



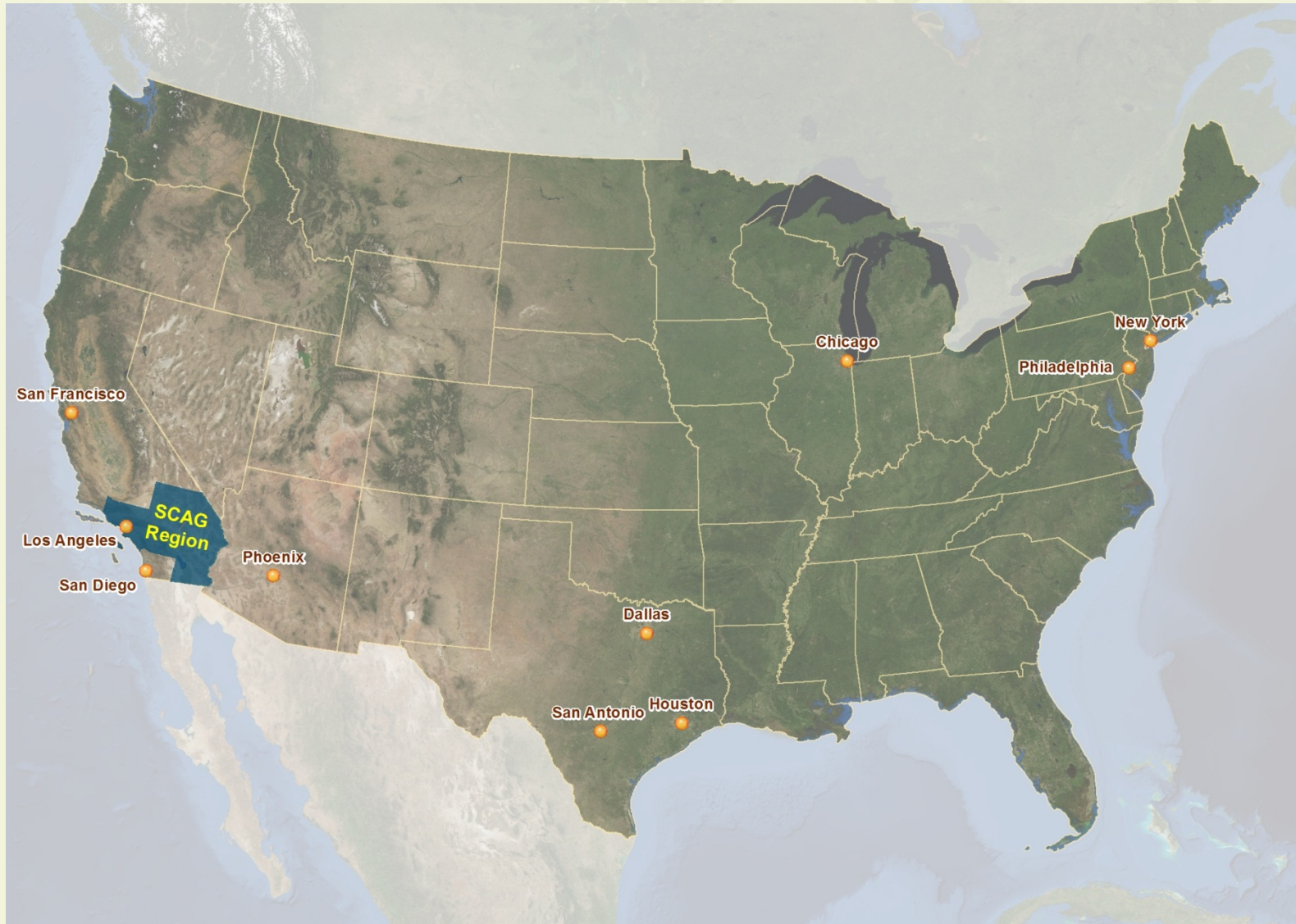
# Visualization of LODES/OnTheMap Work Destination Data Using GIS and Statistical applications

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Research & Analysis  
Southern California Association of Governments

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# Southern California Association of Governments (SCAG)





# SCAG Quick Facts

A map of Southern California with the Southern California Association of Governments (SCAG) region highlighted in a darker shade. The highlighted area includes the counties of Ventura, Los Angeles, San Bernardino, Orange, Riverside, and Imperial. The text "Nation's largest Metropolitan Planning Organization (MPO)" is overlaid on the top part of the map.

