Raymondville Drain Watershed Partnership Steering Committee

March 24, 2021

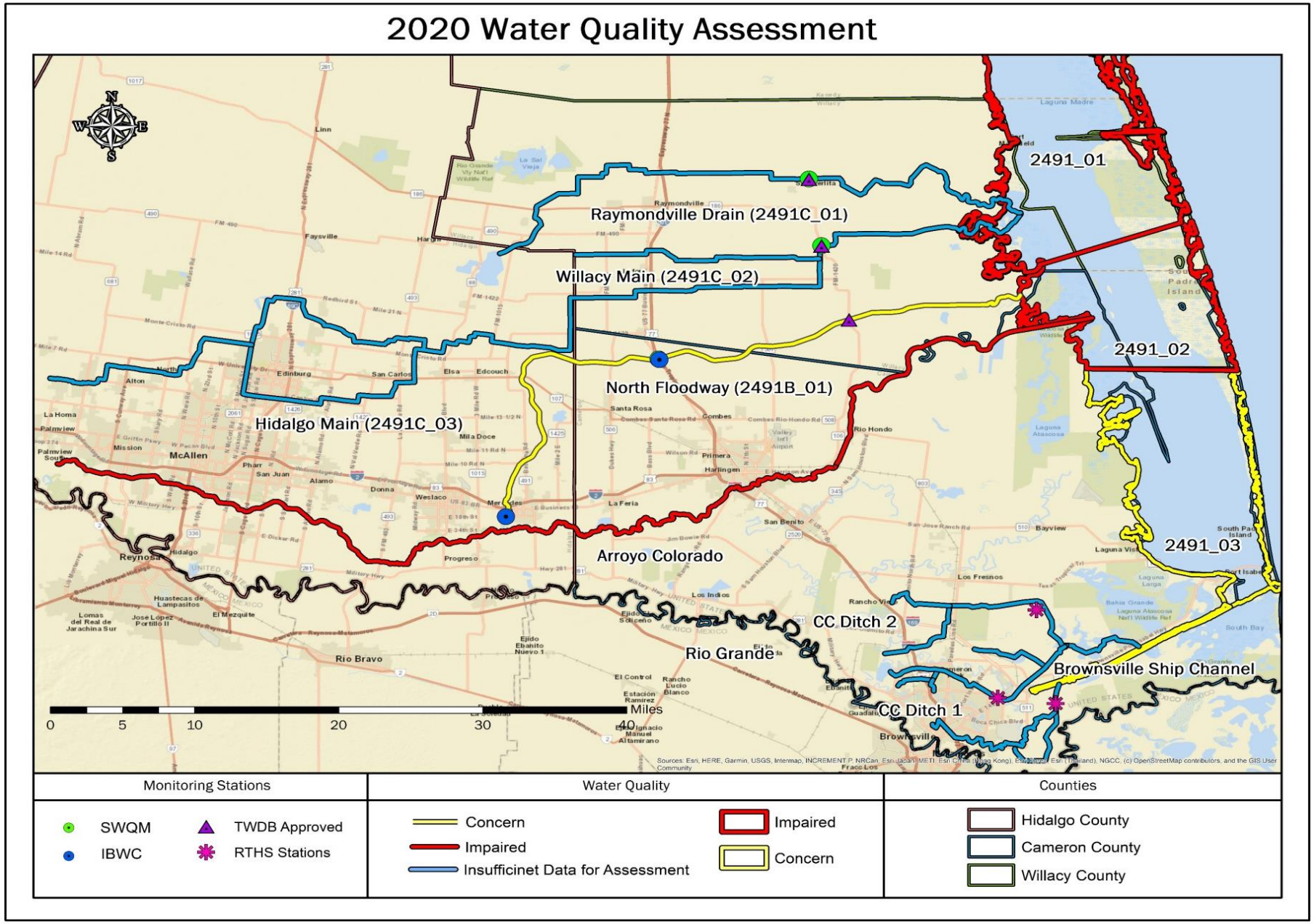
Agenda

- Welcome and Introductions
- Project Status (Mahmoud)
- North and Central Watersheds Data (Linda)
- Texas Water Development Board Freshwater Flows Project Update (Fuller)
- TWDB Flood Infrastructure Fund Projects Update (Ernest)
- FY2022-319 Proposals – Discussion (RATES and Task Force lead)
- Adjourn

Welcome & Introductions

Project Status

LRGV Waterways



Raymondville Darin (2020 Texas Integrated Report)

SEGID: 2491C **Drainage ditches flowing into Lower Laguna Madre**

AUID: 2491C_01 Raymondville Drain flowing into Lower Laguna Madre

Aquatic Life Use

Method	Parameter	Period of Record	Criteria	Data Assessed #	Data Assessed Value	Exceedances #	Exceedances Value	Data Qual	LOS	CF	Int LOS	TCEQ Cause	Cat
Dissolved Oxygen grab minimum	Dissolved Oxygen Grab	12/01/11 - 11/30/18	2	5		0		TR	NC	☐	NA		
Dissolved Oxygen grab screening level	Dissolved Oxygen Grab	12/01/11 - 11/30/18	3	5		0		TR	NC	☐	NA		

Recreation Use

Method	Parameter	Period of Record	Criteria	Data Assessed #	Data Assessed Value	Exceedances #	Exceedances Value	Data Qual	LOS	CF	Int LOS	TCEQ Cause	Cat
Bacteria Geomean	E. coli	12/01/11 - 11/30/18	126	5	65.12	0		TR	NA	☐	NA		

General Use

Method	Parameter	Period of Record	Criteria	Data Assessed #	Data Assessed Value	Exceedances #	Exceedances Value	Data Qual	LOS	CF	Int LOS	TCEQ Cause	Cat
Nutrient Screening Levels	Ammonia	12/01/11 - 11/30/18	0.33	5		0		TR	NC	☐	NA		
Nutrient Screening Levels	Chlorophyll-a	12/01/11 - 11/30/18	14.10	5		4	67.73	TR	CS	☐	NA		
Nutrient Screening Levels	Nitrate	12/01/11 - 11/30/18	1.95	5		4	4.30	TR	CS	☐	NA		
Nutrient Screening Levels	Total Phosphorus	12/01/11 - 11/30/18	0.69	5		3	0.78	TR	CS	☐	NA		

EPA's 9-Elements

- **A- Identify causes and sources of pollution**
- **B - Estimate pollutant loading into the watershed and the expected load reductions**
- **C - Describe management measures that will achieve load reductions and targeted critical areas**
- **D - Estimate amounts of technical and financial assistance and the relevant authorities needed to implement the plan**
- **E - Develop an information/education component**
- F - Develop a project schedule
- G - Describe the interim, measurable milestones
- H - Identify indicators to measure progress
- I - Develop a monitoring component

Project Goal

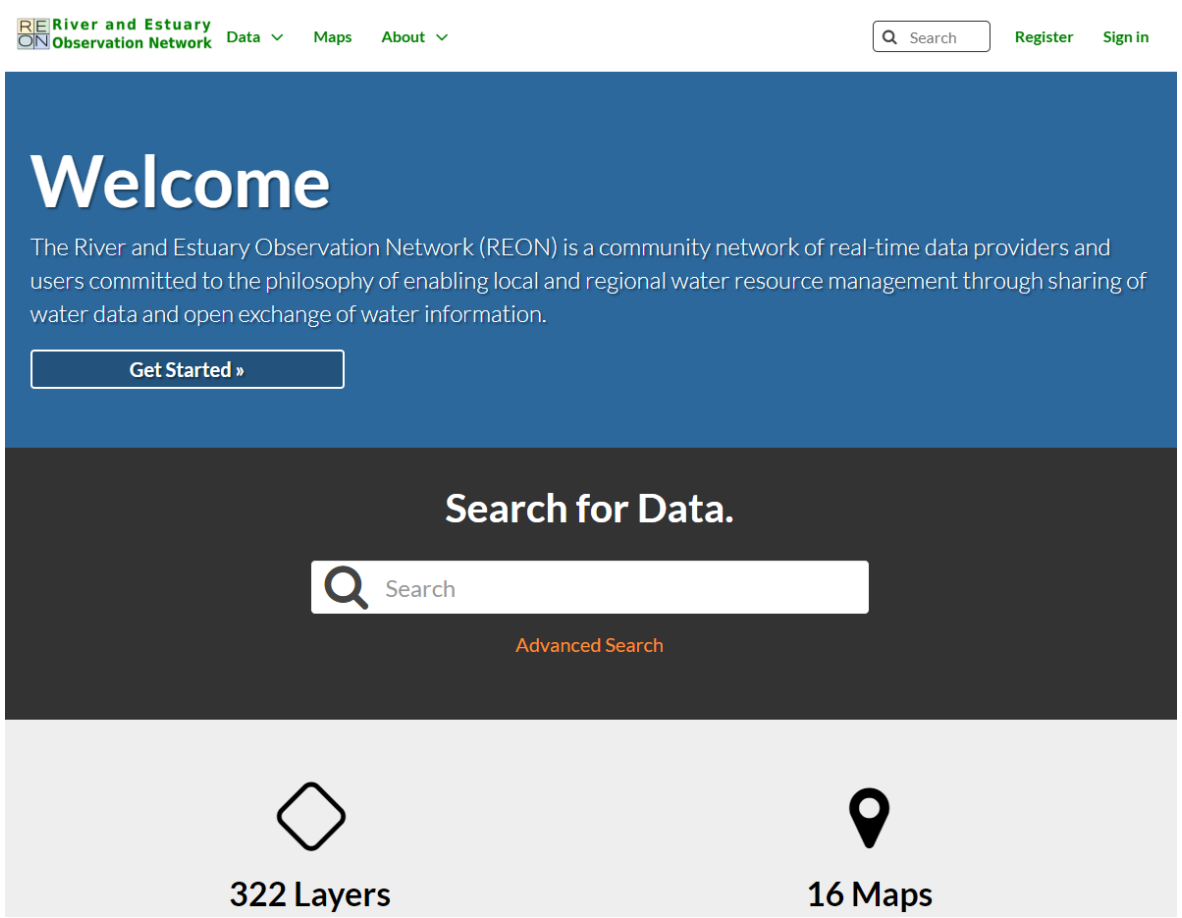
- Partial development of Element A and initiation of Element E of EPA's Nine Elements for WBPs found in the Handbook for Developing Watershed Plans to Restore and Protect our Waters.
  - Completion of Watershed Characterization – Data Evaluation Report and approval from TCEQ PM

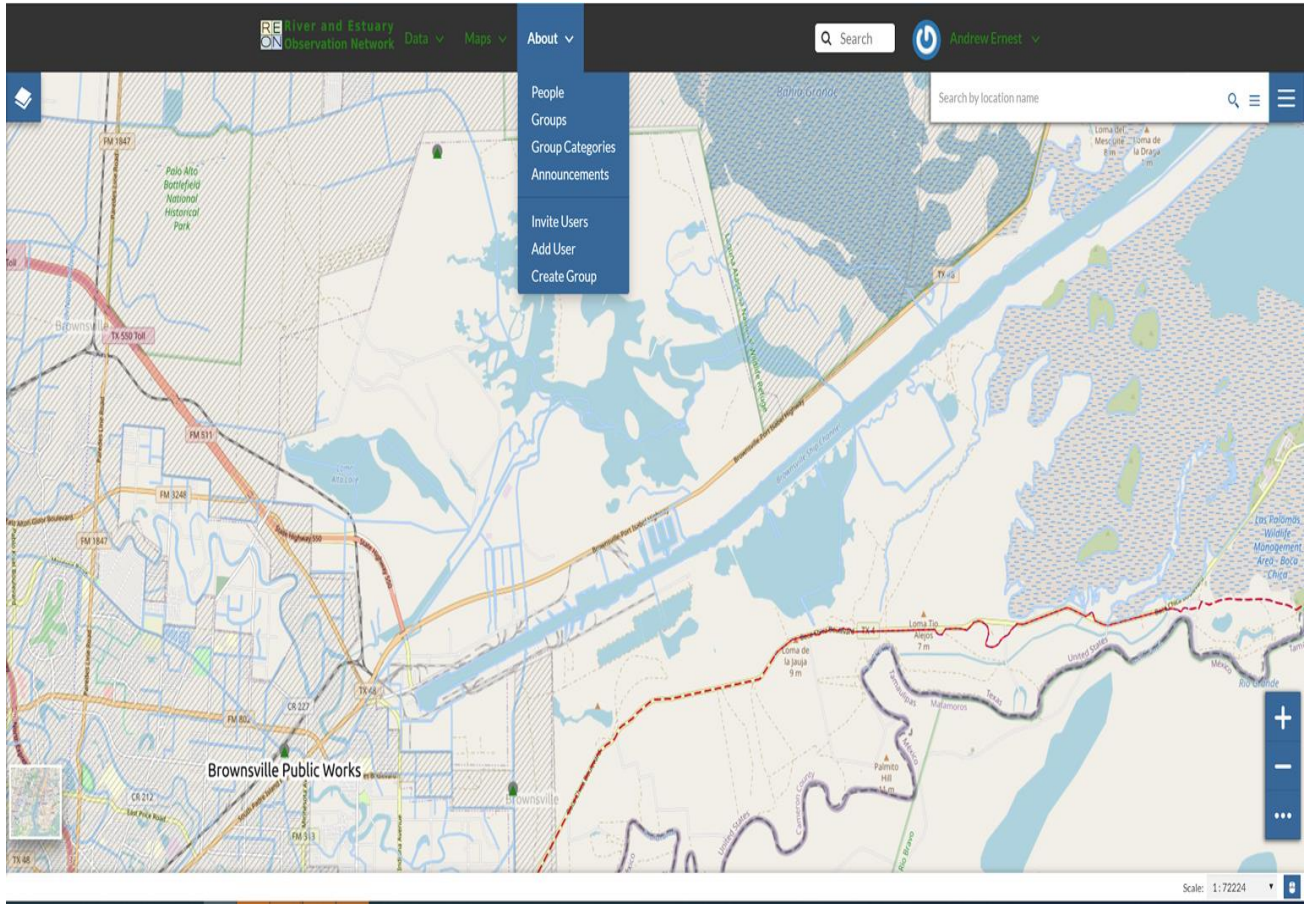
- Engage stakeholders to provide input for the development of a Strategic Plan moving forward based on information presented from the Watershed Characterization.
  - Formation of Stakeholders workgroups.
  - List of next steps for watershed-based planning in the Partnership Coordination Report.

NC Project Timeline

- Start: 09/01/2018 ---- End: 08/31/2022
- Public Participation Plan (Approved 02/19)
- Quality Assurance Project Plan (Approved 08/19)
- Summary of Existing Data and Information (Approved 06/20)
- Interim Existing Data and Information Analysis Report (Approved 02/2021)
- Final Report (To be submitted 08/01/2022)

Database Establishment





Steering Committee Meetings

Date	
02/26/2019	USIBWC North Floodway
03/14/2019	Raymondville Drain
03/25/2019	Hidalgo/Willacy Main Drain
09/11/2019	USIBWC North Floodway
09/25/2019	Hidalgo/Willacy Main Drain
11/06/2019	Raymondville Drain
03/24/2021	Raymondville Drain

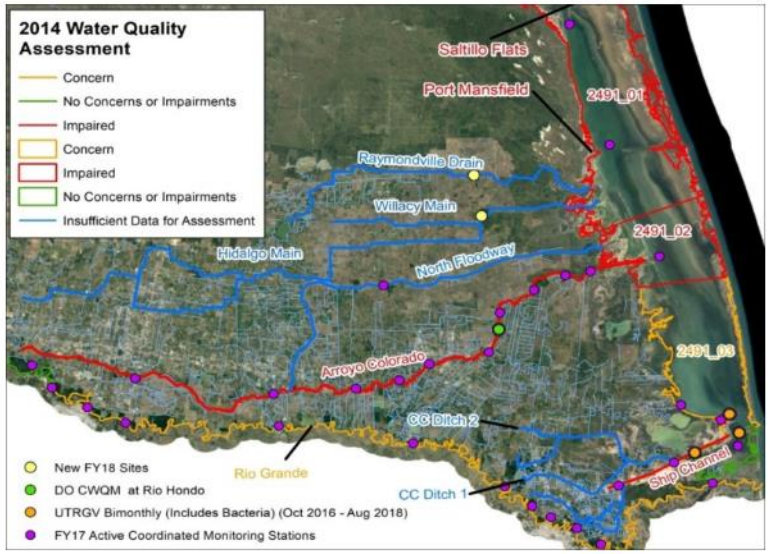
Field Trips

Hidalgo/ Willacy Main Field Trip (09/09/19)

USIBWC North Floodway Field Trip (09/26/19)

Webpage

CHARACTERIZATION OF NORTHERN AND CENTRAL RIO GRANDE VALLEY WATERSHEDS



The Raymondville Drain collects stormwater runoff and return flows from subwatershed with predominant agriculture activity. The North Floodway pilot channel constantly drains WWTP effluent and during large storm events, collect excess runoff from urbanized areas of Hidalgo County and agriculture land in Cameron and Willacy County. The Hidalgo Main Drain carries urban stormwater runoff from central and northern Hidalgo County, and agricultural runoff from northeast Hidalgo County and Willacy County.

