

Assisting the Houston Region

In the Wake of Hurricane Ike

Dmitry Messen
Houston-Galveston Area Council
www.h-gac.com/ike

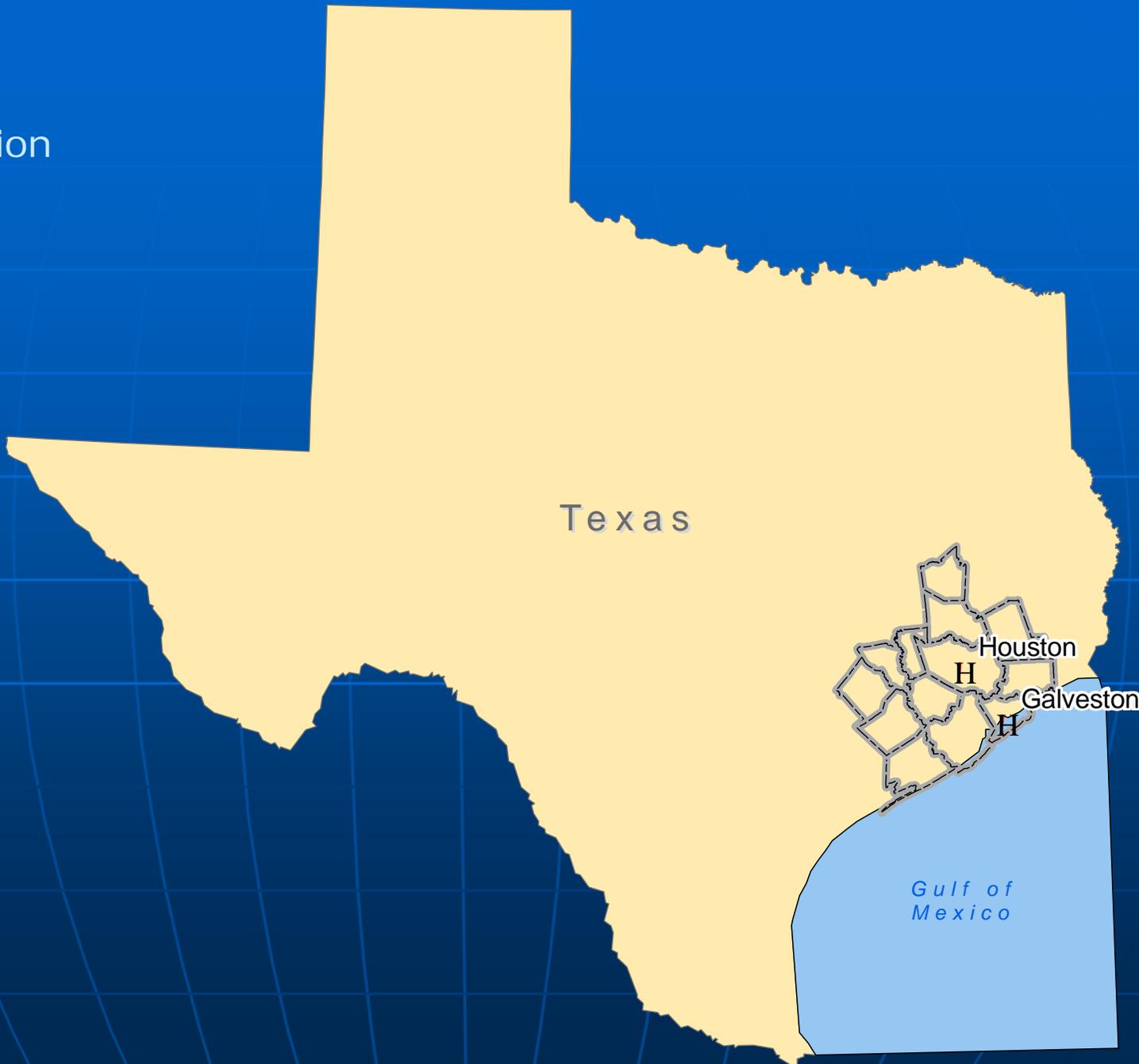


- Houston-Galveston Area Council (H-GAC)
 - Council of Governments (regional planning) and Metropolitan Planning Organization
 - 13 counties, 105 cities, 13 School Districts
 - 5.7 million people, 12,500 square miles

- Local, State, Federal Authorities
 - Evacuation
 - Emergency Operations
 - Immediate response

- Regional Planning Agency
 - Recovery planning
 - Informational assistance

H-GAC Region



Texas

Houston

H

Galveston

H

*Gulf of
Mexico*

Galveston Bay and Surrounding Areas



Hurricane Ike- NOAA SLOSH Model (Estimated Storm Surge)



Basin: Galveston Bay (2002)v3 <gl2>

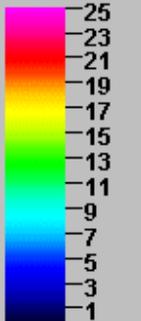
Storm: c:/slosh/pkg/data/rexfiles/i48_g12.rex

For Guidance Purposes Only.
Please refer to
NWS forecasts for official
storm surge information.



