

# Lower Rio Grande Valley 23rd Annual Water Quality Management & Planning Conference

WELCOME

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

# About the Conference

- 1993 - Born as the South Texas Environmental Conference
  - Difficult Mission – Diverse Stakeholders
    - Local/State/Federal Gov'ts; Practitioners; Academia; Students; Vendors
- 1998 - Absorbed as the Flagship Stakeholder Engagement Instrument for the LRGV TPDES Stormwater Taskforce
- 2020 – Cancelled Due to COVID-19
- 2021 – Virtual
- 2022 – We're Back! And Still...

“...the most fun you can have and still learn something...”

- Anonymous





# RATES, Inc.

A NON-PROFIT RESOURCE PROMOTING  
INTEGRATIVE APPROACHES TO REGIONAL WATER RESOURCE MANAGEMENT

ANDREW N.S. ERNEST, PH.D., P.E., BCEE, D.WRE  
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JAVIER GUERRERO, M.S., PH.D. CANDIDATE, EIT  
MEMBER – BOARD OF DIRECTORS  
CHIEF PROJECT & COMMUNITY DEVELOPMENT OFFICER

CHRISTOPHER B. FULLER, PH.D.  
CHIEF OPERATIONS OFFICER



# Issues Limiting Effective Local & Regional Water Resource Management

"Whiskey is for Drinking, Water is for Fighting Over"

-- Mark Twain



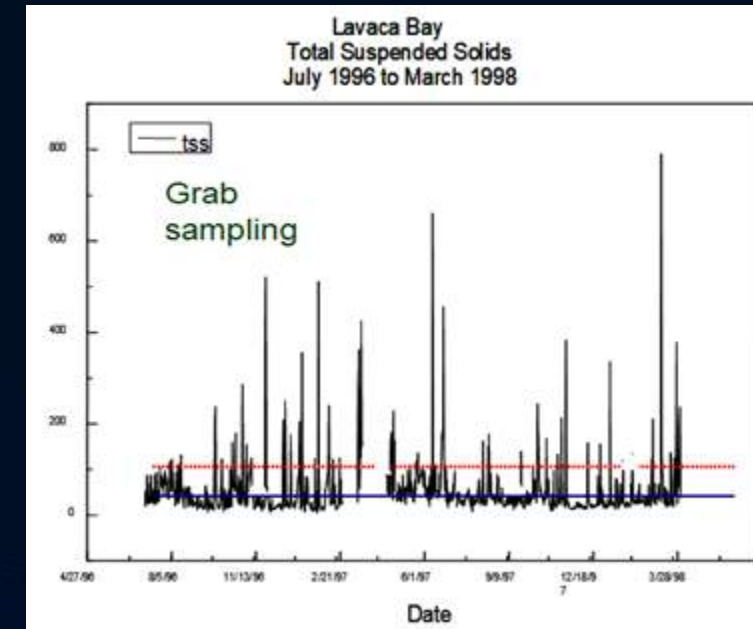
"All Models are Wrong, Some are Useful"

-- George E.P. Box



"99% of environmental change occurs on the order of 1% of the time"

-- James S. Bonner, Ph.D.  
Founder, RATES







## The RATES Solution

- Inter-Jurisdictional Collaboratives
- Tools & Technologies Tuned to the User's Needs & Abilities
- Affordable Near Real-Time Sensors

# RATES Programs



## Affordable Near Real-Time Sensors

- Real Time Hydrologic System
- Stage Height
- All-Weather Precipitation
- Water Quality Sonde
- Nutrient Analyzer

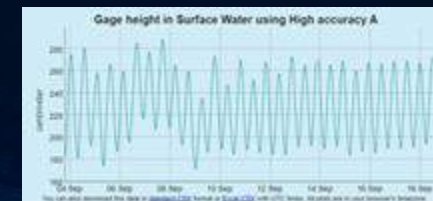
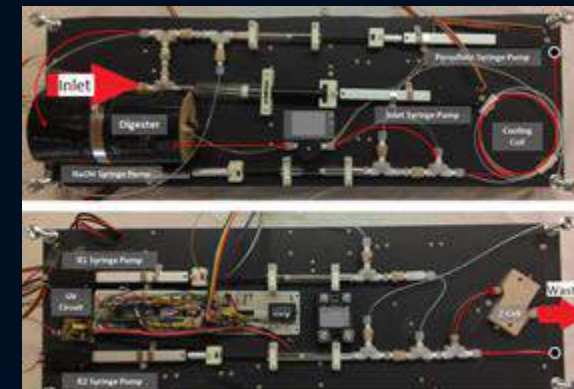


