

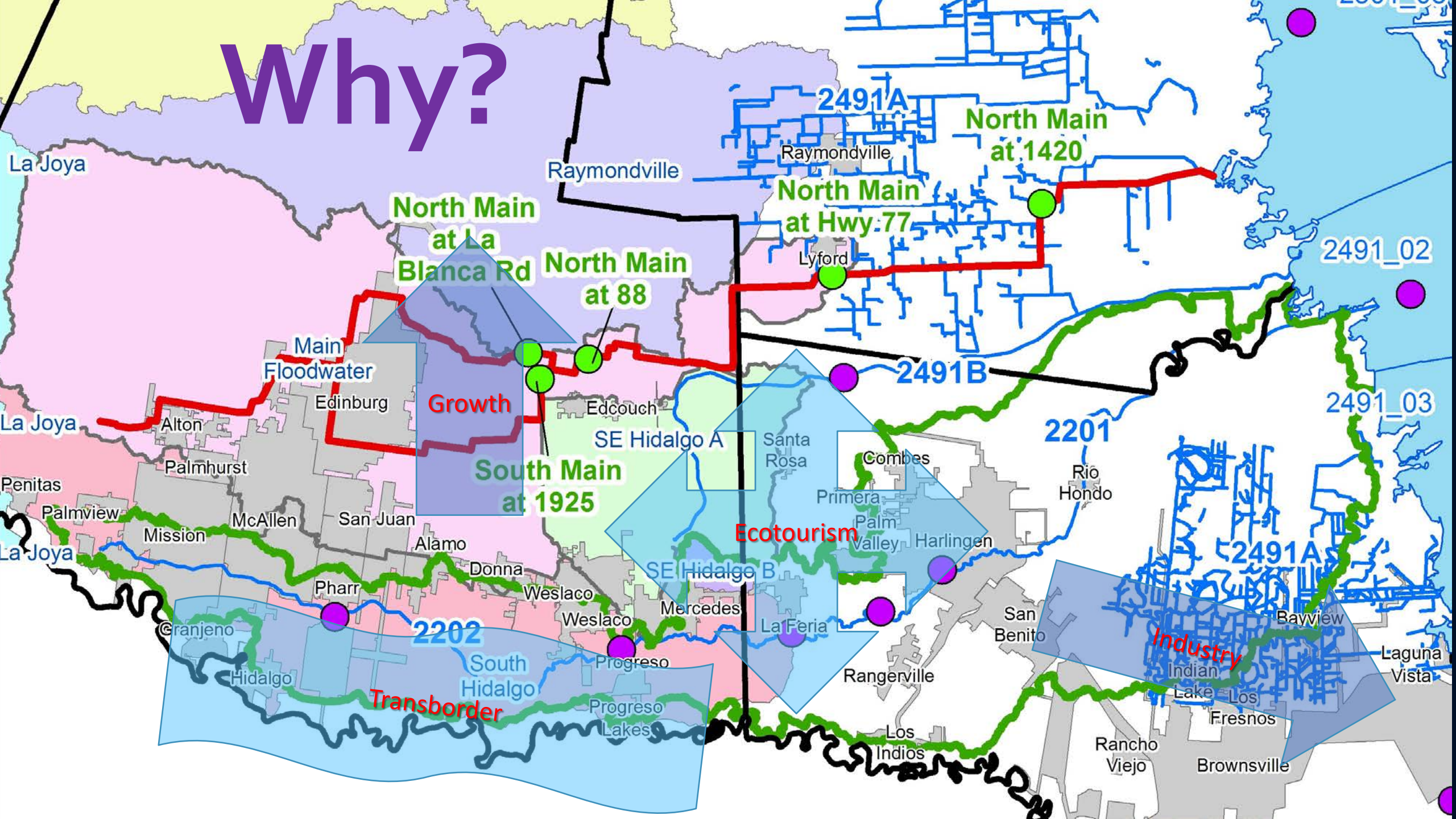


SustainRGV

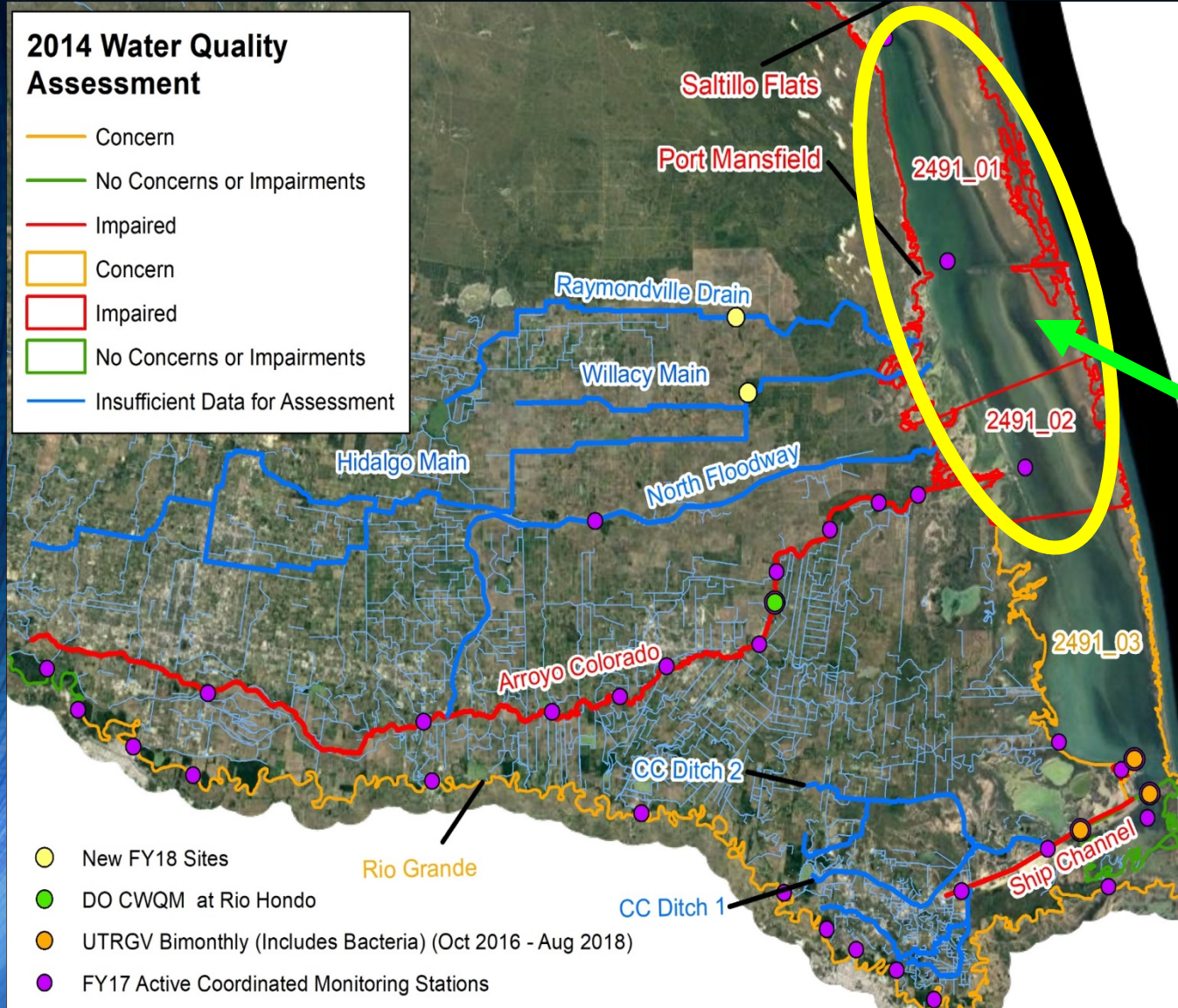
AN INTEGRATED APPROACH TO REGIONAL WATER RESOURCE MANAGEMENT

ANDREW N.S. ERNEST, PH.D., P.E., BCEE, D.WRE
PRESIDENT & CEO
RESEARCH, APPLIED TECHNOLOGY, EDUCATION & SERVICE, INC.

Why?



Laguna Madre

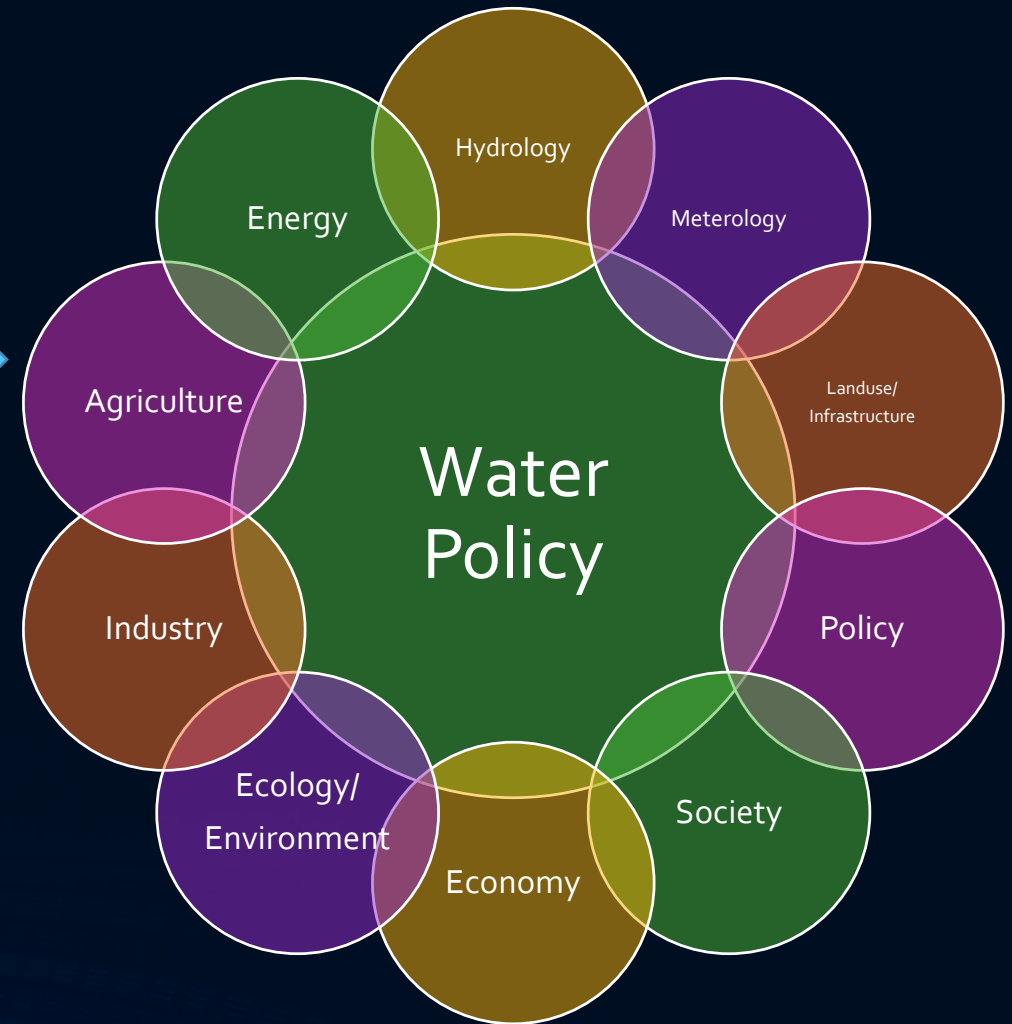


- The Laguna Madre is one of only five hypersaline in the world (Unique ecosystem).
- Due to its location in semi-arid South Texas, its waters generally evaporate more than freshwater flows into it.
- Lower Laguna Madre Segment 2491 (2941_01, 2941_02 and 2941_03).
- Laguna Madre is **impaired** for low **dissolved oxygen** and **bacteria**