Background Information

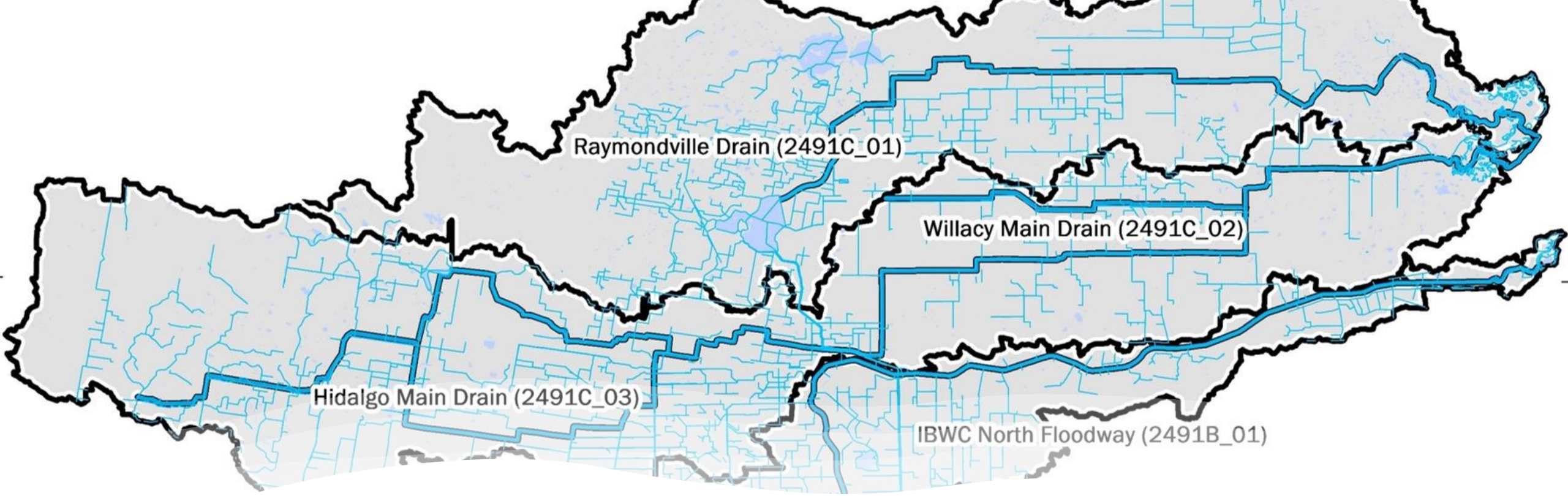
The Raymondville Drain and the Hidalgo Main flow into the Lower Laguna Madre Bay assessment unit (AU) 2491_01 which is impaired for low dissolved oxygen (DO). The North Floodway flows into the Lower Laguna Madre AU 2491_02 which is impaired for low DO and bacteria.

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-032519	Hidalgo SC meeting 03-25-2019
09/11/2019	Steering Committee (USIBWC)	IBWC September 11 Agenda	USIBWC-SC-Minutes-091119	USIBWC SC meeting 09-11-2019
09/25/2019	Steering Committee (Hidalgo /Willacy County Floodway)	Hidalgo September 25 Agenda	HW-SC-Minutes-092519	Hidalgo SC meeting 09-25-2019 1 Hidalgo SC meeting 09-25-2019 2
11/06/2019	Steering Committee (Raymondville Drainage)	Raymondville November 6 Agenda	RV-SC-Minutes-110619	Raymondville Drainage SC meeting 11-06-2019 1

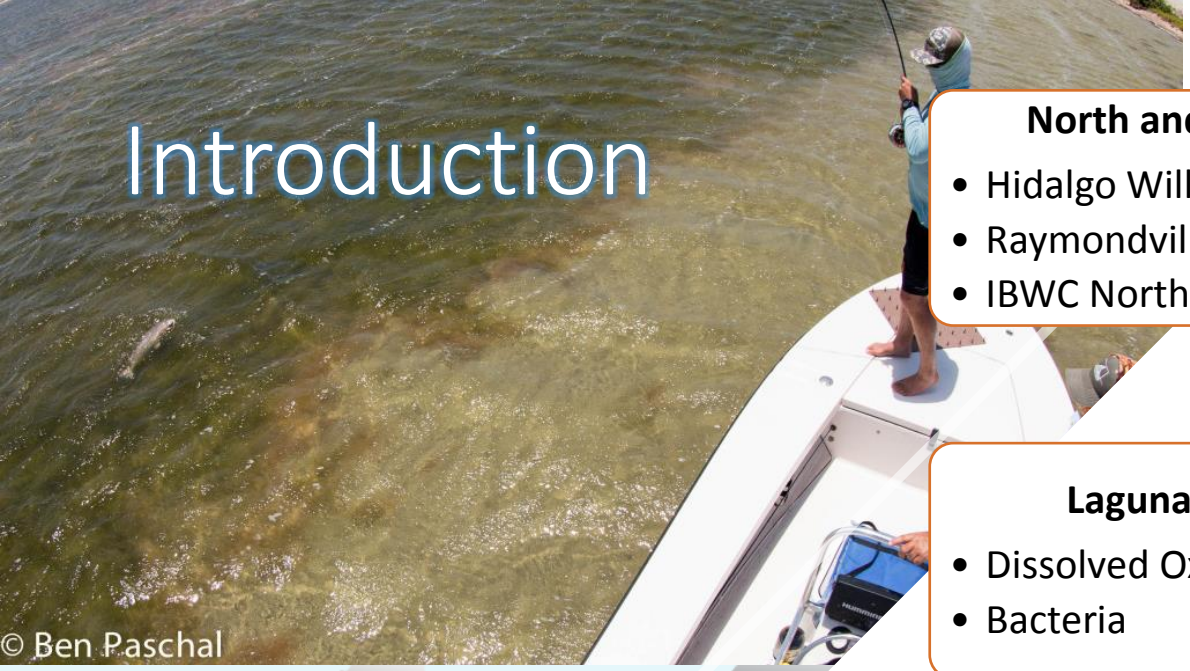
https://rgvstormwater.org/tceq-319-characterization-of-northern-and-central-rio-grande-valley-watersheds/



Development of Cyberinfrastruture for Assessment of the Lower Rio Grande Valley North and Central Watersheds Characteristics

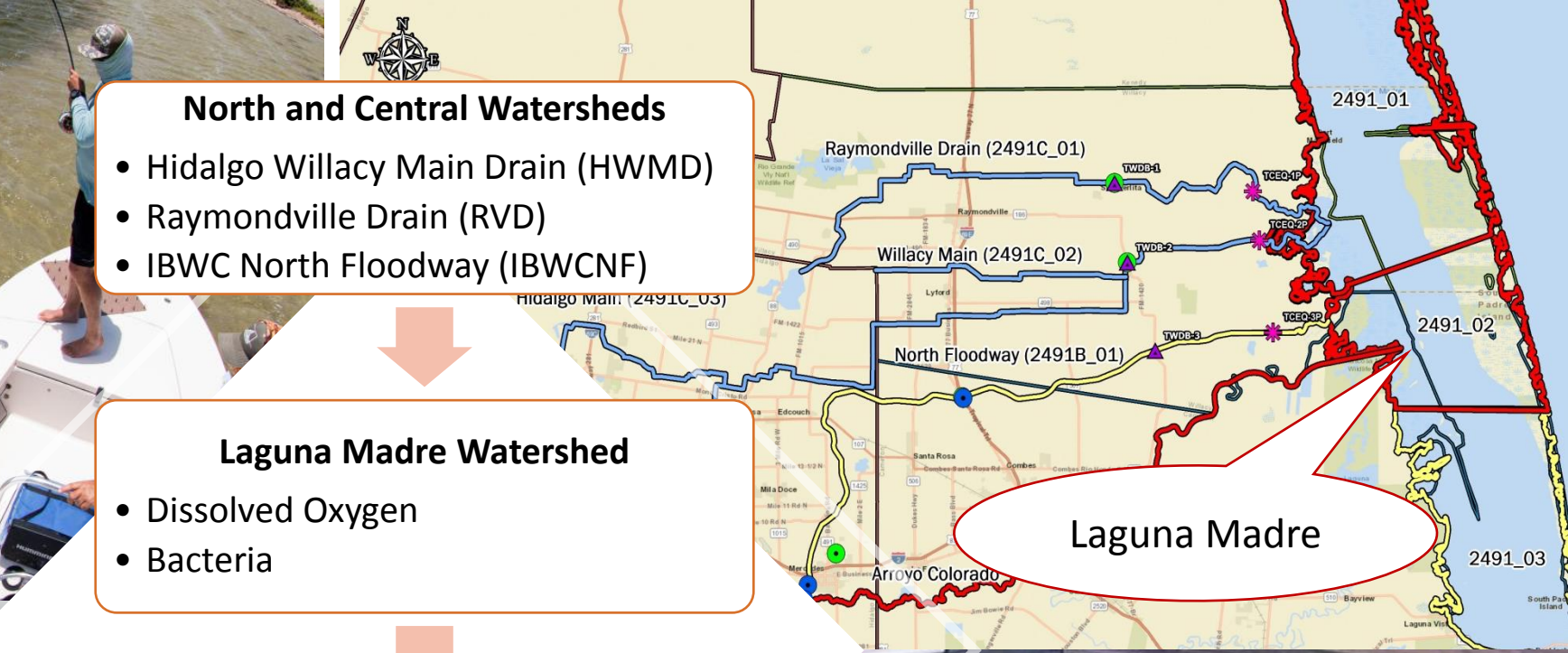
Linda Navarro

Introduction



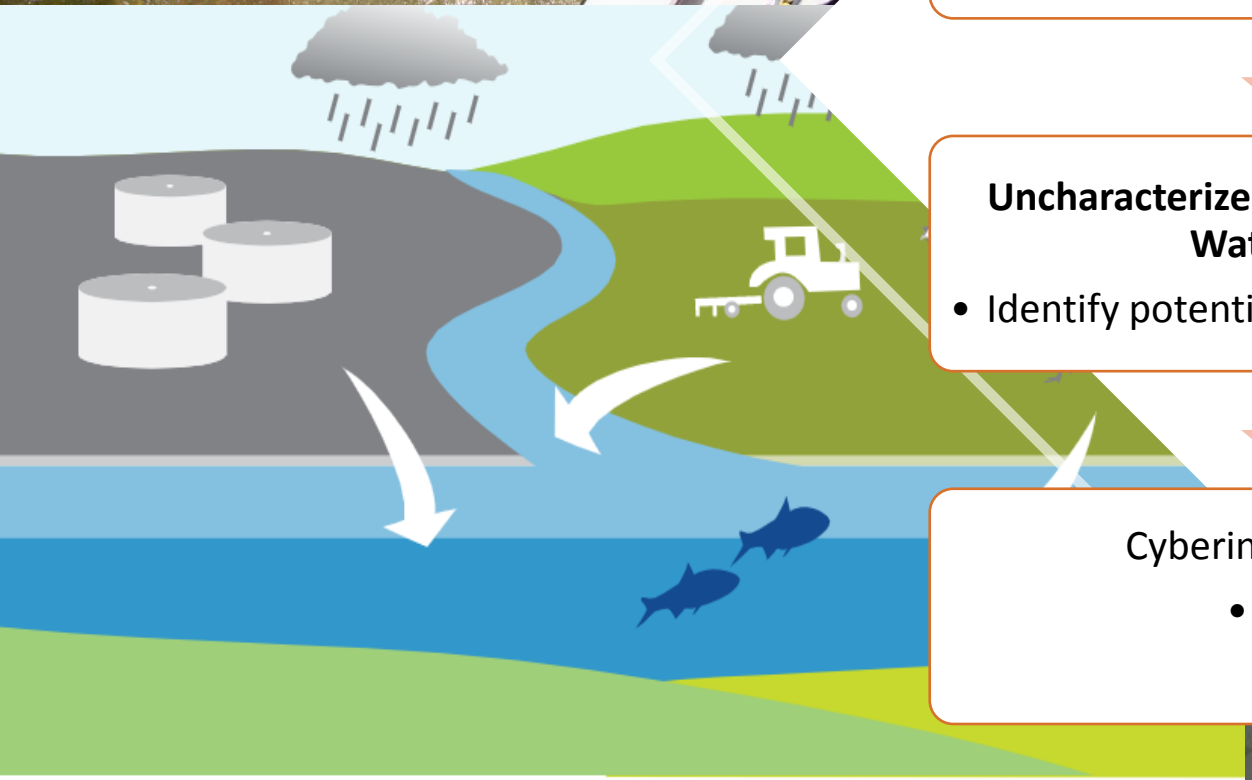
North and Central Watersheds

- Hidalgo Willacy Main Drain (HWMD)
- Raymondville Drain (RVD)
- IBWC North Floodway (IBWCNF)



Laguna Madre Watershed

- Dissolved Oxygen
- Bacteria



Uncharacterized North and Central Watersheds

- Identify potential sources of pollution

Cyberinfrastructure

- REON

Background

Cyberinfrastructure

- Yu et al., (2021) observed that not only did the use of technical infrastructure increase the widespread access to data; the available computing power also made it possible for the researchers to analyze large amounts of data, over longer time spans and a greater range of locations.
- Gutenson et al., (2020) stated that the cyberinfrastructure secures data and delivers interpreted information via a sequence of web services distinct stakeholders.
  - REON.cc now serves as a cyber-collaboratory platform for engaging stakeholders with an interest in data and information for a certain location

Watershed Delineation

- Strager et al., (2010) conducted a hydrological analysis with watershed GIS-based applications to assist both technical and non-technical users for decision-making.
- Amatya et al., (2013) highlighted the importance of high resolution in data resources to obtained accurate results in watershed drainage areas.

Sources of Pollution

- (EPA, n.d.-b) reports indicated that more than 40 percent of all impaired waters were affected solely by nonpoint sources, while only 10 percent of impairments were caused by point source discharges
- Hernandez & Uddameri, (2013);Black&Veatch, (2016) urbanization has led to increased water transfers from agriculture to urban uses.

