CLIMATE RESILIENT GALVESTON

Understanding Climate Vulnerabilities and Adaptation Strategies to Build Resilience

PANELISTS

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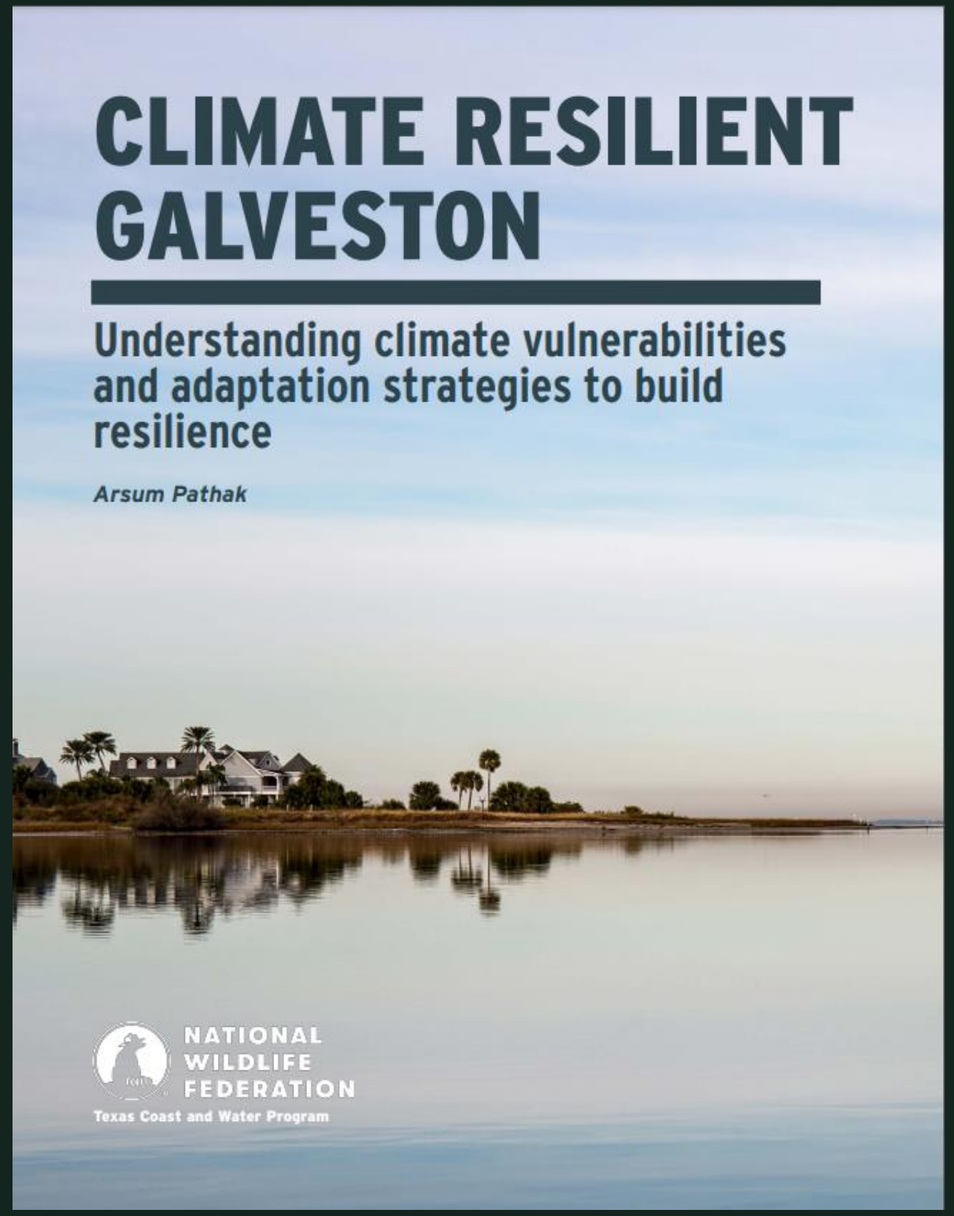
PROJECT OVERVIEW

PURPOSE – Support coastal resilience through

- Synthesizing the latest information regarding climate change-related risks and their socio-economic and environmental impacts on Galveston Island.

- Identifying adaptation strategies to mitigate the impacts to communities and natural assets in Galveston.

PRODUCT – Climate Vulnerability and Resilience Assessment with input from relevant stakeholders in the area.



BROADER CONTEXT — ONGOING PLANNING EFFORTS

Plan	Entity	Type of Entity	Year
Master Drainage Plan	City of Galveston	Local Government	2003
Beach Access Plan	City of Galveston	Local Government	2004 (updated in 2020)
West Galveston Island Greenprint	The Trust for Public Land	Nonprofit	2007
Sustainable Neighborhood Development Strategies	Urban Law Institute	Nonprofit	2009
Comprehensive Plan	City of Galveston	Local Government	2011
The Galveston Bay Plan	Galveston Bay Estuary Program	Nonprofit	2018
Strategic Master Plan	Port of Galveston	Local Government	2019
Galveston 2030	Vision Galveston	Nonprofit	2019
Coastal Texas Protection and Restoration Feasibility Study	US Army Corps of Engineers and General Land Office	Federal Government	2021
Hazard Mitigation Plan	City of Galveston	Local Government	2022
Galveston Bay Estaury Resilience Assessment Report	Houston Advanced Research Center	Nonprofit	2022
Texas Coastal Resiliency Master Plan	Texas General Land Office	State Government	2023

