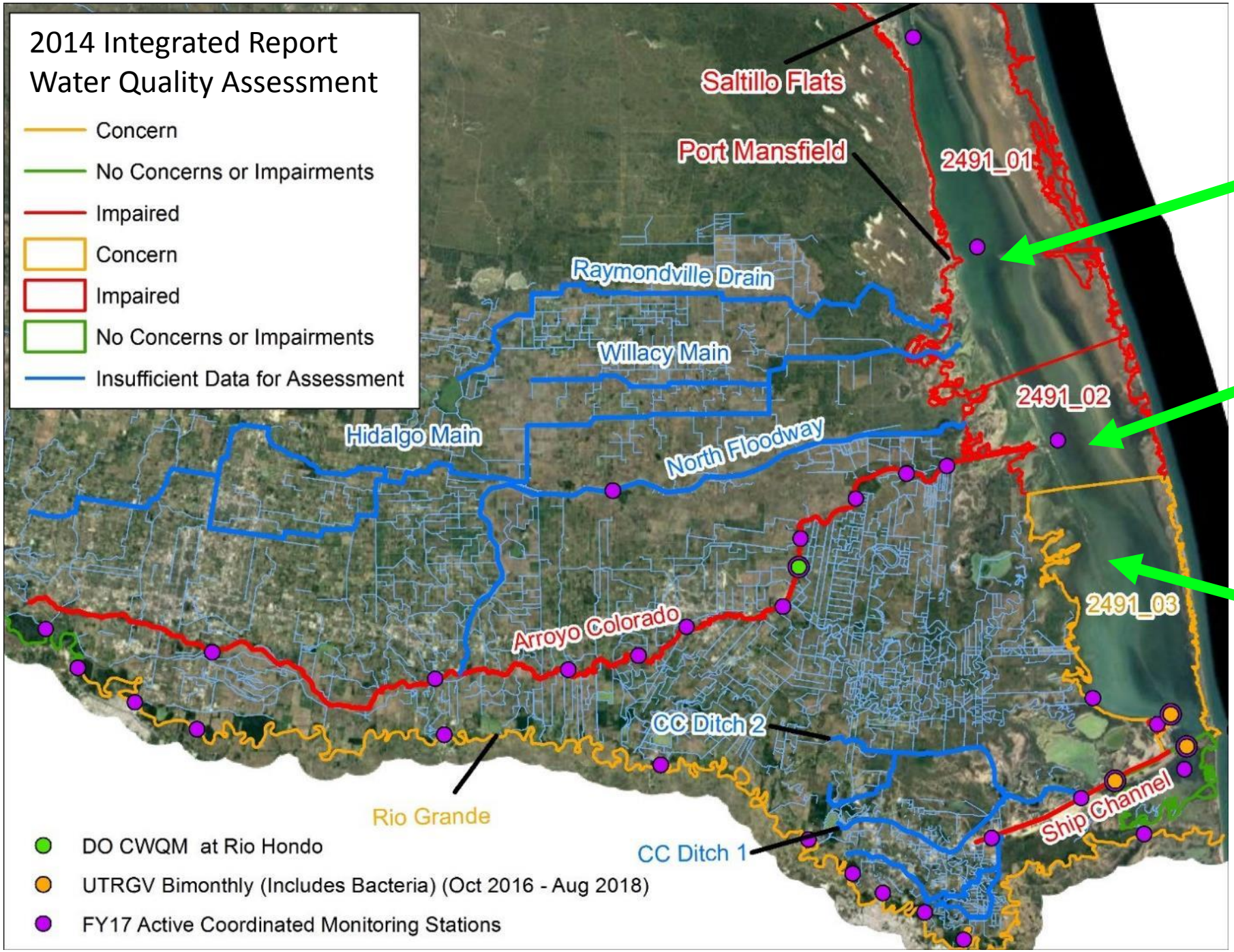
Hidalgo/Willacy Floodway Watershed Partnership

Ahmed Mahmoud, Ph.D.
Civil Engineering Department
University of Texas Rio Grande Valley



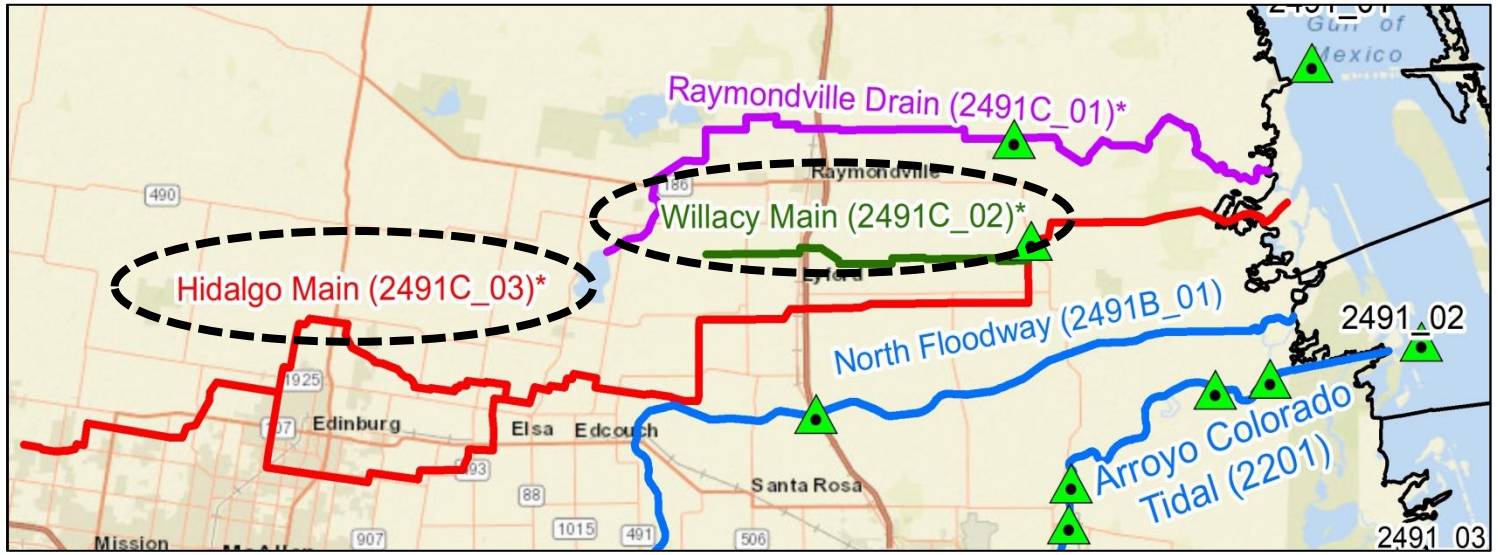
Laguna Madre (2491)

