

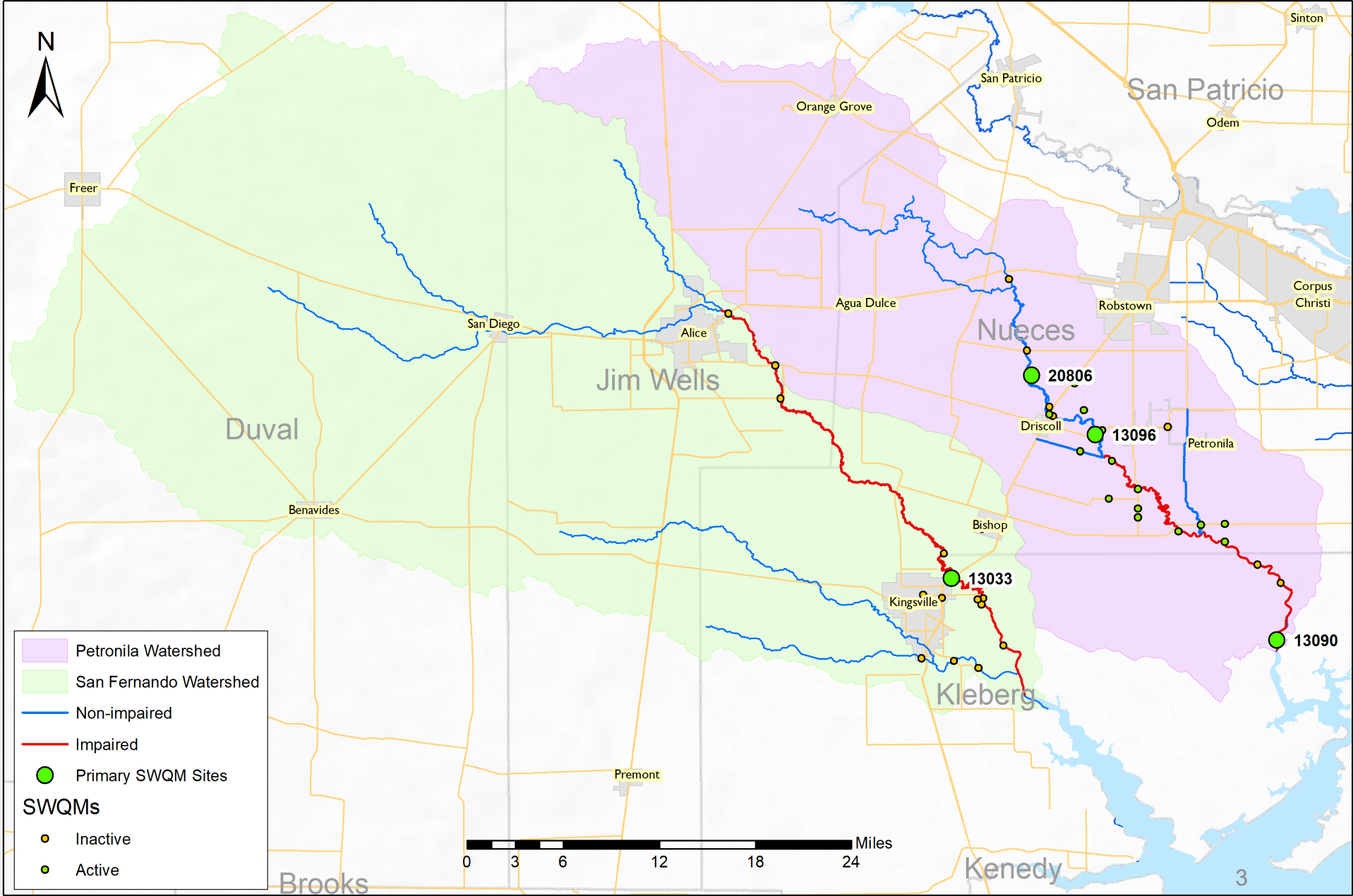
# PETRONILA AND SAN FERNANDO WATERSHED PROTECTION PLAN INTRODUCTION

Lucas Gregory – TWRI Assistant Director  
Clare Escamilla – TWRI Research Specialist  
February 23, 2021

# Topics

- Water quality standards and recent water quality
- Watershed Protection Plan overview and process
- Watershed overview and bacteria source information

# Petronila & San Fernando Creek



# Water Quality Standard

- **Primary Contact Recreation:**
  - 126 MPN/100 mL *E. coli* bacteria in freshwater
  - 35 MPN/100 mL Enterococcus bacteria in tidal waters
- Fecal indicator bacteria is used to indicate potential risk for people engaged in primary contact recreation (swimming, diving, and other activities with increased risk of water ingestion) contracting a gastrointestinal illness <sup>1</sup>

<sup>1</sup> EPA Office of Water. 2012. Recreational Water Quality Criteria. URL: <https://www.epa.gov/sites/production/files/2015-10/documents/rwqc2012.pdf>

# Petronila Creek

## 2020 Assessment<sup>1</sup>

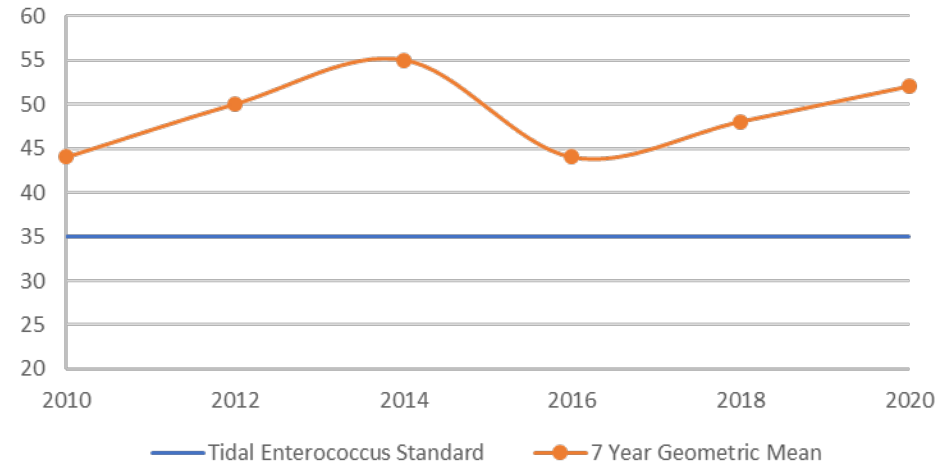
### • Contact Recreation

- Impaired since 2010
  - Enterococcus 52 MPN/100mL
  - *E. coli* = 762 MPN/100mL