Nation's largest Metropolitan Planning Organization (MPO)

6 counties and 191 cities

18 million people within 38,000+ square miles

GDP in 2012: \$890 Billion  
(16th largest economy in the world)

# Overview



- Background
- Objectives
- Methodology
- Results
- Conclusions

# SCAG's Local Profiles

- Planning data reports prepared for each city and county within the SCAG Region.
- Provides local jurisdictions with a resource for local data and analysis.

## Profile of the City of Long Beach

Southern California Association of Governments' (SCAG) Regional Council includes 67 districts which represent 191 cities in the SCAG region.

SCAG Regional Council Districts 29 and 30 include Avalon and Long Beach  
Represented by: Hon. Steven Neal and Hon. James Johnson



This profile report was prepared by the Southern California Association of Governments and shared with the City of Long Beach. SCAG provides local governments with services including planning data and information, technical and planning assistance (i.e. GIS training and growth visioning), and analyzing the impacts of infill development.

May 2013  
Southern California Association of Governments

### 2012 STATISTICAL SUMMARY

Category	Long Beach	Los Angeles County	Long Beach relative to Los Angeles County*	SCAG Region
2012 Population	464,662	9,884,632	[4.7%]	18,242,331
2012 Median Age (Years)	34.3	35.6	-1.3	35.2
2012 Hispanic	42.0%	48.5%	-6.5%	46.4%
2012 Non-Hispanic White	28.6%	27.1%	1.5%	32.1%
2012 Non-Hispanic Asian	12.7%	13.9%	-1.2%	12.4%
2012 Non-Hispanic Black	12.8%	8.0%	4.6%	6.3%
2012 Non-Hispanic American Indian	.3%	.2%	.1%	.2%
2012 Non-Hispanic All Other	3.9%	2.4%	1.5%	2.5%
2012 Number of Households	163,623	3,240,575	[5%]	5,870,063
2012 Average Household Size	2.8	3.0	-0.2	3.1
2012 Median Household Income (\$)	49,808	53,880	-4,072	57,465
2012 Number of Housing Units	176,131	3,454,092	[5.1%]	6,356,479
2012 Homeownership Rate	41.5%	54.3%	-12.8%	54.3%
2012 Median Existing Home Sales Price (\$)	299,000	330,000	-31,000	323,000
2011 - 2012 Median Home Sales Price Change	3.1%	4.8%	-1.7%	6.4%
2012 Drive Alone to Work	75.0%	75.3%	-.3%	77.8%
2012 Mean Travel Time to Work (minutes)	31	32	-1	31.4
2012 Number of Jobs	165,186	4,209,116	[3.9%]	7,462,957
2011 - 2012 Total Jobs Change	2,009	54,513	[3.7%]	109,491
2011 Average Salary per Job (\$)	44,320	50,666	-6,346	49,468
2012 K-12 Public School Student Enrollment	73,500	1,569,933	4.7%	3,096,034

Sources: U.S. Census Bureau; Nielsen Co.; California Department of Finance; MDA Data Quick; and SCAG

\* Numbers with [ ] represent Long Beach's share of Los Angeles County. The other numbers represent the difference between Long Beach and Los Angeles County.

