

UPlan, iPlace3s, Statewide Tools Development, CalSIIM (PECAS), and CSTDM

Nathaniel Roth

neroeth@ucdavis.edu

Urban Land Use Transportation Center/Information
Center for the Environment
University of California, Davis

UPlan and Transportation Models

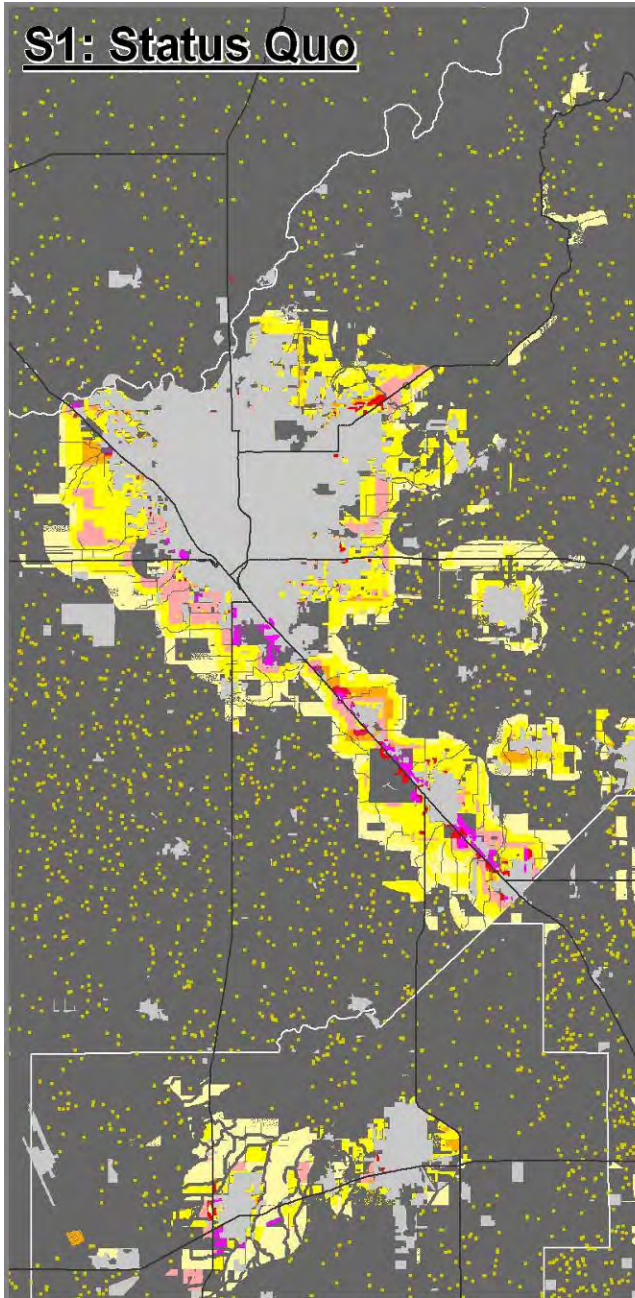
A Brief Description

- A Simple, Rule-based Land Use Model
- Purpose:
 - Land use scenario modeling
 - Land use disaggregation
- How it works:
 - Simple demographics
 - User defined rules and roles for spatial data
 - “General Plans”, masks, attractors, discouragers
- What it isn't:
 - A fully integrated land use/transportation model

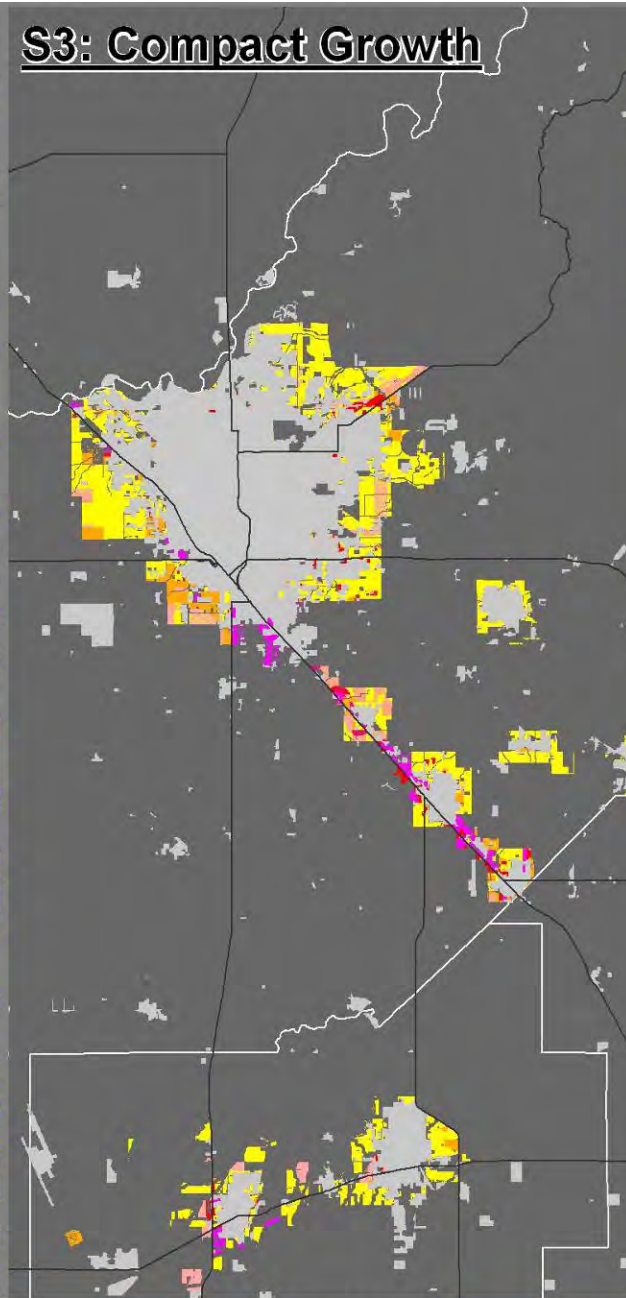
Challenges Integrating UPlan with Travel Demand Models