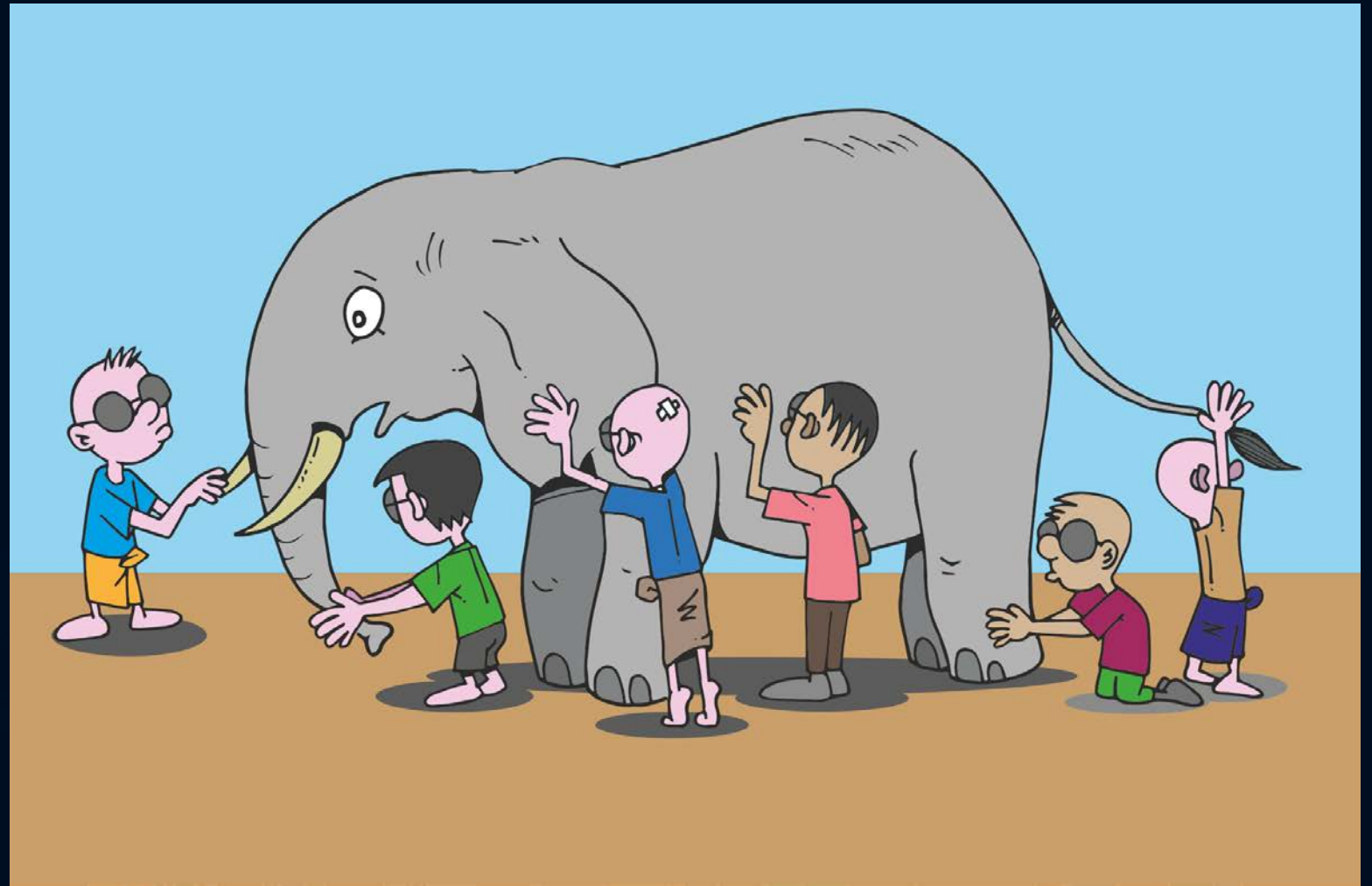
2015 Global Risk Landscape



Water Policy Process Interactions for Resiliency and Economic Growth

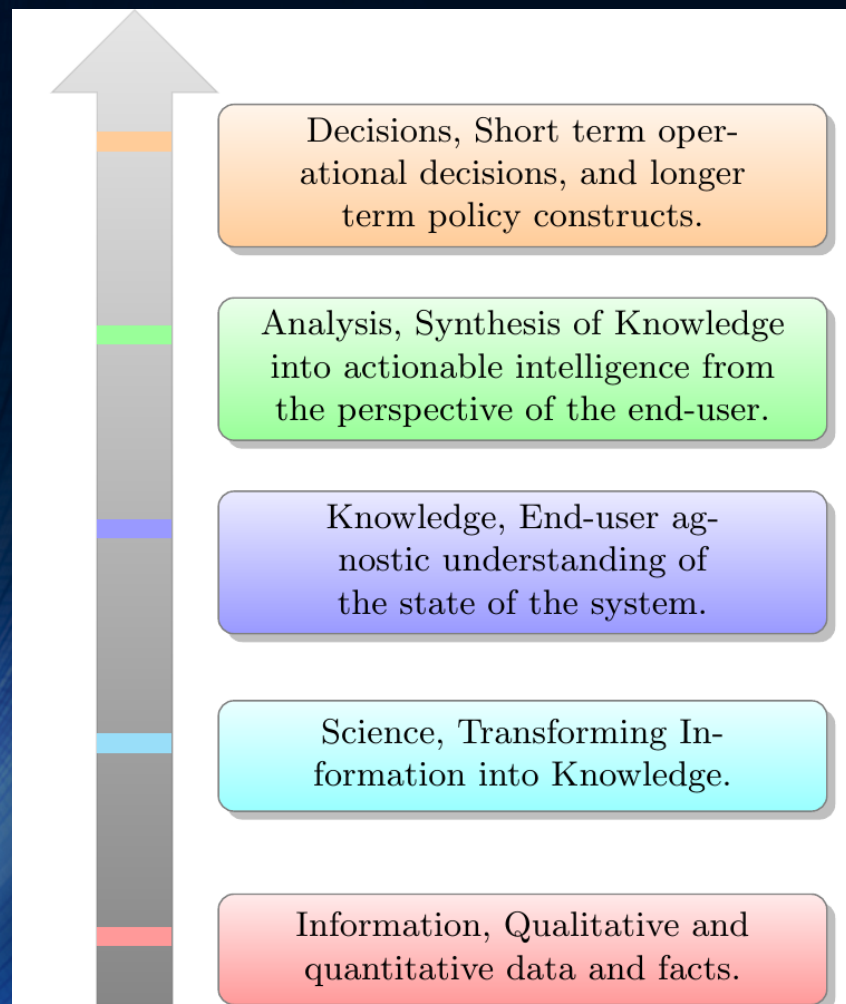


The Fable of the Six Blind Men and the Elephant

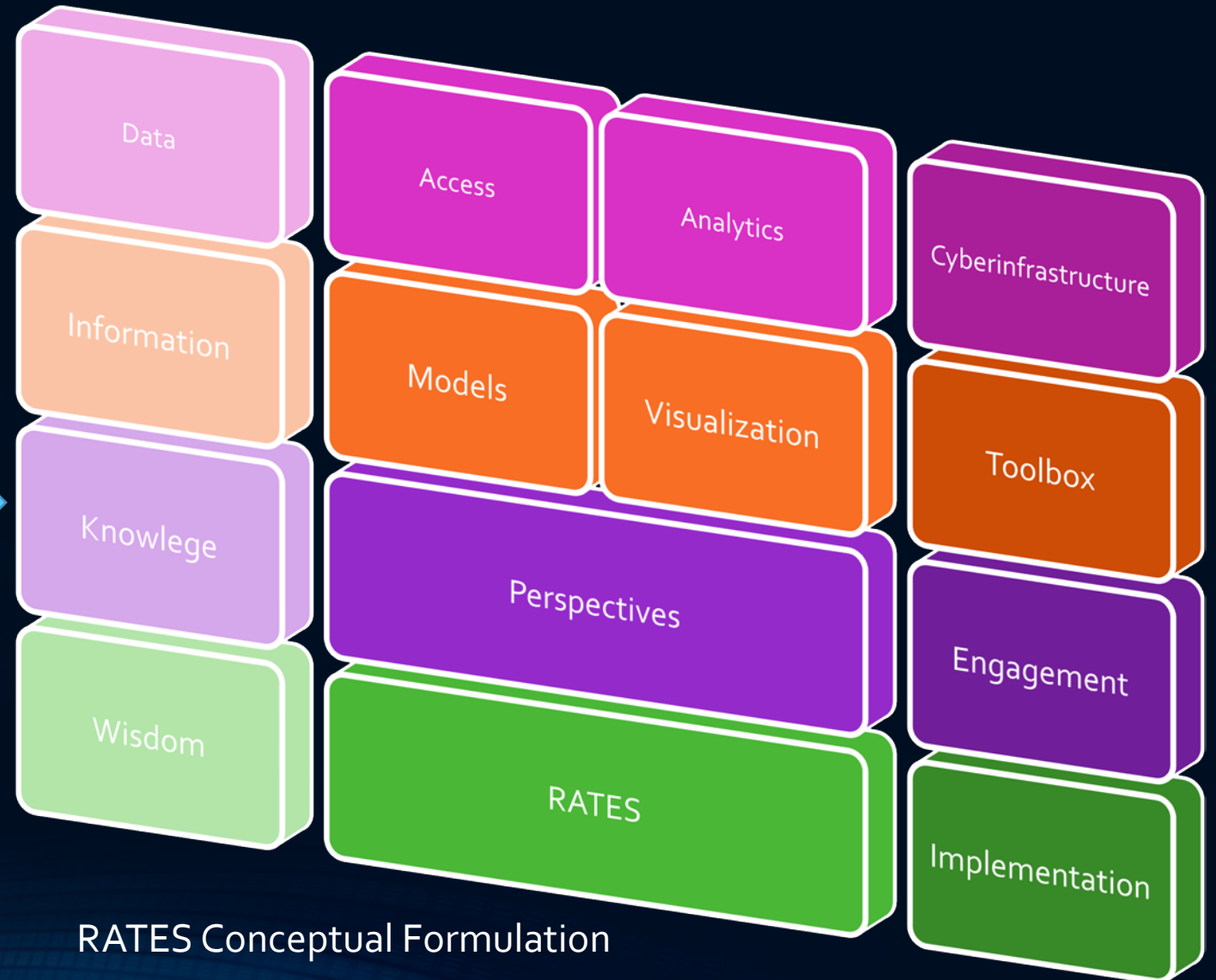
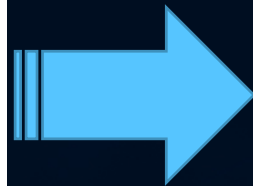
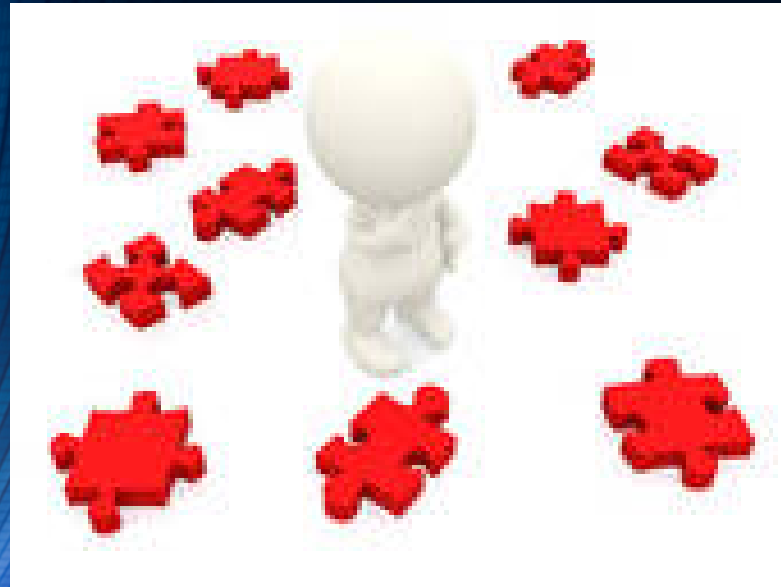


The Case for a Common Operating Picture

What's DIKW Got to Do with It?



Organizing the Puzzle Pieces



RATES Conceptual Formulation

RATES: Bridging Data to Decisions

Results!

Data!



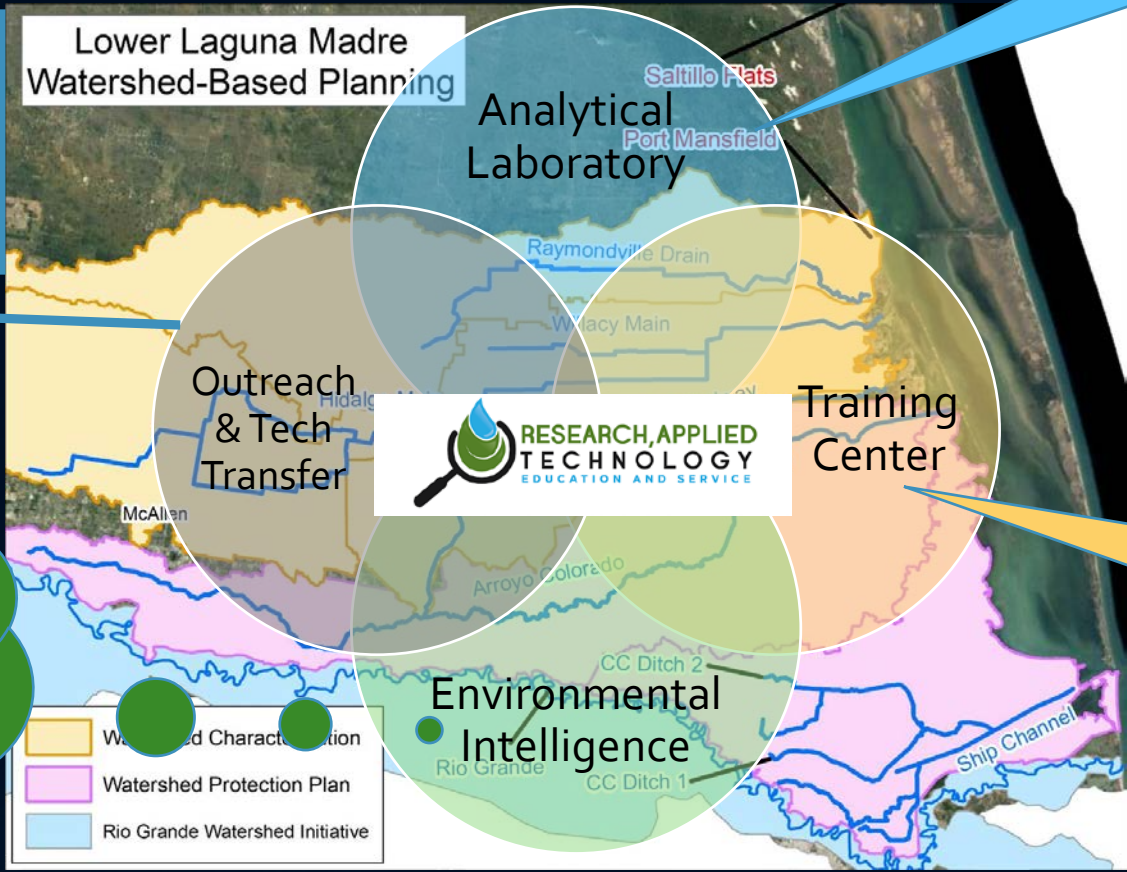
$$\sqrt{V/Y} = \Sigma^P \quad A/\Omega^{\text{tr}} \quad \pi$$
$$d_1 = \frac{10(S/X) + (r + 0.5S^2)t}{\sigma \sqrt{t}}$$
$$d_2 = d_1 - \sigma \sqrt{t}$$
$$\frac{\Omega}{\Sigma \times A \times \Phi}$$
$$\Phi_1 X = \lambda \Sigma^2 \Phi$$
$$\frac{\Omega}{KA} \quad S X / Y \pi = 0.05 \Sigma$$

implement
To implement it, I'd have to understand it.
You may need a different Engineer lawyer.

