

# **Florida's Statewide Regional Evacuation Study Program**

**National Association of Regional Councils**

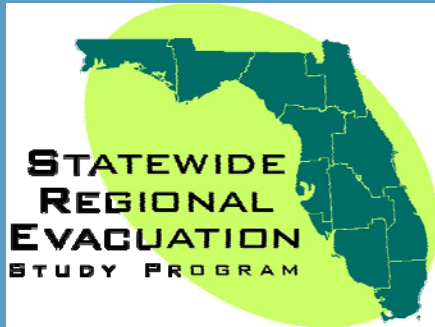
**43rd Annual Conference and Exhibition**

**Transportation and Evacuation Planning Workshop**

**Denver, Colorado**

**June 1, 2009**

**Bob Hamm, PE**  
**Wilbur Smith Associates**



# Florida's Statewide Regional Evacuation Study Program

**Lead Agency:**

**Florida Department of Emergency Management**

**Project Manager:**

**Jeff Alexander, Northeast Florida Regional Council**

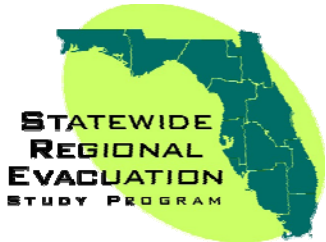
**Partner Agencies:**

**Florida Department of Community Affairs  
Florida Department of Transportation  
Apalachee Regional Planning Council  
Central Florida Regional Planning Council  
East Central Regional Planning Council  
North Central Regional Planning Council  
Northeast Florida Regional Council  
South Florida Regional Planning Council  
Southwest Florida Regional Planning Council  
Tampa Bay Regional Planning Council  
Treasure Coast Regional Planning Council  
West Florida Regional Planning Council  
Withlacochee Regional Planning Council**



# Project Goals

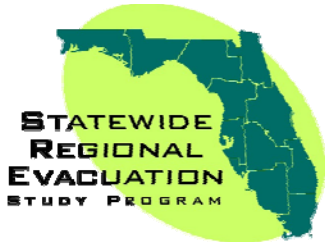
- Study and Update Regional Hurricane Evacuation in light of new legislation (HB 1359 –SB 7121)
- Utilize New LIDAR data combined with updated SLOSH modeling
- Utilize consistent methodology and format to ensure complete transparency and visibility
- Expected completion in 2009



# Description of Phase I

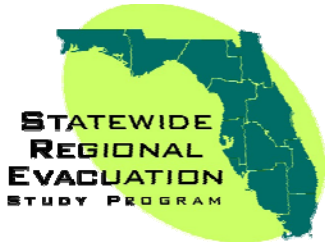
## 95% Complete

- Phase 1 provides for Demographic and Land Use Analysis, Critical Facilities Inventory, Hazards Analysis, Vulnerability, Behavioral, Shelter and Regional Evacuation Transportation Network Analyses, & GIS
- Will yield updated basis for plans and mitigation strategy.



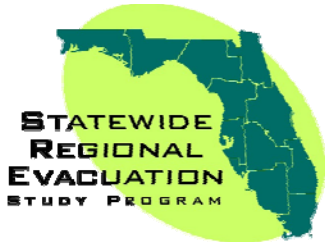
# Phase I

- **Demographic and Land Use Analysis** (Complete)
- **Critical Facilities Inventory** (95% complete)
- **Shelter Analysis** (95% complete)
- **Regional Evacuation Transp. Networks** (Complete)
- **Definition of relevant terms** (95% complete)
- **Behavioral Analysis** (95% complete)