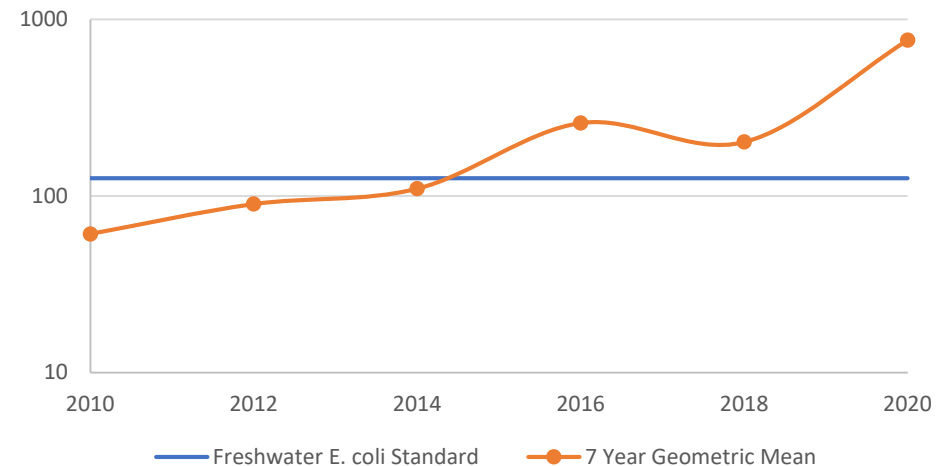
### • General Use

- Concern (Chlorophyll-a)
- TMDL in place (Chloride, Sulfate, TDS)

Petronila Creek Tidal



Petronila Creek Above Tidal



<sup>1</sup> TCEQ. 2020. 2020 Texas Integrated Report of Surface Water Quality for Clean Water Act Sections 305(b) and 303(d) .

# San Fernando Creek

## 2020 Assessment<sup>1</sup>

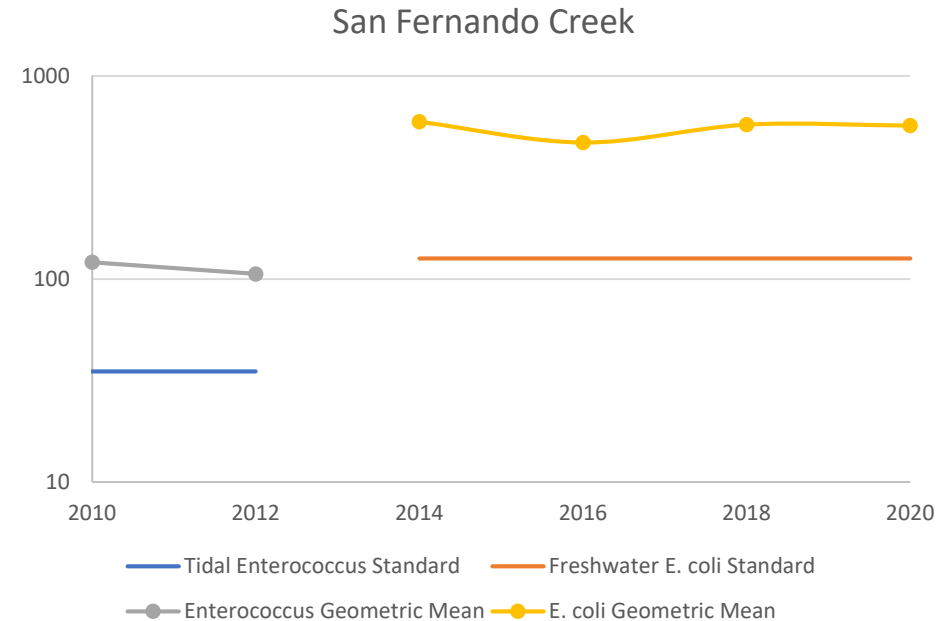
- **Contact Recreation**

- Impaired

- *E. coli* = 570 MPN/100mL

- **General Use**

- Concern (Chlorophyll-a, Nitrate, Total Phosphorus)



# OVERVIEW OF WATERSHED PROTECTION PLANS AND THE PLANNING PROCESS

# Watershed Protection Plan (WPP)

- A holistic stakeholder driven plan that addresses water quality in a watershed rather than political subdivisions
- Addresses all impairments in a watershed
- A mechanism for voluntarily addressing complex water quality problems across multiple jurisdictions
- A framework for coordinated implementation of prioritized and integrated protection and restoration strategies
- Integrates ongoing activities; prioritizes implementation projects based on technical merit and benefits to the community

