Report of Activities, Methods, and Results from the
ESLR 2021 Coastal Resilience: Living with Sea Level Rise in the Texas Coastal Bend
Management Transition Advisory Group (MTAG) Fall 2023 Meeting
December 8, 2023

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Edited by: Peter Bacopoulous
Report Date: February 28, 2024

Research Funded by NOAA National Center for Coastal Ocean Science (NCCOS) under award number NA21NOS4780147-T1-01
PI: Dr. James Gibeaut
Co-PI’s: Dr. Katya Wowk, Dr. Lihong Su, Dr. Peter Bacopoulos and Dr. Chris Kees
# Table of Contents

- **Table of Contents** ................................................................................................................................. i
- Executive Summary ........................................................................................................................................ 1
- Workshop Objectives ...................................................................................................................................... 2
- Workshop Attendants ................................................................................................................................. 2
- Description of Meeting Activities and Content .......................................................................................... 3
  - Introduction and Project Goals .................................................................................................................. 3
  - Overview of Spring 2023 MTAG Output ..................................................................................................... 3
  - Coupled Hydrodynamic-Ecological Modeling ........................................................................................... 4
  - Sea Level Rise Framing .......................................................................................................................... 4
- Appendix A: Participant Agenda .................................................................................................................. 7
- Appendix B: Presentations .......................................................................................................................... 8
- Appendix D: Acronym List .......................................................................................................................... 31
Executive Summary

The Harte Research Institute for Gulf of Mexico Studies (HRI), Texas A&M University-Corpus Christi, The Water Institute of the Gulf (TWIG), and the Center for Coastal Resiliency at Louisiana State University (LSU) received funding from the National Oceanic and Atmospheric Administration to launch a project called "ESLR 2021 Coastal Resilience: Living with Sea Level Rise in the Texas Coastal Bend." The project, led by HRI Endowed Chair for Coastal and Marine Geospatial Sciences Dr. James Gibeaut, engages key stakeholders to improve and apply advanced modeling techniques to project how sea level rise (SLR) and natural infrastructure may impact coastal resiliency. The applied aspect of this work is guided by a Management Transition Advisory Group (MTAG), which provides researchers with key input and insights on modeling SLR scenarios to produce projections of future landscapes.

The Fall 2023 ESLR MTAG virtual meeting was held on December 8, 2023 and is the third MTAG meeting for the project. The workshop focused on key objectives, including refreshing project goals, understanding modeling components, and agreeing on appropriate sea level rise (SLR) framing and scenarios. To begin the meeting, Dr. Gibeaut (HRI) contextualized the project for MTAG that is aiming to assess SLR vulnerabilities and the efficacy of Natural and Nature-Based Features (NNBFs) in mitigating flooding. The workshop had 17 participants, 10 of which are part of the ESLR Team, one representative from the funding agency and six MTAG members.

An overview of the Spring 2023 MTAG output highlighted flood concerns in various communities, guiding the development of future habitat scenarios. Current and potential NNBFs were presented, emphasizing a wide range of locations and approaches. Timelines of concern for the MTAG were outlined for 2023, 2035, 2040, 2025, and 2070.

Dr. Bacopoulos (LSU) presented "Coupled Hydrodynamic-Ecological Modeling," illustrating a dynamic modeling approach’s impact on SLR understanding. The toolbox for effective modeling was discussed, emphasizing the need for data on mangroves, marsh evolution, suspended sediment concentration (SSC), and organic accretion.

Dr. Collini’s (TWIG) SLR framing presentation explored different approaches, including location-based and regional framing. The MTAG engaged in a Menti exercise, revealing a balanced preference for the Intergovernmental Panel on Climate Change (IPCC)’s Sixth Assessment Report (AR6) and Us Interagency Taskforce 2022 Sea Level Rise Technical Report. Discussion highlighted considerations of believability, political factors, and alignment with federal funding requirements. Discussion on SLR rates included perspectives on local versus regional data, highlighting scenarios for 2040, 2050 and 2065. The need for a representative curve and consideration of timesteps were emphasized.

