

# MID-TERM FOLLOW-UP ASSESSMENT OF A DISAGGREGATE LAND USE MODEL

**Stewart Berry, Srinivasan Sundarum, &  
Howard Slavin**

**Caliper Corporation  
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# Introduction

- **In 2006 we developed a microsimulation model that forecast demographics and land use for Clark County, NV.**
- **The model and a short-term assessment were presented at previous TRB Planning Applications Conferences**
- **We now evaluate its predictions several years later to see if they are obsolete or delayed**

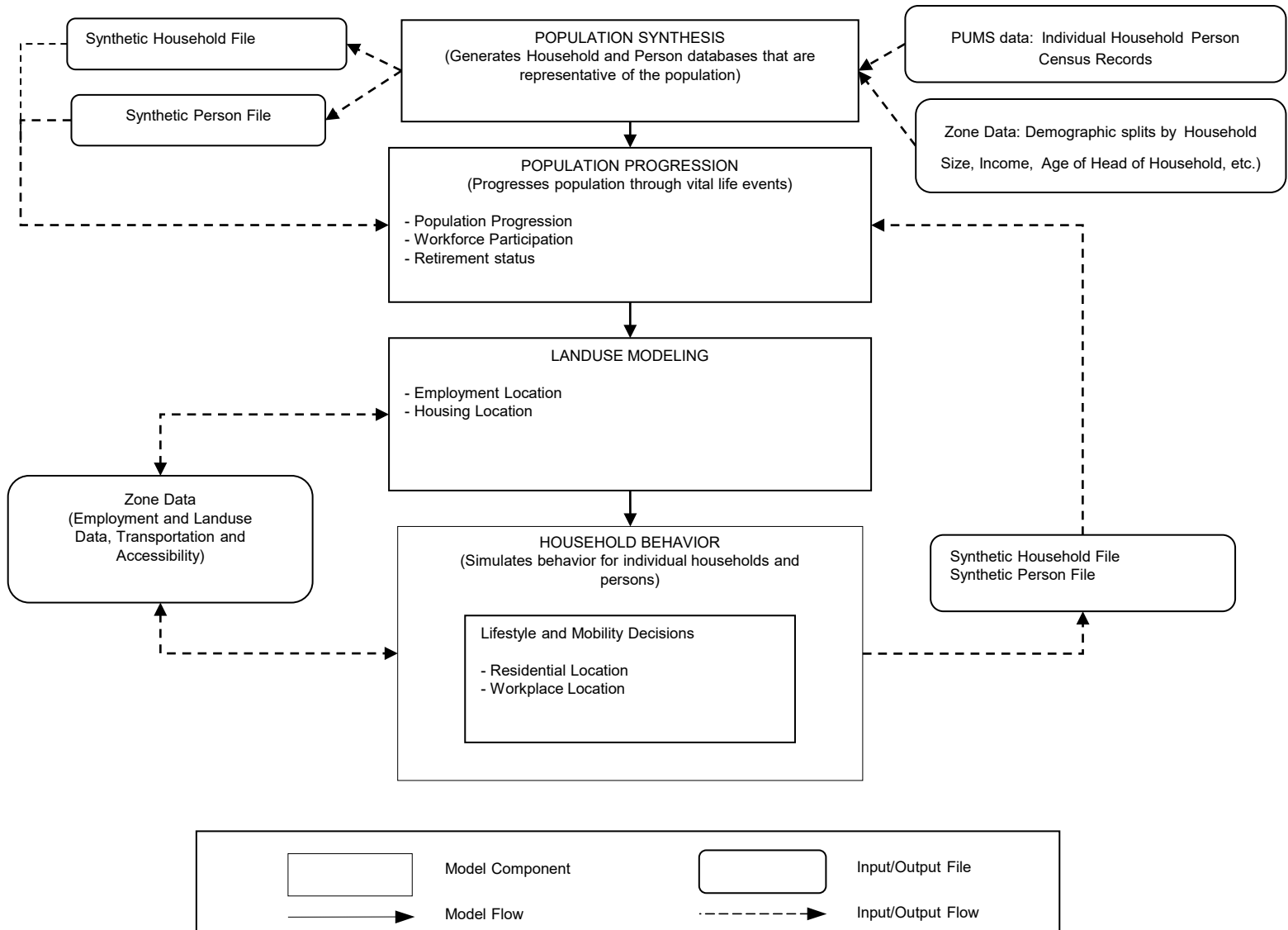
# STEP3 Model Characteristics

- **Microsimulation**
- **Landuse models**
- **Choice models**
- **GIS implementation**
- **Cell based zones**
- **Population aging**