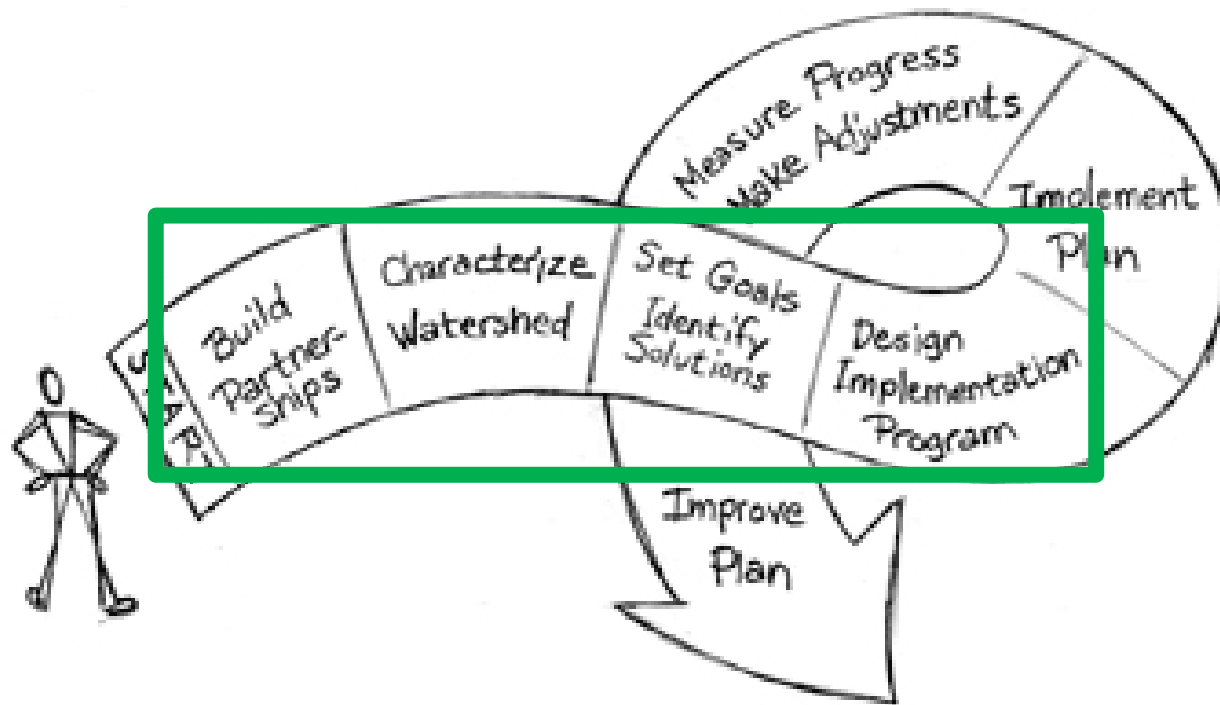


# Watershed Protection Plan (WPP)

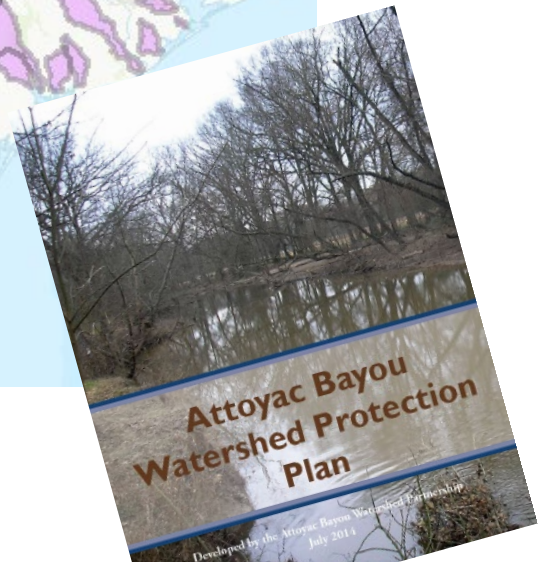
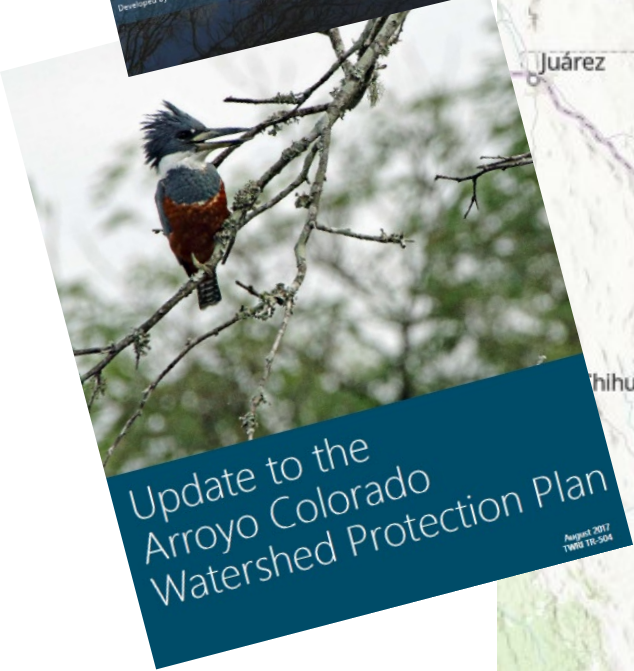
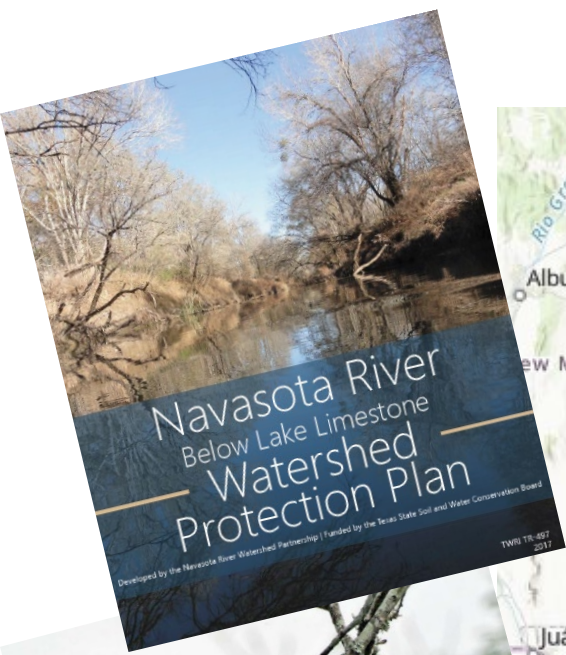
## 9 Key Elements of Successful WPPs

- Identify Causes and Sources
- Estimate Loading Reductions Needed
- Describe Management Measures
- Education and Outreach Component
- Schedule for Implementation
- Define Measurable Milestones
- Source of Financial Assistance and Estimate Costs
- Progress Indicators to Measure Reductions and Adaptive Management
- Monitoring to Evaluate Effectiveness

# WPP Process



# WPPs Across Texas



# WPP Benefits

- Identify priority areas for implementation within a watershed
- Implement to get the biggest bang for the buck
- Leverage resources of individuals, local governments, regional authorities, state and federal agencies
- Improves ability to acquire grant and loan dollars for needed work
- Incorporate adaptive management that allows plans to change over time:
  - learn as you go
- WPPs are voluntary!