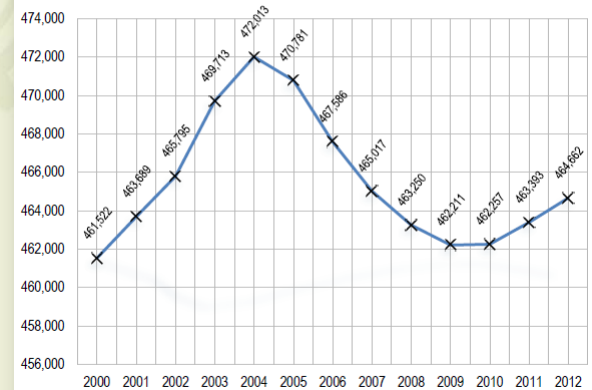
Maped jurisdictional boundaries are as of July 1, 2012 and are for visual purposes only. Report data, however, are updated according to their respective sources

# SCAG's Local Profiles (cont.)

- Current and historical demographic, socio-economic, housing, transportation and education data
- Information and communication resources for elected officials, business and residents.

## II. Population (the City of Long Beach)\* *Population Growth*

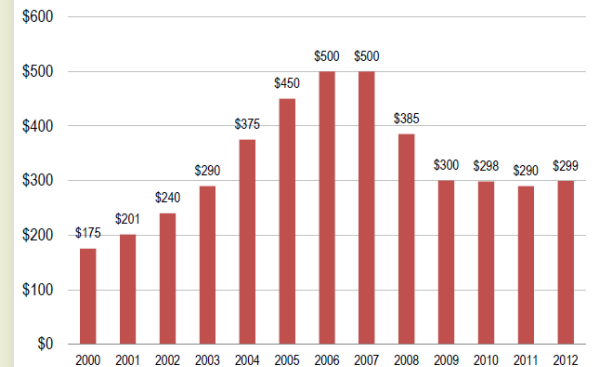
Population: 2000 - 2012



Sources: California Department of Finance, E-5, 2012

## *Home Sales Prices*

Median Home Sales Price for Existing Homes: 2000 - 2012  
(in \$ thousands)



Source: MDA Data Quick, 2012

# Major Work Destinations

- New feature of the 2013 Local Profiles
- Top 10 locations where residents from a local jurisdiction commute to work
- Correlation with regional development patterns and the geographical location of the local jurisdictions, particularly in relation to the regional transportation system.

# Objectives

- Identify the major work destinations for each jurisdiction in the SCAG region
  - 191 cities and 6 counties
- Visualize the spatial patterns of the major work destinations for each jurisdiction
  - To understand where residents of each jurisdiction are employed





