



Guadalupe-Blanco River Authority

Your Trusted  
Water Resource



# Guadalupe River Habitat Conservation Plan

THIRD PUBLIC STAKEHOLDER MEETING

September 28, 2023



# GRHCP Information and Updates



# New GRHCP Project Staff

Daniel Large, HCP Policy Director, GBRA



Lucas Bare, ICF Project Manager



# Frequently Asked Questions (FAQs)

GBRA.ORG

## Frequently Asked Questions



What is a Habitat Conservation Plan (HCP)?



What is an Incidental Take Permit (ITP)?



What is "Take"?



What is the proposed duration of the plan?



What are Covered Species and how are they chosen?



References



[www.gbra.org/environmental/habitat-conservation-plan/](http://www.gbra.org/environmental/habitat-conservation-plan/)



# Available Online Documents

## Documents



DATE	PRESS RELEASE
July 2021	<a href="#">GBRA to Develop Habitat Conservation Plan for the Guadalupe River</a>
DATE	TECHNICAL MEMORANDUM
April 14, 2023	<a href="#">Methods/Models For Determining Species/Habitat Impacts – Impact Assessment For Covered Mussels Species</a>
December 1, 2022	<a href="#">Climate Change Information and Recommended Approaches</a>
October 14, 2022	<a href="#">Hydrological Modeling Needs</a>
October 2022	<a href="#">TAG Review Flowchart</a>
September 9, 2022	<a href="#">Covered Activities for the Guadalupe River Habitat Conservation Plan and Incidental Take Permit</a>
August 1, 2022	<a href="#">Second Party Take: Options for Coverage and Next Steps for Initiating the Stakeholder</a>
July 21, 2022	<a href="#">TAG Review Process</a>
July 19, 2022	<a href="#">TAG Purpose Overview</a>
January 17, 2022	<a href="#">Proposed Covered Species for the Guadalupe River Habitat Conservation Plan and Incidental Take Permit</a>
December 17, 2021	<a href="#">Proposed Plan Area for the Guadalupe River Habitat Conservation Plan and Incidental Take Permit</a>
December 17, 2021	<a href="#">Permit Term for the Guadalupe River Habitat Conservation Plan and Incidental Take Permit</a>
October 4, 2021	<a href="#">GRHC Project Goals</a>



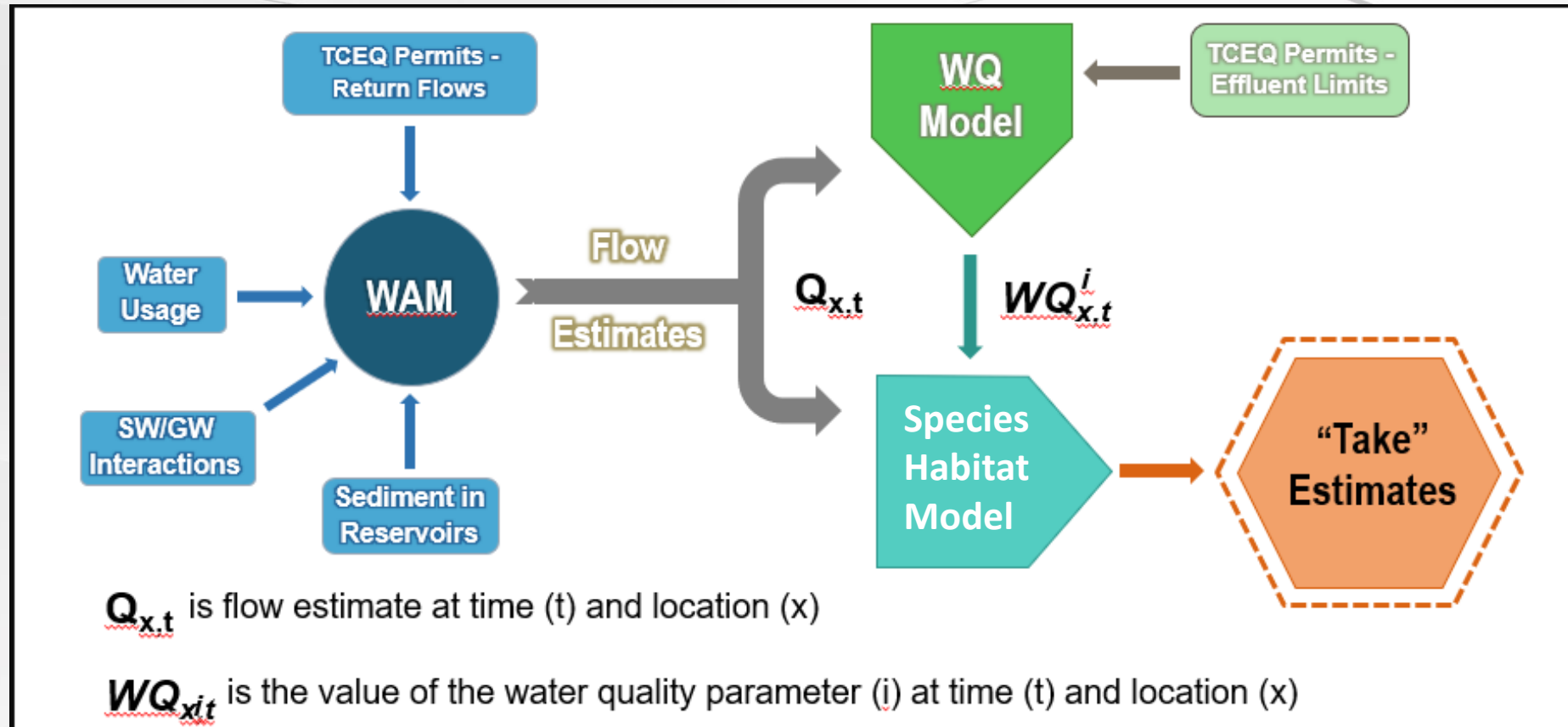
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# Water Availability Modeling

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# GRHCP Hydrologic Modeling Approach





