

Decision Support GIS

GIS/Spatial Growth Modeling

For the

TAMPA BAY REGION



www.tbrpc.org

Decision Support GIS

Spatial Growth Modeling

- **Decision Support Software Suite** drawing upon numerous software applications and data sources.
- **Maps future growth of development in multiple scenarios**
 - Housing, commercial, industrial, etc.
 - Shows impacts on natural resources
- **Tests policy choices**
 - What if? Type analysis
 - Compare alternative development scenarios
 - Compare policy alternatives
- **Provides Visual Representation of written policy**
 - What might this policy look like in 10, 20, 30 years?
- **SGM adds capacity to our ability to provide technical support to decision makers**

Decision Support GIS

Spatial Growth Modeling

Can couple with existing models and tools

- Land Use – (SGM, Community Viz, What-If)
- Natural Resources - (FDEP, TBEP, SwiftMud, Vista)
- Transportation - (TransCAD, FSUTMS, ULAM)
- Natural Disaster - (SLOSH, MEOW, RVAM, TAOS)
- Hazards events – (CAMEO, HLS-CAM)
- Econometric – (REMI, IMPLAN, FIAM)

Spatial Growth Modeling / GIS

Crème de la creme

We're using output from numerous computer model and data sources to create "themes" upon which we can build scenarios and test alternatives for an almost unlimited array of questions

Let's test Drive!



An aerial photograph of a coastal region featuring extensive green mangrove forests interspersed with blue water channels and ponds. In the background, a city skyline is visible under a clear sky.

Building a Growth Scenario

- 1. Select geographic area**
- 2. Select rate of population or development growth**
- 3. Determine developable land bank**
- 4. Assign new growth to types of development (housing, commercial, etc.)**
- 5. Define Growth rules**

Growth Calculator

**Growth to
What Year?**

**Current Base Pop.
& Growth Rate/Time Step**

**Density Type –
Dwelling Info**

Spatial Growth Model - Growth in Acres per Time Step

Final year for growth:

Time step interval (in years):

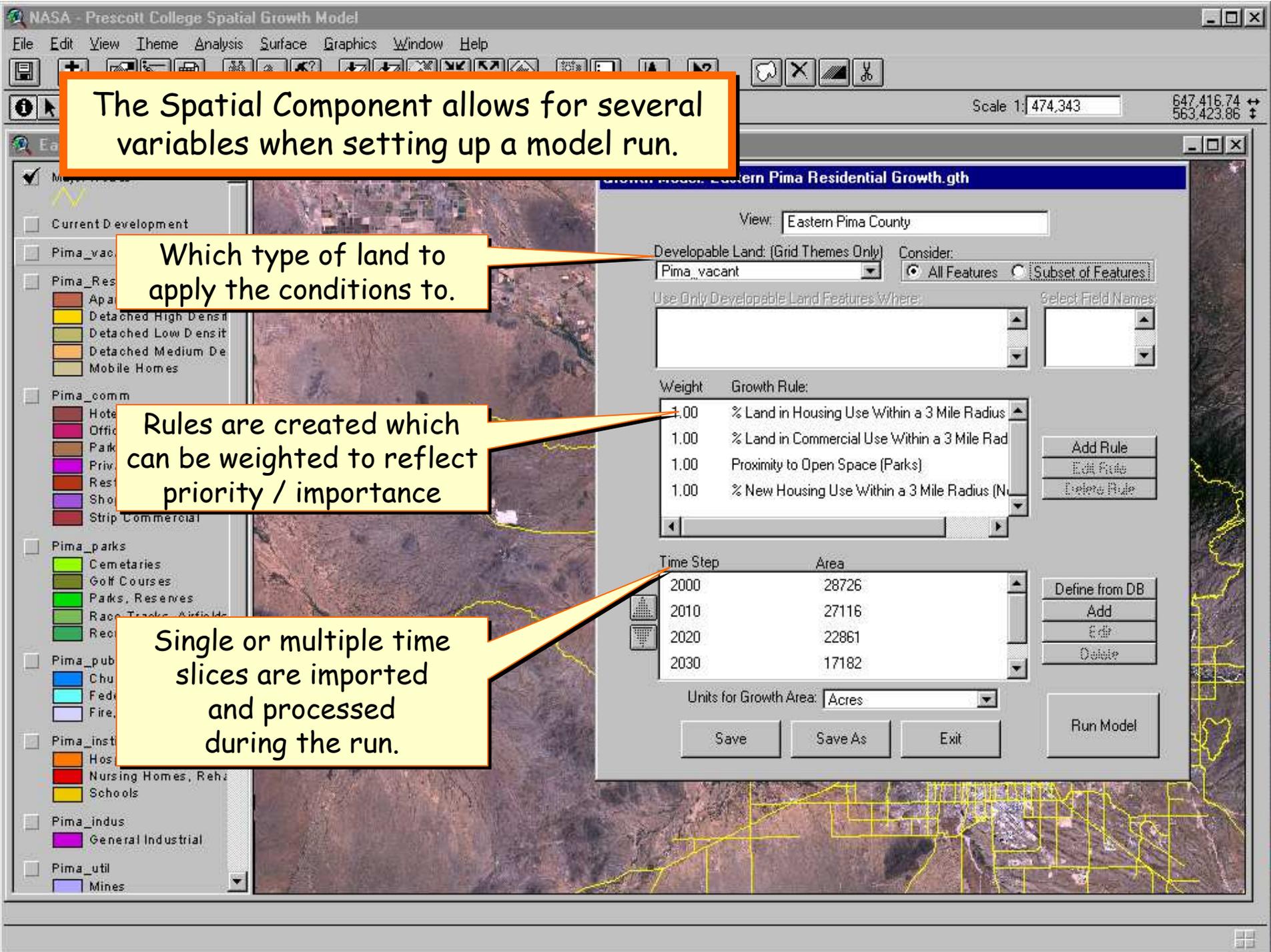
Initial population:

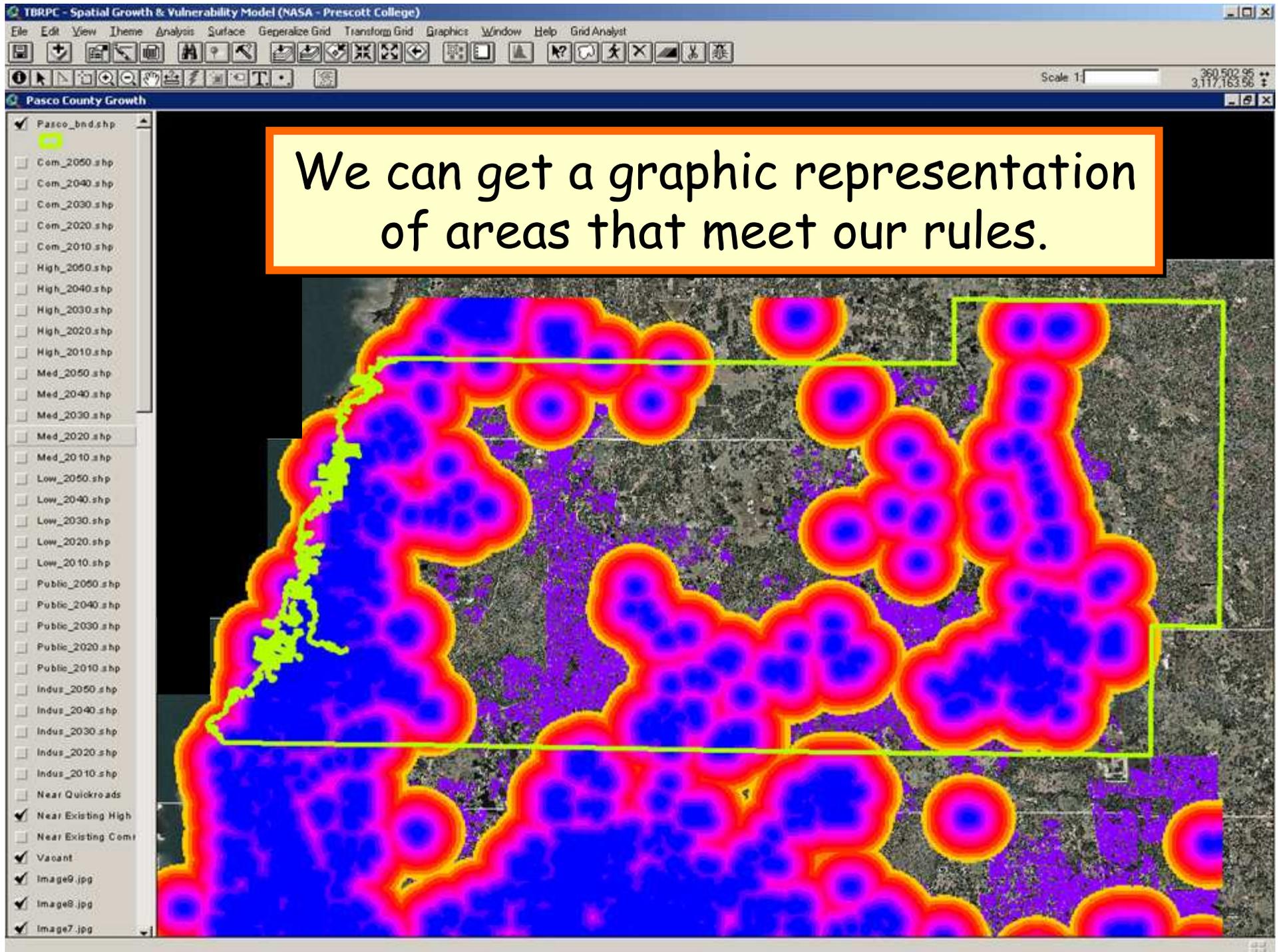
Population increase per time step:

Density Type	% of New Growth	# Persons Per Dwelling	# Dwellings Per Lot	Lot Size in Acres	Time	Growth in Acres	
Single Family	<input type="text" value="40"/>	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	2006	<input type="text" value="533"/>	Save
					2011	<input type="text" value="587"/>	
Multi Family	<input type="text" value="30"/>	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	2006	<input type="text" value="400"/>	Save
					2011	<input type="text" value="440"/>	
Rural	<input type="text" value="30"/>	<input type="text" value="3"/>	<input type="text" value="1"/>	<input type="text" value="1"/>	2006	<input type="text" value="400"/>	Save
					2011	<input type="text" value="440"/>	

Add Density Type

Calculate Close





We can get a graphic representation of areas that meet our rules.

Sample Model Runs

- ❖ Pasco County
 - ◆ Countywide example
- ❖ Gateway Area, Pinellas County
 - ◆ Sector planning example

Acreage Allocation Pasco County

	2010	2020	2035
2 du/ac Res	10130	9690	14535
5 du/ac Res	2701	1550	2325
Comm/Ind	1034	1540	2310

Low Density Residential (2 du/acre)

- ❖ Less than 1.5 miles from major road

Med Density Residential

5 du/acre

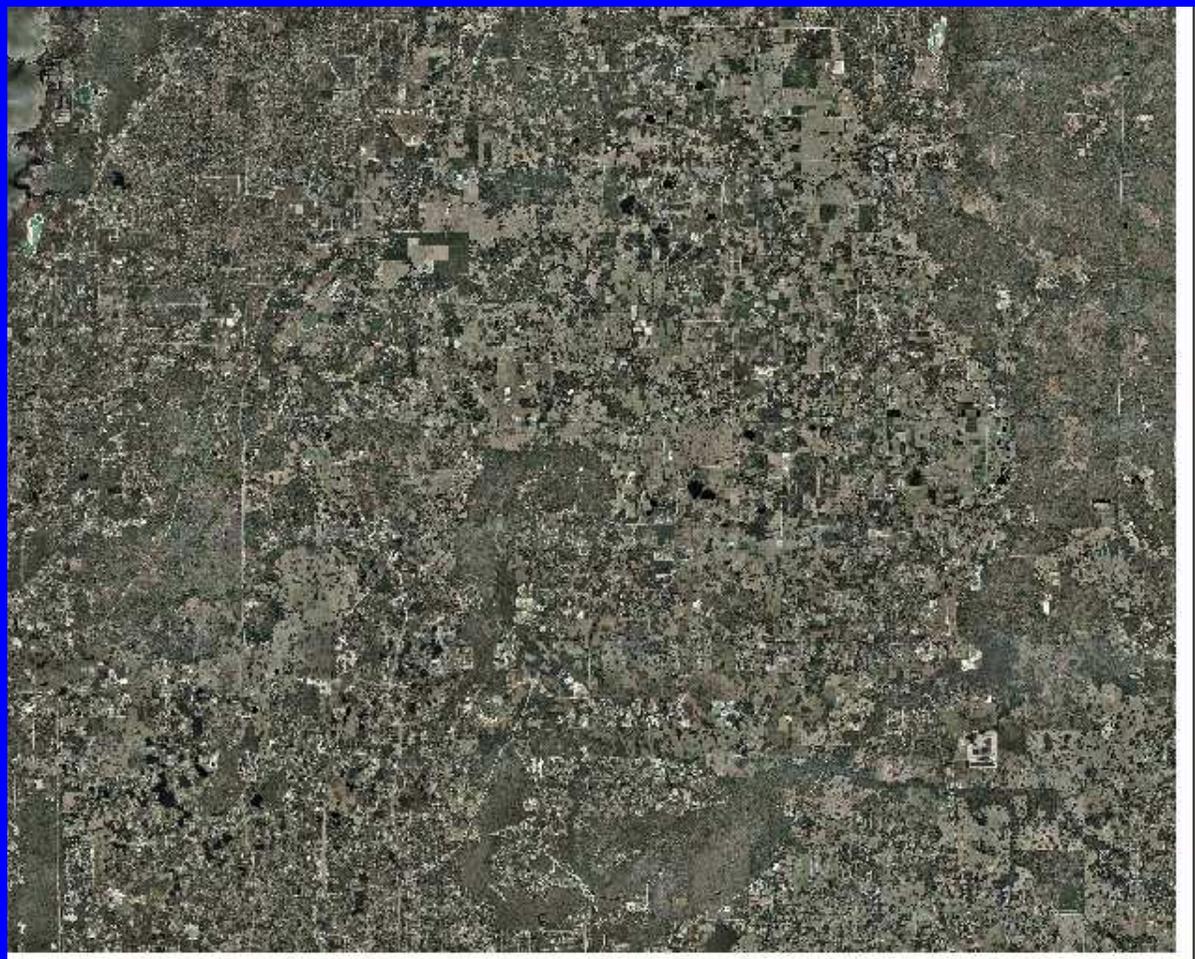
- ❖ Road proximity
- ❖ Cluster growth
- ❖ < 1 mile from DRI
- ❖ Near Town Center
- ❖ Locate near new commercial (as defined by model from now until 2010)

Commercial

- ❖ Away from wells
- ❖ < qtr mile from major roads
- ❖ Near existing commercial
- ❖ In or near DRI
- ❖ Near town center

- Low Density Residential*
- *< 1.5 miles from major road*
- Medium Density Res (5 du/acre)*
- *Road Proximity*
- *Cluster growth*
- *< mile from DRI*
- *Near town center*
- Commercial / Industrial*
- *Away from Wells*
- *< qtr mile from major roads*
- *Near existing*
- *In or near DRI*
- *Near town center*

2000

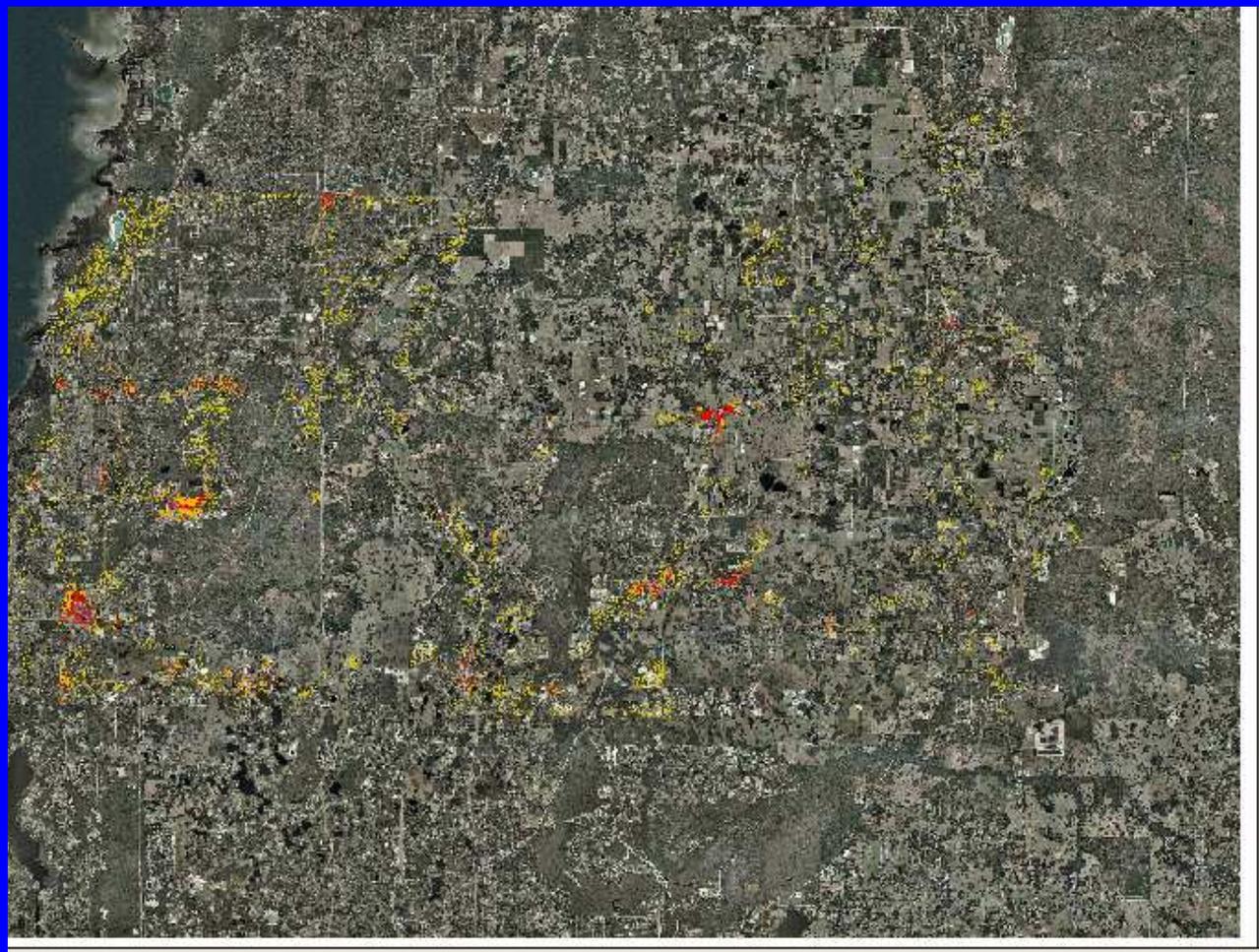




Low Density Residential
- < 1.5 miles from major road
Medium Density Res (5 du/acre)