- Data Challenges:
 - Recent trends (building permits, employment)
 - Existing land use
- Integration is a manual process
 - Feedback loops
- Requires matching land uses from UPlan to the transportation model
- Tools exist for exporting the new land use
 - Default export
 - Custom export

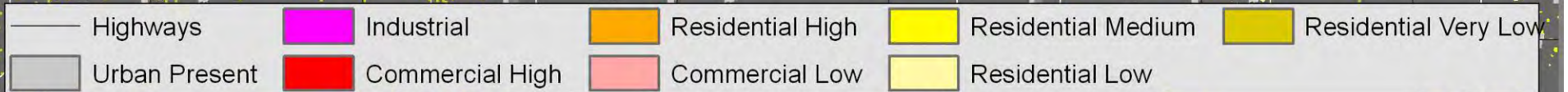
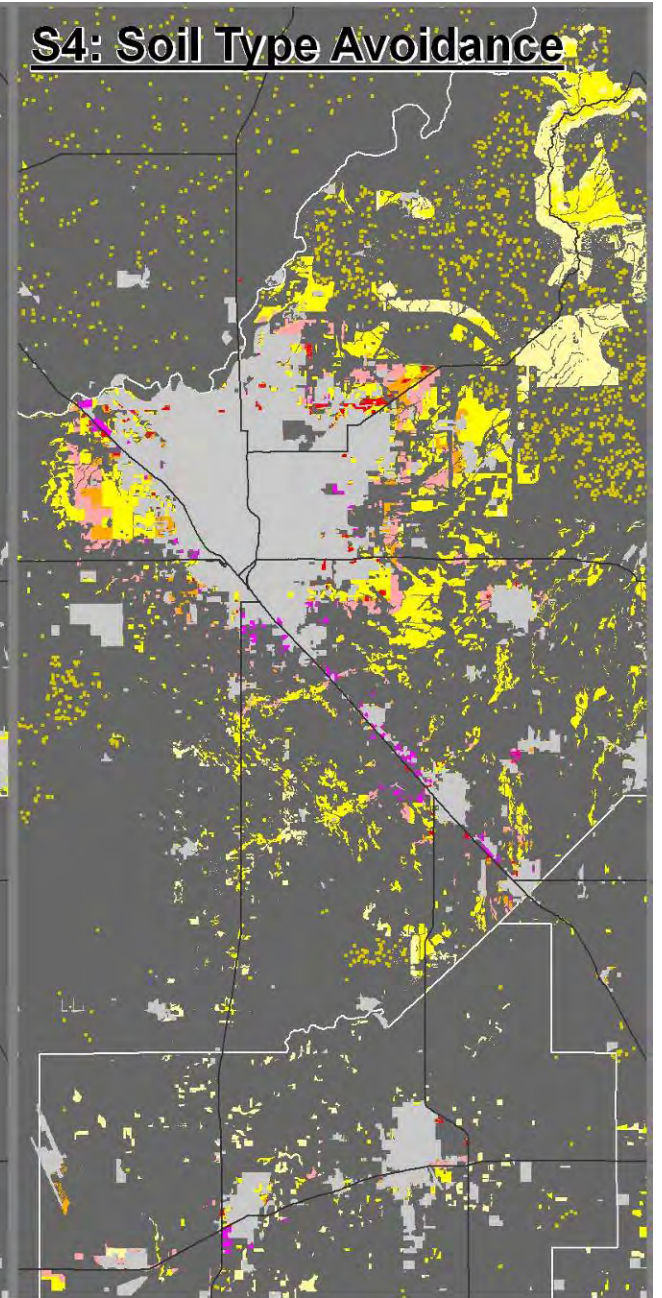
S1: Status Quo