Water Quality

- In the US, 70% of rivers and streams are not assessed (EPA 2017). 53% that are assessed are considered impaired.
- Abrams (2012) stated that fecal bacteria usually comes from stormwater discharges
- (TCEQ, 2006a) Improper wastewater management practices have caused severe water quality problems regarding dissolved oxygen, bacteria, and algae

Objectives

- Laguna Madre Watershed
- Cyberinfrastructure
- NC Watershed Delineation
- Sources of Pollution
- Water Quality Data
- Flow Data

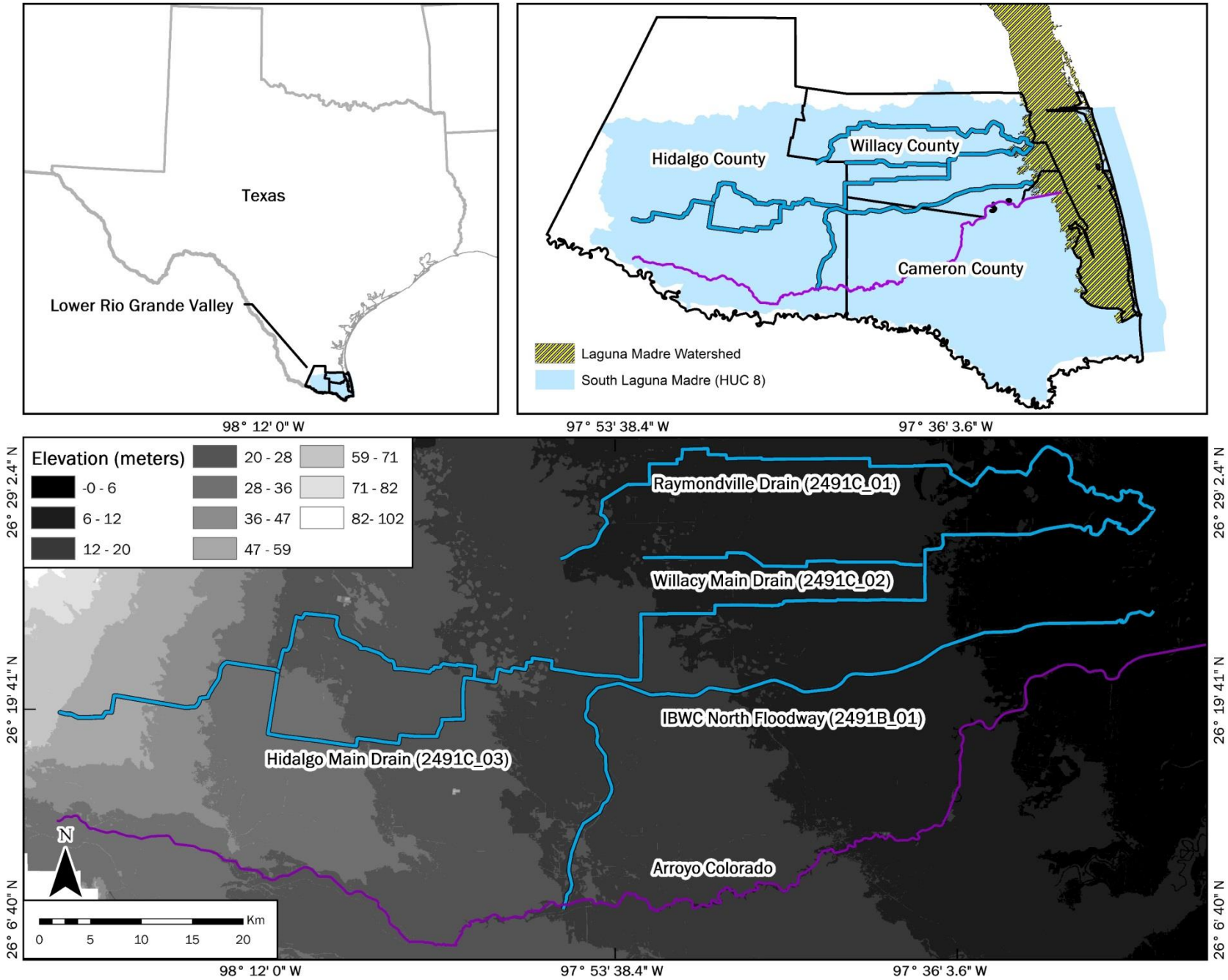


Figure 1: Location of the North and Central Watersheds

Study Area

- **LRGV Region**: Hidalgo, Willacy, and Cameron Counties
- The waterways area generally slopes southeast
- Flat elevation from 102 to 0 meters
- Clay soils: Low permeability
- Proximity to the Arroyo Colorado