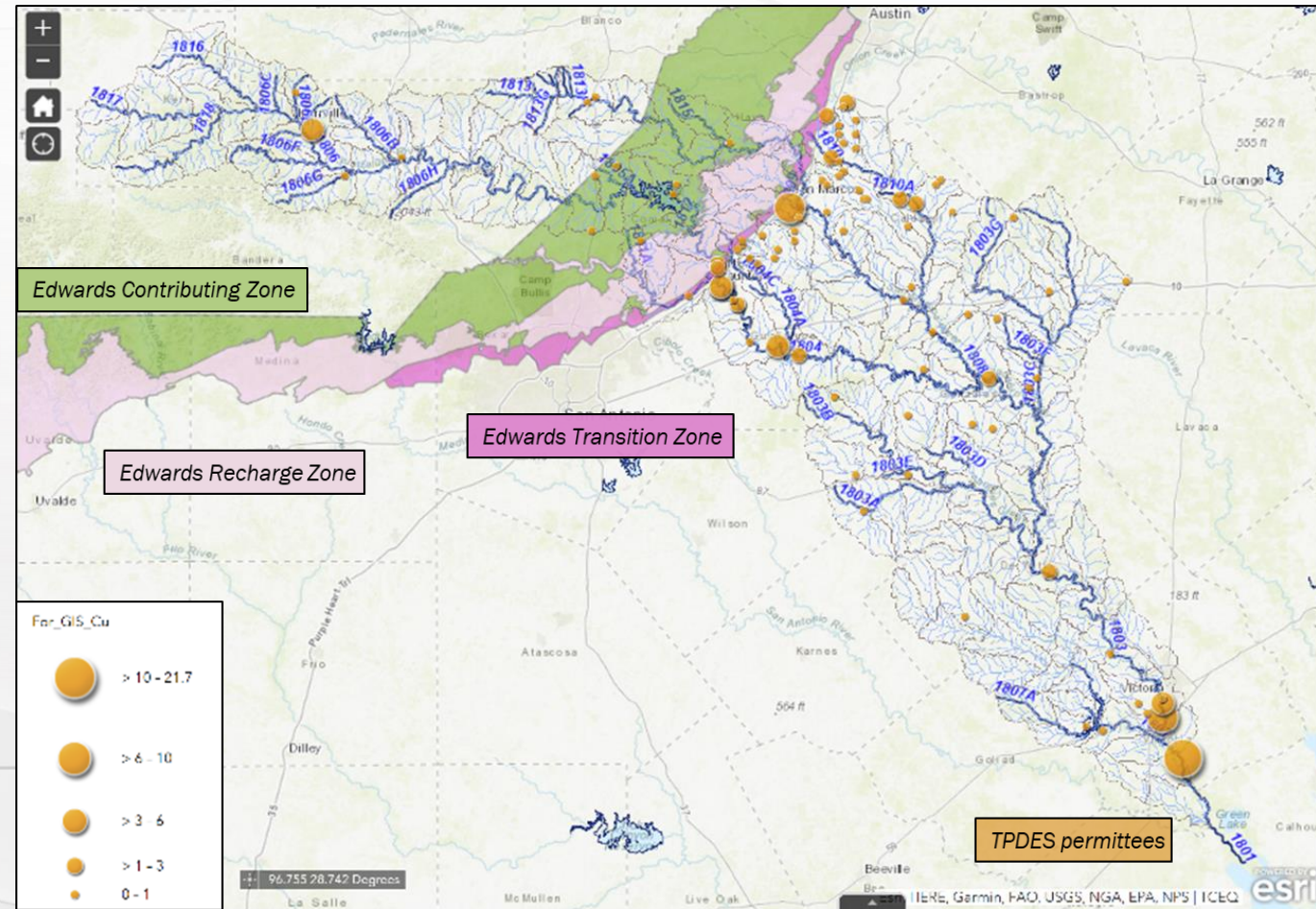
# Surface Water Modeling Scenarios

Table 2<sup>1</sup>. Summary of Surface Water Model Scenarios and General Surface Water Modeling Assumptions

Scenario	Scenario Purpose	Flow and Related Attributes	Covered Activities (GBRA and 2 <sup>nd</sup> Parties)		Other Entities		Large Dams or Other Existing Infrastructure/ Sediment Conditions	Conservation Measures	Climate Change	
			Water Use & Operations	Return Flows	Water Use & Operations	Return Flows				
Initial Scenarios										
1	Reference	Baseline for HCP impact analysis	Current water management in the basin without GBRA & 2 <sup>nd</sup> Parties Covered Activities	No	No	Yes/Current	Yes/Current	Yes/ Current Sediment Conditions for All Large Reservoirs <sup>(a)</sup>	No	No
2a	Covered Activities	Impact Analysis and Take Estimates	Current water management in the basin with future GBRA & 2 <sup>nd</sup> Parties Covered Activities (full water rights)	Yes/Future (full water rights)	Yes/Future (full water rights)	Yes/Current	Yes/Current	Yes/Current Sediment Conditions for All Large Reservoirs Except Canyon & 2 <sup>nd</sup> Party Reservoirs <sup>(b)</sup>	No	No
2b	Future Usage	Contextualize Impacts based on Future Usage	Future water management in the basin with future GBRA & 2 <sup>nd</sup> Parties Covered Activities (projected usage)	Yes/Future (Region L+) <sup>e</sup>	Yes/Future (Region L+)	Yes/Future (Region L+)	Yes/Future (Region L+)	Yes/Future Projected Conditions	No	No
Subsequent Scenarios										
3	Climate Change	Assess feasibility of future mitigation efforts	Use future evaporation, precipitation, and streamflow projections (TBD)	Yes/Future	Yes/Future	Yes/Future	Yes/Future	Yes/Future	No	Yes
4	Conservation Strategy	Assess extent to which conservation measures mitigate take	Proposed future operations plus conservation flows and restoration	Yes/Future	Yes/Future	Yes/Future	Yes/Future	Yes/Future (Other than infrastructure to be removed – e.g., dams removed for HCP)	Yes	TBD
5	Conservation Strategy with Alternatives <sup>(c)</sup>	Assess extent to which alternative conservation measures mitigate take	Proposed future operations plus conservation flows and restoration for alt. conservation strategies	Yes/Future	Yes/Future	Yes/Future	Yes/Future	Yes/Future (Other than infrastructure to be removed – e.g., dams removed for HCP)	Yes	TBD

# TCEQ QUAL-TX Models

- QUAL-TX models
  - Used by TCEQ in making water-quality permit decisions
- Typically, TCEQ performs QUAL-TX modeling for all permittees
- GBRA is modifying the protocol to focus on ammonia and dissolved oxygen