Houston ★

Stm Tide ft
NGVD 1929

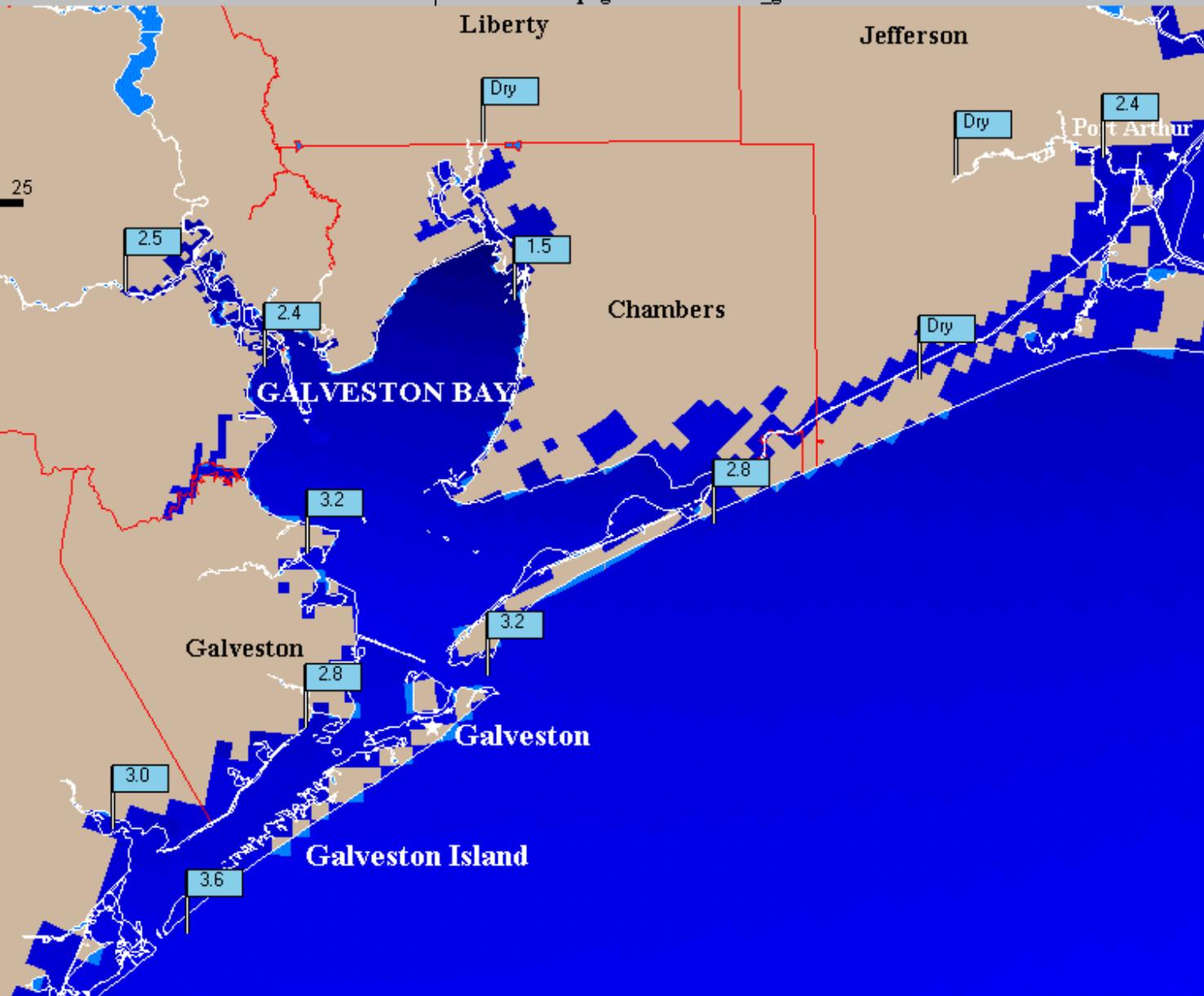


Tide level:
3.0(99.9) ft



09/12/2008
08:20:00 UTC

Brazoria



Bolivar Bridge - Pre Ike



Bolivar Bridge - Post Ike



Bolivar Ferry - Pre Ike



Bolivar Ferry - Post Ike



H-GAC Responds to Ike

- Develop an Information Resource
- Quickly provide searchable information
 - Infrastructure
 - Industrial facilities
 - Population and Employment
 - Property
- Provide summaries to support impact scenarios, damage estimates and funding requests
- Assessment of *potential* damage

H-GAC Responds to Ike

- Pulling together many different data sources
 - Employment-related
 - Zip-code Business Patterns
 - Info-USA Businesses Database
 - ES-202
 - H-GAC Forecast

- Request to LEHD Team for OTM data
 - Block-level employment estimates
 - Assessment of affected jobs
 - Outstanding Service!