SustainRGV

Low Impact Development
Green Infrastructure
Decision Support Systems
LID Decision Management Tool
Water Wizard Tools

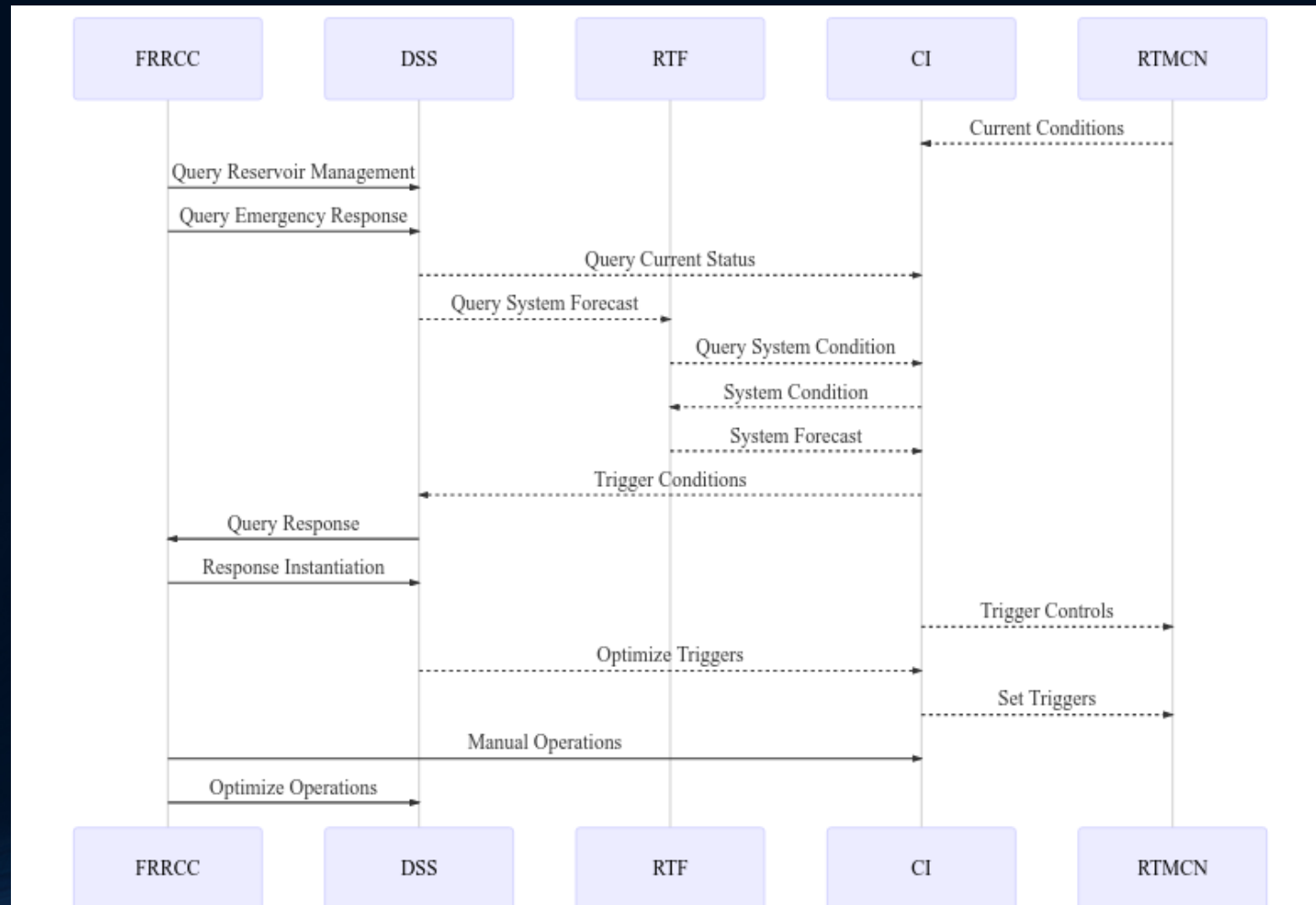
Water Treatment
Wastewater Treatment
Watershed
Estuarine
Solid/Hazardous Waste



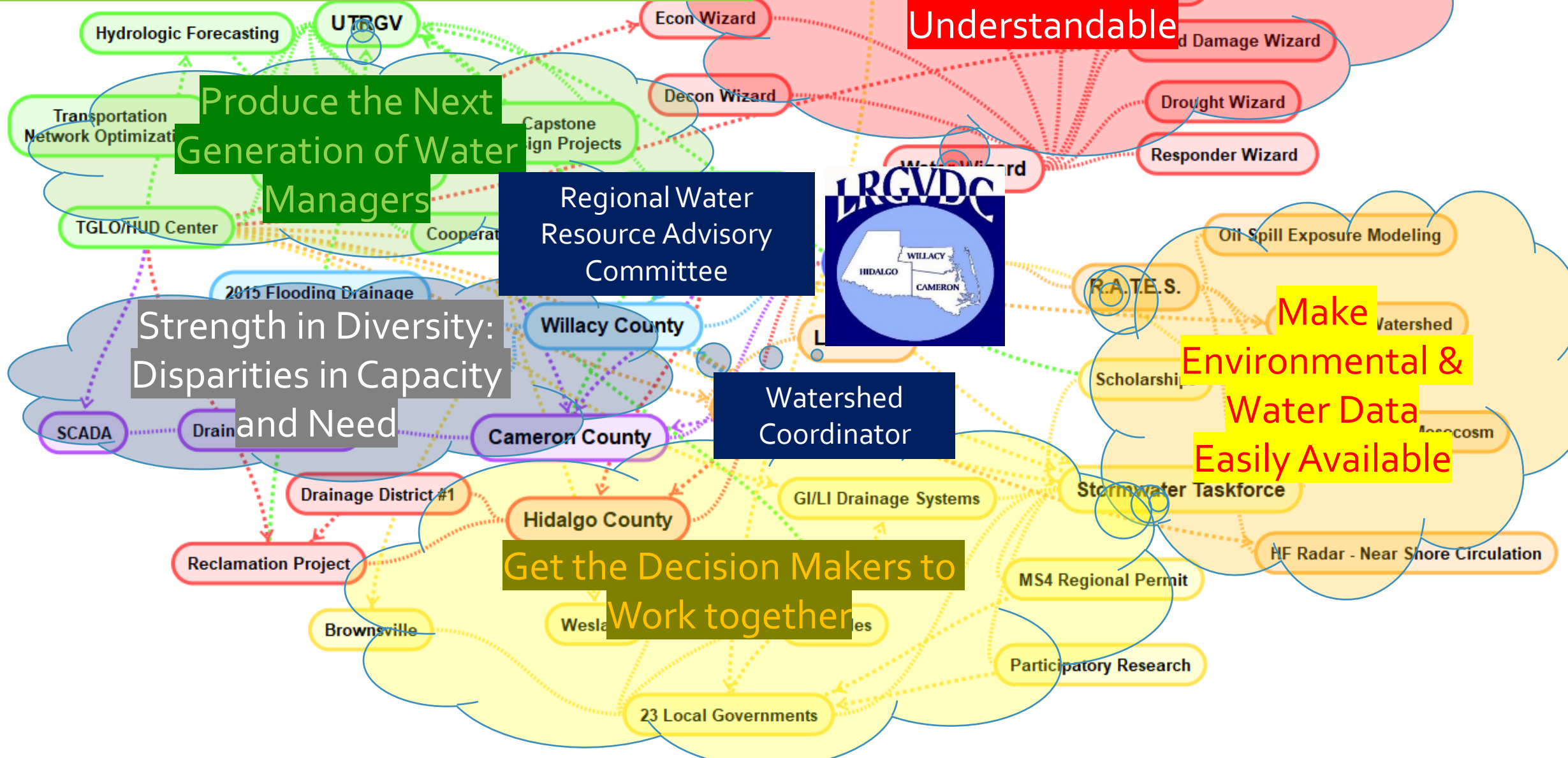
River and Estuary Observation Network
Real-Time Hydrologic Systems
Environmental Monitoring
HF Radar
LiDAR
Decision Support Integration
Water Wizard

GIS
Stormwater
Water/Wastewater
Remote/Real-Time
Instrumentation

Science-Driven Decision-Making



Democratization of Water Intelligence



Strength in Diversity:
Disparities in Capacity
and Need

The Lower Rio Grande Valley TPDES Stormwater Taskforce

THE FOUNDATION



LRGV TPDES Stormwater Taskforce

HISTORY

- Phase II TPDES Stormwater Rules
- Small Regulated LRGV Cities Support
- 1998: Founded @ TAMUK
- 2016: Transition to UTRGV
- 2018: Explosive Growth
 - Strains UTRGV Contracting Capacity
 - Legal Entity Formation
- Research Institute: RATES/RGV

NOW

- Role
 - Stormwater Management
 - Watershed Management
 - Non Point Source Pollution Management
- RATES facilitates organization/operations
- Task Force supports
 - Research, Students
 - Community
- 27 Members & Growing

Executive Committee

- Joe Hinojosa, Gen. Mgr., Santa Cruz Irrigation District #15
 - Chairperson, LRGV TPDES Stormwater Task Force
- Jose Figueroa, Public Works Director, City of Mercedes
 - Vice-Chair, LRGV TPDES Stormwater Task Force
- Zenaida Guerrero, Engineer I, City of Weslaco
 - Secretary, LRGV TPDES Stormwater Task Force
- Melisa Gonzales, Stormwater Manager, City of Alamo
 - Past Chairperson, LRGV TPDES Stormwater Task Force

* Task Force Reps appointed by City Council, Board of Directors, Commissioners Court, etc. via interlocal agreements.