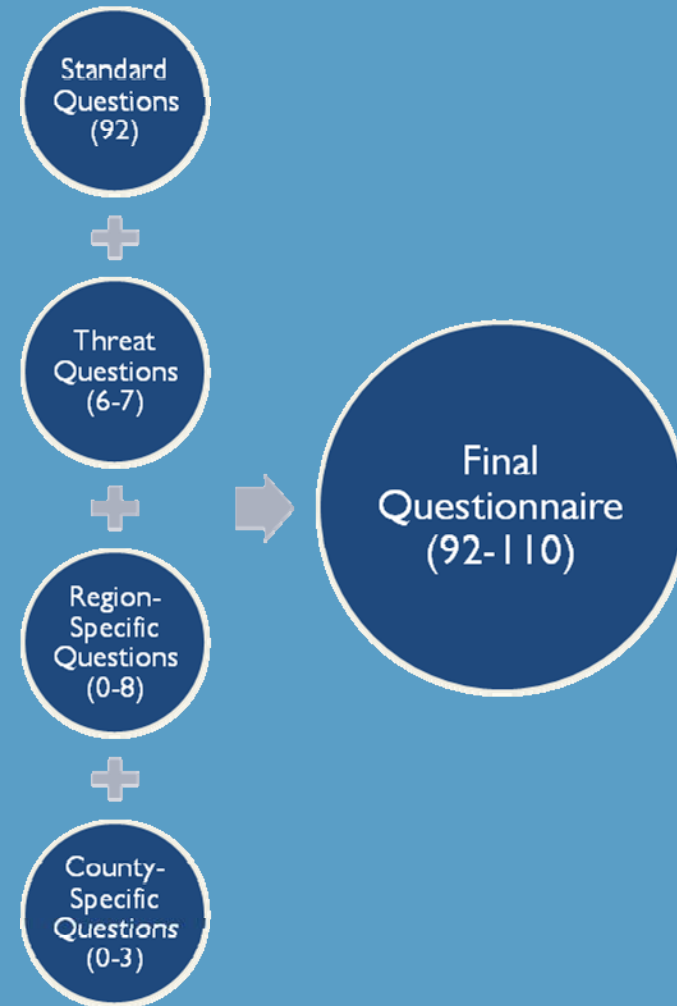
# Behavioral Data Interview Effort

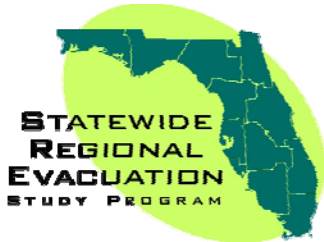
- **Interview Staff**
  - 180 interviewers worked on study
  - 10 supervisors
  - 2 data collection managers
- **>21,500 hours of programming, training, testing, interviewing, validating**
- **Most difficult regions:**
  - North Central - small population
  - South - urban area



# Behavioral Data Interview Effort

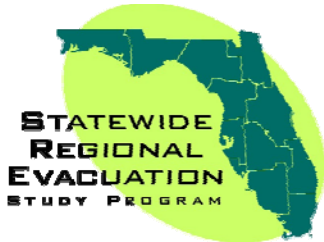
- 92 standard questions
  - 18 versions of evacuation zone awareness question
- 6 to 7 threat questions (i.e., wildfires, freshwater flooding, hazardous material accidents, nuclear power plant accidents)
- 0 to 8 region-specific questions
- 0 to 3 county-specific questions





# Response Rate - 27.8%

| Call Disposition         | # of calls     |
|--------------------------|----------------|
| Complete                 | 18,800         |
| Schedule Callback        | 4,201          |
| Refused                  | 46,753         |
| Terminated Early         | 1,998          |
| Government/Business      | 2,608          |
| Answering Machine        | 138,319        |
| Language barrier         | 2,077          |
| Over Quota               | 225            |
| Non-working/disconn      | 21,054         |
| Busy                     | 19,103         |
| No Answer                | 90,070         |
| Wrong number             | 286            |
| Fax machine/modem        | 3,430          |
| Out of town              | 260            |
| Call back later          | 23,234         |
| Non-qualified respondent | 1,959          |
| Already completed        | 427            |
| Left message             | 22             |
| Duplicate Number         | 134            |
| Push to Night            | 5,958          |
| <b>Total Calls</b>       | <b>380,918</b> |