# Species Impact Methodologies

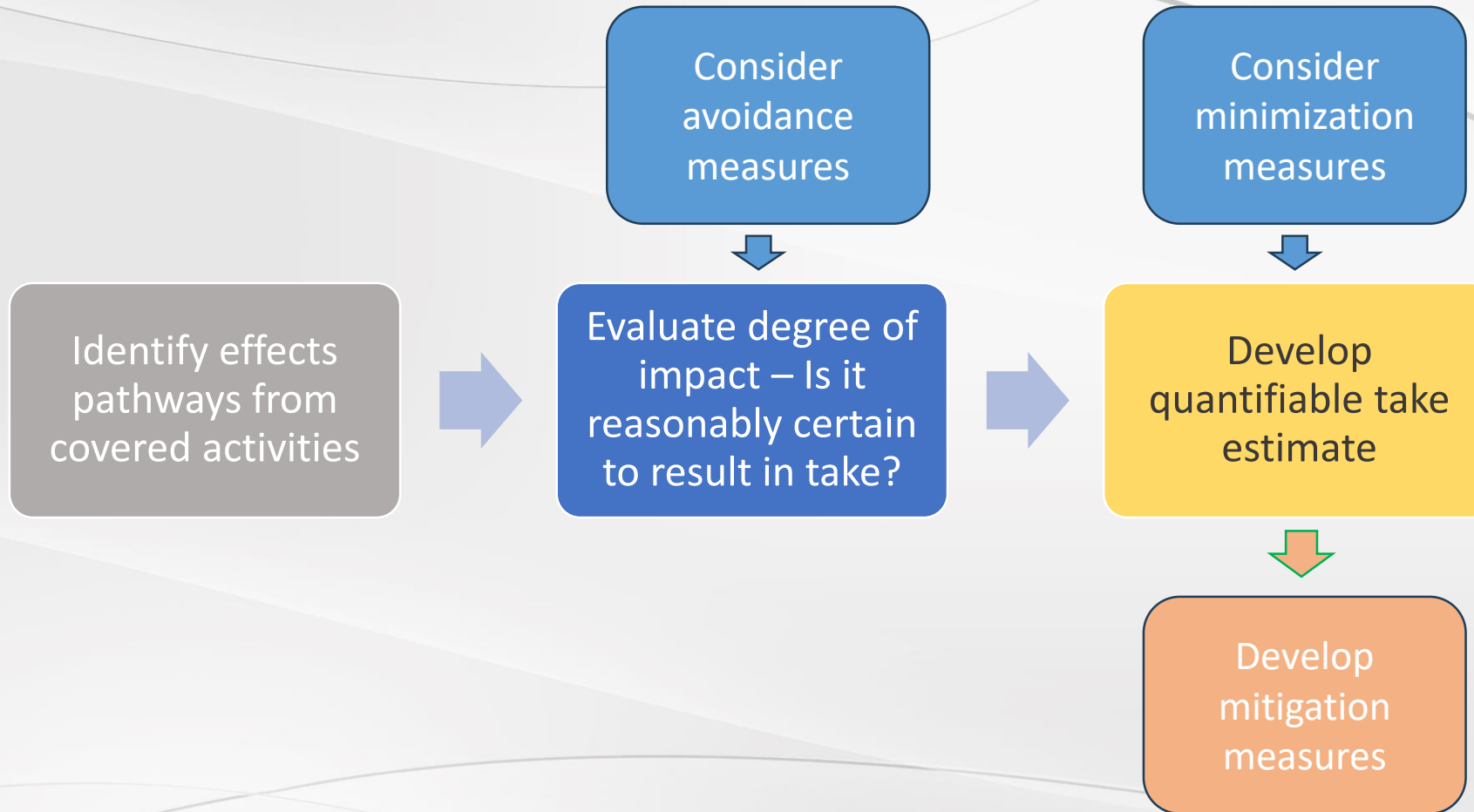




# GRHCP Covered Species



# Impact Assessment Framework



# GRHCP Species



## Covered Species

- Coastal Birds
  - Whooping crane
  - Eastern black rail
- Freshwater mussels
  - Guadalupe fatmucket
  - Guadalupe orb
  - False spike
- Fish
  - Guadalupe darter

## Avoidance Species

- Golden-cheeked warbler
- Monarch butterfly



## Considered but Not Covered

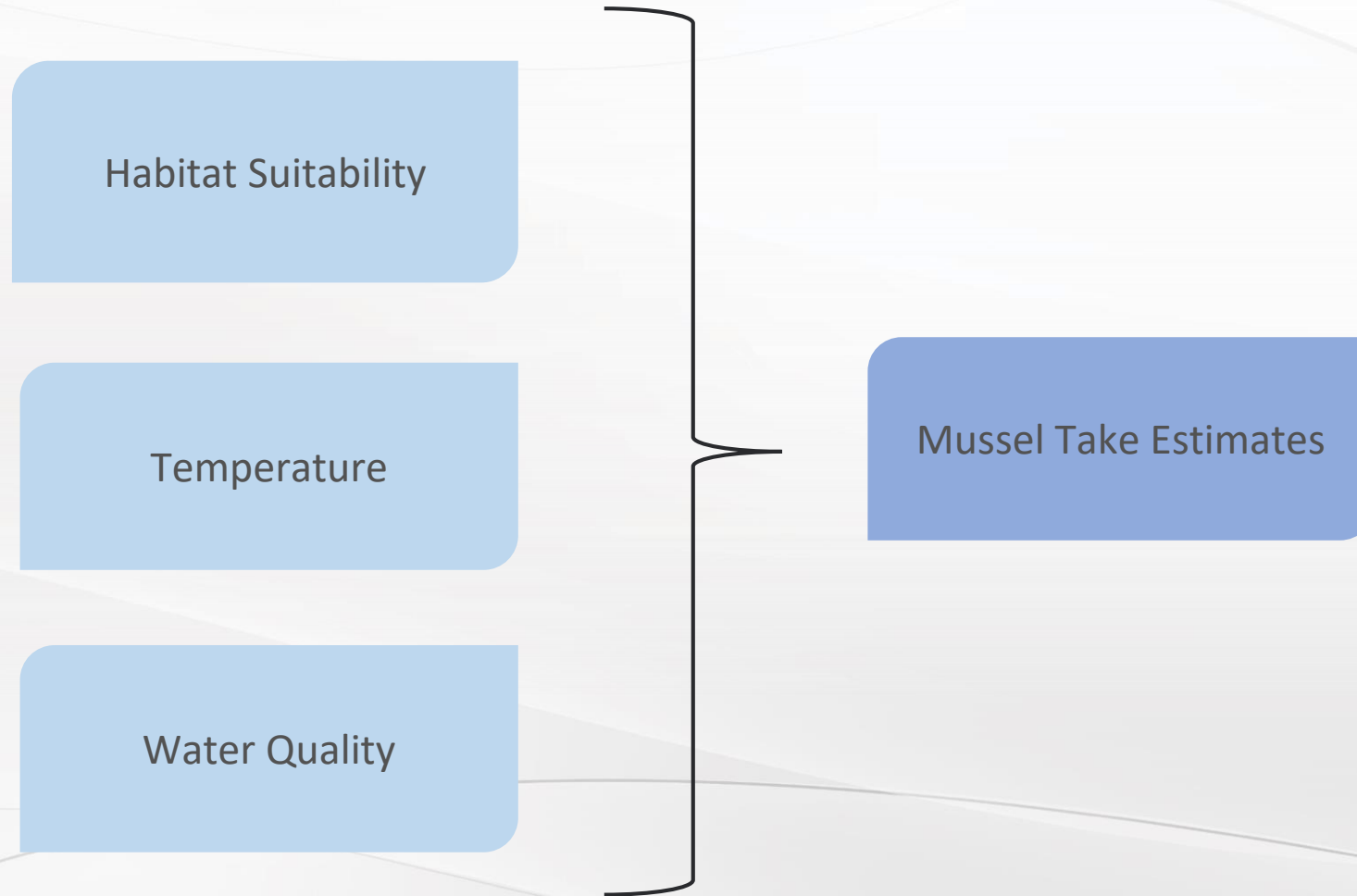
- Springs-associated Salamanders
  - Fern bank salamander
  - Cascade Caverns salamander
  - Undescribed *Eurycea* sp.
- Shorebirds
  - Red knot
  - Piping plover
- Fish
  - Roundnose minnow
  - Guadalupe bass
  - American eel
  - Burrhead chub
- Mammals
  - Jaguarundi