## Inter-Jurisdictional Collaboratives

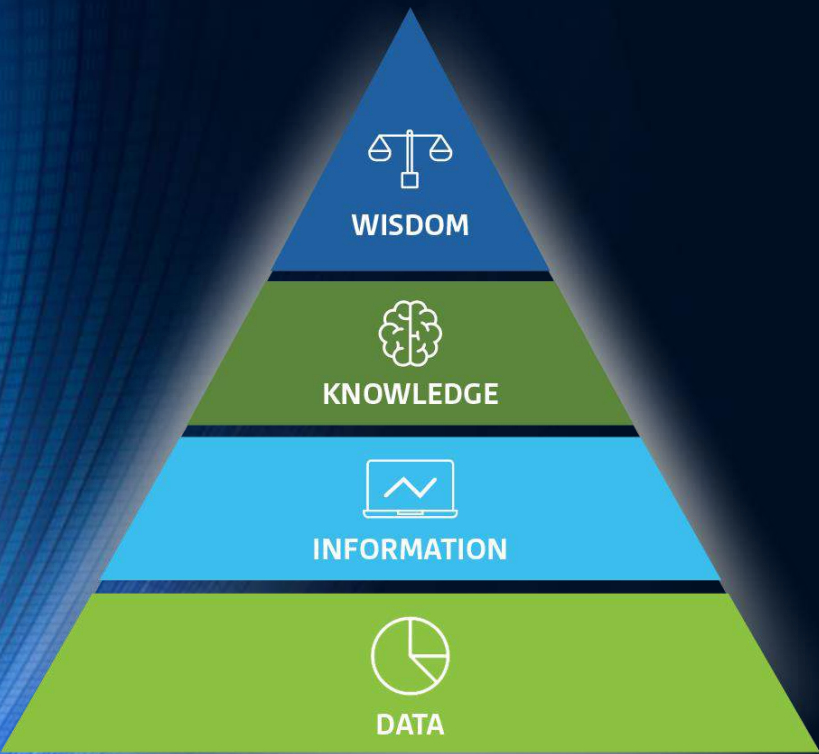
- LRGV Stormwater Taskforce
- River & Estuary Observation Network
- Risk Management Planning Partnership

## Tools & Technologies Tuned to the User's Needs & Abilities

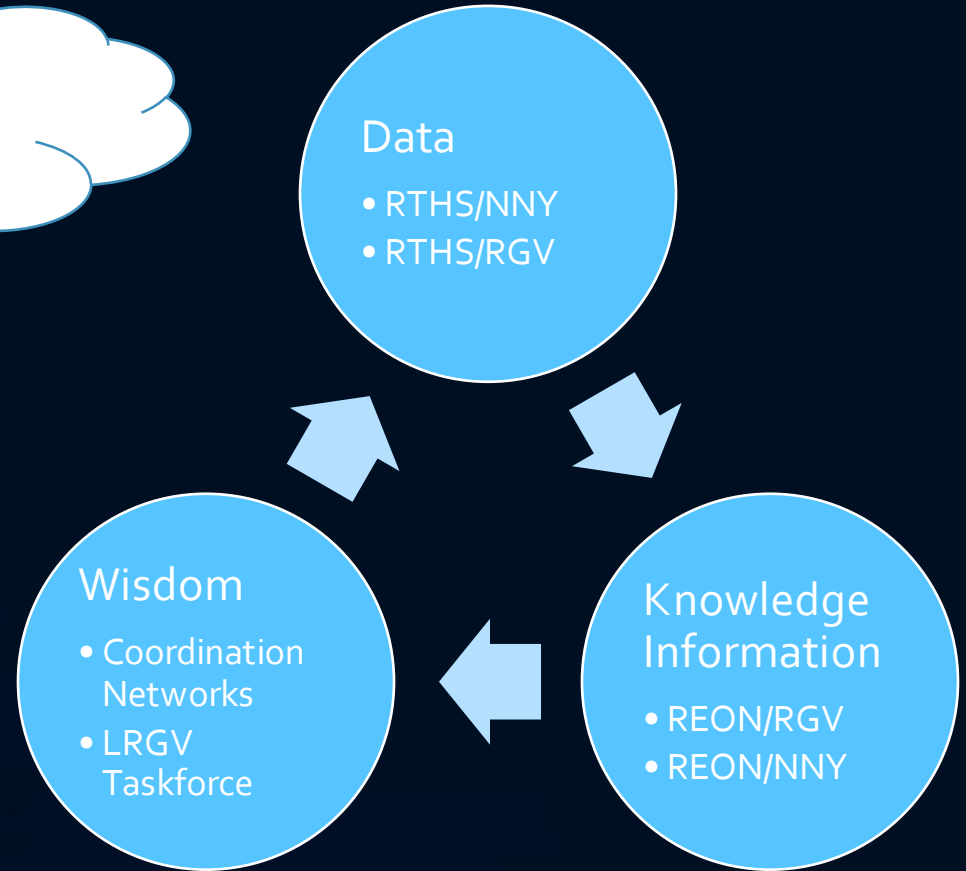
- REON.cc
- Flood Damage Wizard
- Rate Wizard
- Decon Wizard
- Econ Wizard
- WDS Wizard
- WCE Wizard