BROADER CONTEXT – UNPRECEDENTED FUNDING

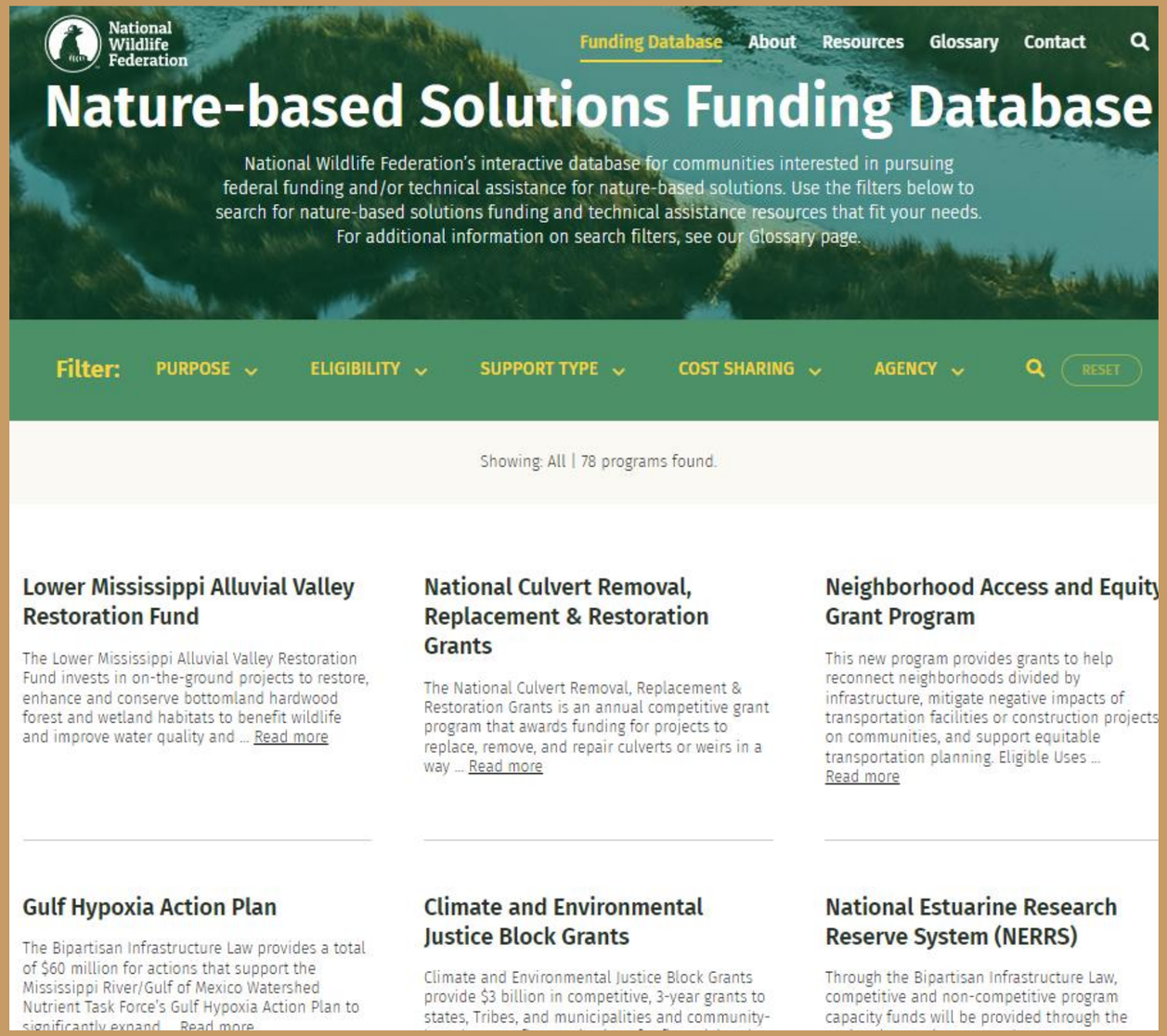
The **INFRASTRUCTURE** ***and*** **JOBS ACT**

WASHINGTON, D.C. (February 22, 2024) – The National Fish and Wildlife Foundation (NFWF) today announced the release of the 2024 Request for Proposals for the National Coastal Resilience Fund (NCRF) and expects to invest approximately $140 million in grants—including approximately $96 million from the Bipartisan Infrastructure Law—to support nature-based solutions for coastal resilience that provide a first line of defense for coastal communities and ecosystems from increasing impacts due to rising sea levels and more intense storms.