# Mussels



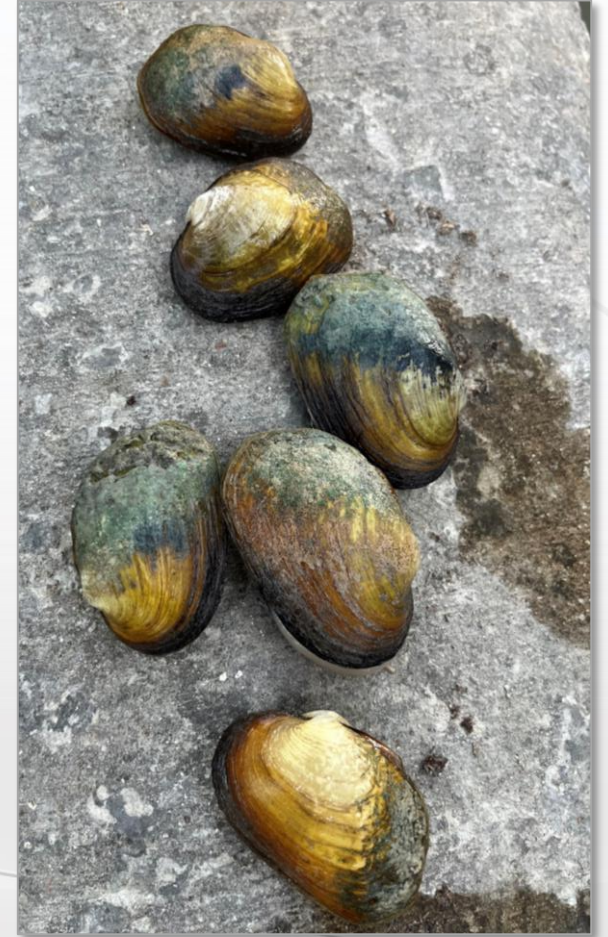
# Mussel Impact Estimation



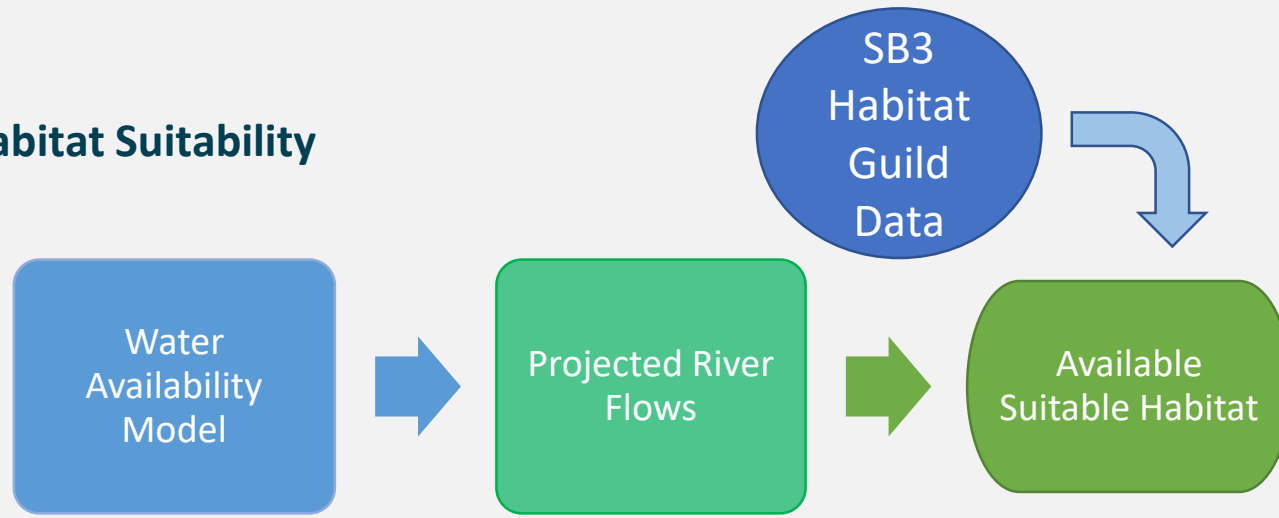


# Habitat as a Surrogate for Estimating Take

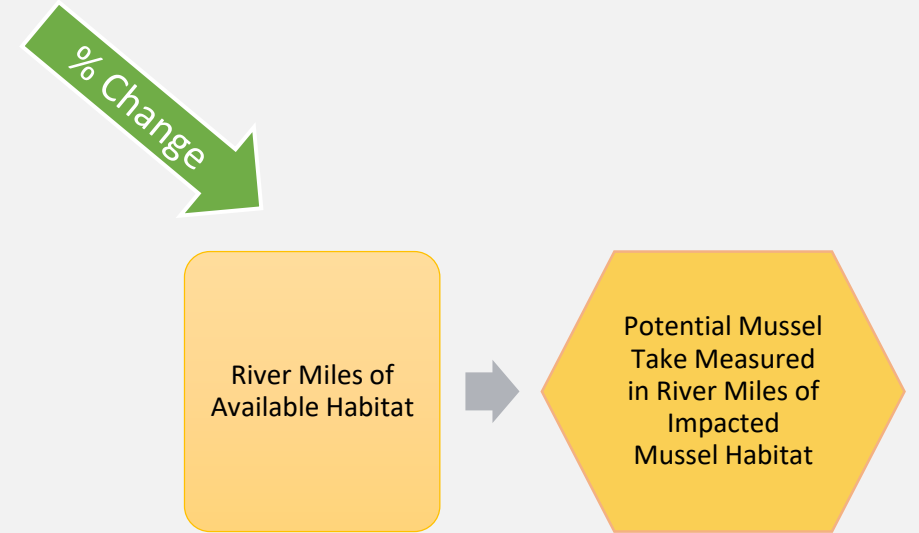
- Mussel detection probabilities are low, with clumped distributions
- “Take can be quantified in a number of ways, such as numbers of affected individuals, nesting groups, **or a surrogate measure like acres of habitat or stream miles**” (USFWS ITP and HCP Processing Handbook, 2016, p. 8-2)
- **Occupied Habitat (measured in river miles)**
  - Assumes positive relationship between occupied stream miles and mussel population
  - Consistent with USFWS methods (SSA) and other recent Texas efforts (BRA CCAA)