# Technology-Based Regional Capacity Development



"What's DIKW got to do with it?"





# RATES Vision

*Democratizing Water Intelligence for Knowledge-Enabled Policy & Decision Making*

- Mission: ***"Make knowledge-based policy and decision making possible with regards to water resource management."***
- **Data:** address monitoring needs of under-served areas to ensure technology and monitoring solutions are available to all
- **Information:** Translate water & environmental data into actionable intelligence
- **Knowledge:** Educate decision makers and elected officials to promote knowledge-based decision making
- **Wisdom:** Support implementation through facilitation of collaborative efforts between stakeholders such as municipalities, academic institutions, not-for-profits, conservancy & environmental groups as well as state and federal regulatory agencies







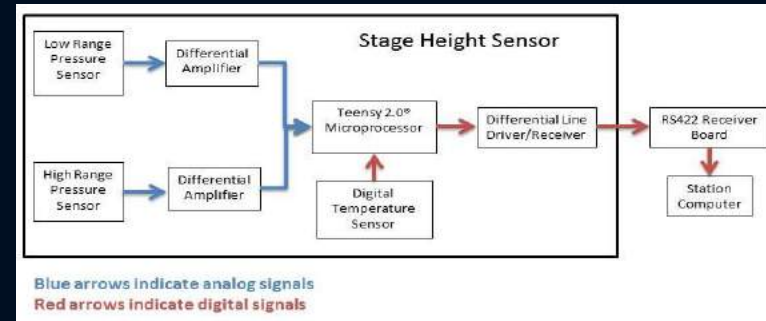
# Data

AFFORDABLE NEAR-REAL-TIME SENSORS

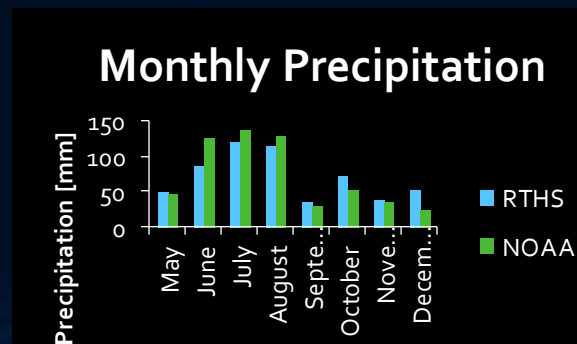
# Sensor Technology

## Reduce Capital Cost

- Enabling technology borne through low-cost microprocessors (Teensy)
- Incorporated into sensor designs.
  - Stage height
  - Precipitation
  - Water quality
  - Integrated network
- Standardized/modular designs
- Integrated systems



Developed water quality sonde can be built for approximately \$2,000. Comparable commercially available sonde ~\$20-25K with sufficient performance to characterize parameter variability and range.