# Model Basics



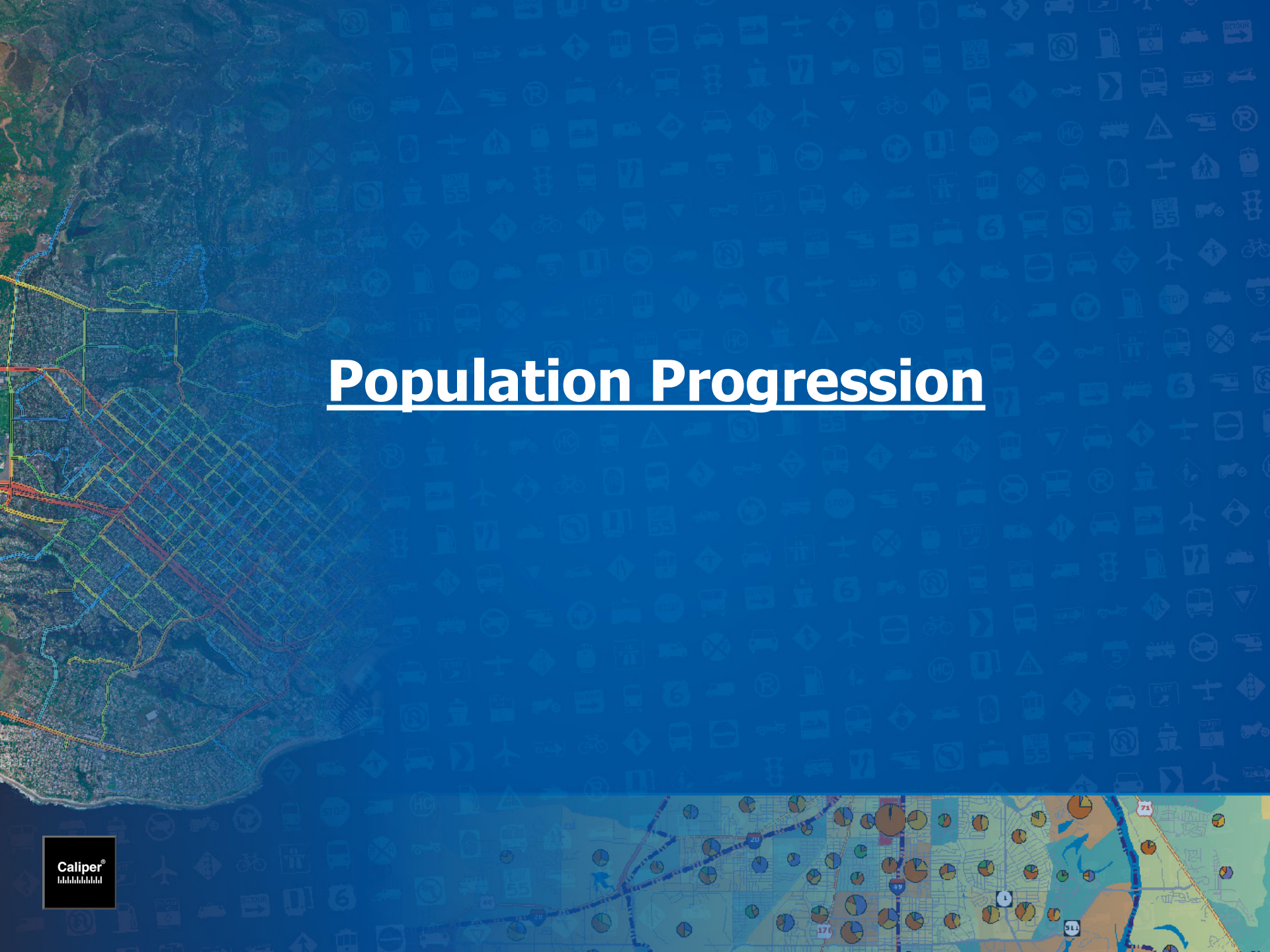
# STEP3 Framework



# Output

- **Four STEP3 scenarios**
  - High growth with extensive urban dispersion
  - High growth with constrained urban dispersion
  - Lower growth with extensive urban dispersion
  - Lower growth with constrained dispersion

# Population Progression



# Aging, Mortality and Births

- Age by 1 year
- Education of children is increased
- Income and wages increase
- Death rates are applied
- Birth rates are applied



# Household Formation

- **Leave home at age 22**
  - Vehicles, employment & income are calculated
- **Divorce**
  - Income & vehicles are split; children are assigned using custody probability
- **Marriage**
  - Single men are identified & potential brides are searched for based on age

# Migration

- Regional in- and out- migration is modeled using rates from IRS tax returns
- Intra-county migration is modeled using rates from the 2000 Census

# Labor Force

- **Worker**
  - Determined by gender, age, race, marital status & children by age
- **Retired**
  - If aged 65+, retirement status is determined by gender, age & household structure
- **Unemployed**
  - Determined using published Clark County rates