# Petronila and San Fernando Creeks WPP

- Focus planning effort to address current water quality impairments
  - *E. coli* and Enterococcus
- Simultaneously address other water quality concerns
  - Chlorophyll-a and nutrients
- Develop voluntary, locally desired management strategies to improve water quality

Impetus for this project came from the Baffin Bay Stakeholder Group's desire to work toward improved water quality in Baffin Bay

Mechanism to capitalize on and compound current conservation activity in the watershed

# Project Team and Roles



- Project coordination, quality assurance, data analysis, stakeholder facilitation, WPP development



- WPP development assistance, stakeholder engagement



- Water quality monitoring, data management, stakeholder engagement



- Data and loading assessments, needed reduction estimates, stakeholder engagement, WPP development support



- Stakeholder engagement and facilitation



- Project funding, stakeholder engagement

# WATERSHED CHARACTERIZATION:

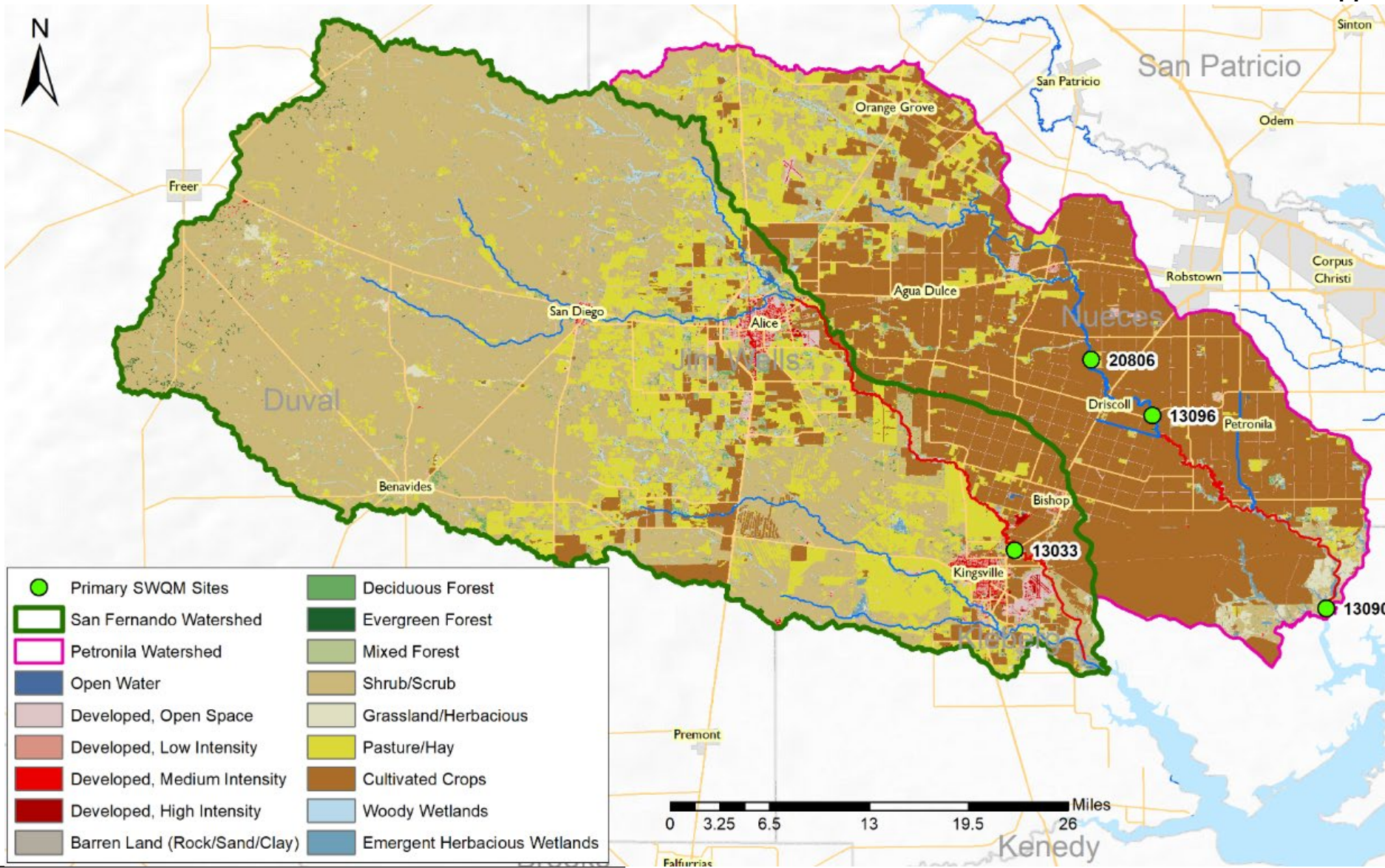
## COMMON BACTERIA SOURCES

# Population Estimates Are Important

- Used to estimate bacteria contributions
- Animal estimates strongly tied to specific land uses or covers
- Used to identify priority loading areas in the watershed
- Helps to plan future management
- Estimates Are Needed For:
  - Deer
  - Dogs & Cats
  - Feral Hogs
  - Livestock (cattle, goats, hogs, horses, sheep)
  - Septic Systems (OSSFs)
- Did we miss any major sources?



# Land Use and Land Cover Data



# Land Use and Land Cover Data

Land Cover Class	Acreage	Percentage of Watershed
Developed Area	51,414	4.1%
Barren Land	3,694	0.3%
Forest	17,640	1.4%
Shrub/Scrub	562,941	45.1%
Grassland/Herbaceous	14,956	1.2%
Pasture/Hay	194,917	15.6%
Cultivated Crop	370,329	29.7%
Wetland	29,717	2.4%
Open Water	1,494	0.1%
<b>Total Acreage</b>	<b>1,247,102</b>	<b>100.0%</b>

# How Are Estimates Derived?

## Available Data

- Local, regional, state and national data sets
- Councils of Government, AgriLife Extension, NRI, NRCS, TPWD, TWRI, USDA
  - Address data
  - Published methods
  - Population estimates
  - Stocking rates

## We Need Input from You!

- No one knows the watershed like you do
- We want your opinions on what numbers of each population are appropriate and will discuss these

# Scale Down County Level Data

Several data sets are reported on the county level

Entire county not in the watershed

County level data multiplied by respective percent of each county in the watershed

	Total area of county (acres)	Area of watershed within county (acres)	Percent of total county within watershed	Percent of watershed within each county
<b>Duval</b>	1,149,259	421,469	37%	34%
<b>Jim Wells</b>	555,730	362,488	65%	29%
<b>Kleberg</b>	578,888	189,812	33%	15%
<b>Nueces</b>	549,498	273,333	50%	22%
<b>Total</b>	2,833,374	1,247,102		100%

