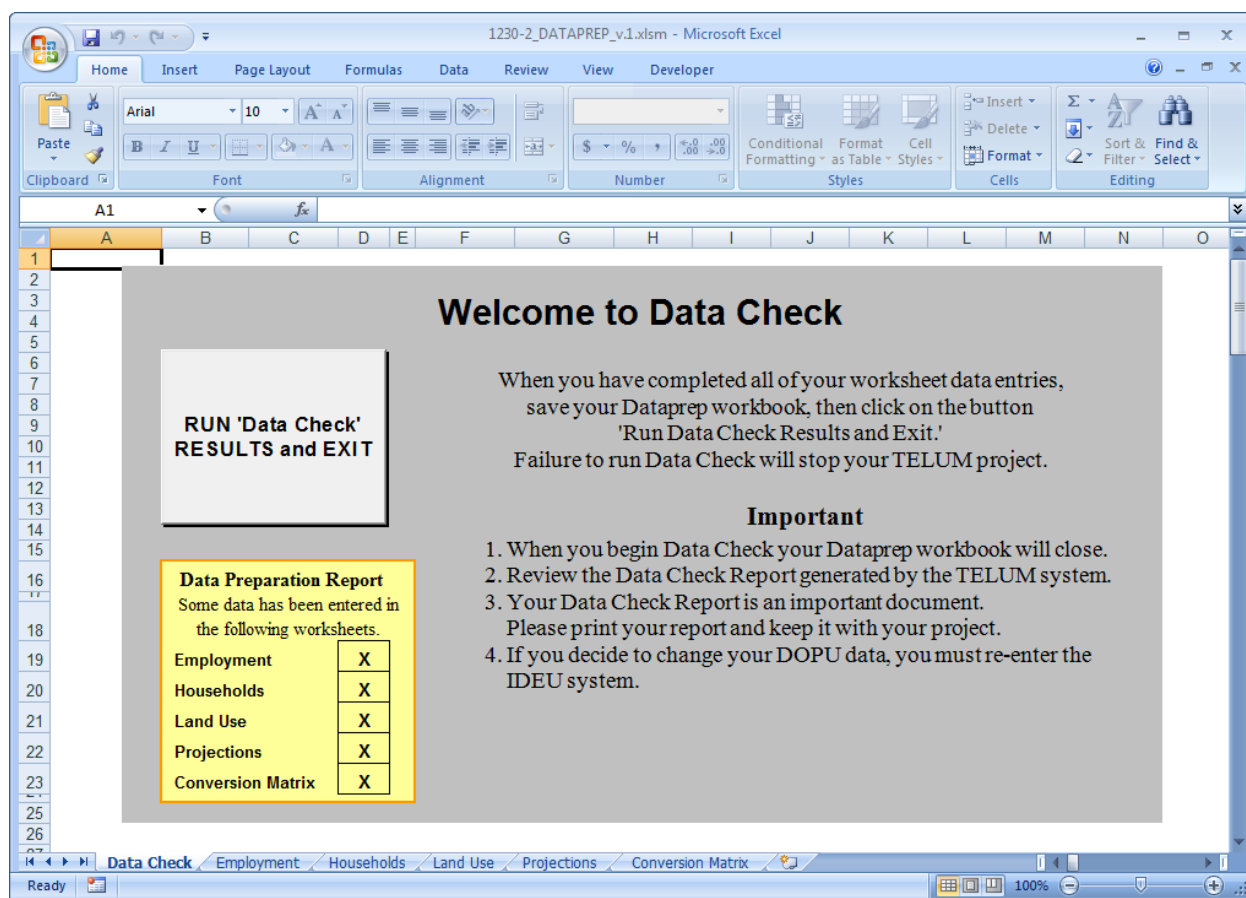


Figure 5 – DOPU Dataprep Workbook, Data Check screen

*****NOTE:** Please exit the *RC_DOPU_DATA.xls* file before running the DOPU Workbook “Data Check.”

The “RUN Data Check Results” button inside the “Data Check” worksheet is enabled once all worksheets are populated with the required data inputs. When you click this button TELUM will perform a consistency check of your data and a report will be created. In this report, TELUM will highlight values that are not within the predefined expected (reasonable) ranges. At this point, click the “RUN Data Check Results” button.

Check Your Data Consistency Results

The chart shown in Table 2 contains the values we expect you will see as you review your DOPU Data Consistency Final Report for Rancho Carne.

Table 2 – DOPU Data Consistency Report

Screen	Variable	Value
P4.30	Correlations	
	Total Current vs. Lag Household Correlation	0.786
	Total Current vs. Lag Employment Correlation	0.923
	Total Household vs. Employment Correlation	-0.190
	Total Household vs. Population Correlation	0.997
P4.30.1	Employment Correlations	
	AGR vs. AGR	0.830
	LMFG vs. LMFG	0.946
	PROF vs. PROF	0.914
	RTL vs. RTL	0.967
	FIRE vs. FIRE	0.926
P4.30.3	Consistency Check of Regional Ratios	
	Population per Household	2.5
	Population per Employment	2.0
P4.30.2	Percentage Change	
	Households	10.2 %
	Employment	0.9 %
	Population	11.5 %
	Employment, Current to Forecast	12.9 %
	Land Use Check	0

In the tutorial project (or later in any project you will be working on) the values displayed in red font, as well as warnings, will indicate the low or high correlations or percentage changes in specific model parameters. It is strongly recommended that you review these reports and pay special attention to any highlighted values. The identified discrepancies can give a hint whether some of the inputs should be re-examined and adjusted to ensure the desired level of accuracy and quality of model inputs. In the Rancho Carne example, there is a low correlation for total households vs. employment, as a place of residence in this region does not correlate with a place of work.