FUNDING PROGRAMS RESILIENCY DESIGN GUIDE

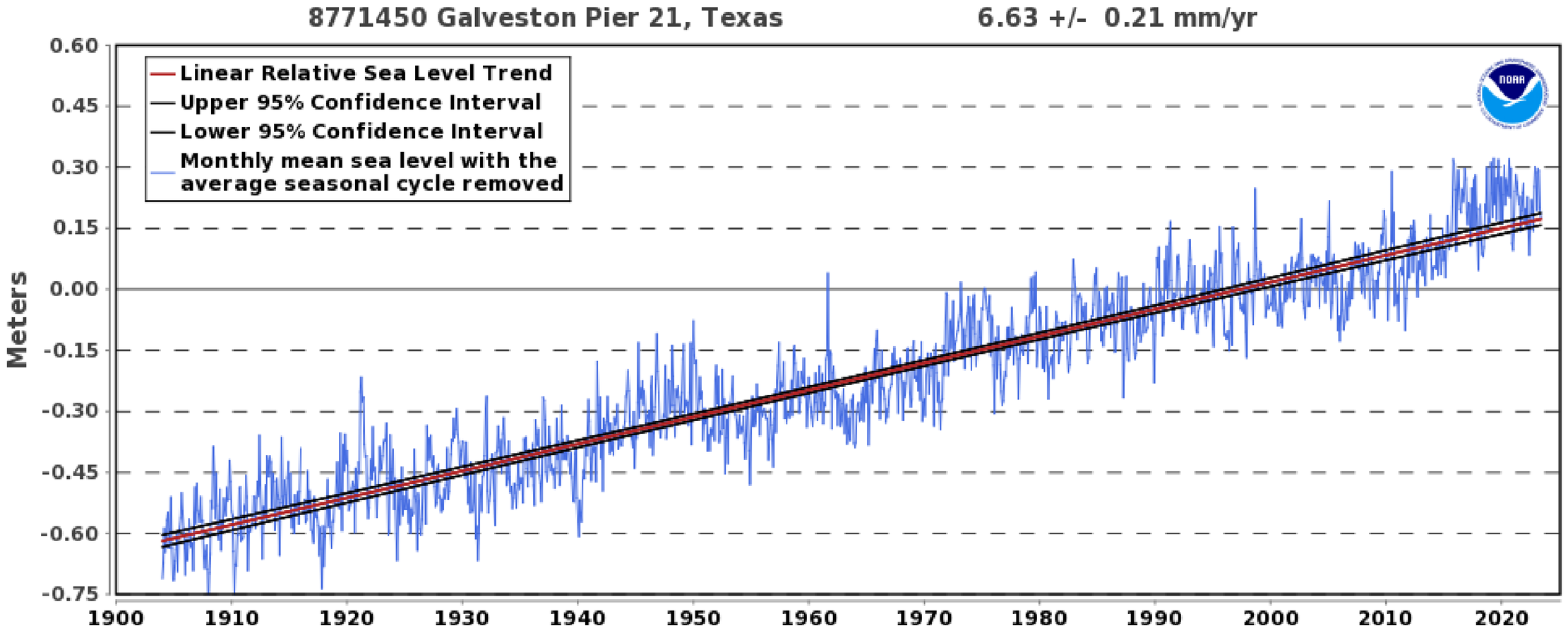
SCAN ME

FUNDING NATURE-BASED SOLUTIONS

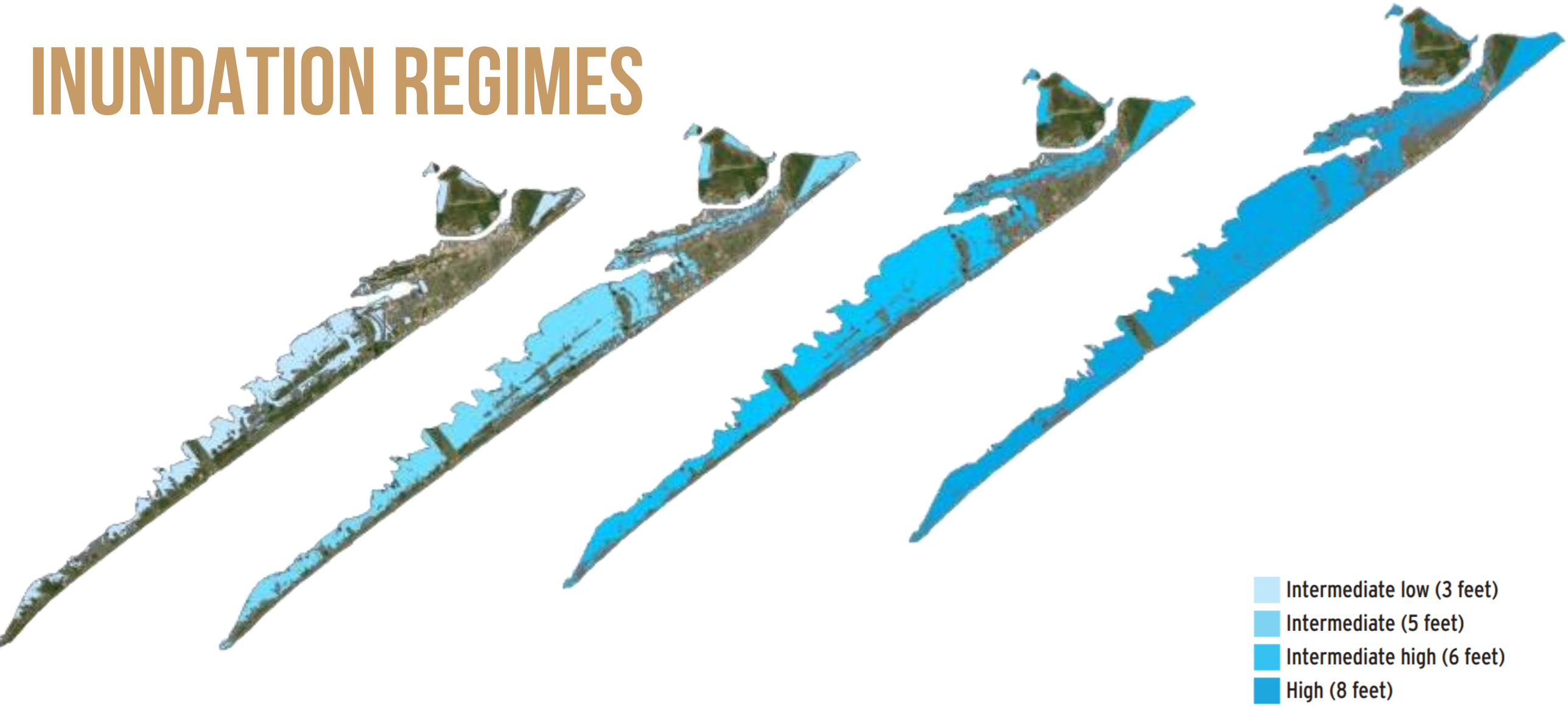


fundingnaturebasedsolutions.nwf.org

CHANGING CLIMATE: WHY ARE SEA LEVELS RISING?