2010

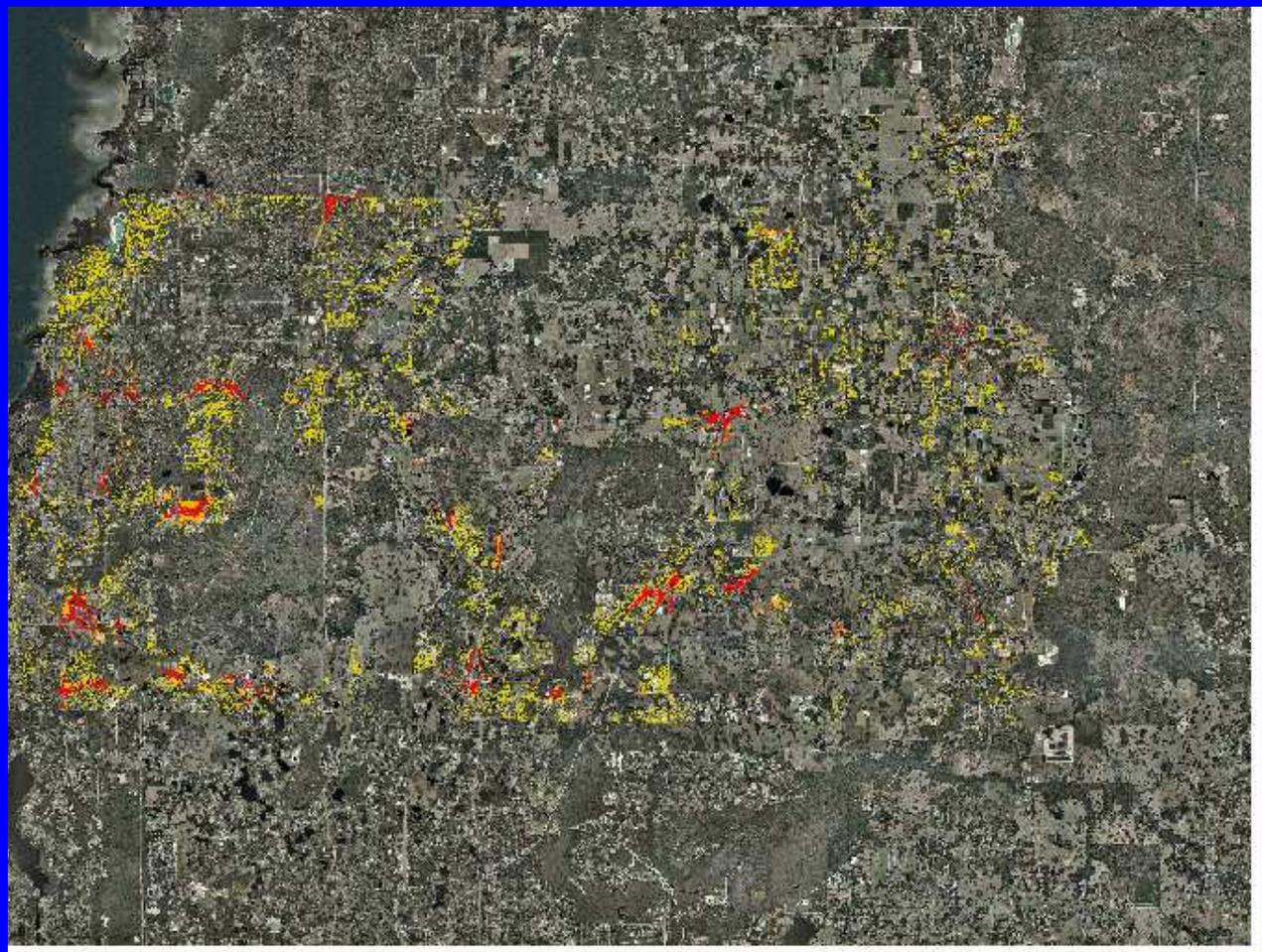
- Road Proximity
- Cluster growth
- < mile from DRI
- Near town center
- Commercial / Industrial*
- Away from Wells
- < qtr mile from major roads
- Near existing
- In or near DRI
- Near town center





- Low Density Residential*
- < 1.5 miles from major road
- Medium Density Res (5 du/acre)*
- Road Proximity
- Cluster growth
- < mile from DRI
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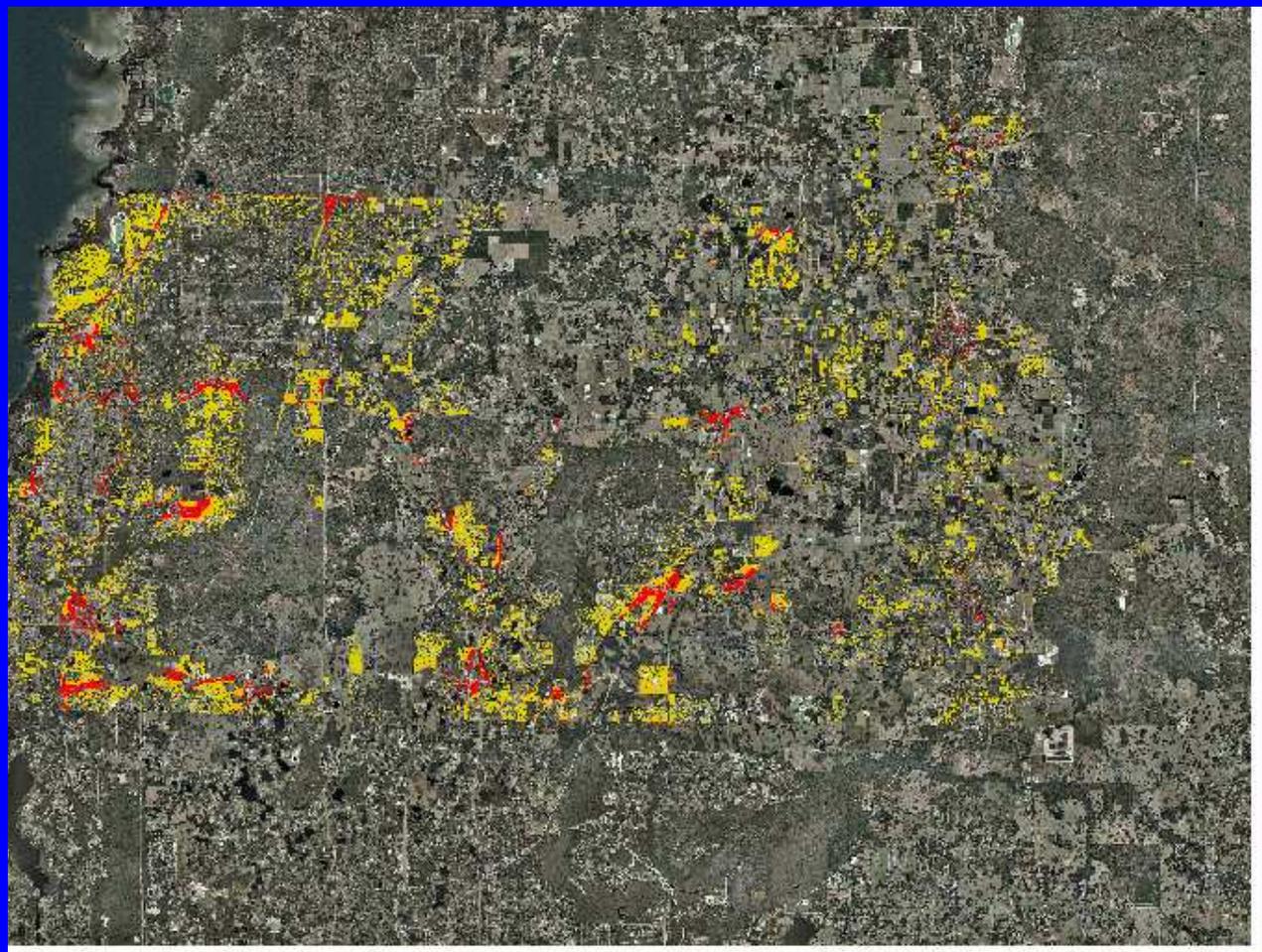
2020





- Low Density Residential*
 - < 1.5 miles from major road
- Medium Density Res (5 du/acre)*
 - Road Proximity
 - Cluster growth
 - < mile from DRI
 - Near town center
- Commercial / Industrial*
 - Away from Wells
 - < qtr mile from major roads
 - Near existing
 - In or near DRI
 - Near town center

2035



Gateway Area Pinellas County

	<u>ACRES</u>		
	2010	2020	2030
Apartments	50	75	100
Comm/Office/ Industrial	75	95	100

Apartments & Condos

- ❖ < .25 miles from Guideway node
- ❖ < 1000 feet from roadway
- ❖ < 500 feet from utilities

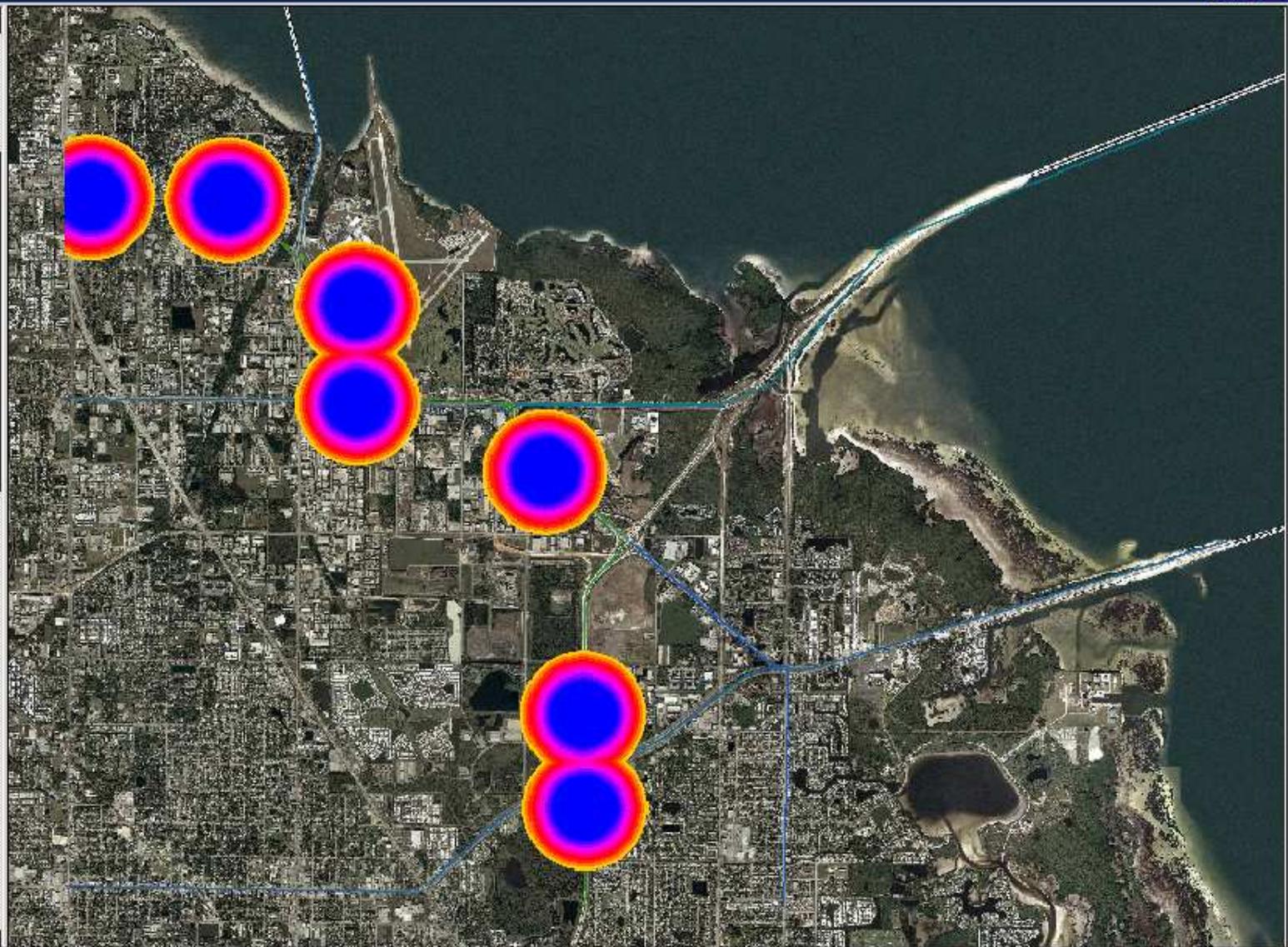
Commercial

- ❖ < 2000 feet from guideway node
- ❖ < 1000 feet from roadway
- ❖ Zoning must be office/comm/Ind
- ❖ < 500 feet from guideway route



Scale 1: 72,642 329,344.37 3,088,359.64

- 1038 - 1245
- 1246 - 1452
- 1453 - 1659
- 1660 - 1867
- No Data
- Utilities
- Roadways
- Guideway Nodes
- jobs_2030
 - 251 - 2850
 - No Data
- jobs_2020
 - 305 - 2849
 - No Data
- jobs_2010
 - 437 - 2845
 - No Data
- Composite Suitability Grid
 - 1 - 317
 - 318 - 634
 - 635 - 950
 - 951 - 1267
 - 1268 - 1583
 - 1584 - 1900
 - 1901 - 2216
 - 2217 - 2533
 - 2534 - 2850
 - No Data
- Cluster
- Guideway path
- office FLUM
- Roadways
- Guideway Node
- All_rds
 - 1
 - 2
 - 3