S3: Compact Growth

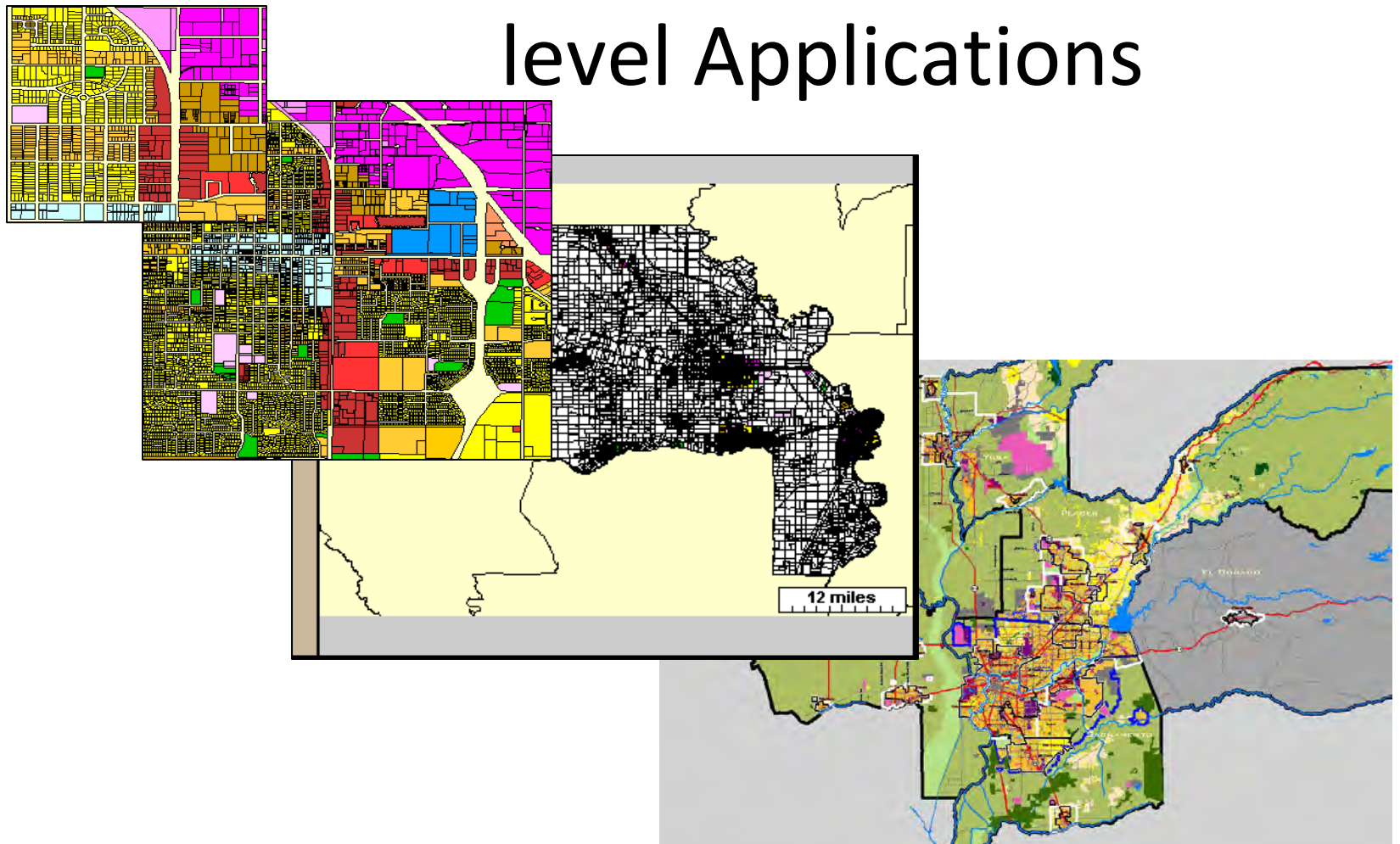


S4: Soil Type Avoidance



iPlace3s

Neighborhood to Region-level Applications



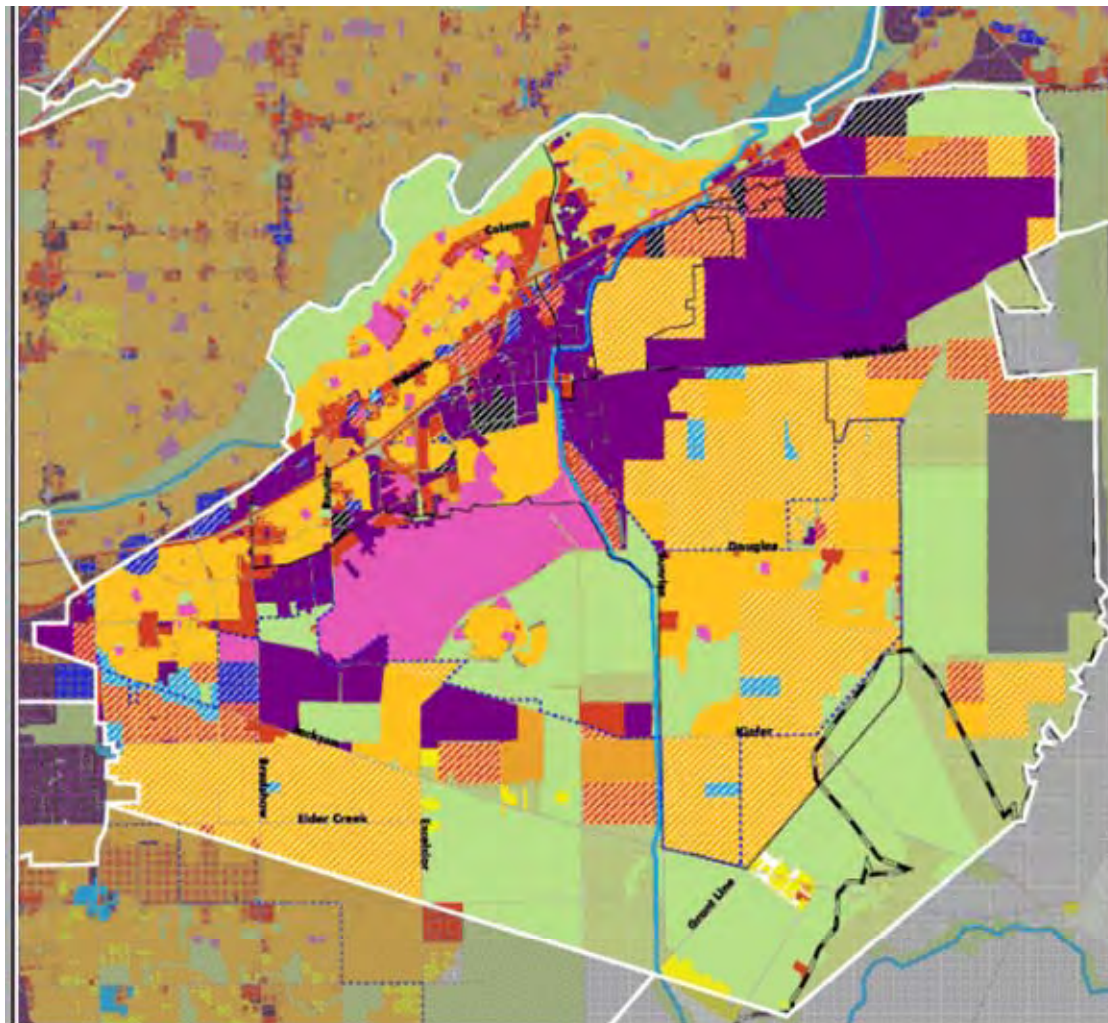
Regional to Neighborhood-level applications

- Blueprint planning land use alternatives
- RTP land use allocations
- Local land use plan updates (general plans, etc.)
- Measure performance of development proposals
- Staff level tool AND public outreach tool