Delegated Representation

City of Brownsville – Carol Vasquez

City of San Juan – David Salinas

City of Alton – Jeff Underwood

City of San Benito – Bernard Rodriguez

City of Los Fresnos – Raul Garcia

City of Mission – Juan De La Garza

City of Primera – Veronica Flores

Cameron County – Augusto Sanchez-Gonzalez

Hidalgo County Pct. #1 – Saul Garcia

City of Mercedes – Jose Figueroa

City of Elsa – JJ. Ybarra

Hidalgo County Pct. #4 – Velinda Reyes

Lower Laguna Madre Estuary Partnership – Augusto Sanchez

Santa Cruz Irrigation District #15 – Joe Hinojosa, REM

City of La Feria – Juan Oritz

City of Donna – Roy Jimenez

City of Edinburg – Robert Valenzuela, CSI, CEO

Cameron County DD#1 – Hector Lerma, CSI

City of Weslaco – Zenaida Guerrero

City of La Joya – Isidro Venecia

City of Alamo – Ernesto Solis

City of Palmview – Rudy Flores

City of Palmhurst – Lupe Garcia

City of Edcouch – V. Hugo De La Cruz

Willacy County – Eduardo Gonzales

City of La Villa – David Alaniz

Town of Combes – Lonnie Bearden

Main Focus

- Stormwater Management Program (Compliance)
 - Develop new SWMP for new permit 2019-2024
 - Education, Outreach and Training
 - seek State and National conferences, events and initiatives; bring to the Valley
- Expanded focus to the Task Force to include solid waste, air quality, wastewater, planning and construction programs
- Non point source pollution programs
- Low Impact Development and Green Infrastructure Programs

Regional Watershed Coordinator

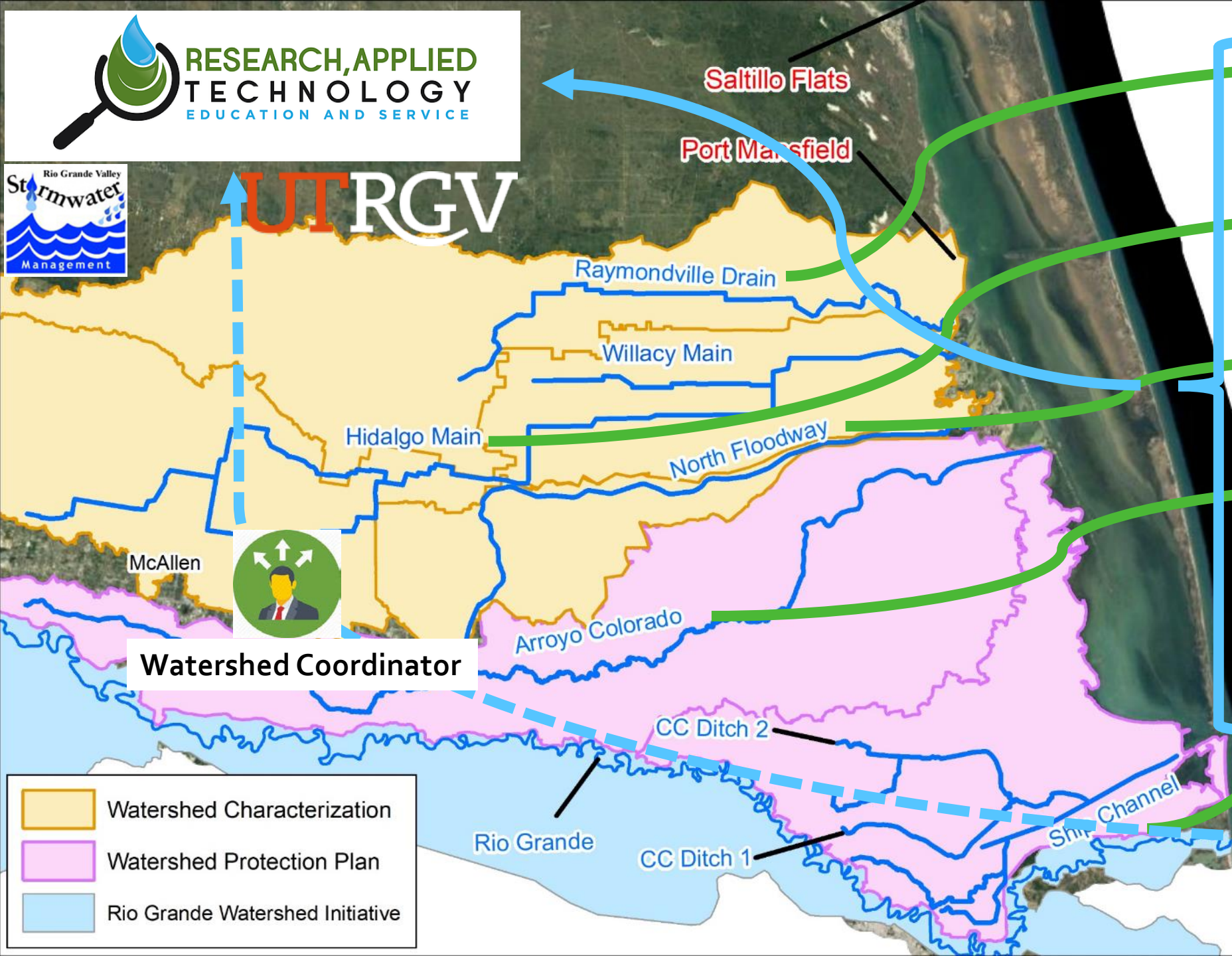
LOWER LAGUNA MADRE WATERSHED

Watershed Coordinator

- RATES EMPLOYEE
- STATIONED AT LRGVDC
- FUNDED BY:
 - RATES/RGV
 - COUNTY OF CAMERON
 - COUNTY OF HIDALGO
 - COUNTY OF WILLACY
 - LRGVDC
 - Grants
- OVERSEE 319 PROJECTS AND WATERSHED RELATED ACTIVITIES
- ROLE UNDER DEVELOPMENT

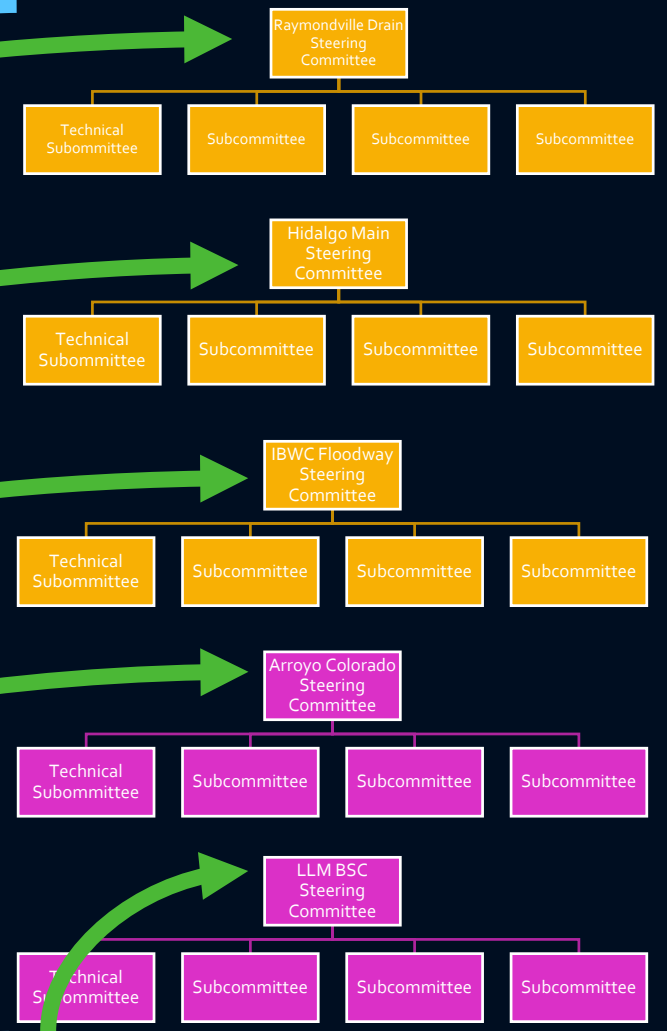


UTRGV



Watershed Coordinator





- Watershed Characterization
- Watershed Protection Plan
- Rio Grande Watershed Initiative

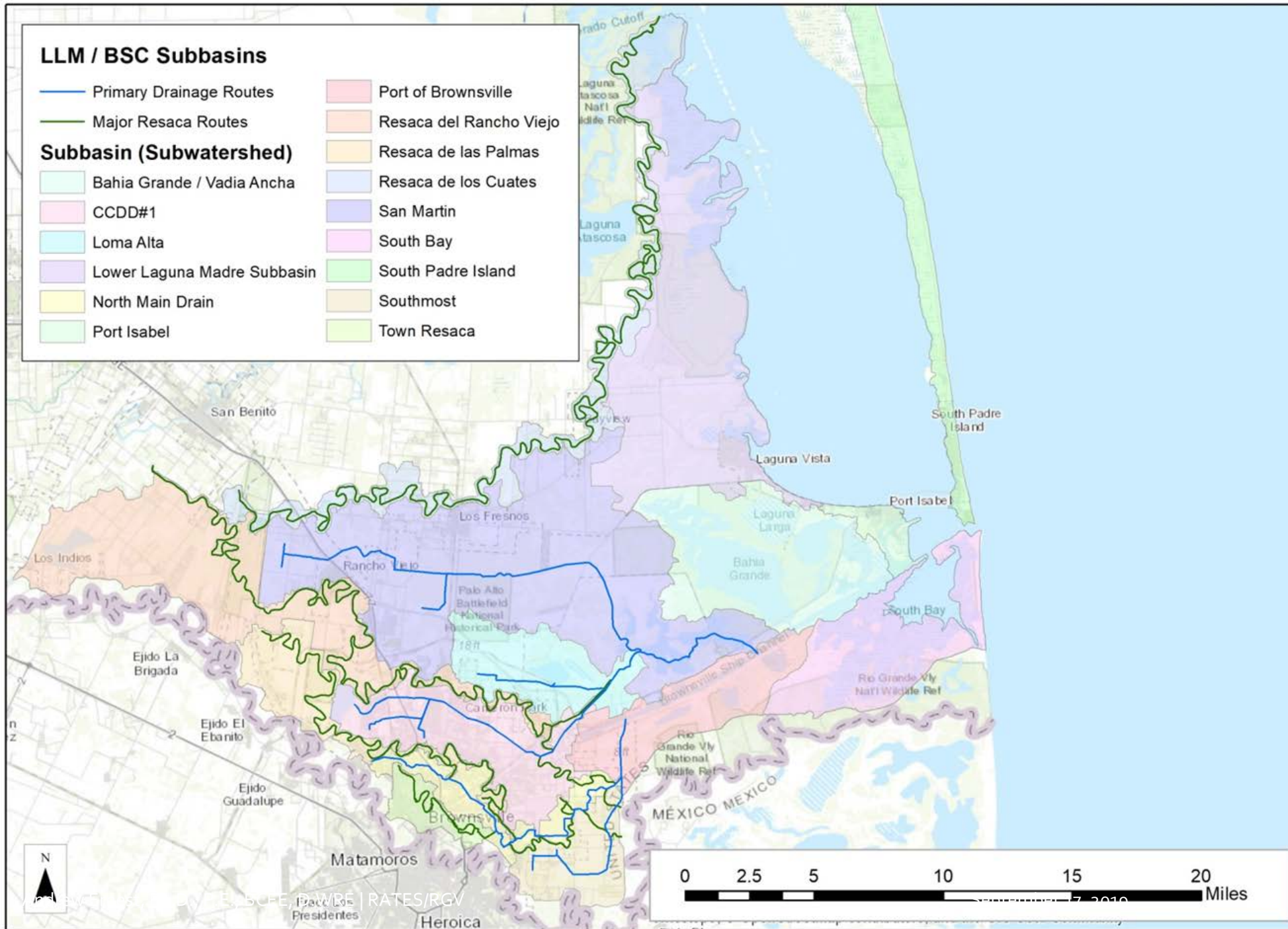


604(b)

Regional Water Resources
Advisory Committee

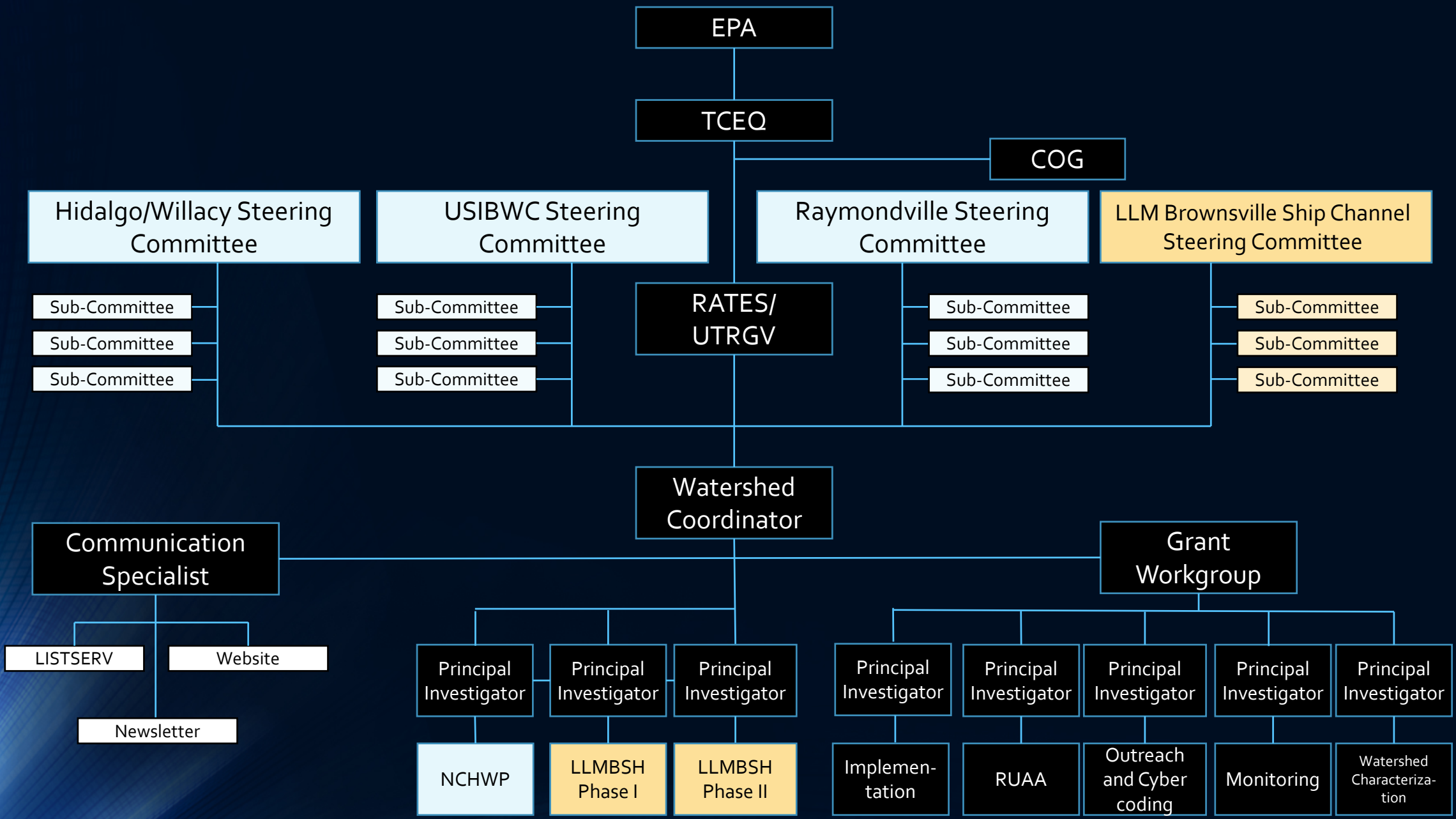
LLM / BSC Subbasins

- | | |
|---|---|
|  Primary Drainage Routes |  Port of Brownsville |
|  Major Resaca Routes |  Resaca del Rancho Viejo |
| Subbasin (Subwatershed) | |
|  Bahía Grande / Vadia Ancha |  Resaca de los Cuates |
|  CCDD#1 |  San Martín |
|  Loma Alta |  South Bay |
|  Lower Laguna Madre Subbasin |  South Padre Island |
|  North Main Drain |  Southmost |
|  Port Isabel |  Town Resaca |