Low Dissolved Oxygen
Chlorophyll-a

Low Dissolved Oxygen
Bacteria
Ammonia
Nitrate
Chlorophyll-a

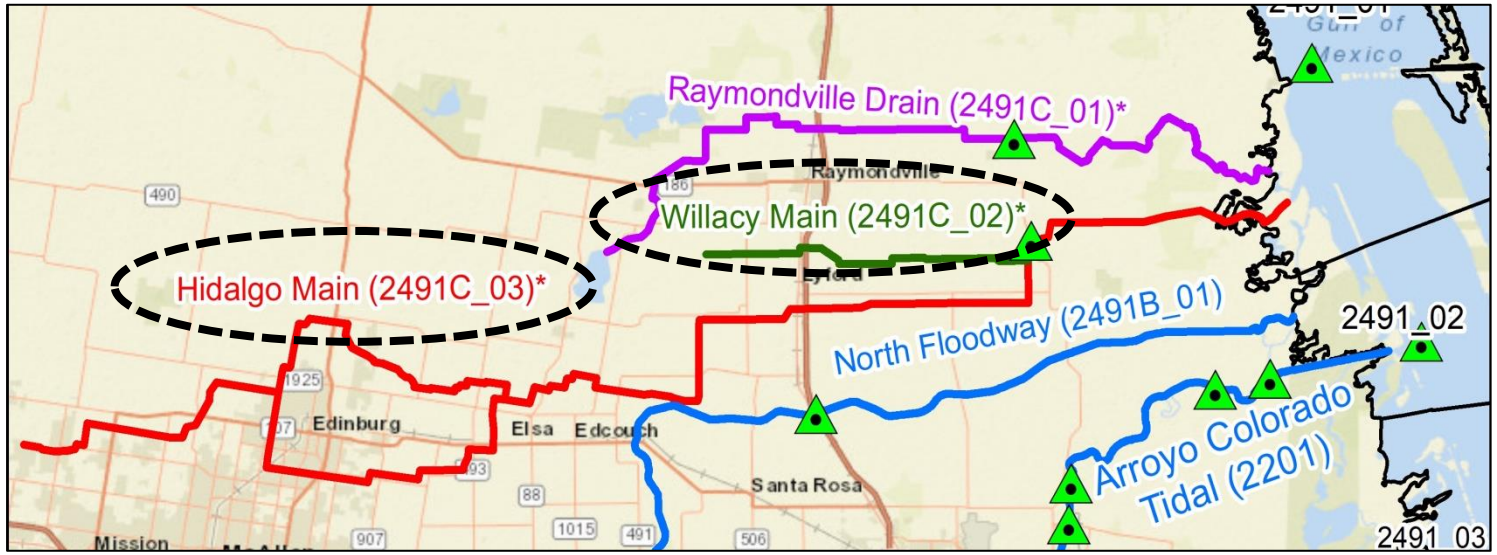
Low Dissolved Oxygen

Hidalgo/Willacy County Floodway



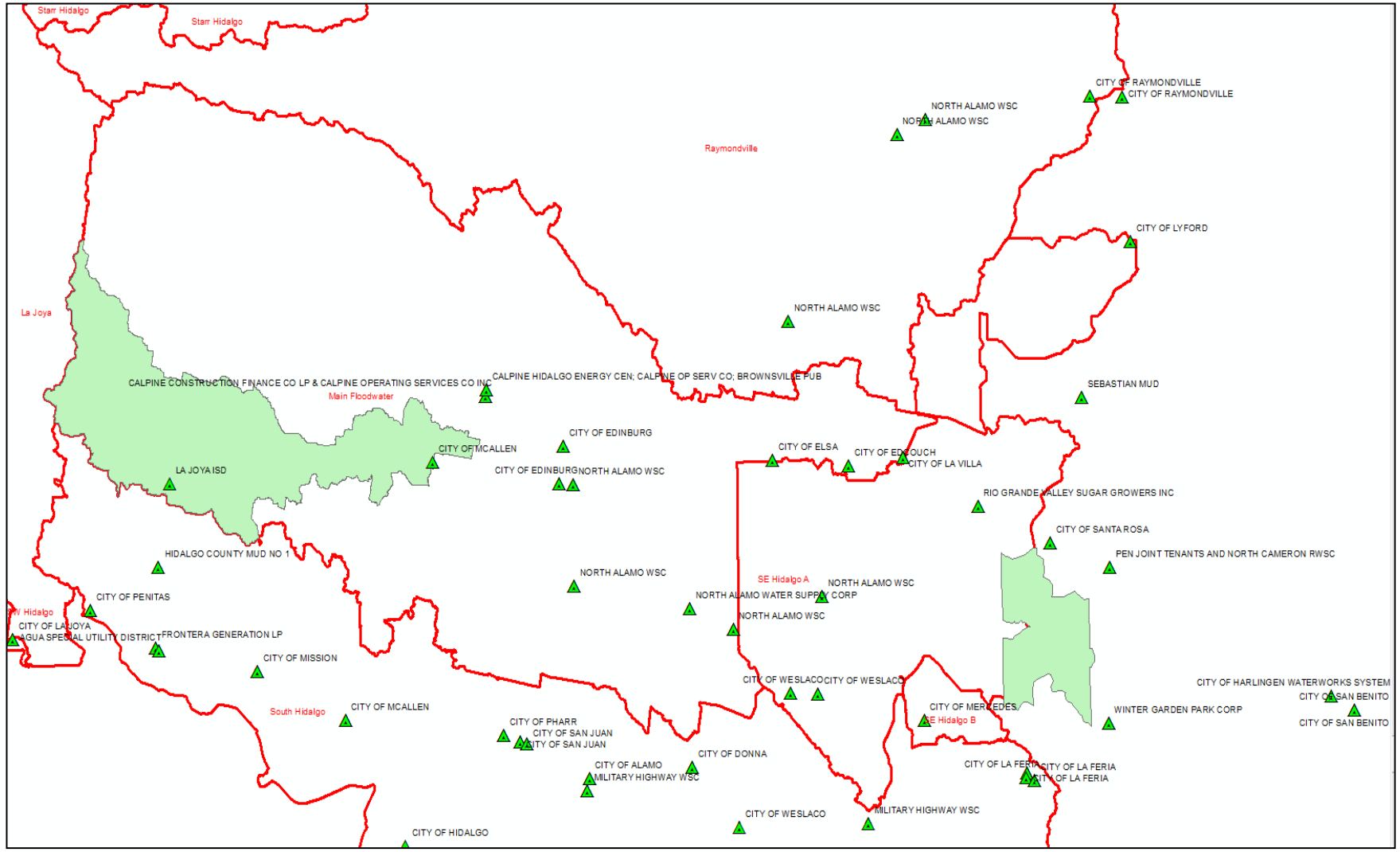
- Includes region **above the Arroyo Colorado** to the **south** watershed boundary of the **Raymondville Drain**, and from the **Starr County border** to the **Laguna Madre**

Hidalgo/Willacy County Floodway



- Carries urban stormwater runoff from central and northern Hidalgo County, and
- Agricultural runoff from northeast Hidalgo County and Willacy County
- WWTP outfalls as continuous flow