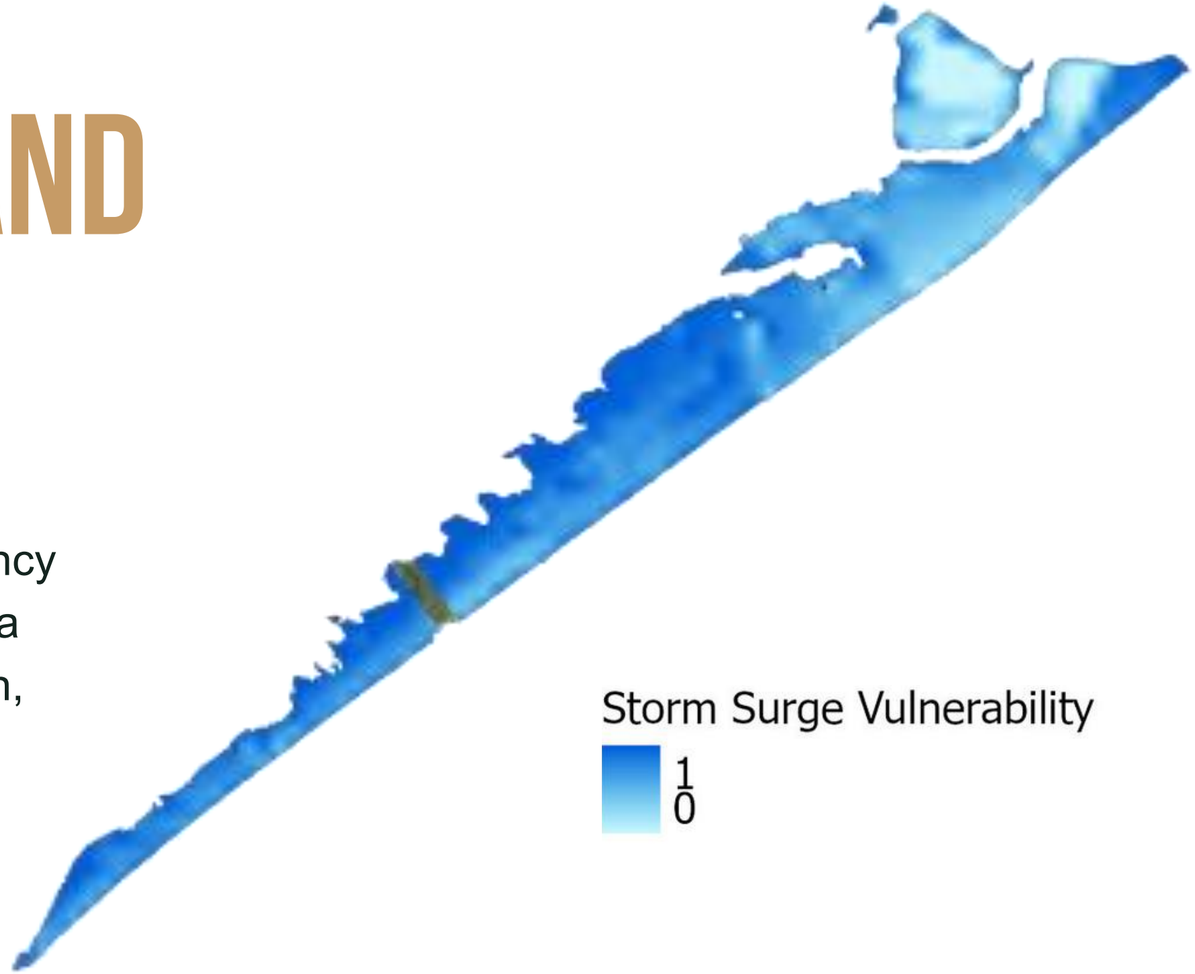


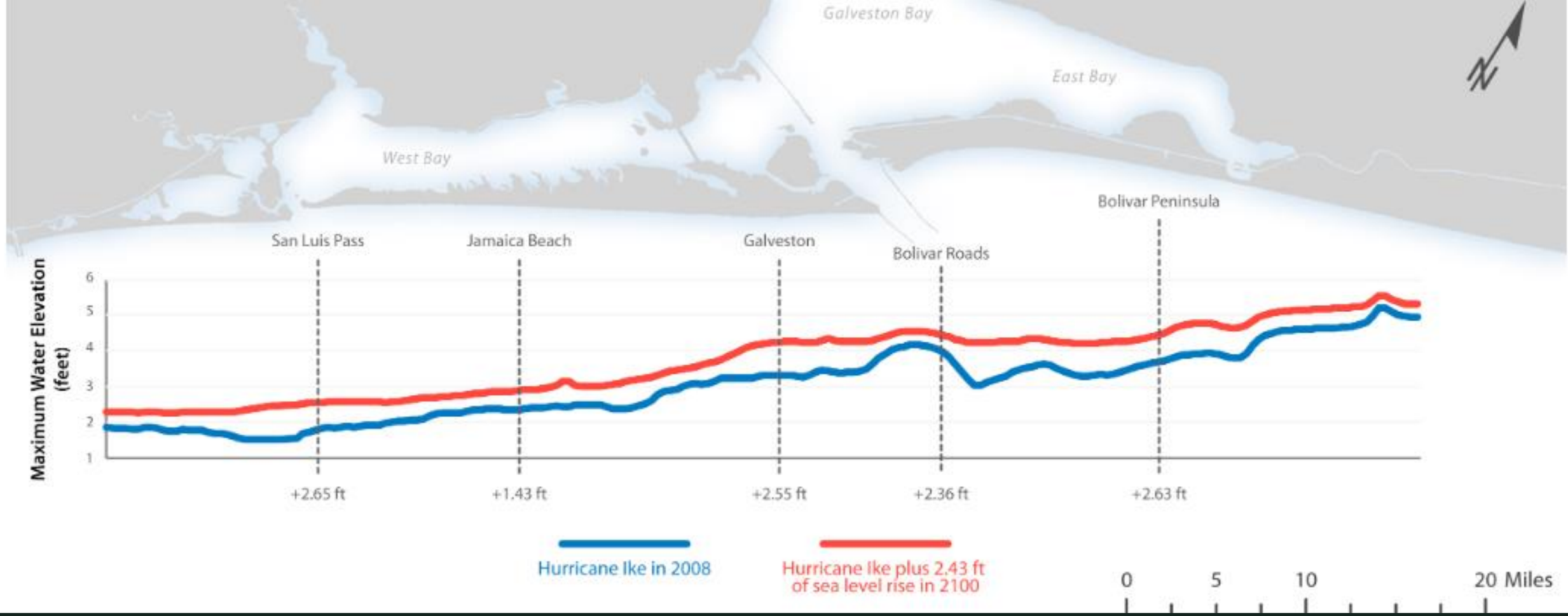
SEA LEVEL RISE AND INUNDATION REGIMES



COASTAL STORMS AND STORM SURGE

Climate change is expected to increase the frequency of severe Category 4 and 5 hurricanes. Warmer sea surface temperatures contribute to storm escalation, higher moisture content, and increased rainfall.