- Information Services were made available to local governments as well as state and federal

Major Data Groups

Critical Infrastructure

- Refineries
- Pipelines
- Power Plants
- Power Sub-Stations
- Power Transmission Lines
- Fire & Police Stations
- Hospitals
- Schools & Universities
- Wastewater Treatment
- Landfills
- Closed Landfills
- Commercial Facilities
- Grocery Stores/Retailers
- Cultural Sites
- Buildings
- Cemeteries
- Correctional Facilities

Imagery

- Pre Ike
- Post Ike
- NAIP (rural counties)
- Pre Ike Land Cover

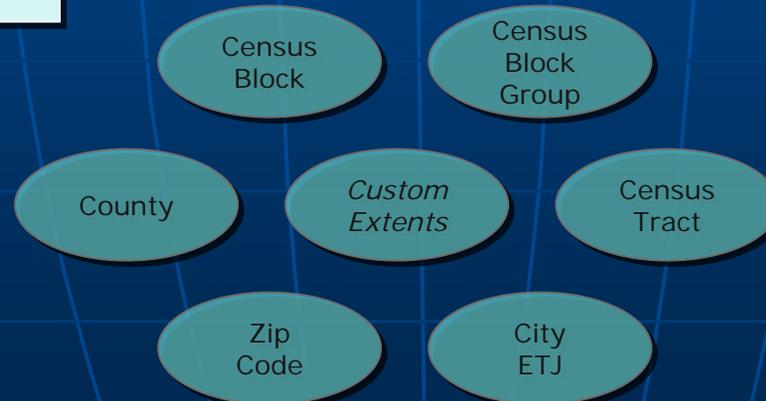
Socio-Economic

- Parcel Boundaries
- Parcel Valuation
- Parcel Land Use
- Population
- Employment
- Households
- SBA Loans

Transportation

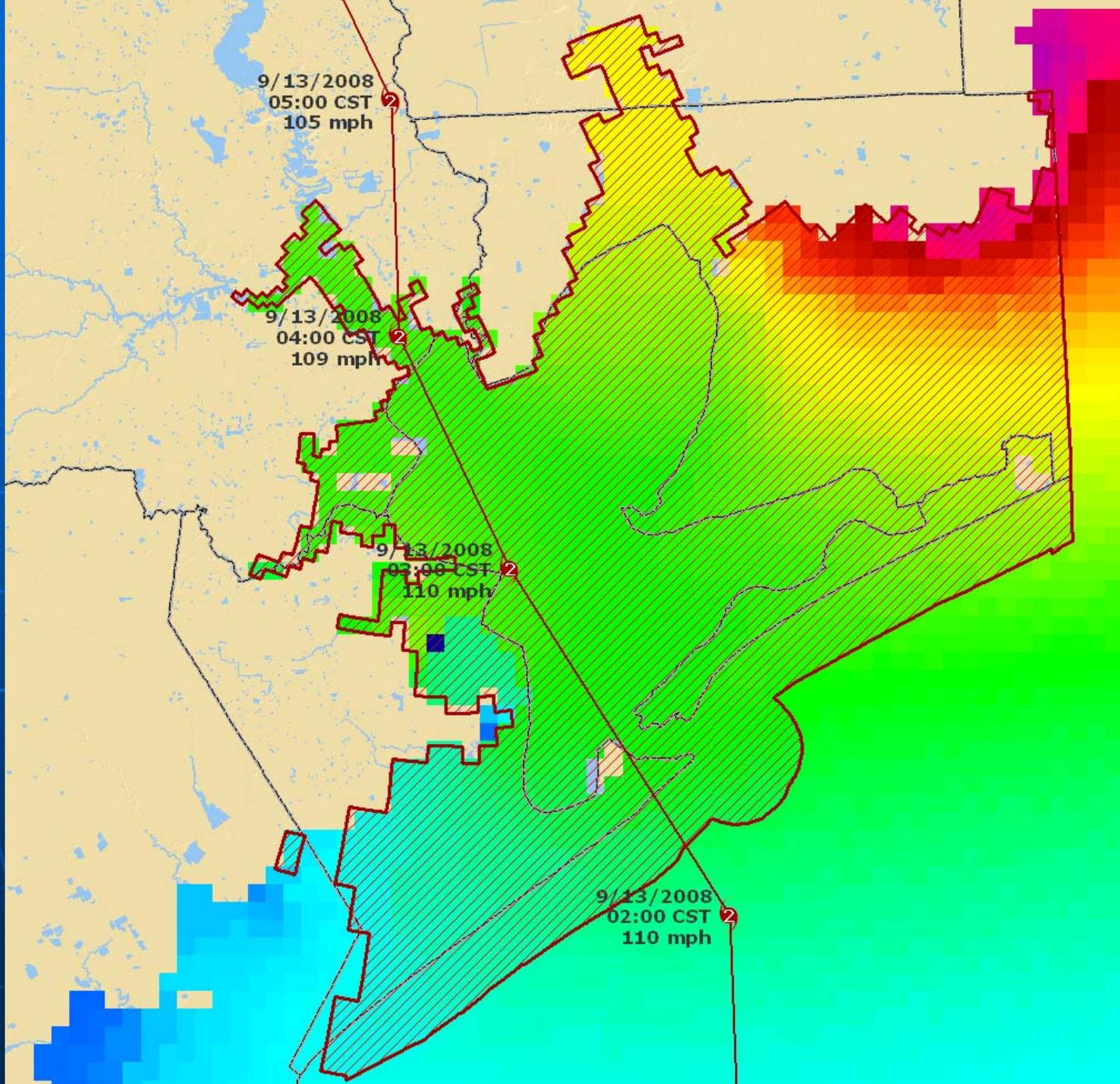
- Major Highways
- Arterial Roads (StarMap)
- Airports & Runways
- Bridges
- Railways & Crossings
- Metro Transit Centers
- Intermodal Terminals
- Ports
- Waterways