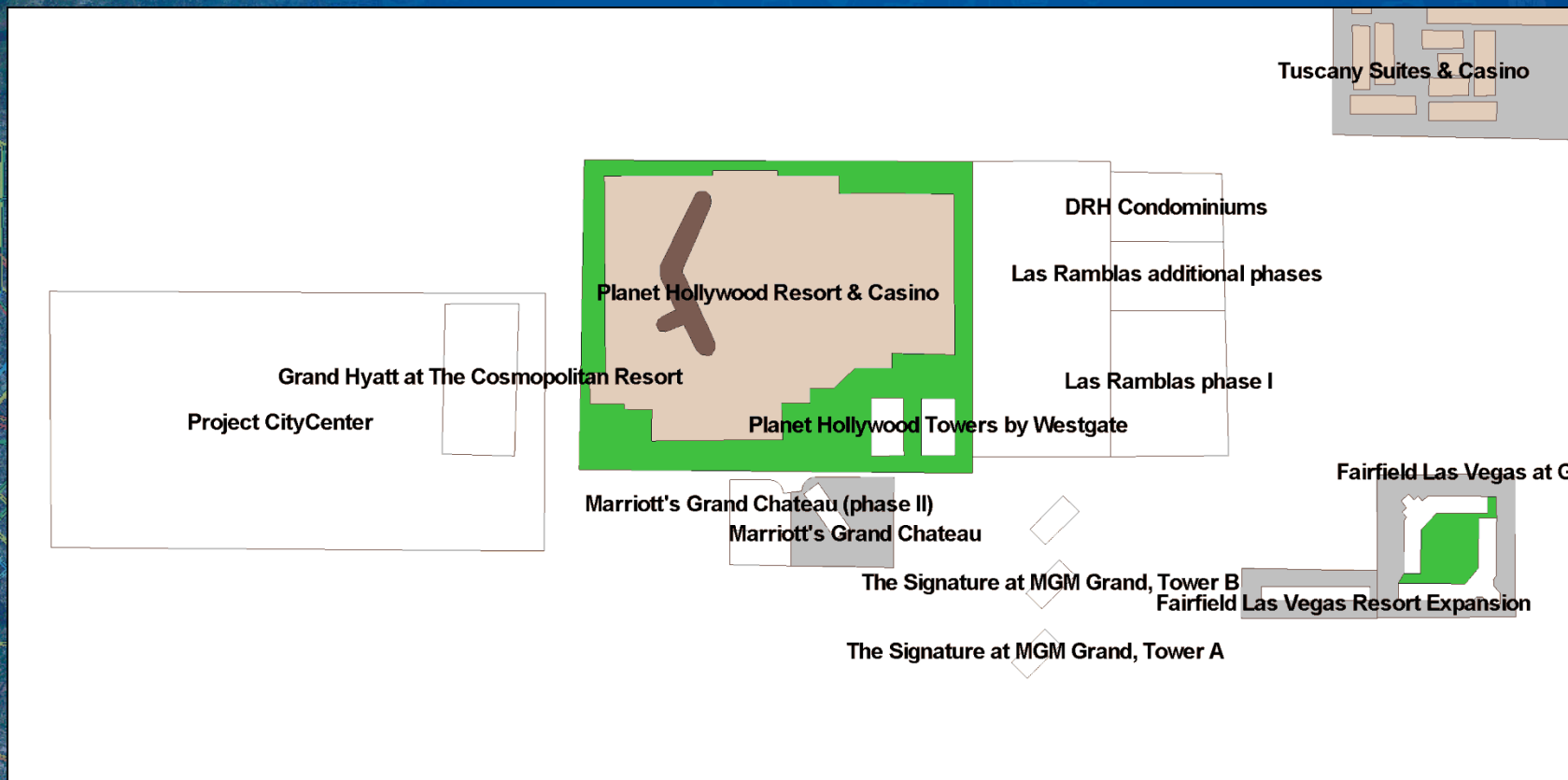
# Land Use Modeling



# External Inputs

- **The user can add residential and employment buildings:**
  - **Construction year**
  - **The number of owner/renter units**
  - **The number of jobs in 7 sectors:**
    - Hotel
    - Office
    - Industrial
    - Regional Retail
    - Community Retail
    - Neighborhood Retail
    - Other Non-Retail

# Post-2000 Development Layer



# Undevelopable Land

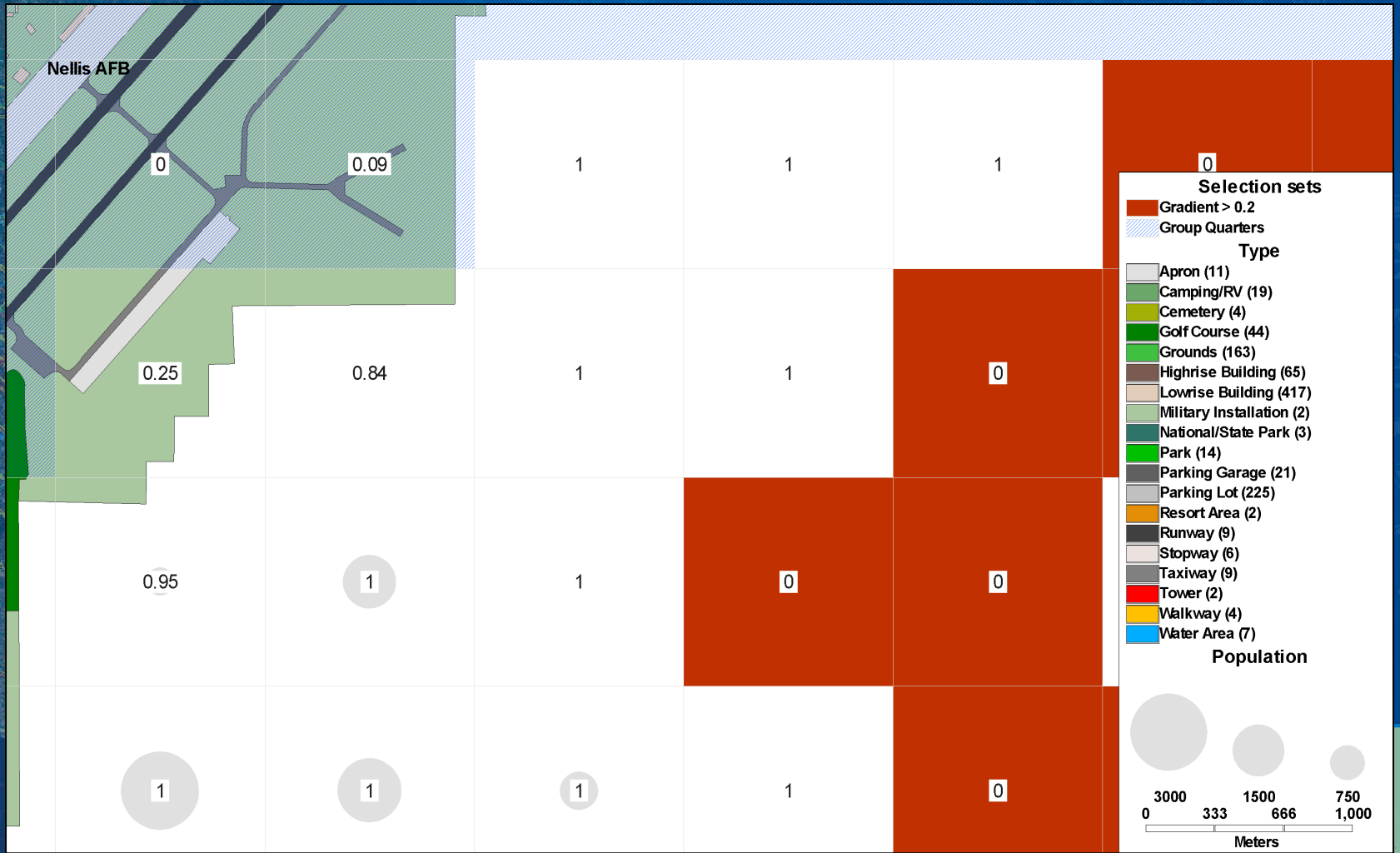
- **Undevelopable land restricts growth:**
  - **Military installations**
  - **Airports**
  - **Water bodies**
  - **Parks**
  - **Steep gradient**
  - **Constrained lands**