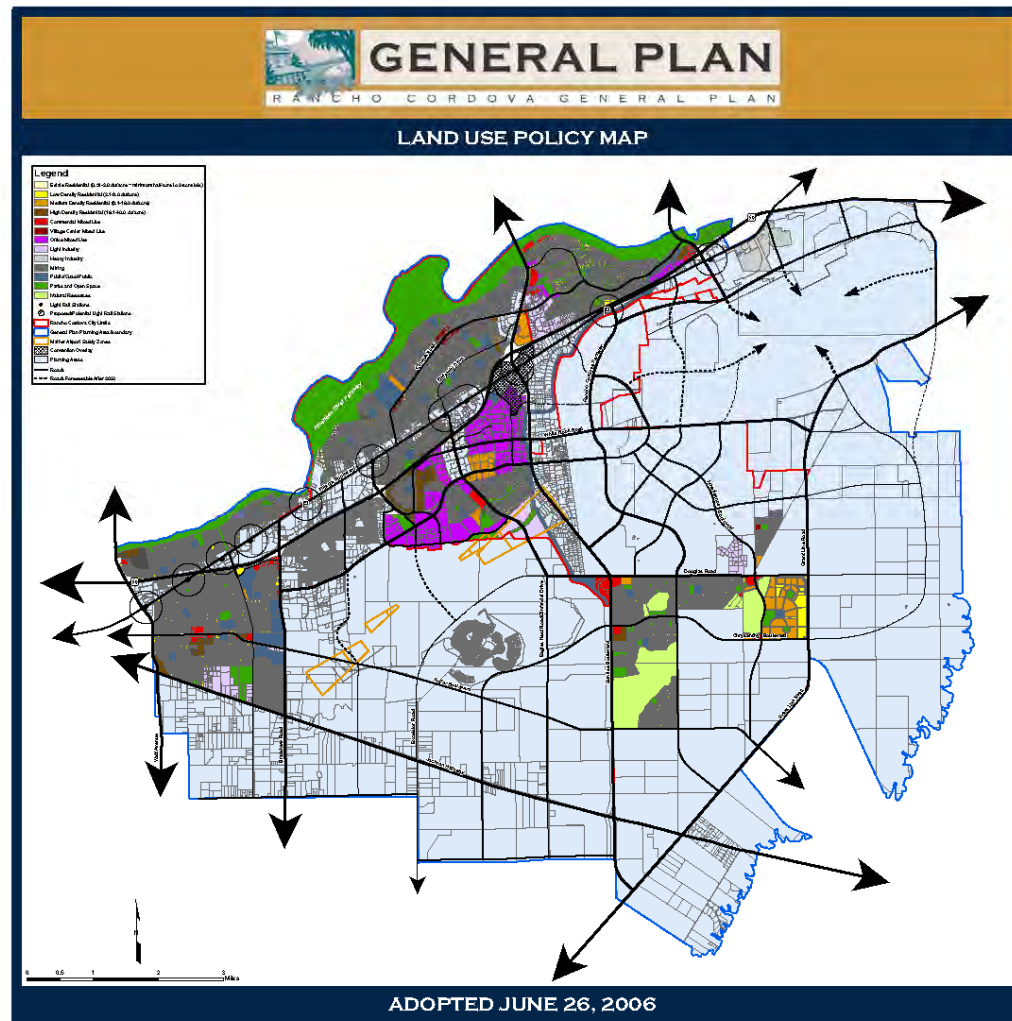
Measure and Compare Results

- Total jobs and dwelling units
- Density by land use type and mix of uses
- Change in vehicle mile traveled and vehicle trips
- Change in walk/bike and transit mode shares
- Building GHG emissions
- Building energy consumption
- Economic feasibility (Return on Investment)
- Export data to regional travel model
- Mobile source air emissions (from regional travel model)