Hidalgo/Willacy WWTP



- Around 21 WWTP outfall discharge their effluent in the floodway

Project Description

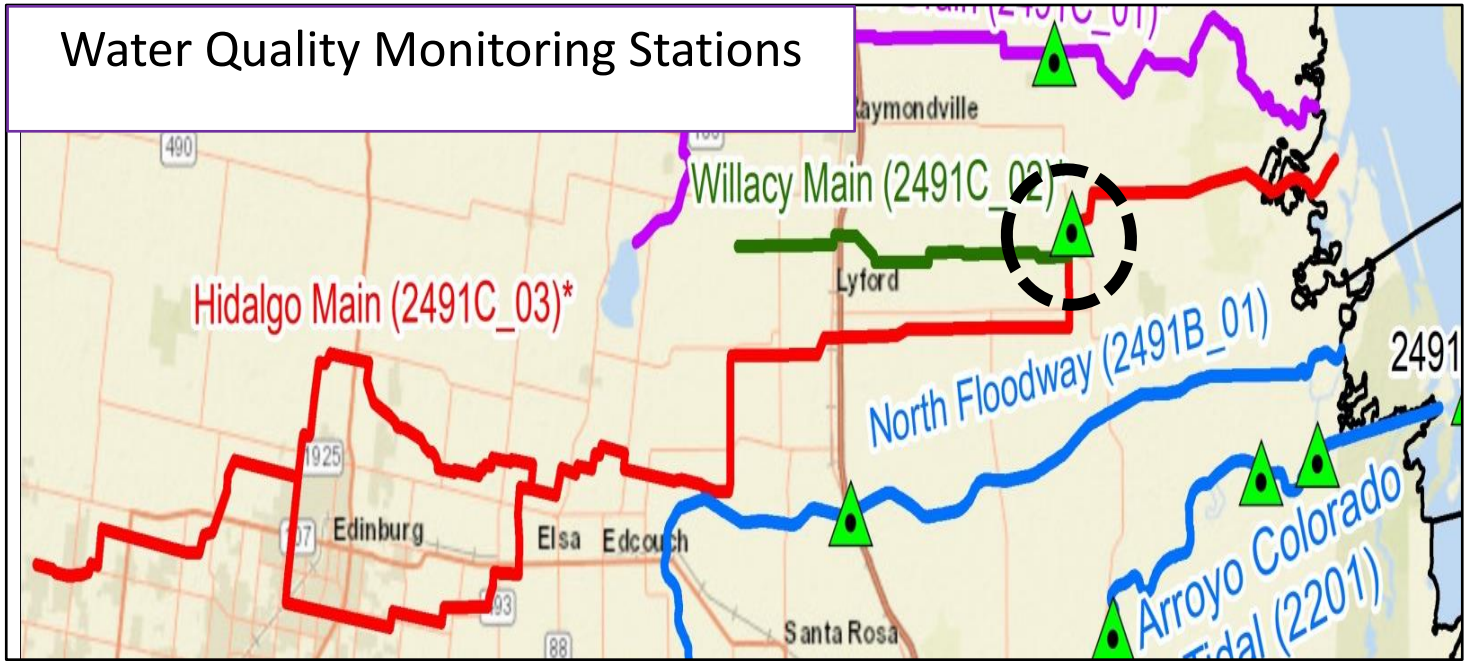
- The major sub-watersheds must be characterized to identify potential causes and sources of impairments.

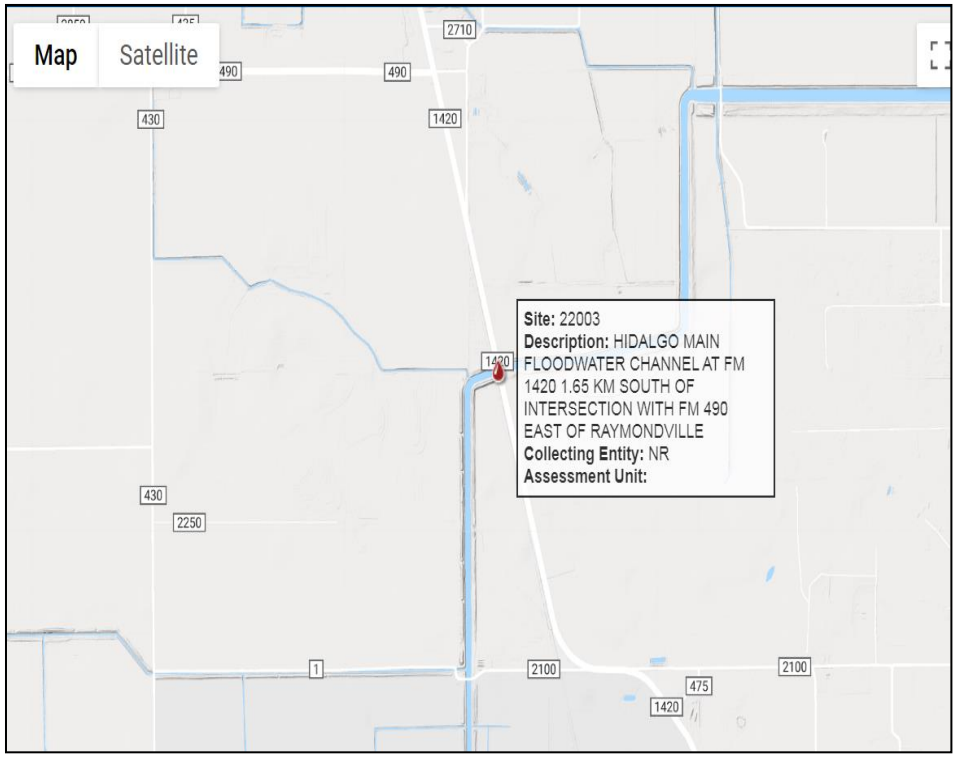
- This project will identify existing data and identify data gaps for characterization as well as identify a path forward by selecting an analytical method for estimating pollutant loads