## Habitat Suitability



## Methodology for Estimating Mussel Take





# Salamanders

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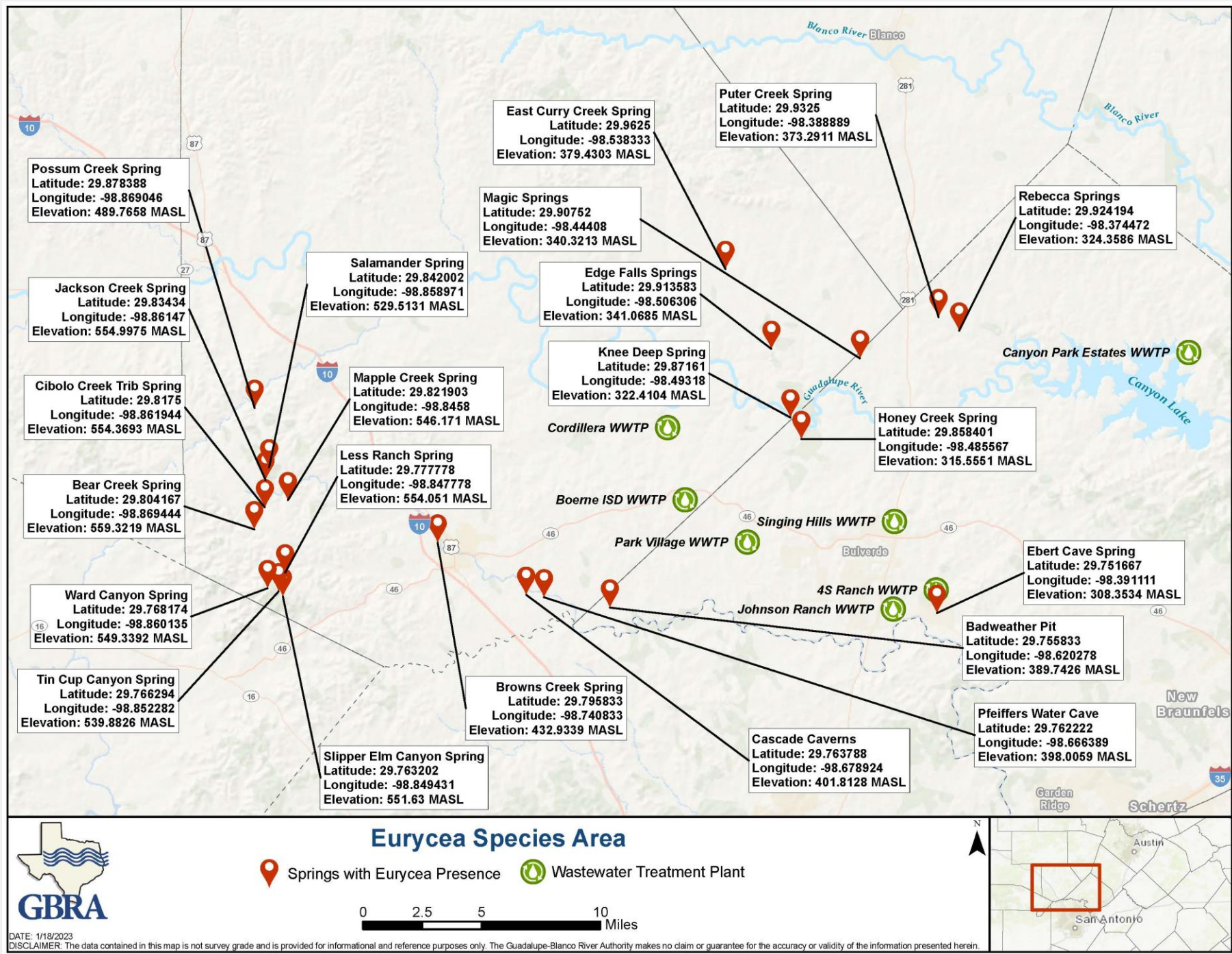


# Salamander Impact Estimation for GBRA Facilities

- Elevation of wastewater treatment facilities (WWTFs) vs. springs/karst
- Hydrologic barrier between WWTFs and springs/karst
- Receiving stream (intermittent or perennial)
- Effluent discharge method (land application or direct discharge)
- Distance between WWTFs and river/karst feature
- Literature on water quality impacts to *Eurycea*

Potential  
Salamander  
Impacts



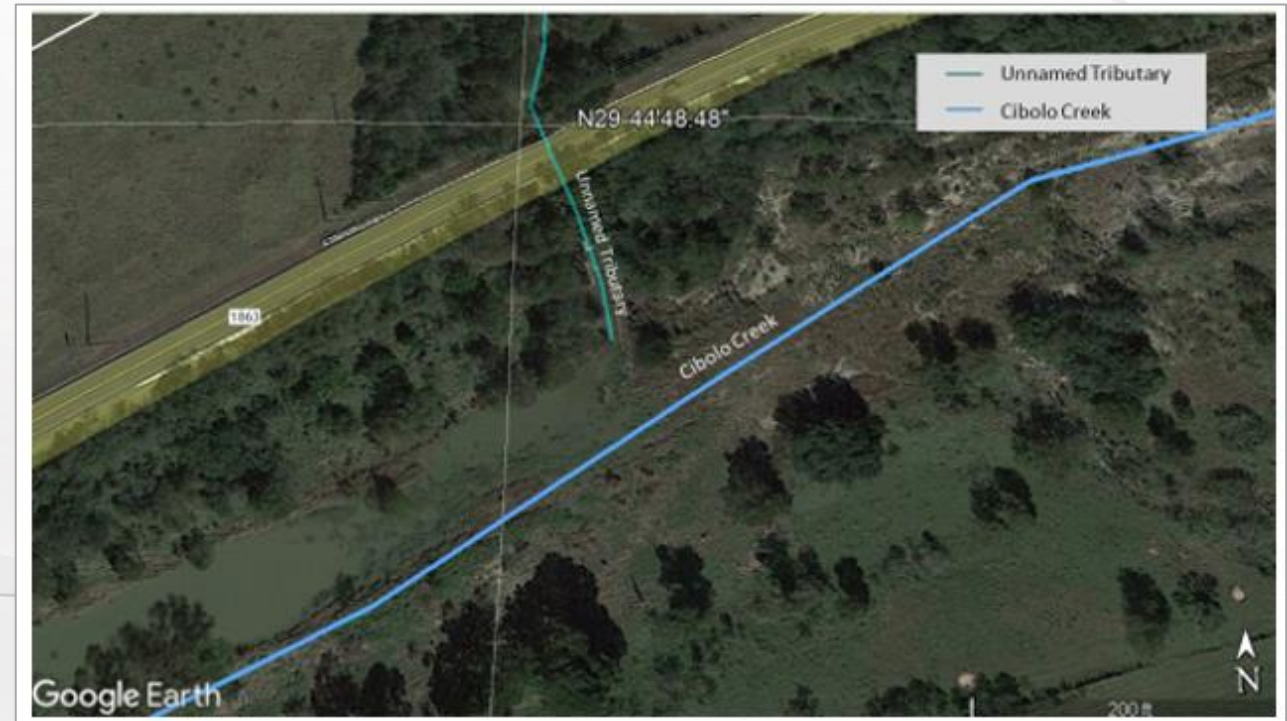
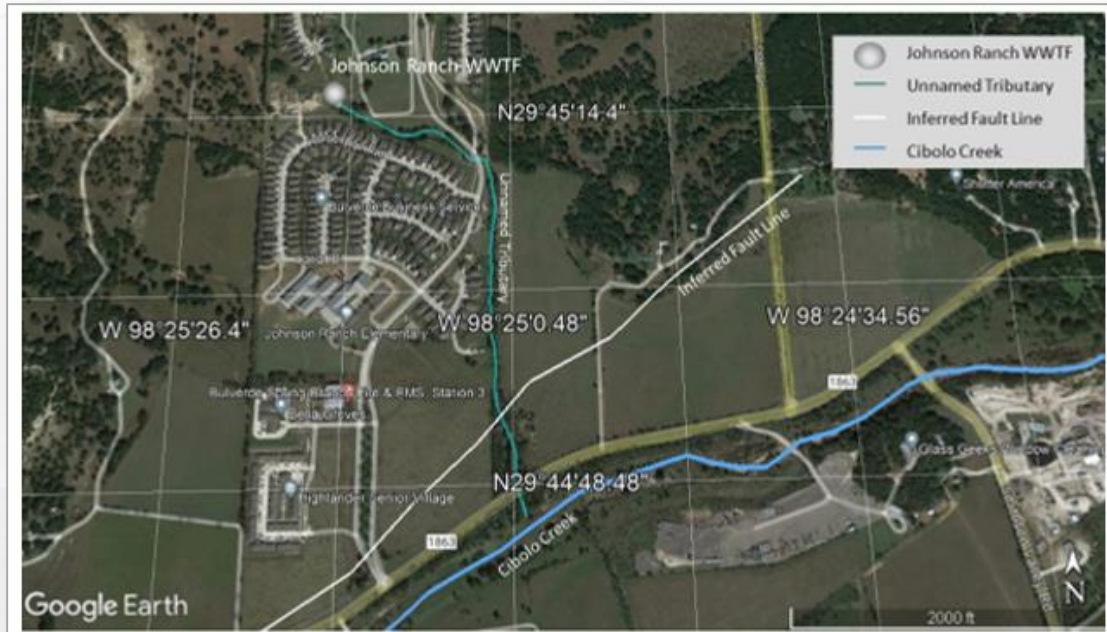