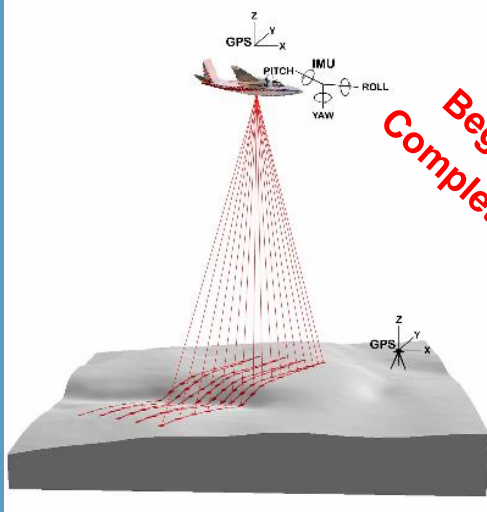


# Description of Phase Two

## 35% Complete

- LIDAR topographic data and new SLOSH models are underway for each region
- Includes Vulnerability Analysis consisting of the delineation of the storm tide limits and evacuation zones, identification of population-at-risk and evacuation populations, storm surge analysis of critical facilities and the evacuation transportation analysis
- Products include printed documents and digital data, including GIS products
- Will development impact methodology, and evacuation zones impacts assessment tools

# Project Overview



Light Detection and Ranging  
LiDAR

Begun FY 06-07  
Complete FY 07-08

Contractors

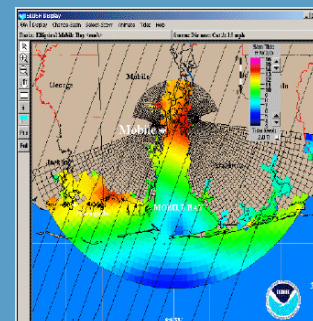
Begun FY 06-07  
Complete FY 08-09



Data Processing  
Development for SLOSH

Contractors

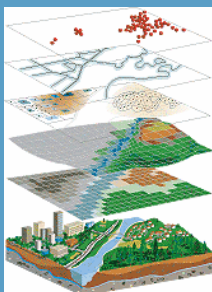
Begun FY 08-09  
Complete FY 09-10



Sea, Lake, Overland Surge from Hurricanes  
SLOSH Models

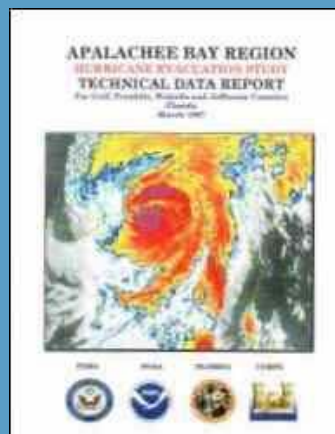
Analyses  
Vulnerability  
Behavioral  
Demographics  
Transportation

Begun FY 06-07  
Complete FY 09-10



Regional  
Planning  
Councils

Regional Evacuation  
Studies

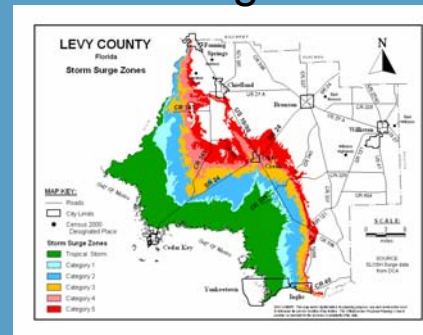


FY 09-10

Regional  
Planning  
Councils

Begun FY 08-09  
Complete FY 09-10

Storm Surge Zones



National  
Hurricane  
Center



# Transportation Objectives

- **Satisfy State Requirements**  
Standardized definitions for clearance times
- **Statewide Consistency**  
All RPC regions use same transportation methodology
- **Single or Multi-Region Analysis**  
Each RPC has ability to conduct own analysis
- **Model Interface**  
Allows users ability to easily create and run evacuation scenarios



# Behavioral Data

- **Statewide Behavioral Studies**  
Studies nearing completion in all RPC regions
- **Provides Important Data for Modeling:**
  - Who is evacuating?
  - Where they are going?
  - When they are leaving?



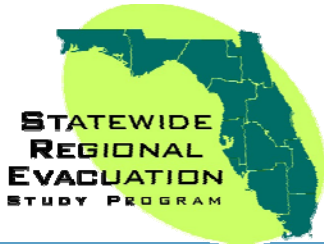
# Small Area Data

- **Regional Demographic Studies**  
RPC regions developing updated demographics
- **Provides Important Data for Modeling:**
  - Where/how many people?
  - Where/how many households?
  - Where/how many vehicles?
  - Where/how many mobile homes?
  - Where/how many hotel/motels?
  - Where/how many shelters/capacity?