Blueprint Growth Scenario: Rancho Cordova

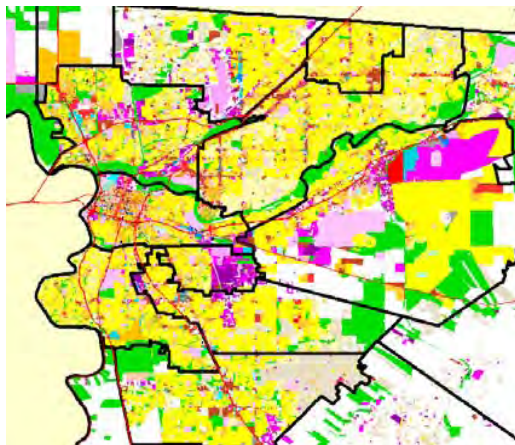


General Plan Map: Rancho Cordova



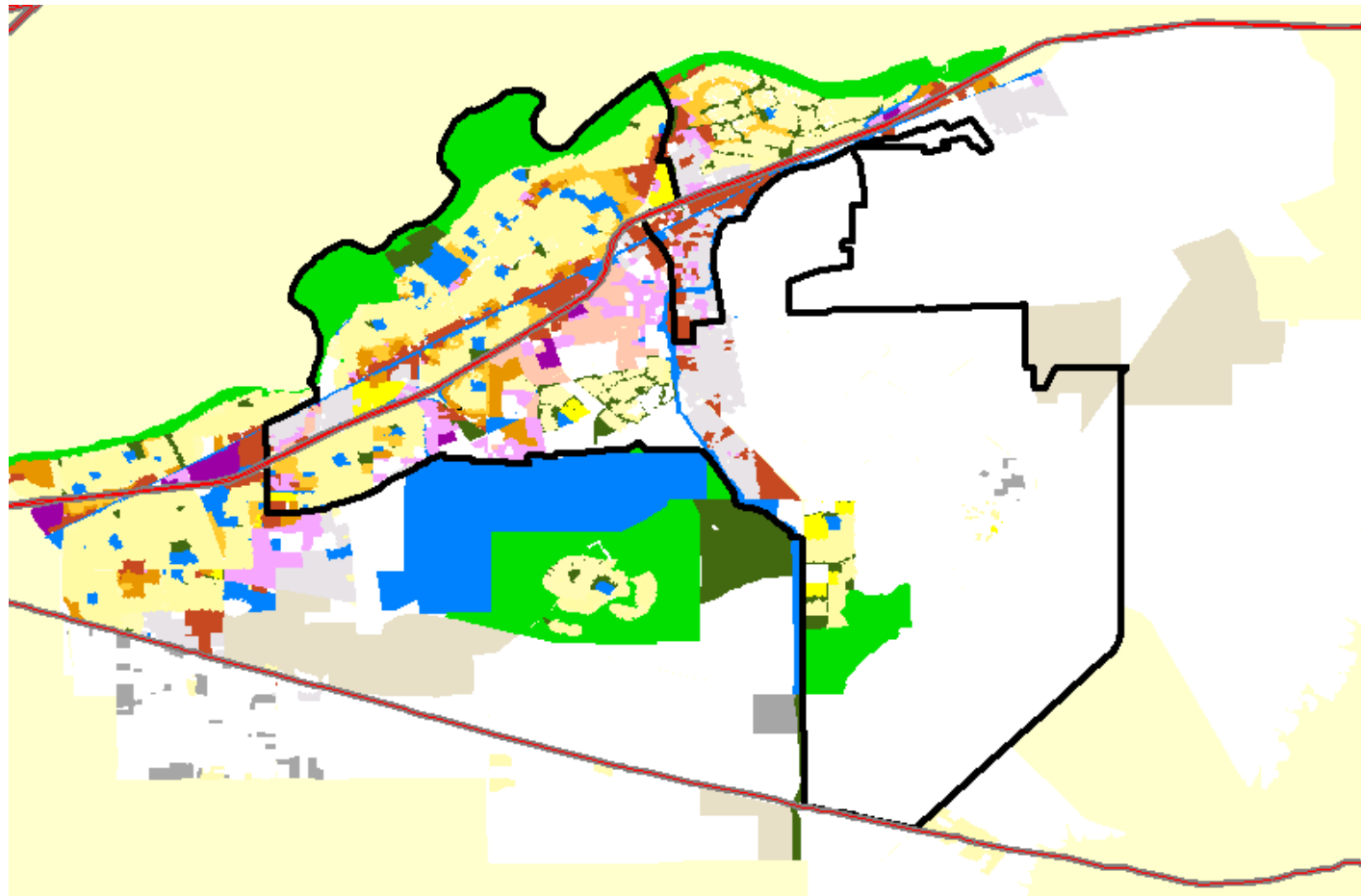
Land Use Assumptions

Export to Travel Model

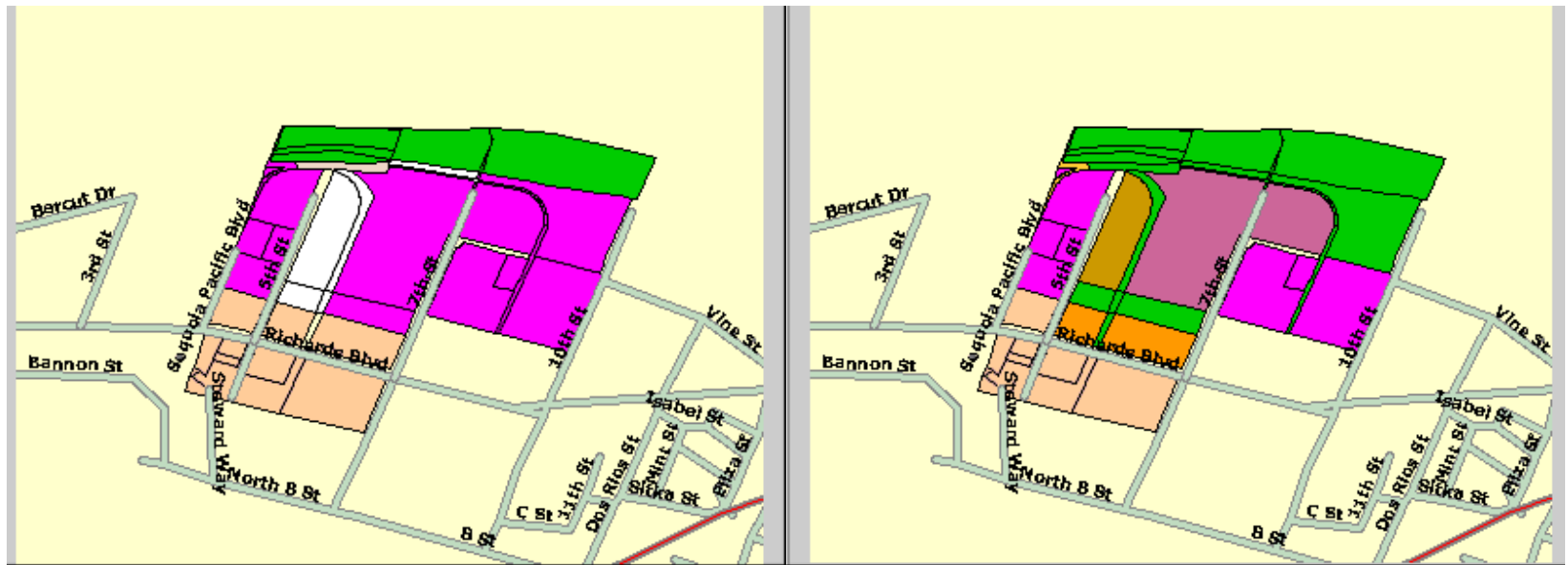


A	B	C	D	E	F	G	H	I
EXISTING CONDITIONS - JANUARY 2007								
TAZ	TOTAL DWELLING UNITS	ATTACHED DWELLING UNITS	DETACHED DWELLING UNITS	TOTAL EMPLOYEES	RETAIL JOBS	OFFICE JOBS	INDUSTRIAL JOBS	PUBLIC JOBS
1043	395	0	395	3,378	294	2,005	1,079	0
1119	0	0	0	0	0	0	0	0
1120	0	0	0	0	0	0	0	0
1121	0	0	0	0	0	0	0	0
1122	0	0	0	4,044	38	3,951	55	0
1123	1,323	0	1,323	1,425	15	1,336	0	0
1124	0	0	0	4,364	235	2,187	1,942	0
1138	0	0	0	0	0	0	0	0
1142	0	0	0	0	0	0	0	0
116	0	0	0	289	0	0	289	0
1160	0	0	0	0	0	0	0	0