4. MAP IT – Geographic Zones and Data Check

If you have ArcGIS (versions 8.3 or later) installed on your computer system, you will be able to use TELUM MAP IT, a mapping tool for visual geographic display of model inputs, as well as calibration and forecasting results. Following the data consistency reports you will be asked if you wish to use MAP IT (TELUM screen **Mapit.4**). If you select “No,” this will be the last time TELUM presents MAP IT as an option. If you should decide to use MAP IT later, you will need to revisit the TELUM DOPU module and select “Yes” option on this screen.

If you select “Yes,” MAP IT will require a set of regional shapefiles inside the main TELUM folder. Inside your tutorial “Data” folder is a set of shapefiles for Rancho Carne, labeled *ZONE.SHP*, *ZONE.DBF* and *ZONE.SHX*. Place these three files inside the main TELUM directory before enabling the MAP IT function. The shapefiles contain geographic references for the same twenty zones defined in IDEU and DOPU. Each zone is represented with a polygon enclosing the zone’s area. Each zone in shapefiles is labeled with an ID that corresponds to number (1 to 20) associated with that zone’s household, employment, and land use data entered in the DOPU Dataprep Workbook.

Launch MAP IT

When you get to screen **Mapit.6** please click the MAP IT button (with a small globe) to start the ArcGIS module. At the opening, MAP IT will prompt you to “*select the shapefile field that contains the zone number*”. For the Rancho Carne project, select the “ID” field from a drop-down menu.

*****NOTE:** If you do not select the correct “ID” field when prompted as you enter MAP IT for the first time, your data will not map correctly.

TELUM begins MAP IT by instructing users to complete a mapping check, called “*Check Zones*.” “Check Zones” is used to ensure mapping consistency. If the user finds that their zone maps appear to be inaccurate, they must correct the problem before MAP IT can be enabled for future use in current project.

You can change the appearance settings of your maps as desired. The following is an example of the “Check Zones” map for the Highest Total Employment in the Rancho Carne region (Figure 6).

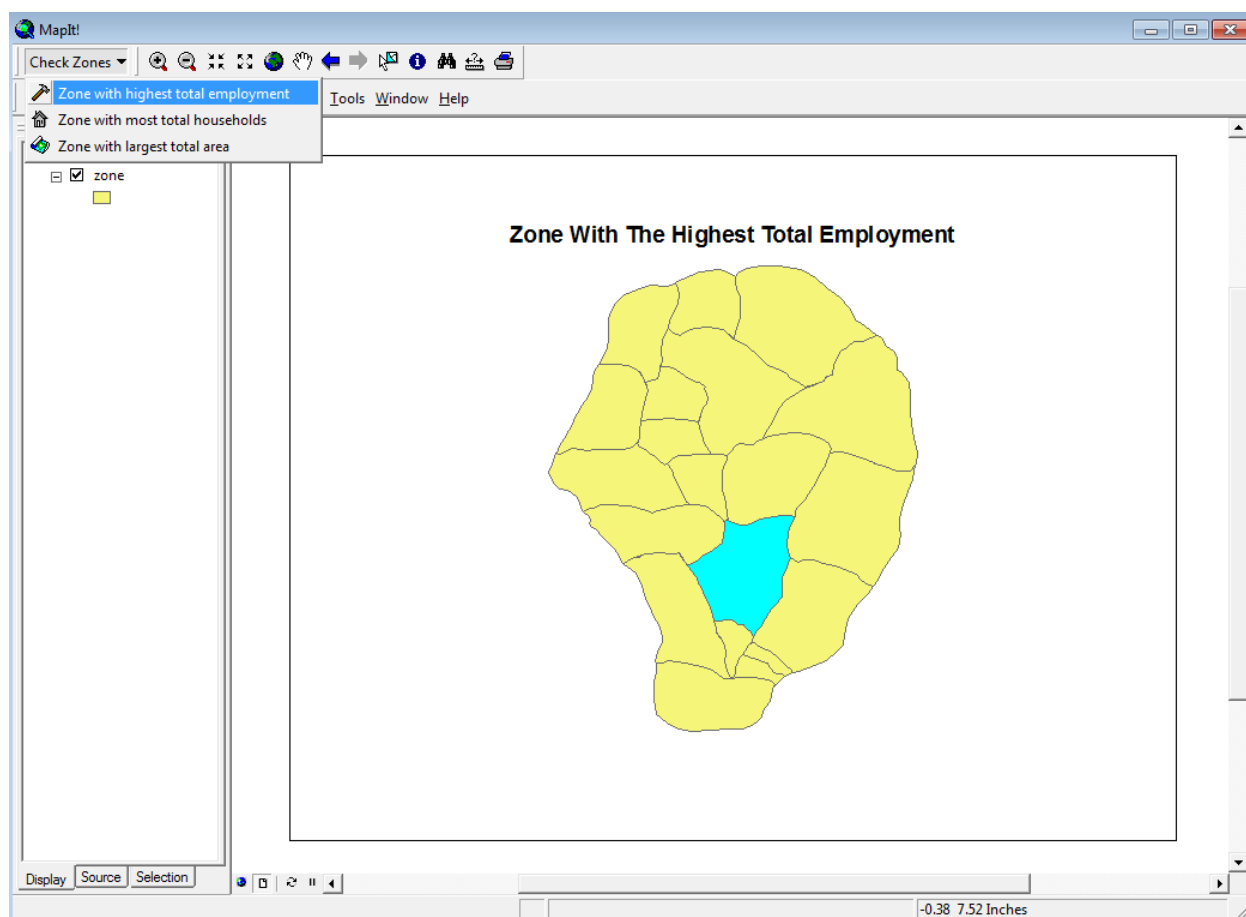


Figure 6 – MAP IT “Zone Check”: map of the Zone with the Highest Total Employment

When you are finished working in MAP IT, please exit ArcGIS to return to TELUM by clicking on the “X” button in the upper right corner of the MAP IT window.