# Residential Cell Growth

- **The user can increase or decrease settlement sprawl and density**
- **A cell can be developed when it:**
  - **Has developable land**
  - **Has 2 neighboring cells with 919 people in each**
  - **Is not a group quarters cell**



# Cell Characteristics Influencing Urban Growth



# Employment Seeds

- **Non-retail employment grows using:**
  - Future landuse layer
  - Fixed growth
- **Retail employment grows using:**
  - “Hot-spots” that identify areas where there is high population but little retail

# Locational Choices



# Hotel Workers

- **Choose work zone first**
- **Employment preferences:**
  - CBD
  - Strip
  - High employment zones
- **Residence preferences:**
  - Income
  - Owner or renter status
  - Travel time to work
  - Number of units available

# Non-Hotel Workers

- **Choose residence zone first**
- **Residence preferences:**
  - Income
  - Owner or renter status
  - Average travel time to work
  - Number of units available
- **Employment preferences:**
  - CBD
  - Strip
  - Closeness to home zone
  - Vehicle & transit travel times & costs

# Demographics, Projections and Estimates

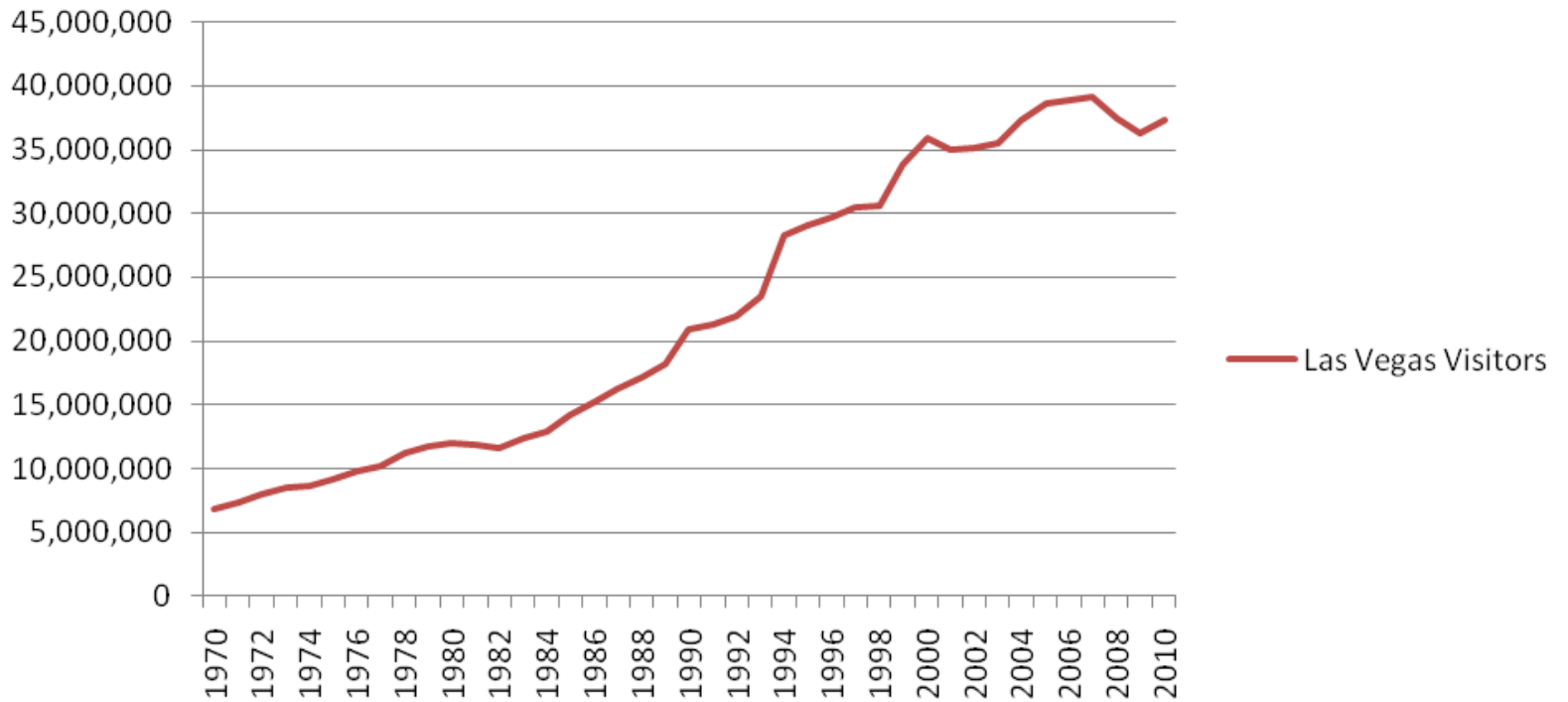


# Population Forecasting Problems

- **Likelihood of low and high variants?**
- **Vital statistics as linear trends**
- **Even stochastic models handling cyclical behavior cannot predict abrupt changes**
- **Predictions at the micro-scale can deviate wildly from reality**

# Las Vegas Visitors

## Las Vegas Visitors



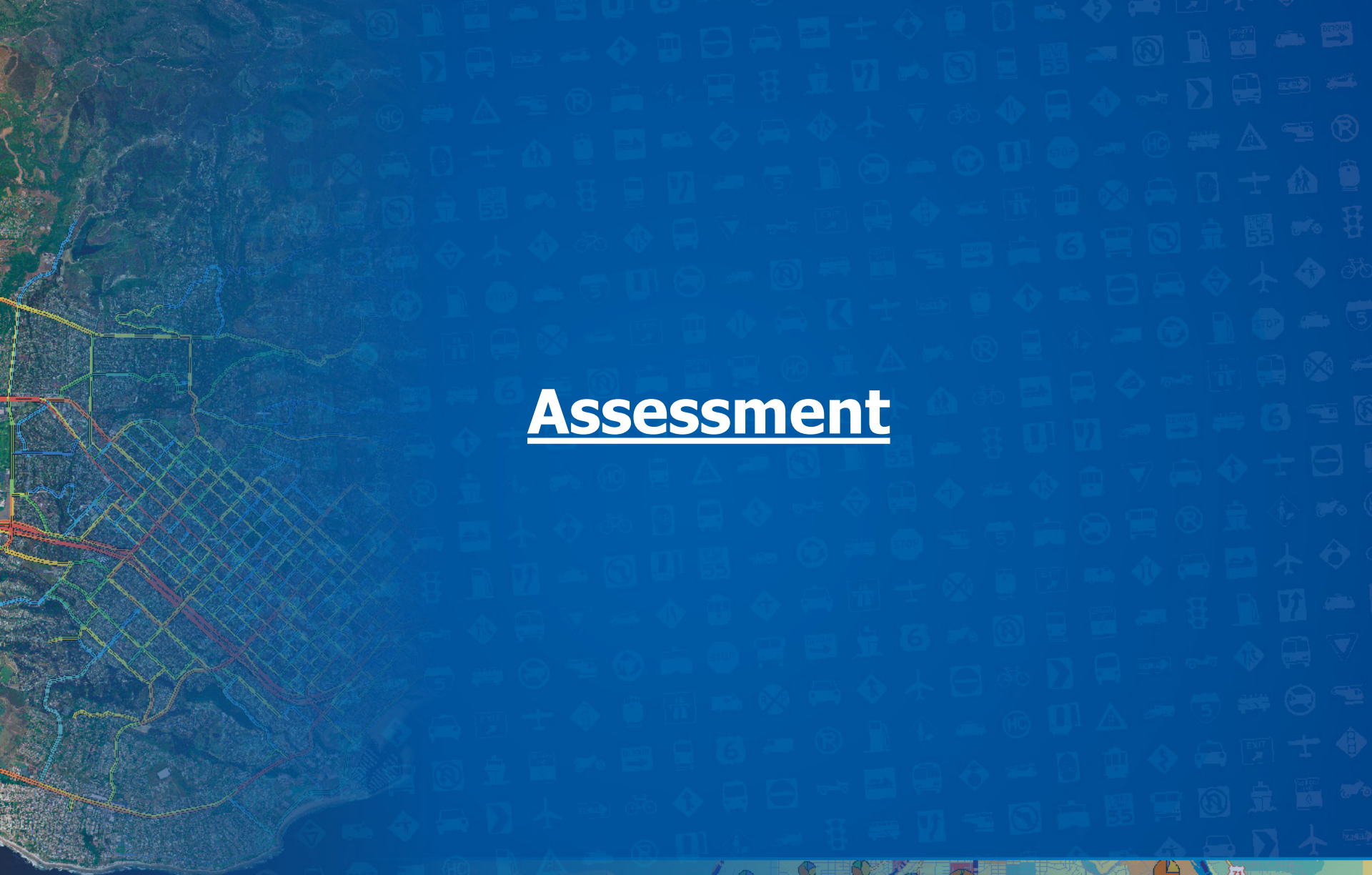


# Las Vegas Valley

- **Visitors below peak levels**
- **Population growth slow**
- **Unemployment up**
- **Immigration decrease**