Local Land Use Plan Monitoring



Measure Local Land Use Changes



BASE CASE

MIXED RETAIL/RESIDENTIAL

SCENARIO COMPARISON

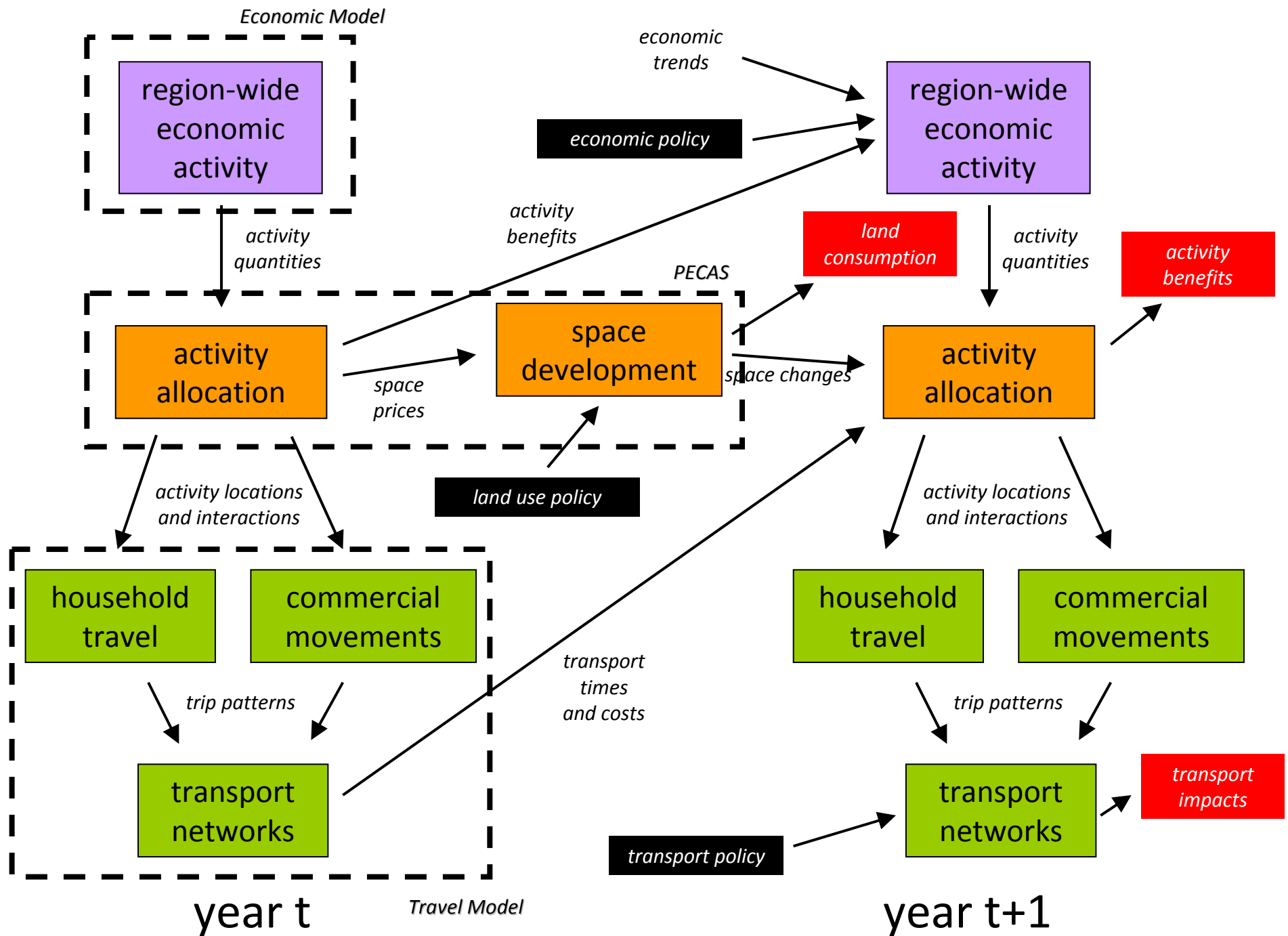
SCENARIO NAME	TOTAL EMPLOYEE CHANGE	TOTAL EMPLOYEES	EMPLOYEES PER ACRE	TOTAL DWELLING UNIT CHANGE	TOTAL DWELLING UNITS	DWELLING UNITS PER ACRE	VMT PER HOUSEHOLD CHANGE	VMT PER RETAIL JOB CHANGE	VMT PER NON-RETAIL JOB CHANGE	TRANSIT CHANGE	PED/BIKE CHANGE
BASE CASE	0	2,209	21.16	0	2	1.07	0%	0%	0%	0.0%	0.0%
MIXED RETAIL/RESIDENTIAL	-604	1,605	29.46	+2,999	3,001	72.27	-56%	-85%	-64%	+0.6%	+6.2%

Statewide Development of Transportation / Land Use Planning Tools

- Development of “Ds” elasticities for representative regions across the state
- 2 Large MPOs and 6 smaller RTPA/MPOs
- Using similar data and methods
 - Structural Equation Modeling for large MPOs
 - Hierarchical Linear Models for smaller areas
- A toolset for applying these elasticities to areas using an open framework
 - UPlan
 - iPlace3s
 - Standalone spreadsheets