Upon returning to TELUM click “NEXT” on the screen **P5.6M** and proceed by answering questions regarding the “Check Zone” maps (screens **P5.7M**, **P5.8M**, and **P5.9M**). If “Check Zones” was successful, you should answer “YES” to all of the questions. If so, you are ready to use MAP IT again throughout the project. First you will be able to map and review the household, employment, and land use data entered in DOPU. If you wish to do this, please click on the “MAP IT” button on screen **P5.51M**. The Figure 7 shows one such map for Upper Middle Income Households in the Rancho Carne region in year 2005.

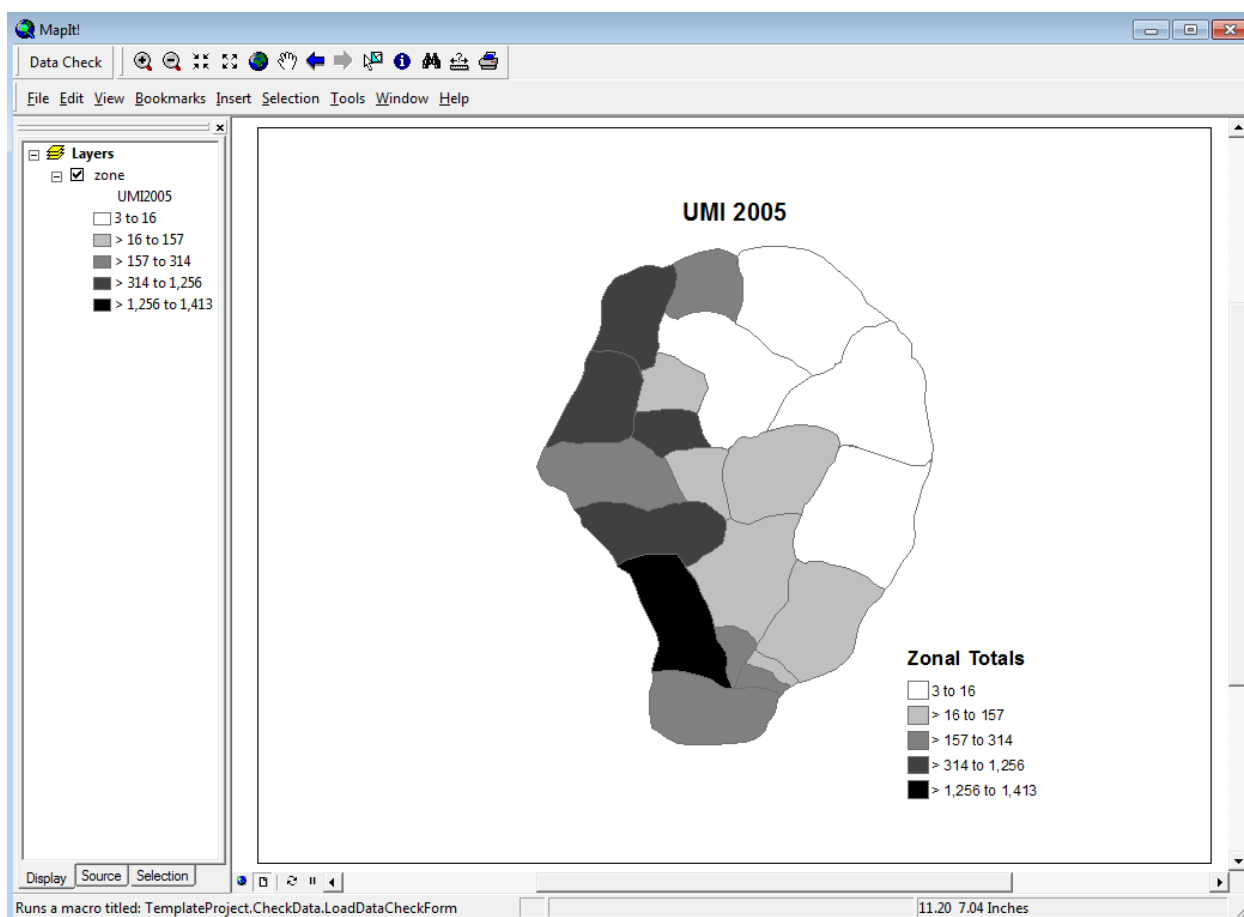


Figure 7 – MAP IT map of the Upper Middle Income Households by Zone in year 2005

5. Travel Impedance Preparation Unit (TIPU)

In this section you will prepare a Travel Impedance File. The term “impedance” refers to the travel time, travel cost, or a composite of both, calculated by the travel demand models (not included in TELUM) to describe differences in zone-to-zone difficulty of interaction. An impedance file would typically be available from your agency’s transportation modeling department. TELUM manual provides steps and examples for converting an impedance file to a format required for your TELUM project. For the Rancho Carne project, the impedance file labeled *IMPD.txt* is provided in the Tutorial folder. Place the *IMPD.txt* file inside the *C:\TELUM 2011\DATA* folder. Instructions for creating an *IMPD.txt* file with your regional data are provided in TELUM Manual, Chapter 4: Data Preparation.

TIPU Impedance Data Inputs

The Travel Impedance Preparation Unit (TIPU) performs a data validation procedure on the contents of your IMPD.txt file. In order to run this validation you must enter the data shown in Table 3 into TELUM as you work through the TIPU section.

Table 3 – TIPU impedance validation data

Screen	TIPU Data Variable	Input Value
P5.30.3	Average Impedance	87
P5.30.4	Smallest Impedance	7
P5.30.5	Largest Impedance	197
P5.30.6	Top 4x4 impedances	10, 45, 31, 87
		45, 7, 30, 42
		31, 30, 8, 67
		87, 42, 67, 23
P5.30.7	Bottom 4x4 impedances	14, 61, 39, 28
		61, 14, 34, 33
		39, 34, 28, 21
		28, 33, 21, 29

When you have completed these steps correctly, TELUM will search for the impedance file, verify its contents, and display the frequency distribution of impedances by zone. You will then automatically be “escorted” into the next section, Model Calibration and Preparation Unit, or MCPU.