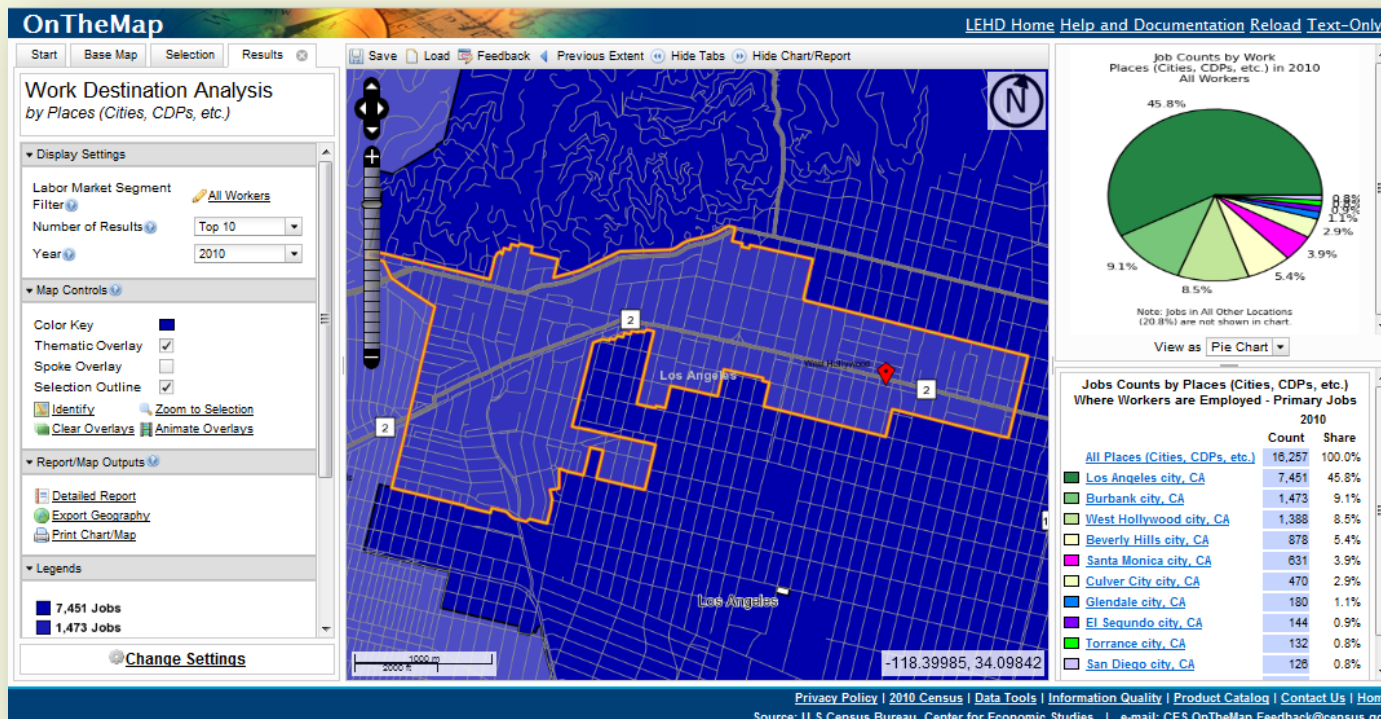
# **Methodology**

# Identifying Major Work Destinations

- Using *OnTheMap* application
  - Work Destination Analysis
- Using LEHD Origin-Destination Employment Statistics (*LODES*) raw datasets
  - Available for download from LEHD website

# OnTheMap Application

- Web-based mapping and reporting application



# *OnTheMap* Application

- Web-based mapping and reporting application
- Based on 2002-2011 *LODES* data
- Easy-to-use interface
- Not able to search/download for multiple locations

# *LODES* Raw Datasets

- Raw form as a set of comma separated variable (CSV) text files
  - Available for the years 2002-2010
  - State-based / 3 types (OD, RAC, WAC)
- Enumerated by census blocks
  - Version 6 by 2010 census blocks
- Data manipulation and processing