# National Ag Statistics Survey: NASS

- USDA effort to measure agricultural production across the nation (cattle, goats, horses, hogs, sheep)
- Conducts the Census of Agriculture every 5 years
- 2017 most recent published
- Conduct interim surveys to illustrate annual numbers (less extensive survey, but still good idea of what is in the area)

## County Level NASS Livestock Info

County	Estimated Livestock in Watershed				
	Cattle	Hog	Horse	Goat	Sheep
Duval	5,297	104	94	222	149
Jim Wells	22,022	130	695	1,660	340
Kleberg	6,257	63	145	290	104
Nueces	4,659	148	361	270	170
<b>Total</b>	<b>38,235</b>	<b>445</b>	<b>1,201</b>	<b>2,442</b>	<b>763</b>

- These estimates can be refined
  - NRCS provides recommended stocking rates for livestock
    - acres per animal unit (1,000 lbs live weight)
  - Varies by land cover: managed pasture vs. rangeland

# Wildlife Population Estimates

- TPWD estimates deer densities for deer management units across the state
  - Average # of acres per deer for the 4 counties in watershed: ~1 deer per 39 ac.
- Texas A&M wildlife department estimated feral hog density
  - # of acres per hog
  - Used a conservative estimate of 1 hog per 50 ac.

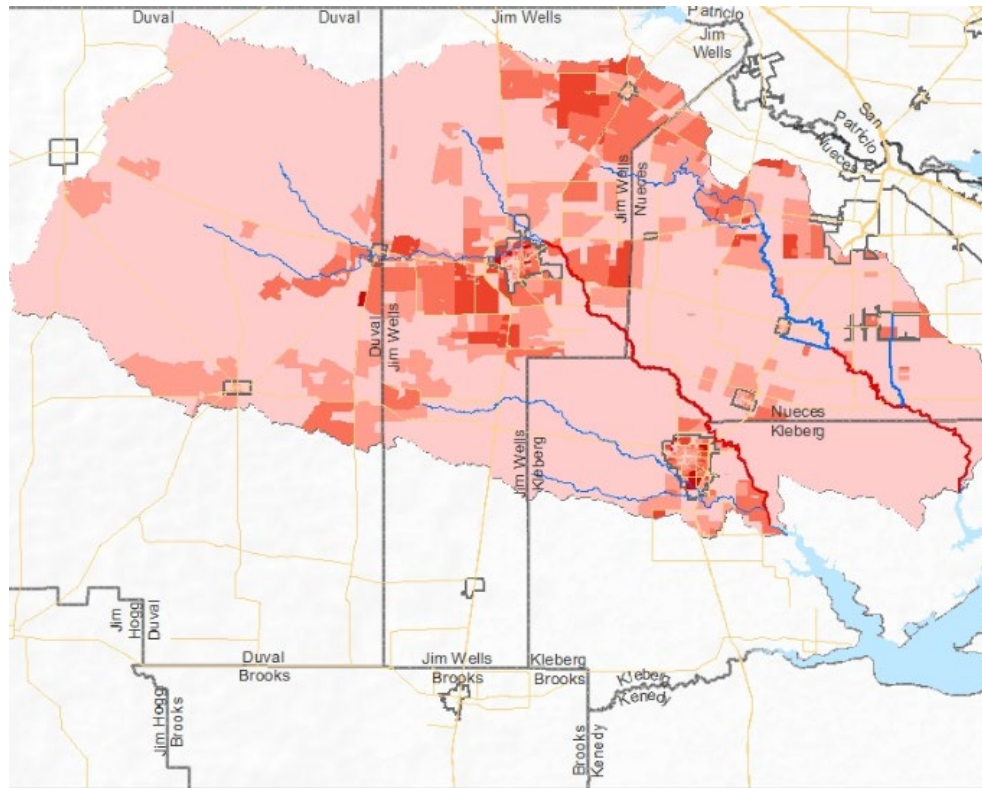
County	Estimated Wildlife in Watershed	
	Feral Hogs	Deer
Duval	8,254	6,430
Jim Wells	6,871	10,764
Kleberg	3,505	5,491
Nueces	5,180	8,114
<b>Total</b>	<b>23,810</b>	<b>30,798</b>

Deer and Hogs assumed to inhabit following land uses:

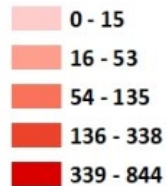
- Cropland
- Forest/Shrubland
- Pastures
- Rangeland
- Wetlands



# Human Associated Sources: Pets

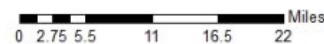


2010 Census Block Population

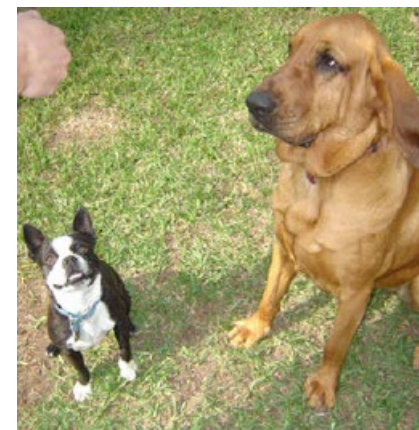


Petronila & San Fernando Creek

Sources:  
Population - US Census Bureau  
Stream Segments - TCEQ  
Counties, Cities, Roads - TNRIS