# Reduce Unit Data Costs

- Application of surrogate measurements

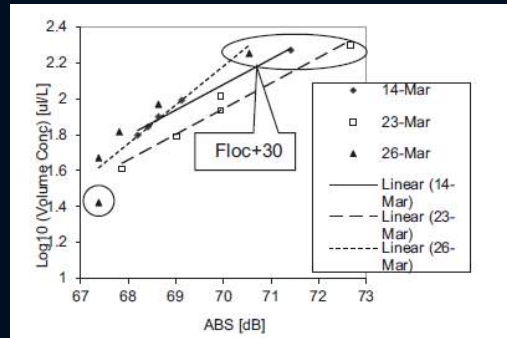
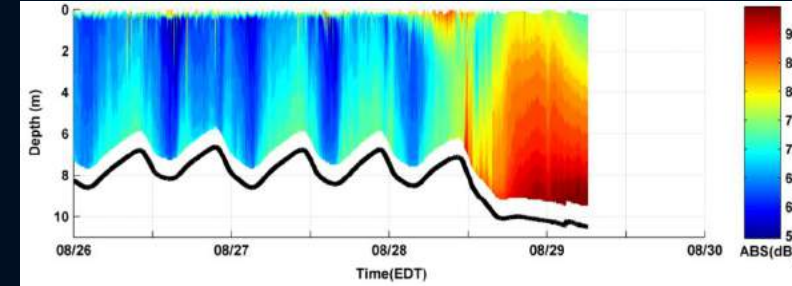
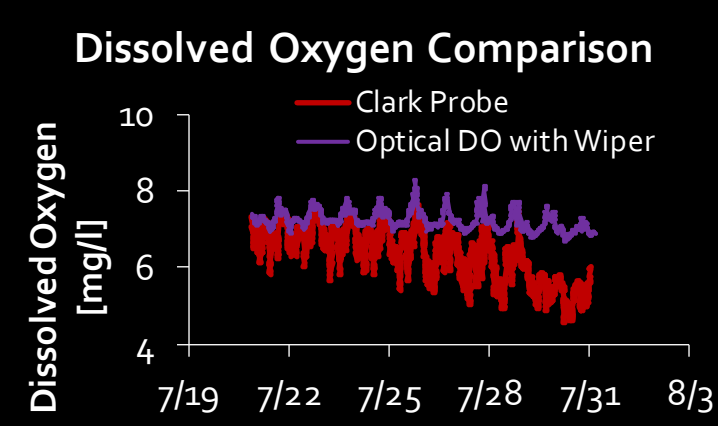


Fig. 3. ABS responses to Log(10) volume concentrations at 0.65 m depth.



- Minimize service requirements through maximizing service intervals.

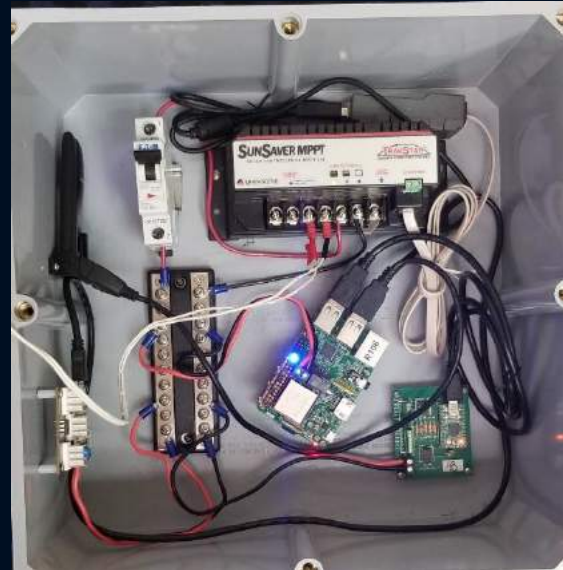


- Maximize parameter counts of developed sensors and sensor nodes (pH, DO, salinity, turbidity, chlorophyll, CDOM, atmospheric conditions, water level, water temp, etc.)



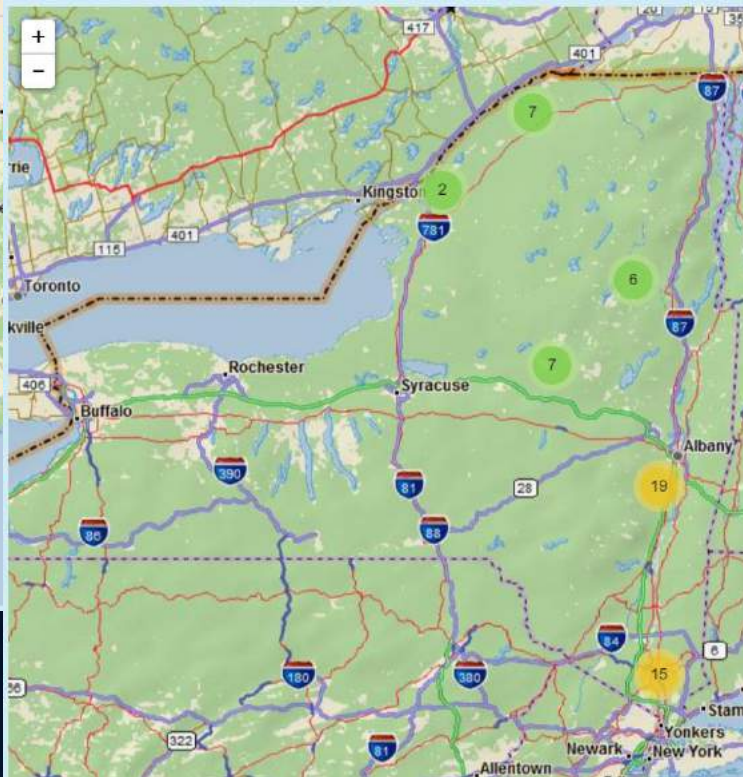
# Real-Time Hydrologic System (RTHS)