*Analysis can be provided
in the following geographies*



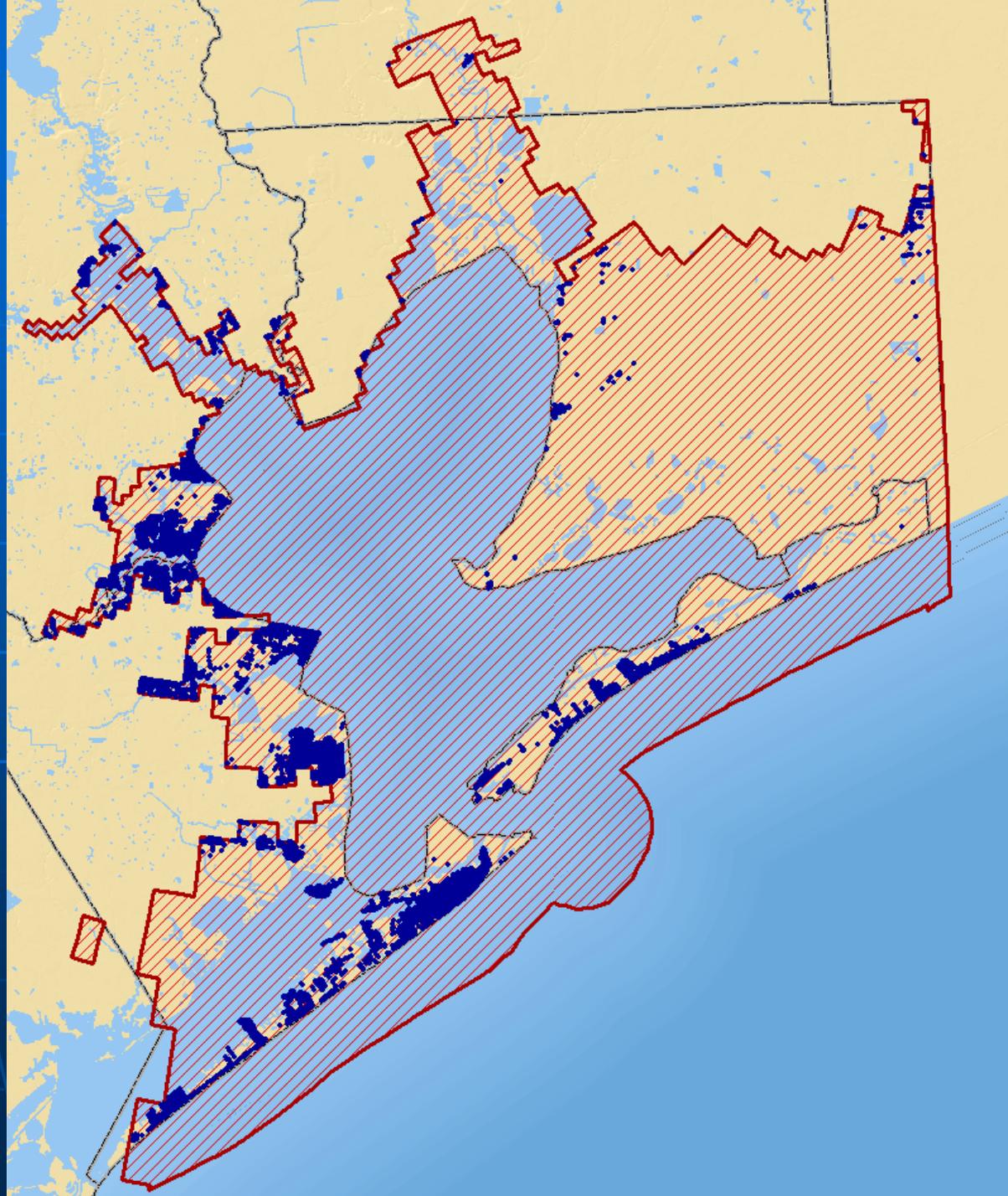
Hurricane Ike- Actual Path and Estimated Storm Surge

- Storm surge of 10 feet or more common in the Galveston Bay area
- Used extent of 10 foot surge as analysis zone