Flow Monitoring Stations

16 Flow monitoring Hidalgo County Drainage District #1

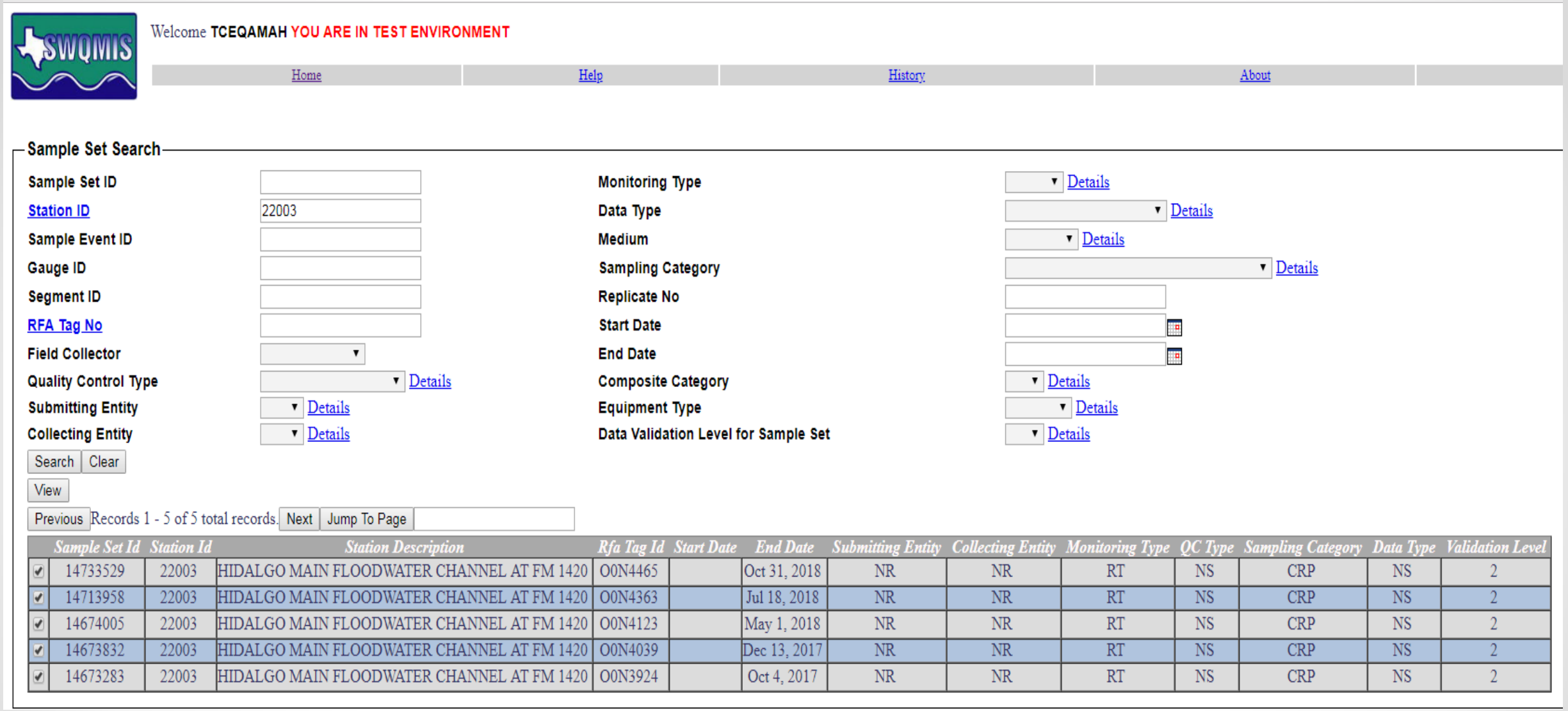
Water Quality Monitoring Stations





Only one TCEQ water quality monitoring station (ID 22003), new site started in 2017

Hidalgo Main floodwater channel at FM 1420 1.65 KM south of intersection with FM 490 East of Raymondville



- NR: Nueces River Authority
- CRP: Clean River Program
- RT: Routine Monitoring

Draft 2018 Texas Integrated Report

SegID: 2491 Laguna Madre
Laguna Madre

Impairment Description(s)	*Category*	*Year Segment First Listed*
bacteria (Recreation Use)	**5c**	**2010**
2491_02 Area adjacent to the Arroyo Colorado confluence		

Impairment Description(s)	*Category*	*Year Segment First Listed*
depressed dissolved oxygen	**5b**	**1999**
2491_01 Upper portion of bay north of the Arroyo Colorado confluence		
2491_02 Area adjacent to the Arroyo Colorado confluence		

Nutrient Pollution

- Nutrient pollution is one of America's most widespread, costly and challenging environmental problems, caused by excess nitrogen in the air and water
- Excess nutrients in watershed lead to a large growth of algae. Their carcasses settle and become oxygen demanding materials, resulting in DO depletion and water quality deterioration (eutrophication).
- Wastewater can be a significant source of nutrients especially P.
- The water quality monitoring in the Arroyo Colorado indicates high levels of nutrients and this may be the case for Hidalgo Main.
- Source: fertilizer, P-based detergent, food wastes, livestock wastes, etc