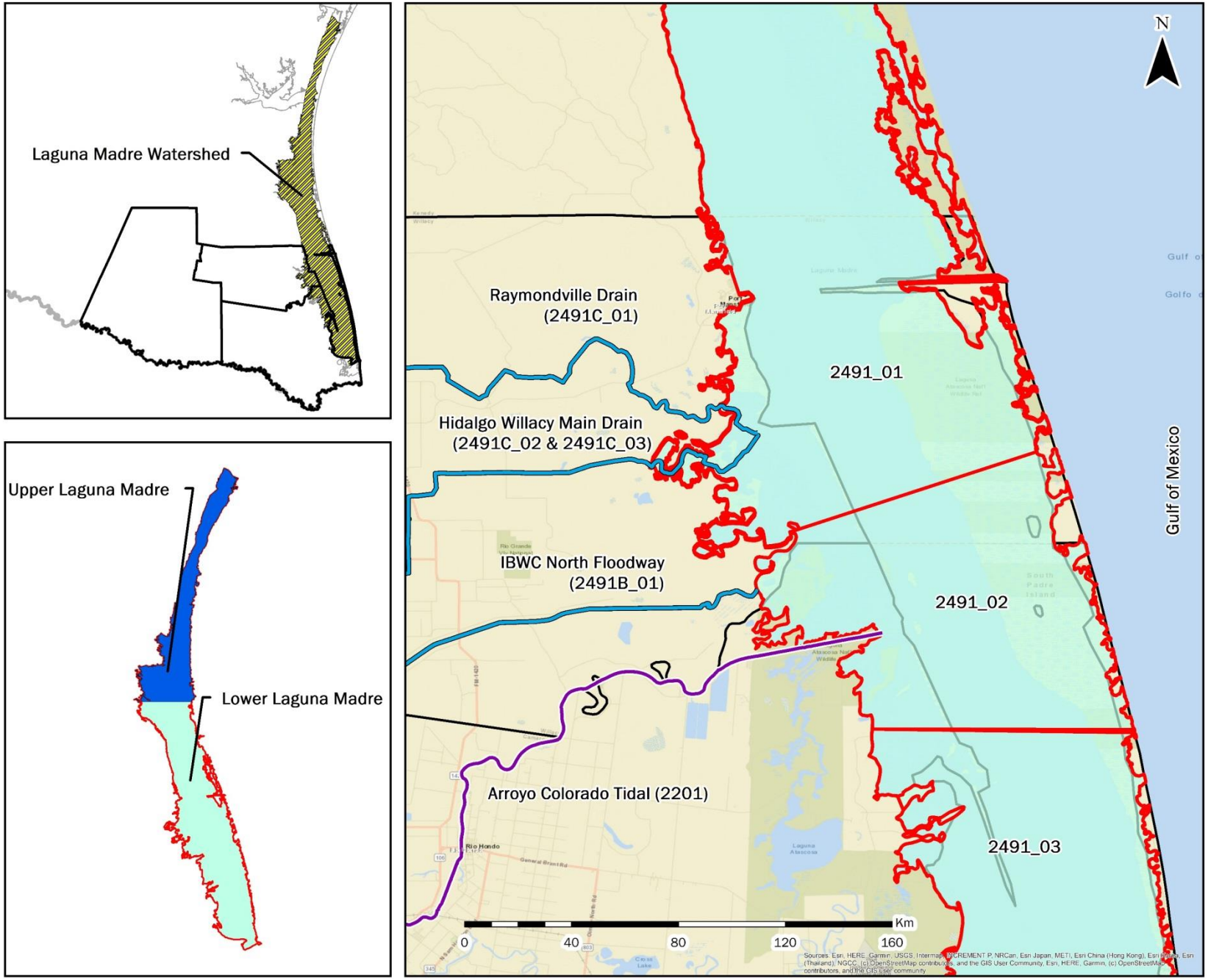


Figure 2: Location of the Laguna Madre

Methodology

Cyberinfrastructure

- **REON:** Development of Maps

Watershed Delineation

- DEM Reconditioning
- Hydrology Tools

Sources of Pollution

- Non-Point Source
- Point Sources
- State and Local data

Water Quality

- State and Local Agencies

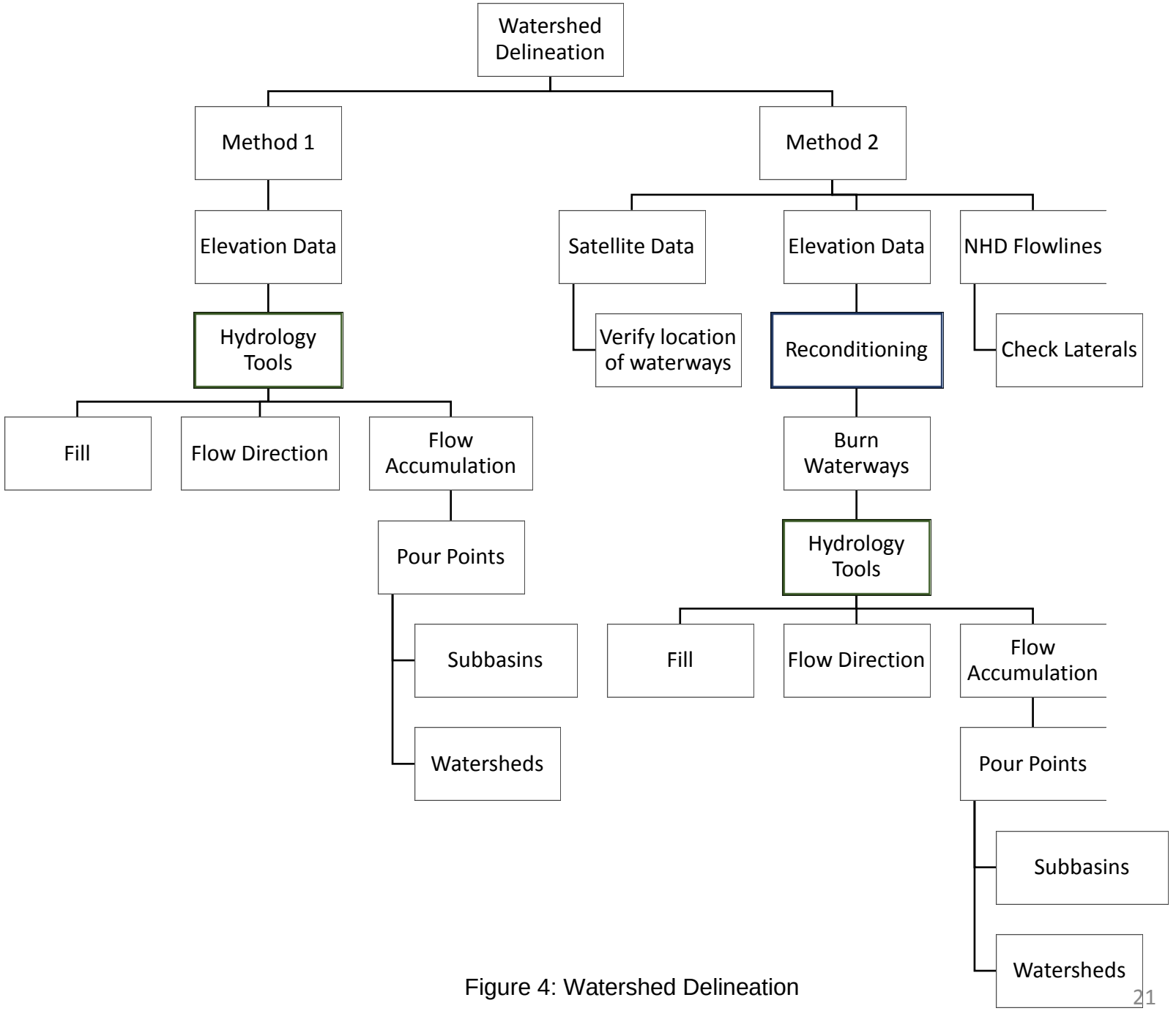


Figure 4: Watershed Delineation

Data Reconditioning

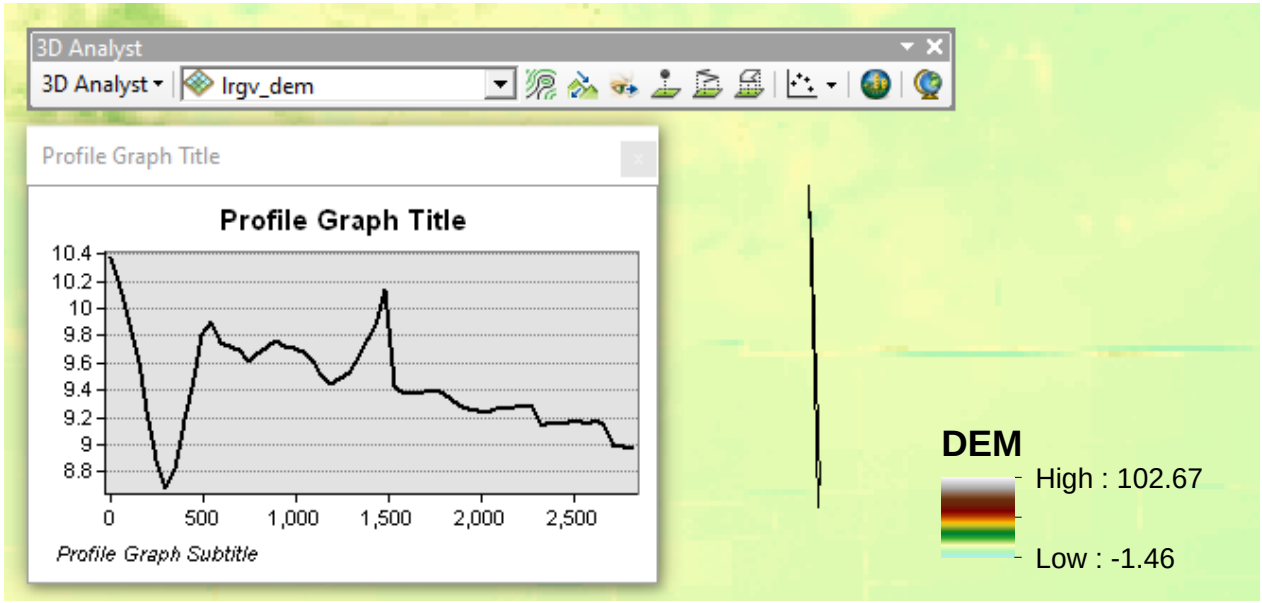


Figure 4: LIDAR elevation data

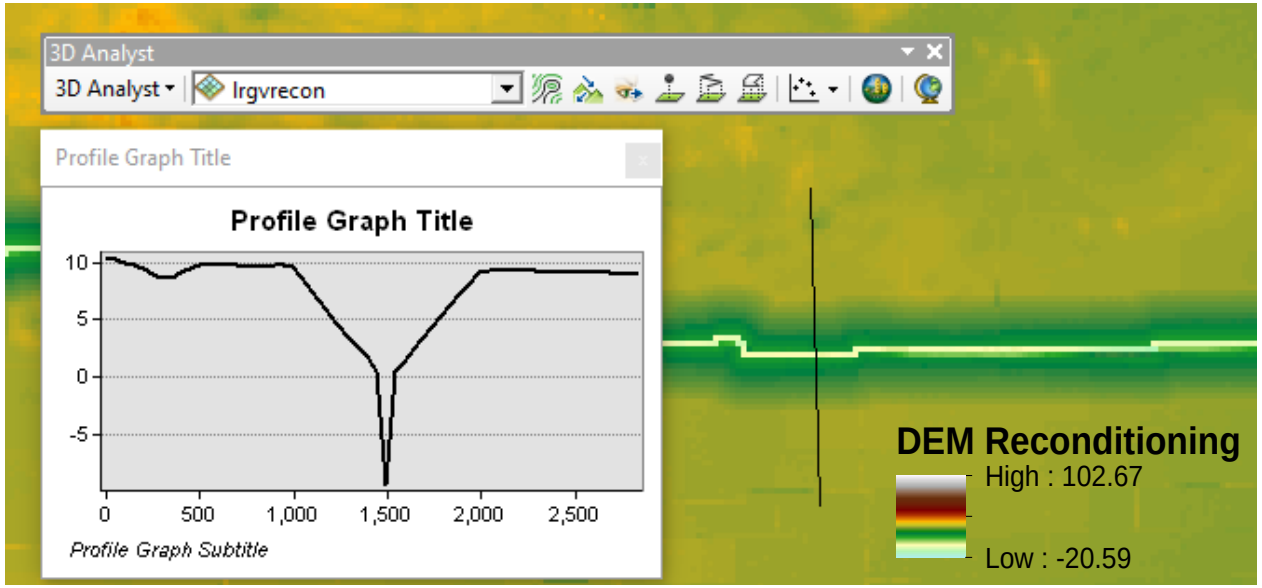


Figure 5: LIDAR elevation data recondition

Results

REON Website

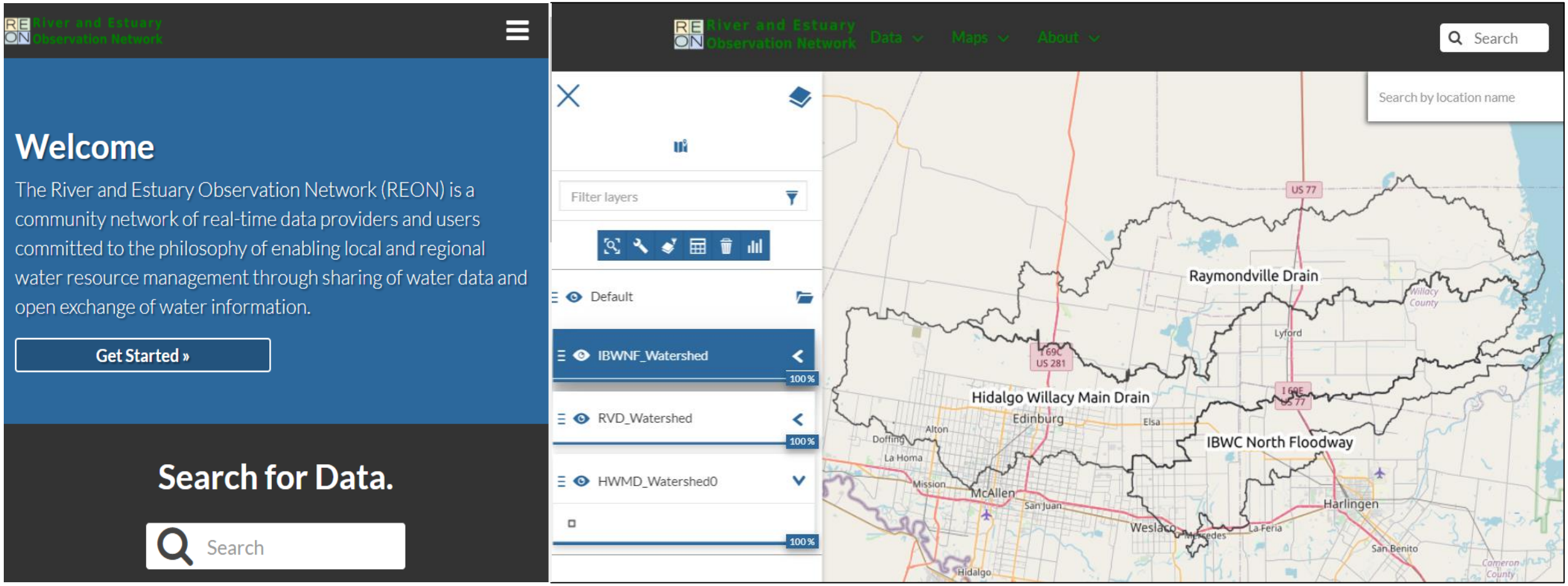


Figure 6: Cyberinfrastructure site

Watershed Delineation

Method 1

Addition of pour points

- Proximity between waterways

Flow Accumulation lines

- No correlation with the waterways

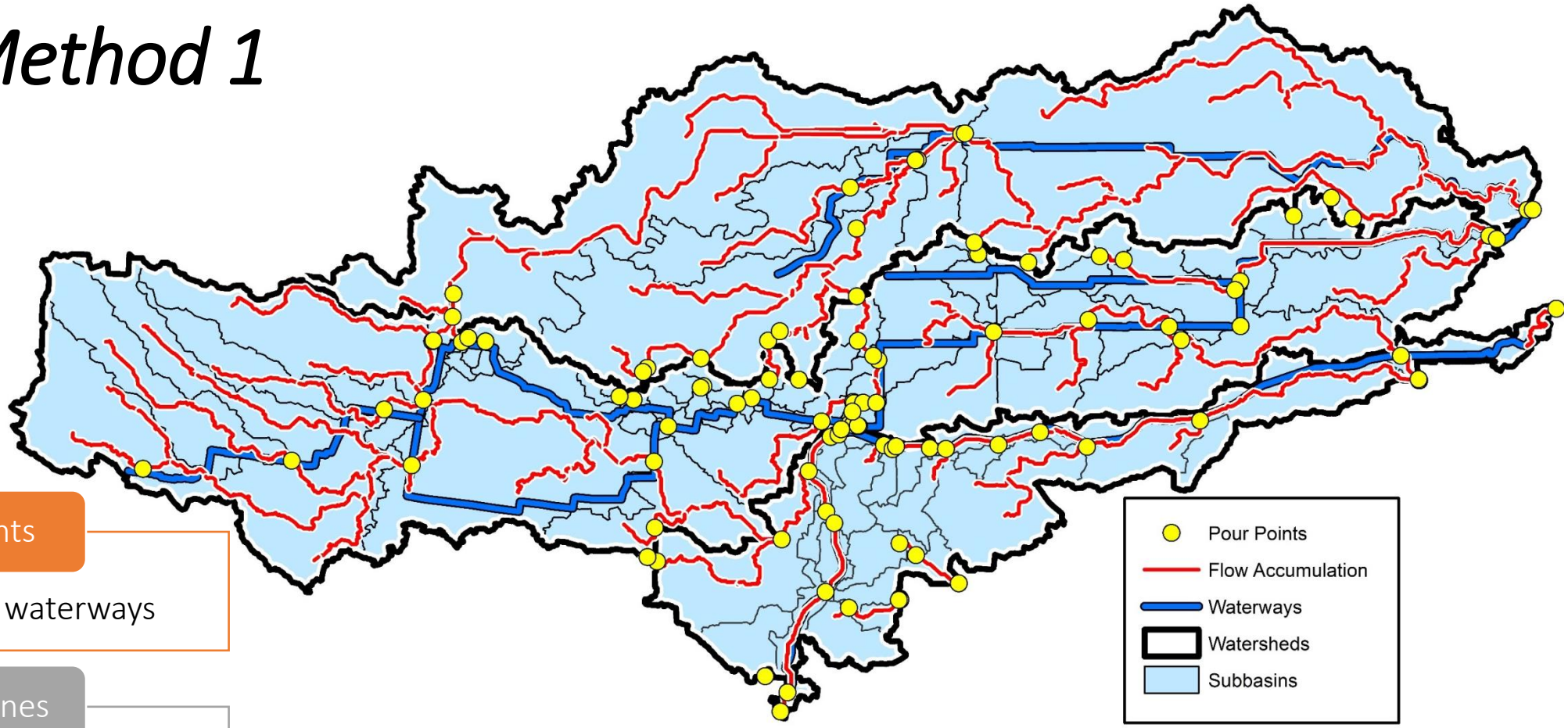


Figure 7: Subbasins of the North and Central watersheds

Watershed Delineation
Method 2

Addition of pour points

- Proximity between waterways

Flow Accumulation lines

- No correlation with the waterways

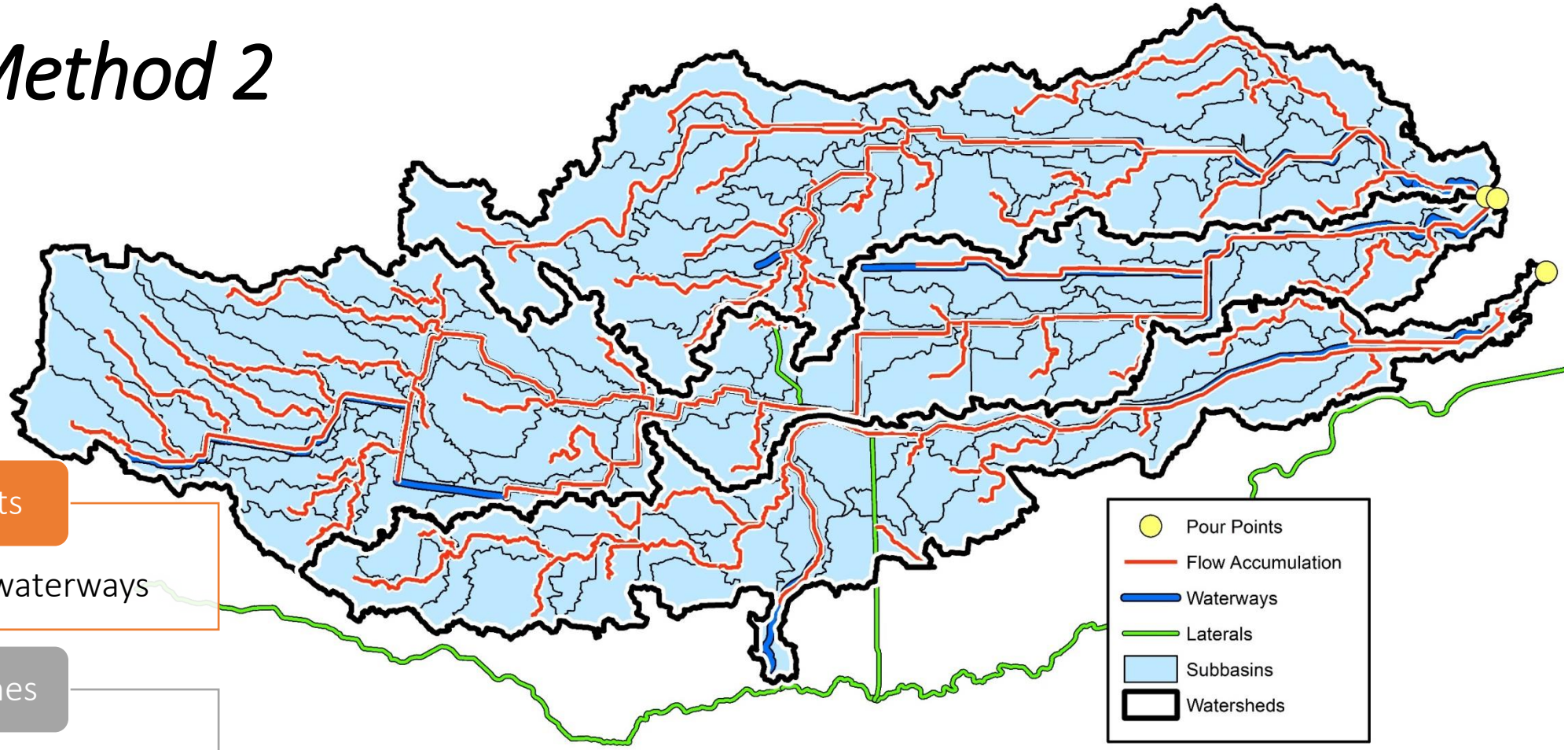


Figure 8: Subbasins of the North and Central watersheds with new DEM

Watershed Delineation

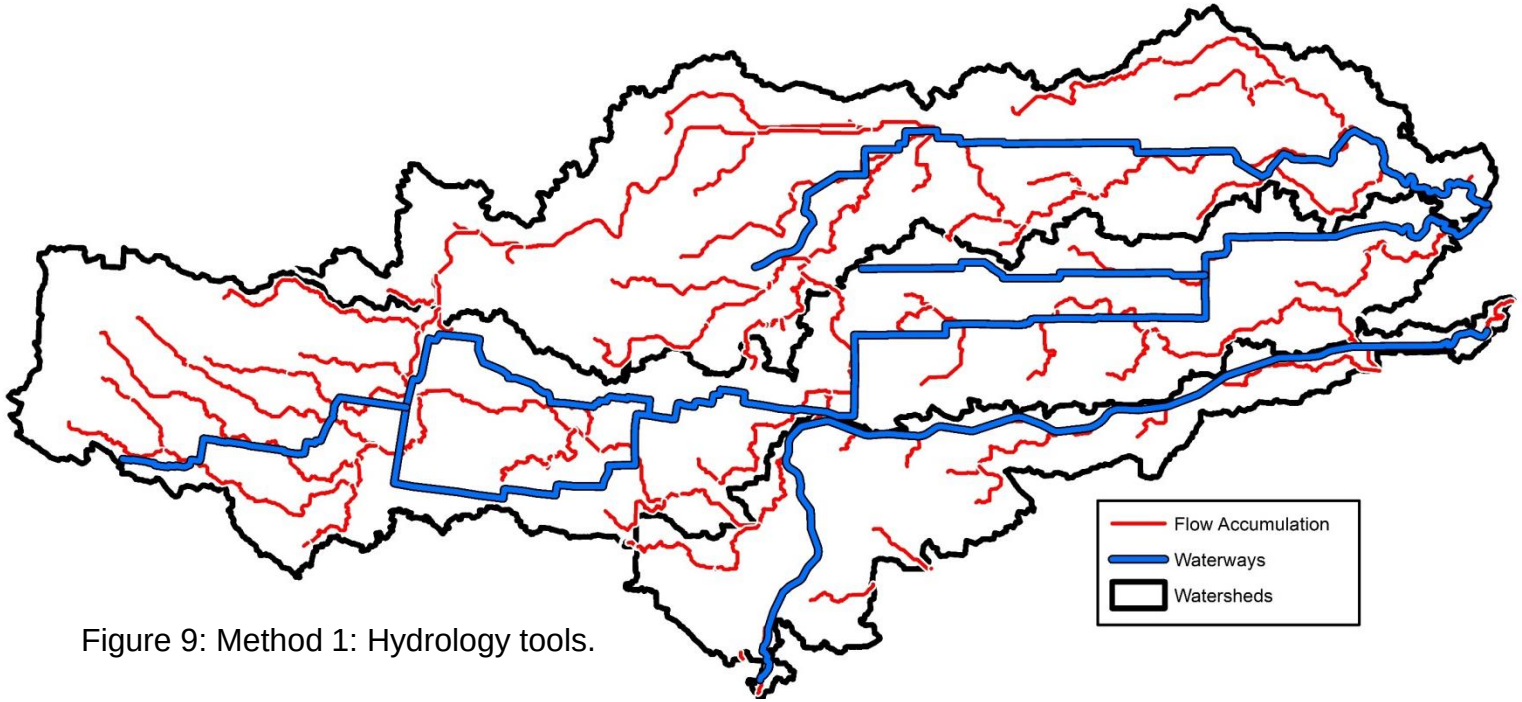


Figure 9: Method 1: Hydrology tools.