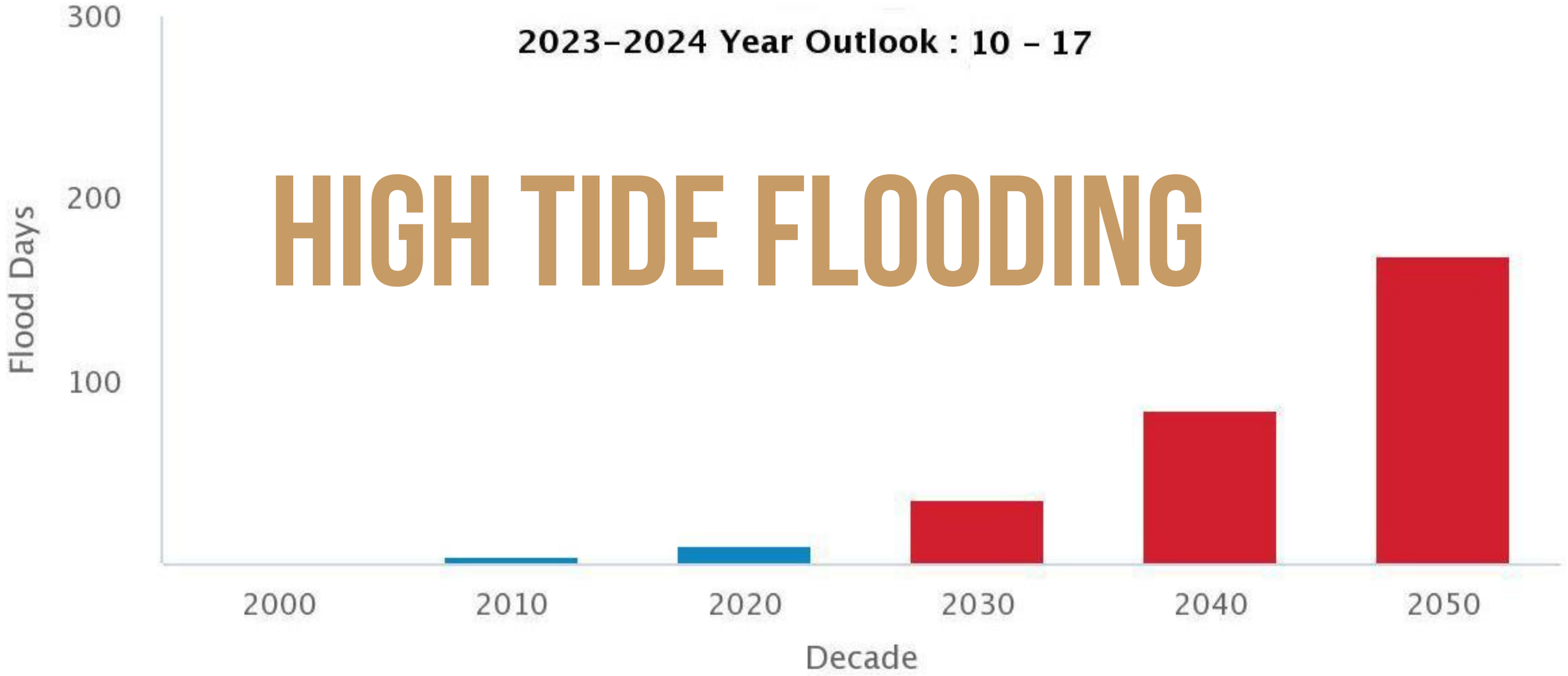




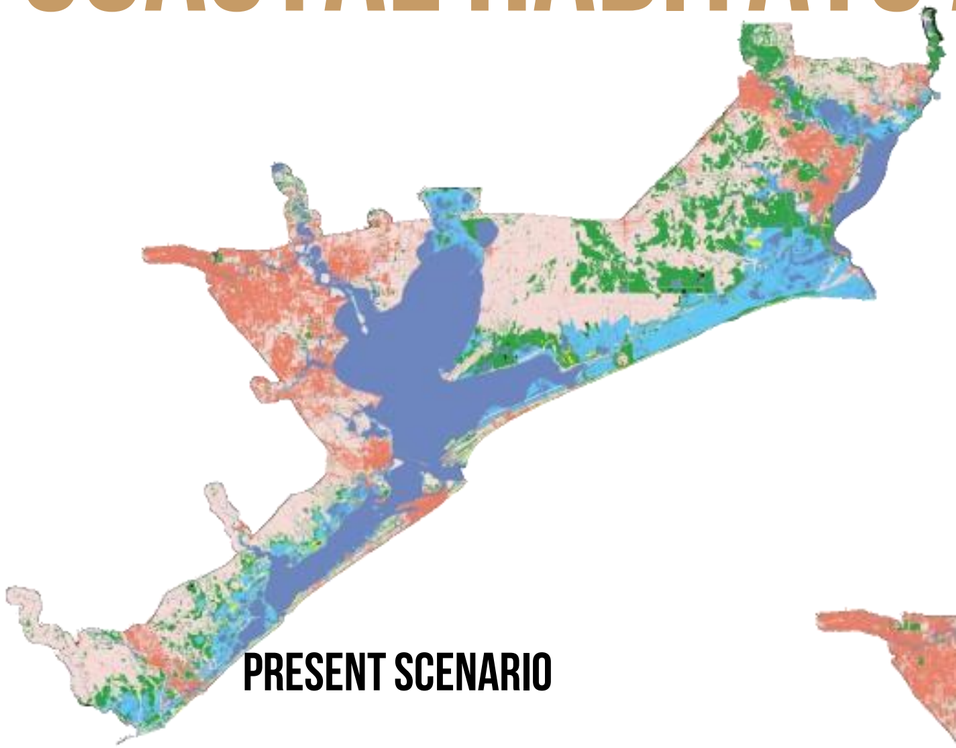
CHANGES IN TOTAL INUNDATION POSED BY HURRICANE IKE WITH SEA LEVEL RISE

If a storm similar to Hurricane Ike were to hit Galveston in 2100, its storm surge would be 450 sq. miles greater than what the island experienced in 2008.