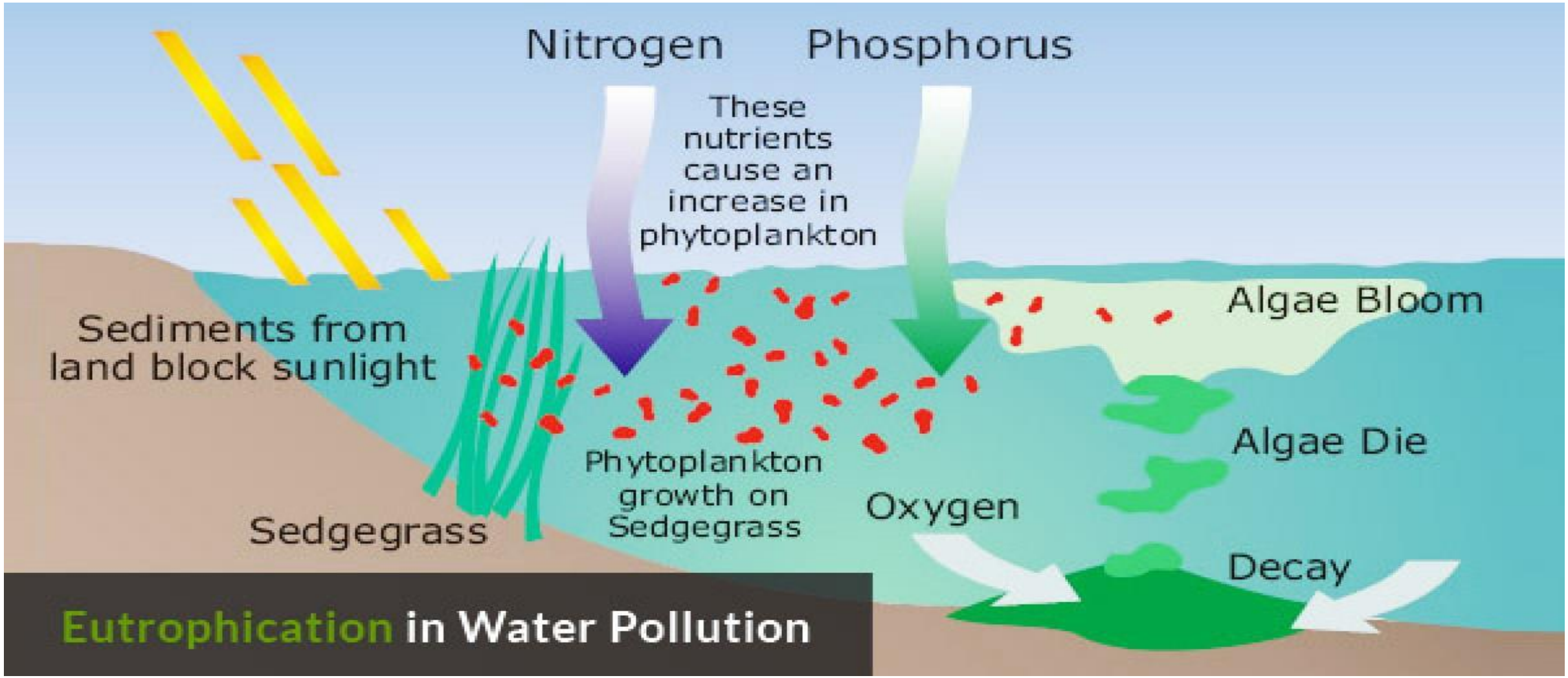
Nutrient Pollution

Eutrophication

- Excessive nutrients strongly affect the extent and severity of the hypoxic zone
  - Extremely low oxygen levels
  - Degraded water quality
  - Impaired marine life
  - 2013 Gulf of Mexico dead zone covers 15,120 Km^2

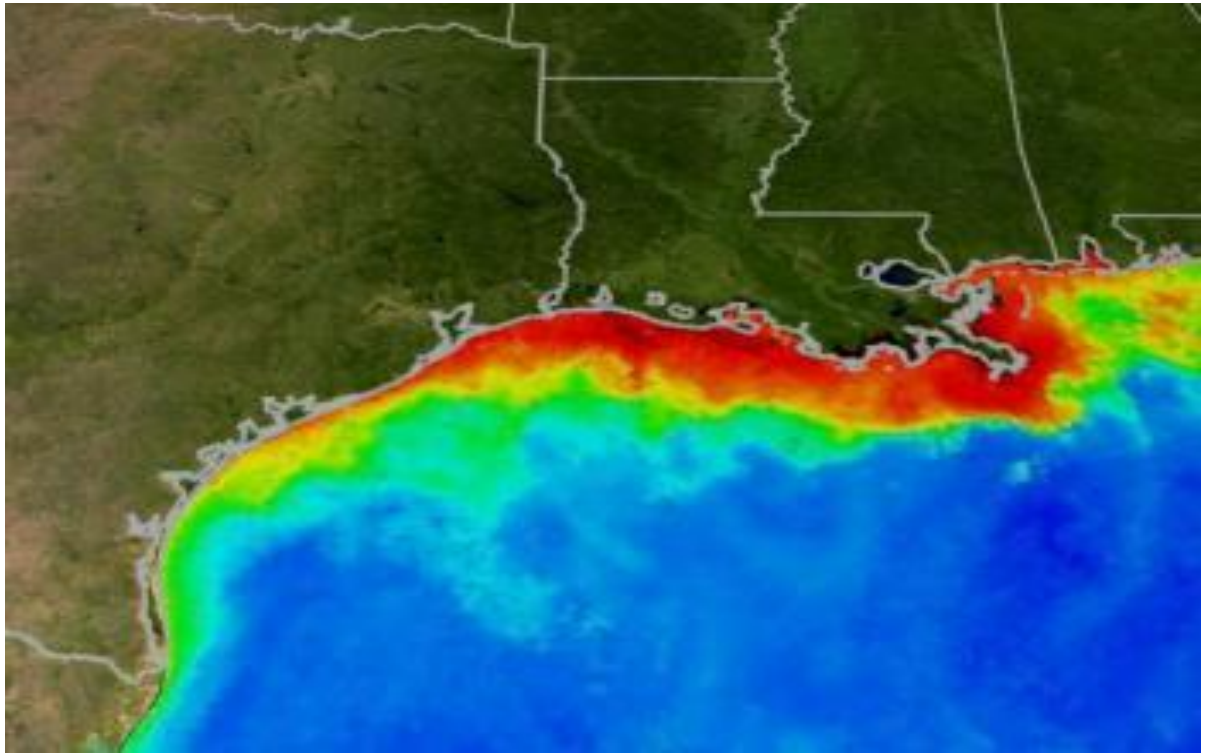
- Eutrophication symptoms: discoloration, unpleasant odors, algae scum, low oxygen levels, release of toxins and ill effects on fish life