Method 1

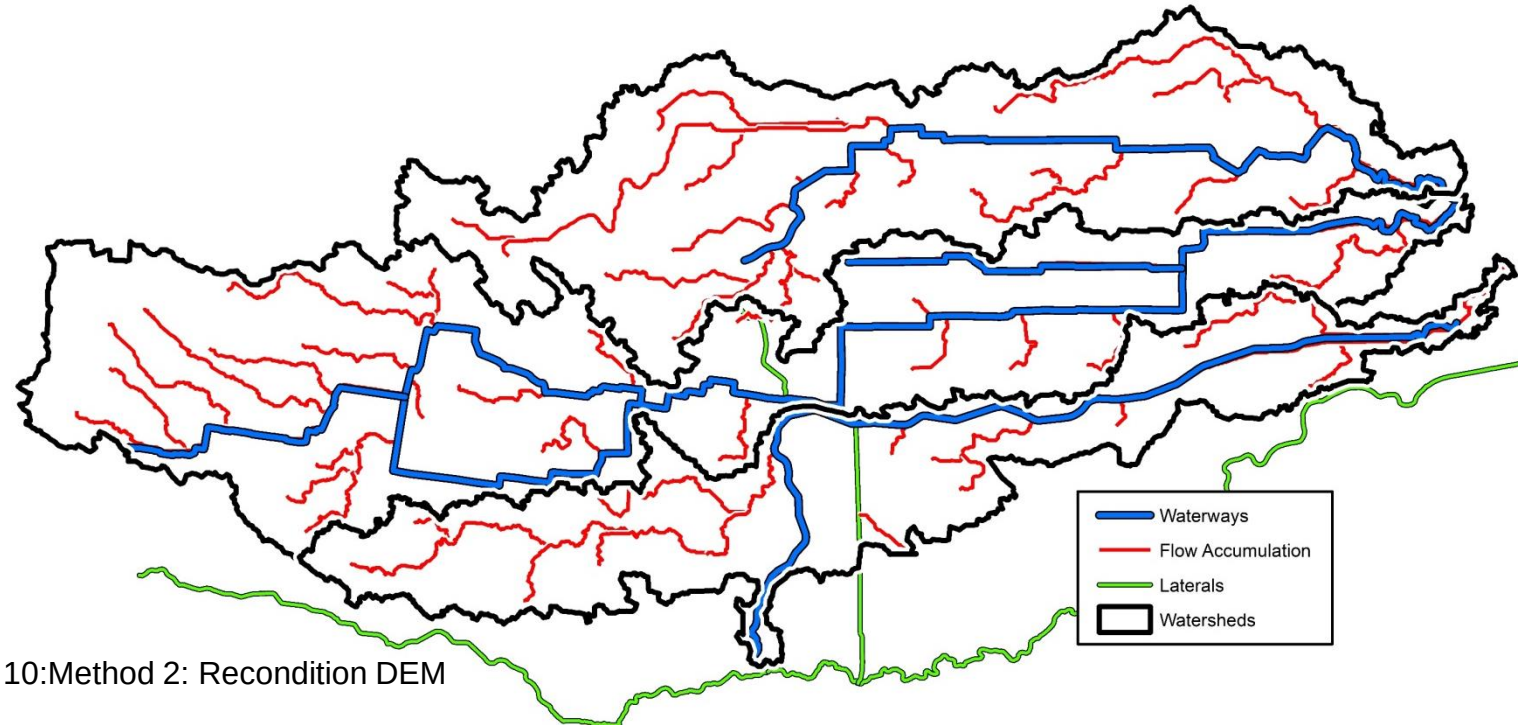


Figure 10:Method 2: Recondition DEM

Method 2

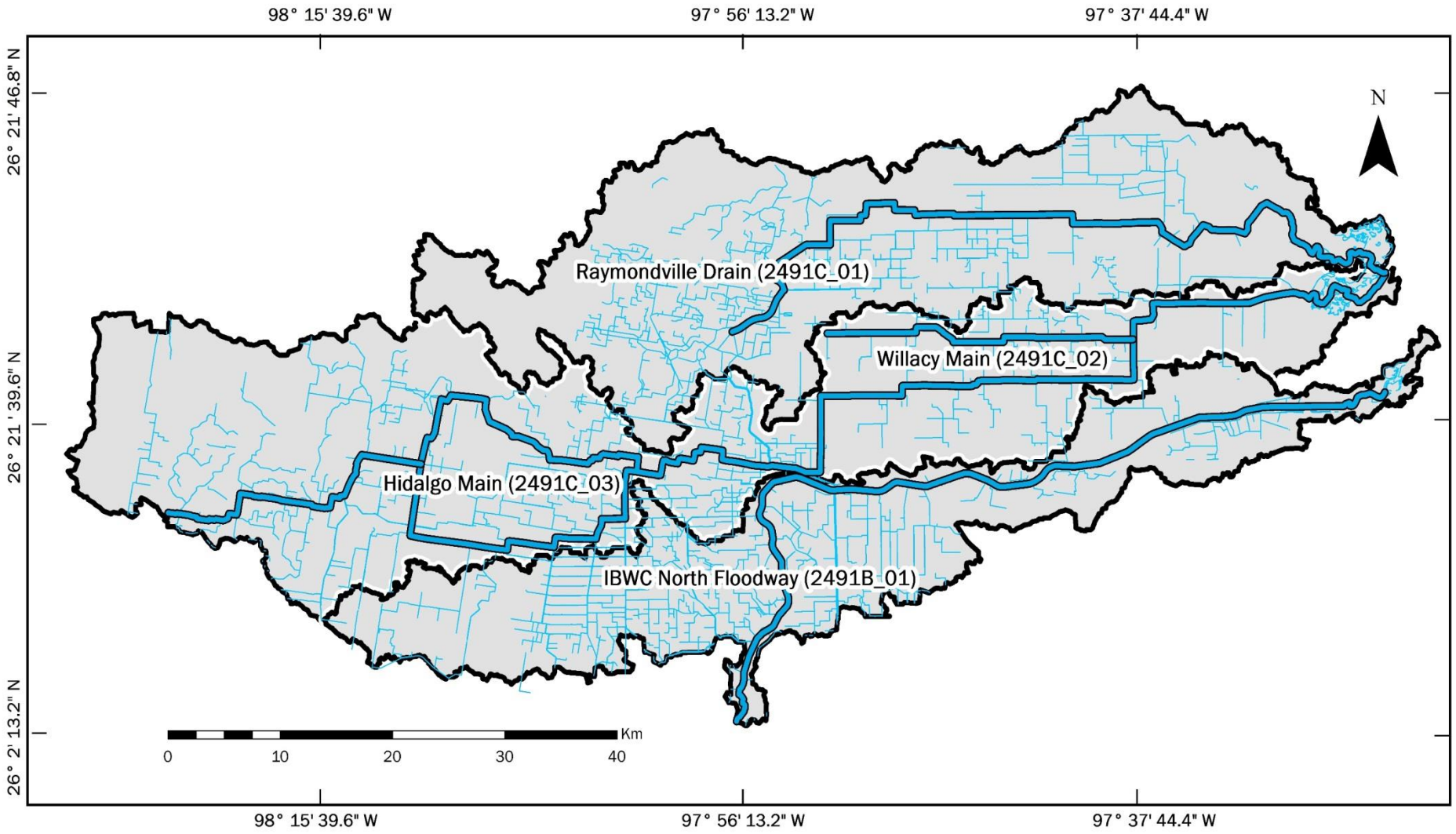


Figure 11: North and Central watersheds

- Areas
- Counties Contribution
- Cities

Non-Point Sources

Table 1: Non-Point Sources of pollution

	HWMD	RVD	IBWCNF
Urbanized Areas	20.1%	4.5%	24.3%
Cultivated Crops	46.6%	52.3%	58.5%
STLR	6.4%	20.3%	3.8%
Totals	73.1%	77.1%	86.6%

HWMD

- Urban Areas
- Colonias

RVD

- (STLR)Ranches
- Agricultural lands

IBWCNF

- Agricultural lands
- Urban Areas

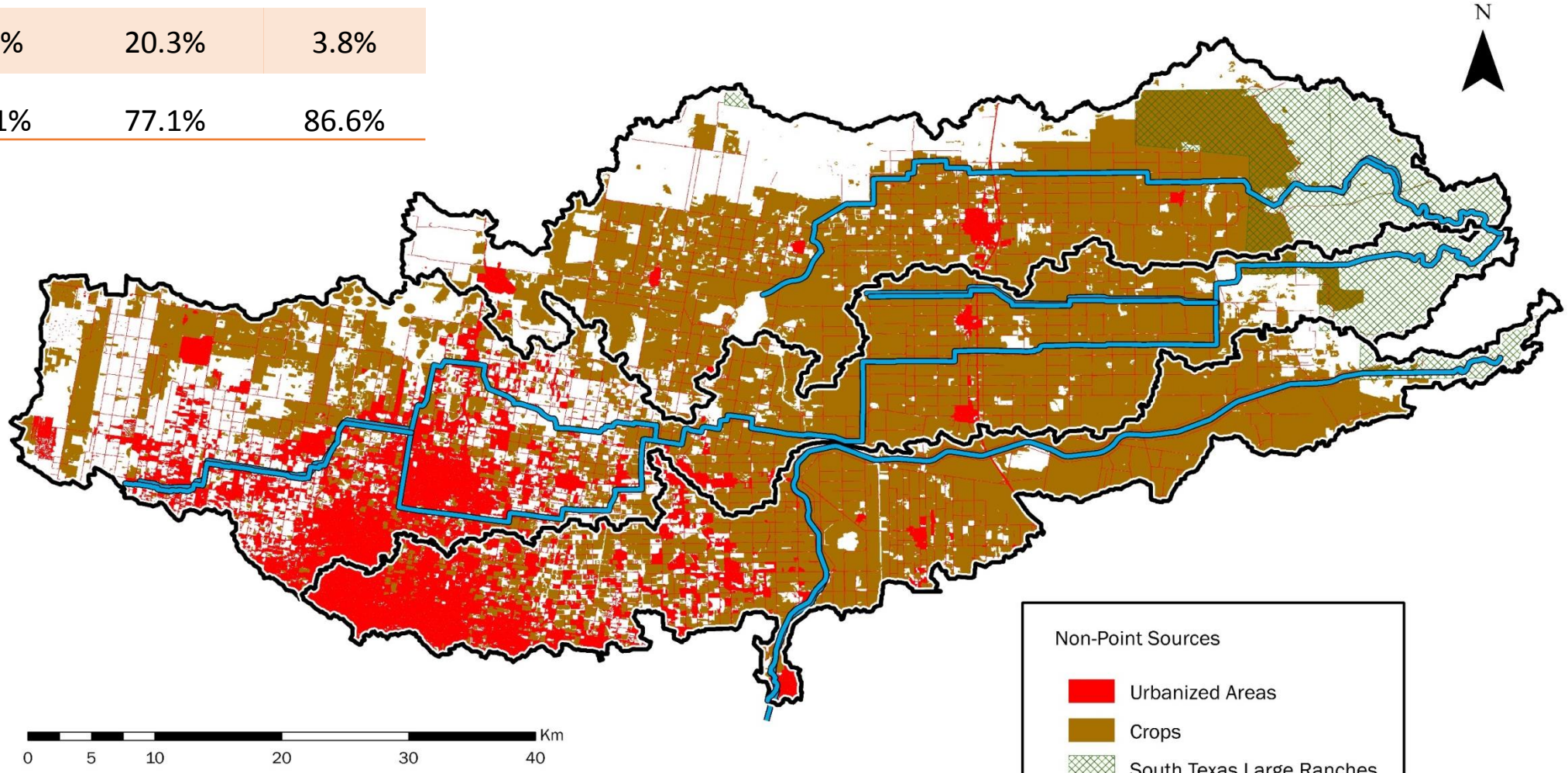


Figure 12: North and Central Watersheds Non-Point Sources

Table 2: Point Sources of pollution

	HWMD	RVD	IBWCNF	Total
TLAP	8	4	3	15
WWO	11	5	9	25
MSW	17	4	3	24
OSSF	4,591	56	4,523	9,170
MS4s	7	1	12	21
Colonias	336	13	216	565
DP	1	1	2	4
Totals	4,971	84	4,768	9,824