- COTS Meteorological Pole
  - Wind Speed/Direction
  - Relative Humidity
  - Air Temperature
  - Barometric Pressure
- Can be solar powered or grid tied
- Master control box
  - Raspberry Pi Microcomputer
  - Sensor Circuit Boards
  - Solar Controller
  - Cell Stick





# National (69...And Counting)



New York (66)



South Texas (3+~70)

Alabama

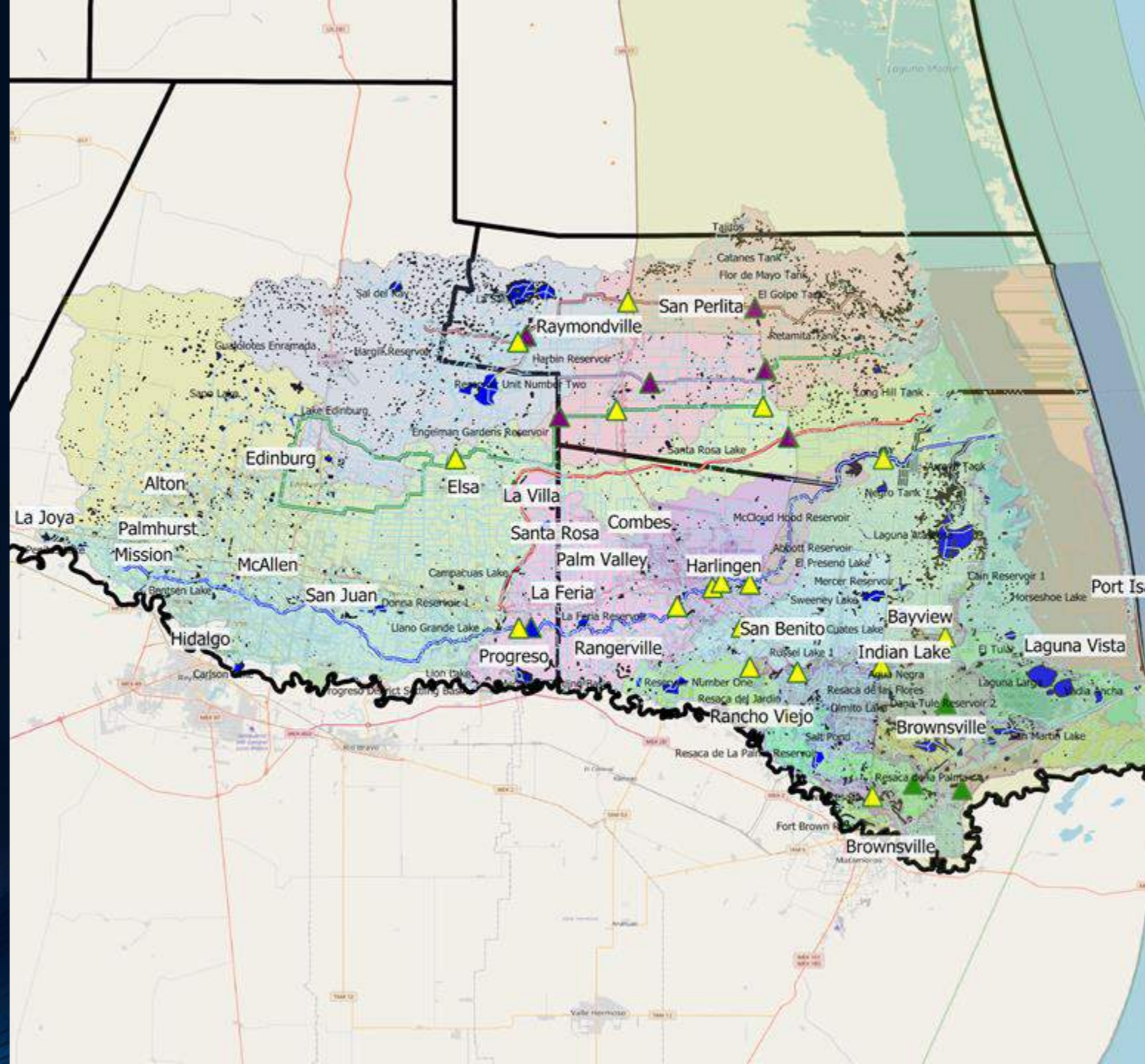


RTHS Network



# Real Time Hydrologic System Network (RGV)

- Data Democratization
- Local Ownership
- Regional Integration
- Regional
- Basin Management
- Flood Planning
- Local
- Flood Warning
- Design Development



## REON/RTHS

- ▲ Active
- ▲ Committed
- ▲ Contracted
- ▲ Proposed

## National Hydrography Dataset

- Flowlines
- Waterbodies

## LRGV Major Drains

- Raymondville Drain East
- Raymondville Drain West
- Willacy Main Drain
- HCDD1 North Main Drain
- IBWC Floodway
- Arroyo Colorado East (Tidal)
- Arroyo Colorado West-Central

## River & Estuary Observation Network Rio Grande Valley

Map of Current, Contracted and Proposed Real Time Hydrologic Stations, overlaid on HUC12 Subwatersheds



0 7.5 15 mi



# Information>Knowledge

TOOLS & TECHNOLOGIES TUNED TO THE USER'S NEEDS &  
ABILITIES



# Welcome

The River and Estuary Observation Network (REON) is a community network of real-time data providers and users committed to the philosophy of enabling local and regional water resource management through sharing of water data and open exchange of water information.