6. Model Calibration and Preparation Unit (MCPU)

In this section you will:

1. Perform Household and Employment Model Calibration
2. Review the Analysis of Calibration Results
3. Perform Land Consumption Model Calibration

Perform Employment and Household Model Calibration

Model calibration is a process of estimating the model parameters (equation coefficients) to obtain the best possible match between observed and estimated distributions of region's employment and household locations. The employment and household model calibrations in TELUM are performed using non-linear regression. TELUM will use your *IDEU*, *DOPU*, and *TIPU* inputs to perform the model calibration. The calibration is computationally intensive and may take up to 30 minutes to complete for models with large number of zones and maximum number of employment and household categories. Upon completion of the employment and household model calibration, TELUM immediately skips to the calibration "Analysis of Results" section.

Analysis of Calibration Results

The Analysis of Results contains statistical measures used to describe the goodness of fit of the calibrated model to the input data. The better the fit of the model to the data, the more reliable the forecasts it can produce. An example of calibration results for Observed vs. Estimated Employment Location for the Retail employment category in Rancho Carne model is provided in Figure 8.

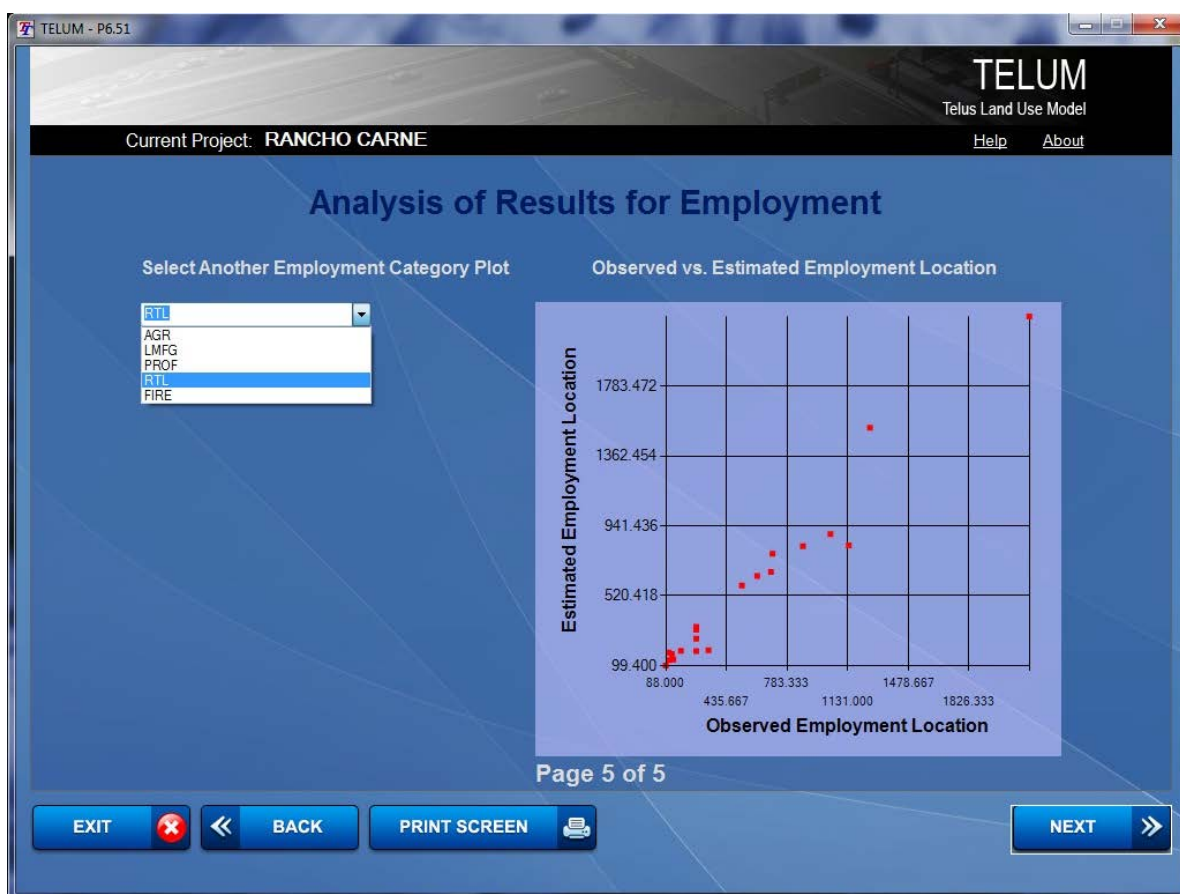


Figure 8 – MCPU Analysis of Results for Employment

MAP IT is available in this section as well, and it allows you to view your Calibration Residuals (screen **P6.M14**). Residual maps show where the model over- and/or underestimates the zonal location of employment and households in the region. An example of MAP IT outputs for Low Income Household Residuals in Rancho Carne model is shown in Figure 9.