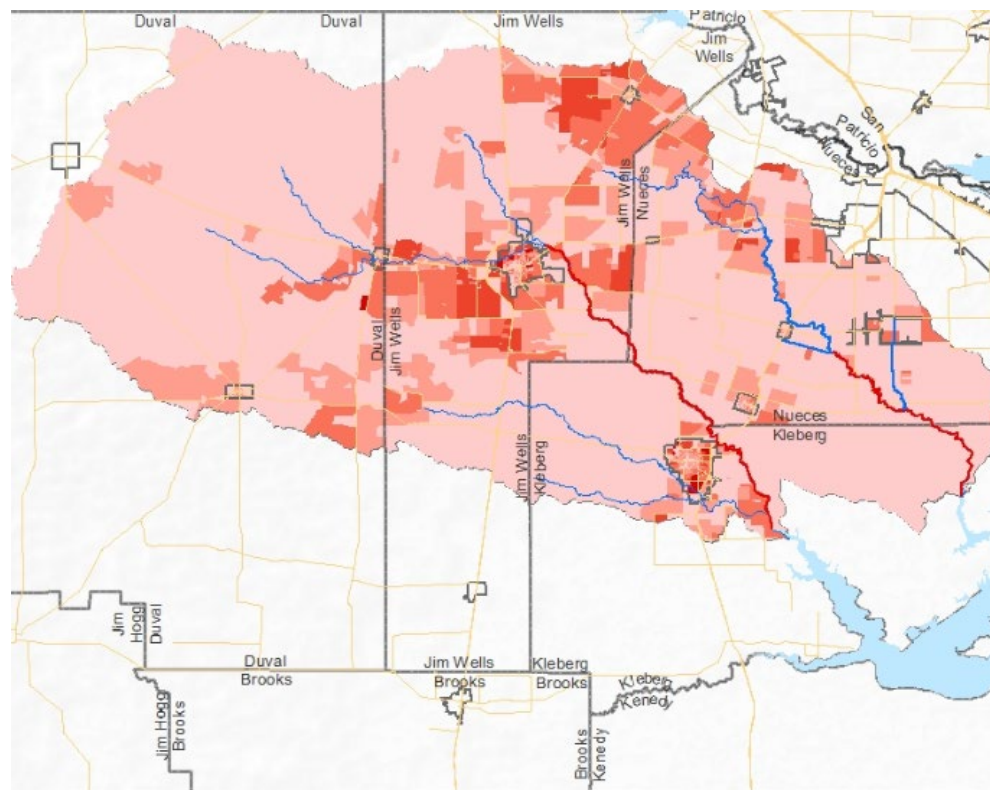


- Pets are associated with people
  - Dogs and Cats are likely contributors
  - American Vet Med. Assoc. 2012 estimated 0.584 dogs and 0.638 cats per household
  - 2010 Census recorded 32,920 individual households across the watershed
  - Dog Estimate: 19,225
  - Cat Estimate: 21,002

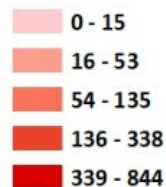




- Still working on OSSF estimations
- Based on number of households outside of wastewater service areas (assumed at city limits if unknown)
  - Census data
  - Verified with 911 address locations
- Will loosely mirror census blocks but will exclude areas served by centralized wastewater treatment
- Will work with county officials to validate estimates

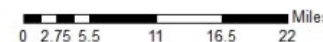


2010 Census Block Population



Petronila & San Fernando Creek

Sources:  
Population - US Census Bureau  
Stream Segments - TCEQ  
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# Human Associated Sources: Wastewater

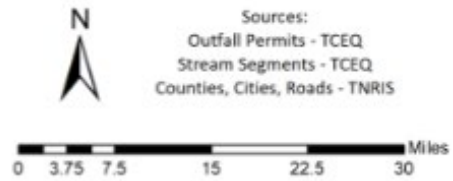
Name	Received Water Body	Design Flow (MGD)
Duval County Conservation and Reclamation District (Benavides WWTP)	San Fernando Creek	0.25
Bishop CISD	Petronila Creek	0.008
City of Bishop WWTP	Caretta Creek	0.32
Ticona Polymers Inc	San Fernando Creek	3.5
San Diego MUD 1	San Diego Creek	0.75
Agua Dulce WWTP	Agua Dulce Creek	0.16
Banquete WWTF	Banquete Creek	0.1
Orange Grove WWTF	Leon Creek	0.2
Kingsville III WWTF	Tranquitas Creek	3.0
Kingsville I WWTF	Santa Gertrudis Creek	1.0
Coastal Bend Detention Center WWTF	Petronila Creek	0.15
US Ecology Texas Inc.	Petronila Creek	
Southside WWTF (Alice)	Lattas Creek	2.6
Northeast WWTF (Alice)	San Fernando Creek	2.02



**Active Permitted WWTP**

- 1: Alice Northeast WWTF
- 2: Alice Southside WWTF
- 3: Banquete WWTF
- 4: Bishop CISD
- 5: City of Bishop WWTP
- 6: City of Agua Dulce WWTP
- 7: Coastal Bend Detention Center WWTF
- 8: Duval Co Conservation and Reclamation Dist
- 9: Kingsville I WWTF
- 10: Kingsville III WWTF
- 11: Orange Grove WWTF
- 12: San Diego MUD 1
- 13: Ticona Polymers Inc
- 14: US Ecology Texas Inc

**Petronila & San Fernando Creek**



# Human Associated Sources: Population Growth

- Expected growth is also considered in OSSFs and WWTFs
- Population estimate for the watershed in 2010 was 83,846
- Considerable growth projected over the next 50 years by office of the State Demographer

County	Population by Year							2070 Increase (from 2010)
	2010	2020	2030	2040	2050	2060	2070	
Duval	11,782	12,715	13,470	14,098	14,644	15,080	15,435	31.0%
Jim Wells	40,838	44,987	48,690	52,052	55,533	58,600	61,410	50.4%
Kleberg	32,061	35,567	38,963	42,202	45,324	48,251	50,989	59.0%
Nueces	340,223	374,157	407,534	428,513	440,797	449,936	456,056	34.0%

## Next Steps: Refine Source Estimates and Set Goals

- Will work with watershed stakeholders to refine bacteria source estimates
  - Goal is to arrive at a reasonable average value for source contributions
- Identify needed bacteria load reductions to meet water quality standards
- Work with stakeholders to begin developing management recommendations to achieve needed load reductions

# WPP Stakeholder Organizational Framework and Decision-Making Processes

*Lucas Gregory*

*Texas Water Resources Institute*

*February 23, 2021*



# Goals of the WPP



- Address impairments in Petronila & San Fernando Creeks (eventual de-listing from 303d List)
- Address other watershed concerns
- Achieve consensus in WPP development
- Facilitate implementation support and participation

# Keys to a Developing Successful WPP

- ⦿ Involve a diversity of interests
- ⦿ Collaborative decision-making
  - Work to achieve joint goals and priorities
- ⦿ Decision-making based on sound science and accurate information
- ⦿ Build consensus around plan components
  - Get things to a point everyone is good with
- ⦿ Strong communication and outreach
- ⦿ Short-term doable action items and long-term objectives/goals