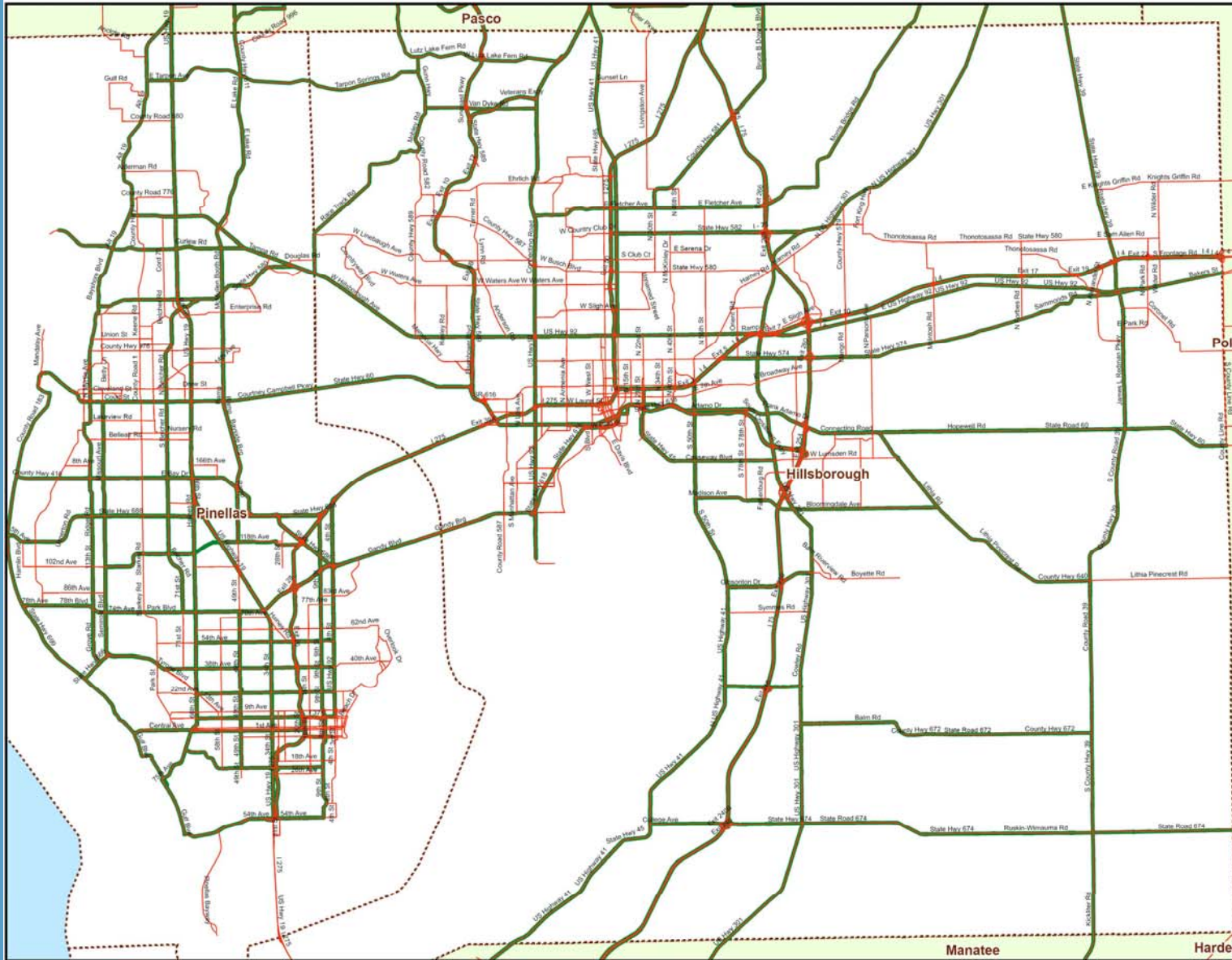
# Evacuation Network

- **FDOT Statewide Model Network**  
Used as a starting point – consistent statewide on consistent GIS projection
- **Updated with RPC Evacuation Route input**  
RPCs developing evacuation route data
- **Provides Important Data for Modeling:**  
Roadway locations and number of lanes  
Preferred evacuation routes  
Traffic control strategies



# Evacuation Network

## HILLSBOROUGH AND PINELLAS COUNTIES



### Map Legend

-  Statewide Model Network
-  Evacuation Routes



This map is prepared under the direction of Florida Division of Emergency Management for the Regional Evacuation Study Update. This map is for planning purposes only. Not to be used for measurement or legal purposes. Please consult with your county for the latest information.