# Assessment



# STEP3 Results

- **Population overestimates at the county level**
- **Significant Place-scale variations**
- **Effects of the down-turn missed**
- **Forecasted year-on-year increases will further deviate from reality**
- **Unrealized & unanticipated construction projects lead to distortions of employment and residence locations**

# Fortunately, we didn't model real estate prices or developer behavior

**Prediction: Las Vegas home-price decline will hit 52 percent**

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LAS VEGAS SUN

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THE ECONOMY:

**Report: 58.2 percent of Las Vegas homes have negative equity**

gaming:

The state of our engine

Strip building boom, buyouts were ill-timed, and many see more pain in '09

MGM, Dubai World reach CityCenter agreement; lawsuit dropped

# BID ONLINE MAY 17-19

## FEATURED NON-PERFORMING NOTES



Fountains at Flamingo  
Las Vegas, NV - 524 Unit Multi-Family Property  
Unpaid Balance: \$50,000,000  
**Starting Bid: \$15,000,000**

Loan Status: Non-Performing  
Loan Advisor: Joe Cuomo  
Phone: 1-855-567-2724 x5393  
Email: JCuomo@ArchetypeAdv.com



Sahara Pavillion North  
333,234 SF Retail  
Las Vegas, NV  
Unpaid Balance: \$56,250,000  
**Starting Bid: \$12,000,000**

Loan Status: Non-Performing  
Loan Advisor: Kurt Herold  
Phone: 1-855-567-2724 x5391  
Email: KHerold@ArchetypeAdv.com

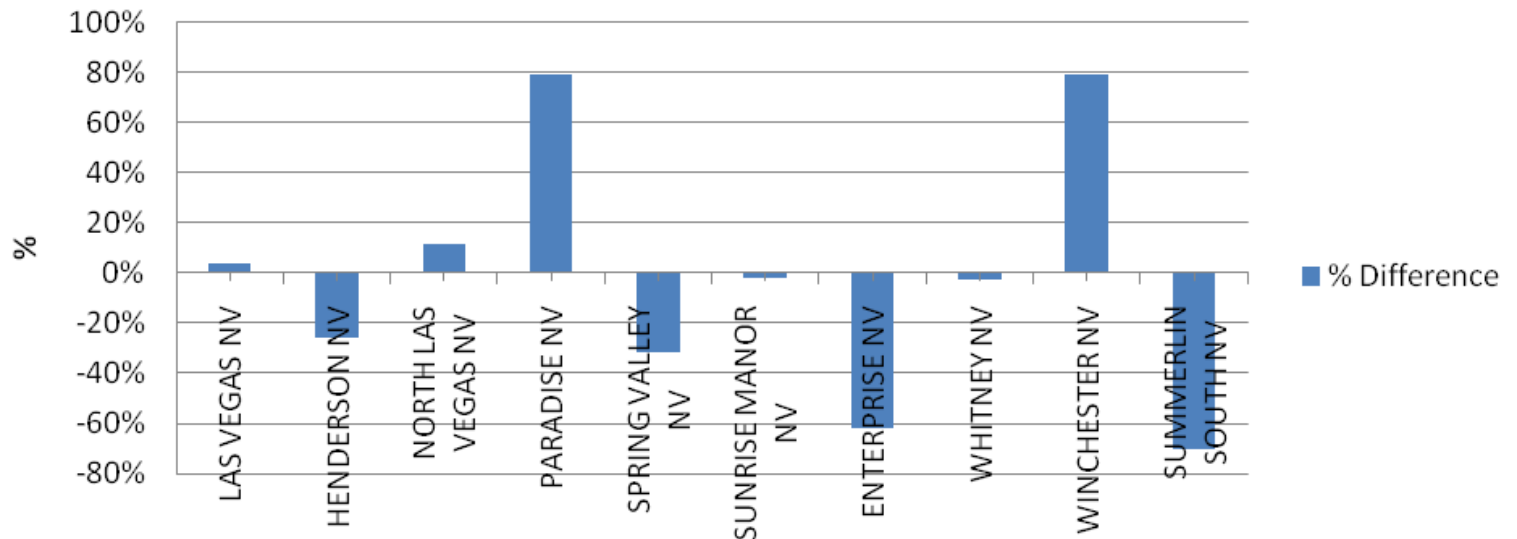


Montego Bay Apartments  
420 Units Multi-Family  
Henderson, NV  
Unpaid Balance: \$38,000,000  
**Starting Bid: \$12,000,000**