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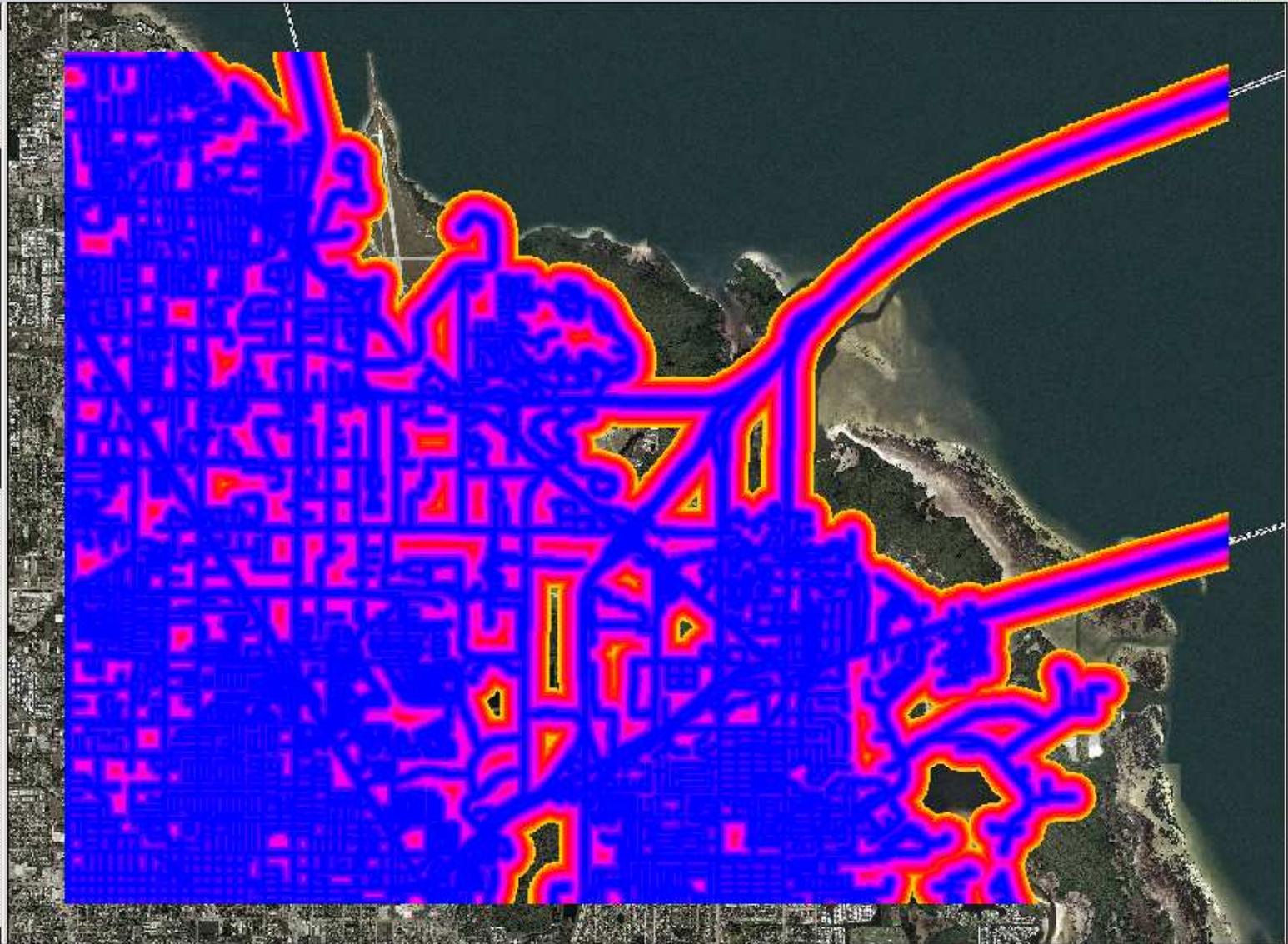
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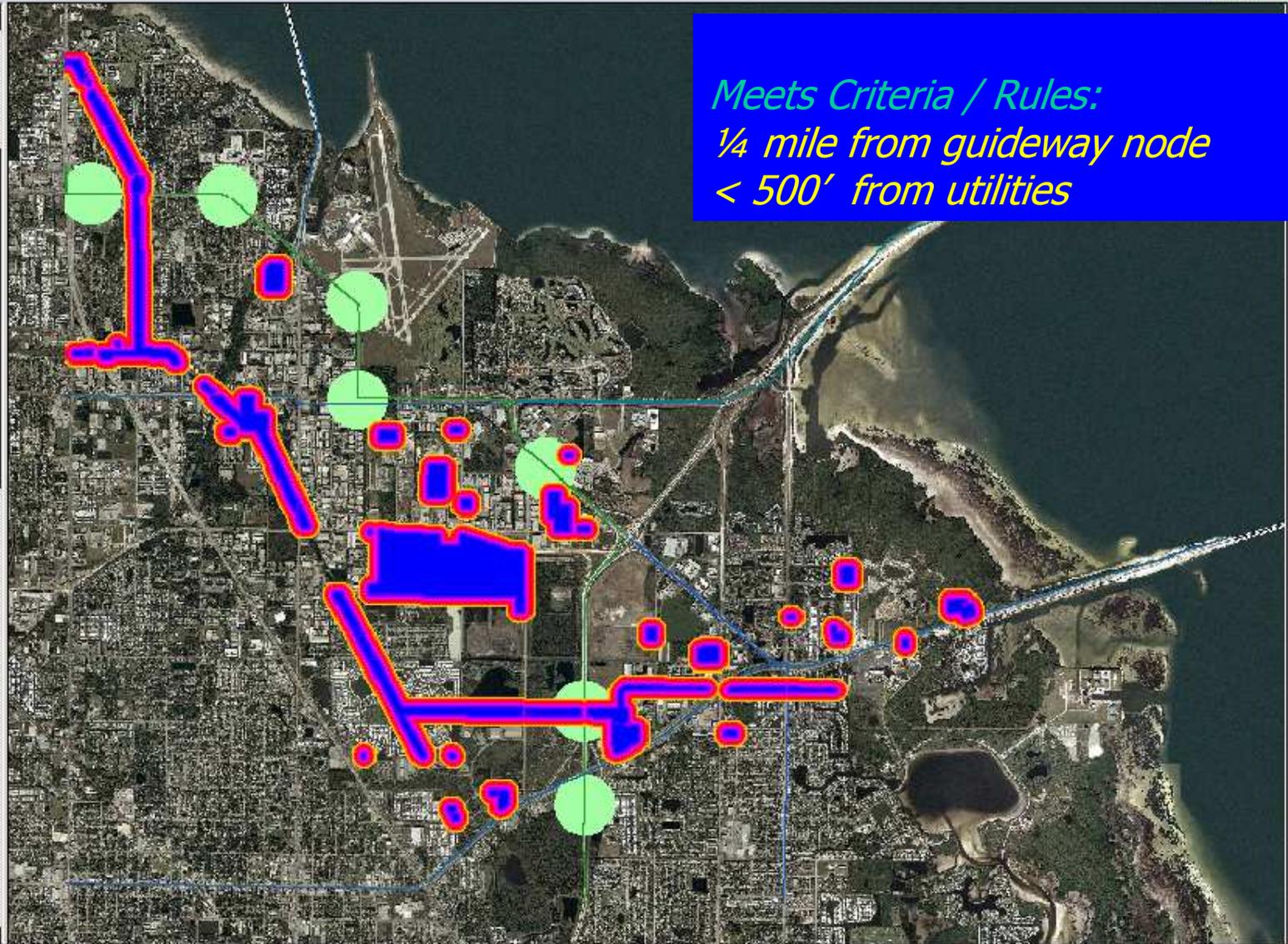
- Cluster
- Guideway path
- office FLUM
- Roadways
- Guideway Node

- All_rds
 - 1
 - 2
 - 3

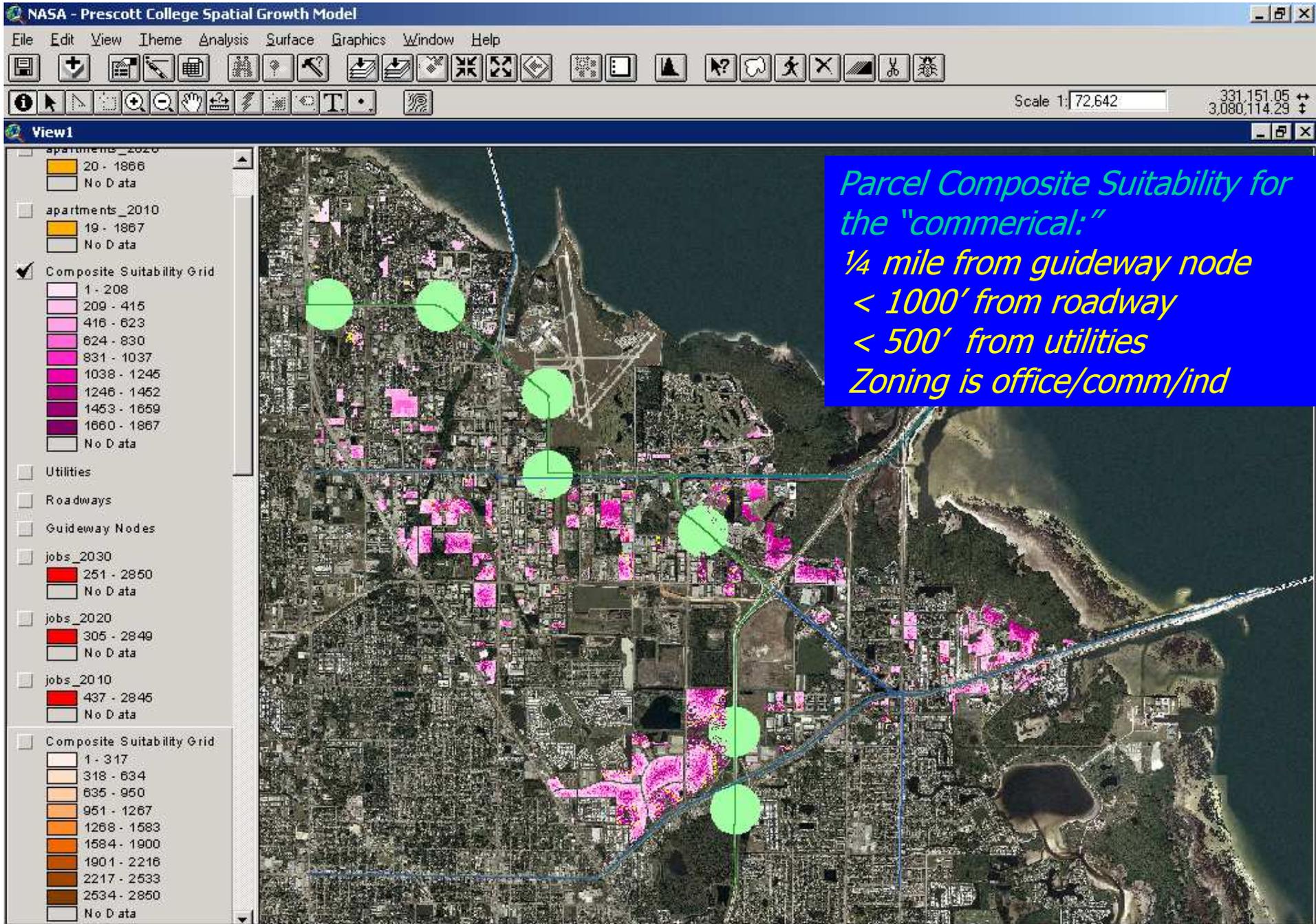




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 - 951 - 1267
 - 1268 - 1583
 - 1584 - 1900
 - 1901 - 2216
 - 2217 - 2533
 - 2534 - 2850
 - No Data
- Cluster
- Guideway path
- office FLUM
- Roadways
- Guideway Node
- All_rds
 - 1
 - 2
 - 3



*Meets Criteria / Rules:
 1/4 mile from guideway node
 < 500' from utilities*

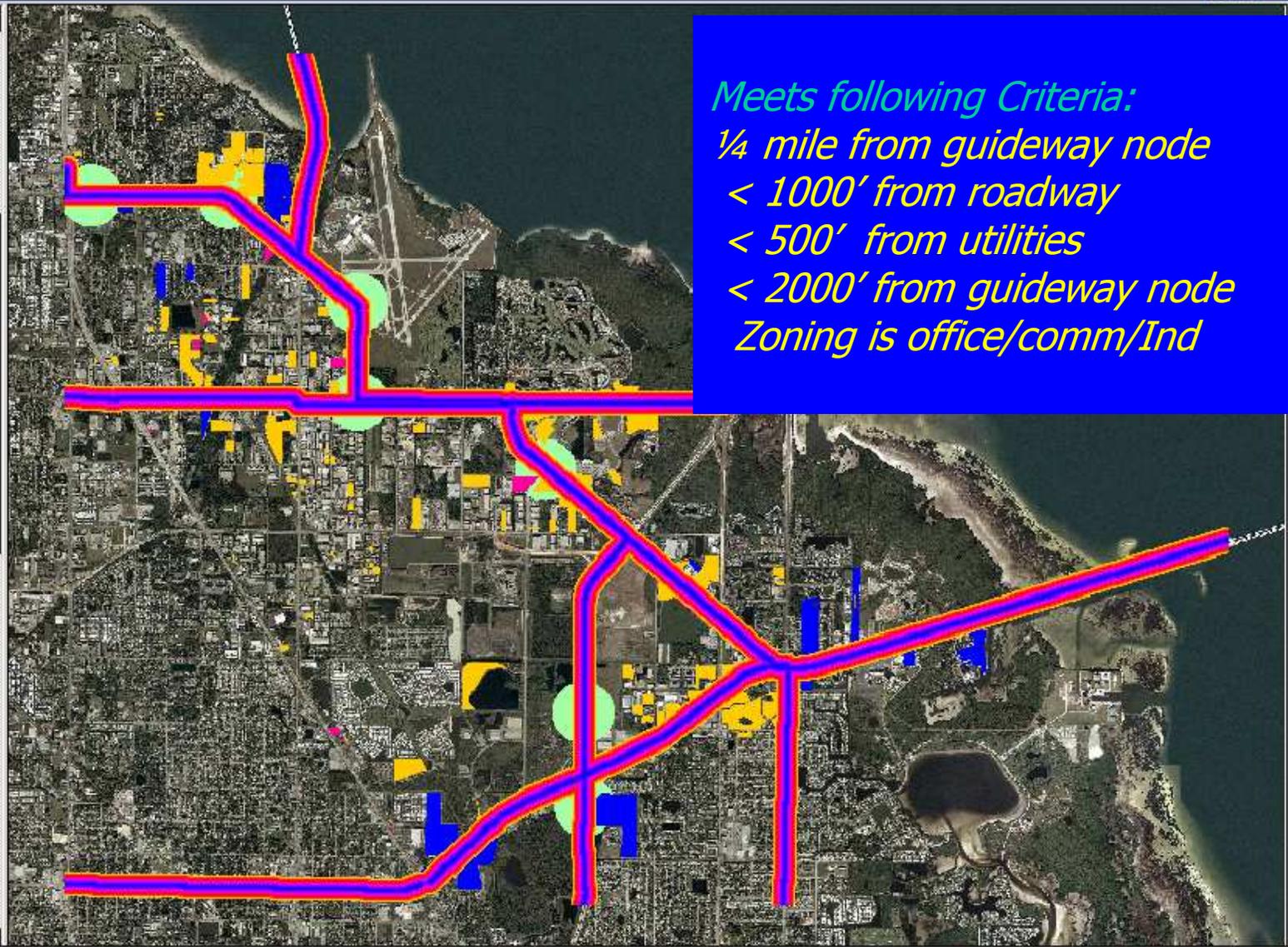




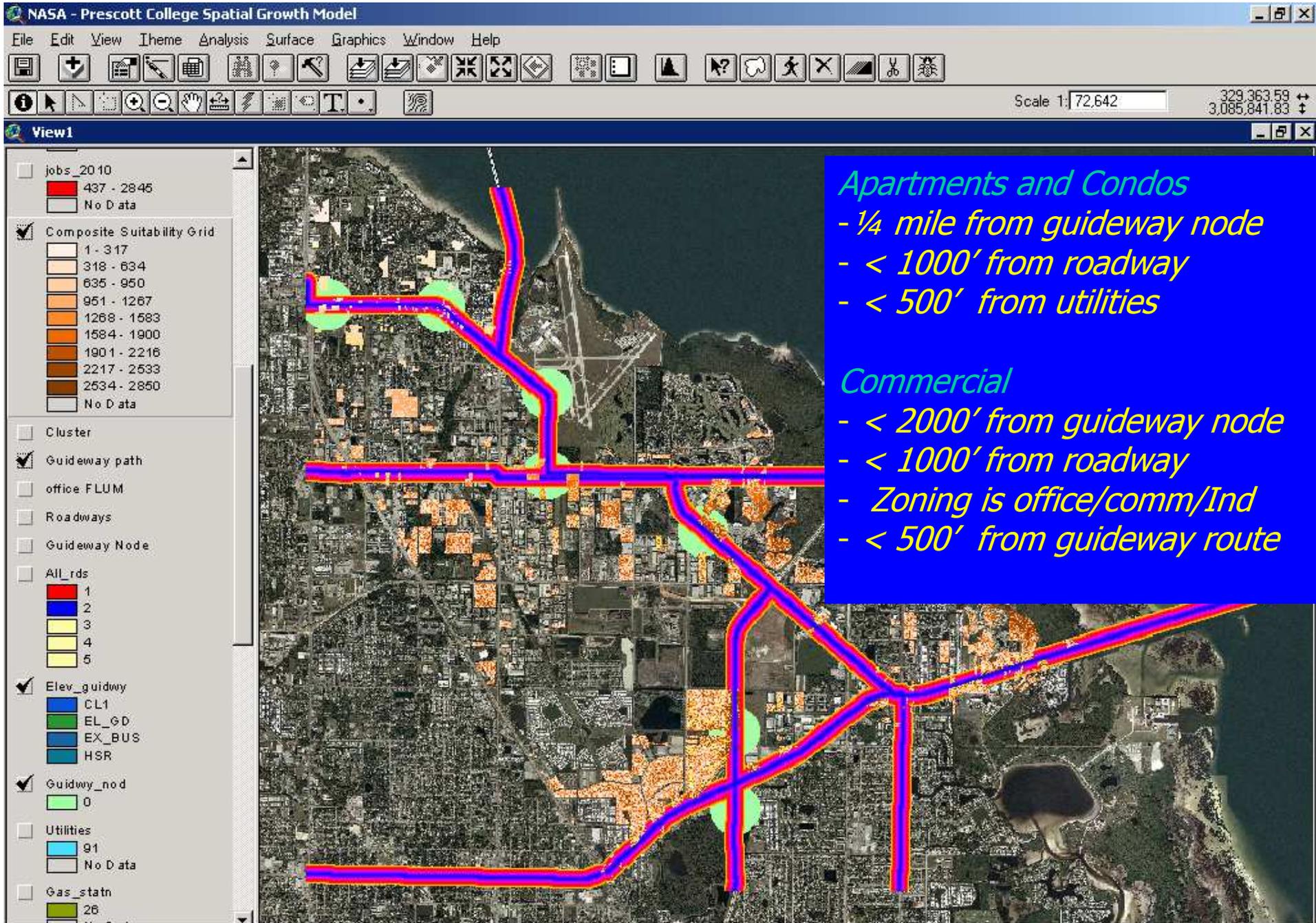
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3,080,863.87

- Guideway Nodes
- jobs_2030
 - 251 - 2850
 - No Data
- jobs_2020
 - 305 - 2849
 - No Data
- jobs_2010
 - 437 - 2845
 - No Data
- Composite Suitability Grid
 - 1 - 317
 - 318 - 634
 - 635 - 950
 - 951 - 1267
 - 1268 - 1583
 - 1584 - 1900
 - 1901 - 2216
 - 2217 - 2533
 - 2534 - 2850
 - No Data
- Cluster
- Guideway path
- office FLUM
- Roadways
- Guideway Node
- All_rds
 - 1
 - 2
 - 3
 - 4
 - 5
- Elev_guidway
 - CL1
 - EL_GD
 - EX_BUS
 - HSR
- Guideway nod



Meets following Criteria:
1/4 mile from guideway node
< 1000' from roadway
< 500' from utilities
< 2000' from guideway node
Zoning is office/comm/Ind