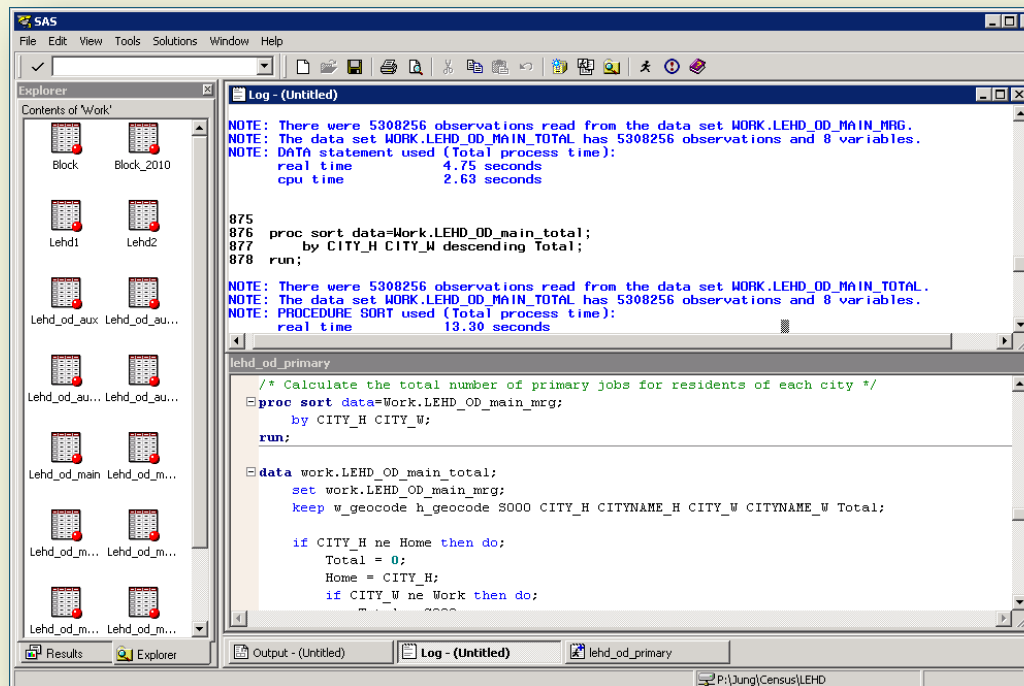


# *LODES* Raw Datasets (cont.)

- *LODES* CA Version 6.1 (2010)
- Variables
  - Residence Census Block Code (*h\_geocode*)
  - Workplace Census Block Code (*w\_geocode*)
  - Total number of primary jobs (*S000*)
  - Correspondence between Census Blocks and Places

# Identifying Major Work Destinations ( O-D Analysis )

- Using SAS (Statistical Analysis System) to calculate the total number of jobs for each O-D at *place* level



# Visualizing Major Work Destinations

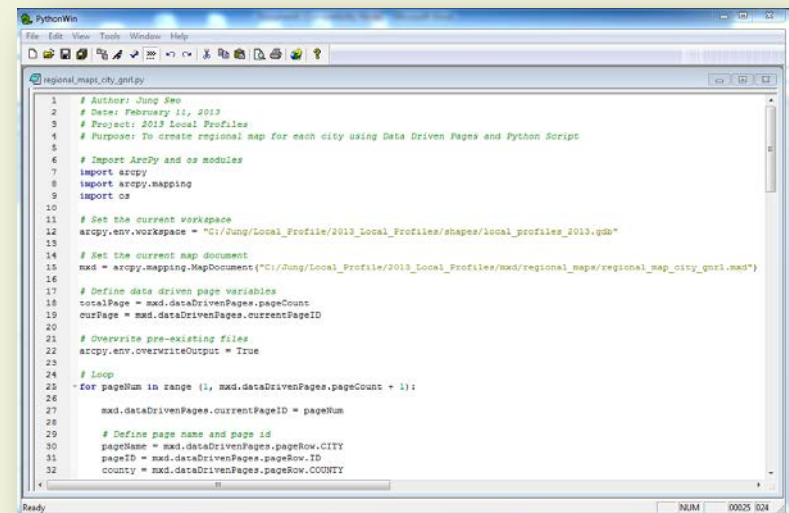
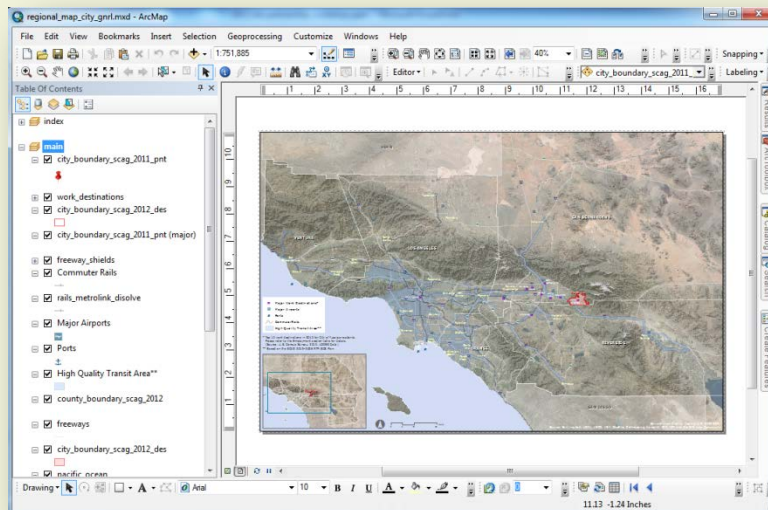
- Using *ESRI ArcGIS* application
  - ***Data Driven Pages*** – To create a multi-page map series from a single map document
- Using *Python* programming language
  - *Python* – Interpreted, object-oriented, high-level general-purpose programming language