DATE: 1/18/2023

DISCLAIMER: The data contained in this map is not survey grade and is provided for informational and reference purposes only. The Guadalupe-Blanco River Authority makes no claim or guarantee for the accuracy or validity of the information presented herein.



# Karst feature analysis - Johnson Ranch WWTF





Conclusion: GBRA and  
Second Party covered  
activities are not reasonably  
certain to cause take  
of spring-associated  
salamanders



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# Whooping Crane and Eastern Black Rail





# Whooping Crane & Eastern Black Rail Impact Estimation

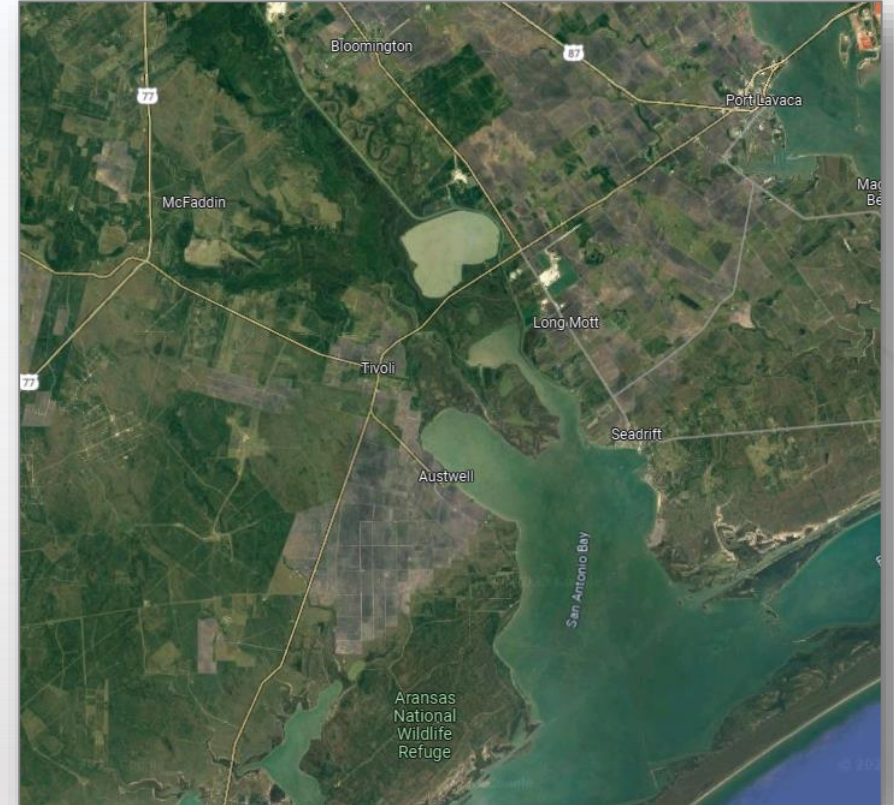
## Habitat

- Inundation
- Salinity
- Vegetation

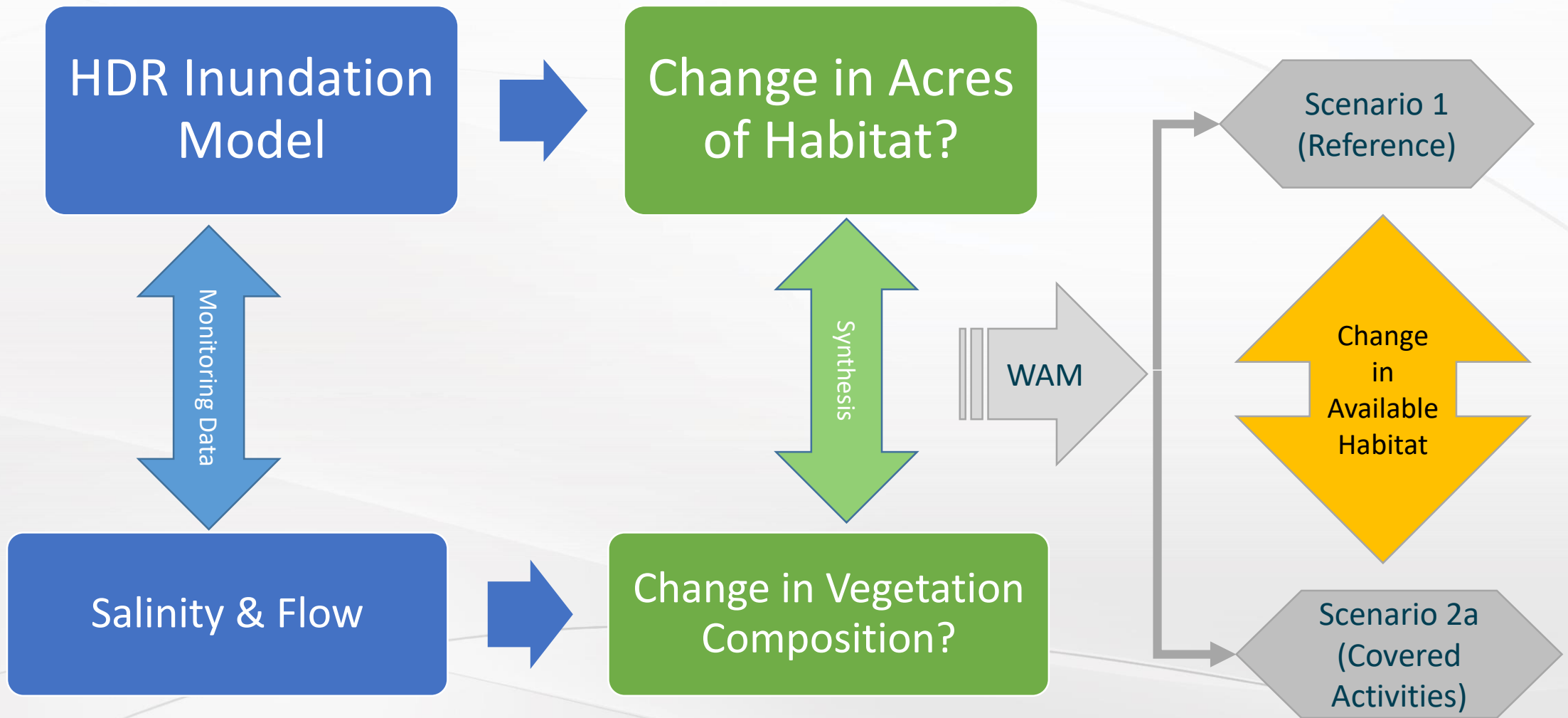
## Food Abundance

- Blue Crab
- White Shrimp
  - Surrogate for invertebrates

## Potential Estuarine Impacts

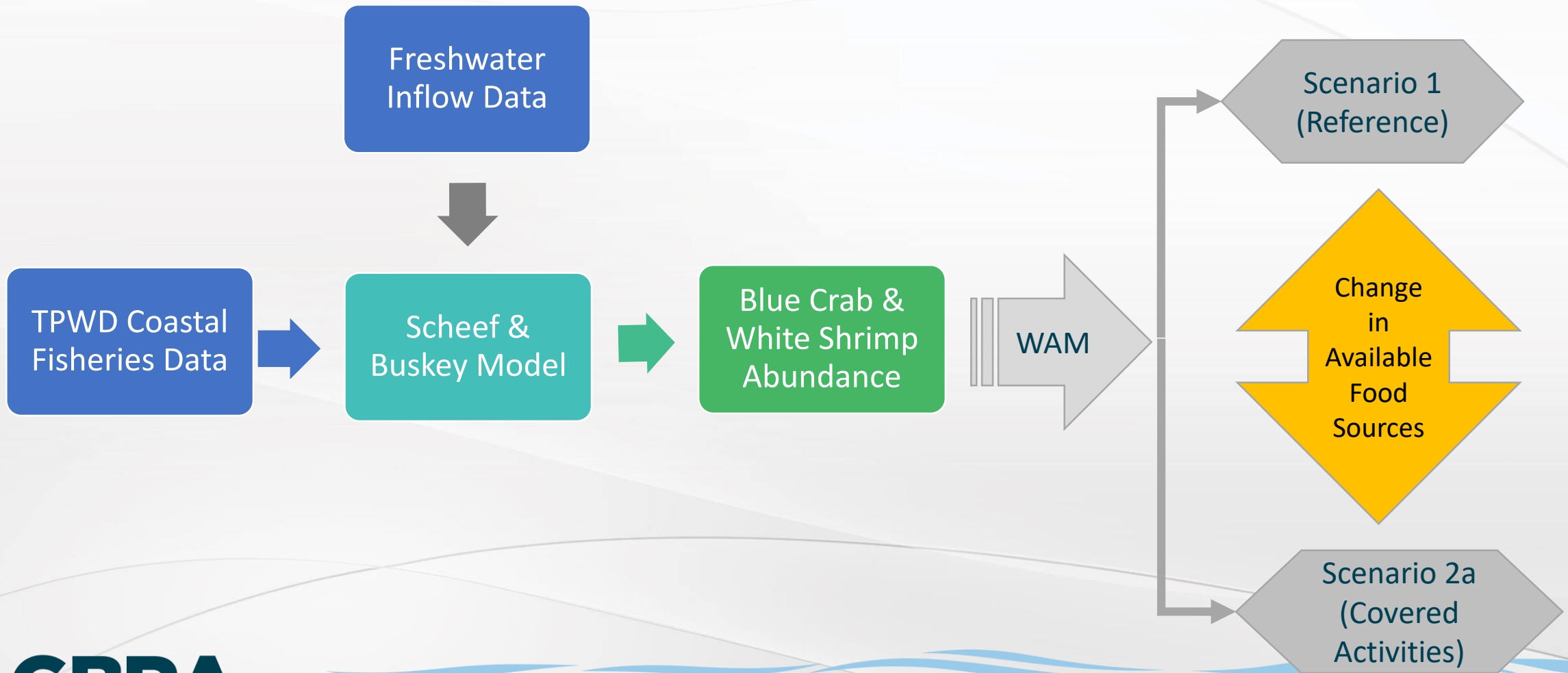


# Habitat





# Food Source Availability



# Whooping Crane & Eastern Black Rail Take Assessment





# Climate Change

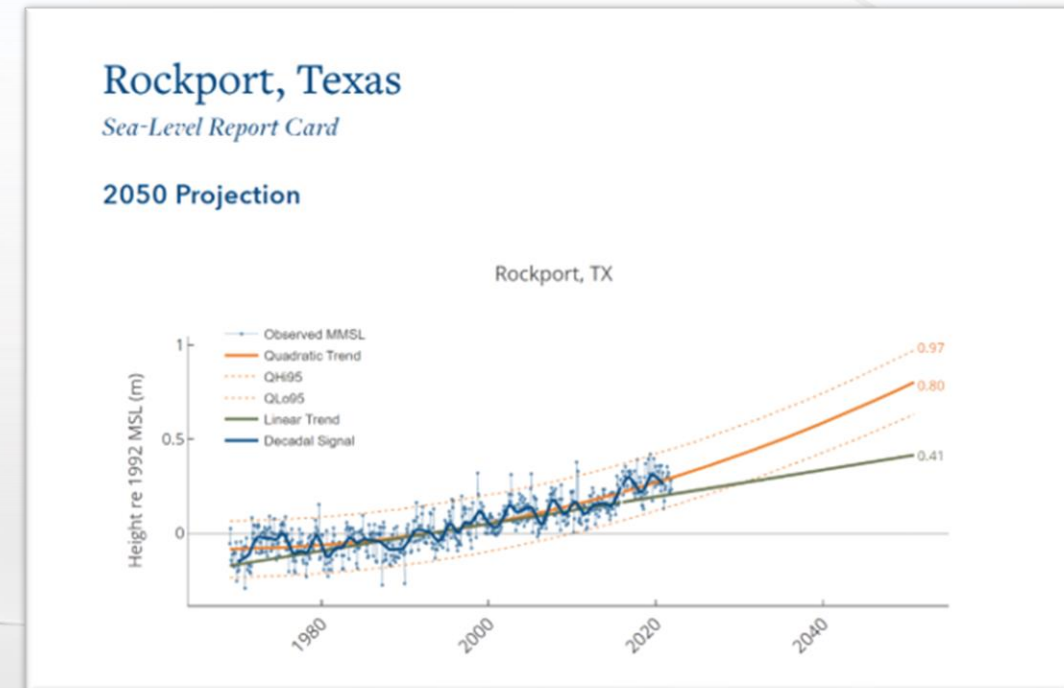
# Addressing Climate Change in HCPs: Overview