Natural Resources Decision Support GIS

For the

TAMPA BAY REGION

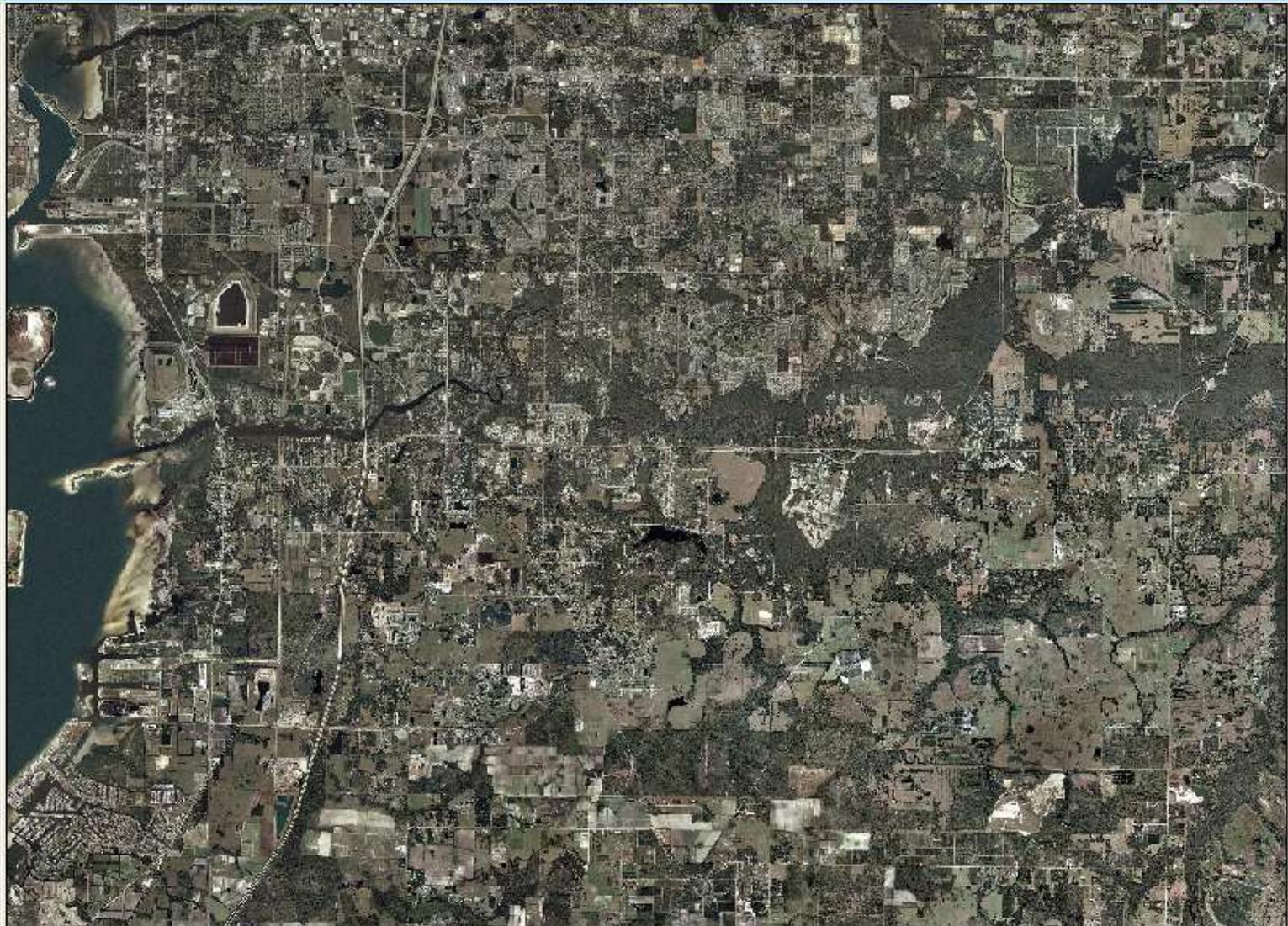




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3,071,628.83

- Major Rivers
- Hillsborough ELAPP
- SW FWMD Acquired Lands
- Pinellas E-lands
- Mngd_areas.shp
- Seagrass 01
- FNAI Habitat 04
 - Priority 1, 2, & 3
- FNAI Coastal 04
 - Upland communities (s.c coastal grass land, marit
 - Wetland communities (r
- FNAI Natural Communities 04
 - Upland Hardwood Fores
 - Tropical Hardwood Ham
 - Sandhill
 - Scrub
 - Pine Flatwoods
- LULC Habitat
 - Dry
 - Wet
- Rsig_rds.shp
- Counties.shp
- County_region.shp
- Tampabay02_southcentral.ec
- Tampabay02_central.ecw

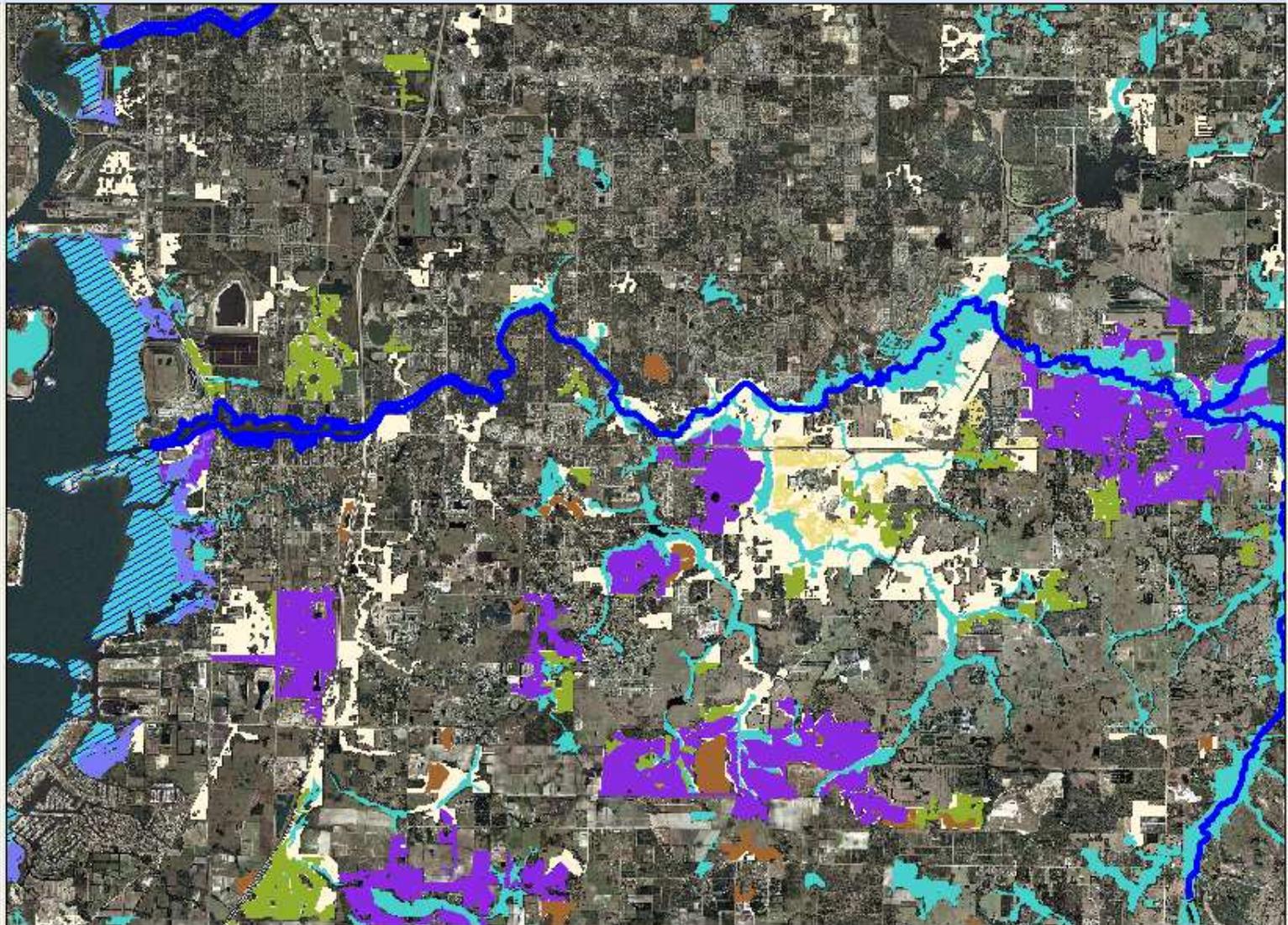




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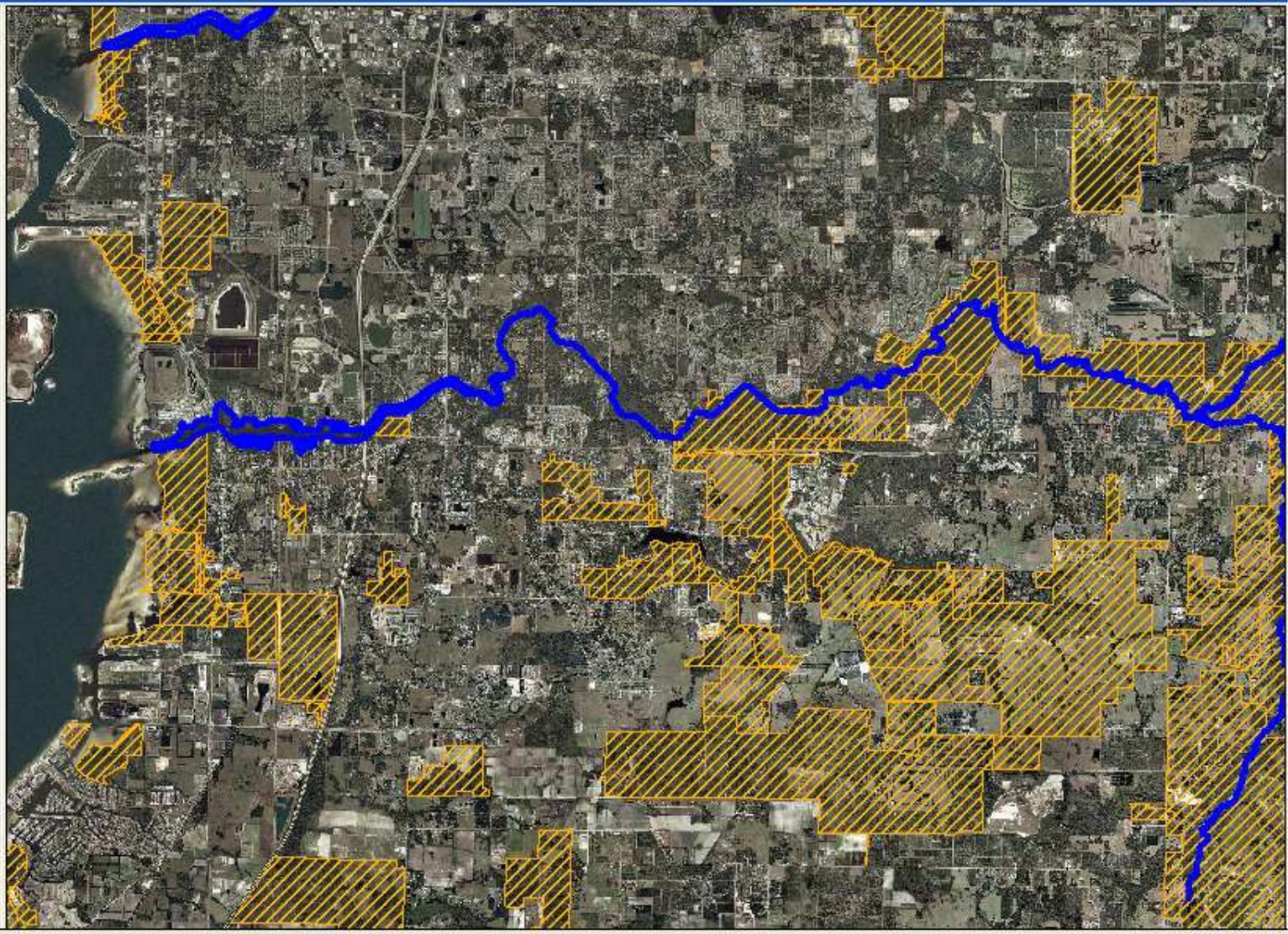




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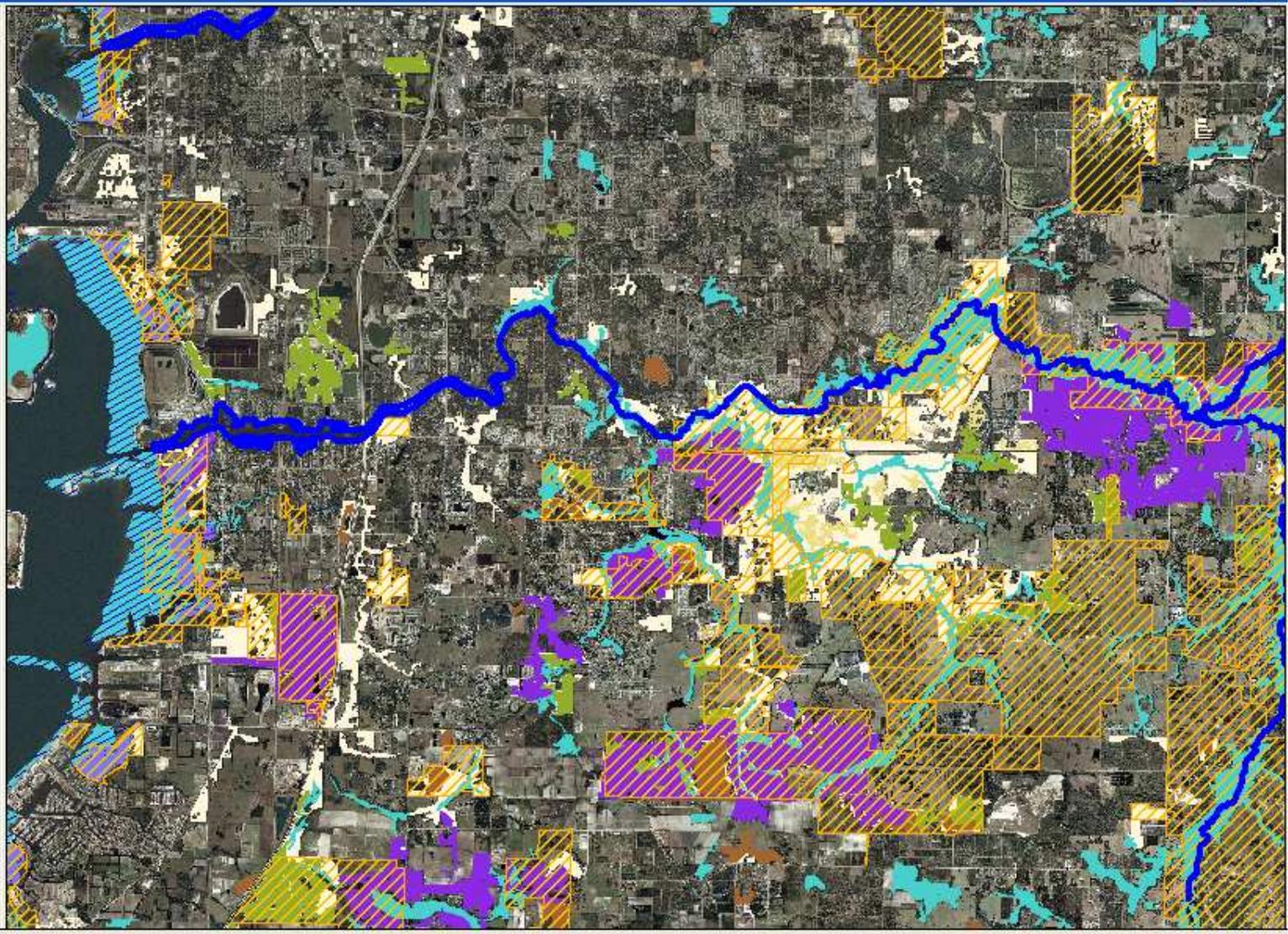
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 - Wet
- Rsig_rds.shp
- Counties.shp
- County_region.shp
- Tampabay02_southcentral.ecw
- Tampabay02_central.ecw





Scale 1:145,489 361,182.64 3,090,798.91

- Major Rivers
- Hillsborough ELAPP
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 - Dry
 - Wet
- Rsig_rds.shp
- Counties.shp
- County_region.shp
- Tampabay02_southcentral.ec
- Tampabay02_central.ecw