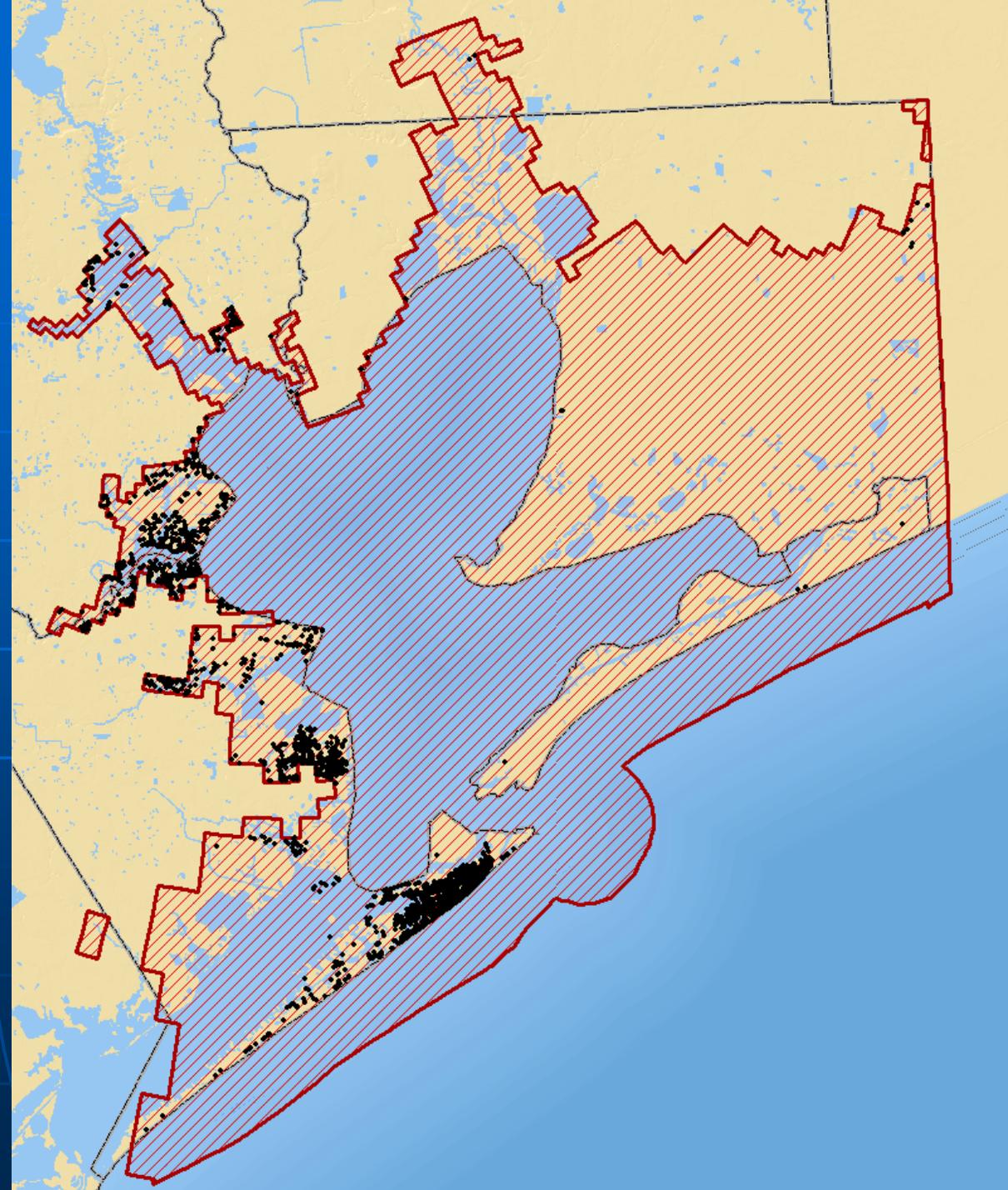
Hurricane Ike- Storm Surge Zone Potential Impacts

	<u>No.</u>	<u>Pop</u>
Households	81K	205K



Hurricane Ike- Storm Surge Zone Potential Impacts

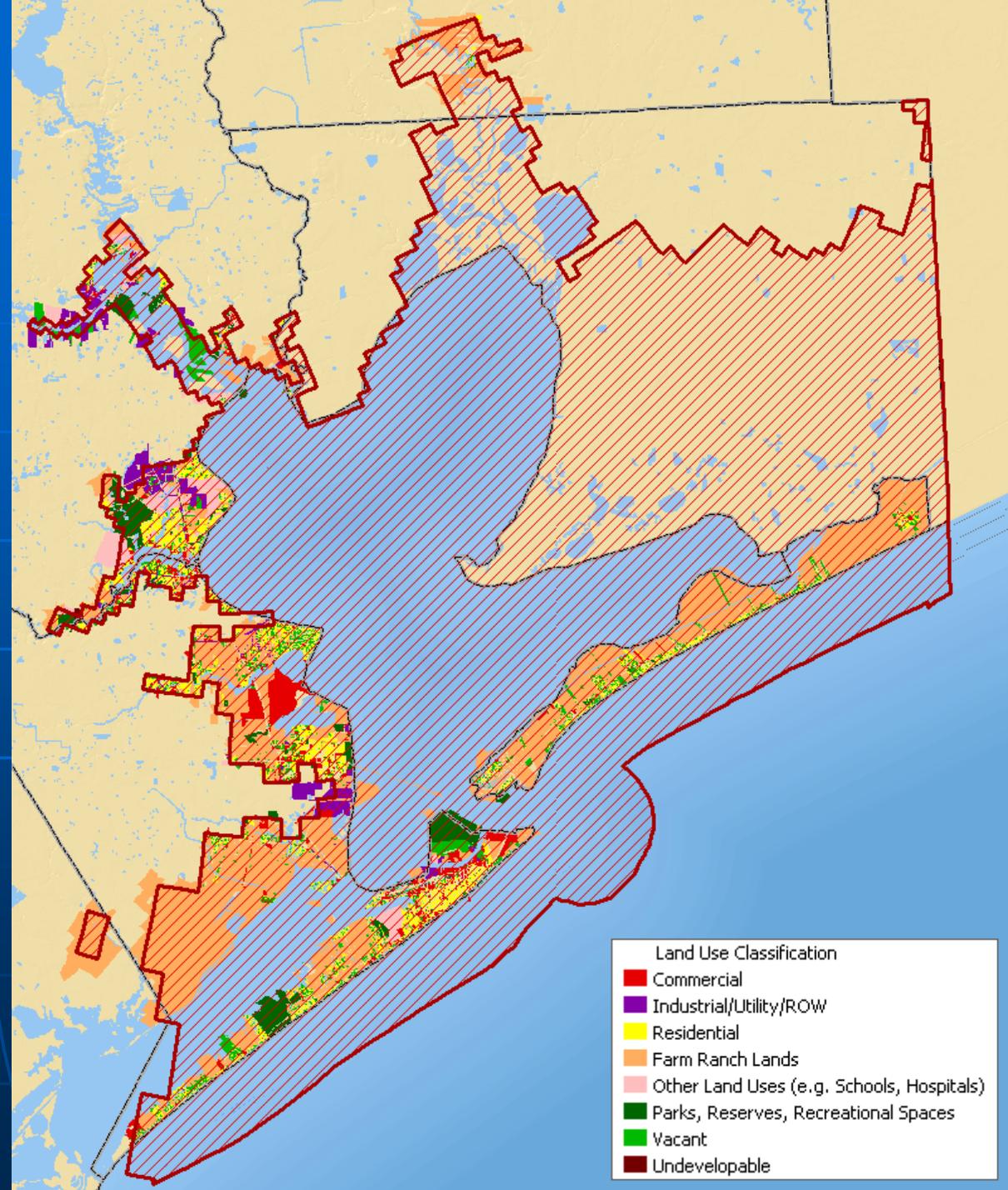
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Hurricane Ike- Storm Surge Zone Potential Impacts