- What's required and what's recommended?
  - To meet issuance criteria, USFWS must assess the impact of the taking with consideration of likely future changes due to climate change or other causes.
- No requirements on how to assess climate change
- **HCP Handbook:** HCP should consider the implications of climate change effects on the HCP's conservation strategy and its ability to fully offset the impacts of the taking.
  - Analyze potential effects of climate change on **covered species**
  - Anticipate climate change effects and address them in the **conservation strategy**
  - Use **adaptive management** process to monitor and address climate change effects
  - Consider climate change effects in **changed circumstances**



# Climate Change in HCPs: Analyzing Effects

- Increases the HCP's **durability** to help justify the permit duration
- Focus on what stressors effect covered species and their habitats:
  - What climatic variables are covered species sensitive to?
  - How might these climate variables change in future climates?
  - Will these changes have indirect effects important to species?
- Tools for analyzing effects
  - Future temperature and precipitation projections
  - Vulnerability analyses for covered species
  - Conceptual models with effects pathways
  - Habitat distribution models
  - Population models



# Climate Change in the GRHCP

## Climate Change Effects on Covered Species

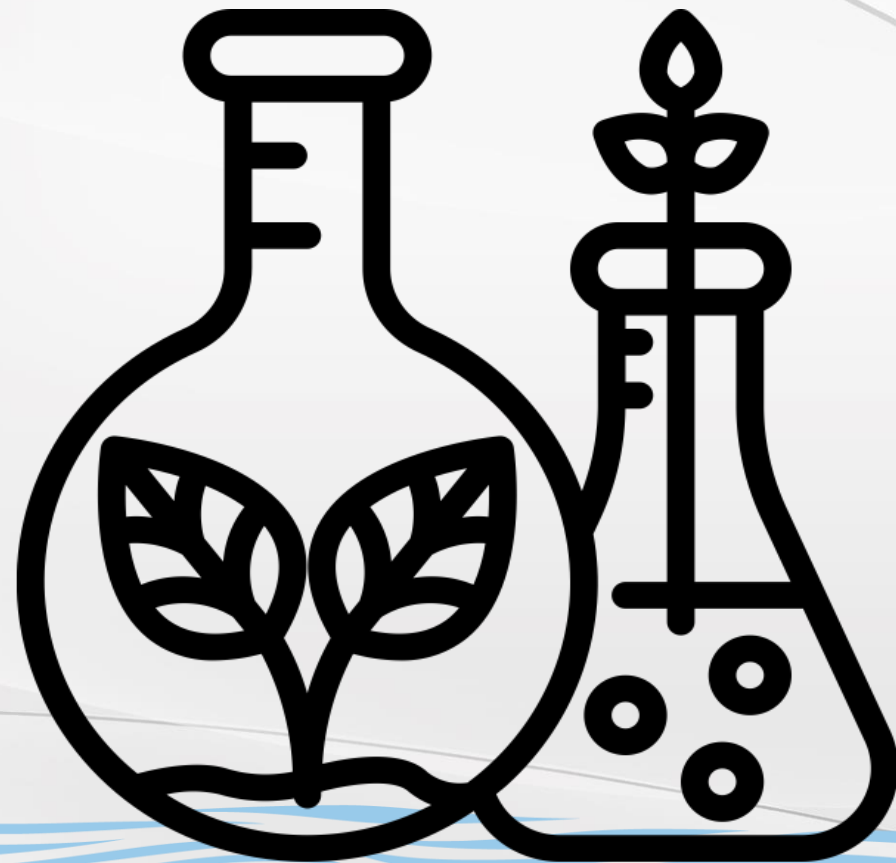
Covered Species	High Flow Events	Sea Level Rise	Drought	Temperature
False Spike	X		X	X
Guadalupe Fatmucket	X		X	X
Guadalupe Orb	X		X	X
Guadalupe Darter	X		X	X
Eastern Black Rail	X	X	X	X
Whooping Crane	X	X	X	X

- **Ways to Address Climate Change in the GRHCP**
  - Assess effects of climate change on covered species
  - Conservation measures that address resiliency towards climate change effects
  - Strong adaptive management and monitoring framework to track effectiveness and adjust as needed
  - Clear thresholds for changed (foreseeable) and unforeseen circumstances





# Technical Advisory Group



# Technical Advisory Group Members



**Dan Opdyke**  
**Chair of Committee**  
Anchor QEA  
Water quality and hydromodeling



**Cindy Loeffler**  
Retired TPWD  
Texas Water Policy and HCPs



**Webster Mangham**  
Trinity River Authority  
Mussel Policy and River Authority  
operations



**Ryan Smith**  
Texas Nature Conservancy  
Texas water and ecosystems



# Update on TAG Proceedings

- Provided comments on draft climate change information memo
- Provided comments on three draft memos describing proposed approaches to evaluate potential impacts to freshwater mussels, salamanders, and two bird species (Eastern Black Rail and Whooping Crane).
- Participated in meetings with GBRA, consultants, and USFWS to discuss these memos

# Questions?

# Email questions or comments to [GRHCP@GBRA.org](mailto:GRHCP@GBRA.org)

- Nathan Pence  
Executive Manager of Environmental Science  
[npence@gbra.org](mailto:npence@gbra.org)
- Chad Norris  
Deputy Executive Manager of Environmental Science  
[cnorris@gbra.org](mailto:cnorris@gbra.org)
- Daniel Large  
HCP Director  
[dlarge@gbra.org](mailto:dlarge@gbra.org)
- Jana Gray  
HCP Coordinator  
[jgray@gbra.org](mailto:jgray@gbra.org)





# Input Session Overview

- Brainstorming session to **generate ideas** on potential conservation measures
  - Freshwater mussels
  - Whooping Crane/Eastern Black Rail
  - Guadalupe Darter
- In-person participants will split into 3 groups
- Virtual participants will use link provided in the “Chat” to enter the virtual room

# "Potential Impact Pathways"

## Freshwater Mussels



- Presence of Host Fish
- Reduction of Food Resources
  - Stream Flow Variations
  - Changes in Water Quality
  - Changes in Water Quantity

## Whooping Crane / Eastern Black Rail



- Changes to Marsh Habitat (e.g., impacts from new construction and operation and maintenance activities)
- Changes in Water Quantity

## Guadalupe Darter



- Stream Flow Variations
- Changes in Water Quality

# "Conservation Measures"

## Avoidance and Minimization Measures

**Avoidance** measures "occur by siting and designing the project in a way that **AVOIDS** impacts to covered species."

**Examples:**

*Seasonal restrictions*

*Reduction of the extent of the covered activity*

**Minimization** measures are "actions that will **REDUCE** the impacts of the taking that have been identified during the development of the HCP."

**Examples:**

*Establishment of buffer zones*

*Maintenance of habitat connectivity*

## Mitigation Measures

**Mitigation measures** "must be based on the biological needs of covered species and should be designed to **OFFSET** the impacts of the take from the covered activities to the maximum extent practicable."

**Examples:**

*Restoration of a degraded habitat*

*Land preservation*

*Threat reduction*

*Enhancement of habitat*