# What is a Stakeholder

- ⦿ A group or individual who:
  - ⦿ Is concerned about the watershed
  - ⦿ Is affected by the decision
  - ⦿ Assists with problem identification
  - ⦿ Promotes awareness, education, and action
  - ⦿ Has the responsibility for implementing a decision
  - ⦿ Facilitates implementation of solutions



# Types of Stakeholders

*Stakeholders can belong to the following entities:*

- ⊙ Landowners
- ⊙ County or regional representatives
- ⊙ Local municipal representatives
- ⊙ State and federal agencies
- ⊙ Business and industry representatives
- ⊙ Citizen groups
- ⊙ Community service and Religious organizations
- ⊙ Universities, colleges, and schools
- ⊙ Environmental and conservation groups
- ⊙ Soil and water conservation districts

# Major Tasks for Stakeholders

- ⦿ Provide guidance and input on potential pollutant sources and estimated pollutant loads
- ⦿ Set plan goals and objectives
- ⦿ Guide identification of measures that could be implemented to address bacteria and other concerns
- ⦿ Identify outreach and education that is needed
- ⦿ Oversee development of an implementation plan & schedule

# Goals for Today

- ⦿ Overview potential organizational structures and decision-making approaches to facilitate WPP development
- ⦿ Highlight roles of various groups
- ⦿ Make recommendations for organization based on experience from other watersheds
- ⦿ Solicit feedback on preferred approach
  - ⦿ Will be done via an online form
    - ⦿ Link is posted in the chat box
    - ⦿ Will also be emailed to you after the meeting today

# WPP Stakeholder Group Framework



# Potential Groupings

- ⊙ **Workgroup** – Groups made up of stakeholders of a similar interest/background
  - ⊙ Meet frequently over a short period of time
  
- ⊙ **Coordination Committee** – decision making body made up of stakeholders from diverse interest/backgrounds
  - ⊙ Meet as needed to discuss decisions
  - ⊙ Meetings open to the public
  
- ⊙ **WPP Stakeholder Group** – The general body of individuals who participate in public meetings
  - ⊙ Broad informational meetings

# Recommended Groupings

- ⦿ **Workgroup** – develop recommended content for the WPP
  - ⦿ Expected to be 3 – 4 meetings at most
  - ⦿ Likely on a monthly basis
  
- ⦿ **Coordination Committee** – review content recommendations and determine WPP content
  - ⦿ Expected to meet ~4 times over course of WPP development
  - ⦿ Likely on a near quarterly schedule
  - ⦿ Meet when decisions need to be made
    - ⦿ Content approval
    - ⦿ Draft WPP overview and discussion
    - ⦿ WPP review and discussion
    - ⦿ WPP comments and revisions

# Coordination Committee Overview

- ⦿ Core group of watershed stakeholders
- ⦿ Members equally representative of watershed stakeholders in the review of the WPP
- ⦿ Facilitates active coordination amongst stakeholder interest groups:
  - ⦿ Identify desired WQ condition and measurable goals
  - ⦿ Prioritize programs and practices to achieve those goals
  - ⦿ Review and comment on WPP content during development
  - ⦿ Communicate with interested parties in the watershed about the WPP

# Prospective Committee Members

Counties: Nueces, Kleberg, Jim Wells, and Duval

- ⊙ Citizens
- ⊙ County Extension Agents
- ⊙ Soil and Water Conservation Districts
- ⊙ County Judges or Commissioners
- ⊙ Nueces River Authority
- ⊙ USDA- Natural Resources Conservation Service
- ⊙ NAS Kingsville
- ⊙ City of Kingsville, Bishop, Alice, Agua Dulce, Driscoll, etc.
- ⊙ Landowners
- ⊙ Ag Producers
- ⊙ County Health Inspectors or Designated Representatives (OSSFs)
- ⊙ Subdivision or homeowner's association
- ⊙ Local Groundwater Conservation Districts
- ⊙ Local Industries
- ⊙ Wastewater Treatment Plants
- ⊙ City Public Works Department/Urban Planning Departments
- ⊙ Universities/Conservation Groups
- ⊙ Others



# Coordination Committee Feedback

Please provide via the form:

- ⦿ Are there any critical groups that we need to include in the process?
- ⦿ Groups listed that should be removed?
- ⦿ Any specific person(s) that should be included to better represent the listed groups?
  - ⦿ Please provide contact info if available
- ⦿ Other Ideas or Discussion?

# Work Group Roles

- ⦿ Responsible for reviewing source estimates, recommending implementation strategies, setting goals and priorities to include in the WPP
- ⦿ Each work group will only focus on work group specific issues
  - ⦿ Example: wastewater work group focuses on solutions related to *E. coli* loading from human wastewater only
- ⦿ Work with facilitator to draft and refine WPP content specific to the work group

# Possible Work Groups

## Work Groups to consider:

- Agricultural Issues
- Coordination and Policy
- Education and Outreach
- Habitat/Wildlife
- On-Site Sewage/OSSF
- Ordinance and Planning
- Natural Resource Management
- Science and Monitoring
- Urban Storm Water
- Wastewater Infrastructure

## Suggested Work Groups for Petronila and San Fernando Creeks :

- Stormwater
- Agricultural & Rural Concerns
- Wastewater & OSSFs
- Monitoring & Science

# Suggested Work Group Structure

- ⦿ Members should provide adequate representation from needed parties
  - ⦿ Preferably 6 – 10 workgroup members
- ⦿ Have at least 2 work group members serve on Coordination Committee
  - ⦿ Serve as a liaison to Coordination Committee that provides work group updates
- ⦿ Adhere to same ground rules as Coordination Committee

# Decision-Making Processes



# Importance of Decision-Making

- ⊙ Decision-making process is critical to the development of the WPP
- ⊙ Mechanisms used effect the efficiency of WPP development process
- ⊙ Number of decision makers can have a significant influence
  - ⊙ Too many can get unruly
  - ⊙ Too few won't reflect diversity of watershed interests
- ⊙ Decision-making process informs what is included in the WPP