Transportation Decision Support GIS

For the

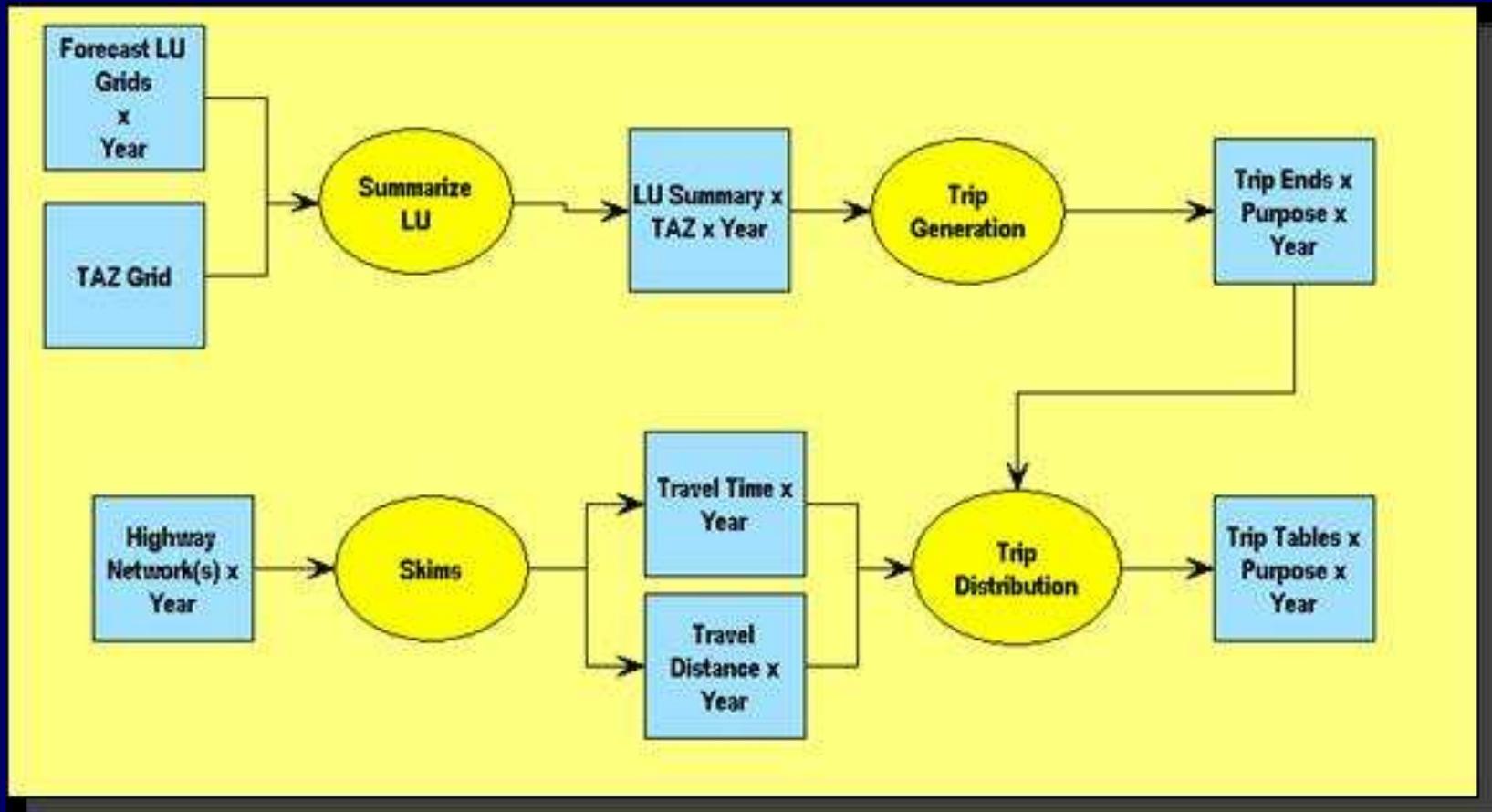
TAMPA BAY REGION



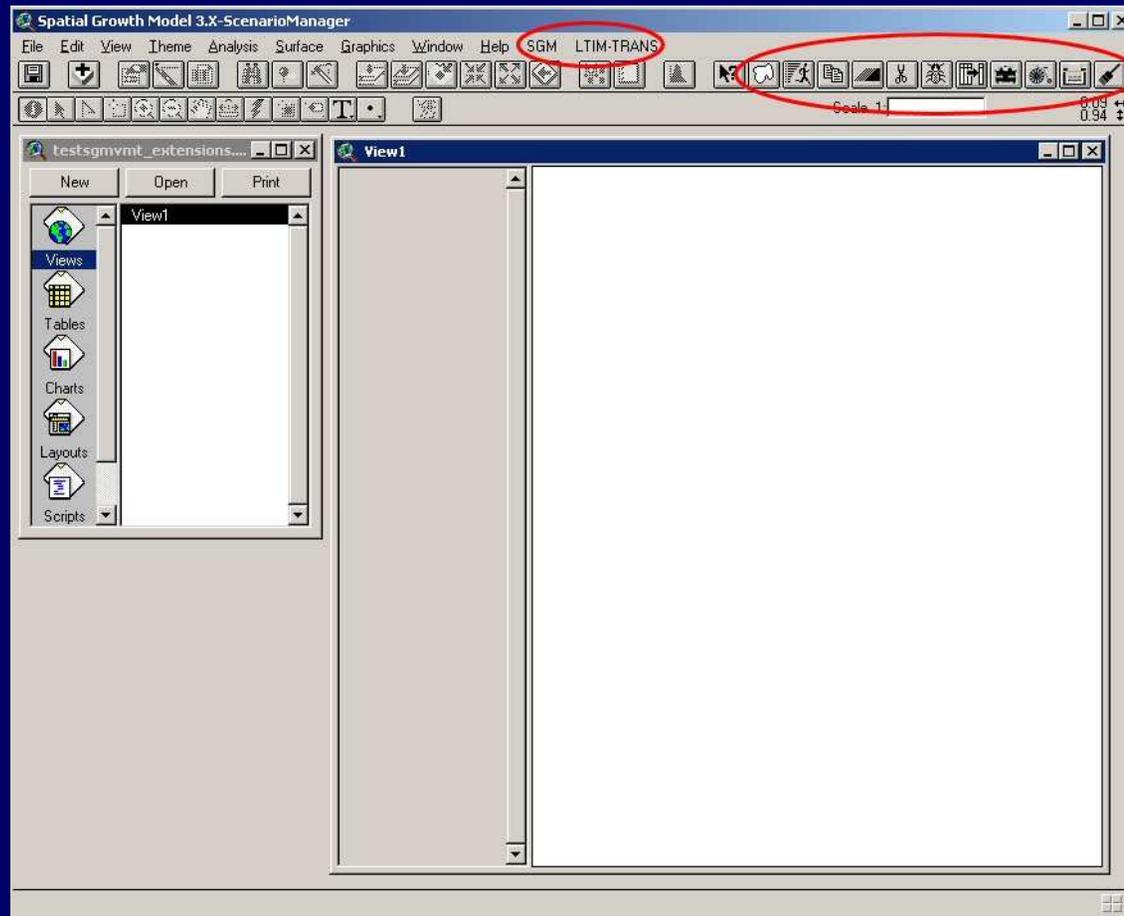
LTIM-Transportation (LTIM-T) estimates the total amount of Vehicle Miles Traveled (VMT) given several user inputs:

- ◆ (1) a Growth Grid (from an SGM or other scenario generator,
- ◆ (2) a Road Network, and
- ◆ (3) various assumptions about transportation behavior, including mode splits.

LTIM Structure

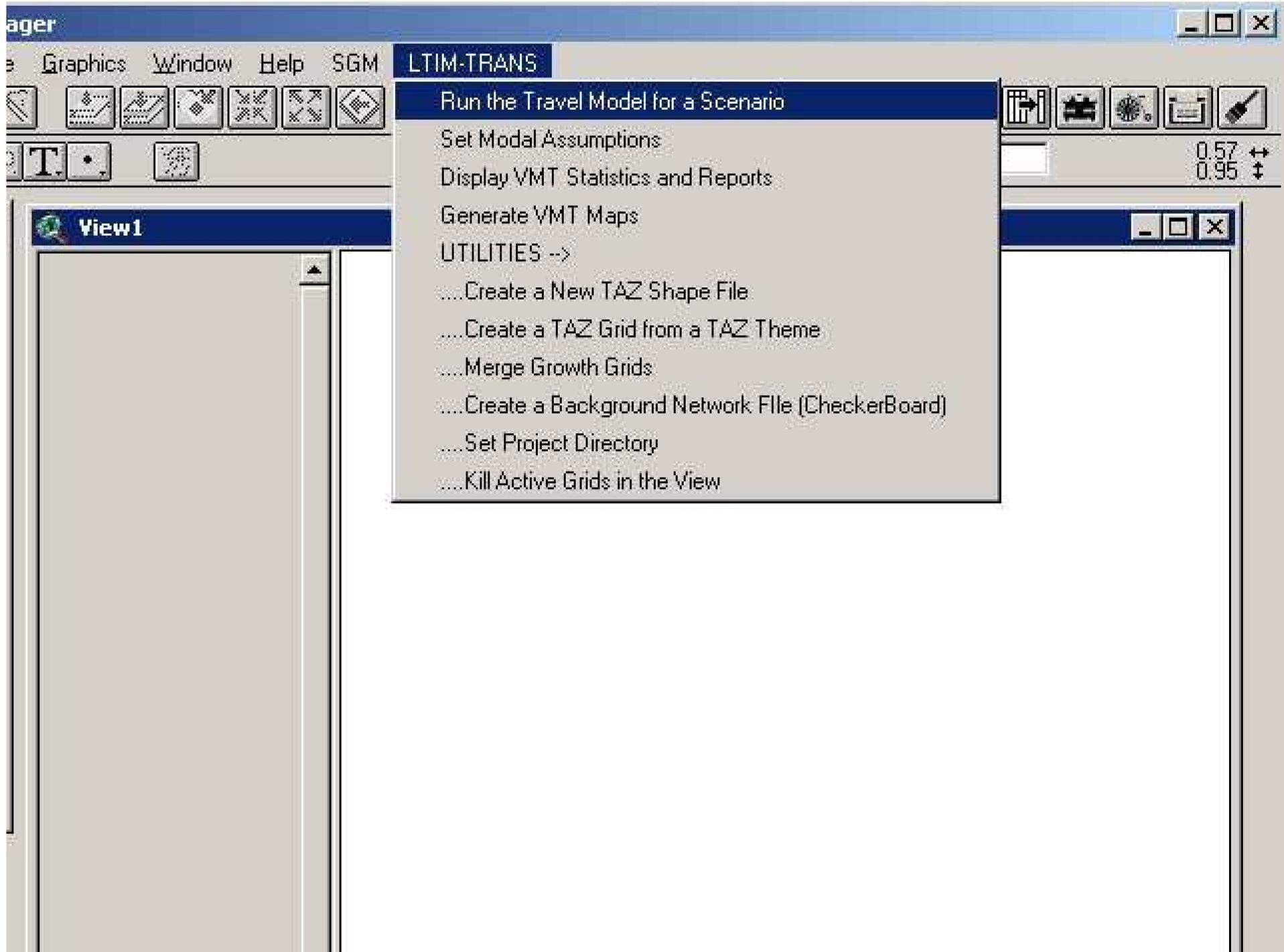


LTIM-Trans Interface



LTIM Functions

Button	Function	Explanation
	Merge Growth Grids	Merges the SGM Growth Grids (one per land use type and timestep) into a single land use grid.
	Run LTIM-Trans	Runs an LTIM-Trans scenario from scratch, which includes building or rebuilding all the trip tables.
	Set Modal Assumptions	Open dialogs for setting or changing the mode split assumptions
	Summarize VMT Statistics	Presents a table that shows either total VMT, PMT (Person Miles Traveled), or Total Trips by Trip Purpose and Time Step
	Map VMT by TAZ	Open dialog for specifying then mapping various aspects of LTIM-Analysis (i.e., VMT, PMT, Trips, etc.), by Year, by Trip Purpose, and showing VMT generation or attraction.



VMT Estimator [X]

Pick a Statistic

Pick a Statistic ▼

Mode Assumptions: DEFAULT

Year

2010
2015

Trip Types

All

HBW

HBO

NHB

Visitor

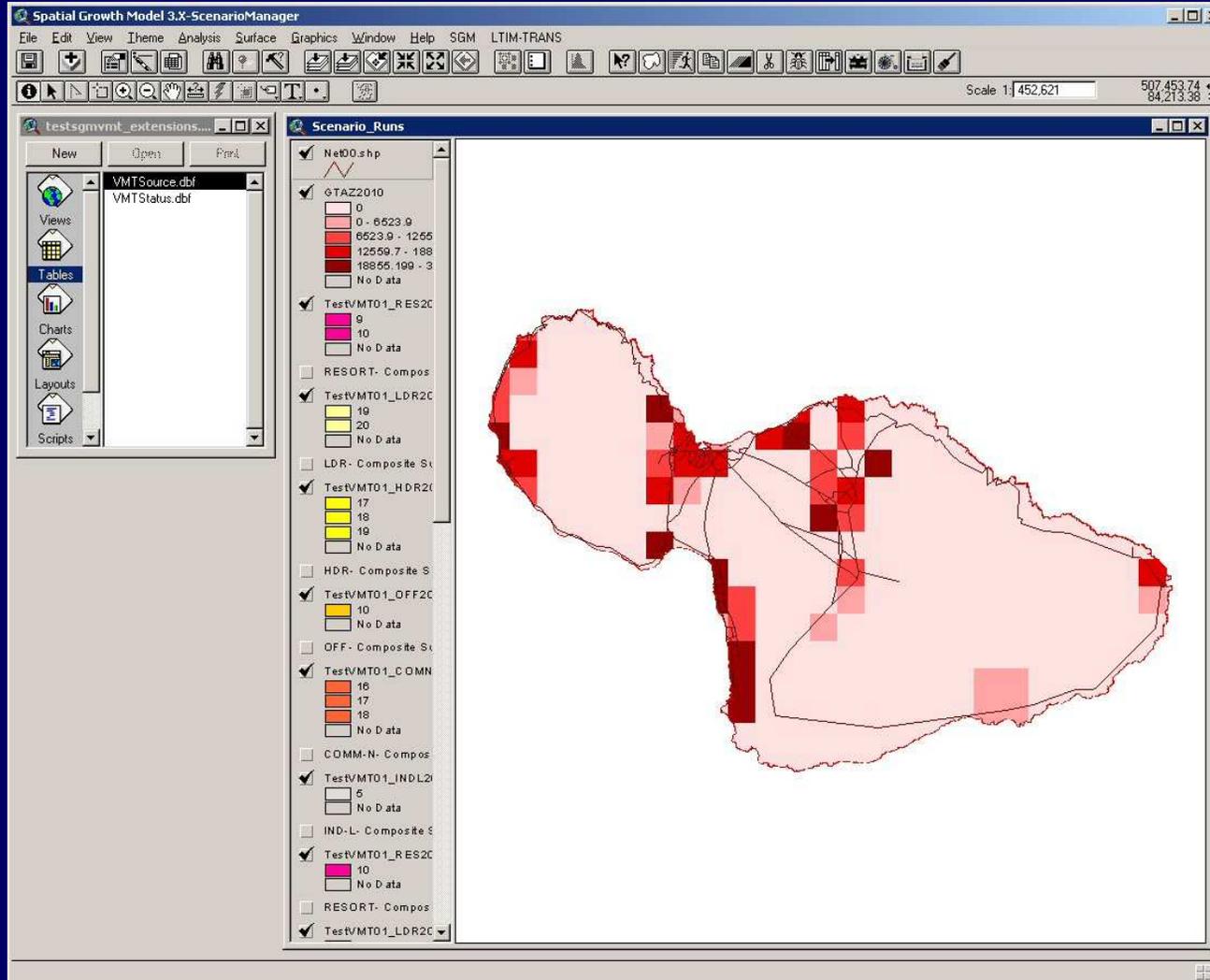
Trip Types

By Zone of Origin

By Zone of Destination

Color Schemes

TAZ Map output showing estimate of Vehicle Miles Traveled by Zone of Destination



Emergency Management Decision Support GIS

For the

TAMPA BAY REGION





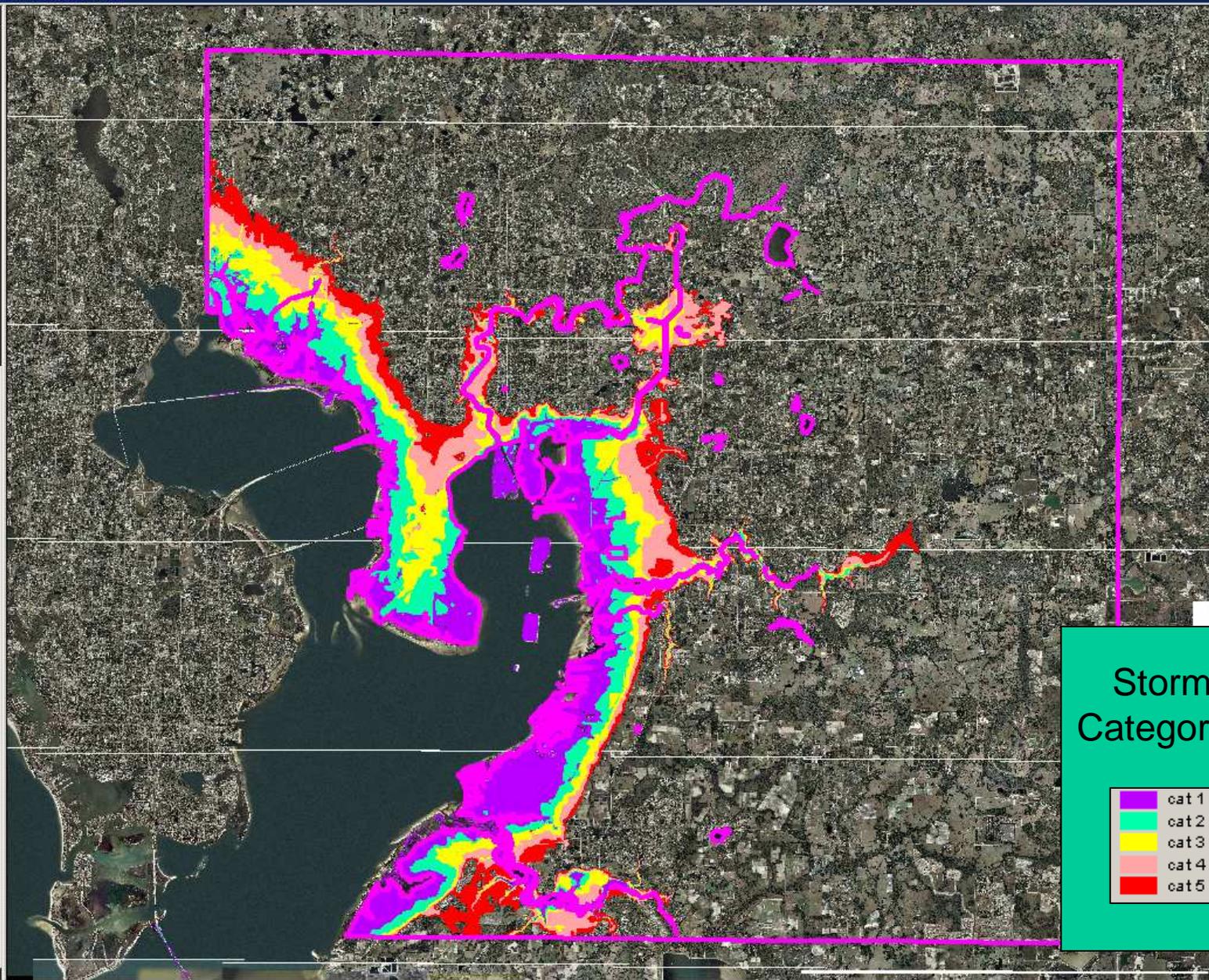
Emergency Management

- Domestic preparedness
- Vulnerability Assessments
- Mitigation planning
- Training
- Incident management
- Recovery