Northern & Central Watershed Protection Plan Project

- The Raymondville Drain and the Hidalgo/Willacy Main, the IBWC pilot channel (IBWC North Floodway) flow into the **Lower Laguna Madre** which is **impaired** for low **DO** and **bacteria**.
- The **three floodways** collect **stormwater runoff** and **agriculture runoff activity** (Non-point source Pollution).
- There is a **lack of water quality data** collection within the target region and limited data has been collected



Regional Water Resource Advisory Committee

FOUNDED JANUARY 2019
Planning and Development since October 2017

Regional Water Resource Advisory Committee

- Established January 30, 2019
- Under LRGVDC Authority
- 15 Members
 - 3 Counties, Large & Small Cities, Special Purpose Districts, Stormwater Taskforce, UTRGV, IBWC, Region M
- Purpose
 - educate, promote, foster, and coordinate community and regional planning efforts on the environmental, economic, and other social impacts of existing, new or proposed regulations, policies, and control regarding water resources management

Delta Reclamation Project

FACT SHEET Lower Rio Grande Valley Regional Water Management Project (Delta Watershed Project) Hidalgo County, Texas

PROJECT BACKGROUND

- In 2008, Hidalgo County Drainage District #1 (HCDD1) contracted to perform a conceptual Regional Water Supply Facilities Plan to identify and evaluate potential project sites. Costs associated with this report (\$0.38 Million) were funded by Texas Water Development Board (TWDB).
- In 2012, Hidalgo County voters approved by a 75% margin, \$10 million through a bond referendum for the Lower Rio Grande Valley Regional Water Management (Delta Watershed) Project.

PROJECT CONSTRUCTION COST

- Approximate estimated construction cost: **\$100,000,000**

PROJECT SCHEDULE

- Contract Executed in April 2013
- Planning Studies, Legal Water Rights Issues and Permits, Environmental Documents, and Preliminary Engineering Report are currently being developed
- Final PER is due April 2015

IMPORTANCE OF PROJECT

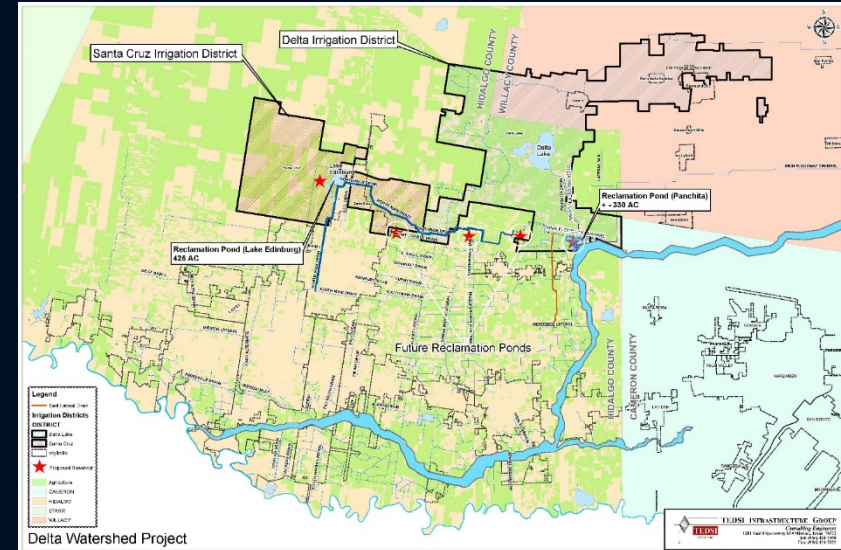
This project, once constructed, will play an important role in the following areas:

- Water Reclamation for agricultural and municipal use
- Raw Water Treatment
- Flood Protection
- MS4 Educational Area
- Economical Development Area
- Green Infrastructure

PROJECT STATUS

- Environmental Impact statement is currently underway
- Legal aspects addressing water rights are currently being preformed for acceptance by Texas Commission on Environmental Quality (TCEQ). Also, an amendment has been filed with Rio Grande Regional Water Authority Region M (RGRWA) for inclusion of the project in the 2012 State Water Plan (SWP). An application has also been filed for this project in the 2017 SWP.
- Water Quality samples and depths are being collected on a quarterly time frame to determine quality analysis and flows in existing ditches.
- Preliminary Engineering Report is being developed for the total 450 Square Mile of delineated drainage area.

January 2014



SMURRF: Santa Monica Urban Runoff Recycling Facility



2010 FLOOD OPERATIONS EDINBURG PUMPING PLANT

- Due to the age of the structure, concern that it could fail under flood conditions
- USIBWC and Hidalgo County coordinated to construct an earthen berm behind the pump house to provide emergency protection



International Boundary and Water Commission
Engineering Services Division

LRGV FLOOD CONTROL PROJECTS

Flood Response & Resilience

- IBWC Partnership
- Reclamation Project
- Dune Restoration
- Post Hurricane Recovery
- Coupled Hydrologic & Coastal Storm Surge Forecast

RIO GRANDE VALLEY MAIN DRAINAGE SYSTEM

HIDALGO COUNTY RAYMONDVILLE DRAIN PROJECT

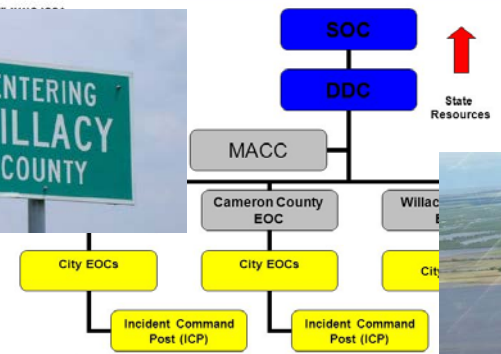
10AM OCT. 6 **GROUNDBREAKING CEREMONY** FM 2812 & SEMINARY RD. EDINBURG

PRESENTED BY

- RAMON GARCIA, HIDALGO COUNTY JUDGE
- JOSEPH PALACIOS, HIDALGO COUNTY COMMISSIONER PRECINCT NO. 4
- VICENTE GONZALEZ, MEMBER OF CONGRESS - 6TH DISTRICT OF TEXAS
- EDUARDO "EDDIE" CANTU, HIDALGO COUNTY COMMISSIONER PRECINCT NO. 2
- DAVID FUENTES, HIDALGO COUNTY COMMISSIONER PRECINCT NO. 1
- BOBBY GUERRA, TEXAS STATE REPRESENTATIVE - DISTRICT 45
- EDDIE LUCIO, JR., TEXAS STATE SENATOR - DISTRICT 27
- SERGIO MUÑOZ, JR., TEXAS STATE REPRESENTATIVE - DISTRICT 46
- TERRY CANALES, TEXAS STATE REPRESENTATIVE - DISTRICT 40



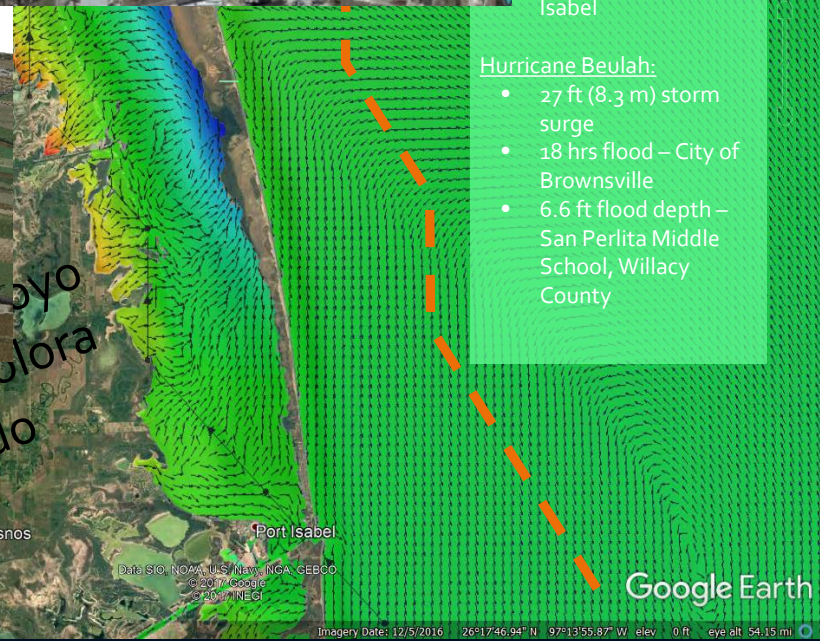
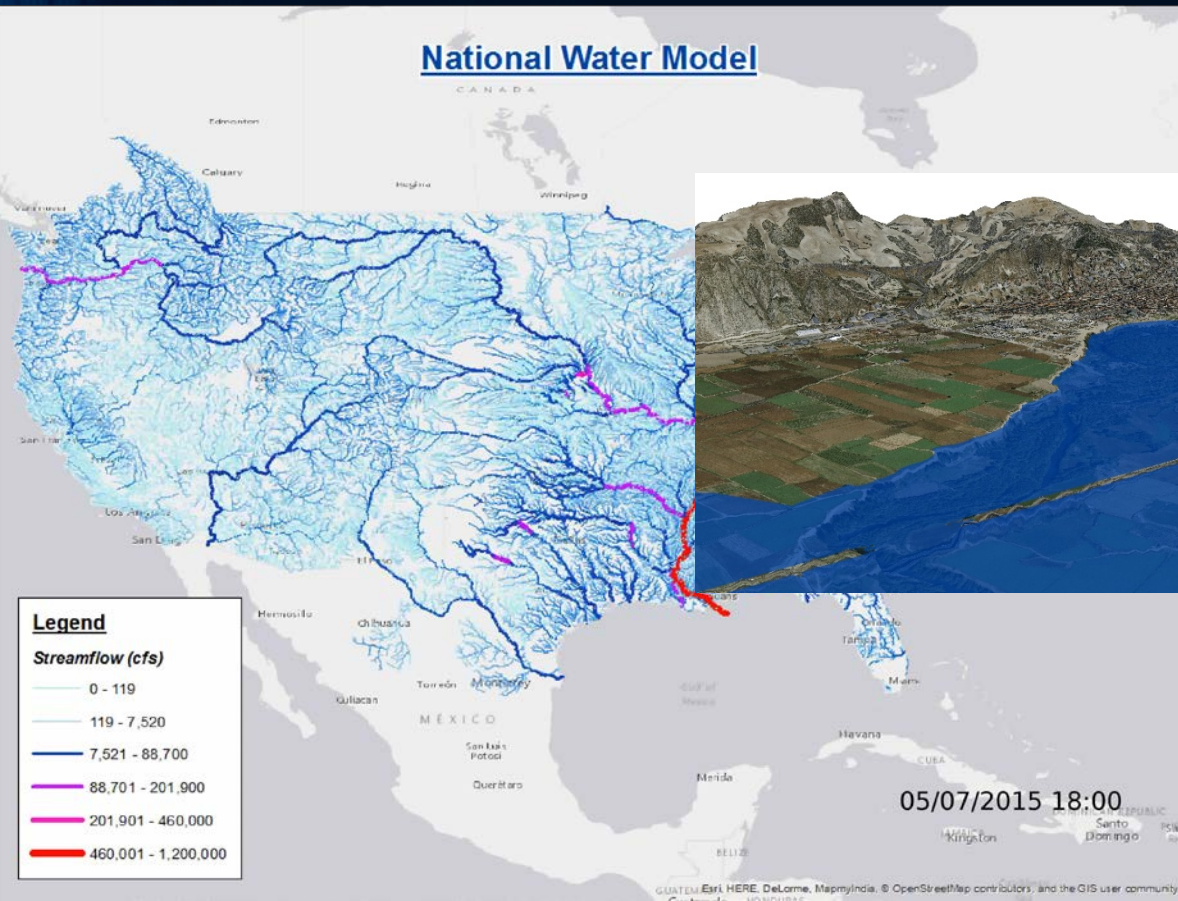
EVDC
Information Center (MACC)
International Relationships