# ArcPy

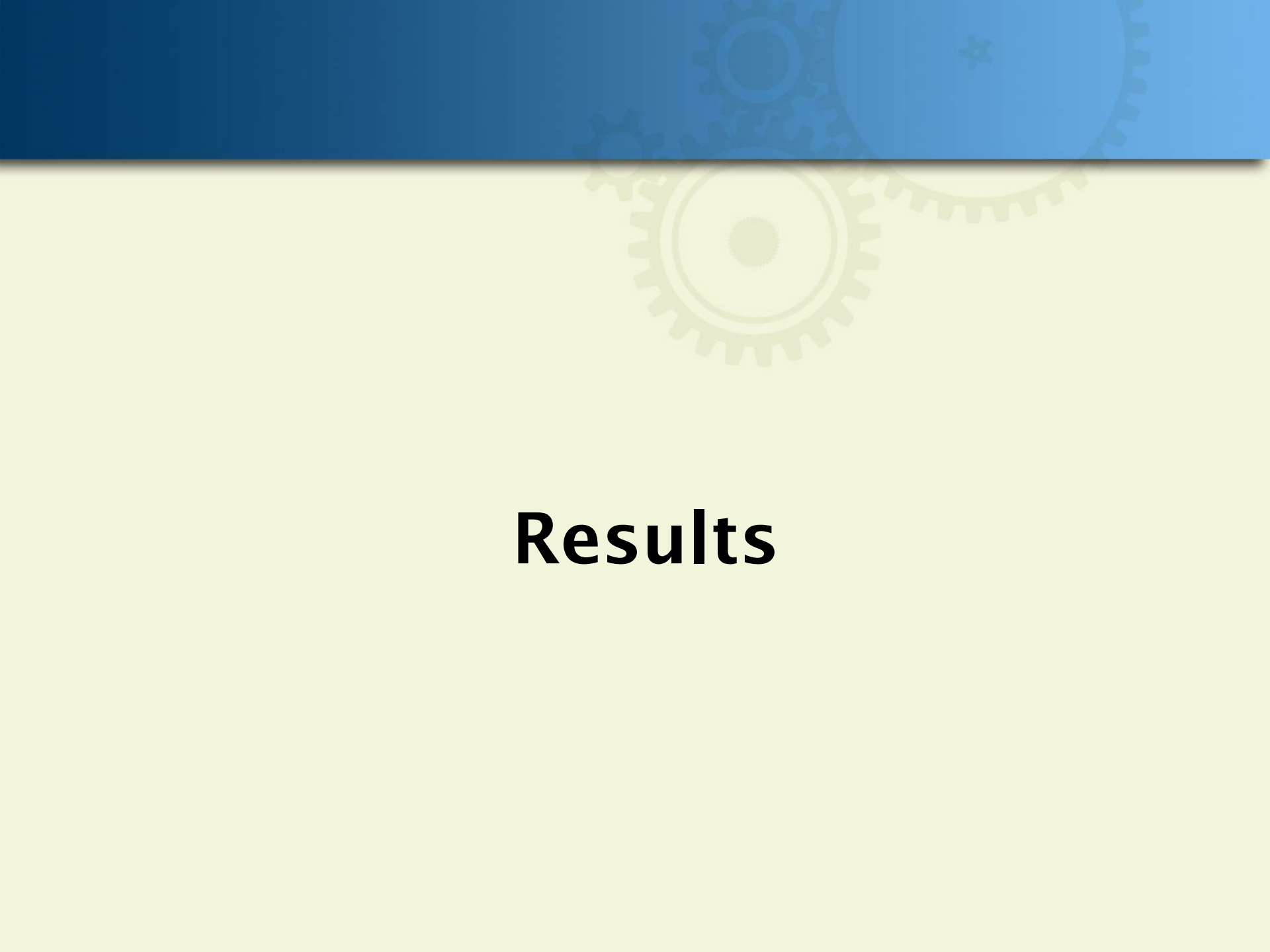
- *Python* site package for performing GIS functions available in *ArcGIS*
  - Encompassing the *arcpy* scripting module
  - Ex) *arcpy.mapping* (mapping module)
- Useful and productive way to perform geographic data analysis, data conversion, data management, and map automation with Python

