

St. Augustine, Florida Back Bay Coastal Storm Risk Management (CSRM) Feasibility Study

MONTHLY PROGRESS MEETING

JULY 2024

**PLEASE MUTE YOUR PHONE AND COMPUTER
TO AVOID BACKGROUND DISRUPTIONS.**

WE WILL START PROMPTLY AT 1:05

Presented by:

Jason Harrah, Senior Project Manager (Jacksonville District, USACE)

Marty Durkin, Planning Technical Lead (Jacksonville District, USACE)

Jessica Beach, Chief Resiliency Officer (City of St. Augustine)



CITY OF
ST AUGUSTINE
EST. 1565



AGENDA



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- Opening Remarks
- Study Overview
- Overall Study Schedule & Budget
- OSE, EQ, & RED Benefit Metrix
- Schedule Updates (90-Day Window)
- Discipline Specific Study Updates
- Upcoming Public Engagements
- Sponsor Remarks
- Agency Questions/Comments
- Public Comments
- Closing Remarks

Study Neighborhoods



Study Authority: House Resolution 2646 (June 21, 2000): St. Johns County, Florida

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That in accordance with Section 110 of the River and Harbor Act of 1962, the Secretary of the Army, acting through the Chief of Engineers, is **requested to survey the shores of St. Johns County, Florida**, with particular reference to the advisability of providing beach erosion control works in the area north of St. Augustine Inlet, the shoreline in the vicinity of Matanzas Inlet, and adjacent shorelines, as may be necessary in the interest of **hurricane protection, storm damage reduction, beach erosion control, and other related purposes.**

Non-Federal Sponsor: City of St. Augustine (COSA)

POC: Jessica Beach, P.E., Chief Resilience Officer, jbeach@citystaug.com

Study Area

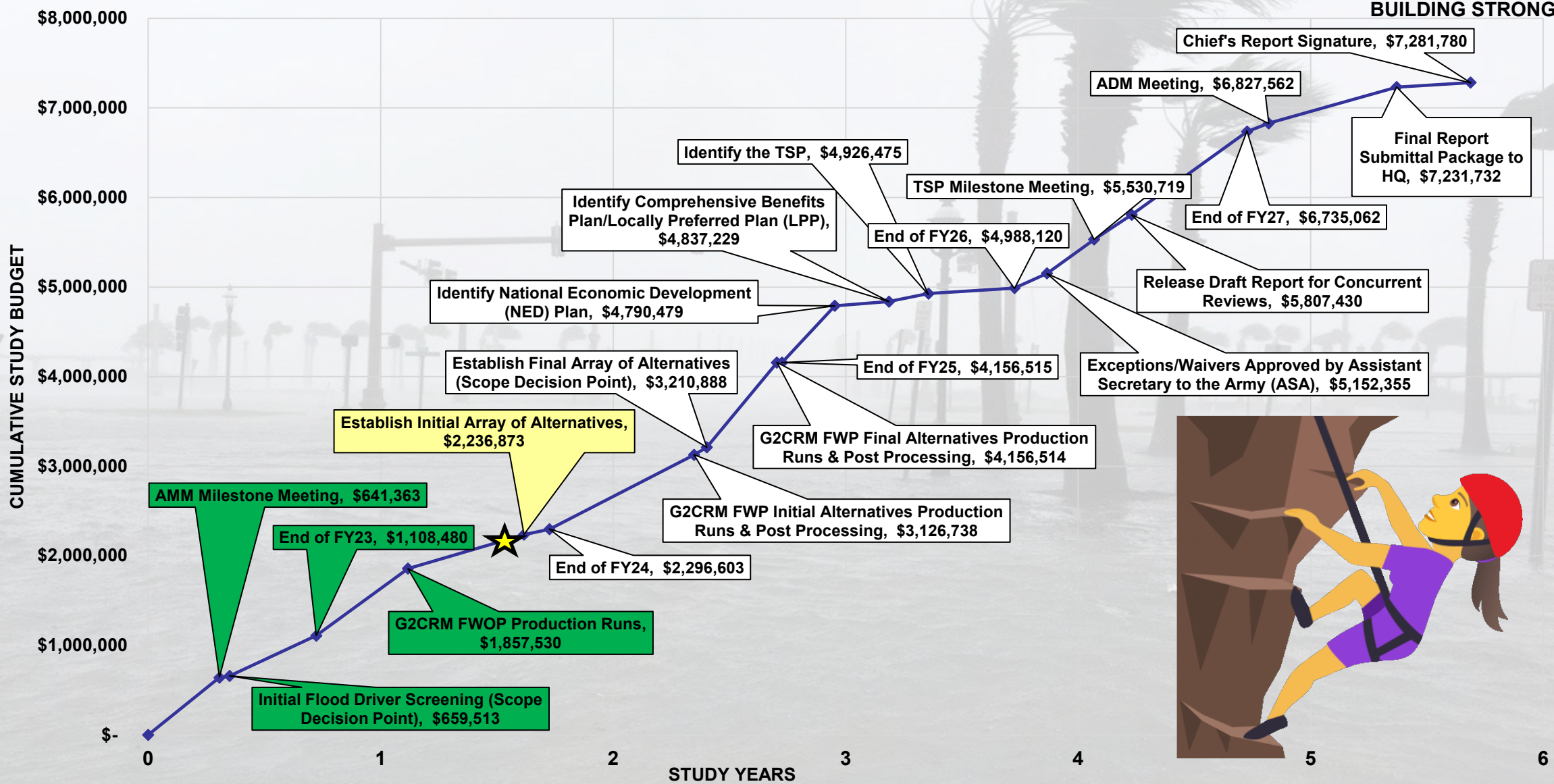
- Entire COSA Municipal Boundary
- 17 Distinct Neighborhoods
- 3 Separate Land Masses
- Interconnected Water Bodies