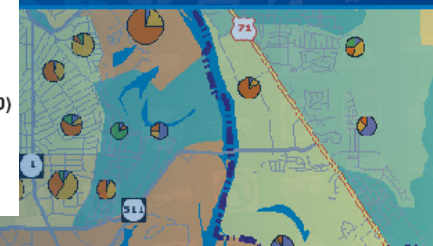
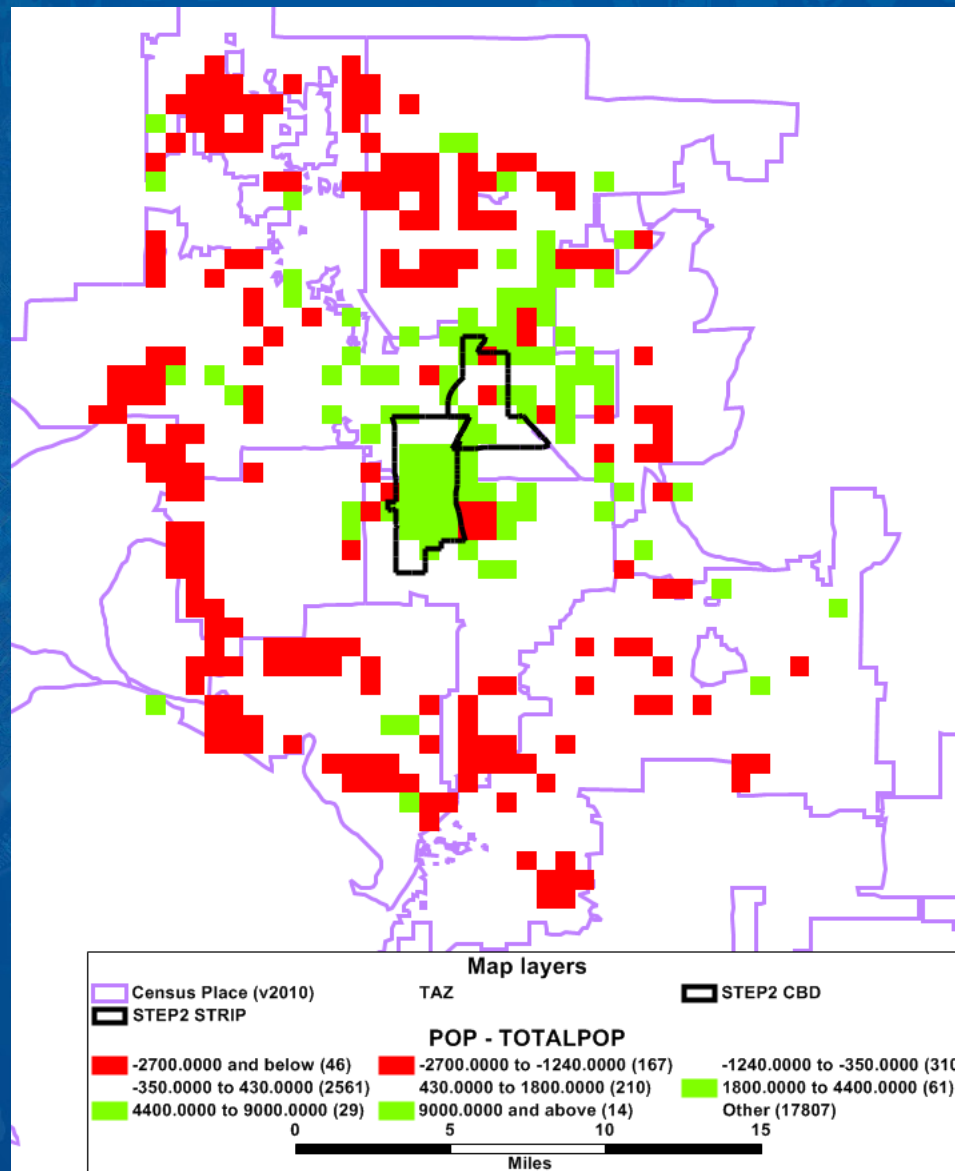
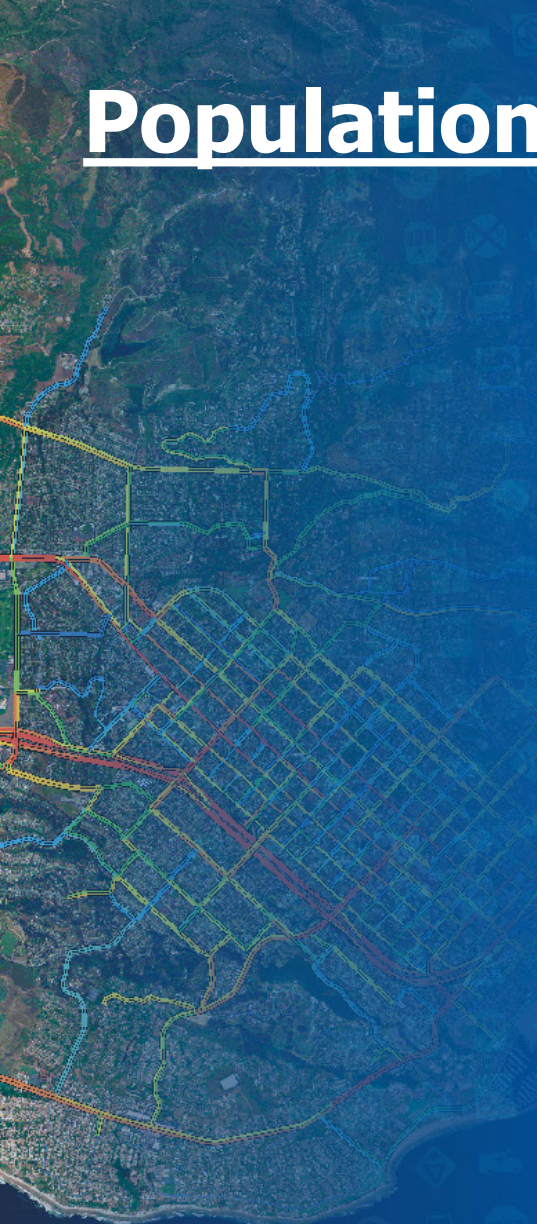
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# Deviations From Projected Number of Residential Units

