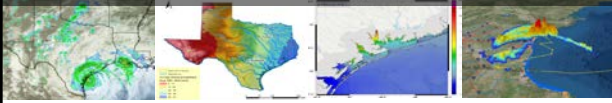



Hydrology Infrastructure Data Collection and Analysis Services for
Community Development Block Grant - Disaster Recovery Programs

Texas General Land Office (GLO) (No. 19-250-000-b720)




Presentation to Stakeholders
Hatim Sharif, Ph.D., P.E., Project Director


June 5th, 2019




UTSA Team Members




Dr. Hatim Sharif




Dr. John Joseph




Dr. Samer Dessouky




Dr. Hazem RashedAli




Dr. Marcio Giacomoni



Dr. Angela Weissmann





Dr. Vikram Kapoor




Dr. Sylvester Ogidan


UTA Team Members




Dr. Nick Z Fang



Dr. Phil Bedient



Dr. Stephen Mattingly



Dr. Michael Zaretsky

Lamar Team Members



Dr. Victor Zaloom



Dr. Qin Qian

Project Tasks

- **Task 1:** Collect and analyze existing coding/zoning data pertinent to regional flooding
- **Task 2:** Review and analyze existing regional drainage oversight strategies and coordination
- **Task 3:** Collect recommendations from local officials concerning flooding prevention and mitigation
- **Task 4:** Prepare and produce an organized data library
- **Task 5:** Produce a finalized written report of the data analysis
- **Task 6:** Present data analysis and recommendations to the GLO and local officials (four to nine presentations)

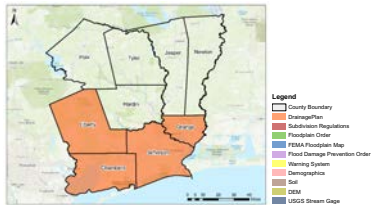
Timeline

Tasks	Time
Task 1	July, 2019
Task 2	August, 2019
Task 3	October, 2019
Task 4	October, 2019
Task 5	October, 2019
Task 6	September - October, 2019

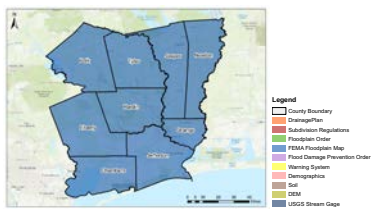
Tasks

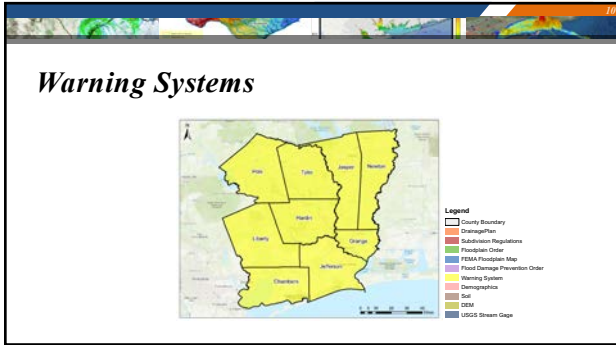
- **TASK 1: Collect and Analyze Existing Coding/Zoning Data Pertinent to Regional Flooding**
 - Collect and organize topographic and GIS data pertinent to regional drainage in the counties of Hardin, Jasper, Jefferson, Newton, Orange, Tyler, Polk, Liberty, and Chambers.
 - Identify similar data collection efforts by other agencies (e.g., USACE, FEMA, TCEQ)
 - Collect documentation including flood studies, local and regional flood mitigation plans, engineering/infrastructure studies, environmental studies, resiliency plans, emergency response plans, regulation and policy studies, and specific disaster information.
 - Review and quality control of the data and documentation collected.