Overall, the workshop continued engagement with the MTAG, providing updates to project modeling component, a summary of previous MTAG input and a peak into upcoming work.
Workshop Objectives

- Refresh on project goals and Spring MTAG input
- Gain understanding of modeling components being used to frame outputs
- Discuss and agree on most appropriate framing for sea level rise
- Discuss and agree on most useful timesteps and sea level rise scenarios for the MTAG

Workshop Attendants

Kara Coffey, HRI-TAMUCC*
Diana Del Angel, HRI-TAMUCC*
Katya Wowk, TWIG*
Renee Collini, TWIG*
James Gibeaut, HRI-TAMUCC*
Mukesh Subedee, HRI-TAMUCC*
Lihong Su, HRI-TAMUCC*
Peter Bacopoulos, LSU, Coastal Ecosystem Design Studio*
Chris Kees, LSU Coastal Ecosystem Design Studio*
Jin Ikeda, LSU Coastal Ecosystem Design Studio*
Debalina Sengupta, Coastal Resilience Program, Texas Sea Grant
Tony Williams, Texas General Land Office
Brittany Sotelo, CC Regional EDC
Trevor Meckley, NOAA ESLR program
Clarence Feagin, US Navy Planning Department
Evan Turner, TWDB
Craig Casper, Corpus Christi MPO

*denotes affiliation with project team
Description of Meeting Activities and Content

Introduction and Project Goals
To begin the meeting, Dr. Wowk led introductions and reviewed the meeting agenda. Dr. Gibeaut reviewed the context of the project and described his work with the General Land Office (GLO) “Texas Coastal Resiliency Master Plan” as catalyst for this work. This project aims to identify vulnerability to sea level rise (SLR) and also to assess the benefit of Natural and Nature Based Features (NNBFs) to mitigate flooding and enhance the persistence of coastal habitats under changing conditions. The goals of the project are as follows:

1. Improve and adapt Hydro-MEM to the Texas Coastal Bend
   a. Improve bare-Earth elevation model
   b. Develop detailed model mesh
   c. Improve data/modeling of marsh vertical accretion
2. Assess SLR vulnerabilities and NNBF efficacy using Hydro-MEM and SLAMM as appropriate
   a. Model SLR effects with and without NNBF
3. Form a collaborative MTAG and co-produce a knowledge base for modeling and assessing SLR resiliency in the region

Overview of Spring 2023 MTAG Output
Dr. Del Angel’s presentation reviewed the conceptual model of a project and identified specific components where input from MTAG is sought. In the Spring 2023 MTAG workshop, participants were queried about flood concerns and the potential for Nature-Based Features (NNBFs). In the Fall 2023 MTAG Workshop, MTAG members were asked for their opinions on Sea Level Rise (SLR) scenarios. Looking ahead, the ESLR modeling team will generate future habitat scenarios, considering the presence or absence of NNBFs, with the aim of providing guidance for planning and future project development.

Dr. Del Angel also presented a recap of the Spring 2023 MTAG sessions held in May and June. A map of "Areas of Flood Concern" was developed based on workshop discussions, with specific concerns raised for communities like Sinton, Taft, and Refugio. Several areas were highlighted as requiring attention, including Copano Bay, where Bayside experienced significant erosion from Hurricane Harvey. The San Antonio River Delta, Rockport area, Salt Lake, Lamar Beach Road, Fulton Beach Road, and other shoreline-adjacent roads were identified as occasionally prone to flooding. Aransas Pass faced flooding concerns from the backside of the peninsula and ship channel. Concerns in Ingleside included future flooding, especially in areas with oil and gas facilities, along with shoreline erosion. The City of Corpus Christi emerged as a hotspot for various concerns, including expansion to the Southside near Oso Creek, Mustang Island, downtown Corpus Christi, North Beach (Corpus Christi Beach), the aging sea wall, Flour Bluff, and the West Side of Corpus Christi. Overall, the MTAG’s input is integral to identifying where the ESLR modeling could be applied and what challenges could be addressed though this project.