DATE CREATED: OCT 21, 2008



# Evacuation Zones

- **Vulnerability Analysis**

Evacuation zones will be developed by counties based on results of ongoing SLOSH modeling and easily recognized geographic features (e.g. major roads)

- **Provides Important Data for Modeling:**

Defines areas that will evacuate (both primary and shadow areas)



# Model Structure

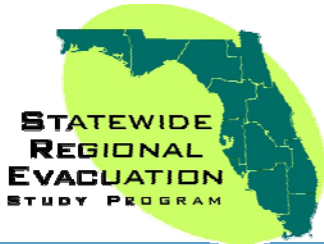
- **Cube Voyager Platform**  
Consistent with FDOT and all MPOs in Florida
- **Cube Avenue Dynamic Traffic Assignment**
- **Model Structure includes:**
  - Behavioral Data – provided by Baker study
  - Demographic Data – provided by RPCs
  - Evacuation Network – provided by RPCs
  - Evacuation Zones – provided by Counties based on SLOSH data



# Prototype Model Development

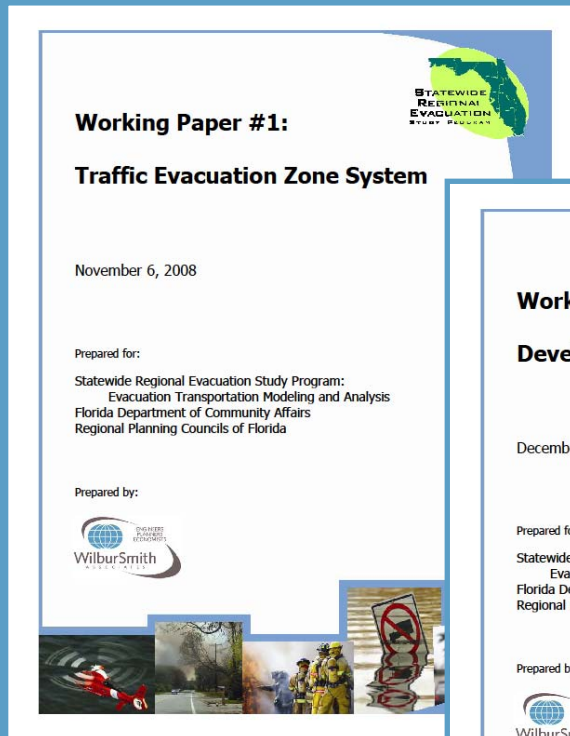
- Tampa Bay RPC Selected for Prototype
- Prototype includes numerous regions:
  - TBRPC, CFRPC, WRPC, and ECFRPC





# Model Process


- Documented in a series of Working Papers

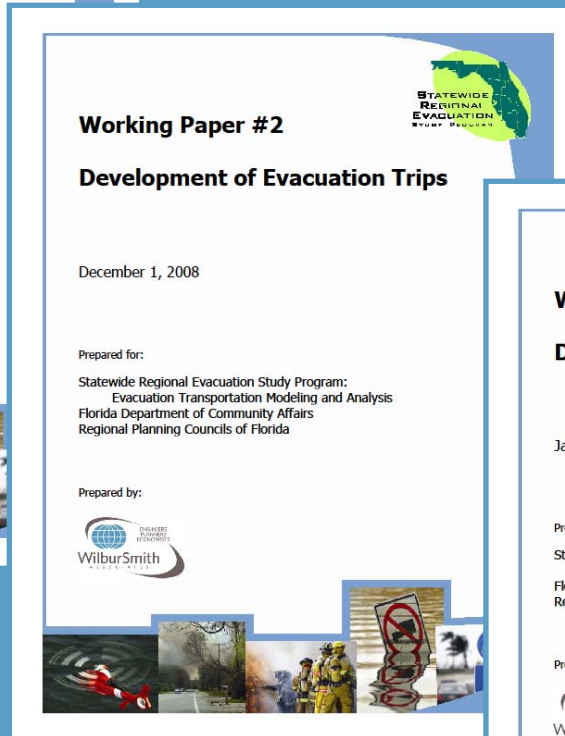



**Working Paper #1:**  
**Traffic Evacuation Zone System**

November 6, 2008

Prepared for:  
Statewide Regional Evacuation Study Program:  
Evacuation Transportation Modeling and Analysis  
Florida Department of Community Affairs  
Regional Planning Councils of Florida