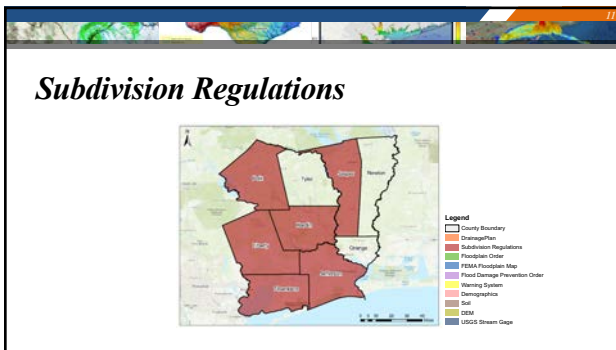
Drainage Plans

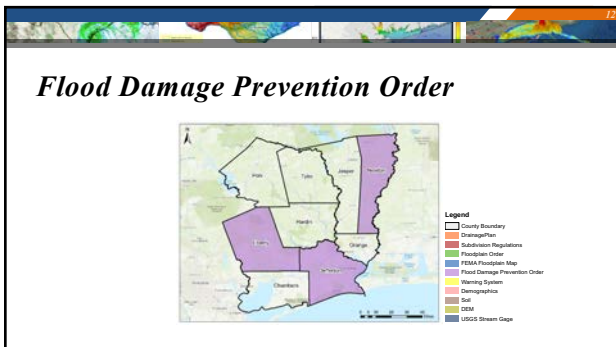


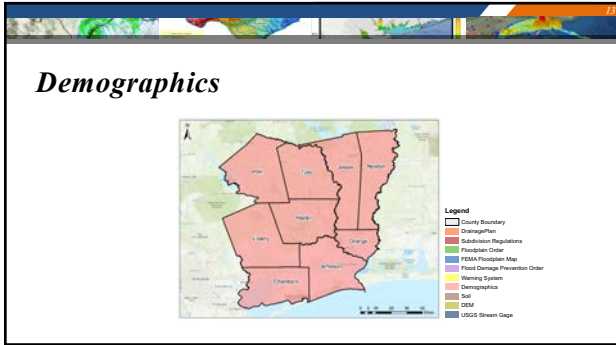
FEMA Flood Maps

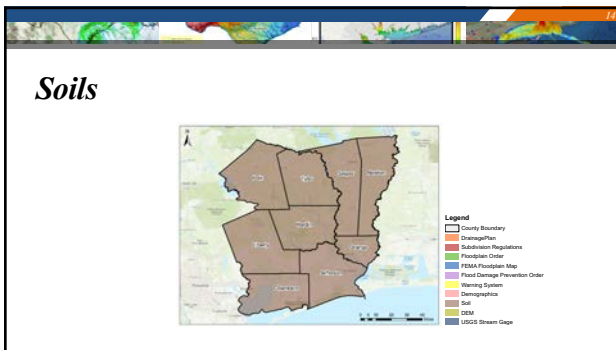


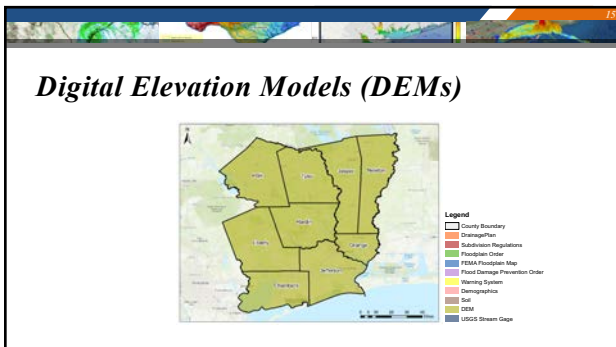


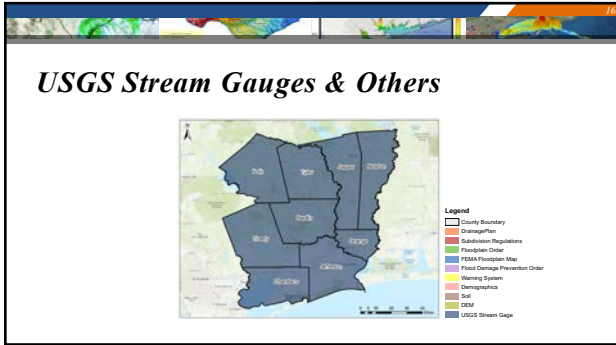


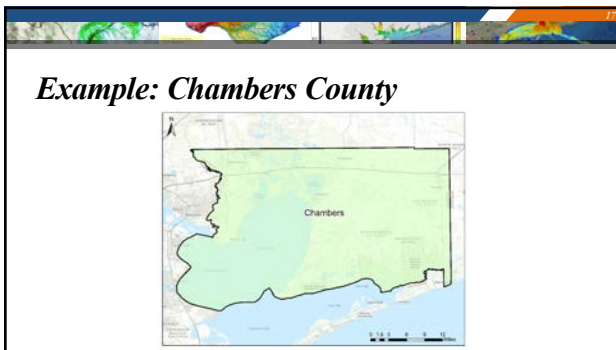


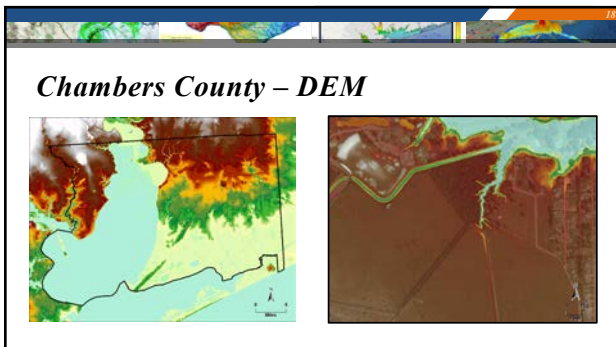


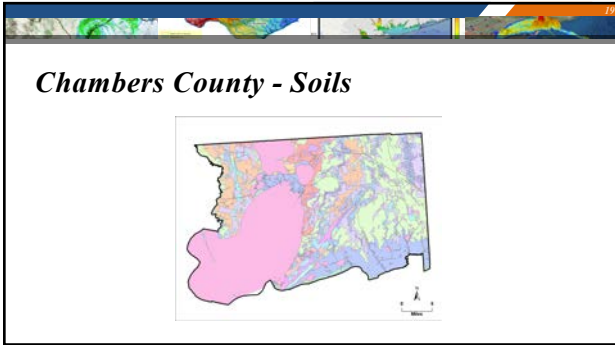


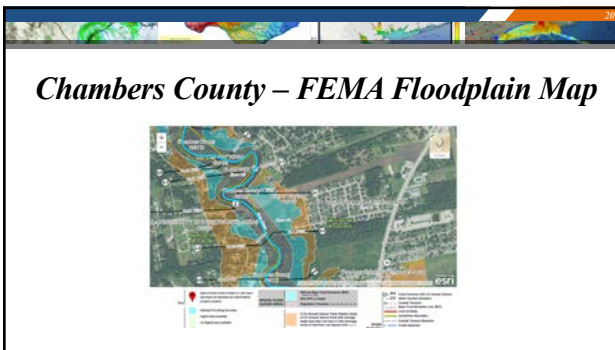














Chambers County - Demographics

Demographics	
Population	42,454
Households	13,320
White, non Hispanic	67%
Hispanic or Latino	22.30%
African American	8.40%
Asian	1.40%
Native American	1%


Education	
High school or higher	85.80%
College or higher	20.50%

Income	
Median household income	74,368
Percent of persons in poverty	9.50%

Chambers County – Warning System


Tasks

- **TASK 2: Review and Analyze Existing Regional Drainage Oversight Strategies and Coordination.**
 - Identify and obtain drainage planning information at the local level.
 - Identify and obtain drainage oversight information from federal entities (e.g. EPA, USDA).
 - Collect information of flood mitigation plans from regional and local agencies.
 - Review and analyze the information collected.




Task 2

- A drainage plan is a strategic planning document that provides information and recommendations that are used to prioritize stormwater protection and restoration projects
- Data collection, technical assessments, identification of actions, participants, and resources that influence the plan development and implementation.
- Identify and locate relevant drainage planning information, compare all plans that apply to the same location, and then extract the information that is relevant to flood mitigation decision process.



Identifying Relevant Drainage Planning Information