Hillsborough County Growth and Hazards

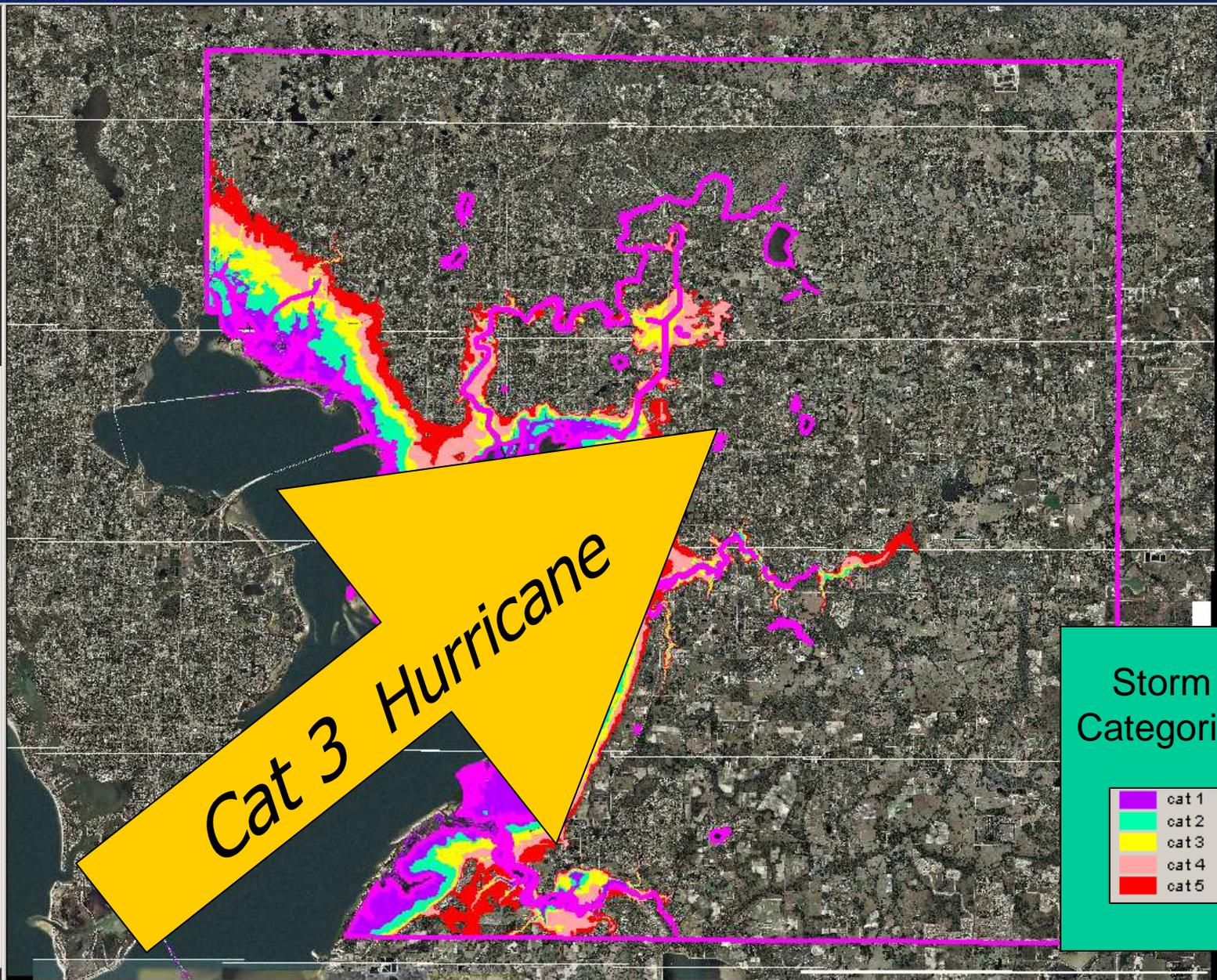
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- Med_2050.shp
- Low_2050.shp
- Indus_2050.shp
- High_2050.shp
- Com_2050.shp
- Hillsborough_bnds.s
- Hills.shp
 - Level A
 - Level B
 - Level C
 - Level D
 - Level E
- Hicrg99.shp
 - water
 - cat 1
 - cat 2
 - cat 3
 - cat 4
 - cat 5
- Hillsparcel_west.shp
- Hillsparcel_east.shp
- Lulc99_clip.shp
 - Ag/Rural
 - Commercial
 - Conservation
 - Industrial
 - Open Land
 - Public/Utilities
 - Residential H
 - Residential Lc
 - Residential M
 - Rec/Open Sp
 - Water
 - Transportation
- Taz.shp
- Image9.jpg
- Image8.jpg
- Image7.jpg
- Image63.jpg



Storm Categories

	cat 1
	cat 2
	cat 3
	cat 4
	cat 5

- Public_2050.shp
- Med_2050.shp
- Low_2050.shp
- Indus_2050.shp
- High_2050.shp
- Com_2050.shp
- Hillsborough_bnds
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 - Residential Lc
 - Residential M
 - Rec/Open Sp
 - Water
 - Transportation
- Taz.shp
- Image9.jpg
- Image8.jpg
- Image7.jpg
- Image63.jpg



Storm Categories

- cat 1
- cat 2
- cat 3
- cat 4
- cat 5



blie_2050.shp

d_2050

v_2050

us_2050

h_2050

m_2050

sborou

s.shp

Level

Level

Level

Level

rg99.sh

water

cat 1

cat 2

cat 3

cat 4

cat 5

parcel

parcel

c99_clip

Ag/R

Com

Cons

Indus

Extreme Risk Property Owners

Notify Now

Shape	Tmk	Owner	Acres	Landvalue	Blgdvalue
Polygon	216003029	The Nature Conservancy /Etal	25.097	2000.00	0.00
Polygon	216003999	road	0.000	0.00	0.00
Polygon	216004001	U.S.A.	1.360	46200.00	13500.00
Polygon	216004002	U.S.A.	6.921	359900.00	0.00
Polygon	216004006	Gillespie,Robert Miner	5.753	32900.00	122400.00
Polygon	216004007	Gillespie,Robert M	1.391	47300.00	0.00
Polygon	216004008	Nakila,Isabella H /Etal	0.989	100.00	0.00
Polygon	216004010	Gillespie,Robert Miner	0.278	100.00	0.00
Polygon	216004020	State of Hawaii	0.150	100.00	0.00
Polygon	216004999	road	0.000	0.00	0.00
Polygon	216005001	Makaula,Joseph Jr /Etal	2.040	200.00	0.00
Polygon	216005002	State of Hawaii	69.000	5400.00	0.00
Polygon	216005003	Werthman,Michael J /Etal	3.080	200.00	0.00
Polygon	216005005	Boerner,Charles J /Etal	10.769	500.00	0.00
Polygon	216005006	Boerner,Charles H Trust/Etal	19.260	500.00	0.00
Polygon	216005007	Boerner,Charles H Trust/Etal	153.550	11700.00	0.00
Polygon	216005008	State of Hawaii	3.295	300.00	0.00
Polygon	216005009	O'connor,Family Trust	13.885	20600.00	62300.00
Polygon	216005010	Stern,Henrietta K /Etal	8.800	700.00	0.00
Polygon	216005011	Keola Hana Maui Inc. /Etal	1.000	50000.00	22700.00
Polygon	216005012	Roman Catholic Church	0.260	34000.00	19200.00
Polygon	216005013	The Nature Conservancy /Etal	2.770	100.00	0.00
Polygon	216005016	The Nature Conservancy /Etal	17.880	800.00	0.00
Polygon	216005021	State of Hawaii	1.437	100.00	0.00

RVAM



Plot Storm Track

Input Wind Radii

Identify Parcels

Notify Owners

Assess Damage

Assess Future Growth Scenarios



- boroug
- blie_205
- d_2050
- v_2050
- us_205
- h_2050
- m_205
- sboroug
- s.shp
- Level
- Level
- Level
- Level
- Level
- Level
- rg99.sh
- wate
- cat 1
- cat 2
- cat 3
- cat 4
- cat 5
- sparcel
- sparcel
- c99_clip
- Ag/R
- Com
- Cons
- Indus
- Oper
- Publ
- Resi
- Resi
- Resi
- Reo/
- Wat
- Tran
- t.shp
- ige9.jpg
- ige8.jpg
- ige7.jpg
- ce99.in

Risk Damage Assessment

Assessment Complete

Landvalue	Blidvalue
2000.00	0.00
0.00	0.00
46200.00	13500.00
359900.00	0.00
32900.00	122400.00
47300.00	0.00
100.00	0.00
100.00	0.00
100.00	0.00
0.00	0.00
200.00	0.00
5400.00	0.00
200.00	0.00
500.00	0.00
500.00	0.00
11700.00	0.00
300.00	0.00
20600.00	62300.00
700.00	0.00
50000.00	22700.00
34000.00	19200.00
100.00	0.00
800.00	0.00
100.00	0.00

Parcels Affected

Extreme	5299
High	5343
Moderate	7167

\$ Building Loss Estimate

Extreme 100% Loss	1,964,336,700
High 75% Loss	1,830,798,900
Moderate 50% Loss	591,793,600

Save Results and Exit?

Future Growth Losses

Scenario 1	12,382,300
Scenario 2	7,564,900



Plot Storm Track

Input Wind Radii

Identify Parcels

Notify Owners

Assess Damage

Assess Future Growth Scenarios





Current Developments

Next Steps

- ❖ Domestic Preparedness & Emergency Management
 - ◆ DOJ funding
 - ◆ Assist with Vulnerability Assessments
- ❖ Integrate Natureserve Vista®
 - ◆ Beta test site /Funding partnership opportunities
 - ◆ Natural Resources of Regional Significance Map
 - ◆ Greenways planning
- ❖ Continue developing separate models for each county
- ❖ Complete Economic Development Module
- ❖ Integrate LTIM-Trans functions for Transportation
- ❖ Land Use modeling to depict impacts related FDOT's Strategic Intermodal System (SIS)

Decision Support GIS

For the

TAMPA BAY REGION

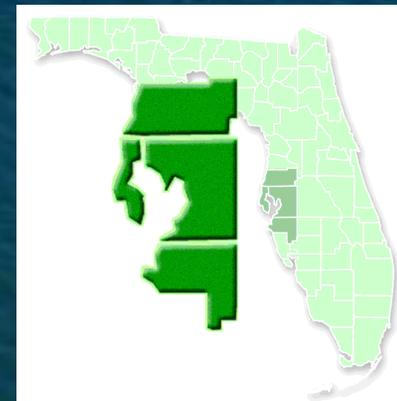


www.tbrpc.org

Economic Development Decision Support GIS

For the

TAMPA BAY REGION



Decision Support GIS

- **Maps future growth**
- **Tests multiple policy choices**
 - **What if we.....?**
 - **Maps alternative policy events**
- **Can couple with existing models**
 - **Resource usage**
 - **REMI and IMPLAN (economic)**
 - **Transportation**
 - **Event models (SLOSH, RVAM)**

EDA Grant

- **Develop Economic Development Module (EDM) for the Spatial Growth GIS**
- **Interface REMI, IMPLAN and Fiscal Impact Model with GIS**



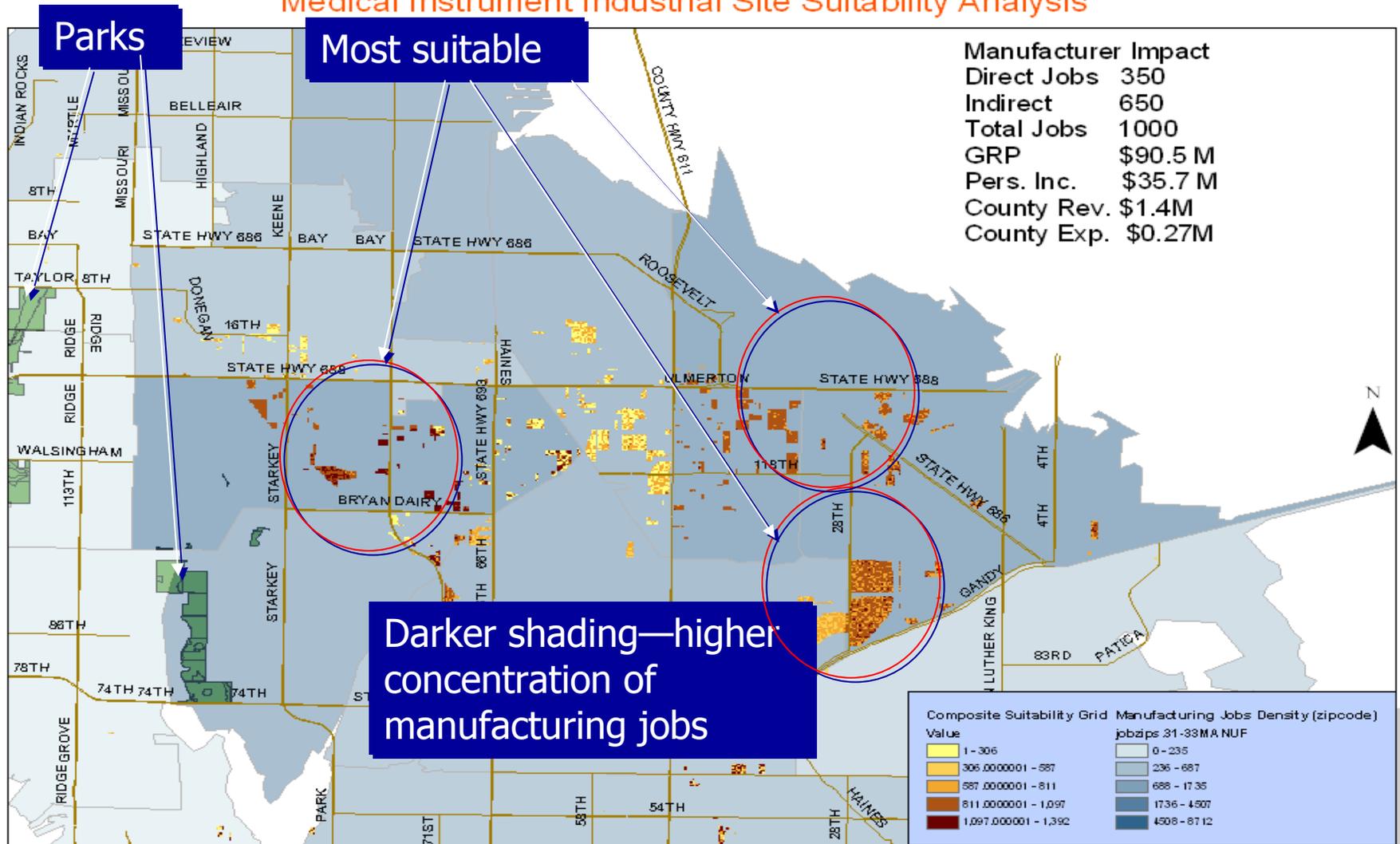
EDM will:

Provide data and analysis to identify special areas of interest:

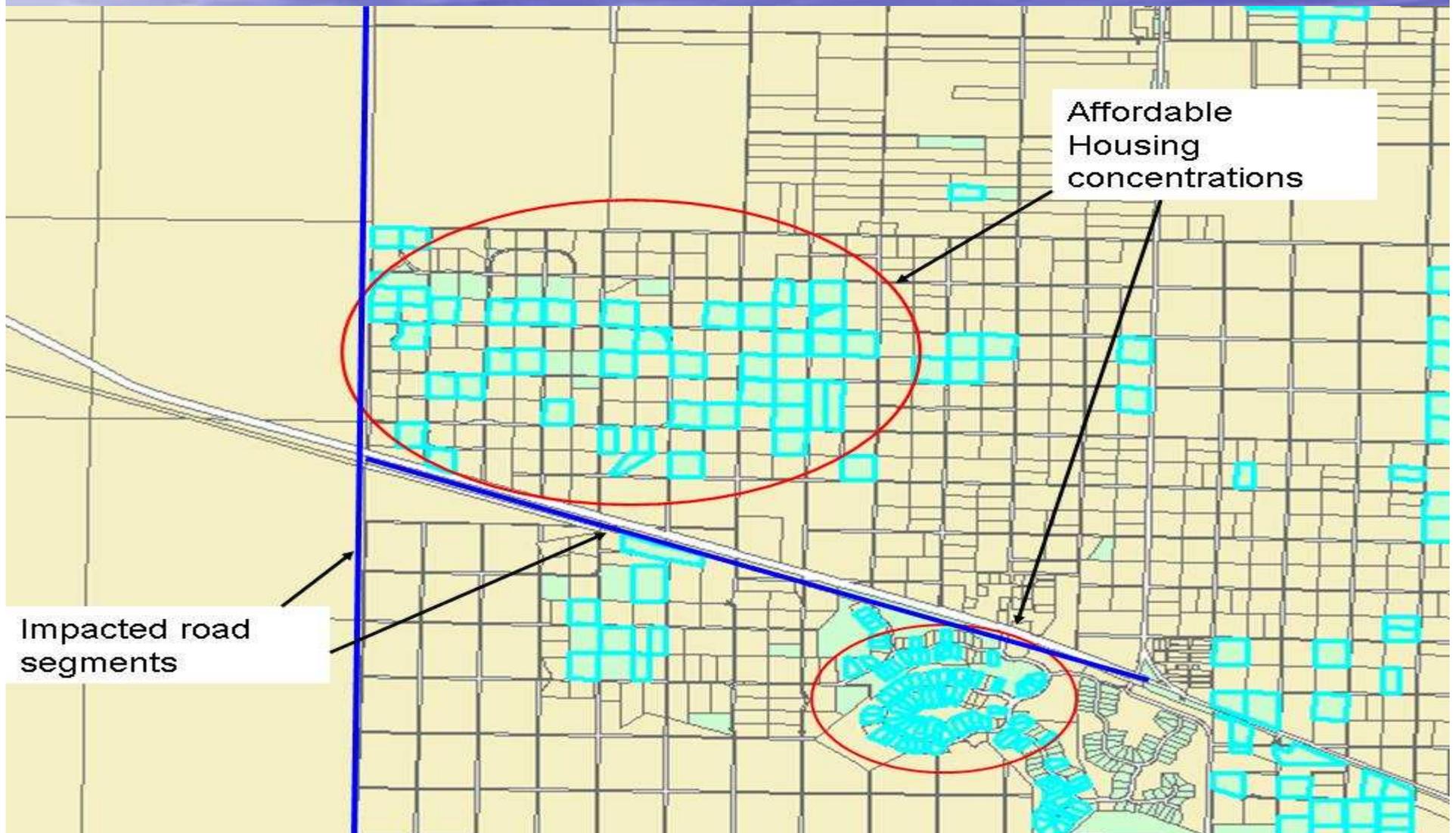
- Industry clusters**
- Employment and housing relationships**
- Regional supply chains**
- Demographic changes**
- And...**