PECAS/CalSIIM

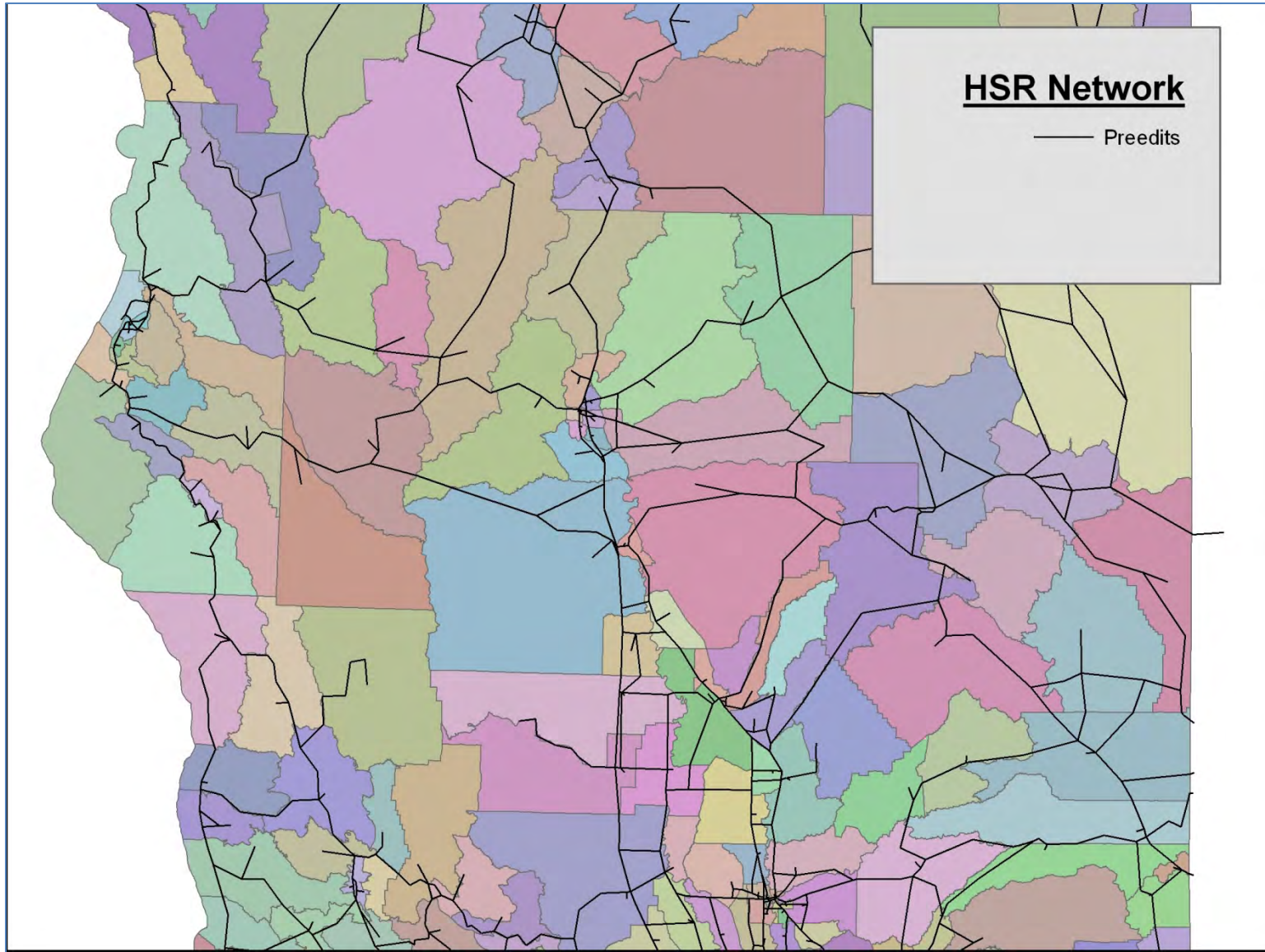
- Integrated economic land use/transportation model
- Purpose:
 - To enable testing of policy scenarios with explicit economic analysis
- Structure:
 - Some of the numbers:
 - 526 Land Use Zones (LUZ)
 - 5191 TAZs
 - ~165 million 50mx50m cells
 - 63 Activities
 - 78 Commodities
 - 38 Land use types
 - 25 Household types
- What it does, in two parts:
 - Market clearing economic model with transportation coefficients for exchange locations. (AA: Activity Allocation)
 - Floorspace supply controlled by development event probabilities. (SD: Space Development)