The presentation showcased a map outlining current and potential NNBFs in the study region. Current NNBFs include the Bayside living shoreline, a breakwater in Copano Bay, seagrass restoration in Portland, wetland restoration at NAS, and the Corpus Christi Seawall. Potential NNBFs discussed encompass enhancing circulation in the Aransas Delta using culverts, addressing drainage and flood control needs at Oso Creek, and implementing seagrass protection in Nueces County. These examples demonstrate a comprehensive approach to utilizing nature-based solutions for environmental conservation and flood mitigation in the region.

The final segment of the presentation emphasized timelines of concern as previously identified by the MTAG, placing significant emphasis on the years 2023, 2035, 2040, 2025, and 2070.
Coupled Hydrodynamic-Ecological Modeling

A presentation titled “Coupled Hydrodynamic-Ecological Modeling” was delivered by Dr. Peter Bacopoulos. The presentation began with a cartoon illustrating the key concepts of a dynamic modeling approach to understand the impact of sea level rise. It emphasized the dynamic responses, including waves, erosion, tides, and flooding, which drive changes in the landscape. LSU utilized this approach, demonstrated through a 24-hour animation of Hurricane Harvey, showcasing water elevation and wind field changes. The modeling approach was applied to determine maximum water levels, crucial for modeling inundation above land (0m NAVD). An example using Hurricane Harvey showed inundation with a sea level rise of 0.82 meters.

The presentation then delved into adapting HydroMEM, a marsh evolution model, to the Texas coast. An example was presented featuring astronomical tides at the Nueces River delta. To describe HydroMEM, wetland migration and vertical accretion are highlighted through a cartoon, emphasizing the two components of vertical accretion: organic and inorganic. The organic component can be derived from marsh organ experiments, where a PVC pipe at different flood elevation is used to grow *Spartina alterniflora* and measurements of biomass density production are taken relative to tide level elevation. The inorganic components can be modeled using suspended sediment concentration (SSC). The presentation showcases examples from Goose Island State Park and Egery Flats, utilizing the Surface Elevation Tables (SET) to aid in developing model parameters.

The modeling toolbox requirements were discussed, emphasizing the need for mangrove data and marsh evolution data. In conclusion, the dynamic modeling approach provides a comprehensive understanding of sea level rise impacts, incorporating various factors to model landscape changes and guide adaptation strategies. The toolbox, including data on mangroves, marsh evolution, SSC, and organic accretion, is crucial for effective modeling and prediction.

Sea Level Rise Framing

Dr. Collini led an interactive presentation on sea level rise (SLR) framing, highlighting different ways to frame the issue, including location-based or regional approaches, and considering various timeframes. Projections for climate planning can focus on temperature, precipitation, and SLR. The Intergovernmental Panel on Climate Change’s Sixth Assessment Report (IPCC AR6)’s Shared Socioeconomic Pathways (SSP) scenarios were introduced, exploring SLR under different emissions scenarios.

Another framing that could be used is that of the US Interagency Taskforce 2022 Sea Level Rise Technical Report (Interagency 2022 Report). This report, instead of specifying a particular temperature, uses possible scenarios which consider risks across a range of uncertainties. Dr. Collini presented SLR projection curves from the IPCC AR6 SSP scenarios and the Interagency 2022 Report scenarios, noting the recent rapid acceleration in the northern Gulf of Mexico.

An overview of the benefits of scenarios versus projections was provided, highlighting that scenarios cover the full range of risk, account for uncertainty in land cover processes, and hedge against uncertainties related to acceleration. Following the presentation, the MTAG engaged in a Menti exercise to vote on whether to prioritize IPCC AR6 or Interagency 2022 Report for the project. The results showed a balanced preference of IPCC AR6 at 4 votes and Interagency 2022 Report at 3 votes (Figure 1). Post vote discussion with participants found that consideration for factors such as believability, political considerations, and alignment with federal funding requirements is important. Some expressed the need to work with the Corps of Engineers and the desire to consider both frameworks for a greater chance of federal funding. Additionally, Dr. Gibeaut highlighted using the 2019 Interagency report but developing their subsidence grid/surface for their specific needs in the TCRMP (Texas Coastal Resilience Master Plan) project.
Dr. Collini reviewed location-specific and regional sea level rise (SLR) rates for various scenarios, including low, intermediate-low, intermediate, intermediate-high, and high, focusing on tide gauges in Corpus Christi and Rockport, as well as regional Western Gulf values. The discussion that followed involved different perspectives on how to approach SLR projections:

- One participant advocated for using local data and projections if available.
- Another suggested erring on the side of higher projections and emphasized extrapolating trends. Considered the idea of focusing on a single location for better community reception.
- Another raised the question of when the saltwater dam would be overtopped and suggested tying projections to local actionable items for better impact and attention.
- Dr. Collini inquired about the modeling capacity for regional projections and proposed a middle ground approach, considering a regional Coastal Bend average.
- Another option discussed the possibility of not focusing on a single location (Corpus) but rather adopting a regional Coastal Bend average, striking a balance between a single location and the Western Gulf.
- Dr. Gibeaut emphasized the importance of choosing a representative curve for an area, and the ADvanced CIRCulation (ADCIRC) modeling will take care of the difference across the area and the importance of choosing a curve.

The discussion concluded with a suggestion of a regional curve and focus on timesteps. The timestep discussion followed. One suggestion was 2040. For the planning organization 2035 and 2050, with the possibility of extrapolating data to cover the year 2040. The Navy, has specific requirement for projections up to the year 2065, with an emphasis on minimizing risk by focusing on the highest confidence interval. There might not be much variation in scenarios in 2040 so one would be fine. One participant suggested having shorter timeframes, especially up to 2050, to reduce uncertainty. They acknowledged differences between high and low scenarios, particularly when looking further into the future. Discussion on Specifics: There was a discussion about the
differences between projections within a one-foot range and the consideration of using a smaller increment, such as 20 cm (8 inches). A participant expressed flexibility in accepting extrapolations for 2035 and 2050.

One participant stated that their facilities focus on the year 2065, where the estimate was provided as 14 feet above sea level. The possibility of categorizing scenarios based on the magnitude of SLR was raised for further consideration.

**FIGURE 2.** DISCUSSION ON SLR SCENARIOS AND TIMEFRAMES. PURPLE CIRCLES SHOW TIME FRAMES AND CURVES OF INTEREST TO THE MTAG.
Appendix A: Participant Agenda

ESLR Coastal Resilience: Living with Sea Level Rise in the Texas Coastal Bend
Management Transition Advisory Group (MTAG) Virtual Meeting
December 8, 2023
1:00-3:00 PM CST
Zoom Virtual Meeting Information Below

Workshop Objectives:

- Refresh on project goals and Spring MTAG input
- Gain understanding of modeling components being used to frame outputs
- Discuss and agree on most appropriate framing for sea level rise
- Discuss and agree on most useful timesteps and sea level rise scenarios for the MTAG

Meeting Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Item</th>
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</thead>
<tbody>
<tr>
<td>12:50 pm</td>
<td>[meeting opens for technology check]</td>
</tr>
<tr>
<td>1:00 pm</td>
<td>Welcome, Around the Virtual Room &amp; Refresh</td>
</tr>
<tr>
<td>1:35 pm</td>
<td>Update &amp; Discussion on Modeling Components</td>
</tr>
<tr>
<td></td>
<td>• Presentation</td>
</tr>
<tr>
<td></td>
<td>• Questions &amp; Discussion</td>
</tr>
<tr>
<td>2:00 pm</td>
<td>Selecting Sea Level Rise Framing (e.g., temp., emissions, risk-based)</td>
</tr>
<tr>
<td></td>
<td>• Presentation</td>
</tr>
<tr>
<td></td>
<td>• Voting Exercise &amp; Discussion: Selecting a Sea Level Rise Framing for the Coastal Bend</td>
</tr>
<tr>
<td>2:30 pm</td>
<td>Selecting Sea Level Rise Timesteps and Scenarios</td>
</tr>
<tr>
<td></td>
<td>• Updates</td>
</tr>
<tr>
<td></td>
<td>• Voting Exercise &amp; Discussion: Selecting Sea Level Rise Timesteps and Scenarios</td>
</tr>
<tr>
<td>2:55 pm</td>
<td>Spring ’24 MTAG In-Person Meeting and Next Steps</td>
</tr>
<tr>
<td>3:00 pm</td>
<td>Adjourn</td>
</tr>
</tbody>
</table>
### Appendix B: Presentations