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	<u>No.</u>	<u>Jobs</u>
Businesses	>5K	99K
<u>Property*</u>	<u>Parcels</u>	<u>Impr. Value</u>
Residential	60K	\$6.9B
Commercial	5K	\$3.7B
Other	32K	\$191M

*Galveston, Liberty, Harris, and Brazoria Counties



Land Use Classification

- Commercial
- Industrial/Utility/ROW
- Residential
- Farm Ranch Lands
- Other Land Uses (e.g. Schools, Hospitals)
- Parks, Reserves, Recreational Spaces
- Vacant
- Undevelopable

Hurricane Ike- Storm Surge Zone Potential Impacts

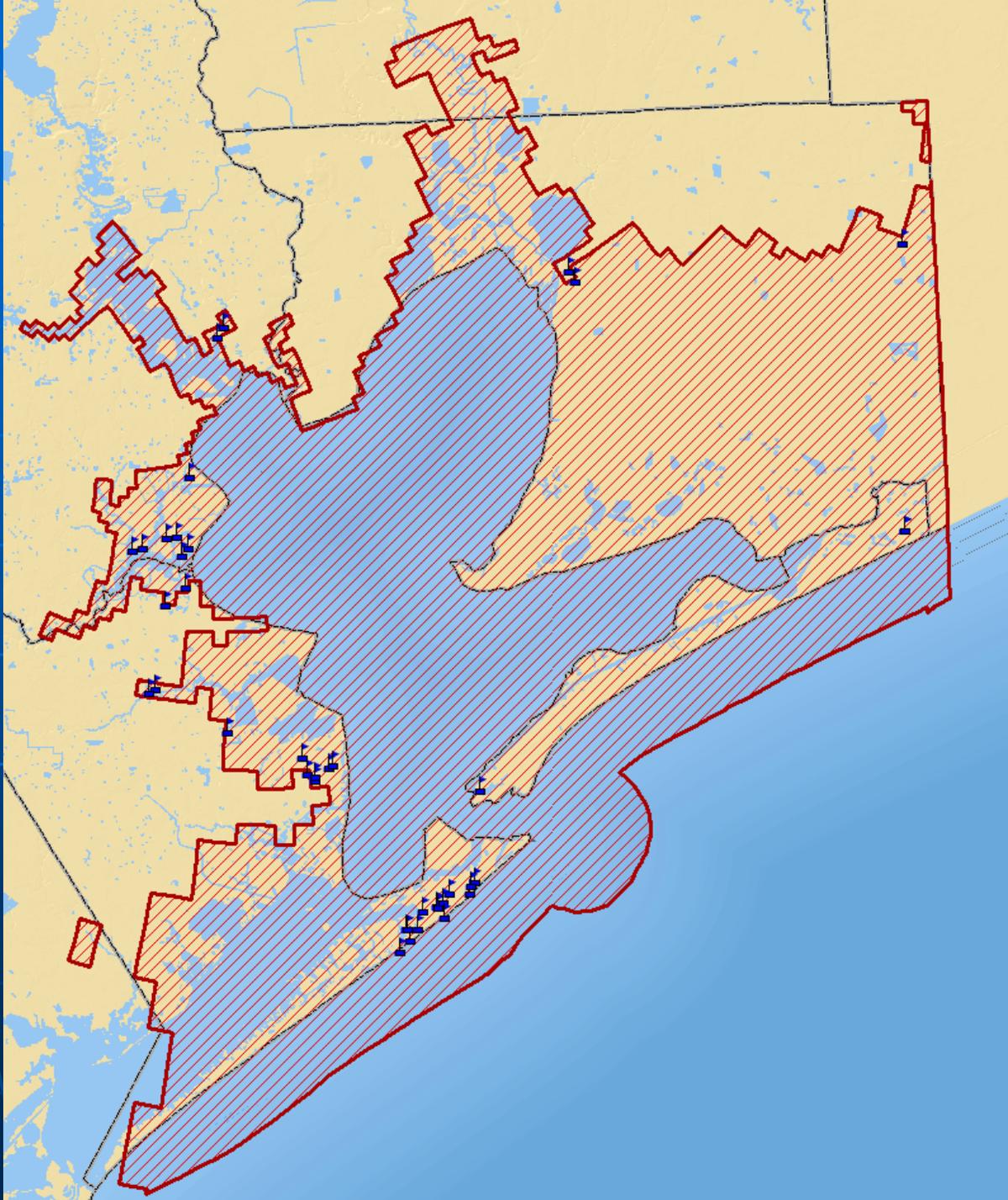
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<u>Infrastructure</u>	<u>No.</u>
Schools (K-12)	42