# Possible Decision-Making Processes

## ⦿ Formal

- ⦿ Established bylaws that govern the actions of the committee
- ⦿ Adhere to Open Meeting Act Requirements
- ⦿ Formal voting of designated Coordination Committee Members only

## ⦿ Informal

- ⦿ Use ground rules to govern coordination committee and work groups
- ⦿ Strive to have most stakeholder groups represented in meetings
  - ⦿ Will also seek feedback via email/phone as needed
- ⦿ Decision making via consensus building

# Ground Rules Examples

## ○ Geronimo Creek – More Formal

- Goals
- Powers
- Timeframe
- Membership Selection
- Steering Committee
- Workgroup
- Technical advisory
- Replacement/additions
- Alternates
- Decision making
- Quorum
- Facilitators

## ○ Upper Gulf Coast Oyster Waters – Less Formal

- No formal voting committee/representative
- Speak up
- Disagree respectfully
- Silence is presumed consent
- Listen during discussions
- Respect opinions and don't criticize people
- Be open to new ideas
- Silence cell phones
- Have fun



# Recommended Approach for Petronila & San Fernando Creek

- ⦿ Informal approach to group organization
  - ⦿ Follow ground rules and make decisions via consensus
  
- ⦿ Work Groups focus on developing management recommendation to address respective pollutant sources
  
- ⦿ Coordination Committee reviews Work Group recommendations and determine WPP content

# Next Steps and Timeline

*Clare Escamilla*

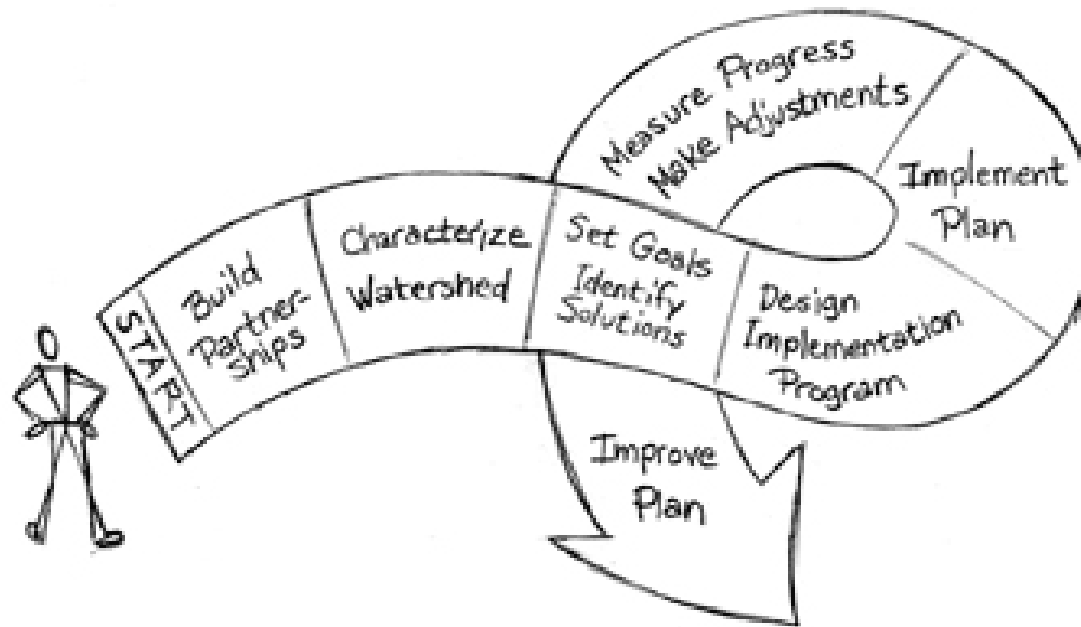
*Research Specialist II*

*Texas Water Resources Institute*



# Next Steps – Near Term

- ◎ Fill out the online form to help structure workgroups, meetings,
- ◎ Host workgroup meetings:
  - ◎ Location and Time: TBD by specific workgroup – March-May



# Upcoming Events

- ⦿ Water Quality and Fisheries
- ⦿ March 3, 2021
- ⦿ 6PM – 8PM
- ⦿ Virtual
- ⦿ RSVP:  
[ashmarie@tamu.edu](mailto:ashmarie@tamu.edu)



## Keeping Your Bay Healthy & Productive

Baffin Bay supports high recreational and commercial fishery landings in Texas. It contains distinct and rare serpulid reefs as well as critical habitat for migratory birds and other wildlife. Current water quality impairments and degradation have raised local concern about its health and future. An existing local Baffin Bay Stakeholder Group, consisting of fishermen, landowners, farmers, ranchers, business owners, local government, and agencies would like to expand protection efforts. The development of a locally driven plan for voluntarily addressing issues through a unified approach provides an advantage when seeking funding for improvement projects. Please join us and share feedback on your vision for the future of Baffin Bay.

RSVP: [ashmarie@tamu.edu](mailto:ashmarie@tamu.edu)

### Agenda Items

- Presentation on Baffin Bay's importance and overview of watershed protection planning process;
- Presentations on past and current research efforts;
- Panel Session with Q&A: academic researchers, local fishing guides, commercial fishermen, agencies
- Breakout sessions: Attendees provide input on concerns, and prioritizing needs, and assets of the Bay to continue setting short and long-term goals for the Bay.

*Full Agenda with ZOOM link to Follow*

**Virtual Workshop**  
**March 3, 2021**  
**6:00-8:00 p.m.**

### Contact Project Team at:

Morgen (979) 324-5024  
Ashley (248) 229-5222

### Local Support:



# Overall Timeline

- ⦿ **March 2021 – May 2021: Workgroup meetings**
- ⦿ June 2021: Coordination Committee Meeting to present workgroup recommendations (Open to the Public)
- ⦿ June 2021 – August 2021: Develop draft WPP
- ⦿ Fall 2021: Coordination Committee Meeting to present draft plan (Open to the Public)
- ⦿ Late Fall 2021 – Edit WPP based on comments from stakeholders, TSSWCB, TCEQ, EPA
- ⦿ Early Winter 2022- Coordination Committee Meeting to discuss comments received from agencies
- ⦿ Winter 2022 – submit final WPP to EPA
- ⦿ **May 2022 – Project ends have final WPP completed**

# Thank You!

Project websites:

<https://twri.tamu.edu/baffinwpp>

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