#### Living with Sea Level Rise in the Texas Coastal Bend

#### OBJECTIVES & AGENDA

<table>
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<th>Agenda Item</th>
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**Objectives**
- Refresh on project goals and Spring MTAG input
- Gain understanding of modeling components being used to frame outputs
- Discuss and agree on most appropriate framing for sea level rise
- Discuss and agree on most useful timesteps and sea level rise scenarios for the MTAG
Context

- The Texas General Land Office publishes the TCRMP which identifies coastal vulnerabilities and strategies to address them.
- HRI models the impacts of SLR and storm surge for the TCRMP using SLAMM and ADCIRC models.
- NOAA’s Effects of SLR (ESLR) Program funds research for (1) describing coastal vulnerability, (2) determining benefits of Natural and Nature Based Features (NNBF), and (3) predicting effects of SLR.
- LSU developed and applied new SLR modeling techniques (Hydro-MEM) under the ESLR program.
- HRI, LSU, and TWI are partners on this newly funded ESLR project with the following goals:

Goals

- Improve and adapt Hydro-MEM to the Texas Coastal Bend
  - Improve bare-Earth elevation model
  - Develop detailed model mesh
  - Improve data/modeling of marsh vertical accretion
- Assess SLR vulnerabilities and NNBF efficacy using Hydro-MEM and SLAMM as appropriate
  - Model SLR effects with and without NNBF
- Form a collaborative MTAG and co-produce a knowledge base for modeling and assessing SLR resiliency in the region
Spring MTAG Overview
Diana Del Angel
Harte Research Institute

Goals of ESLR 2021

- Goal 1: Improve and Adapt Hydro-MEM to the Texas Coastal Bend
- Goal 2.1: Assess SLR Vulnerability
- Goal 2.2: Assess Efficacy of Natural and Nature Based Solutions
ESLR Components: End Goal

How can NNBF’s enhance resilience?

- Future habitat scenarios
- Future habitat scenarios with NNBF
- Policy, ecosystem services assessment, and additional outcomes of NNBF

Spring 2023 MTAG Recap

- In-person Session - May 2nd 2023
- Remote session – June 21st 2023

- Review of SLR projections in the Coastal Bend
- Mapping SLR Concerns and NNBFs
- Timelines of Concern

https://www.harteresearch.org/project/living-sea-level-rise-texas-coastal-bend
Mapping Areas of Flood Concern

Legend
Flooding
- Future
- Current

- Current:
  - Communities of Sinton and Taft
  - Refugio
  - Bayside – erosion from Harvey
  - Future:
    - San Antonio River Delta, currently eroding and needs mitigation.

Mapping Areas of Flood Concern: Rockport

Legend
Flooding
- Future
- Current

- Current/Future:
  - Salt Lake – area filled with debris after Harvey-sensitive habitat present
  - Lamar Beach Road, Fulton Beach Road, and other roads adjacent to the shoreline can occasionally flood
Mapping Areas of Flood Concern: Portland-Ingleside-Aransas Pass

- Current:
  - Aransas Pass flooding concerns stemming from backside of peninsula & ship channel
  - Portland
- Future:
  - Ingleside: flood concerns, in areas with oil and gas facilities, & shorelines erosion

Legend
Flooding
- Future
- Current

0 0.75 1.5 3 Miles

Mapping Areas of Flood Concern Corpus Christi

- Current/Future:
  - Expansion to Southside near Oso Creek
  - Mustang Island
  - Downtown Corpus Christi
  - North Beach (Corpus Christi Beach)
  - Aging CC sea wall
  - Flour Bluff
  - West Side of Corpus Christi