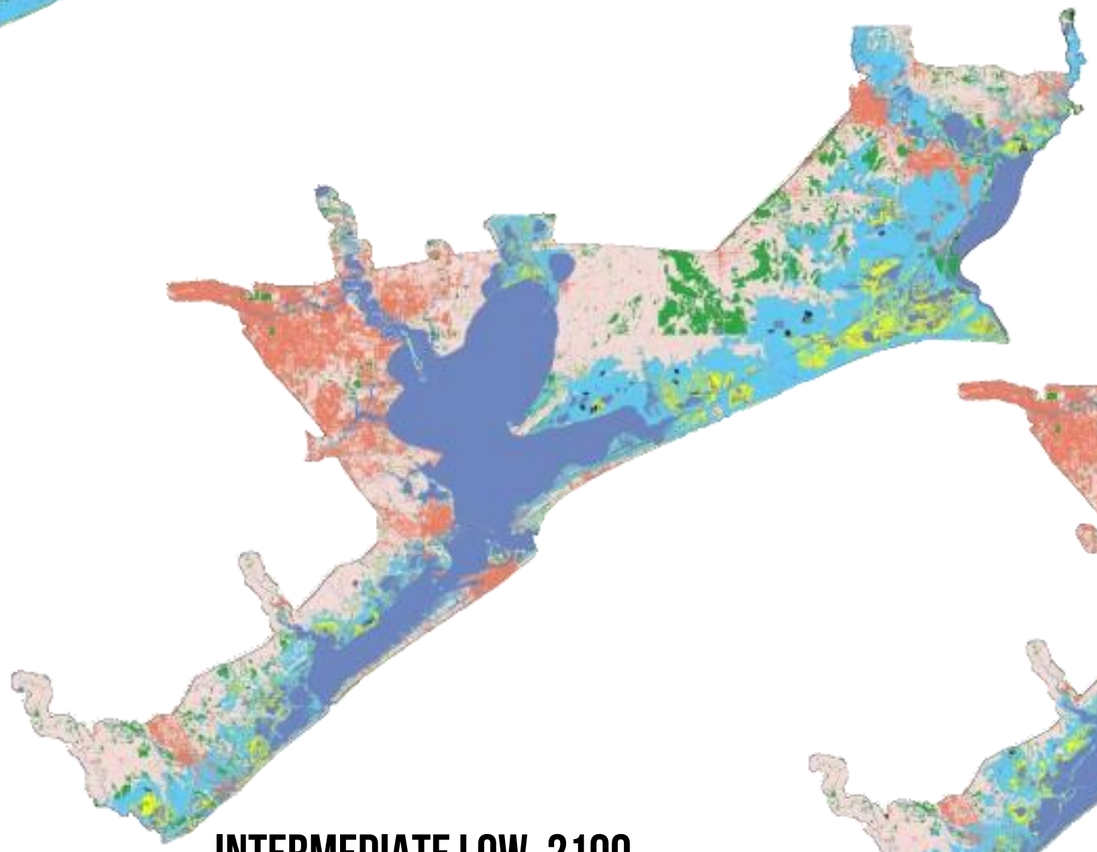
HIGH TIDE FLOODING



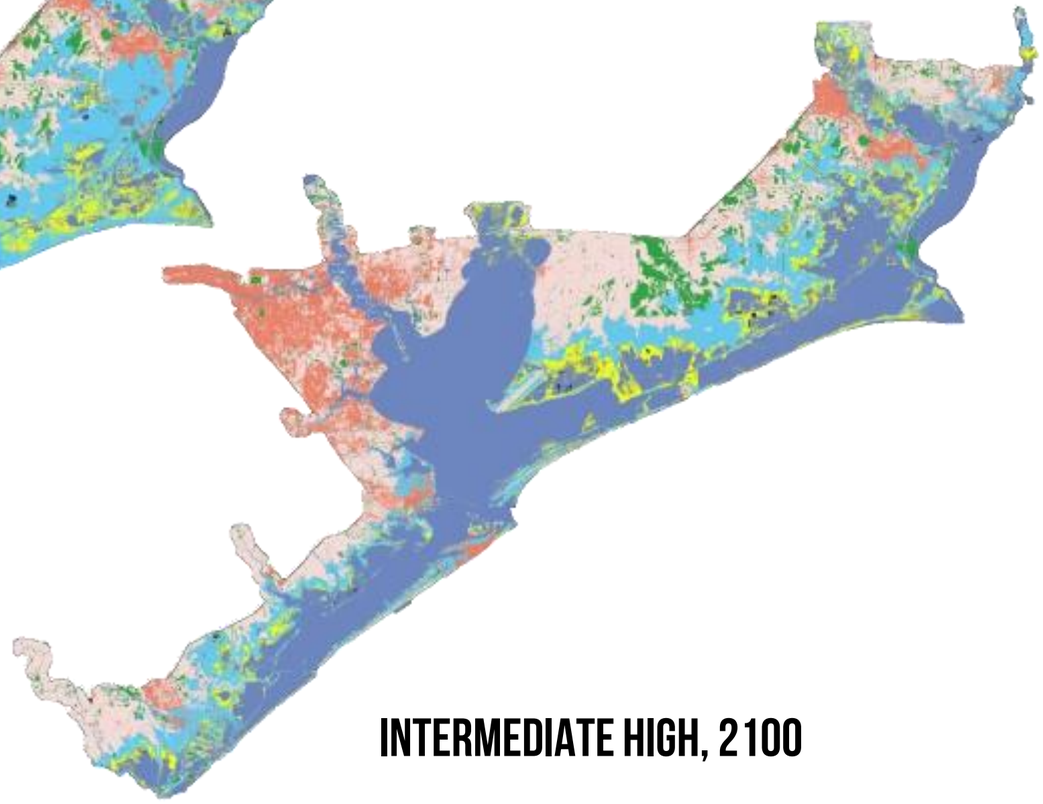
COASTAL HABITATS AND LAND COVER



PRESENT SCENARIO



INTERMEDIATE LOW, 2100

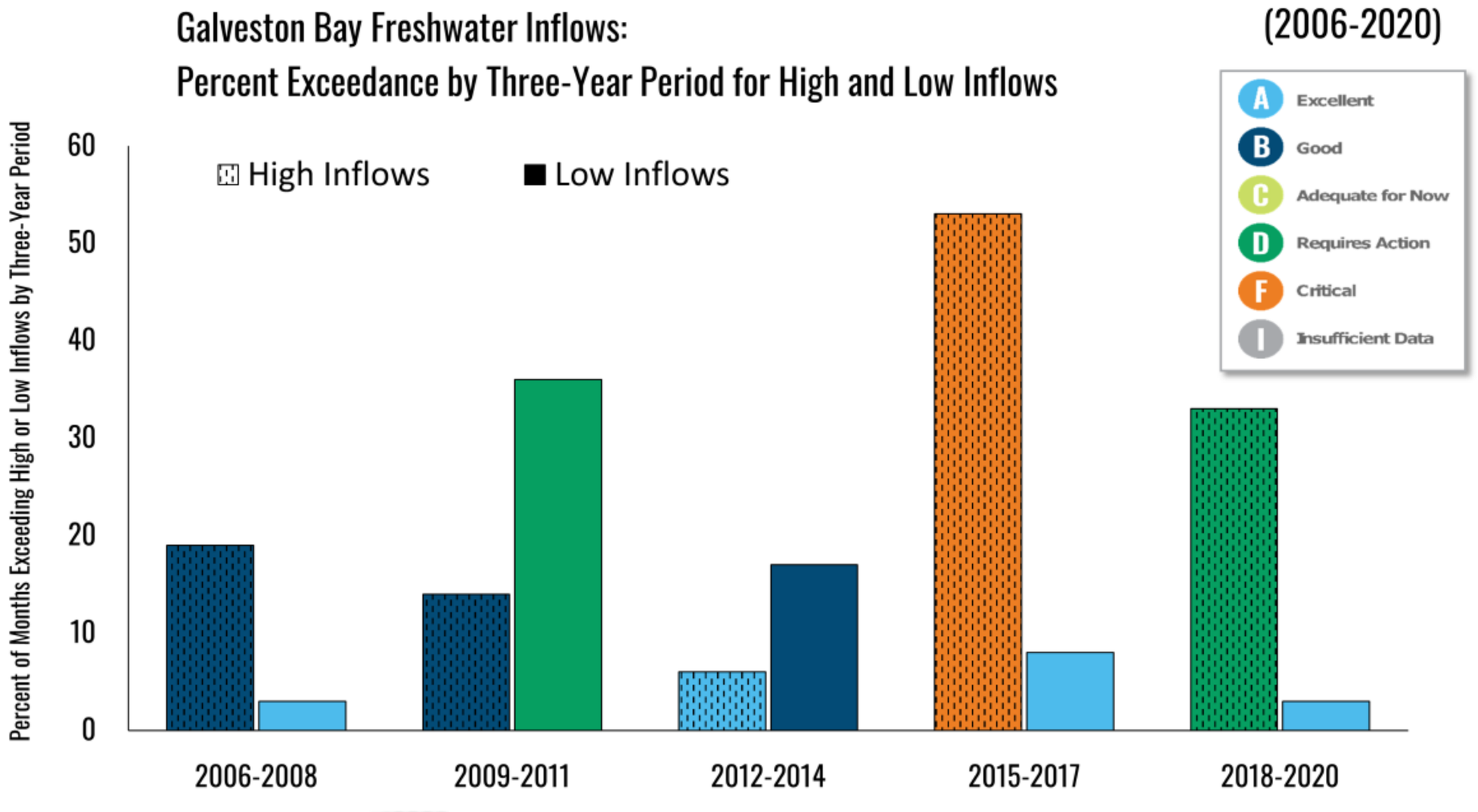


INTERMEDIATE HIGH, 2100

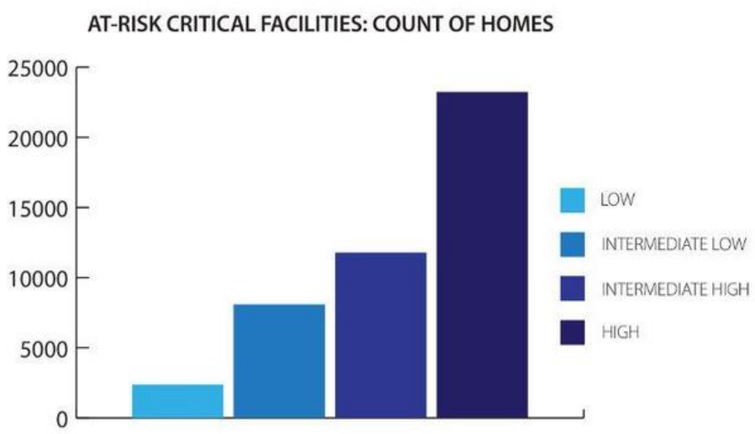
Land Cover

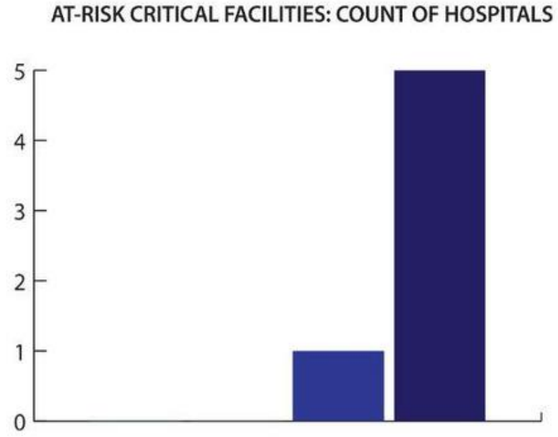
- Developed Dry Land
- Undeveloped Dry Land
- Freshwater Emergent Wetlands, Non-Tidal
- Saltwater/Brackish Emergent Wetlands, Tidal
- Flats and Beaches
- Open Water