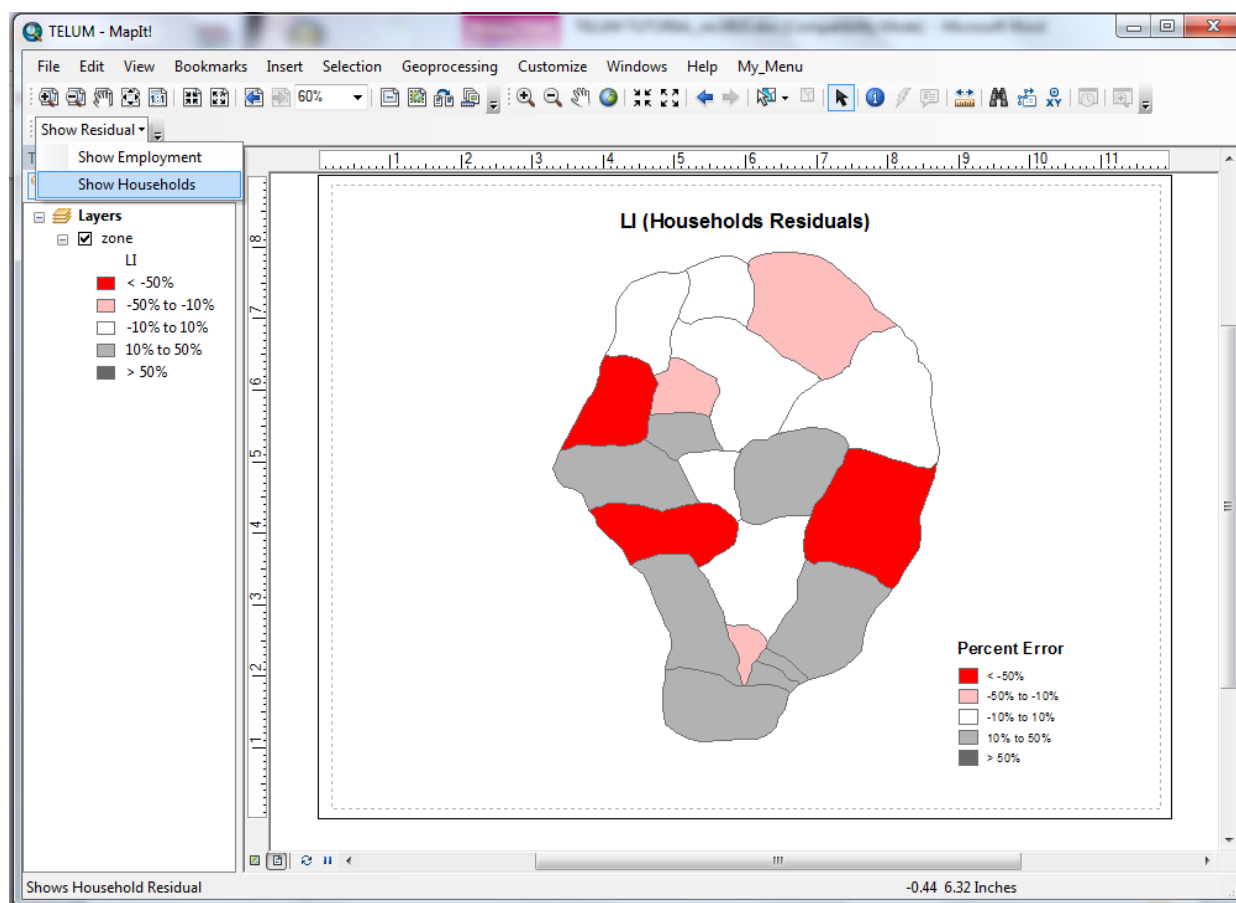


Figure 9 – MAP IT Output: Calibration Residuals for the Low Income Household category

To explain the meaning and importance of calibration residuals, let's assume that a zone in Rancho Carne contains the regional airport. The presence of the airport shows a concentration of employment. Under other circumstances, a concentration of employment like this will cause an increase in household attraction, which is not the case here because households are prohibited from locating near the airport. While the model is unable to know zonal specifics, a user may be able to identify the model's source of high over- or underestimation. A zone with a significant overestimation of households, as in this example, will appear in the dark gray color on the map. The zonal characteristics like this are important to document as they can later be added as "local knowledge" to the model to modify zonal attractiveness and thus improve the accuracy of forecasts.

Perform Land Consumption Model Calibration

The Land Consumption Model (LANCON) is the last section in the *MCPU* component of TELUM. The LANCON uses the zonal land use, employment, and household data to forecast the change in the amount of land (by zone) that will be used by each of the household and employment categories. The LANCON calibration is performed using a linear multiple regression. Much like the employment and household calibration analysis, LANCON provides statistical measures of the goodness of fit for the region's land use data.

At the start of LANCON, the calibration (regression) procedure will ask you to provide the following information:

1. On TELUM screen **P6.10A**, indicate which employment categories in Rancho Carne are *Basic* (basic categories are industries that produce goods). For Rancho Carne please check *AGR* and *LMFG*.
2. On TELUM screen **P6.10B**, indicate which household categories in Rancho Carne are *Low* and *High Income* (low and high incomes refer to households that fall in the bottom or top quartile/quintile in the region, respectively). For Rancho Carne please check *LI* as your Low Income household category and *HI* as your High Income household category.

After providing this information, TELUM will take you to screen **P6.10C**. On this screen please click the "LANCON" button to execute LANCON calibration. This process takes time - please wait for the "NEXT" button to become enabled before proceeding further. Once the calibration is completed you will be informed and will be able to go to the next screen. The LANCON calibration summaries will be displayed by Residential, Commercial, and Industrial Land Consumption category in the LANCON Statistical Report section.

The results of LANCON calibration are provided in terms of goodness of fit of the model to the input data. In an actual project the user might wish to examine land use types and zones for which there were large errors to see whether any data corrections would improve results. An example of the LANCON results screen for commercial land consumption by zone is shown in Figure 10.