Real-Time Forecasting



Hurricane Harbie:
 25 ft (7.6 m) storm surge near the Arroyo Colorado outfall
 15 hrs flood – Port of Isabel

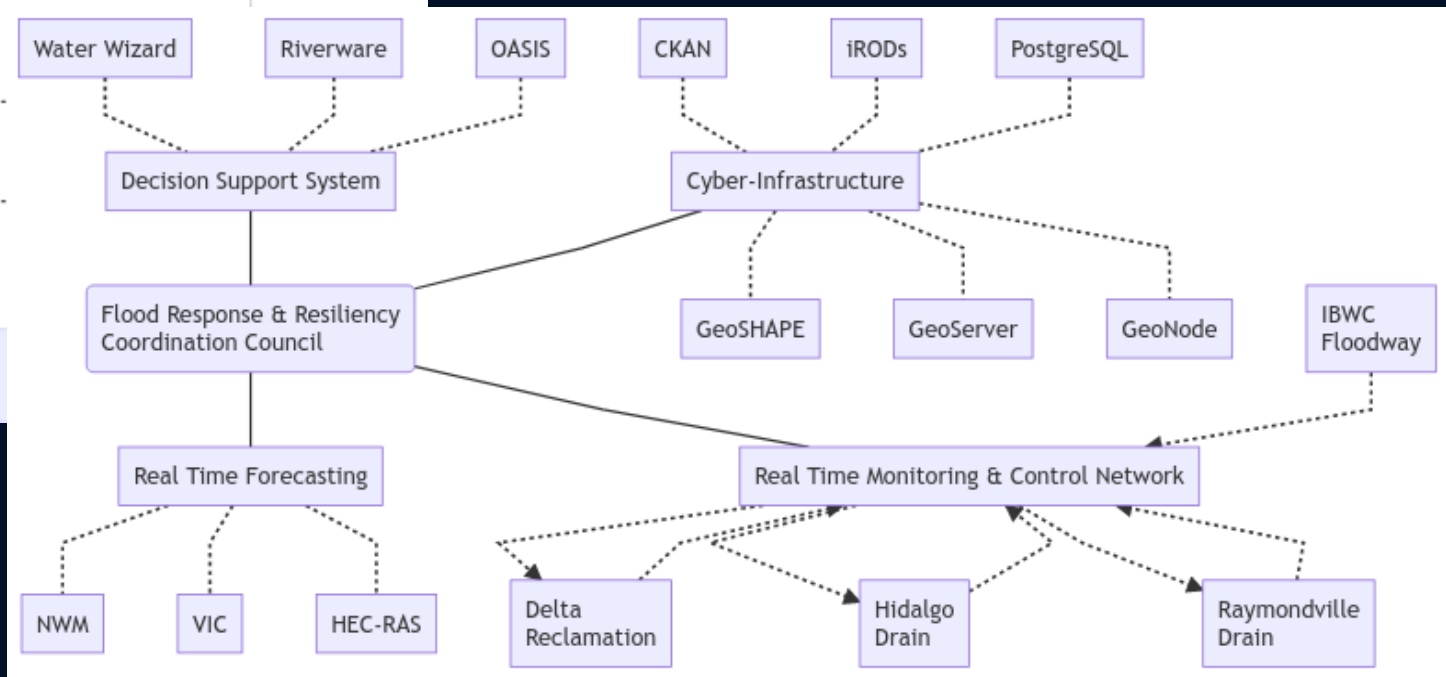
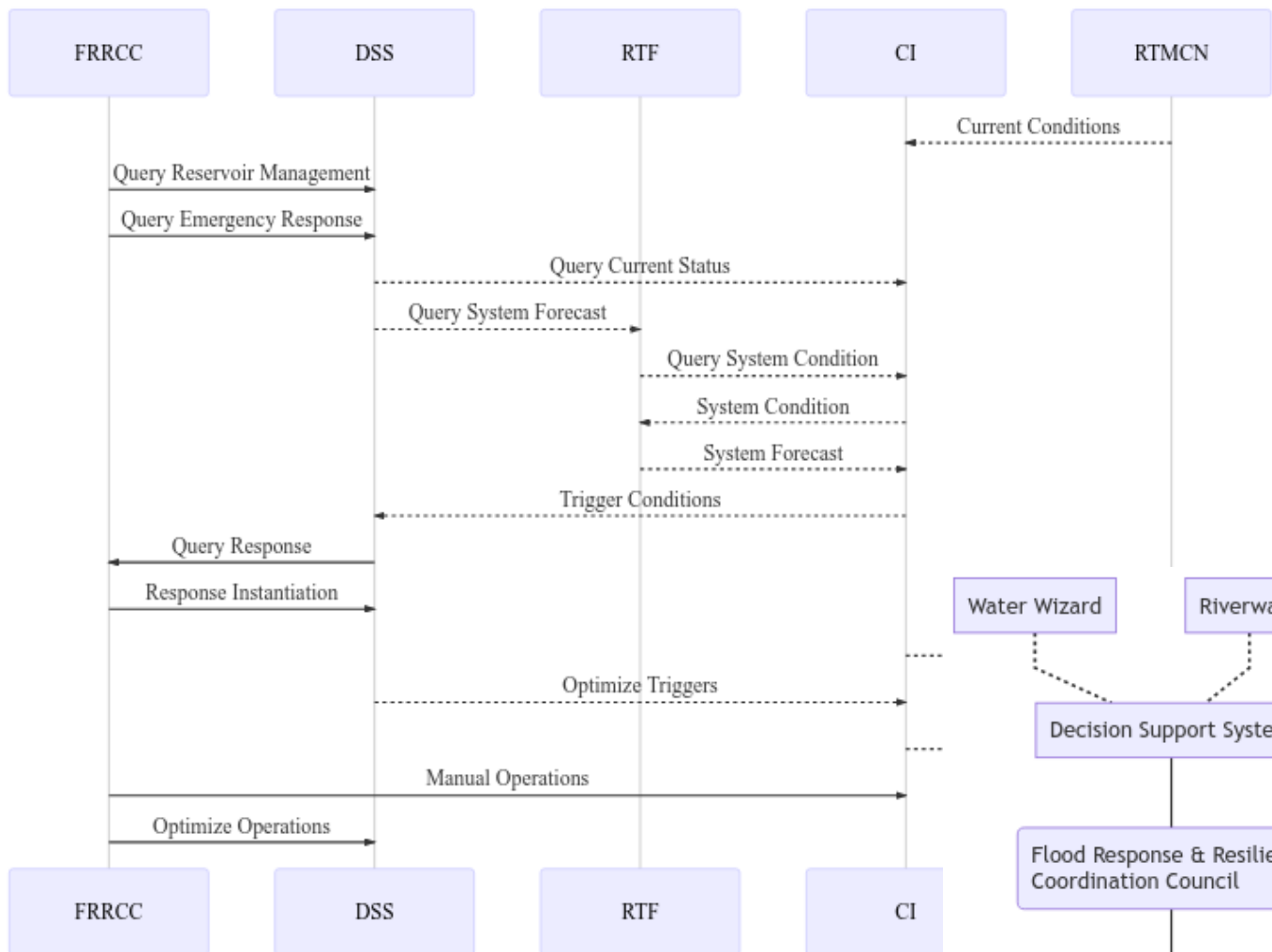


Hurricane Beulah:

- 27 ft (8.3 m) storm surge
- 18 hrs flood – City of Brownsville
- 6.6 ft flood depth – San Perlita Middle School, Willacy County

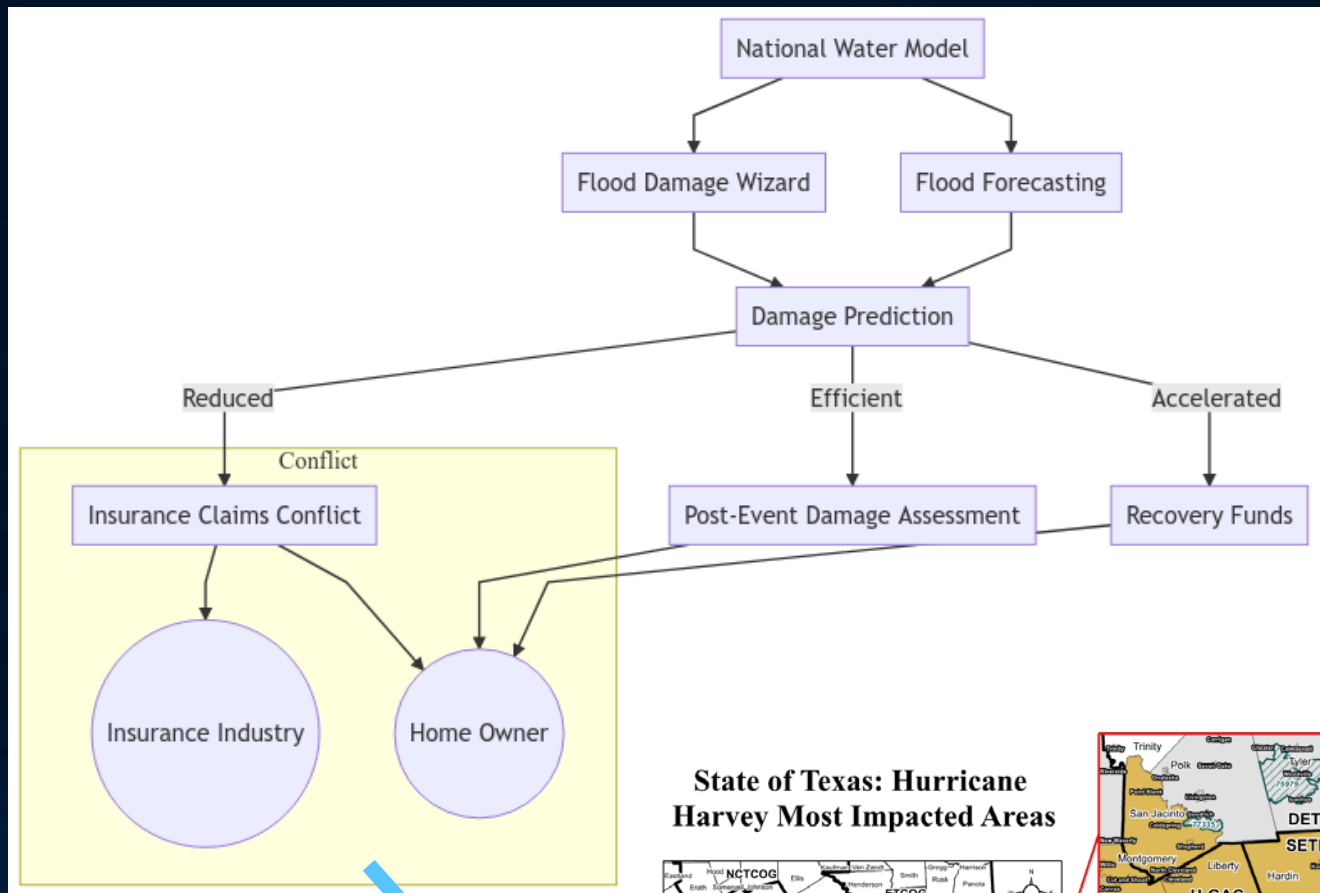


Flood Response & Resiliency Network

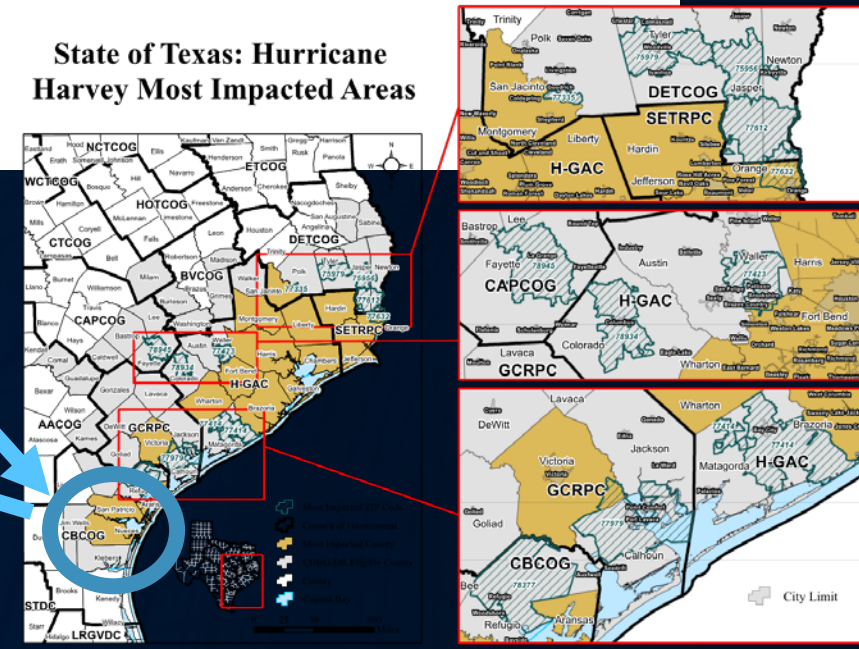


- Coordination
- Local Intelligence
 - Hydrologically Complex
 - Overlapping Jurisdictions
 - Monitoring Network