Eutrophication



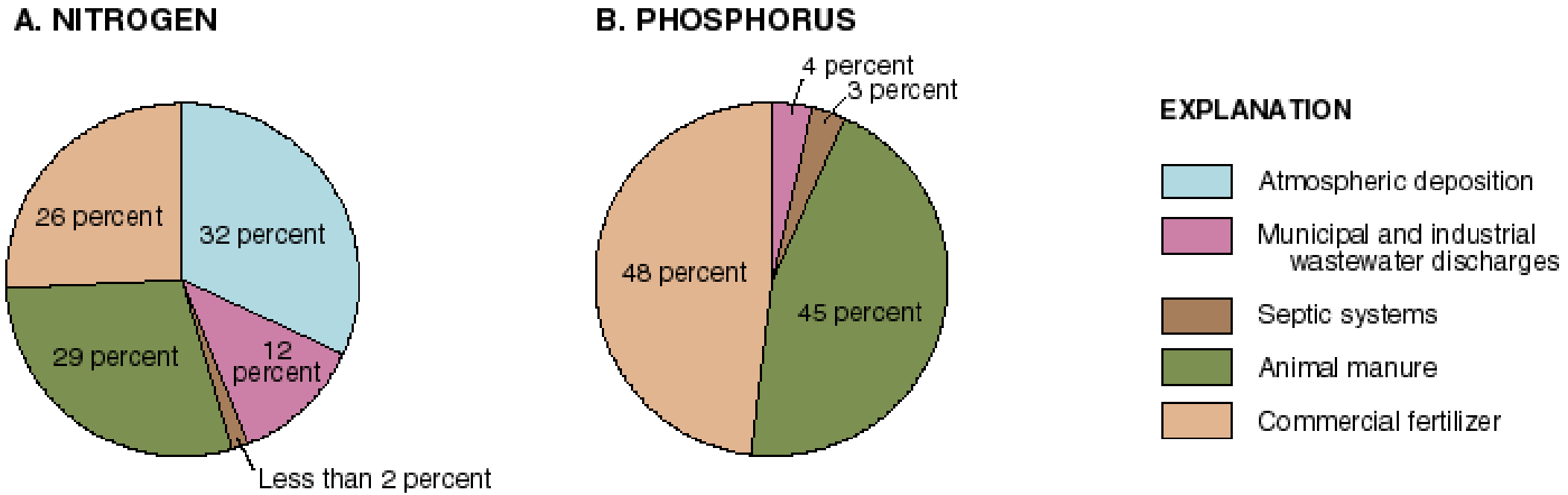
Eutrophication

Eutrophication in the Gulf of Mexico



https://www.youtube.com/watch?v=BqaxdKXO9yc

Inorganic Water Pollutants



https://pubs.usgs.gov/circ/circ1166/nawqa91.5.html

Task 2: Quality Assurance

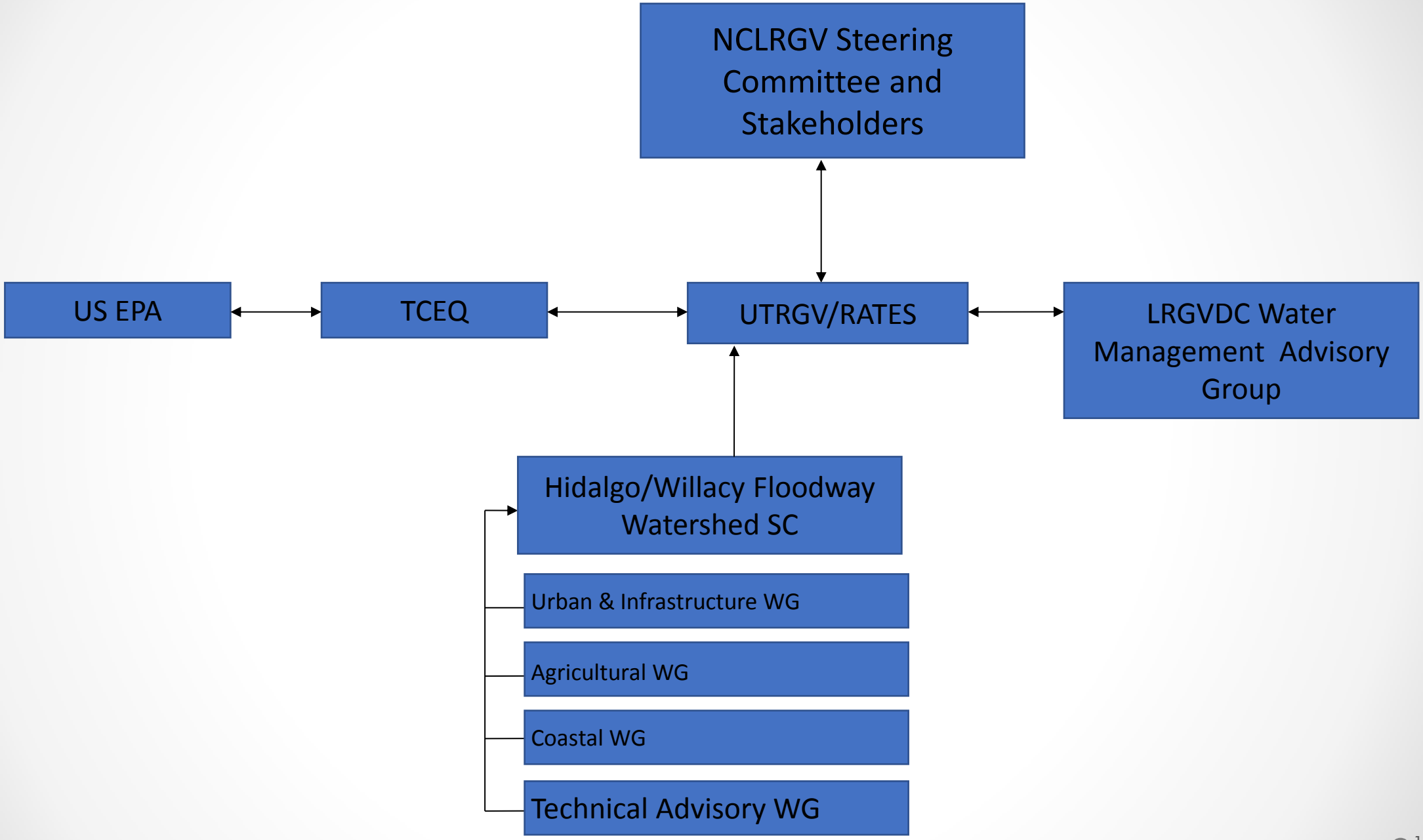
- Quality Assurance Project Plan
- Draft QAPP

Geospatial Data

GIS Data	Source
Roadways	Cities in each watershed
Local Drainage Network	City and County drainage network layers. HCDD Layers – Link, Pharr Layers – Link, Edinburg Layers – Link, Weslaco Layers – Link and Brownsville Layers – Link
Irrigation Canals	GIS layers available from Irrigation Districts and TAMU, TAMUK LRGV Maps – Link, HIDCC1 – Link
Land Use	Cities in each watershed (2016 National Land Cover data base as Land use)
Existing Urban BMP locations	Information of existing BMPs will be gathered from cities
Areas of drainage project locations	Areas of existing and future drainage projects will be obtained from cities and drainage districts.

Non-Geospatial Data

GIS Data	Source
Flow Data	Hidalgo, Cameron, Willacy Counties and Cities on each watershed
Drinking Water Data	Cities
Biological Assessments	Hidalgo, Cameron, Willacy Counties
Climatic Data	IBWC, NCEI, and NOAA. Rain gages near and within watershed.


NCLRGV Steering Committee and Stakeholders
US EPA
TCEQ
UTRGV/RATES
LRGVDC Water Management Advisory Group
Hidalgo/Willacy Floodway Watershed SC
Urban & Infrastructure WG
Agricultural WG
Coastal WG
Technical Advisory WG

Hidalgo/Willacy Floodway Watershed Protection Plan

Steering Committee:

1. Chair David Fuentes, Hidalgo County Commissioner
2. Vice Chair Eduardo Gonzalez, Willacy Commissioner
3. Marci Oveido, LRGVDC
4. Andrew Ernest, UTRGV
5. Melisa Gonzales, City of Alamo
6. Chris Fuller, Ph.D., RATES/RGV
7. Tushar Sinha, Ph.D., TAMUK
8. Ahmed Mahmoud, Ph.D., UTRGV
9. Jose Hinojosa, LRGV TPDES Stormwater Task Force
10. David Alaniz, City of La Villa
11. Javier Guerrero, RATES