Prepared by:  
  
WilburSmith

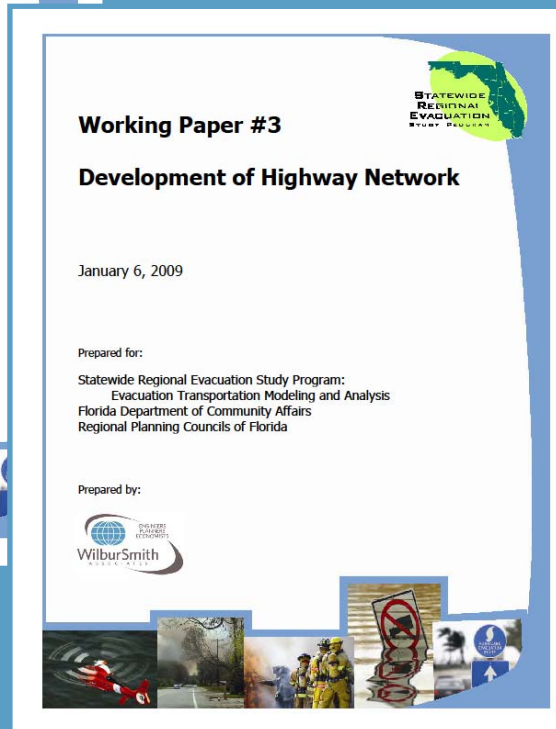



**Working Paper #2**  
**Development of Evacuation Trips**

December 1, 2008

Prepared for:  
Statewide Regional Evacuation Study Program:  
Evacuation Transportation Modeling and Analysis  
Florida Department of Community Affairs  
Regional Planning Councils of Florida


Prepared by:  
  