Assist Site Selection Studies

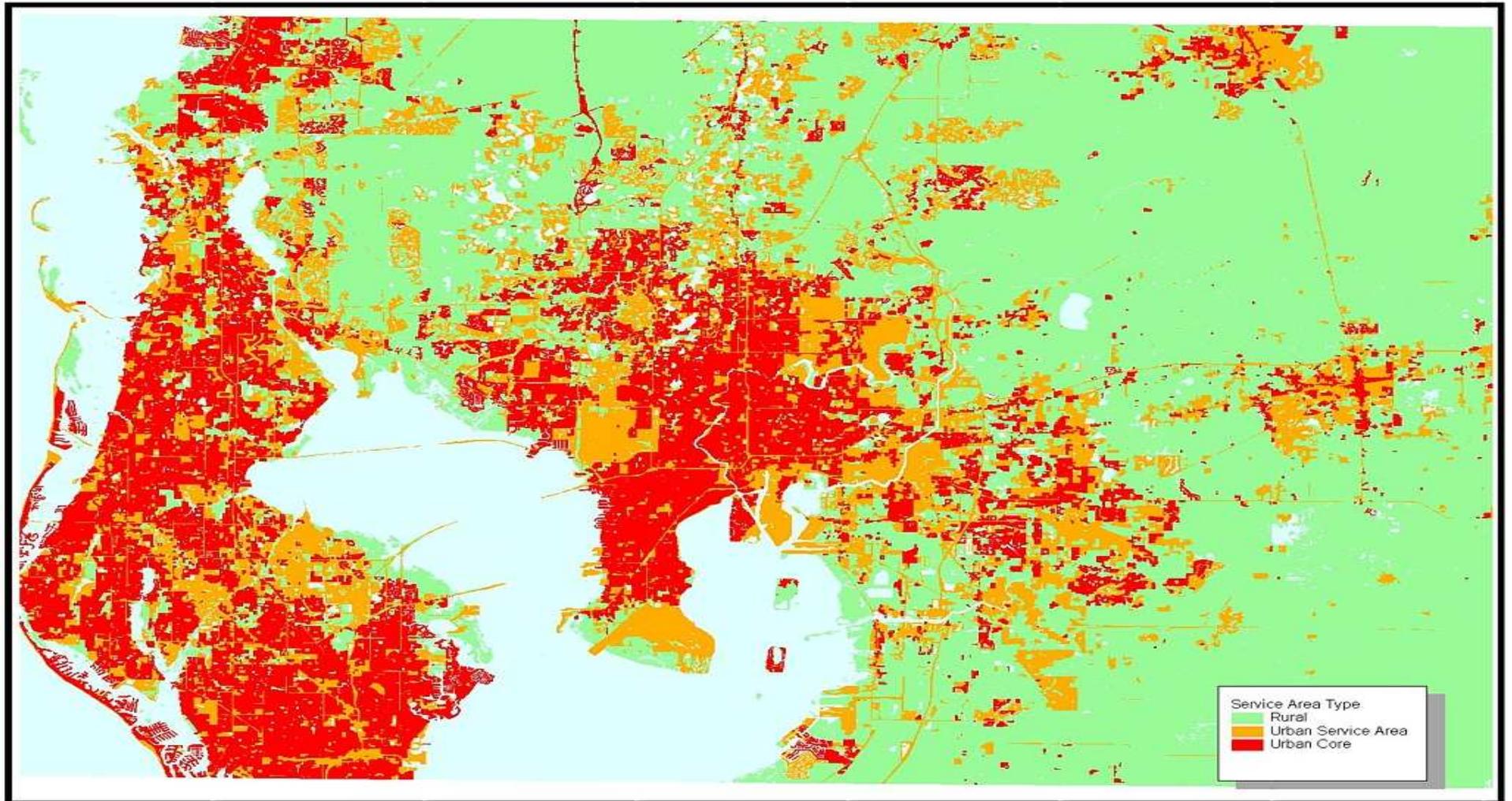
Medical Instrument Industrial Site Suitability Analysis



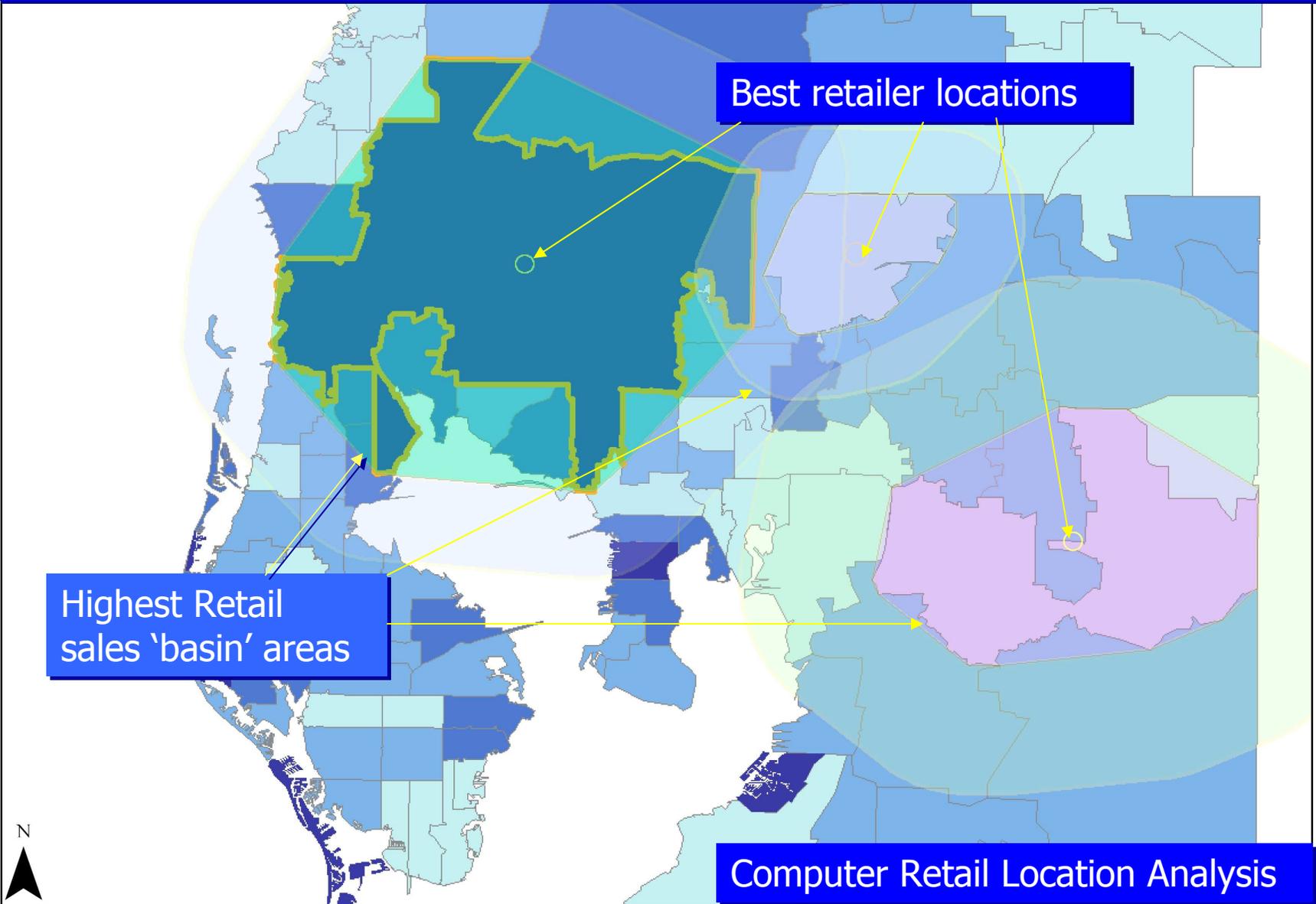
Link Development to Infrastructure Capacity & Model Costs/Benefits of Incentives



Depict Fishkind Model Impacts



Conduct Trade Area/Area of Influence Analyses



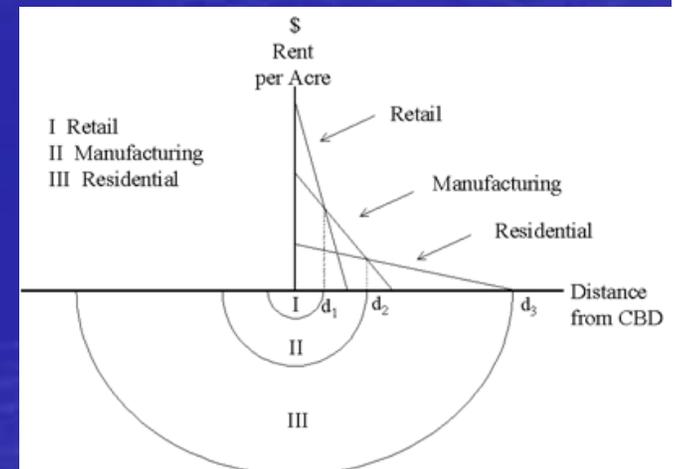
The Problem

- How do we allocate REMI county level data to sub-county level data?
 - Firm level analysis also means you know where your jobs are and you can use GIS to map employment changes and incorporate transportation costs
 - Some industries locations are obvious (e.g., aerospace) so most impacted areas can be identified
 - Macroeconomic impacts must be treated differently

Job and Population Zipcode Allocation Methodology

- “Modified” gravity approach
 - Current and forecasted job distribution by industry pattern
 - Weighed by
 - proportional share of job change
 - historical job and population growth pattern
 - proximity to suppliers and household spending
 - Industry location demands (“bid-rent function”)
 - Increasing demand for vacant land over time
- Demographic forecasting allocations follow similar approach (available land, relative growth rates, housing values)

EDM Model Assumptions							
1	Population Growth Rate	1.0	Employment Gravity	1.0	Base Year	2005	
3	Job Growth Rate	1.0	Vacant Land	0.5	Forecast Year	2005	
4	Input-Output (IO)	1.0	Location Rent	2.0	Forecast Period	0	
Indirect Employment Analysis		2-Digit NAICS	Employment	Zipcode	Household Indirect		
6	Default Model Zipcode 33607 and Industry 56	31	369	33607	2.0		
2-Digit NAICS Industry Employment		Hillsborough	Manatee	Pasco	Pinellas	Region	Jobs Change
9	11 Forestry, fishing	12,251	5,219	2,800	6,701	26,971	0
9	21 Mining	260	132	107	253	752	0
10	22 Utilities	3,432	175	725	2,240	6,572	-2
11	23 Construction	36,893	8,882	8,895	28,554	84,324	-41
12	31-33 Manufacturing	33,169	11,817	3,109	43,385	91,480	-14
14	42 Wholesale trade	33,214	3,836	1,988	20,787	59,825	-12
14	44-45 Retail trade	77,044	19,184	17,927	87,581	181,736	-56
15	48-49 Transportation & warehousing	23,732	1,719	1,889	7,973	35,298	-550
16	51 Information	23,985	1,543	1,037	15,772	42,337	-8
17	52 Finance & insurance	53,109	4,242	3,781	32,148	93,280	-21
18	53 Real estate	23,531	6,178	3,992	23,756	57,458	-10
19	54 Professional, scientific & technical services	52,808	5,961	4,221	38,686	101,576	-23
20	55 Management of companies & enterprises	3,489	1,500	177	9,051	14,197	-3
21	56 Admin, support, waste mgmt	129,281	43,546	5,696	102,368	281,071	-20
22	61 Educational services	8,392	1,719	1,889	9,073	15,266	-7
23	62 Health care and social assistance	58,529	13,604	13,865	63,891	150,889	-19
24	71 Arts, entertainment & recreation	15,318	2,845	1,872	11,140	30,875	-8
25	72 Accommodation & food services	47,372	7,942	8,190	37,608	101,112	-32
26	81 Other services	32,905	8,238	7,783	31,622	80,548	-28
27	95 Auxiliaries	2,260	33	443	1,272	4,008	0
28	99 Unclassified	443	77	82	246	848	0
29	Employment Total	672,367	147,646	89,278	552,310	1,461,601	-852



Firm Level Analysis

- New firms entering the market or expansion of an existing facility sensitive to transportation costs
 - EDM generates a distance table from the firm to all other locations in the region and weighs supply chain spending by cost-distance
 - Transportation cost sensitive spending makes the pattern of indirect job creation more accurate

Microsoft Excel - EDMkaT2.xls

File Edit View Insert Format Tools Data Window Help

Type a question for help

100%

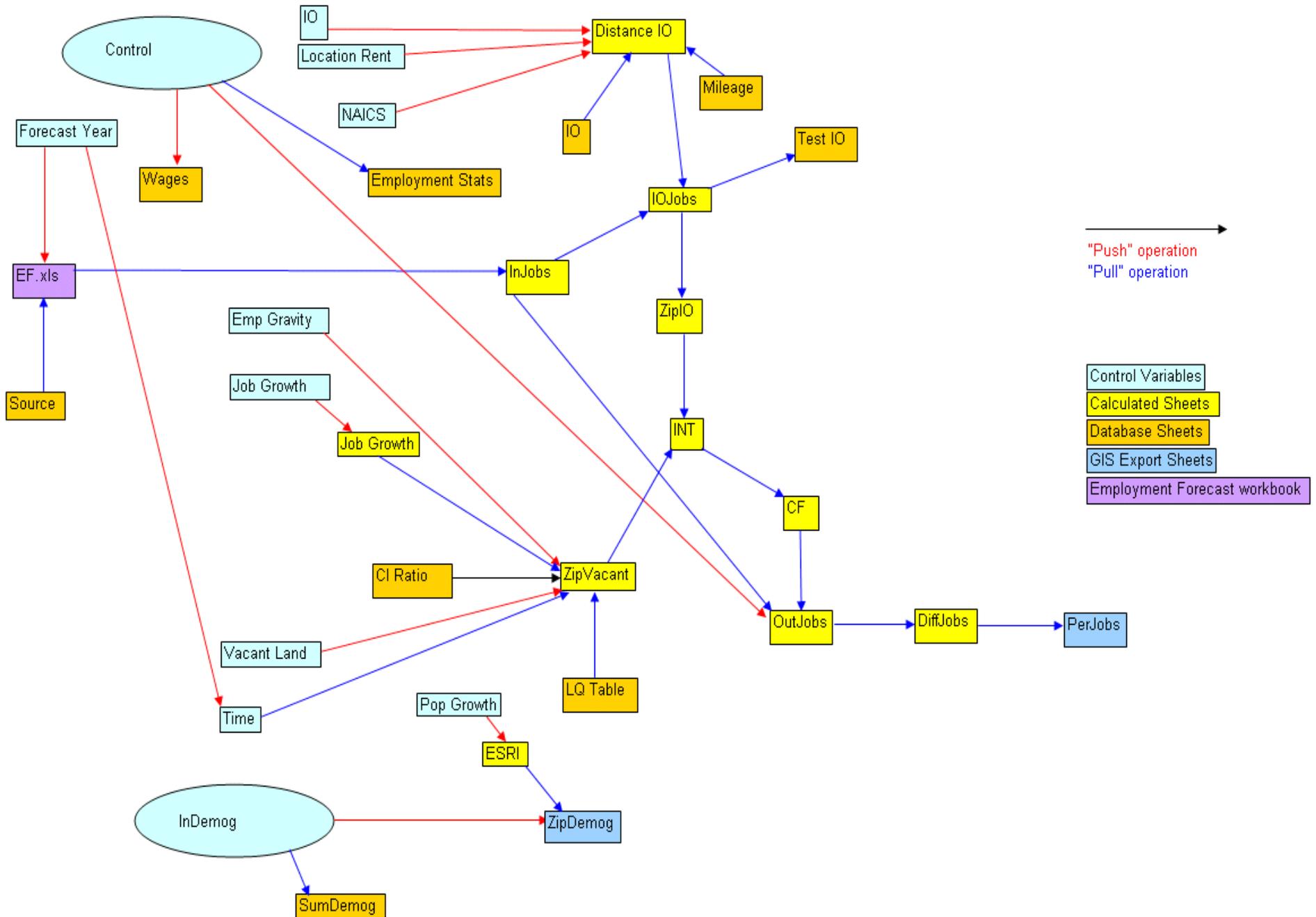
Arial 10

G19 $=IF(ISERROR((DiffJobs!G19)/InJobs!G19),"",(DiffJobs!G19)/InJobs!G19)$

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
1	ZIP	11Forestry	21Mining	22Utilities	23Constru	31-33Manu	42Wholes	44-45Retai	48-49Trans	51Informat	52Finance	53Real est	54Professi	55Manage	56Admin,	61Educ
2	33510				0.031	0.009	0.002	0.013	0.005	0.002	0.021	0.019	0.003		0.029	-0.0
3	33511	0.004			0.007	0.000	0.030	-0.012	-0.010	-0.027	-0.022	0.005	0.005	0.006	0.014	0.0
4	33523	-0.015			0.027	0.009	0.017	-0.025	0.005		0.002	0.001	0.003		-0.001	
5	33525	0.018		0.026	-0.025	0.023	0.002	0.032	0.005	0.002	0.010	-0.022	0.012	0.006	0.013	-0.0
6	33527				-0.002	-0.020	-0.008	0.030	0.022		0.002	0.001	0.003	0.006	0.014	0.0
7	33534				0.004	0.037	0.002	-0.002	0.005	0.002		0.028	0.003		0.002	
8	33540	0.026	0.001		0.021	-0.004	0.002	0.005	0.005	0.002	0.012	0.011	0.003		0.002	0.0
9	33541	-0.023		0.003	-0.020	-0.013	0.002	0.019	0.005	0.020	-0.007	0.001	0.024		-0.027	0.0
10	33543				-0.021	0.009	0.002	0.009	0.005	0.002	0.002	-0.017	0.003		-0.013	0.0
11	33544				0.024	0.009	0.002	0.003	0.005			0.001	0.003		-0.023	0.0
12	33547	-0.027			-0.025	0.009	0.002	-0.008	0.005	0.002	0.002		0.003		-0.009	0.0
13	33548				0.033	0.009	0.002	0.003	0.005	0.002	-0.018	0.001	0.003		0.018	0.0
14	33549	-0.026		0.003	-0.019	0.009	0.002	-0.021	-0.018	-0.006	-0.020	0.001	0.024	0.006	0.031	0.0
15	33556	-0.023			0.031	0.034	0.023	-0.009	0.005	-0.025	0.002	0.009	0.003	0.006	0.027	0.0
16	33558				0.004	0.009	0.002	0.003	0.005	0.002	0.002	-0.006	0.003		0.002	0.0
17	33559	-0.023			0.004	0.009	0.002	0.003	0.005		0.002	0.001	0.027		0.002	
18	33565	-0.011			0.030	0.036	0.002	0.023	0.005	0.002	0.002	-0.025	0.003	0.006	0.018	
19	33566	-0.012			0.017	0.022	-0.011	0.017	-0.013	0.026	-0.005	0.026	-0.020	0.006	0.032	0.0
20	33567	-0.023			-0.010	0.019	0.028	-0.012	0.029	0.002	0.027	0.025	0.025	-0.001	0.029	0.0
21	33569	-0.009			0.012	0.029	-0.018	-0.010	-0.011	0.002	-0.016	-0.025	0.023	0.006	0.023	0.0
22	33570	-0.011	0.025		0.014	0.032	0.024	-0.014	-0.010		0.002	0.016	0.020		0.023	
23	33572				-0.011	0.034	0.019	0.005	0.005	0.027	-0.014	0.001	0.032		0.017	0.0
24	33573				-0.014	0.009	0.002	0.004	0.005		0.030	0.022	0.003	0.018	-0.006	0.0
25	33576	-0.016		-0.020	0.004	0.009	0.023	0.021	0.005	0.002	0.002	0.001	0.026		0.002	-0.0
26	33584				-0.021	0.009	0.026	0.031	0.005	0.002	-0.015	-0.021	0.003	-0.023	-0.001	-0.0
27	33592	0.026	0.001		0.021	0.035	0.015	0.029	0.014		0.002	0.020	0.003	0.006	-0.019	
28	33594			0.003	-0.005	0.009	-0.003	-0.026	0.005	-0.017	-0.019	0.019	0.016	0.006	0.031	0.0
29	33597	0.027			0.004		-0.026	0.003	0.005	0.002	0.002	0.001	0.003		0.002	
30	33598	-0.007			-0.008	-0.015	0.002	0.003	0.005	0.002		0.001	0.003		0.026	