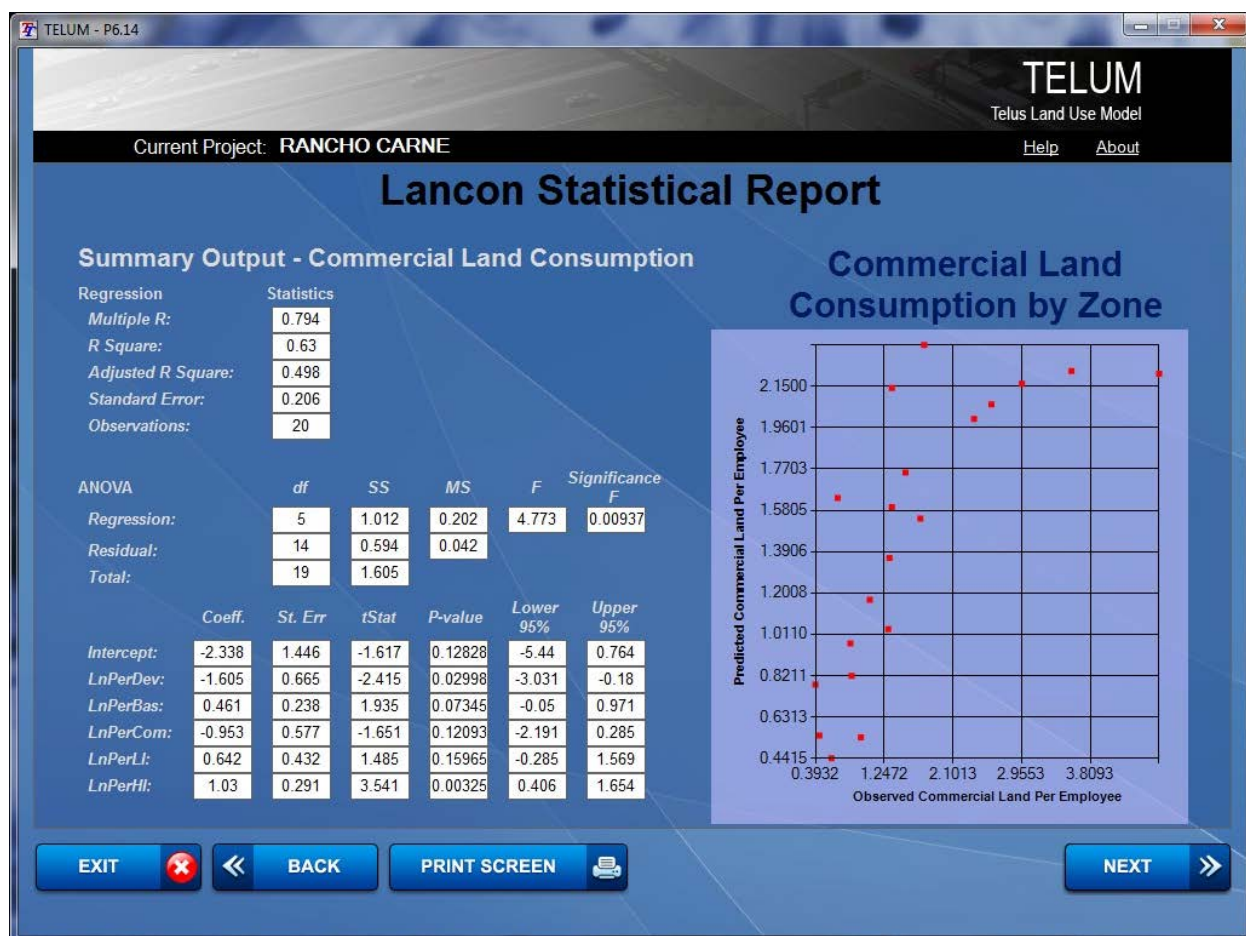


Figure 10 – LANCON Statistical Report

7. Model Forecasting Unit (MFCU)

In this section you will do the following:

1. Prepare Files for the Forecast Model
2. Perform a Baseline Model Forecast
3. Re-run a Model Forecast
4. Perform a Policy Model Forecast
5. Map, Analyze, and Compare Forecast Results

Prepare Files for the Forecast Model

When starting the *Model Forecasting Unit (MFCU)*, TELUM prepares the data files for the first set of model forecasts, called “*Baseline*”. Baseline forecasting is a process of spatial allocation of employment and households to zones based on the observed regional demographic and socio-economic indicators and calibrated attractiveness variables obtained from the current and lag year data inputs. Before performing the Baseline forecast TELUM provides you with an opportunity to:

- Change the number of “forecast time periods”
- Add an additional impedance file for a future forecast time period
- Change the region’s total employment and household projections

Perform a Baseline Model Forecast

For Rancho Carne, perform the Baseline forecasts with **NO changes** to the forecast time periods, impedance files, or projections table, as shown in Table 4.

Table 4 – Baseline forecast run settings

Screen	MFCU Variable	Input Value
P7.26.1	Change Regional Employment and Household Projections	No
P7.13	Add Future Impedance File	No
P7.5	Impose Employment or Household Constraints	No

At the conclusion of the Baseline forecast, TELUM will immediately provide an “Analysis of Forecast Spatial Patterns” to summarize the changes (growth or decline) of the region’s employment and household spatial allocations. It is important to review this report carefully in conjunction with the MAP IT Forecasting results. On TELUM screen **P7.8.1**, click the MAP IT button to map the forecast results – a sample map of forecast results is shown in Figure 11.