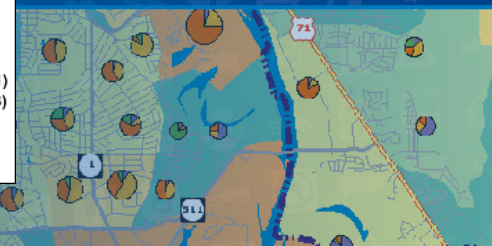
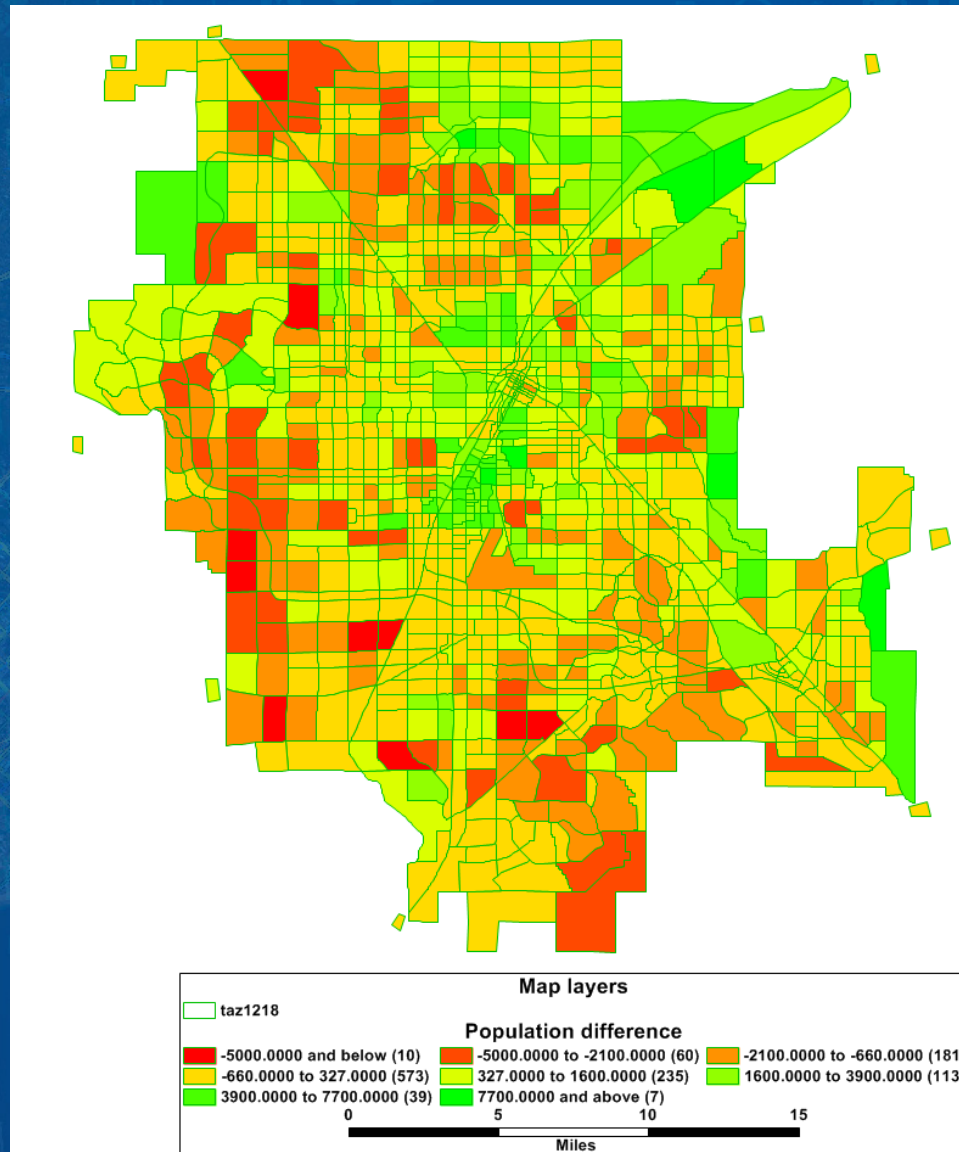
## % Difference in Expected Units (2010)



# Population: Cell Over-, Under- Estimation



# Population: TAZ Over-, Under- Estimation





# Major Developments by Status



# Spatially-Flawed Relationships

- **Overestimated the attractiveness of the strip and CBD for work and residential proximity**
- **Suburban growth furthest from jobs and in the least affordable areas**
- **Spatial diversification of the gaming industry confounds local scale predictions**
- **Exogenous data unreliable**
  - **7,474 housing units to be built (via major projects) in Paradise by 2010, but which were either cancelled or delayed beyond 2010**

# Model Results Delayed or Obsolete?

- **Employment, population growth, & visitor numbers are recovering**
- **Housing & employment below peak levels**
- **Key model trend was immigration:**
  - dramatic decrease in US movers
  - below levels of international immigration
  - growth driven by natural increase
- **Las Vegas is diversifying while providing urban services & infrastructure**
- **Unlikely that a resurgent economy would realign reality with model projections**

# Conclusion

- **STEP3 failed to produce reasonable place-level forecasts**
- **The models were thwarted by the economy.**
- **The evidence suggests that it is very difficult to create long-range projections at the local level, and near-impossible on a micro-scale**
- **Perhaps such tools are better employed over shorter time periods**