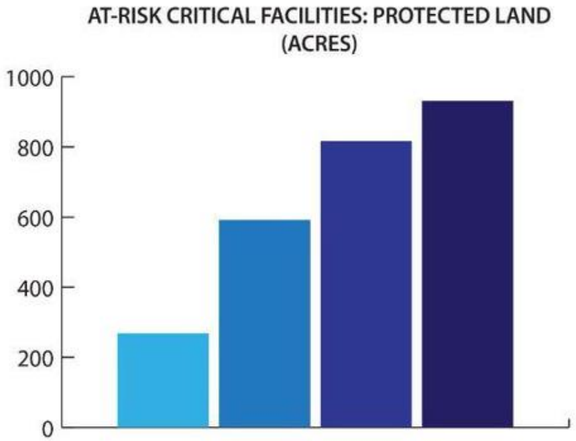
WATER QUANTITY AND QUALITY

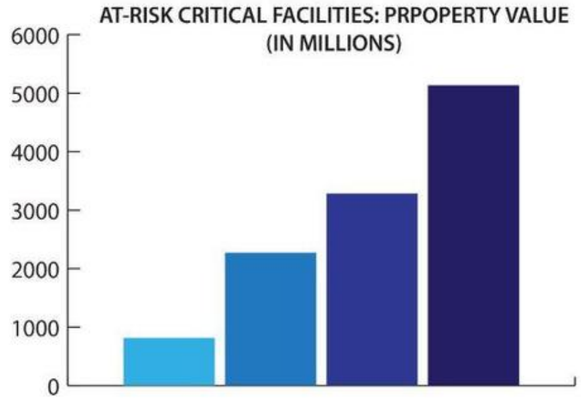


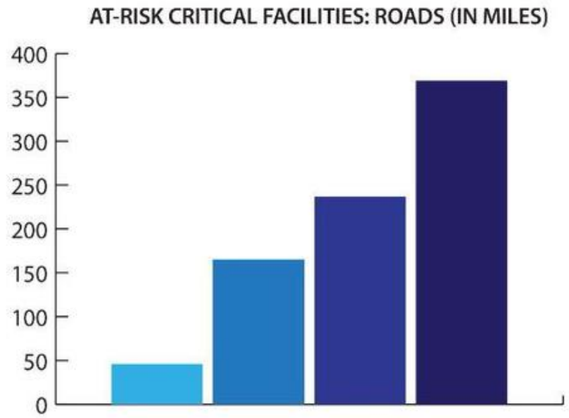
BUILT ENVIRONMENT

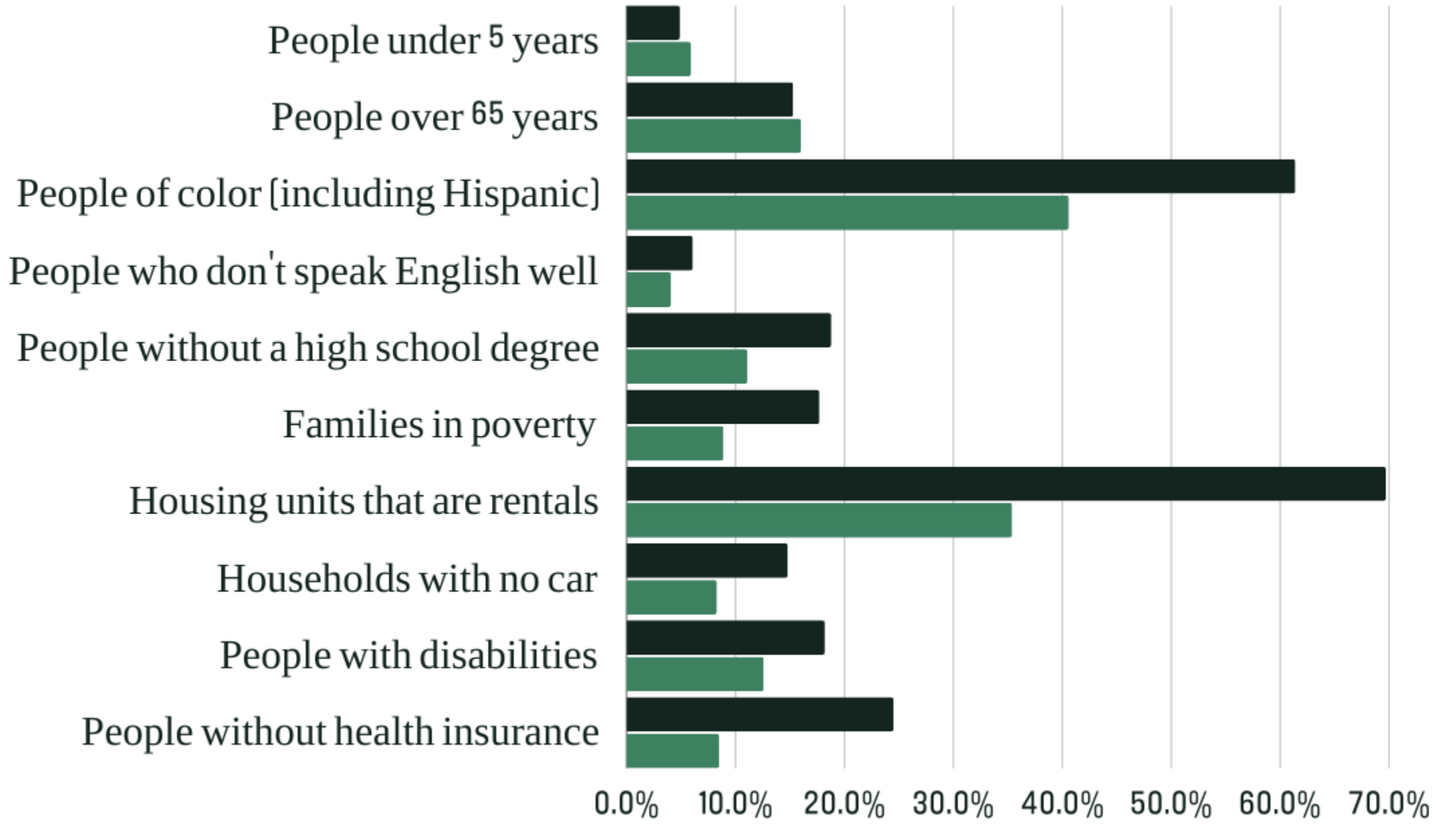




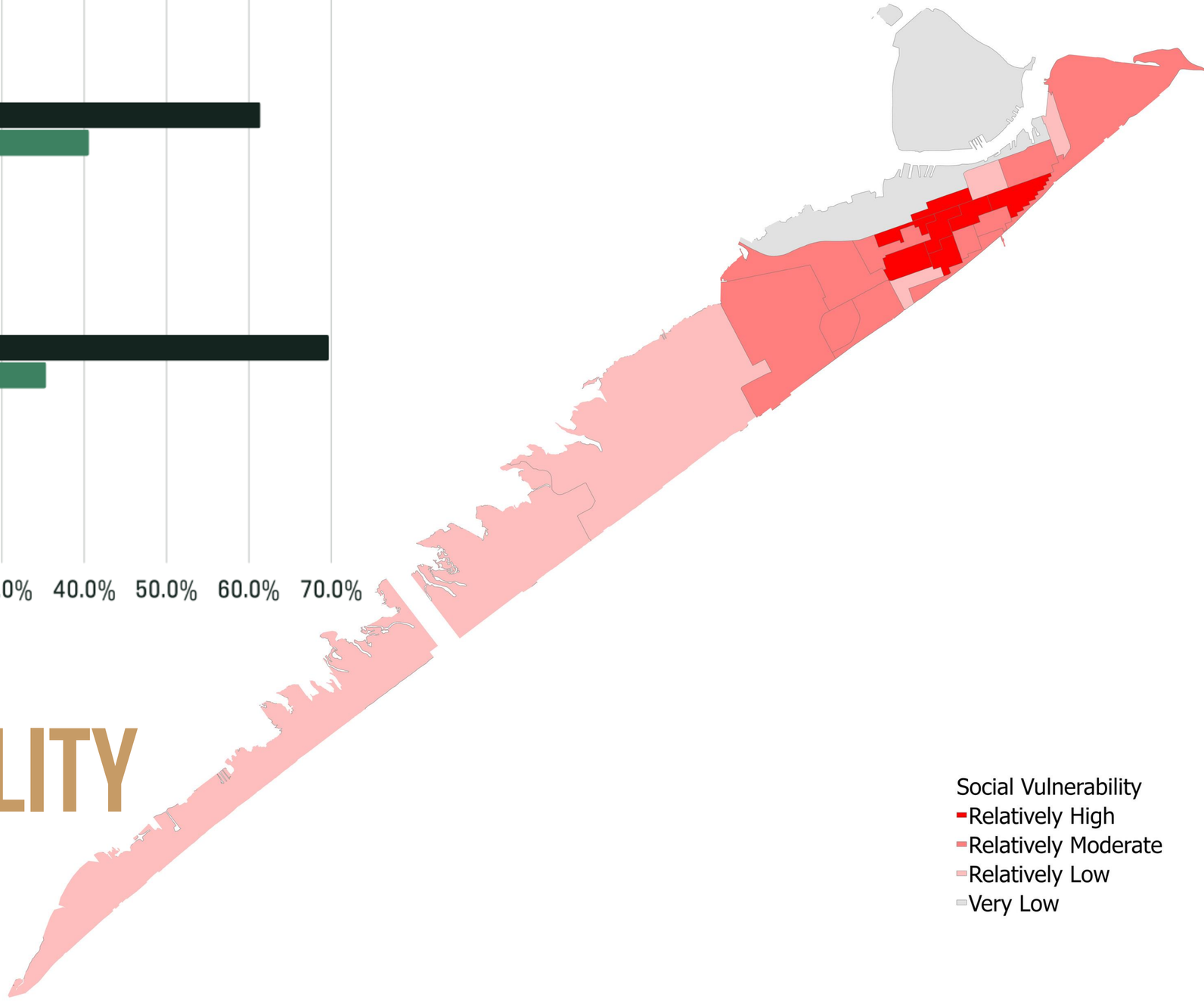








SOCIAL VULNERABILITY

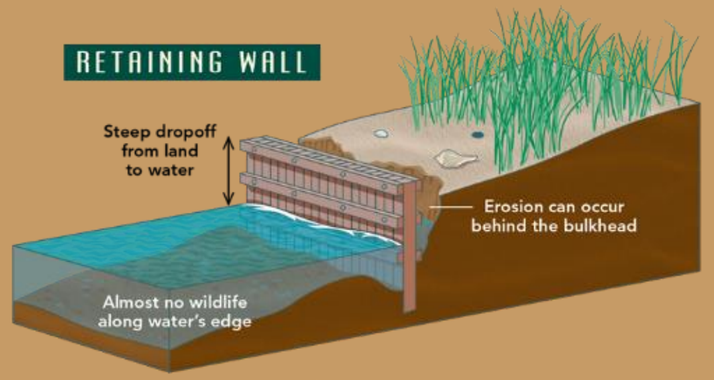


CLIMATE ADAPTATION: NATURE-BASED SOLUTIONS CAN HELP GALVESTON PREPARE

WHAT ARE NATURE-BASED SOLUTIONS?

"Nature-based Solutions are actions to protect, sustainably manage and restore natural and modified ecosystems in ways that address societal challenges effectively and adaptively, to provide both human well-being and biodiversity benefits" (Cohen-Shacham et al. 2016)

- Centers around conservation or restoration of natural systems, or the emulation of natural system functions in built environment
- Alternative to hard infrastructure, or can be used in combination – "green-gray hybrid solutions"
- Delivers climate adaptation and mitigation outcomes
- Provides co-benefits such as water and air quality improvements, wildlife habitat, carbon sequestration, and community recreational use



'Hard' infrastructure like retaining walls abruptly severs the ecological connection between the coast and water.

Not only do Living Shorelines defend land against destructive waves, but they also provide crucial habitat for fish and wildlife.

EXAMPLES OF NATURE-BASED SOLUTIONS

WHY NATURE-BASED SOLUTIONS?

Conventional engineered solutions can be:

- Costly
- Require continuous maintenance
- Unable to adapt to changing climatic conditions

Natural systems provide many services including risk reduction

- Opportunities to work with, rather than against nature
- Natural systems can be adaptive in the face of changing conditions
- Offer a host of related environmental and social benefits

KEY CONSIDERATIONS FOR USE OF NATURE-BASED SOLUTIONS

RECOGNIZE NATURAL SYSTEMS & PROCESSES AS CRITICAL INFRASTRUCTURE

CONSIDER CLIMATE IMPACTS ON PRIORITY NATURAL ASSETS

SEEK TO PROTECT OR RESTORE CRITICAL NATURAL INFRASTRUCTURE

CONSIDER EQUITY IMPLICATIONS IN THE DESIGN AND APPLICATION OF NbS

ENSURE THAT NbS YIELD NET POSITIVE BIODIVERSITY BENEFITS

GIVE NATURAL FEATURES AND PROCESSES SPACE TO FUNCTION

INTEGRATE NbS INTO EXISTING PLANNING PROCESSES

KEY PILLARS TO ADVANCING NATURE AND NATURAL-BASED PROJECTS

01

Identifying and implementing on-the-ground projects

02

Building community capacity and cohesion to advance these projects

03

Supporting climate jobs and training

04

Fostering a conducive regulatory and policy landscape

PILLAR 1. IDENTIFYING AND IMPLEMENTING ON-THE-GROUND PROJECTS

Protect, conserve, connect and restore terrestrial and aquatic habitats and manage species to support biodiversity, ecosystem services, and outdoor recreation during climatic changes.

1.1 Use living shorelines to stabilize shoreline edges, where appropriate