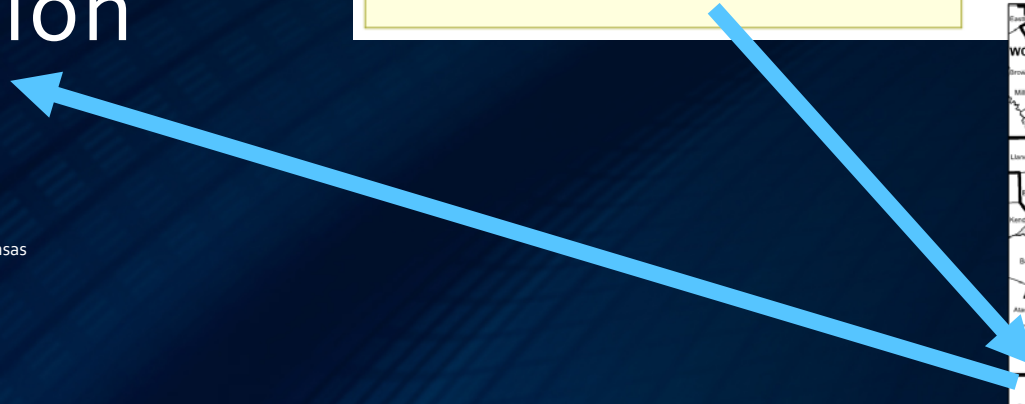
Flood Damage Prediction & Recovery Reconciliation



State of Texas: Hurricane Harvey Most Impacted Areas



- Flood DPRR – Flood “Dipper”
- Decision Support Model
- Development
 - Corpus Christi, Rockport, Port Aransas
- Validation Universal Application
 - Rio Grande Valley



HB 13

- Flood Planning, Mitigation & Infrastructure Projects
- Phelan, Larson, Longoria, Guerra, Zerwas
- March 5th – LRGV Delegation Testimony Austin
- \$3.26B
- Through TWDB
- Regional Thrust: LRGVDC

By: Phelan, Larson, Longoria, Guerra, Zerwas H.B. No. 13
Substitute the following for H.B. No. 13:
By: Farrar C.S.H.B. No. 13

A BILL TO BE ENTITLED

AN ACT

1
2 relating to flood planning, mitigation, and infrastructure
3 projects; making an appropriation.

4 BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF TEXAS:

5 SECTION 1. The heading to Section 15.405, Water Code, is
6 amended to read as follows:

7 Sec. 15.405. FLOOD CONTROL PLANNING CONTRACTS.

8 SECTION 2. Section 15.405, Water Code, is amended by
9 amending Subsections (a), (f), and (g) and adding Subsection (a-1)
10 to read as follows:

11 (a) In this section, "flood control planning" means any work
12 related to:

13 (1) planning for flood protection;

14 (2) preparing applications for and obtaining
15 regulatory approvals at the local, state, or federal level;

16 (3) activities associated with administrative or
17 legal proceedings by regulatory agencies; and

18 (4) preparing engineering plans and specifications to
19 provide structural or nonstructural flood mitigation and drainage.

20 (a-1) The board may enter into contracts with political
21 subdivisions to pay from the research and planning fund all or part
22 of the cost of ~~developing~~ flood control planning ~~(plans)~~ for the
23 political subdivision.

24 (f) The board shall adopt rules establishing criteria of

86R19629 SLB-F

1

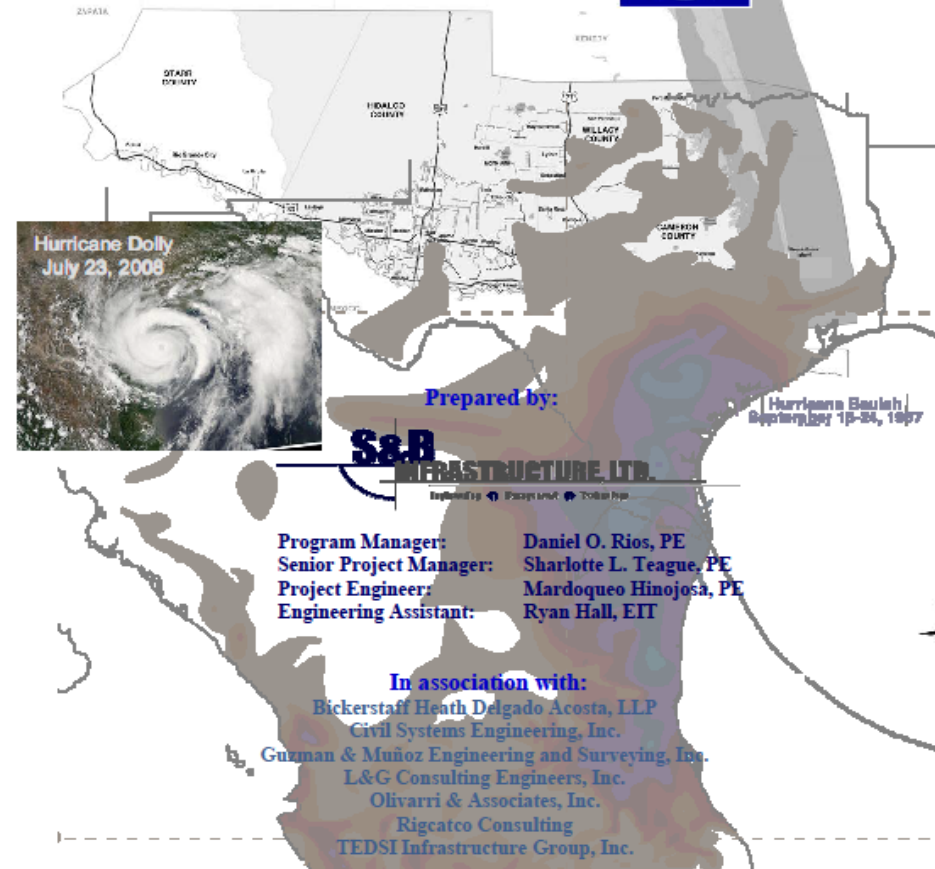
HUD Initiative

- Letter from Gov. Abbott to HUD Secy Carson
- \$370M
- Updated LRGV Strategic Plan

Lower Rio Grande Valley Regional Economic Adjustment Plan For Building Disaster Resilient Communities

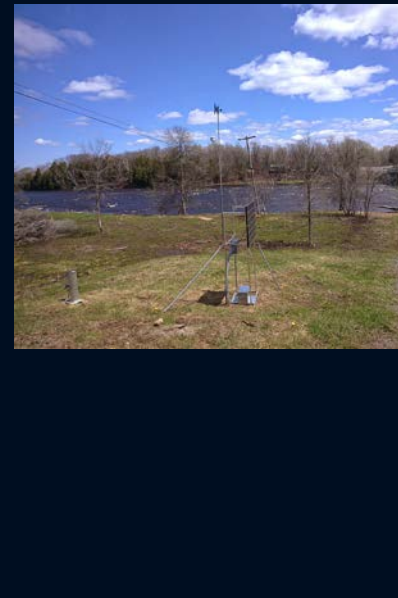
US Department of Commerce – Economic Development Administration
Grant No. 08-79-04390


Prepared for:
**Lower Rio Grande Valley
Development Council**



September 28, 2012

Real-Time Monitoring

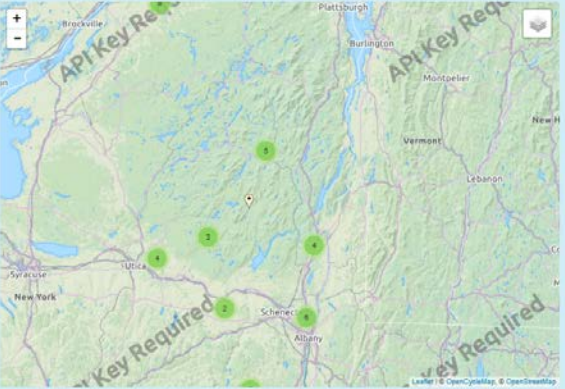






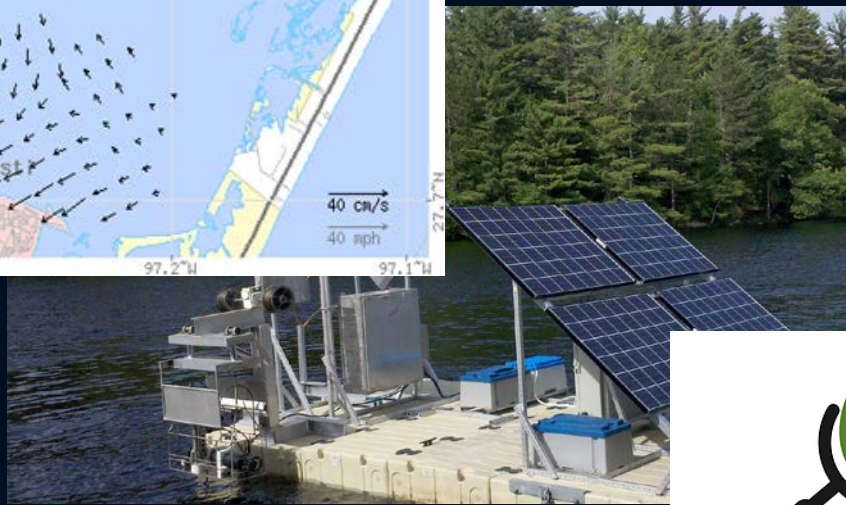
Real-Time Hydrologic System

REON maintains a system of water quality sensors in rivers and estuaries systems. REON is a project of the [Research Institute for Rivers and Estuaries](#).

You can pick a site off the map, [choose a site by name](#), [choose a variable](#), [compare two sites](#), or [view all site choices](#). You can double-click to zoom on/off, mouse wheel to zoom, use the +/- on the top left, or hold shift and draw a box to zoom to the box.







River & Estuary Observatory Network (REON)

- Series of land based sensor nodes coupled with deployable floating profiling platforms
 - Address “paradigm shift” in term of monitoring needs
 - Make sensor systems more cost effective
 - Develop and implement an effective cyber infrastructure
 - Field test to validate and improve