Legend
Flooding
- Future
- Current

0 0.75 1.25 2.5 5 Miles
**Mapping Natural and Nature-Based Features**

- **Current:**
  - Bayside living shoreline
  - Breakwater in Copano Bay
  - Portland seagrass restoration
  - NAS wetland restoration
  - Corpus Christi Seawall

- **Potential**
  - Culvert is Aransas Delta to enhance circulation
  - Oso Creek Drainage and flood control needs
  - Seagrass protection needed in Nueces County

---

**Timelines of Concern**

Combined responses from MTAG 2023 May and June sessions

- **2020**
- **2040**
- **2060**
- **2080**
- **2100**
- **2030**
- **2050**
- **2070**
- **2090**
ELSR: Living with Sea Level Rise in the Texas Coastal Bend
Coupled Hydrodynamic-Ecological Modeling

Christopher E. Kees, Peter Bacopoulos and Jin Ikeda

Sea Level Rise (SLR) Impacts

- The coastal system dynamically responds to sea level rise
- The static (bathtub) approach does not work
SLR impacts on storm surge and inundation: SLR=0.82m

Hydrodynamic modeling
Ecosystem functions and resilience to SLR

- Wave and storm surge attenuations: Protect hinterlands
- Vertical accretion vs. SLR results in horizontal migration

Marsh/mangrove modeling

\[
\frac{dZ}{dt} = \frac{dZ_{\text{org}}}{dt} + \frac{dZ_{\text{min}}}{dt}
\]

Total accretion = Organic accretion + Mineral accretion

Sediment elevation table (SET) data
(curtesy of Mission-Aransas NERR)

Examples shown for Copano Bay
(Vertical accretion of platform elevation)
Mineral accretion

Inorganic accumulation due to sediment capture by intermittently submerged vegetation

\[
\frac{dz_{\text{min}}}{dt} = \frac{M_{\text{inorganic}}}{k_2} = \frac{q \times m \times f \times D \times F_{IT}}{k_2}
\]

Example geared towards the Texas Coastal Bend

\[
\frac{dz_{\text{min}}}{dt} = 0.7 \text{ mm yr}^{-1}
\]

<table>
<thead>
<tr>
<th>Variable</th>
<th>Meaning</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>(q)</td>
<td>Unitless capture coefficient</td>
<td>1 (full capture)</td>
</tr>
<tr>
<td>(m)</td>
<td>Suspended sediment concentration</td>
<td>(3 \times 10^5 \text{ g cm}^{-3}) (assume 30 mg/L)</td>
</tr>
<tr>
<td>(f)</td>
<td>Tides per year</td>
<td>365 yr(^{-1}) (diurnal)</td>
</tr>
<tr>
<td>(D)</td>
<td>Depth of submergence at high tide: MHW – Z</td>
<td>26.4 cm (MHW, Aransas)</td>
</tr>
<tr>
<td>(F_{IT})</td>
<td>Flooding frequency: (D / (\text{MHW} – \text{MLW}))</td>
<td>0.5 (assume (Z = 0) m)</td>
</tr>
<tr>
<td>(k_2)</td>
<td>Bulk, self-packing density of inorganic matter</td>
<td>1.99 g cm(^{-3})</td>
</tr>
</tbody>
</table>

For a fixed value of SSC\(^*\), the modeling already can account for mineral accretion as a function of marsh elevations and tide levels

\(^*\) Assumed here was SSC of 30 mg L\(^{-1}\) from literature

Organic accretion

A function of aboveground biomass (AGB) + belowground biomass (BGB)

\[
\frac{dz_{\text{org}}}{dt} = C(\text{AGB} + \text{BGB}) \sim 10 \text{ mm yr}^{-1}
\]

Field observation geared towards the Texas Coastal Bend, Rezek et al. (2017): Analyzing data now

Another example: Marsh organ data collected in coastal LA at CRMS 322 (saline) and CRMS 399 (brackish)

Credit: Brandon Wolff, LSU thesis student
A Bit More About Sea-Level Rise
Setting the Stage

- Discuss potential ways to frame future sea-level rise: temp, SSPs, risk-based
- Discuss single location projections or regional average
- Discuss number of scenarios needed at different time points