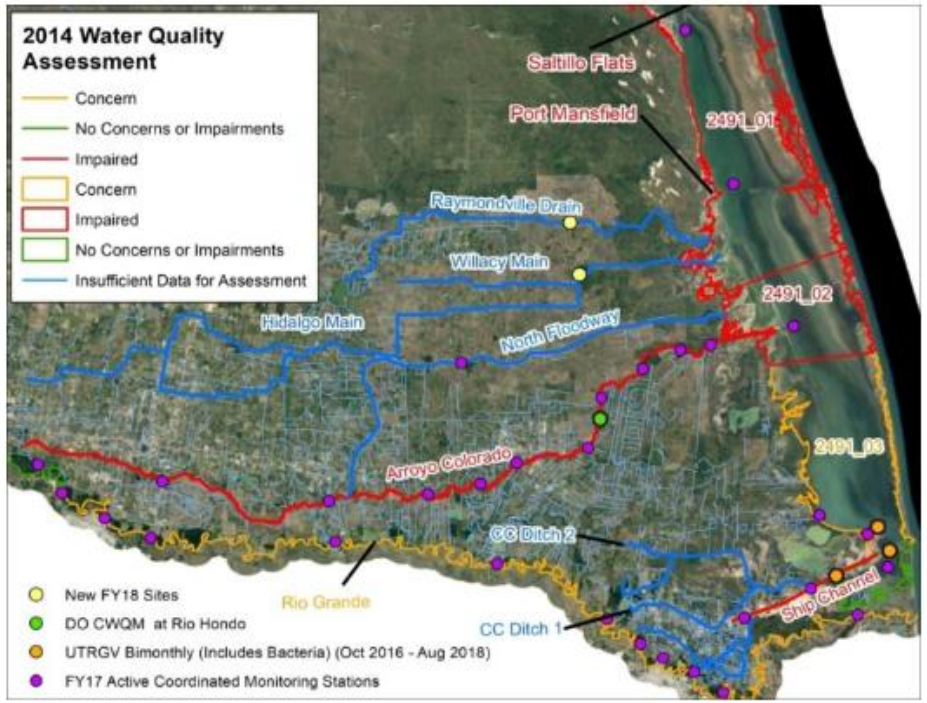
Subcommittees

1- Urban and Infrastructure Workgroup
2- Coastal Workgroup
3- Agricultural Workgroup
4- Technical Advisory Committee:

1. Andy Ernest, Ph.D., P.E., UTRGV
2. Chris Fuller, RATES/RGV
3. HCDD#1 – TBD
4. WCDD#1 – TBD
5. CCDD#1 - TBD

Project Website

CHARACTERIZATION OF NORTHERN AND CENTRAL RIO GRANDE VALLEY WATERSHEDS



Background Information

The Raymondville Drain and the Hidalgo Main flow into the Lower Laguna Madre Bay assessment unit (AU) 2491_01 which is impaired for low dissolved oxygen (DO). The North Floodway flows into the Lower Laguna Madre AU 2491_02 which is impaired for low DO and bacteria.

The project area is comprised of subwatersheds associated with the Raymondville Drain, the Hidalgo Floodway, and the IBWC pilot channel (IBWC North Floodway). These major waterways contribute freshwater and stormwater to the Laguna Madre. This project will begin the assessment of these subwatersheds. It is anticipated that these three distinct subwatersheds will need to be assessed, quantified, and identified as separate major watersheds in the Lower Rio Grande Valley.

Steering Committee and Workgroup Meetings

Date	Type of Meeting	Meeting Agenda	Notes	Presentation
02/26/2019	Steering Committee (USIBWC Floodway)	IBWC Feb 26 Agenda	USIBWC-SC-Minutes-022619	USIBWC SC meeting 02-26-2019
03/14/2019	Steering Committee (Raymondville Drain)	Rayondville Macrh 14 Agenda	RV-SC-Minutes-031419	Raymondville SC meeting 03-14-2019
03/25/2019	Steering Committee (Hidalgo/Willacy County Floodway)	Hidalgo Macrh 25 Agenda	HW-SC-Minutes-032619	Hidalgo SC meeting 03-25-2019

- https://rgvstormwater.org/tceq-319-characterization-of-northern-and-central-rio-grande-valley-watersheds/

Field Trip (09/09)

1- Santa Monica
2- El Sauz Ranch
3- Hidalgo/Willacy
4- La Panchitas

La Panchitas

Control Structure for storm waters from Hidalgo to Willacy County

3750 cfs

5 – 9 x 17 Boxes; 4 – 9 x 15 Gates

Diversion Channel from North Main Drain to IBWC North Floodway.


CAT

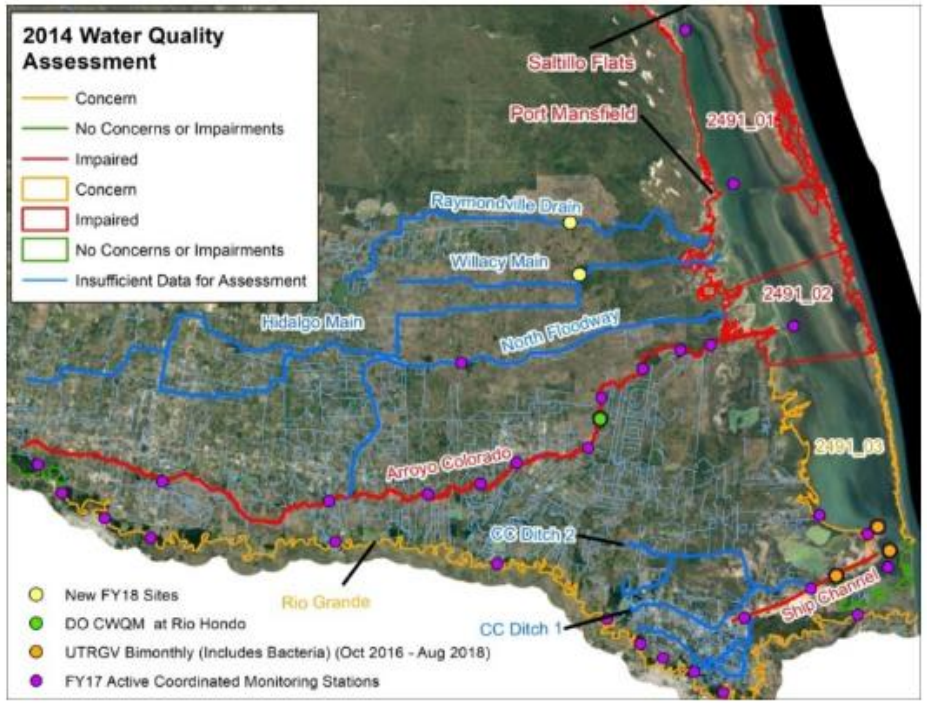
Questions?

- **Environmental Protection Agency Texas Commission on Environmental Quality (TCEQ) Clean Water Act (CWA) Section 319(h) Nonpoint Source (NPS) Grant Program through UTRGV**
- **TCEQ Project Manager** : Tim Cawthon
- **PI :** Andy Ernest, Ph.D., P.E., BCEE, D. WRE
- **Watershed Coordinator**: Ahmed Mahmoud, Ph.D.

Logo Discussion

Website Discussion

CHARACTERIZATION OF NORTHERN AND CENTRAL RIO GRANDE VALLEY WATERSHEDS



Background Information

The Raymondville Drain and the Hidalgo Main flow into the Lower Laguna Madre Bay assessment unit (AU) 2491_01 which is impaired for low dissolved oxygen (DO). The North Floodway flows into the Lower Laguna Madre AU 2491_02 which is impaired for low DO and bacteria.