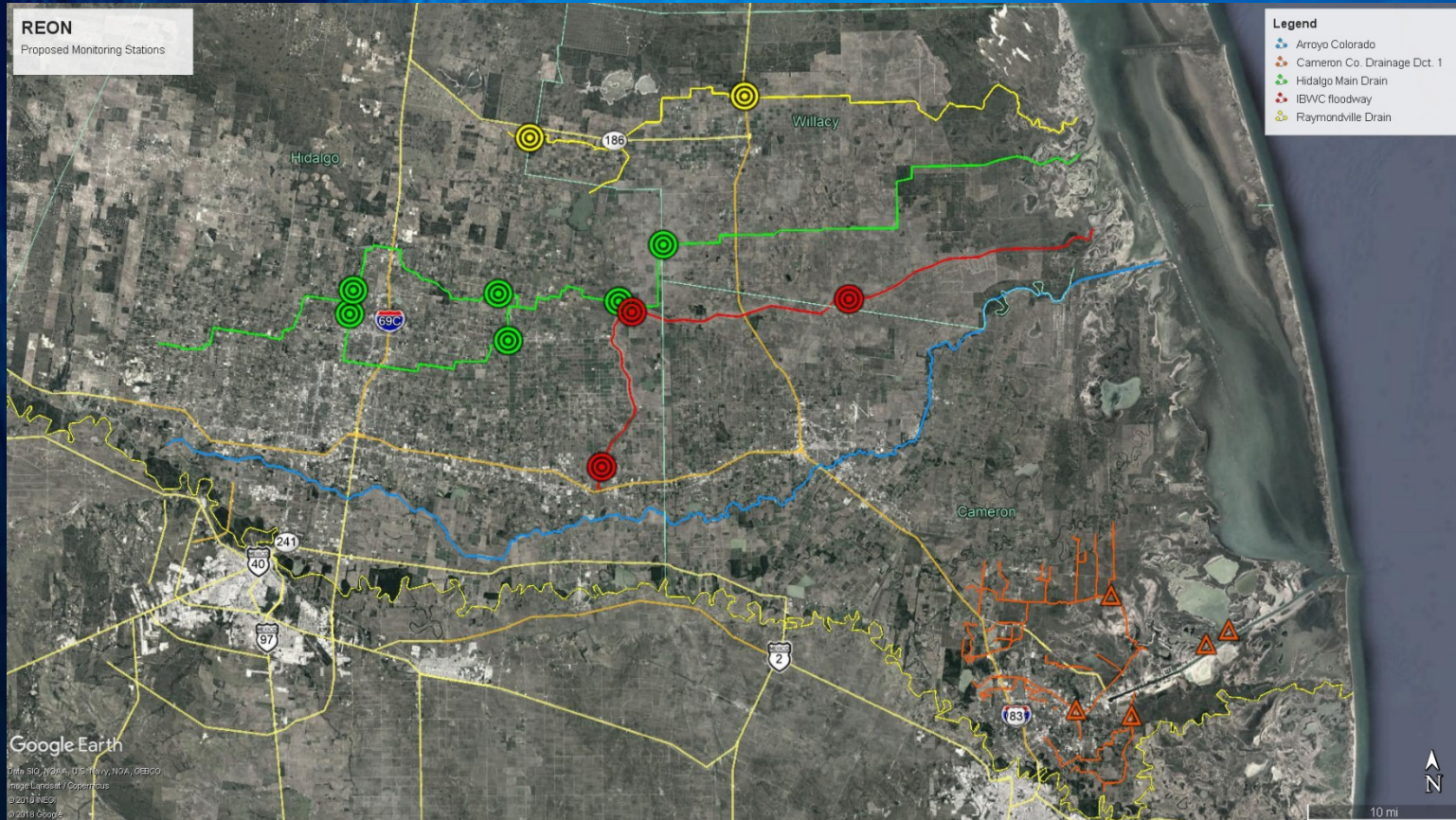
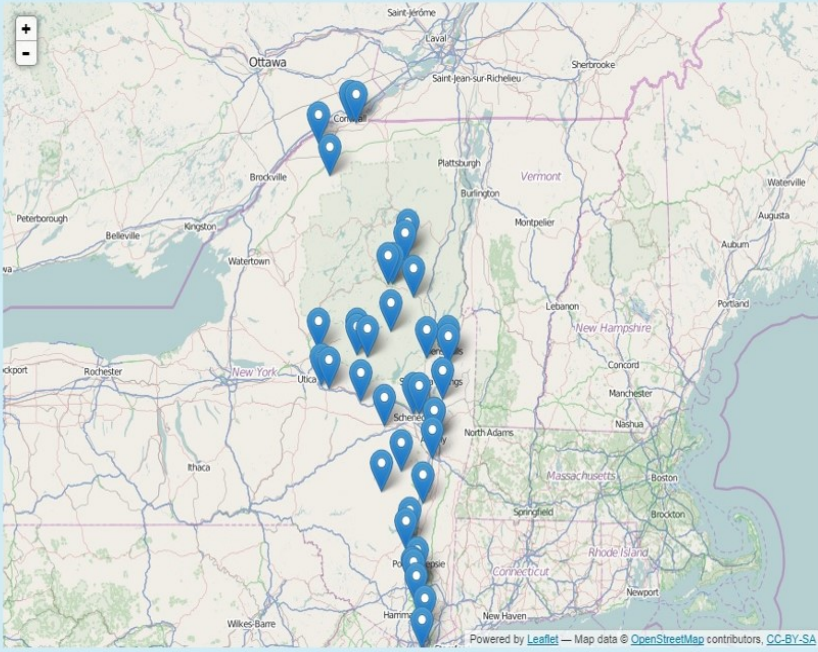




Real-Time Hydrologic System

We maintain a system of water quality sensors in [riverine](#) and [estuarine](#) systems.

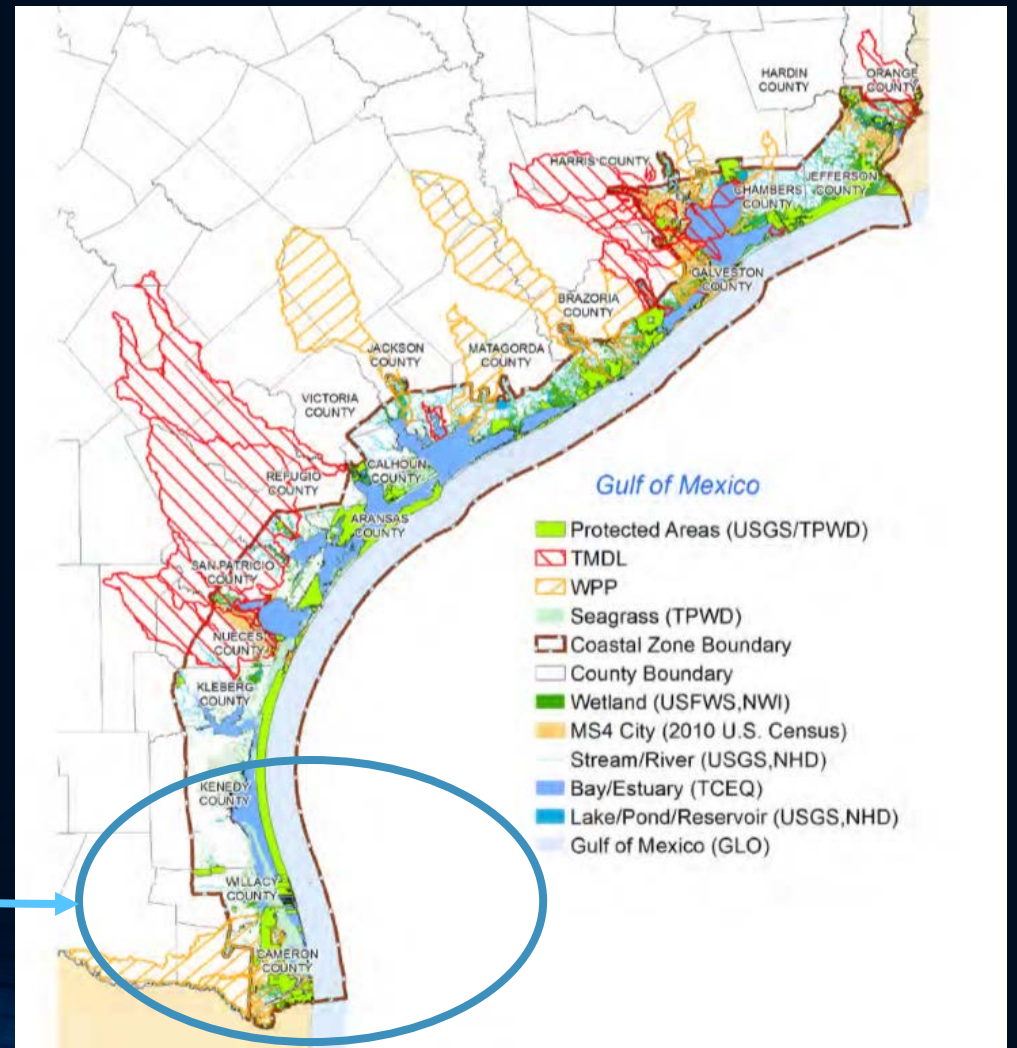
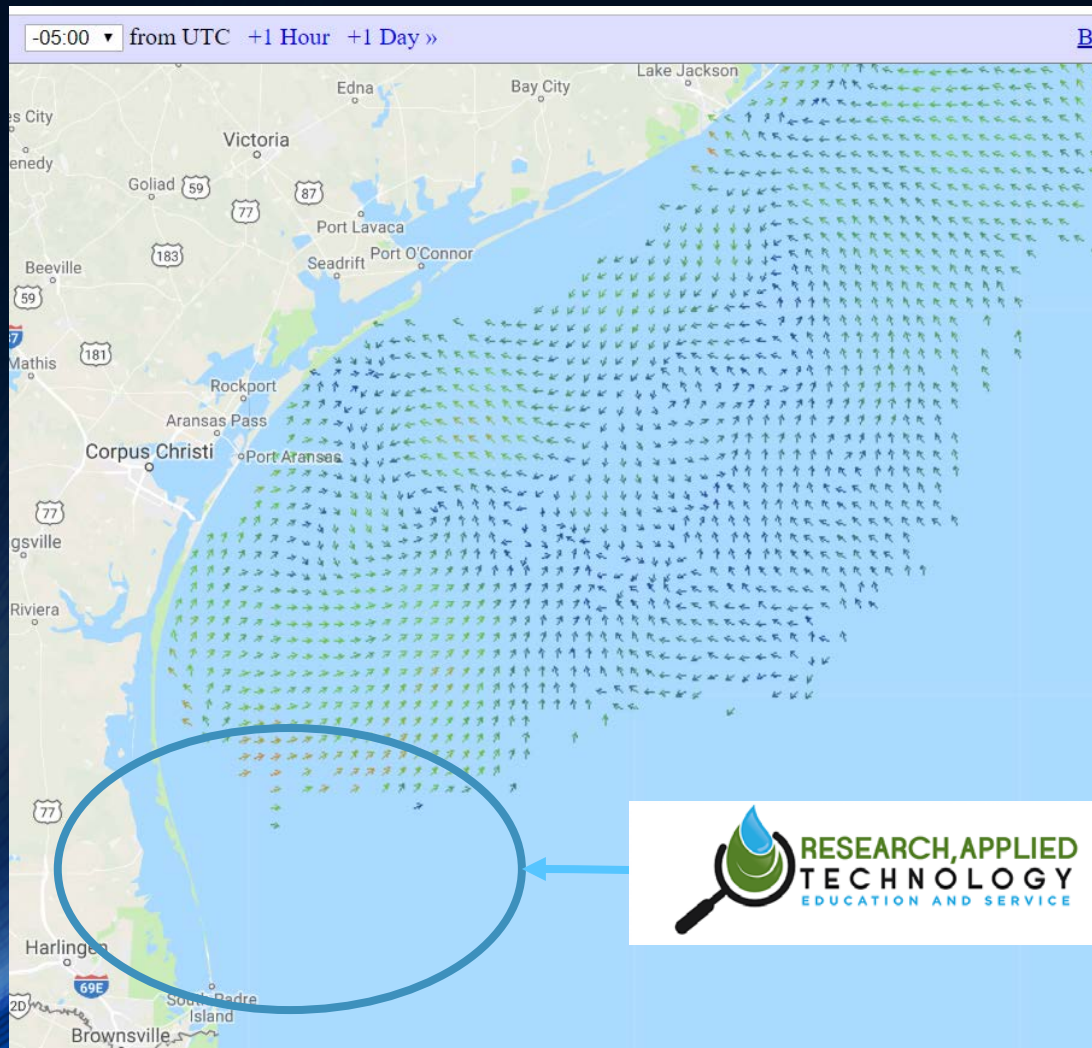
You can pick a site off the map, or [choose a site by name](#).



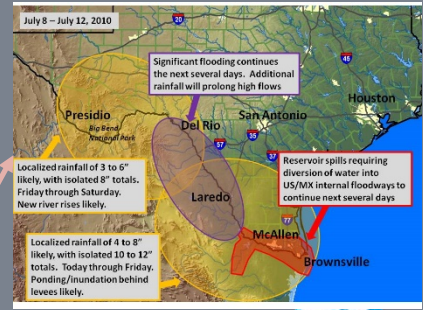
REON/RGV

RIVER & ESTUARY OBSERVATORY NETWORK
RIO GRANDE VALLEY

HF Radar – Lower Rio Grande Valley



Integrated Water Intelligence



RATES iRODS



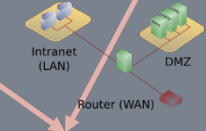
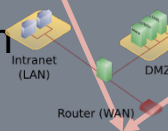
UA SciNET



UA/WPLI OASIS

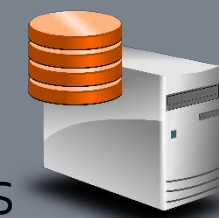
UTRGV SciNET

UTRGV Water Research



UTRGV/CIVE iRODS

INTERNET®



UA/WPLI iRODS





GeoSHAPE

Geospatial capabilities for Security, Humanitarian Assistance, Partner Engagement

[View on GitHub](#)



- Create, edit, and share critical data on an integrated dynamic map in near real time
- Map updates can be seen by users from anywhere in the world
- Mobile app lets users capture data and photos in the field and upload them to the map
- System allows users to operate in connected and disconnected environments
- Notifications about changes in the map increase situational awareness in dynamic operations

GeoSHAPE gives organizations the ability to create, share, and visualize information through dynamic, collaborative maps

The outcome is improved situational awareness, and fact-based decision-making enabling a wide gamut of operations

GeoSHAPE – Geospatial capabilities for Security, Humanitarian Assistance, Partner Engagement – is designed to enable collaboration on geospatial information between mission partners in connected and disconnected operations. GeoSHAPE has been built utilizing open source software and open standards to make it available for partners and to maximize interoperability. GeoSHAPE is the integration of a geospatial portal (GeoNode), a web mapping client (MapLoom), and a mobile application (Arbiter), that leverages the infrastructure provided by a geospatial server and database components. GeoSHAPE is the outcome of the Rapid Open Geospatial User-Driven Enterprise (ROGUE) Joint Capability Technology Demonstration (JCTD).