Point Sources

HWMD

- WWO
- OSSFs
- Colonias

IBWCNF

- WWO
- OSSFs
- MS4s
- DP

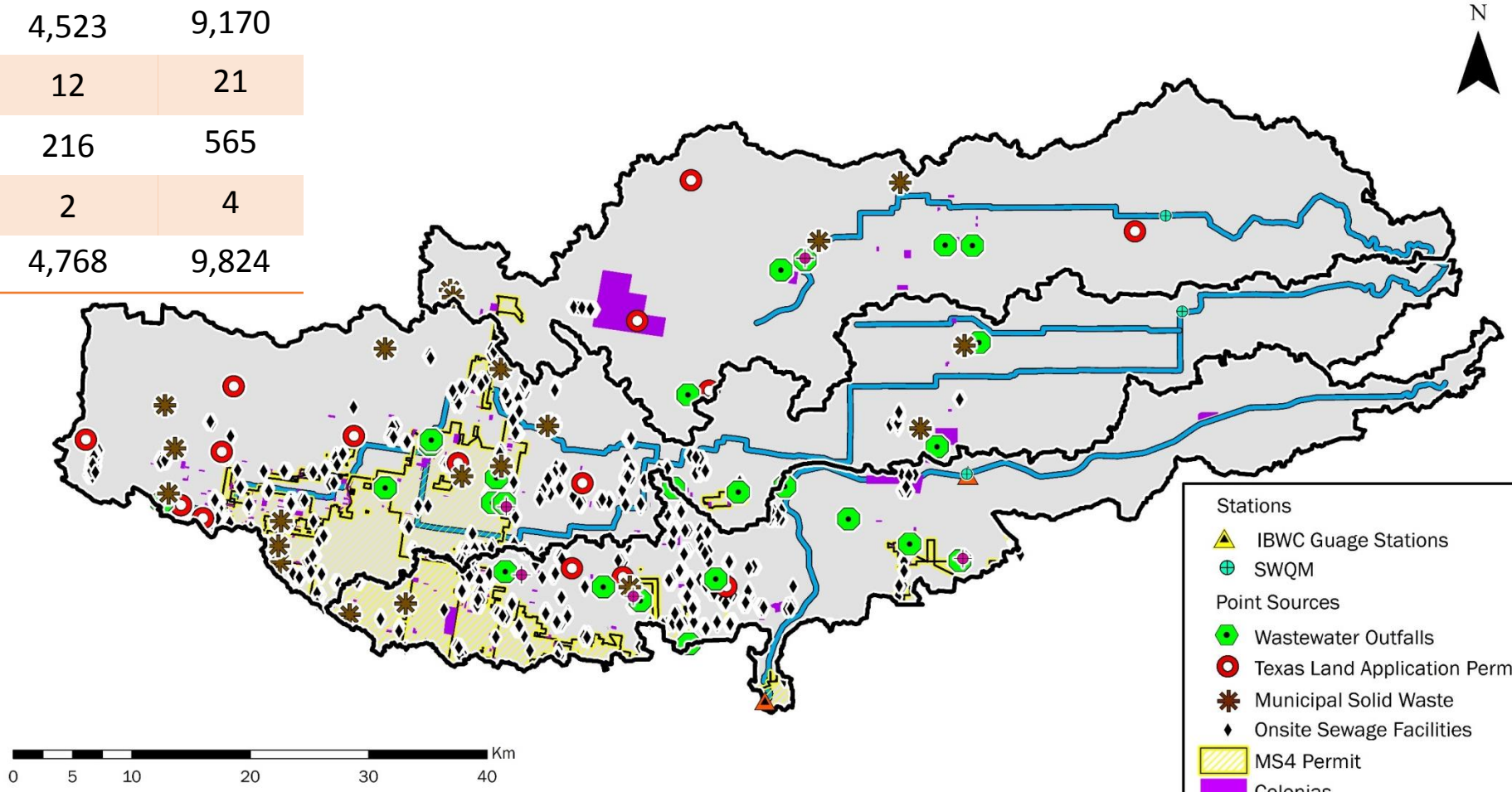


Figure 13: North and Central Watersheds Point Sources

Water Quality Samples

Hidalgo Willacy Main Drain

- Clean Rivers Program
- 8 Samples
- 2017-2019

Raymondville Drain

- Clean Rivers Program
- 8 Samples
- 2017-2019

IBWC North Floodway

- SWQMs
- 29 Samples
- 2011-2019

Water Quality

Predominant Levels

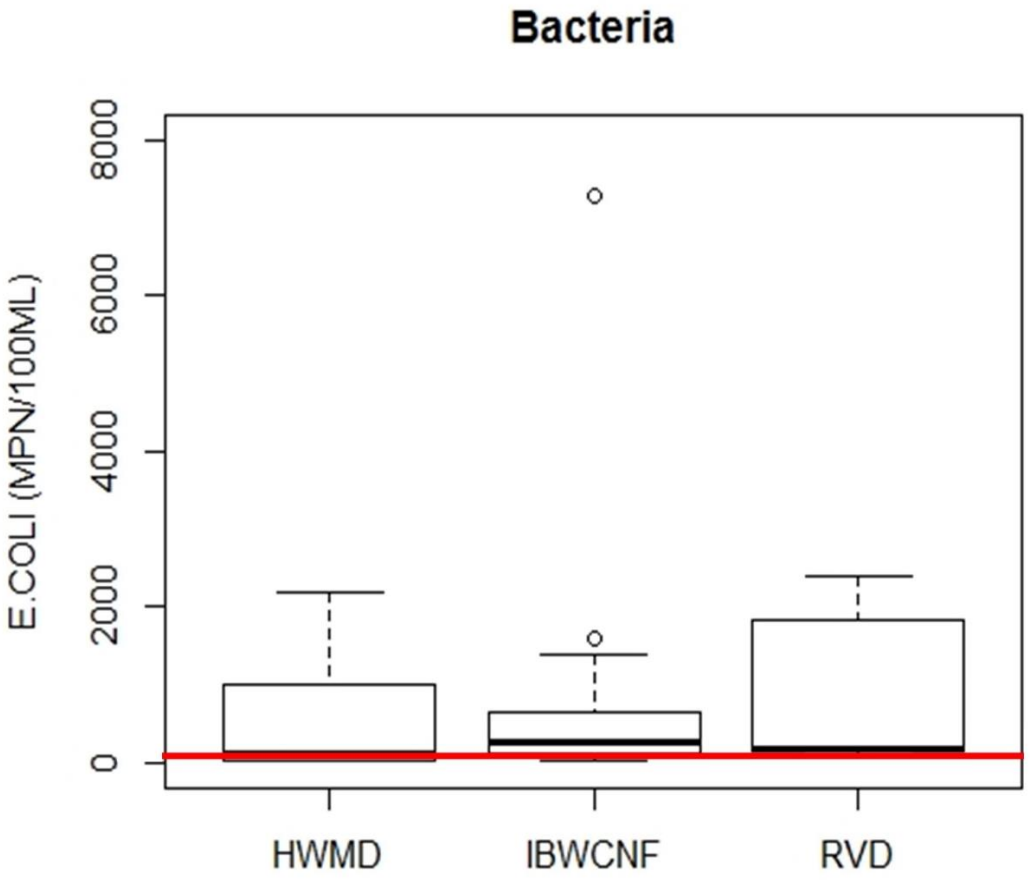
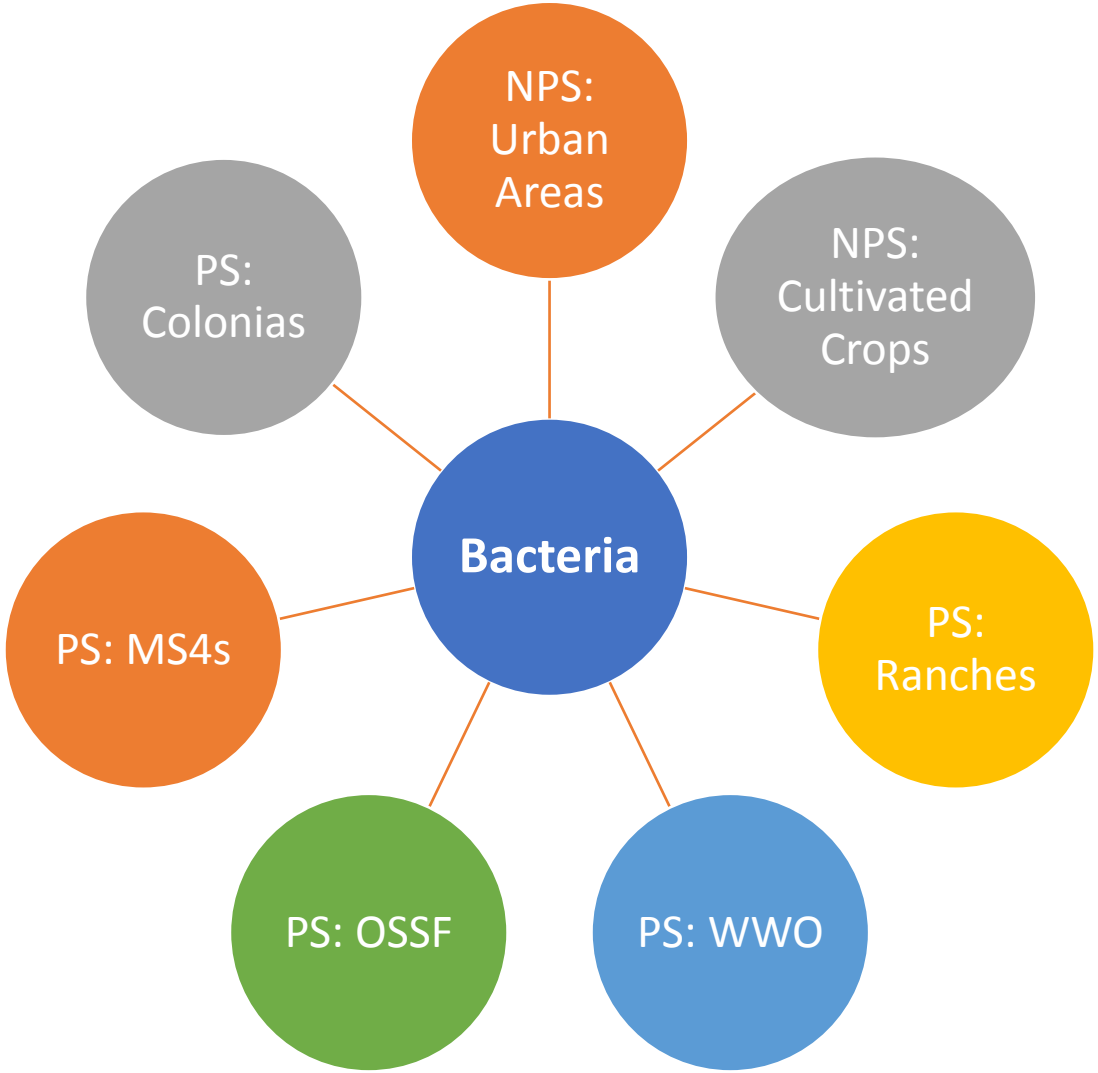
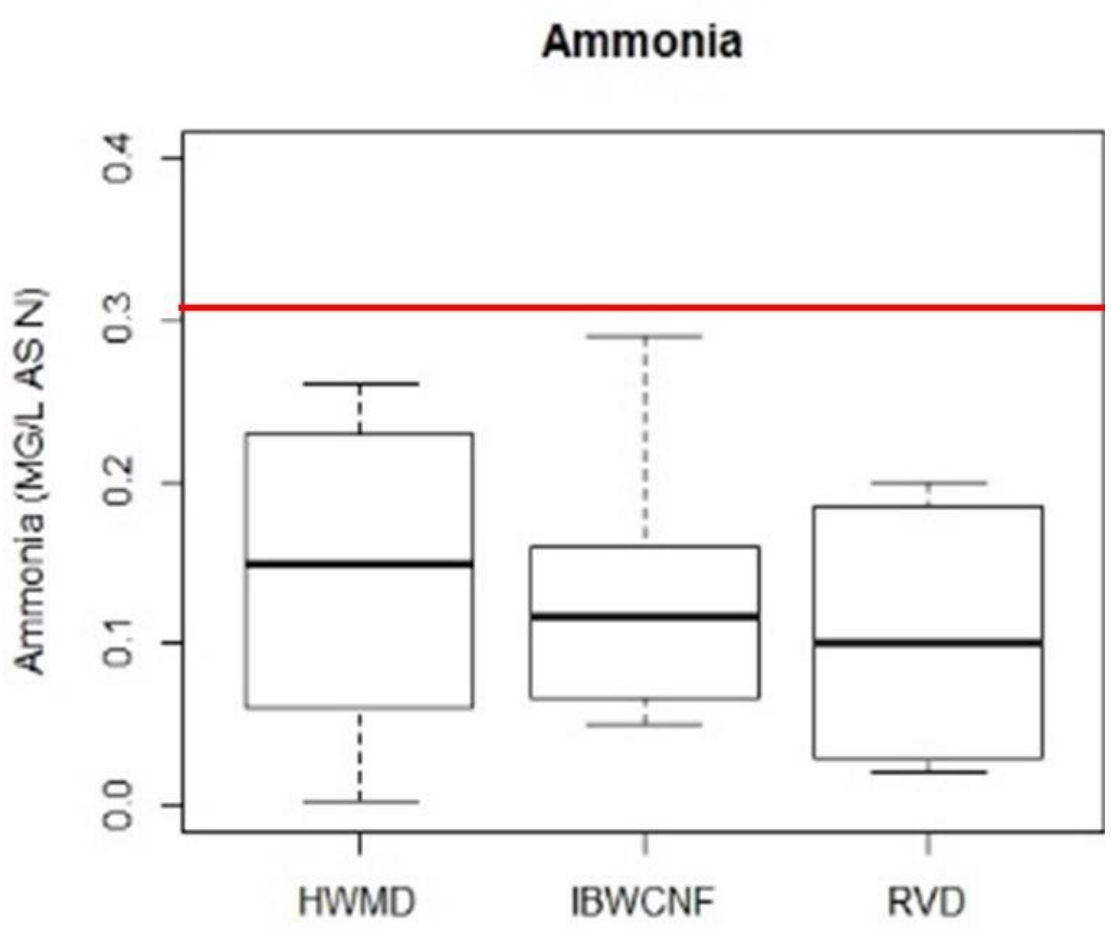


Figure 14: Predominant Levels for Bacteria



Water Quality

Concerning Levels



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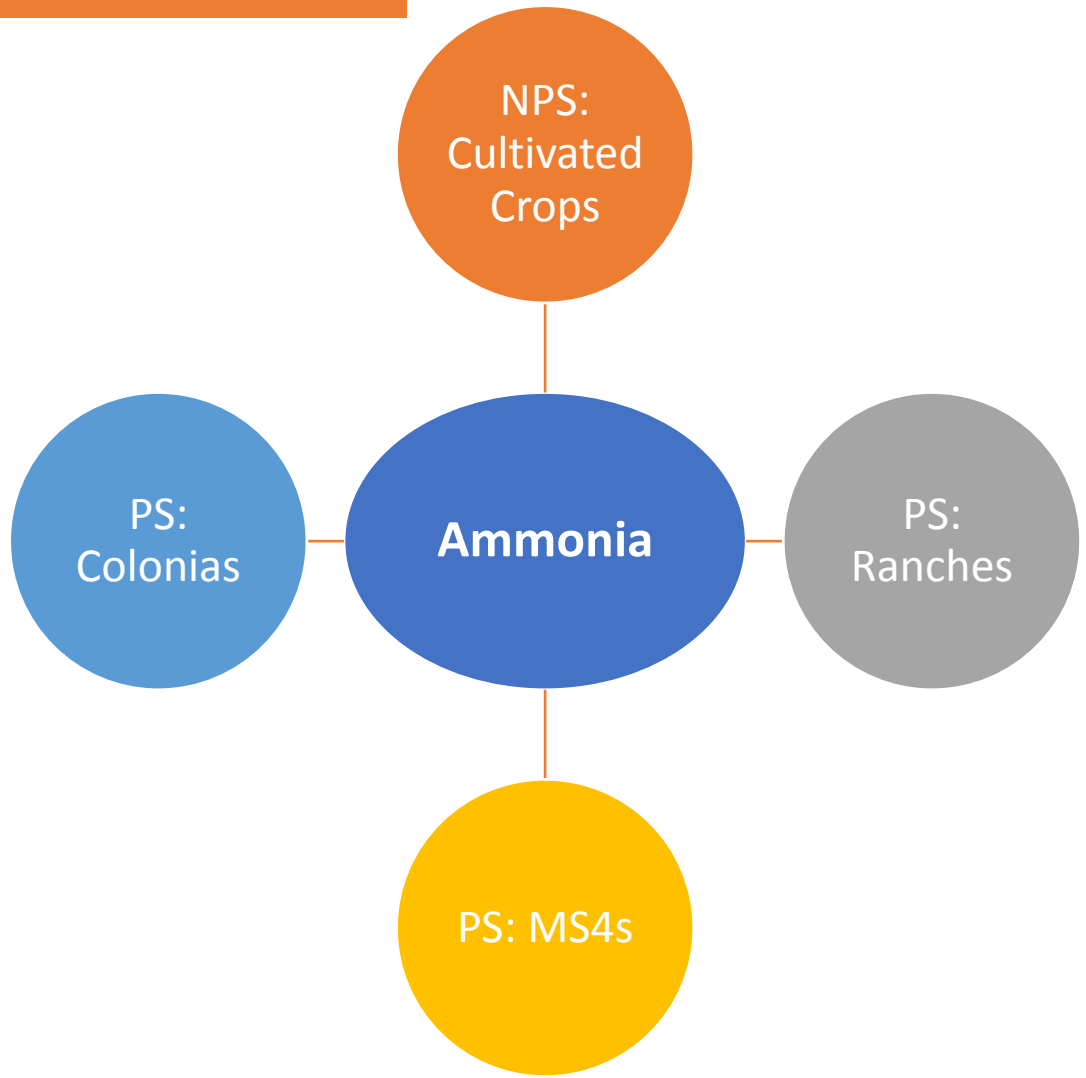
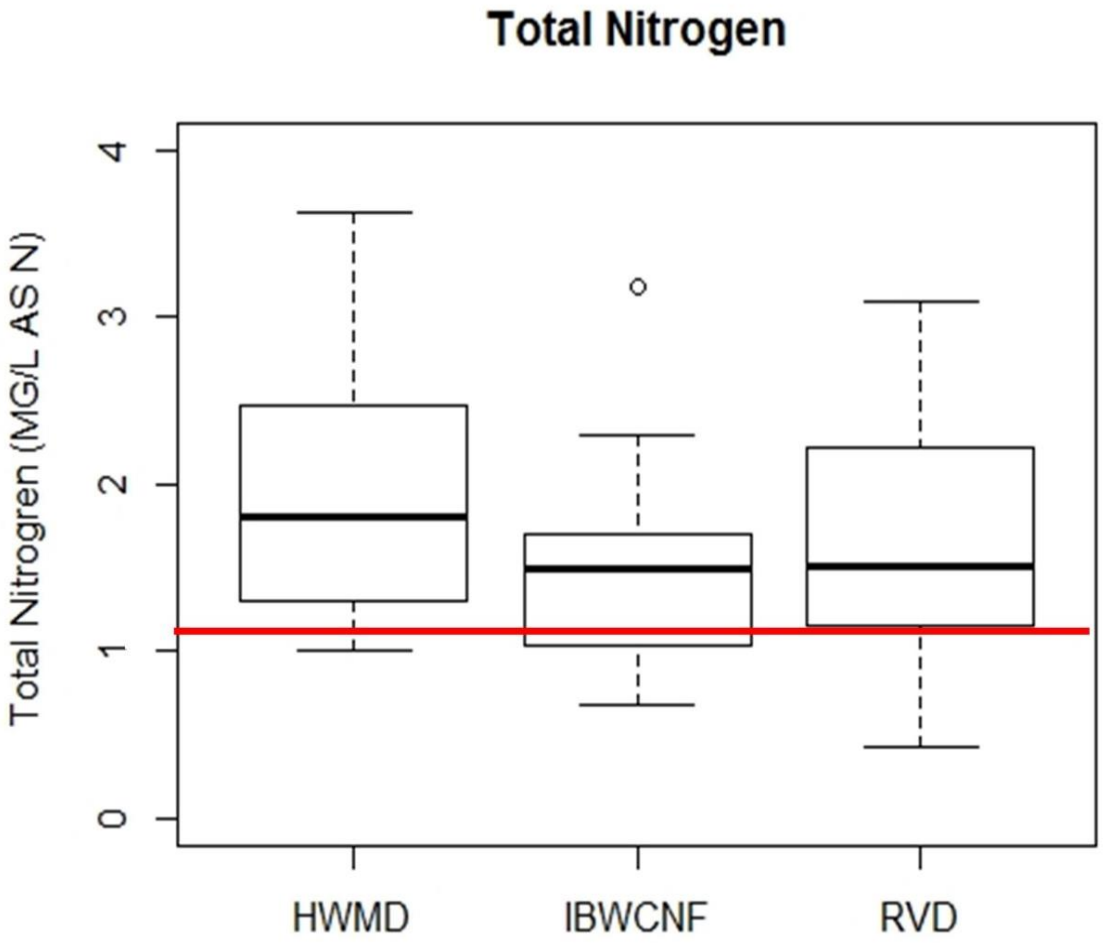