1.2 Explore construction of offshore oyster reefs and beds to attenuate wave energy, reduce erosion, and improve water quality
1.3 Protect and restore barrier beaches and dunes through renourishment and revegetation
1.4 Restore degraded salt marshes and facilitate marsh migration
1.5 Consider opportunities to establish habitat connectivity on and around local project sites
1.6 Implement site-specific green infrastructure measures to mitigate stormwater runoff, reduce urban heat island effect, and improve water quality
1.7 Prioritize low-impact development (LID) practices and conserve land to increase open space
1.8 Sustain freshwater inflows

PILLAR 2. BUILDING COMMUNITY CAPACITY AND COHESION TO ADVANCE PROJECTS

Leveraging the strength and leadership of local communities to aid in the adaptation of our natural resources by connecting them to places in ways that are accessible to and equitable for all people.

2.1 Develop strategies for enhanced outreach and education
2.2 Empower grassroot champions to co-design nature-based projects
2.3 Create a city-community liaison to align city leadership, non-profits, and philanthropic interests to enhance collaboration and coordination
2.4 Coordinate with existing organizations to promote ecotourism

PILLAR 3. PROMOTING CLIMATE JOBS AND TRAINING

Integrating climate-smart principles and practices into decision-making through improved climate training, investment in climate-related or climate-enhanced jobs, and connections with higher-education networks.

3.1 Support and develop opportunities for community science
3.2 Launch a place-based resilience training program for city officials
3.3 Implement project and place-based learning through existing collaborations and frameworks
3.4 Encourage backyard habitat development practices

PILLAR 4. FOSTERING A CONDUCIVE REGULATORY AND POLICY LANDSCAPE

All parties and partners involved in implementing adaptation-focused natural resource and ecosystem management goals on land or in water have a clear understanding of priorities, responsibilities and roles and seek to eliminate barriers and obstacles.

4.1 Conserve land and use financial incentives to remove infrastructure from floodplains
4.2 Update building codes to account for climate change impacts
4.3 Incorporate the best available science on the impacts of climate change in policies, regulations and programs
4.4 Create local wetlands protection bylaws and regulations
4.5 Designate areas requiring special protection in light of climate change (e.g., beaches, wetlands, priority habitat) and limit new development in these areas
4.6 Use transferable development credits to reduce risky coastal development
4.7 Implement comprehensive water resources management such as One Water
4.8 Create incentives for integrating nature in development
4.9 Increase collaboration amongst local, regional, and state entities

THANK YOU