Framing Sea-Level Rise - Considerations

- Gulf sea-level rise acceleration
- Low confidence, high-impact processes
- Projections vs scenarios
  - Temp projections
  - Emissions projections
  - Risk-based scenarios
Projections

- Some states & municipalities are aligning climate planning across different issues (temp, precip, sea-level rise) to projections of future conditions
- IPCC AR6 developed projections based on SSPs
  - Shared socioeconomic pathways = storylines of the future
  - Separated out low-confidence processes
Scenarios

- Some stakeholders want to plan to the range of what is possible
- US Interagency Taskforce developed a risk-based suite of scenarios
- Span the range of uncertainties

US SLR Task Force

Observational data show that sea levels are rising and the recent trend is accelerating.
Rapid, recent acceleration

- The Gulf has seen rapid acceleration – not due to vertical land motion
- Several theories being tested currently as to why
  - Narrowed down to likely being related to heat content
  - Still questions about the duration long-term
  - Has implications for near-term planning & adjustments to scenarios/projections

Recent Acceleration in the Gulf
Recent Acceleration in the Gulf

![Graph showing sea-level rise with various data points and lines representing Texas and California observations and projections.](image)
Benefits of Different Framings in the Gulf

SCENARIONS
Cover full range of risk
Account for uncertainty around LC processes
Hedge on uncertainties around acceleration

PROJECTIONS
Easier to relate to other types of planning – e.g., temperature or precipitation changes

Location specific or regional

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Corpus</th>
<th>Rockport</th>
<th>Western Gulf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2.1</td>
<td>2.6</td>
<td>3.0</td>
</tr>
<tr>
<td>Int-Low</td>
<td>2.8</td>
<td>3.2</td>
<td>3.6</td>
</tr>
<tr>
<td>Intermediate</td>
<td>4.3</td>
<td>4.7</td>
<td>5.1</td>
</tr>
<tr>
<td>Int-High</td>
<td>5.9</td>
<td>6.3</td>
<td>6.7</td>
</tr>
<tr>
<td>High</td>
<td>7.7</td>
<td>8.0</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Western Gulf of Mexico Scenarios

Between Intermediate and Intermediate-High

Rockport Scenarios
Rockport Scenarios

Time Steps & Scenarios

• We will use the selected time steps and scenarios to describe changing flood risk with SLR at each time step.

• How much range is needed to justify multiple SLR scenarios evaluated?
  • Example: in 2050 the entire range is 1 ft of SLR. Is that enough for two scenarios?
  • First though – need time steps
Time Steps & Number of Scenarios
Western Gulf of Mexico Scenarios

Sea-Level Rise (ft)

Year

2000 2010 2020 2030 2040 2050 2060 2070 2080 2090 2100

Extrap Obs  Low  IntLow  Int  IntHigh  High

Thank you!!!!!
Appendix D: Acronym List

**Organizations and Agencies**

- CBCOG – Coastal Bend Council of Governments
- CC Regional EDC – Corpus Christi Regional Economic Development Corporation
- HRI – Harte Research Institute for Gulf of Mexico Studies
- LSU – Louisiana State University
- TWIG – The Water Institute of the Gulf
- NOAA – National Oceanic and Atmospheric Administration
- TAMUCC – Texas A&M University – Corpus Christi
- TGLO – Texas General Land Office
- TWDB – Texas Water Development Board
- CBBEP - Coastal Bend Bays and Estuaries
- CC MPO - Corpus Christi Metropolitan Planning Organization
- NAS Naval Air Station

**Other Acronyms**

- ADCIRC – ADvanced CIRCulation (hydrodynamic model)
- DEM – Digital Elevation Model
- ESLR – Effects of Sea Level Rise Program
- MEM – Marsh Equilibrium Model
- MTAG – Management Transition Advisory Group
- NNBF - Natural and Nature-Based Features
- SLAMM – Sea Level Affecting Marshes Model
- SLR – Sea Level Rise
- TCRMP – Texas Coastal Resiliency Master Plan

IPCC AR6 - Intergovernmental Panel on Climate Change, 6th Assessment Report