Water Quality

Predominant Levels



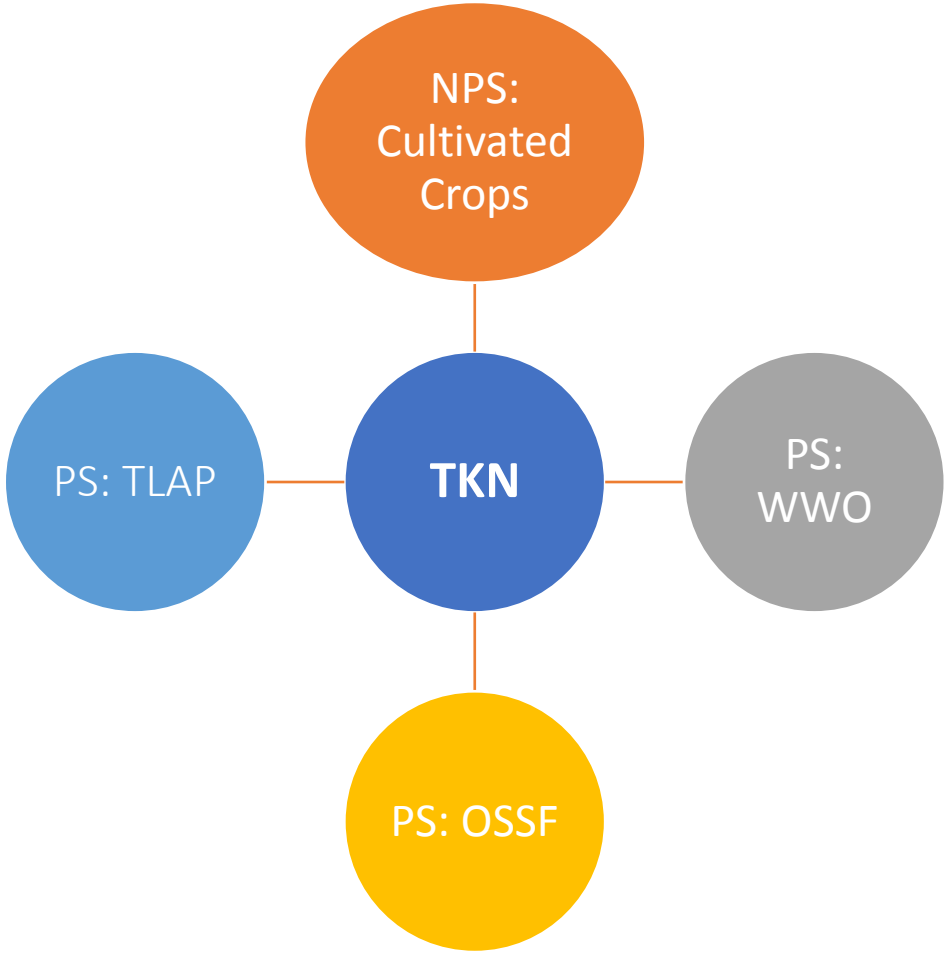
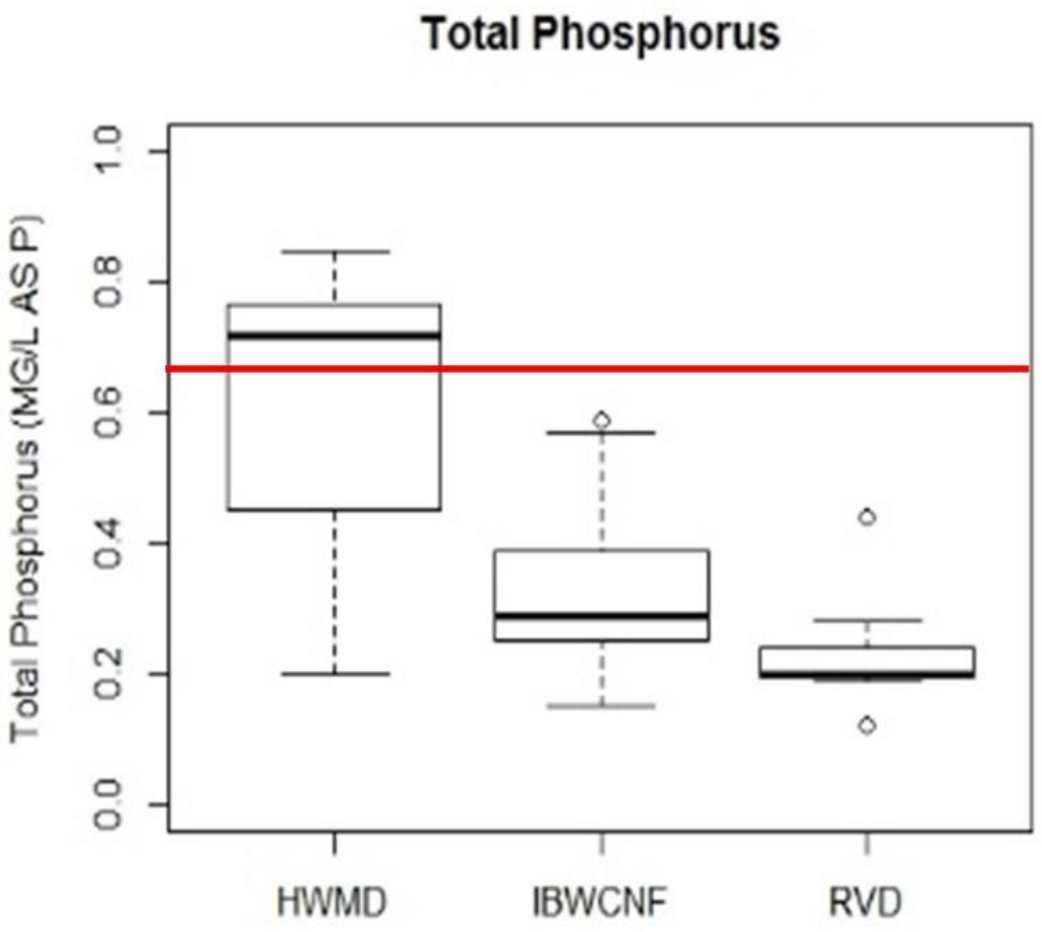


Figure 14: Predominant Levels for Bacteria

Water Quality

Concerning Levels



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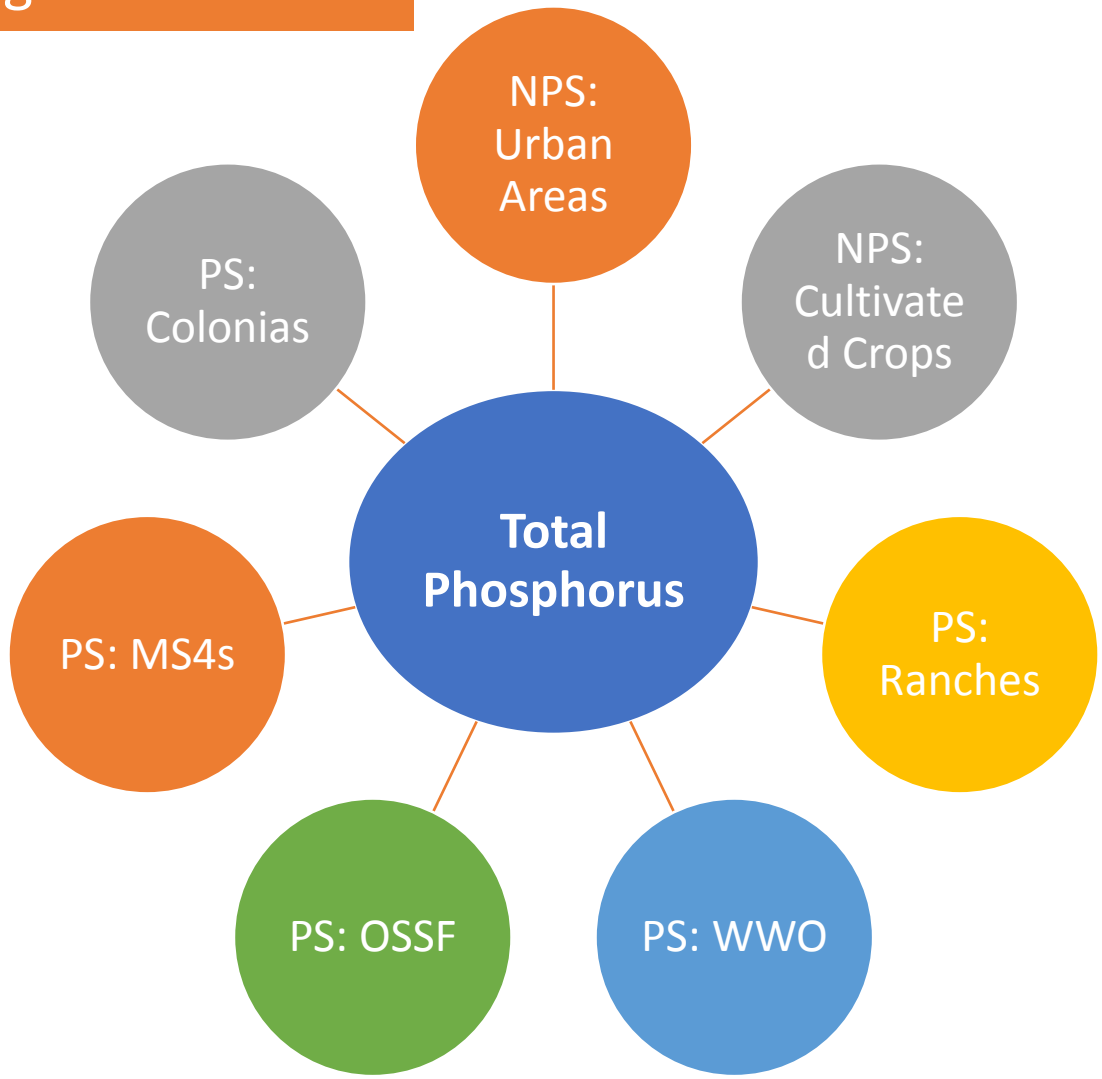
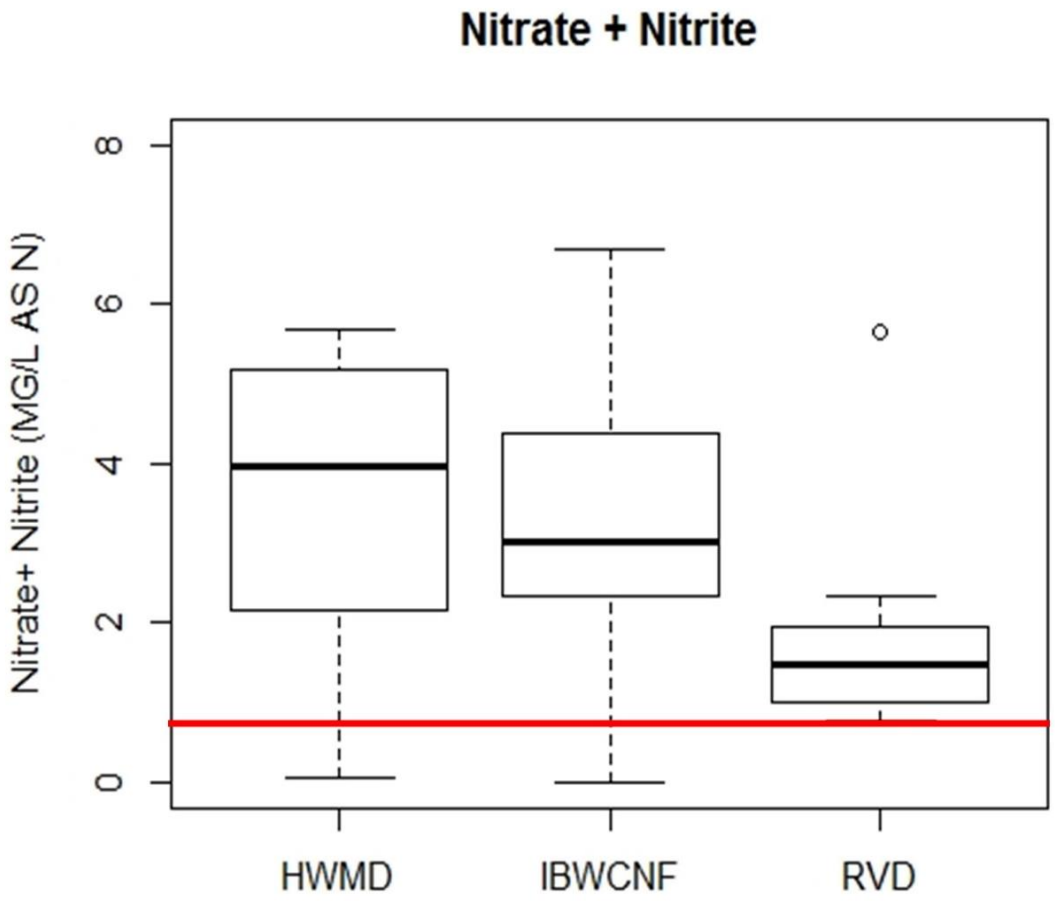


Water Quality

Predominant Levels



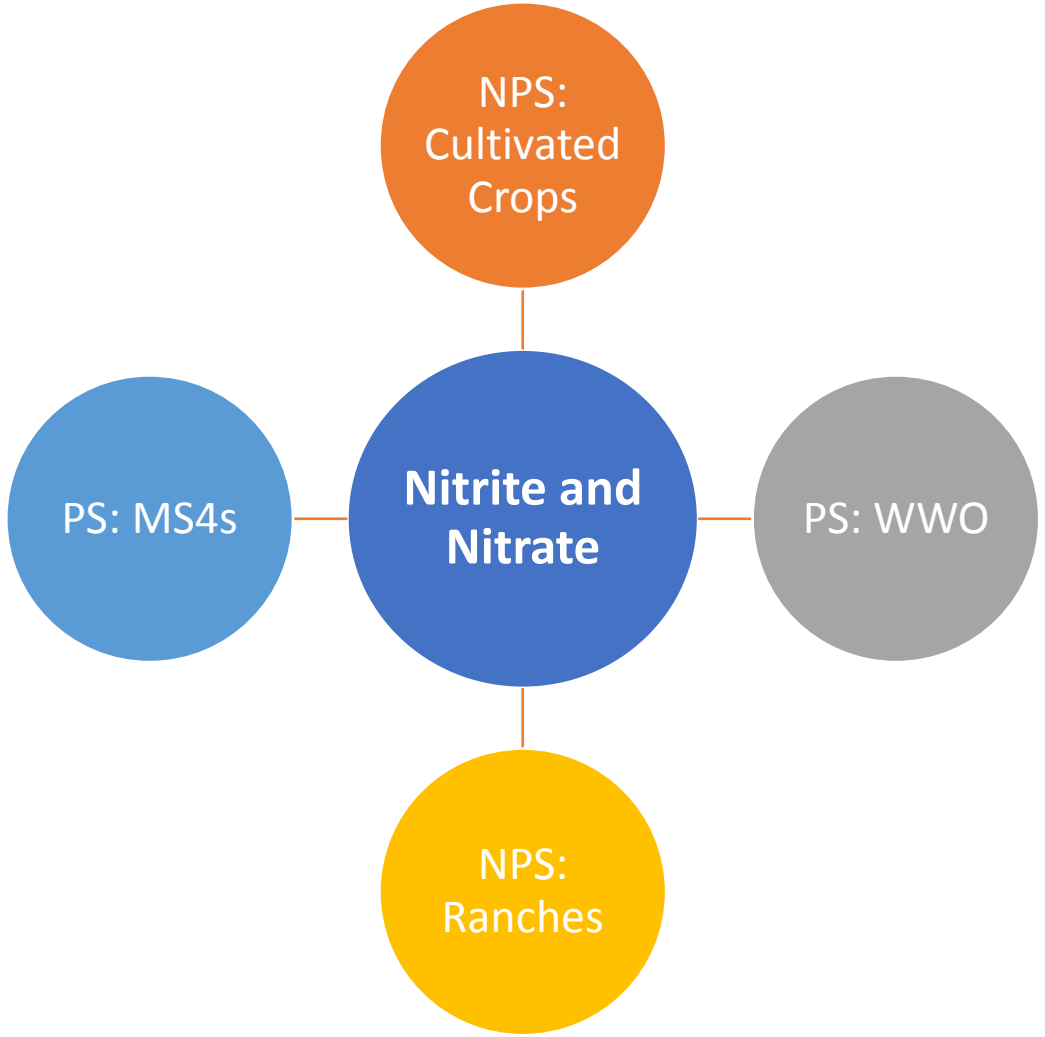
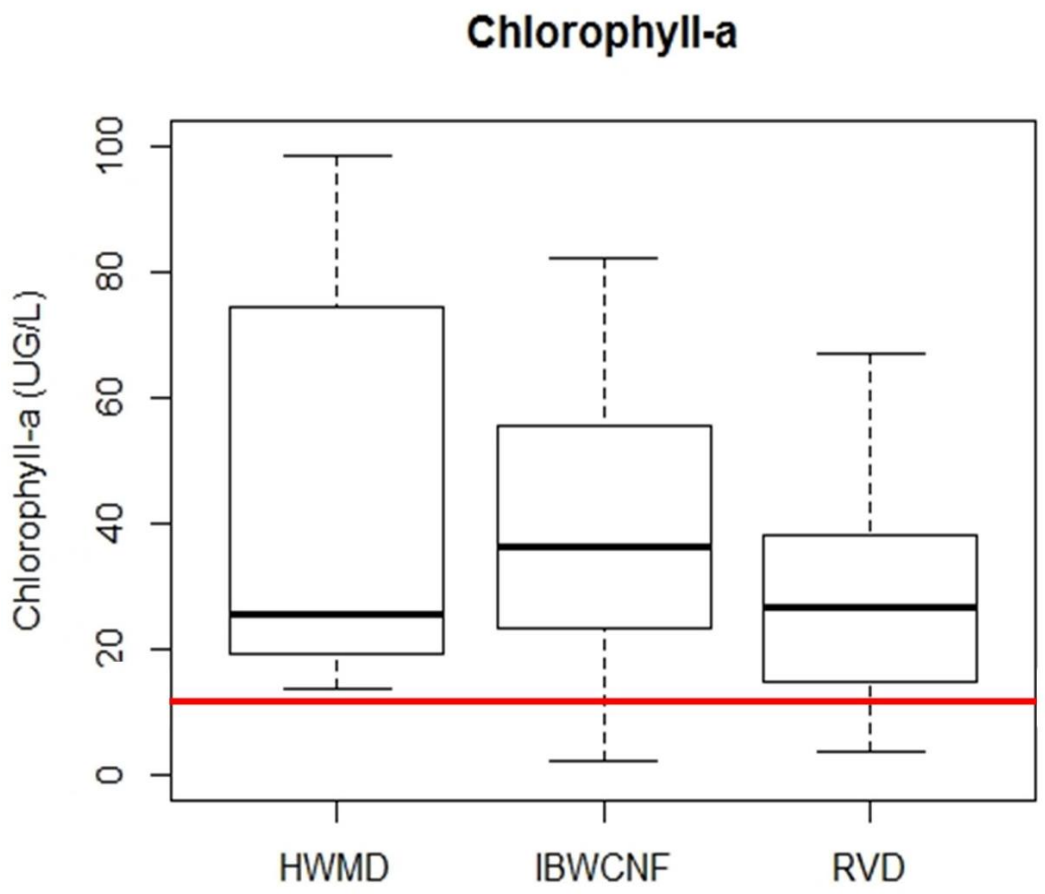