WilburSmith




**Working Paper #3**  
**Development of Highway Network**

January 6, 2009

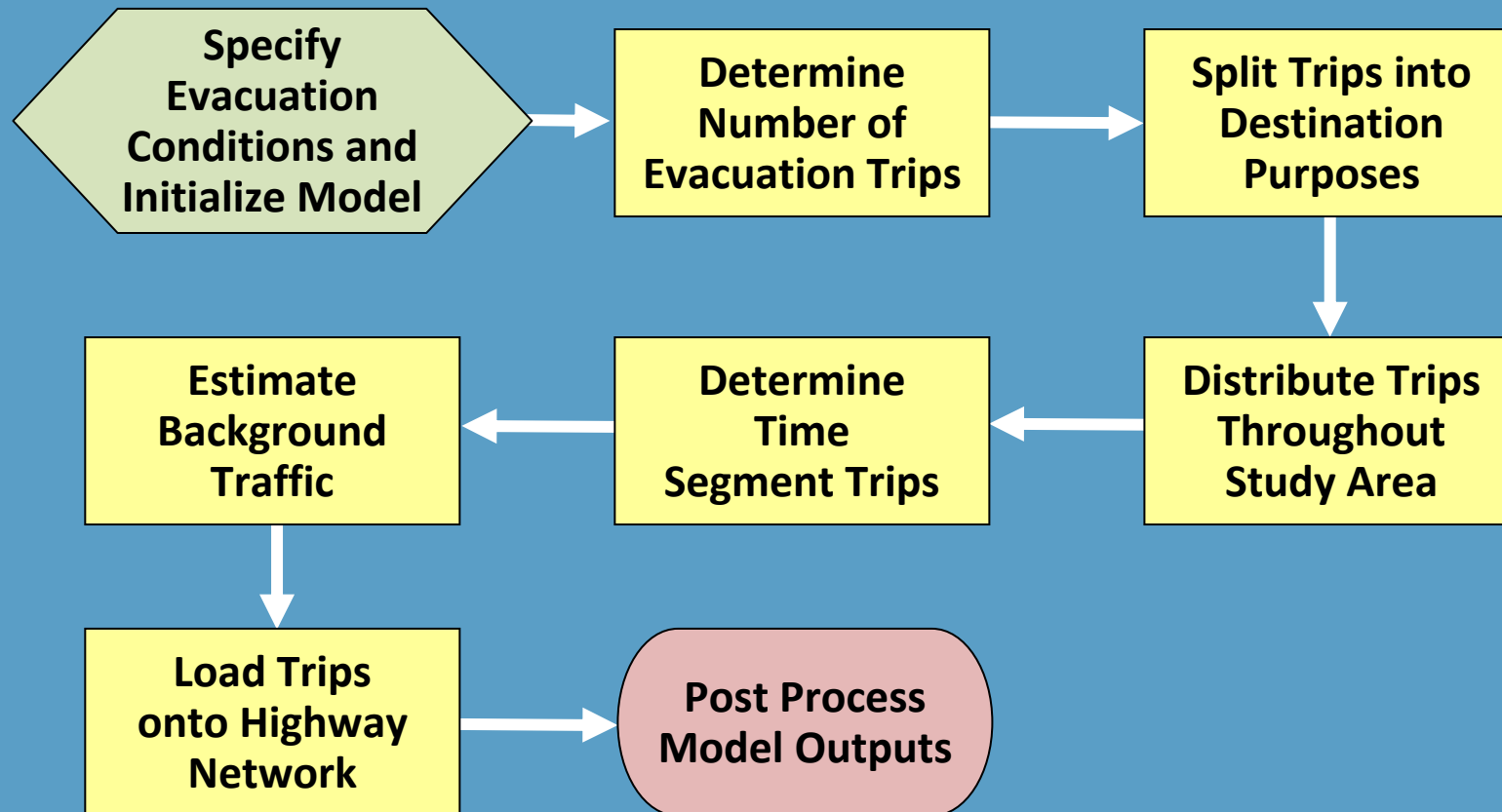
Prepared for:  
Statewide Regional Evacuation Study Program:  
Evacuation Transportation Modeling and Analysis  
Florida Department of Community Affairs  
Regional Planning Councils of Florida

Prepared by:  
  
WilburSmith





# Model Process





# Model Output

## Tables, Graphs, Maps, and/or Charts depicting:

- Clearance Times (SRESP Adopted definitions)
- Numbers of Evacuees and Vehicles Leaving the County
- Numbers of Evacuees and Vehicles Entering the County from Adjacent Counties
- Volume Estimates on Evacuation Routes
- Vulnerable Population Numbers



# Geographic Extents of Evacuation Model





# Transportation Interface for Modeling Evacuations

- **Behavioral Data**
  - Two options - 100% response or survey data response
- **Socioeconomic Data**
  - Three options – 2006, 2010, 2015
- **Highway Evacuation Networks**
  - Three options – 2006, 2010, 2015
- **Storm Category and Counties Evacuating**
  - Cat 1, 2, 3, 4, 5 and Choose County
- **Response Curve**
  - Slow, Medium, Fast



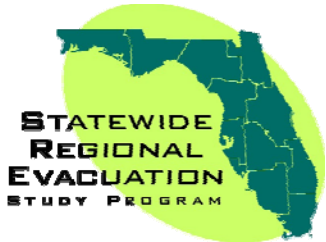
# Transportation Interface for Modeling Evacuations

- **Growth Management**
  - Modify small area data at zonal level to compare scenarios of large developments (DRI)
- **Shelter Inventories**
  - Modify shelter capacities to close or expand shelters
  - Investigate adding new shelters
  - Investigate phasing shelters during evacuation
- **Highway Evacuation Networks**
  - Investigate modifying roadway segment capacities



# Transportation Interface for Modeling Evacuations

- **Tourist Population and Seasonal Population**
  - Investigate adding option for high or low tourist/seasonal population assumption
- **Text File Exports**
  - Hurrevac, Hurritrack, WebEOC
- **Scenario Results**
  - Various text reports, maps, and graphics



# Questions/Comments??

- **SRESP Program:**

Jeff Alexander

Northeast Florida Regional Council

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- **Transportation Modeling and Analysis:**

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