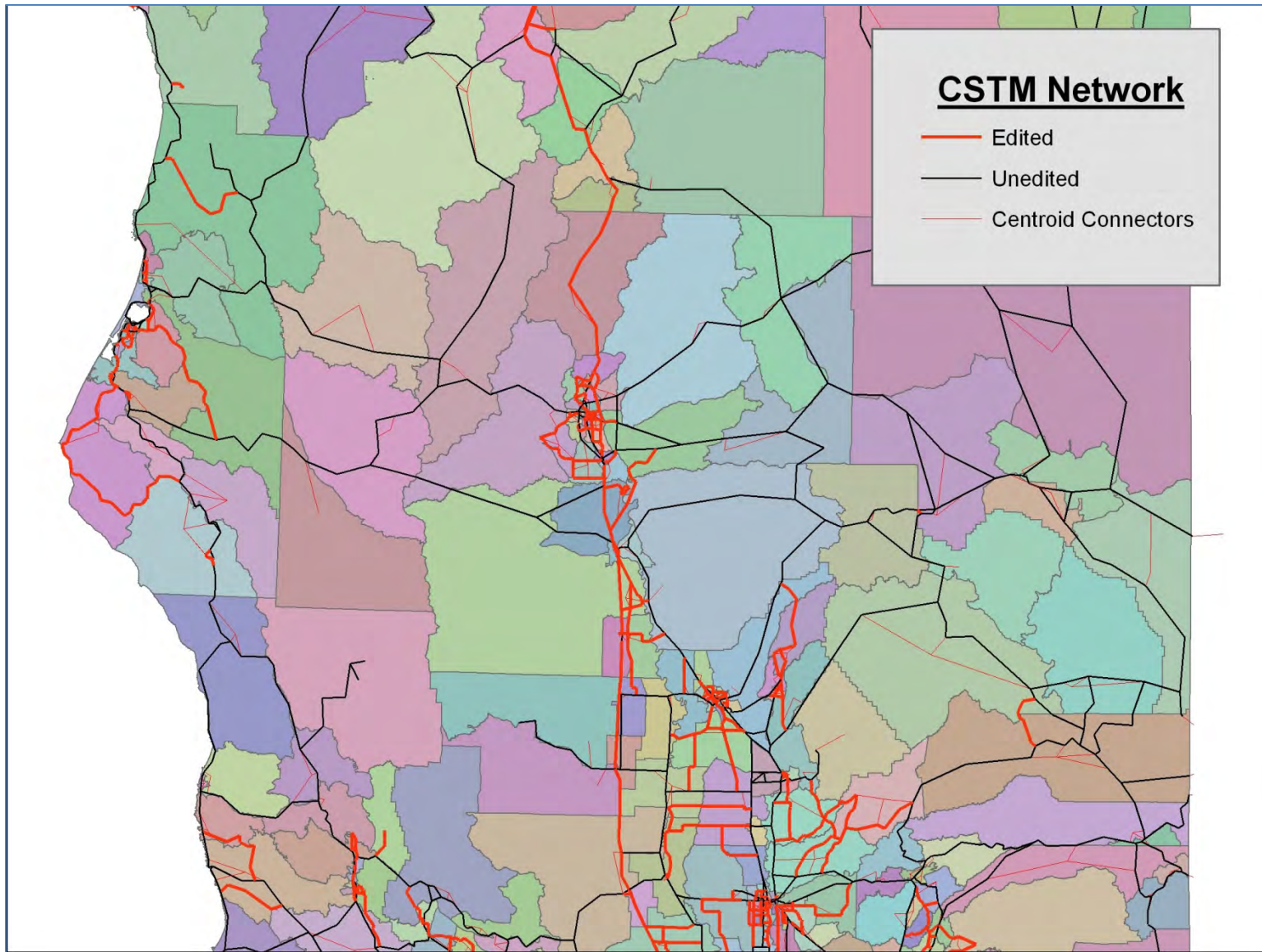
CSTDM

- Statewide Interregional Travel Demand Model
- Purpose:
 - Track interregional travel and intraregional travel with interregional implications
- Structure:
 - 5 component models:
 - Short Distance Personal Travel
 - Long Distance Personal Travel
 - Short Distance Commercial Vehicle
 - Long Distance Commercial Vehicle
 - External
 - Simulates population movements and commercial vehicle patterns
 - 4 daily time periods
 - 5191 TAZs
 - Modes: SOV, HOV2, HOV3+, Truck, Local Transit, Rail, Air
- Synthetic population and employment
- Networks are enhanced from the HSR Model
- Socio-demographics from integrated Census, MPO, and commercial data sources.
- Travel surveys, 2001 Statewide Travel Survey, and 2000-2004 Surveys from SANDAG, SCAG, MTC and SACOG.

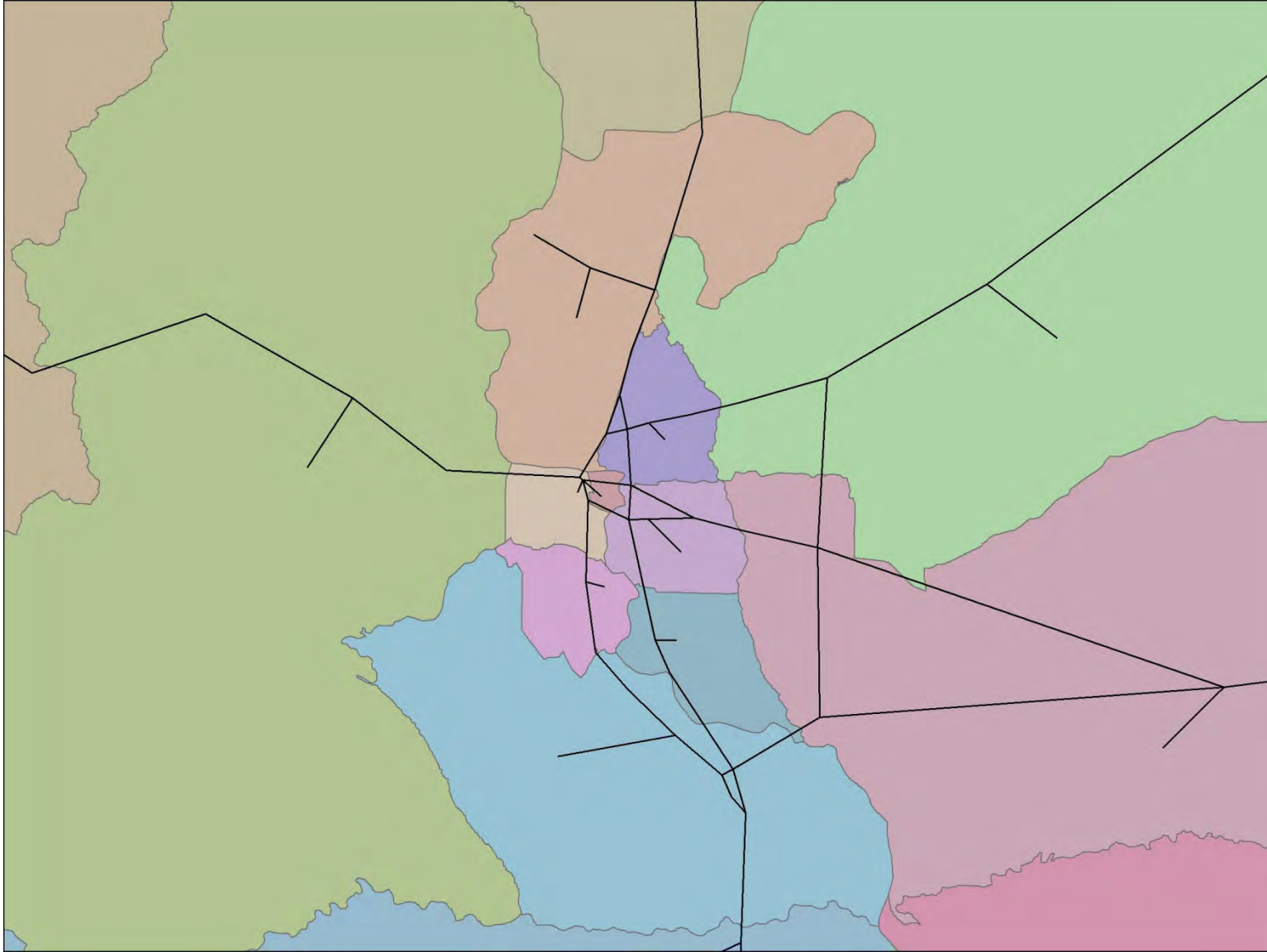
HSR TAZ System and Network



CSTDM TAZ System and Network



HSR TAZ System and Network



CSTDm TAZ System and Network