Figure 14: Predominant Levels for Bacteria

Water Quality

Predominant Levels



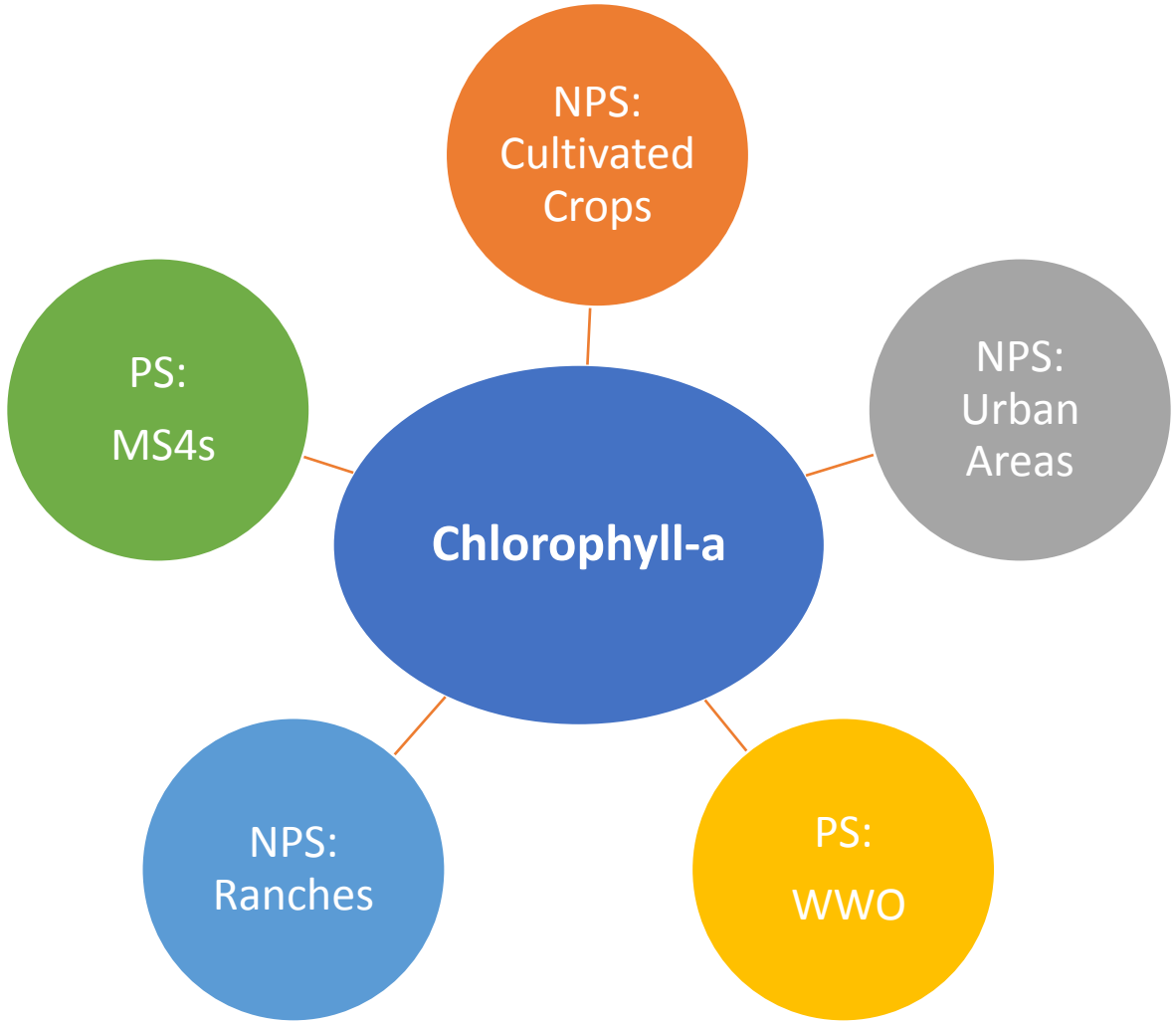
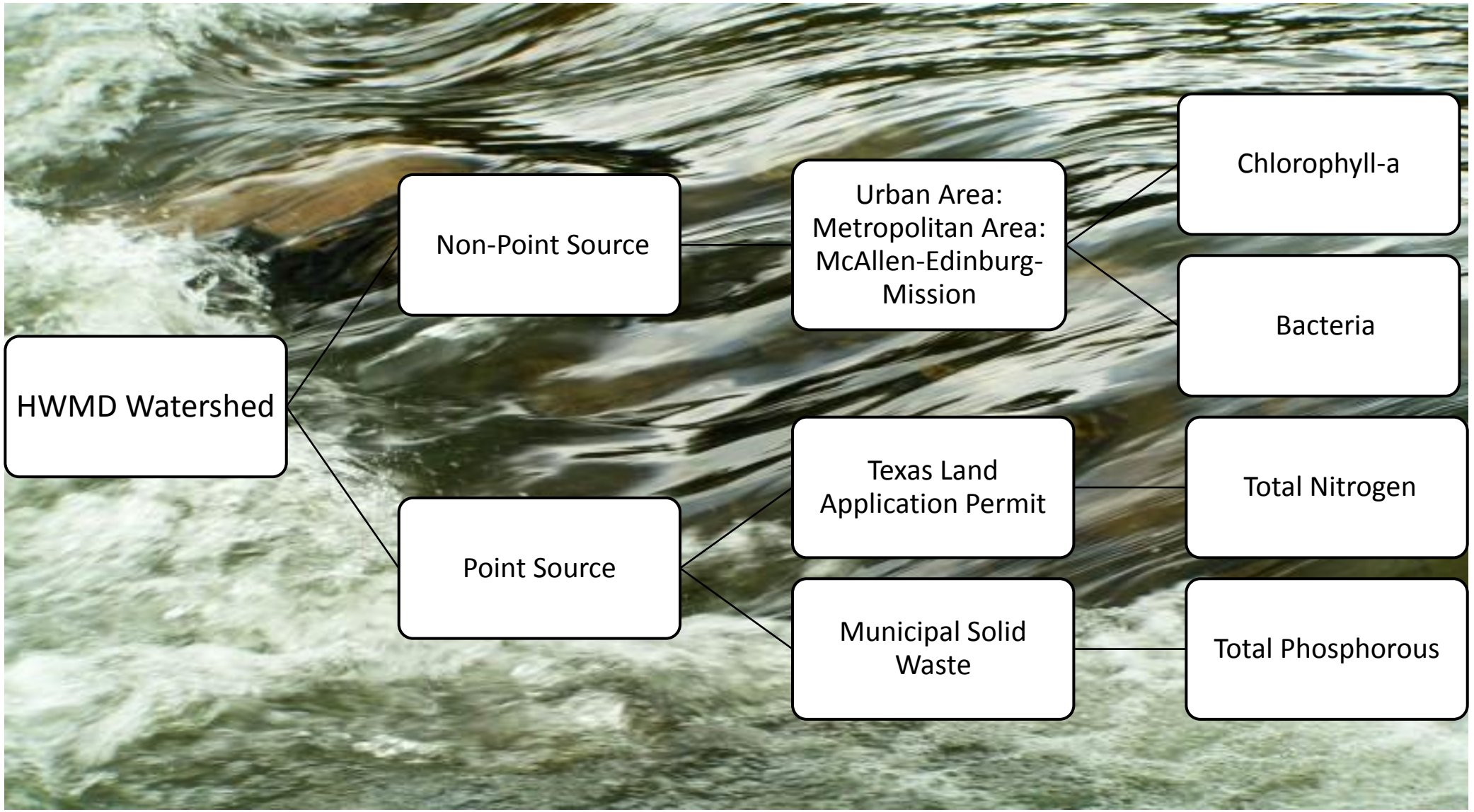
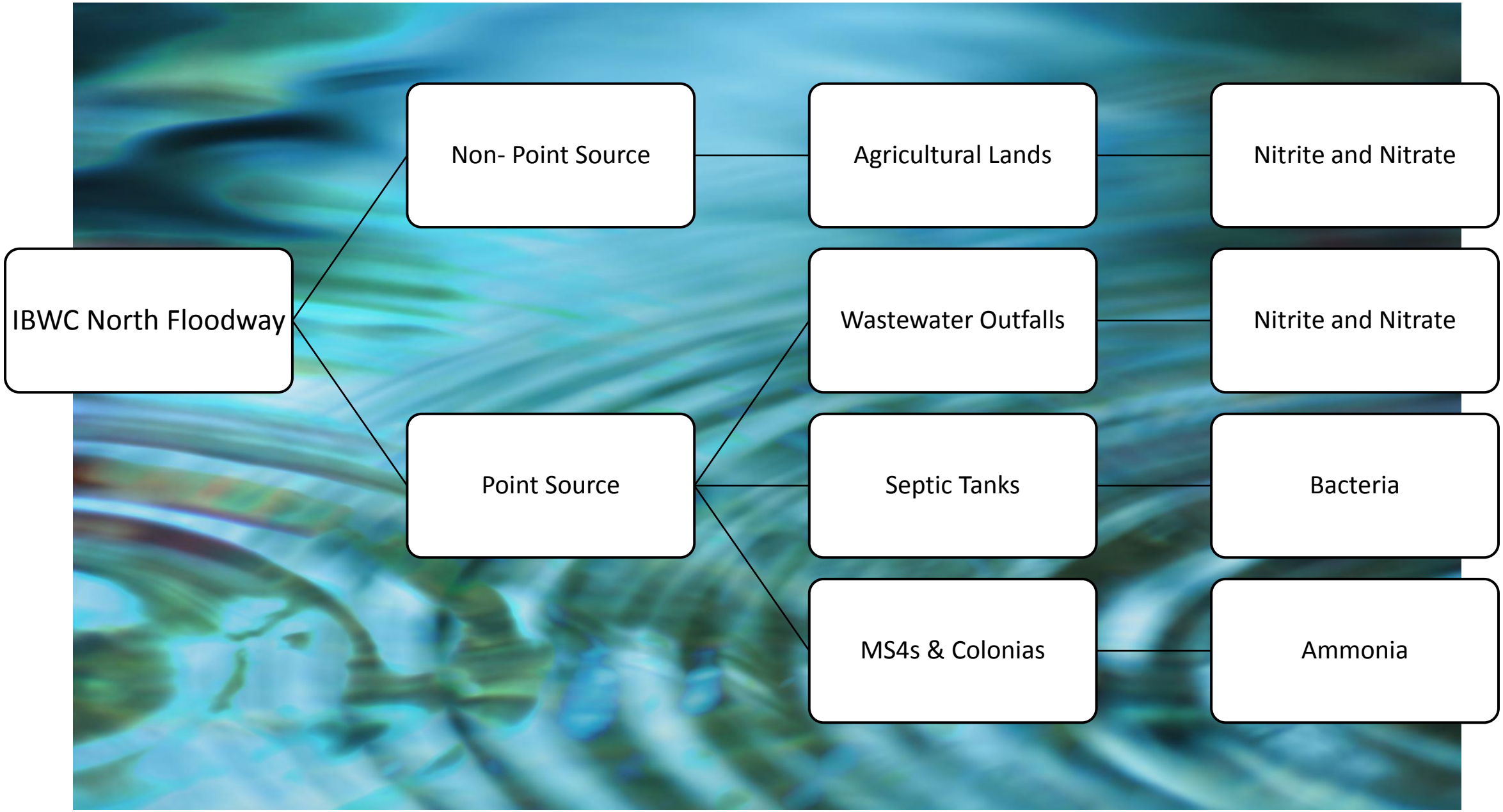


Figure 14: Predominant Levels for Bacteria

Conclusions


HWMD Watershed
Non-Point Source
Point Source
Urban Area: Metropolitan Area: McAllen-Edinburg-Mission
Texas Land Application Permit
Municipal Solid Waste
Chlorophyll-a
Bacteria
Total Nitrogen
Total Phosphorous

RVD Watershed → Non-Point Source → Ranches: Livestock → Bacteria


IBWC North Floodway
Non- Point Source
Point Source
Agricultural Lands
Wastewater Outfalls
Septic Tanks
MS4s & Colonias
Nitrite and Nitrate
Nitrite and Nitrate
Bacteria
Ammonia

Thank You

FY2022-319 Proposals

1- Lower Laguna Madre-Hydrodynamic Water Quality Study

a) Circulations patterns in LLM are poorly understood in this impaired water body, thus difficult to characterize the sources of impairments

b) Propose to integrated real-time current monitoring program (Possible HF Radar to characterize the circulation patterns)

2- North and Central-Lower Rio Grande Valley-Phase II

a) Continuation of Phase I which involves Characterization of the Northern and Central Lower RG Valley Watersheds base on existing data

b) Currently available data is insufficient to characterizing

c) Will provide additional monitoring to determine the water quality status of the North and Central Water sheds, may be extended to characterize the tidal reaches

3- Llano Grande Lake Dredging Feasibility Study

a) Dredging was identified in ACWPP as a potential implementation to improve AC water quality. A feasibility study was suggested as a first phase of its implementation.

b) Dredging would potentially increase ground water flows to Llano Grande and hence increase fresh water flow to Arroyo Colorado

c) Proposal in 2020 was not evaluated by TCEQ because project title included the word dredging and dredging is outside the scope of TCEQ 319 program. Suggest dusting proposal off and remove/limit mention of dredging. (next year Llano Grande Implementation-Feasibility Study)

4- Arroyo Colorado-Tidal: Implementation of Watershed Monitoring and Modeling Estuarine Hydrodynamics

a) AC-WPP classified the estuarine hydrodynamics of the AC as poorly characterized

b) AC is impaired

c) Thus is NPS polluted loads to the LLM are poorly understood.

d) Proposal called for characterizing the tidal forces and flux in river through a combination of continuous monitoring of stage height with ADCP to measure tidal velocities in the river. Additional flow measurements and over complete tidal cycles would enable generation of velocity-indexed discharge rating curves.

e) Modeling would be employed to assess the impact of estuarine hydrodynamics on Water Quality.

5- LRGV LID Implementation-Harlingen City Hall and Cameron County San Benito Annex

a) Goal to reduce NPS loads to the AC through the implementation of Bioretention cells such as rain gardens, bioswales, and biofilters

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