- Drainage planning information at the local level will include independent research and personal outreach to state and local agencies and stakeholders.
- Relevant datasets that are valuable to the process may often be developed by conservation or resource organizations at the national or local level.
- Local project stakeholder meetings are an essential tool to help identify the key planned and ongoing types of flood mitigation activities.



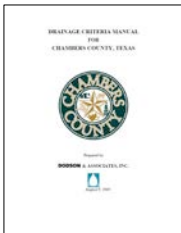


Federal Entities

- Several federal agencies that have drainage oversight information from regulatory as well as non-regulatory programs:
 - Environmental Protection Agency
 - U.S. Army Corps of Engineers
 - U.S. Department of Agriculture
 - National Resource Conservation Service
 - Watershed and Flood Prevention Operations Program
 - Department of Interior
 - Bureau of Land Management


Regional Entities

- County Drainage Districts
- River Authorities
- Houston-Galveston Area Council (HGAC)
- Deep East Texas Council of Governments (DETCOG)
- South East Texas Regional Planning Commission (SETRPC)
- Texas Commission on Environmental Quality (TCEQ)
- Texas Water Development Board (TDWB)
- Texas Department of Transportation (TxDOT)
- Association of State Floodplain Managers (ASFM)
- Texas Floodplain Management Association (TFMA)


Chambers County Drainage Plans/Manuals

		
--	--	--

Chambers County – Subdivision Regulations




**Chambers County
Texas
Subdivision
Regulations**
Adopted October 2004




Tasks

- **TASK 3:** To Collect Recommendations from Local Officials Concerning Flooding Prevention and Mitigation.
 - To conduct a survey of cognizant personnel about regional drainage.
 - To analyze survey results and determine common drainage problems and concerns.
 - To schedule interviews and discussions with each relevant entity.
 - To organize recommendations collected.