Get Started

## Search for Data.

Advanced Search



322 Layers



- REON.cc is Designed for:
- Regional Decision Making
  - Preventing Duplication

River and Estuary Observation Network
Data
Maps
About

Search
Andrew Ernest

People
Groups
Group Categories
Announcements
Invite Users
Add User
Create Group

Search by location name

## Real-Time Hydrologic System

Site: Brownsville Public Works County: Cameron

Barometric pressure

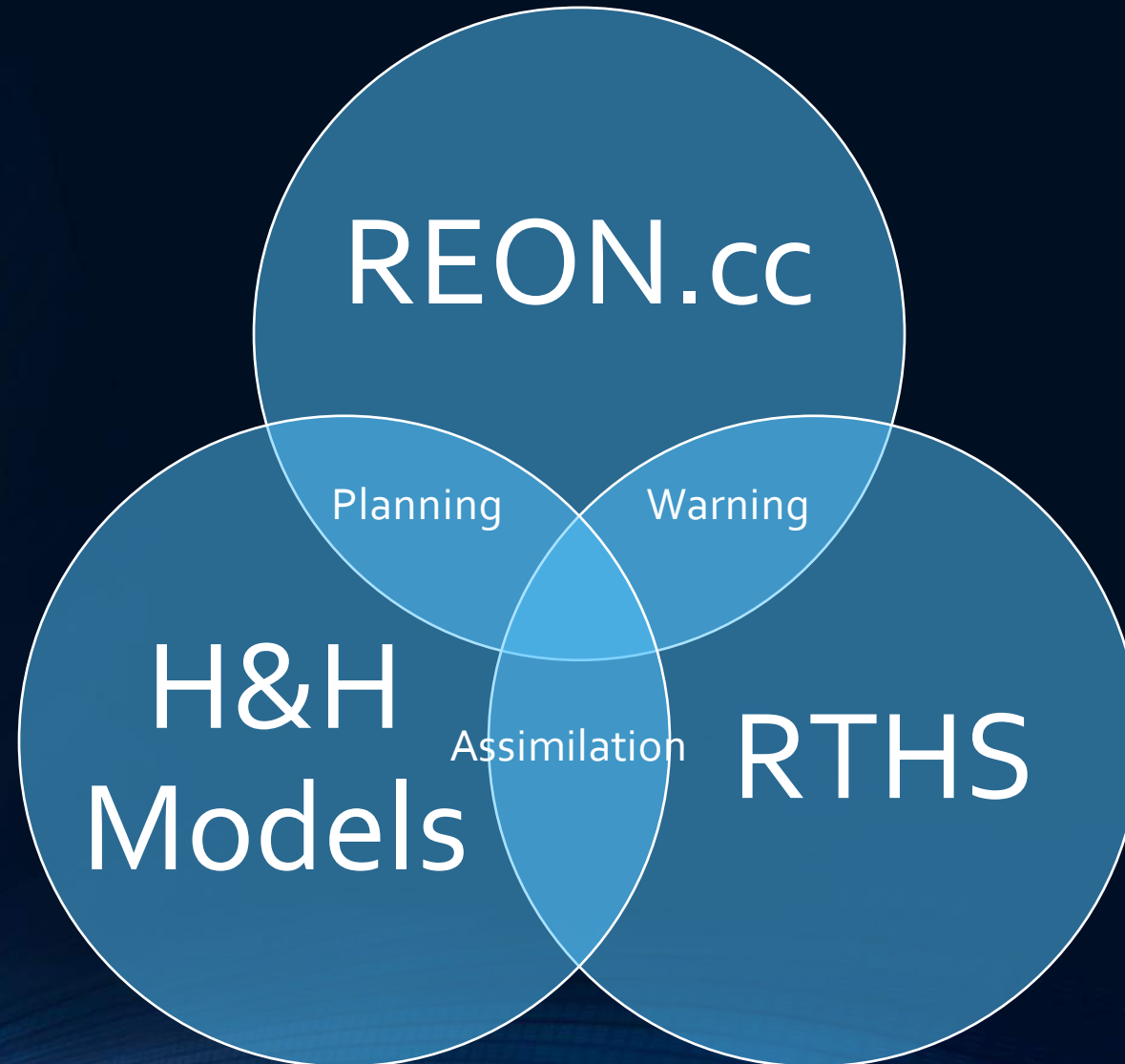
Stage height using Large range



River & Estuary Observation Network  
Cybercollaboratory



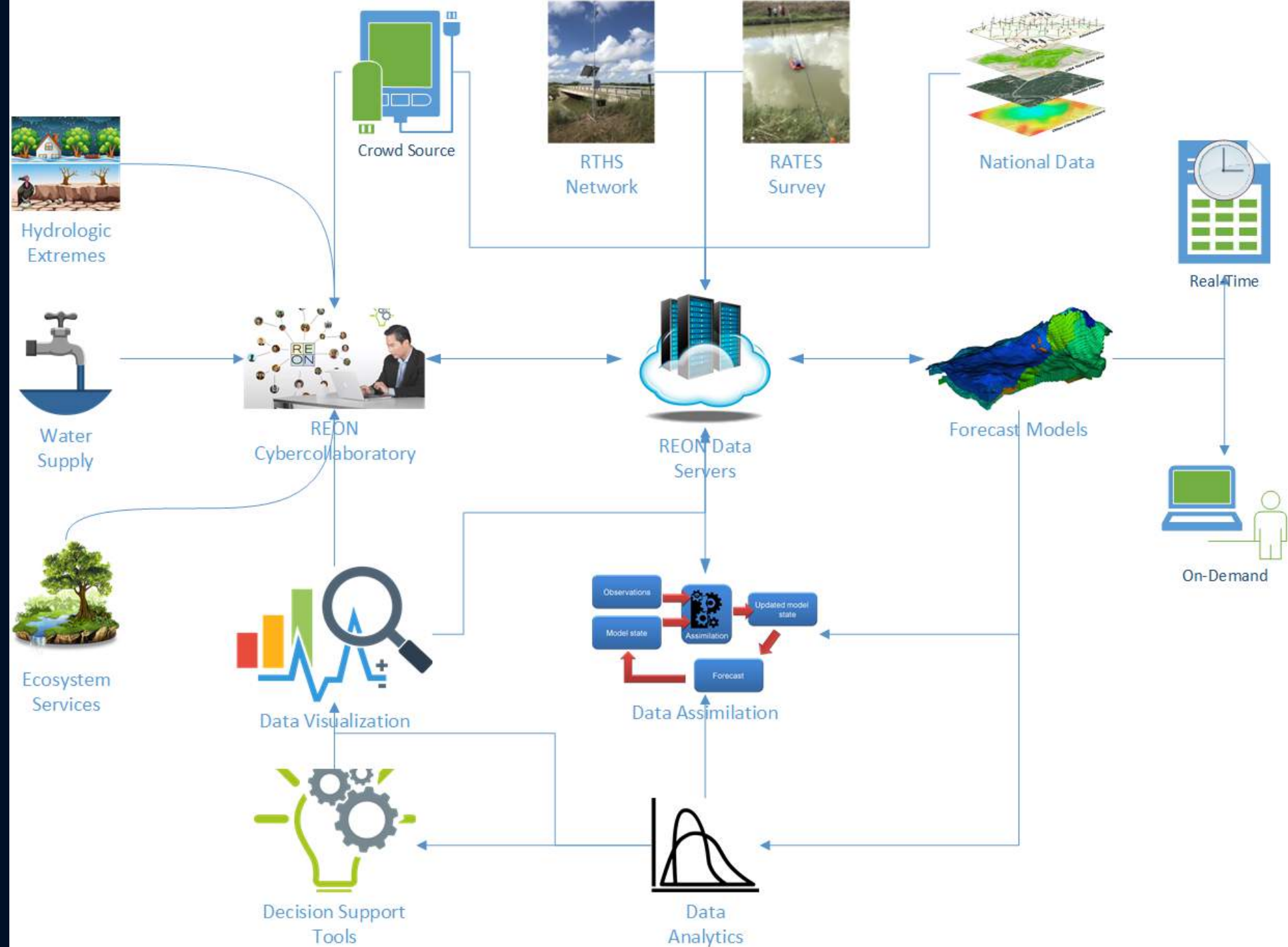
# Flood Intelligence





# River & Estuary Observation Network

## Operational Components



The background is a deep blue gradient. On the left, there's a faint grid of small squares. On the right, there are several concentric, curved lines that create a sense of depth and movement, resembling a tunnel or a stylized globe.

# Wisdom

INTER-JURISDICTIONAL COLLABORATIVES