Cover Meta InJobs OutJobs DiffJobs PerJobs InDemoa

Economic Development Module (EDM) Flowchart



EDM Forecasting Example with REMI Analysis: Rise in Hillsborough County Aerospace Industry Sales

- **Hillsborough county aerospace industry experiences 20% increase in sales over forecast growth**
- **In 2004, aerospace sales were \$160 million.**
- **Through 2010, sales climb to an annual average of \$197 million.**

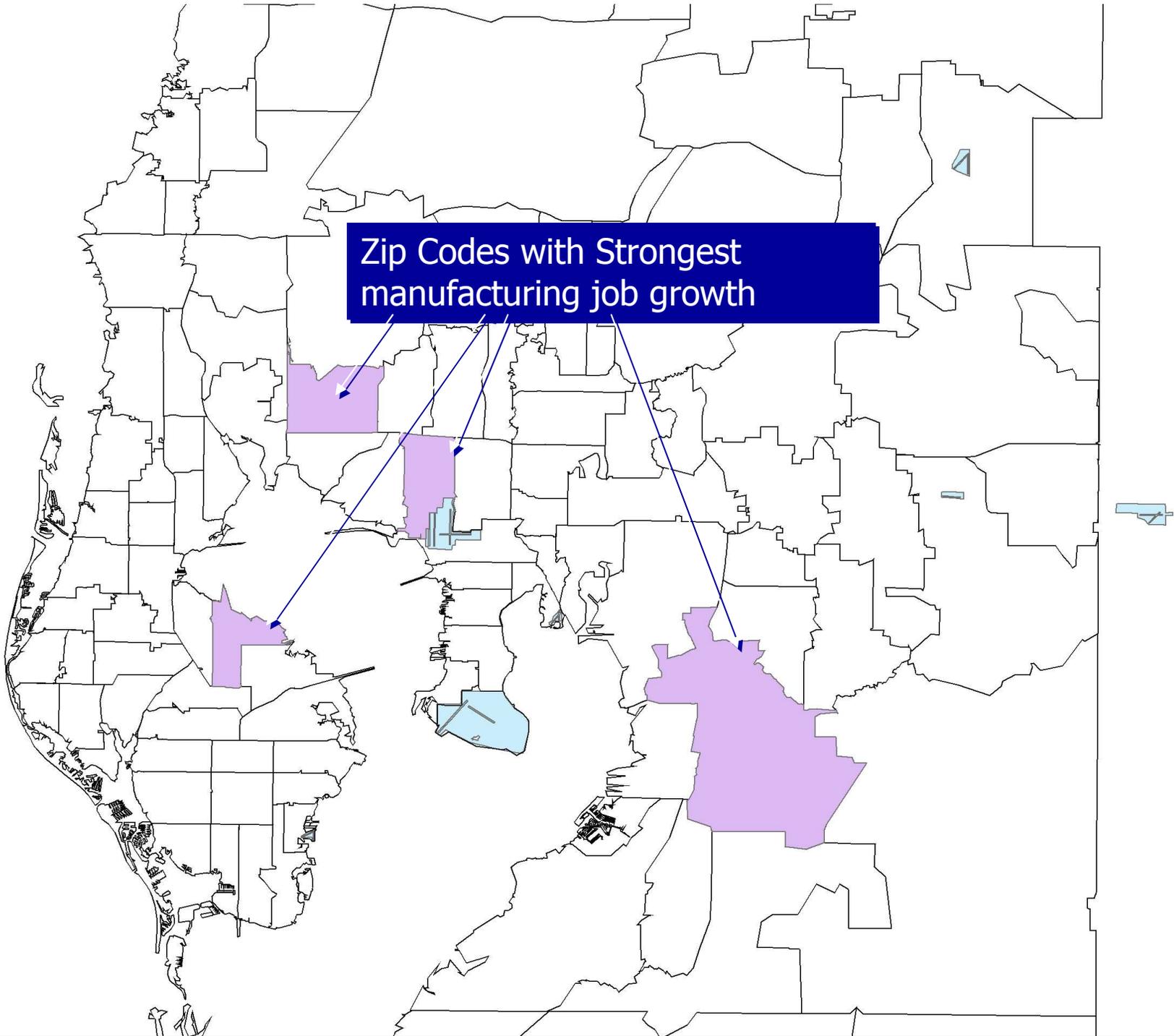


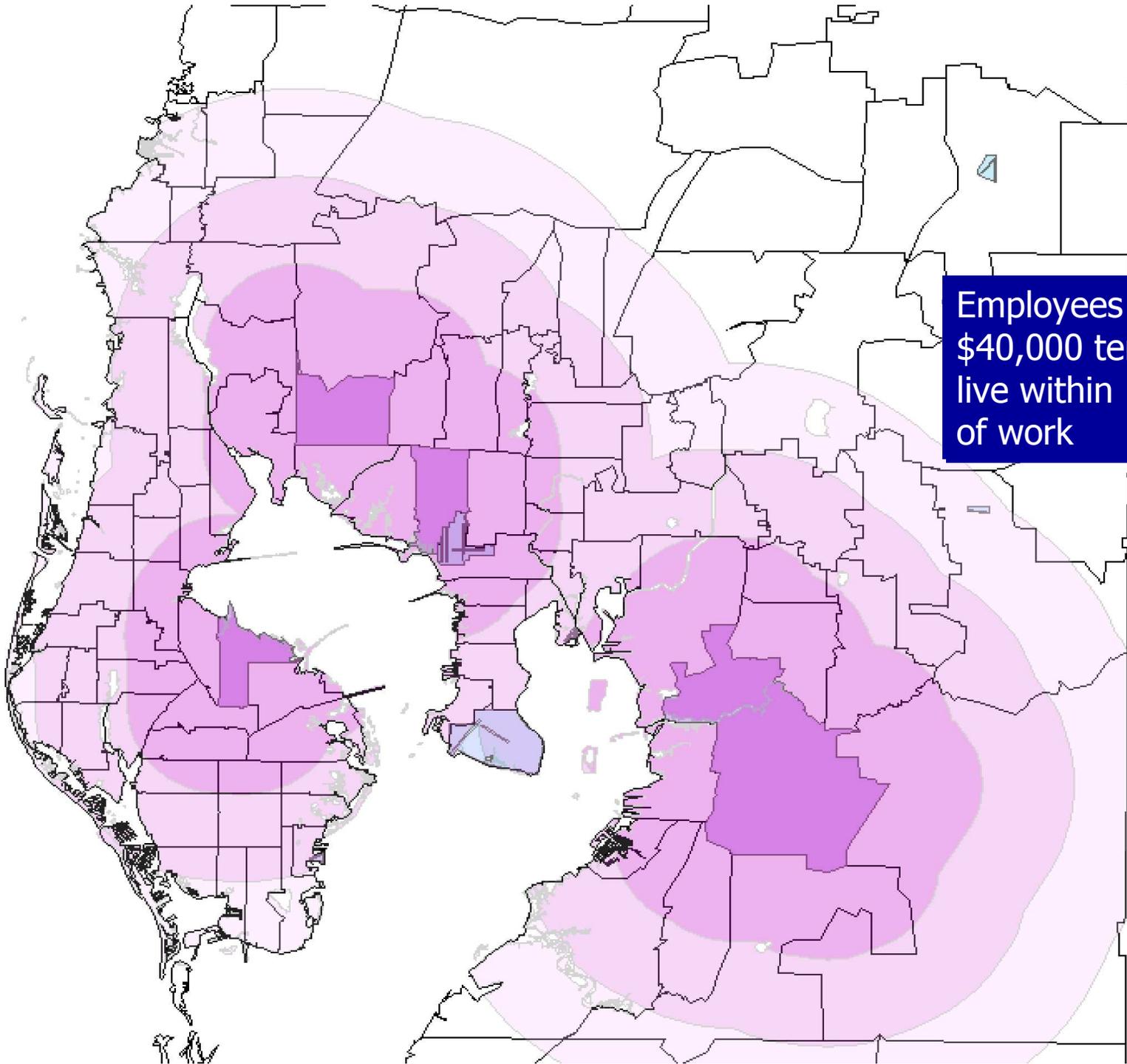
Results

- 500 New Jobs in all industries (137 in manufacturing)
- \$37 M Gross Regional Product
- \$20 M Personal Income
- Economic Migration 58
- EDM can show where:
 - New employees go to work
 - New employees might live (and spend their money)
 - Indirect jobs might appear
 - Induced employment occurs

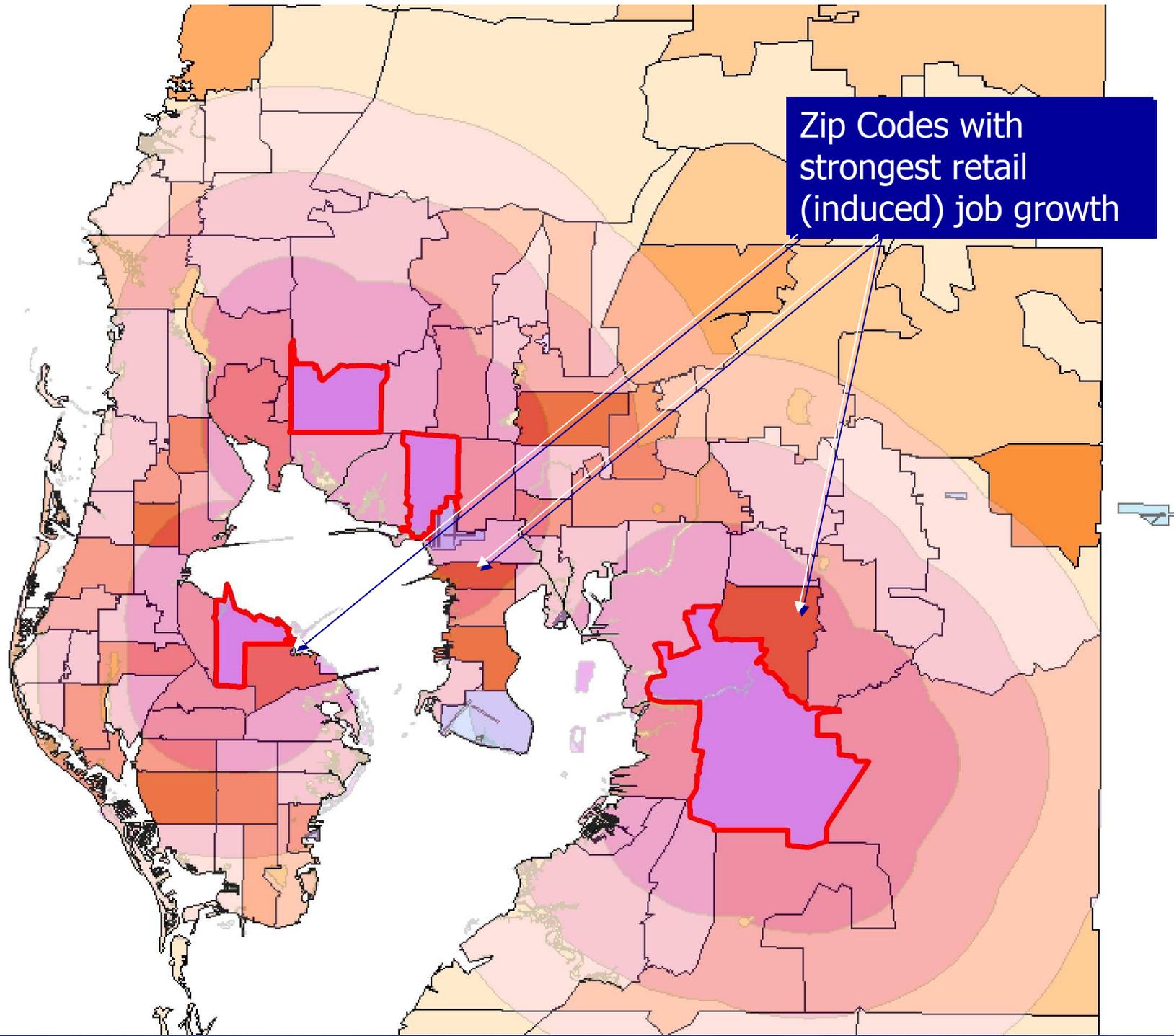


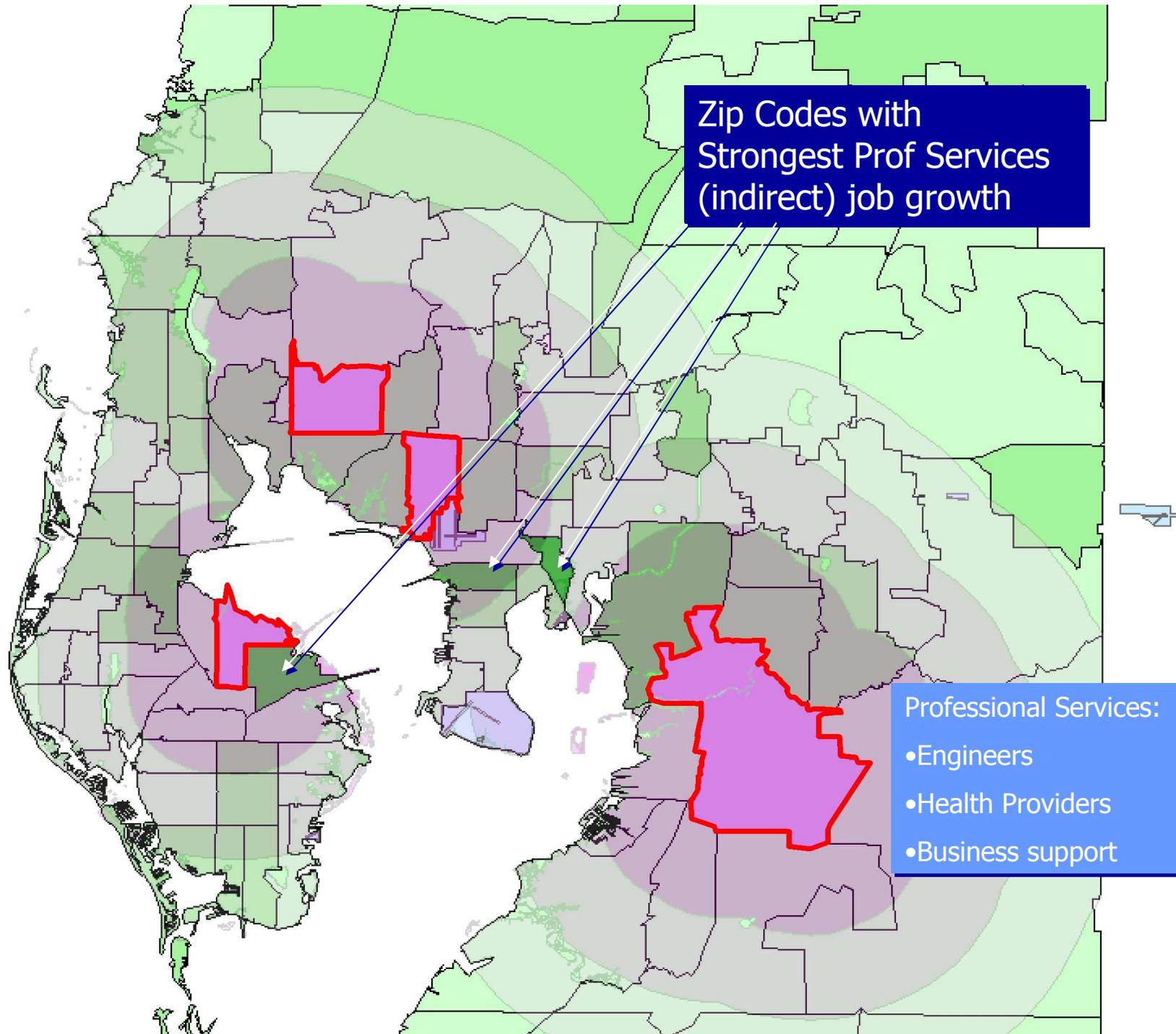
**Zip Codes with Strongest
manufacturing job growth**





Employees earning \$40,000 tend to live within 10 miles of work





Next Steps for EDM

- Develop transportation capability of EDM (trip rate generation)
- Investigate fiscal impacts aspect of GIS
- Ensure compatibility with new homeland security module
- Refine user interface

Summary

- EDM will be operational by Summer 2005
- EDM is “beta” ready for local governments
Web: www.tbrpc.org/economic/edm.htm
- Contact:
Randy Deshazo, Sr. Planner
(727) 570-5151 X 31 or randy@tbrpc.org