# Visualizing Major Work Destinations ( Automated Mapping Workflow )

- Using ArcGIS and Python to create a series of work destination maps for 191 cities and 6 counties



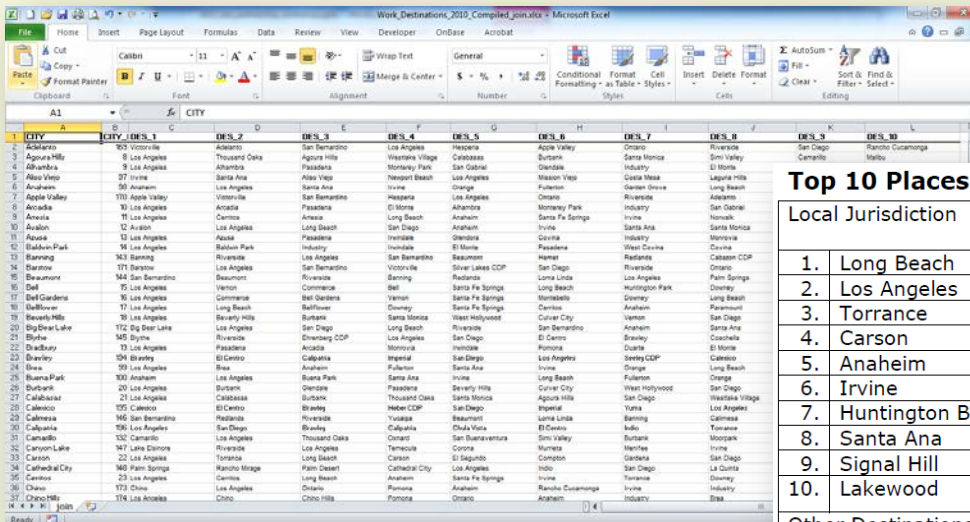




# Results

# Top 10 Work Destinations ( LODES Raw Dataset )

- Identified top 10 work destinations where residents of local jurisdictions commute to work (191 cities and 6 counties), based on *LODES* raw datasets.



**Top 10 Places Where Residents Commute to Work: 2010**

Local Jurisdiction		Number of Commuters	Percent of Total Commuters
1.	Long Beach	38,504	23.27 %
2.	Los Angeles	23,371	14.13 %
3.	Torrance	5,216	3.15 %
4.	Carson	3,922	2.37 %
5.	Anaheim	3,522	2.13 %
6.	Irvine	3,428	2.07 %
7.	Huntington Beach	3,113	1.88 %
8.	Santa Ana	2,833	1.71 %
9.	Signal Hill	2,559	1.55 %
10.	Lakewood	2,463	1.49 %
Other Destinations		76,504	46.24 %

Source: U.S. Census Bureau, 2012; LODES Data; Longitudinal-Employer Household Dynamics Program

# Visualization of Top 10 Work Destinations

- Created a series of maps that depict top 10 work destinations for 191 cities and 6 counties, based on automated workflow using ArcGIS and Python.





# **Conclusions**

# Conclusions

- Using LODES raw datasets with SAS, was significantly efficient in processing O-D data for numerous jurisdictions in the region.
- Automation process improved visualization workflow efficiency.
  - The workflow allows for repetitive tasks to be automated by executing programmed actions.
- Some inconsistencies were found in O-D job numbers between results from *LODES* raw datasets and results from *OnTheMap* results.



# Thank you!

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