# The Lower Rio Grande Valley TPDES Stormwater Taskforce

A WORKING MODEL FOR REGIONAL COLLABORATION



# 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
- 30 Members & Growing
  - Past Chairperson, LRGV TPDES Stormwater Task Force

# 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
- Peter Hermida, Engineer I, City of Weslaco
  - Secretary, LRGV TPDES Stormwater Task Force
- Melisa Gonzales, Stormwater Manager, City of Alamo

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



<b>City of Brownsville</b> Carol Vasquez	<b>City of La Feria</b> Jaime Sandoval	<b>City of San Juan</b> Kimberly Diaz	<b>City of Donna</b> Roy Jimenez
<b>City of Alton</b> Jeff Underwood	<b>City of Edinburg</b> Robert Valenzuela, CSI, CEO	<b>City of San Benito</b> Bernard Rodriguez	<b>Cameron County DD#1</b> Albert Barreda
<b>City of Los Fresnos</b> Raul Garcia	<b>City of Weslaco</b> Peter Hermida, E.I.T.	<b>City of Mission</b> JP Terazzas, P.E.	<b>City of La Joya</b> Isidro Venecia
<b>City of La Villa</b> David Alaniz	<b>City of Primera</b> Celina Gonzales	<b>City of Alamo</b> Ernesto Solis	<b>City of SPI</b> Carlos Sanchez
<b>Cameron County</b> Augusto Sanchez	<b>City of Palmview</b> Rodolfo Flores	<b>City of Harlingen</b> Xavier Cervantes	<b>Hidalgo County Pct. #1</b> Saul Garcia
<b>City of Palmhurst</b> Lupe Garcia	<b>City of Mercedes</b> Jose Figueroa	<b>Willacy County</b> Eduardo Gonzales	<b>City of Edcouch</b> Hugo De La Cruz
<b>City of Elsa</b> J.J. Ybarra	<b>Town of Combes</b> Megan Meidel	<b>Hidalgo County Pct. #4</b> Velinda Reyes	<b>Santa Cruz Irrigation District #15</b> Joe Hinojosa, REM

**Taskforce Liaison**

Javier Guerrero, M.S., E.I.T., Ph.D. Candidate



# Lower Rio Grande Stormwater Taskforce

# 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



# LRGV Flood Response & Resiliency Network



FEMA



US Army Corps of Engineers®



# RATES...a Public/Private Partnership Serving The Lower Rio Grande Valley



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