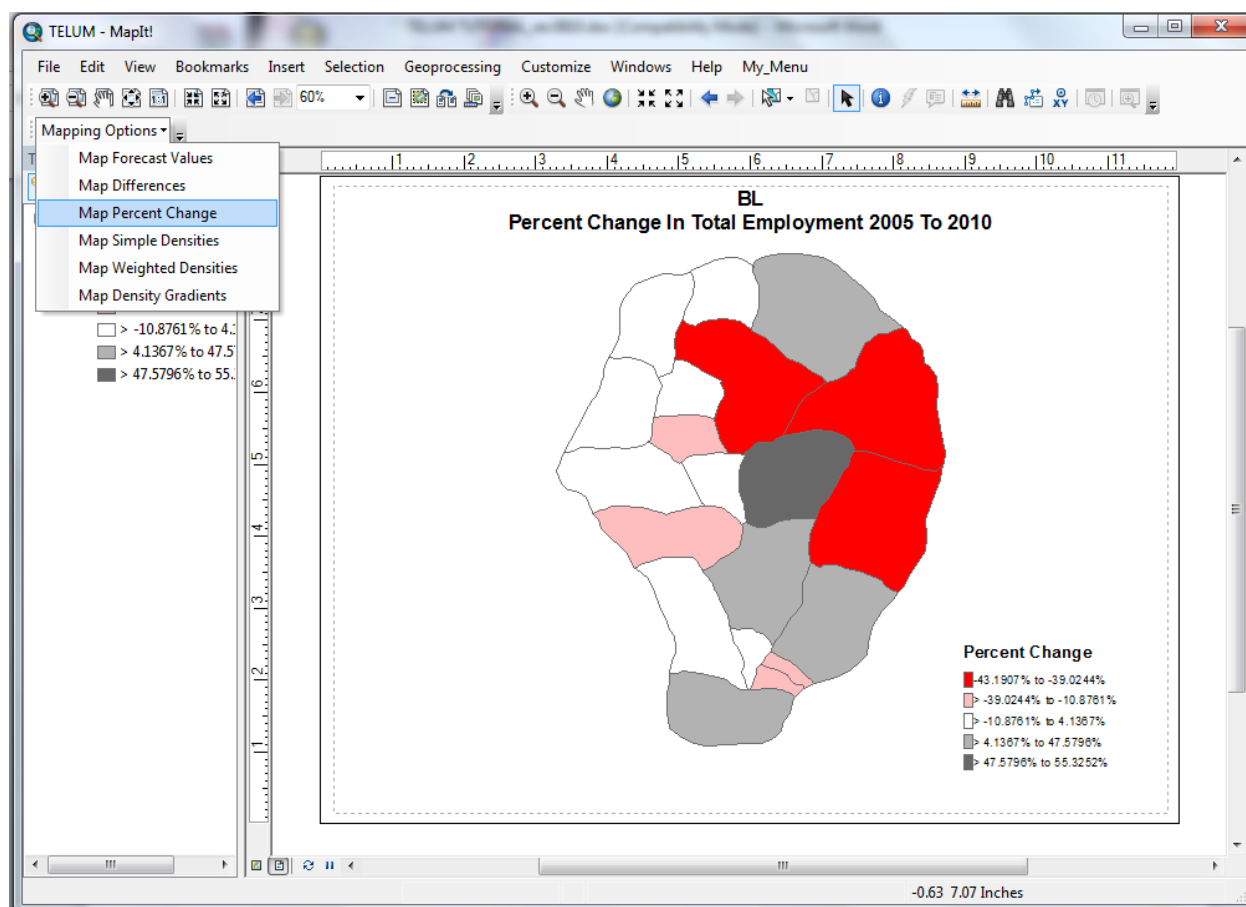


Figure 11 – A sample MAP IT output for the Rancho Carne Baseline Forecast

Rerun a Model Forecast for the Rancho Carne Baseline Model

After reviewing the “Analysis of Forecast Spatial Patterns”, TELUM will walk you through a series of information screens that are used to decide what to do next and to organize and store the data for the existing and new model forecast outputs if you decide to perform additional forecasts.

The charts shown in Table 5 and Table 6 provide the information and data you will need to “Rerun” the “Baseline” forecast for the Rancho Carne tutorial project with some changes in the model inputs.

The TELUM screen **P7.8.1** prompts you to select one of the following options for proceeding further:

1. Rerun a Model Forecast

2. View a prior Model Forecast
3. Run a new Model Forecast
4. Exit TELUM

Please select option 1 - Rerun a Model Forecast. The following options are presented on screen

P7.8.3:

- A. Change the original *DOPU* data set.
- B. Change the regional control totals inside the *DOPU* Conversion Matrix.
- C. Add or change a future year impedance file.
- D. Change the regional employment and household projections.

Please select option D - Change the regional employment and household projections.

******NOTE:** When rerunning a policy forecast, users may only select options C or D.

Table 5 – Settings for rerunning Baseline forecast

Screen	MFCU Rerun Variable Inputs	Input Value
P7.8.1	Forecasting	Rerun Model Forecast
P7.8.1A	Rerun Model Forecast	Baseline
P7.8.1C	Model Forecast File Storage	OLD_BL
P7.8.3	Do you wish to make changes?	EMP/Household Projections
P7.6	Forecasting Time Periods	Yes
P7.8.4	Enter new EMP/Household Projections	See Table 6 below
P7.13	Travel Impedance	No
P7.5	Forecasting Constraints	No

On TELUM screen P7.8.4 you will be asked to provide the revised regional employment and population projections. Please edit the values for the Employment and Household projections as shown in Table 6.

Table 6 – Revised regional population and employment projections for rerunning Baseline forecast

Year	Employment						Total Population
	AGR	LMFG	PROF	RTL	FIRE	Total Emp	
2010	851	9599	5680	10787	8103	35020	70016
2015	834	10227	6324	11492	8346	37223	74750
2020	751	11084	6975	12299	8763	39872	77219
2025	669	11398	7248	12845	8938	41098	79664
2030	710	11611	7486	13141	9117	42065	81953
2035	684	11743	7573	13274	9482	42756	82776

***NOTE: Bolded/italic/highlighted items are changed from the baseline dataset entered in the Data Prep Spreadsheet

The TELUM is now ready to re-run the baseline forecast.

Run a Policy Model Forecast

Regional planning agencies often times perform alternative model forecasts in addition to their “Baseline” set. These forecasts are usually referred to as “Policy” or “Scenario” forecasts. For a “Policy” forecast a user must intend to:

- Add or change a future year impedance file; and/or
- Change the regional employment and household projections; and/or
- Constrain forecasts using TELUM constraints.

Run a New (Policy) Forecast for Rancho Carne

The charts in Table 7 and Table 8 provide the information and data you will need to enter in TELUM to perform the new (policy) forecast for Rancho Carne. In this new forecast you will add a “Future Year Impedance” file for model year 2015. In this exercise we can assume that Rancho Carne has adopted a new tax incentive policy in zones 6, 7, 16, 17, and 18, which is expected to increase attractiveness of these zones and attract more jobs (employment) and households to these areas. With an increase in population and employment, Rancho Carne’s transportation department has issued new travel impedances for 2015. The new policy forecast is labeled **PS1** (Policy Scenario 1).