Target Professionals

- **Geographic Locations:**
 - Jefferson County, Orange County, Liberty County, Polk County, Chambers County, Hardin County, Tyler County, Jasper County, Newton County
- **Professional Sub-Groups:**
 - Drainage Engineers
 - Planners
 - Regulators (city and county staff)
 - Other agencies and practitioners



Approach

- A two-step process:
 1. Face-to-face interviews:
 - Interview questions and interviewee selection will be informed by responses to the online survey.
 2. Online surveys targeted to each of the three population subgroups
 - Drainage Engineers.
 - Planners, Regulators.

Steps:

- The work will consist of the following Steps:
 - Developing a database of the target professionals in each county.
 - Developing detailed face-to-face interview instruments (targeted to each population group)
 - Developing survey instruments.
 - Testing and refine instruments.
 - Obtaining IRB approval.
 - Conducting site visits and interviews.
 - Analyzing interview responses (transcription and coding).
 - Developing summaries and conclusions.

Tasks

- **TASK 4:** Prepare and produce an organized data library.
 - a project-specific web-based data library that allows spatial viewing, querying, and analysis of the digital data.
 - The organized data library will include all data and data sources gathered, accessed, or utilized during Tasks 1 through 3.
 - In collaboration with a GLO-designated database manager, the library will be provided for use by the GLO, other governmental entities, and the public.
 - Develop web apps using Tethys Platform to enable web-based interaction with spatial data resources stored in the library and cloud repositories (e.g. AWS) and lower the barrier to data and information access.

Categories of Data in Library

- **Nature** (SSURGO soil data, LIDAR ground elevation data, precipitation data via Hydrosshare, etc.)
- **Critical Infrastructure** (existing and planned drainage infrastructure, low water crossings, water flow and stage gauges, water and wastewater treatment plants, wildlife refuges, etc.)
- **Modeling Results, Studies** (FEMA flood mapping and contour data for wave impact, NOAA SLOSH MoMs for storm surge, etc.)
- **Human Observations and Insights** (results from interviews with local officials, drainage engineers, and others)

37

Data Processing and Analysis

All open-source computer code will be carefully documented for ease of updating in relation to:

- Composite risk levels and uncertainty analysis for exposure to multiple risks.
- Interactive plots (histograms, etc.) and multi-layered maps (displaying risk levels, flood contour lines, etc.).
- Keyword searches.
- SQL Server formatting for further modeling and analysis.
- Integration with other on-line data sources.

38

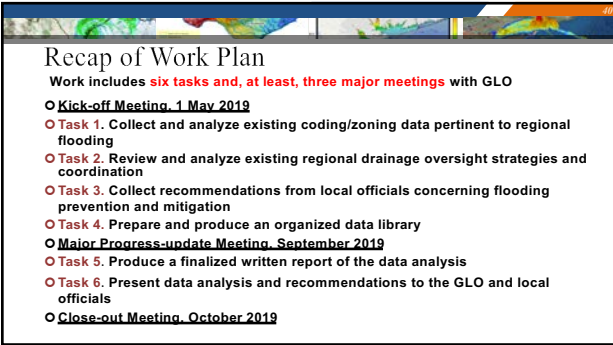
Development of GLO Library Website Interface

```
graph LR; A["Data Collection  
(nature,  
infrastructure,  
models, human  
insights)"] --> B["Data Processing and  
Analysis"]; B --> C["Library Website  
Interface"]
```

39

Library Website Interface

- User awareness of risks and needs aided by
 - Maps displaying multiple layers of user-selected information.
 - Histograms, scatterplots or other charts showing relationships.
 - Keyword searches for citations of the most relevant peer-reviewed studies, and for observations and expert opinions expressed in interviews.
- Maps, charts, and other results downloadable in variety of formats to meet user's need



Recap of Work Plan

Work includes **six tasks and, at least, three major meetings** with GLO

- **Kick-off Meeting, 1 May 2019**
- **Task 1.** Collect and analyze existing coding/zoning data pertinent to regional flooding
- **Task 2.** Review and analyze existing regional drainage oversight strategies and coordination
- **Task 3.** Collect recommendations from local officials concerning flooding prevention and mitigation
- **Task 4.** Prepare and produce an organized data library
- **Major Progress-update Meeting, September 2019**
- **Task 5.** Produce a finalized written report of the data analysis
- **Task 6.** Present data analysis and recommendations to the GLO and local officials
- **Close-out Meeting, October 2019**