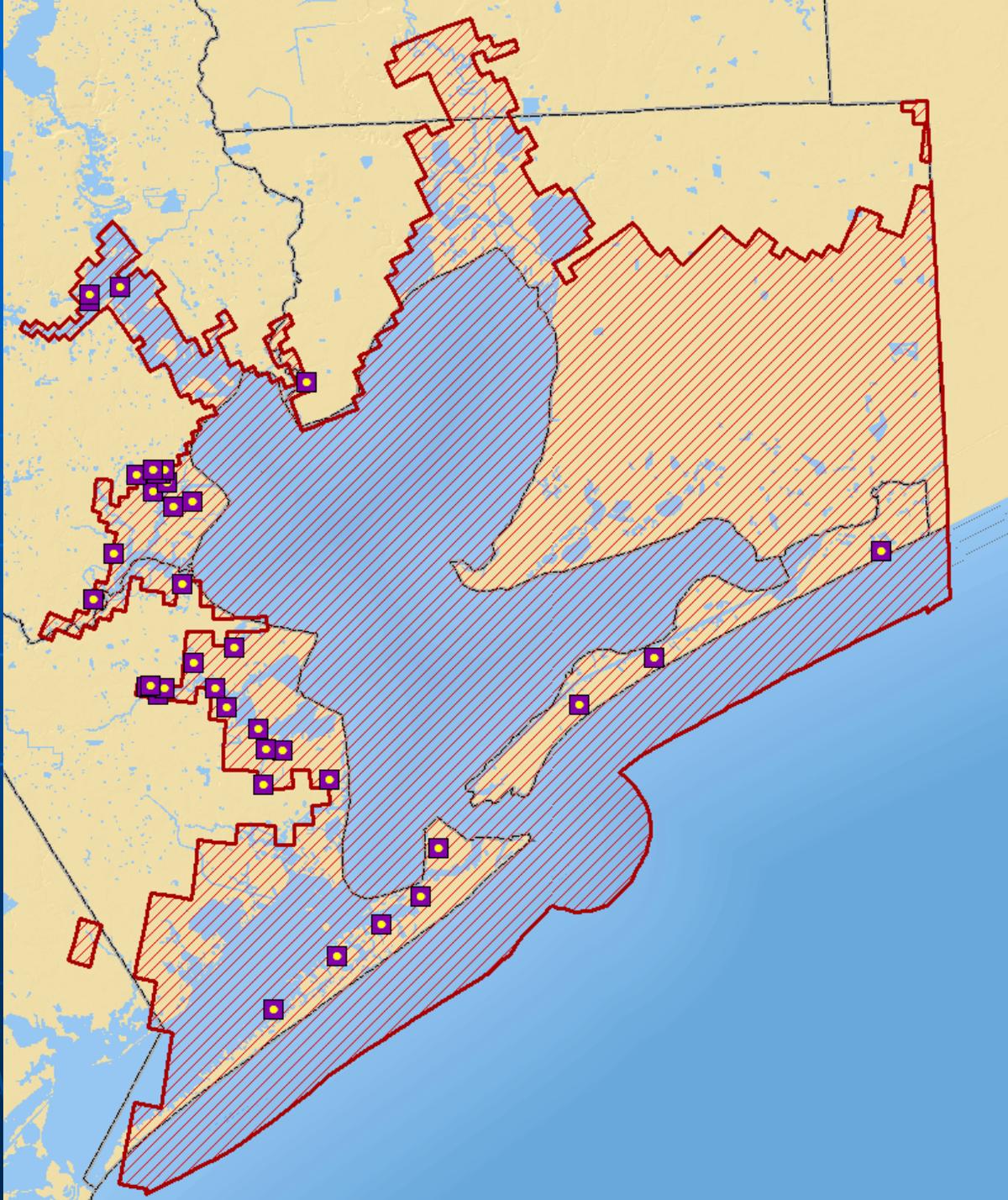


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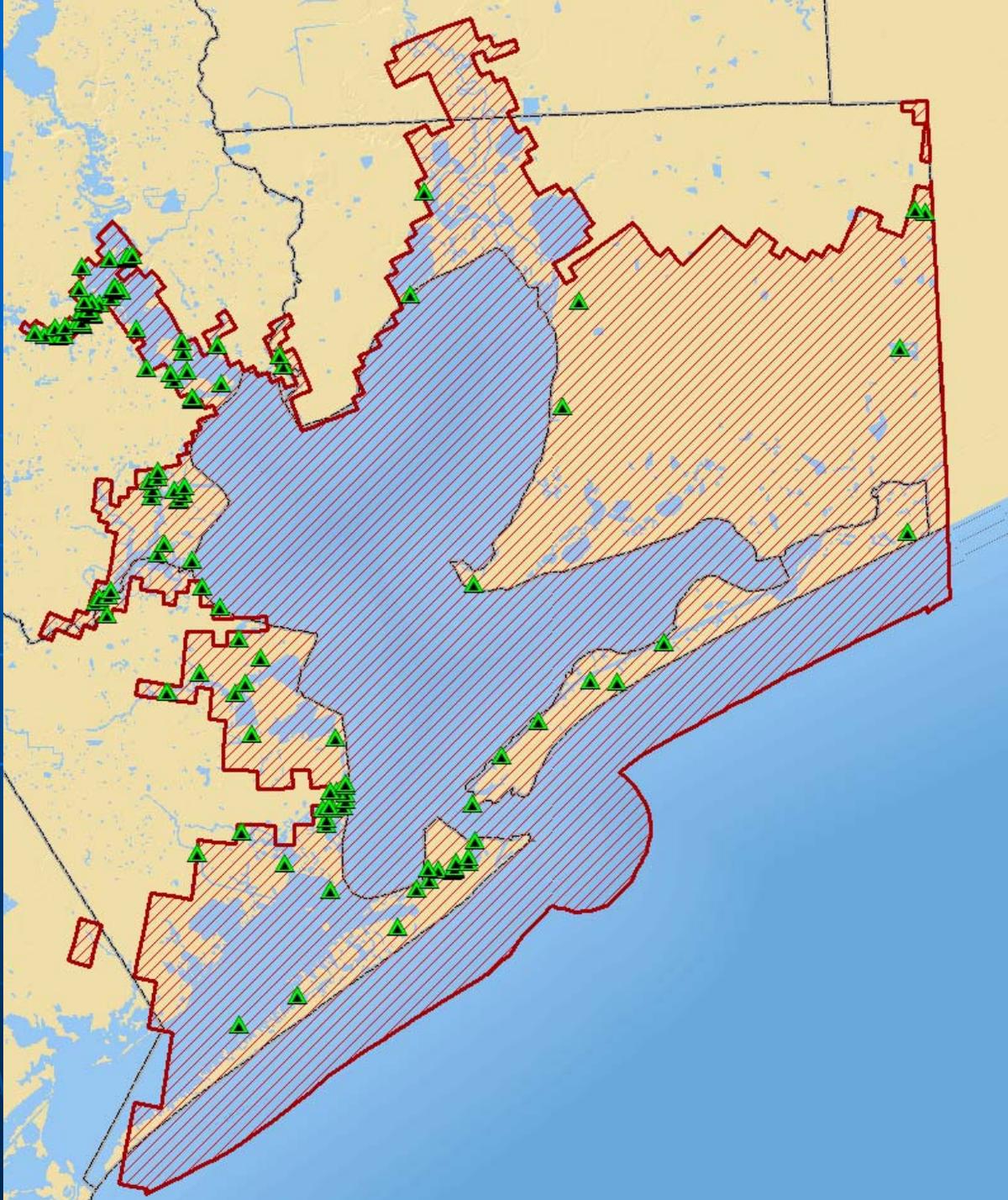


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Waste Water Treatment Plants	131



Results and Lessons Learned

- We offered data and informational services to local governments
 - Not always know if and how it is used in the decision-making process
- Need to improve the dialog
 - What do you have?—What are you trying to do?
- Need for a new resource (platform)
 - **Regional** Informal System
 - Current
 - Comprehensive
 - Accurate
- Not just Digital Government, a GIS Government!

- Regional Information System
 - Comprehensive
 - Society-Economy-Built Environment-Natural Environment (People-Jobs-Buildings-Infrastructure-Land)
 - Spatially Disaggregated
 - Point, line, and polygon features
 - Integrative
 - Jobs-Buildings (Workplaces)
 - People-Jobs (Commute)
 - Roads-Access Points (Delivery)
- Multiple Applications
 - Planning, Forecasting
 - Scenario Analysis, Simulations
 - Emergency Management

Potential LEHD Data Uses

- Emergency Management
 - WAC (Work Area Characteristics)
 - Jobs (total and segmented) in impacted areas
 - RAC (Residence Area Characteristics)
 - Workers (total and segmented) in impacted areas
 - OTM (On The Map)
 - Commuter flows in impacted areas

- H-GAC Socioeconomic Modeling
 - Agent-based microsimulation model of Urban and Regional Growth (UrbanSim—Paul Waddell, UW)
 - Building-level jobs counts (compiled)
 - Individual People and Households (synthesized)
 - We will use OTM data to create a person-job link!

Modeling Natural Disasters

- Exposure: Location-Specific
 - Hurricane path
 - Elevation
- Vulnerability: Asset-Specific
 - Infrastructure conditions
 - Households w/o cars
- Risk: Applying Exposure to Vulnerability
- Need for a data platform encompassing social, economic, environmental, and physical domains!
- Virtual simulations to explore impacts and develop mitigation and recovery plans

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