Table 7 –Settings for running Policy Scenario 1 forecast

Screen	MFCU New Run Variable Inputs	Input Value
P7.8.1	Forecasting	Run a New Model Forecast
P7.8.1B	New Forecast Name	PS1
P7.8.3	Do you wish to make changes?	Add Impedance file
P7.15	Travel Impedance Data	1; 2015
P7.16	Move your IMPD15.txt file into the \TELUM 2011\DATA\ folder	N/A
P7.19	Impedance File values	see table below
P7.5	Forecasting Constraints	No

Table 8 – TIPU (impedance) validation settings for the impedance file for model year 2015

Screen	TIPU Data Variable	Input Value
P7.19	Average Impedance	82
	Smallest Impedance	7
	Largest Impedance	197
	Top 4x4 impedances	10, 45, 31, 87
		45, 7, 30, 42
		31, 30, 8, 67
		87, 42, 67, 23
	Bottom 4x4 impedances	9, 42, 27, 28
		42, 9, 23, 33
		27, 23, 19, 21
		28, 33, 21, 29

Map and Compare Forecast Results

With a Baseline and PS1 forecast completed, you can launch MAP IT (if you have ArcGIS capabilities) to map and compare the forecast results. MAP IT provides a variety of mapping options to help you visually interpret the spatial changes in employment and household location forecasts in the analyzed region. The mapping options include:

- Zonal Forecasts – map and review the zonal values for each employment and household category

- Calculated Zonal Differences – the zonal growth/decline of each employment and household category between two time periods and/or forecast runs (scenarios)
- Calculated Zonal Percent Change – the zonal growth/decline between two time periods and/or forecast runs (scenarios) expressed as a percentage
- Simple Zonal Density – total zonal developable land divided by the total number of zonal employment and/or households observed

An example of MAP IT comparison between the Baseline and PS1 forecasts is shown in Figure 12.

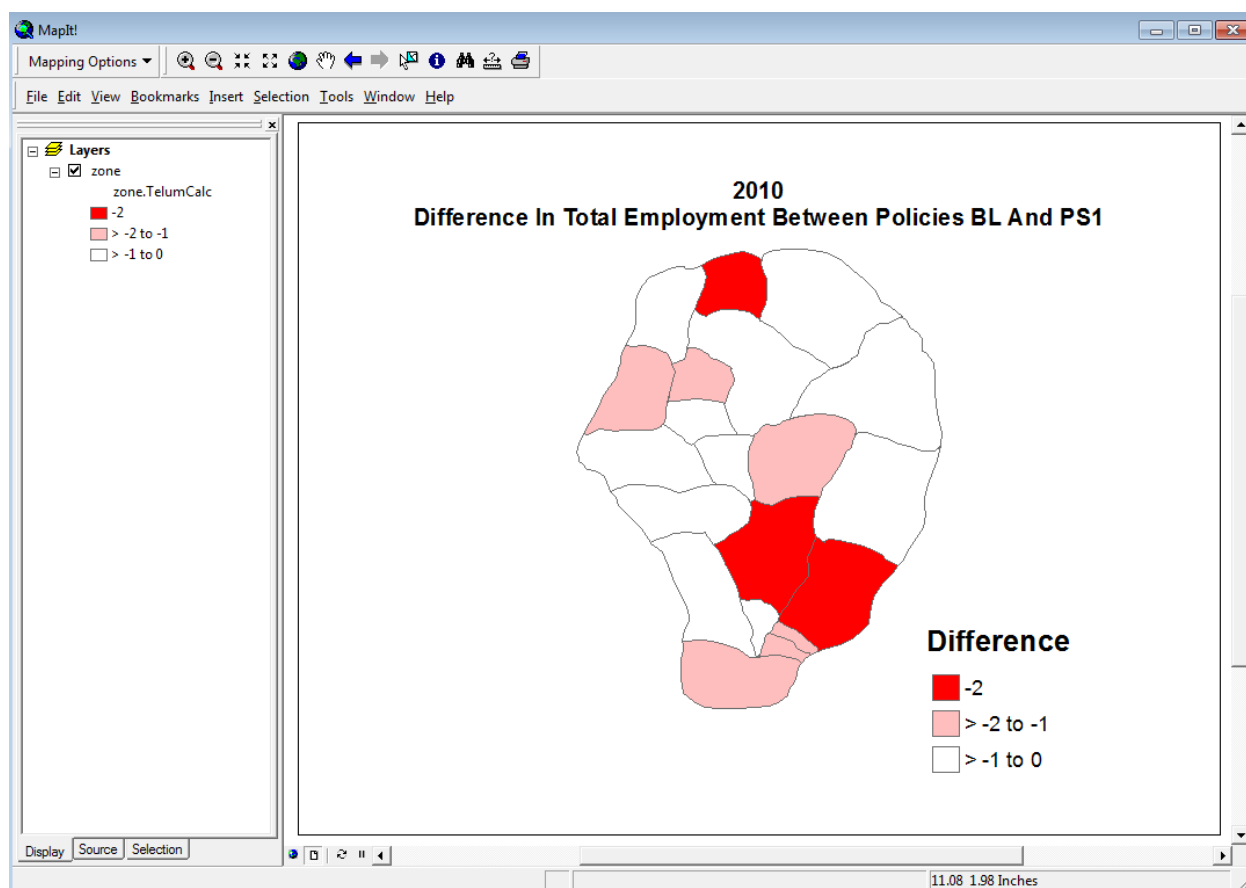


Figure 12 – MAP IT comparison between Baseline and PS1 scenario, 2010 forecasts

This concludes your TELUM Tutorial. If you have questions, please feel free to contact TELUM support staff.

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