The project area is comprised of subwatersheds associated with the Raymondville Drain, the Hidalgo Floodway, and the IBWC pilot channel (IBWC North Floodway). These major waterways contribute freshwater and stormwater to the Laguna Madre. This project will begin the assessment of these subwatersheds. It is anticipated that these three distinct subwatersheds will need to be assessed, quantified, and identified as separate major watersheds in the Lower Rio Grande Valley.

Steering Committee and Workgroup Meetings

Date	Type of Meeting	Meeting Agenda	Notes	Presentation
02/26/2019	Steering Committee (USIBWC Floodway)	IBWC Feb 26 Agenda	USIBWC-SC-Minutes-022619	USIBWC SC meeting 02-26-2019
03/14/2019	Steering Committee (Raymondville Drain)	Rayondville Macrh 14 Agenda	RV-SC-Minutes-031419	Raymondville SC meeting 03-14-2019
03/25/2019	Steering Committee (Hidalgo/Willacy County Floodway)	Hidalgo Macrh 25 Agenda	HW-SC-Minutes-032619	Hidalgo SC meeting 03-25-2019

- https://rgvstormwater.org/tceq-319-characterization-of-northern-and-central-rio-grande-valley-watersheds/

Listserv

Plan Steering Committee Members:

1. Chair David Fuentes, Hidalgo County Commissioner (david.fuentes@co.hidalgo.tx.us)
2. Vice Chair Eduardo Gonzalez, Willacy Commissioner (eduardogonzales0758@gmail.com)
3. Marci Oveido, LRGVDC (moviedo@lrgvdc911.org)
4. Andrew Ernest, UTRGV (andrew.ernest@utrgv.edu)
5. Melisa Gonzales, City of Alamo (mgonzales@alamotexas.org)
6. Chris Fuller, Ph.D., RATES/RGV (cfuller@ratesresearch.org)
7. Tushar Sinha, Ph.D., TAMUK (tushar.sinha@tamuk.edu)
8. Ahmed Mahmoud, Ph.D., UTRGV (ahmed.mahmoud@utrgv.edu)
9. Jose Hinojosa, LRGV TPDES Stormwater Task Force (josehinojosa290@gmail.com)
10. David Alaniz, City of La Villa
11. Javier Guerrero, RATES (jguerrero@ratesresearch.org)

In the Invitation but not in the committee

- abdoul.oubeidillah@utrgv.edu
- roxanne.noyola@co.hidalgo.tx.us
- roseanna.ramirez@co.willacy.tx.us
- saul.garcia@co.hidalgo.tx.us
- rramirez@tsswcb.texas.gov
- lsaenz@lrgvdc911.org
- kim.jones@tamuk.edu
- roxanne.gonzalez@co.hidalgo.tx.us
- jungseok.ho@utrgv.edu
- saul133@hotmail.com
- vramos@lrgvdc911.org

Geospatial Data

GIS Data	Source
LIDAR Data	USGS Willacy and Hidalgo https://data.tnris.org/collection/6a825941-a80b-4a61-a2b2-1da205f2f28b IBWC Cameron County https://data.tnris.org/collection/27f30e8a-115a-4ad5-ace1-5e2aa4a53a70
Subwatersheds	Hidalgo Countywide Flood Map Modernization Project Hydrology Analysis TSDN Report (Hidalgo County and FEMA)
Hydrography	National Hydrography Dataset (NHD)Pre-staged Subregions (https://tnris.org/stratmap/hydrography/)
Local Drainage Network	City and County drainage network layers. HCDD Layers – Link, Pharr Layers – Link, Edinburg Layers – Link, Weslaco Layers – Link and Brownsville Layers – Link
Irrigation Canals	GIS layers available from Irrigation Districts and TAMU, TAMUK LRGV Maps – Link, HIDCC1 – Link
IBWC Gauge Locations	IBWC and TCEQ provided GIS layer to UTRGV
Land Use/Land Cover	National Land Cover Database 2016 (https://www.mrlc.gov/)
Land Use	Cities in each watershed
Soil Map Unit Boundaries and Properties	NRCS SSURGO databases <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
Geology Units	USGS Geologic Atlas of Texas/ Environmental Geologic Atlas of the Texas Coastal Zone--Brownsville-Harlingen Area (Texas Bureau of Economic Geology)
Urbanized Areas (2010)	U.S. Census Bureau TIGER/Line® Shapefiles http://www.census.gov/cgi-bin/geo/shapefiles2010/layers.cgi <http://cfpub.epa.gov/npdes/stormwater/urbanmaps.cfm>

Geospatial Data

GIS Data	Source
TCEQ Permitted Wastewater Outfalls	TCEQ GIS Site Layers Download Page <http://www.tceq.texas.gov/gis/download-tceq-gis-data>
TCEQ Assessment Units	TCEQ GIS Hydrology Layers <http://www.tceq.texas.gov/gis/download-tceq-gis-data>
Water Rights Diversion Points	TCEQ Water Rights Diversion Points <http://www.tceq.texas.gov/gis/download-tceq-gis-data>
Water and sewer service areas	TCEQ GIS Regulatory/ Administrative Boundaries, Water & Sewer Certificates of Convenience and Necessity Service Areas, <www.tceq.texas.gov/gis/boundary.html>
Census Data	U.S. Census https://www.census.gov/cgi-bin/geo/shapefiles/index.php
Census Urban Areas	U.S. Censushttps://www.census.gov/cgi-bin/geo/shapefiles/index.php
Roadways	TxDOT
Roadways	Cities in each watershed
Wells	TWDB Well locations http://www.twdb.texas.gov/mapping/gisdata.asp
TCEQ Surface Water Quality Monitoring Stations	TCEQ GIS Site Layers Download Page <http://www.tceq.texas.gov/gis/download-tceq-gis-data>

Geospatial Data

GIS Data	Source
Address Points	Hidalgo, Willacy, and Cameron Counties available at https://tnris.org/stratmap/address-points/
Parcels	Hidalgo, Willacy, and Cameron Counties available at TNRIS https://tnris.org/stratmap/land-parcels/
Sewer Service Areas	1- Coastal Zone – Texas AgriLife Extension, 2- Hidalgo and Cameron Counties – TWRI
OSSF Points	1- Coastal Zone – Texas AgriLife Extension, 2-Hidalgo and Cameron Counties –TWRI
PAD Database	Protected Areas database Department of the Interior <Link>
Seagrass	TPWD https://tpwd.texas.gov/gis/
Wildlife Management Areas	TPWD https://tpwd.texas.gov/gis/
Water Districts	TCEQ https://www.tceq.texas.gov/gis/download-tceq-gis-data
Colonias	Rural Community Assistance Partnership Link
Coastal Zone Boundary	General Land Office http://www.glo.texas.gov/land/land-management/gis/
Existing Urban BMP locations	Information of existing BMPs will be gathered from cities
Areas of drainage project locations	Areas of existing and future drainage projects will be obtained from cities and drainage districts.