Objectives to be achieved within the City of St. Augustine over a 50-year period of analysis from 2035-2085 are to...

1. Manage risk of coastal flood damages.
2. Manage risk to health and life-safety.
3. Manage risk to cultural and natural resources.
4. Manage flooding impacts to the local economy.



STUDY SCHEDULE & BUDGET





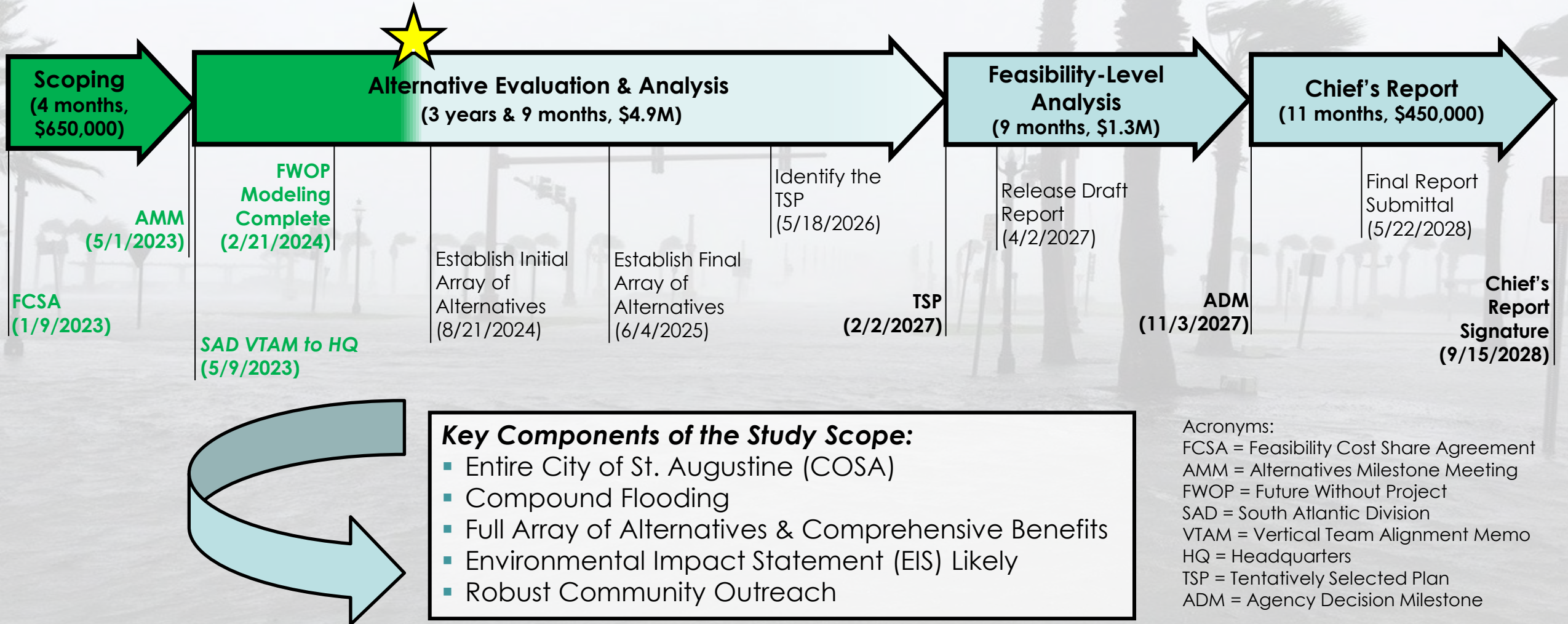
STUDY OVERVIEW

★ We Are Here



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Schedule & Budget Overview: **5 years & 9 months, \$7.3M, Cost Share ~50% Fed, 50% Sponsor**



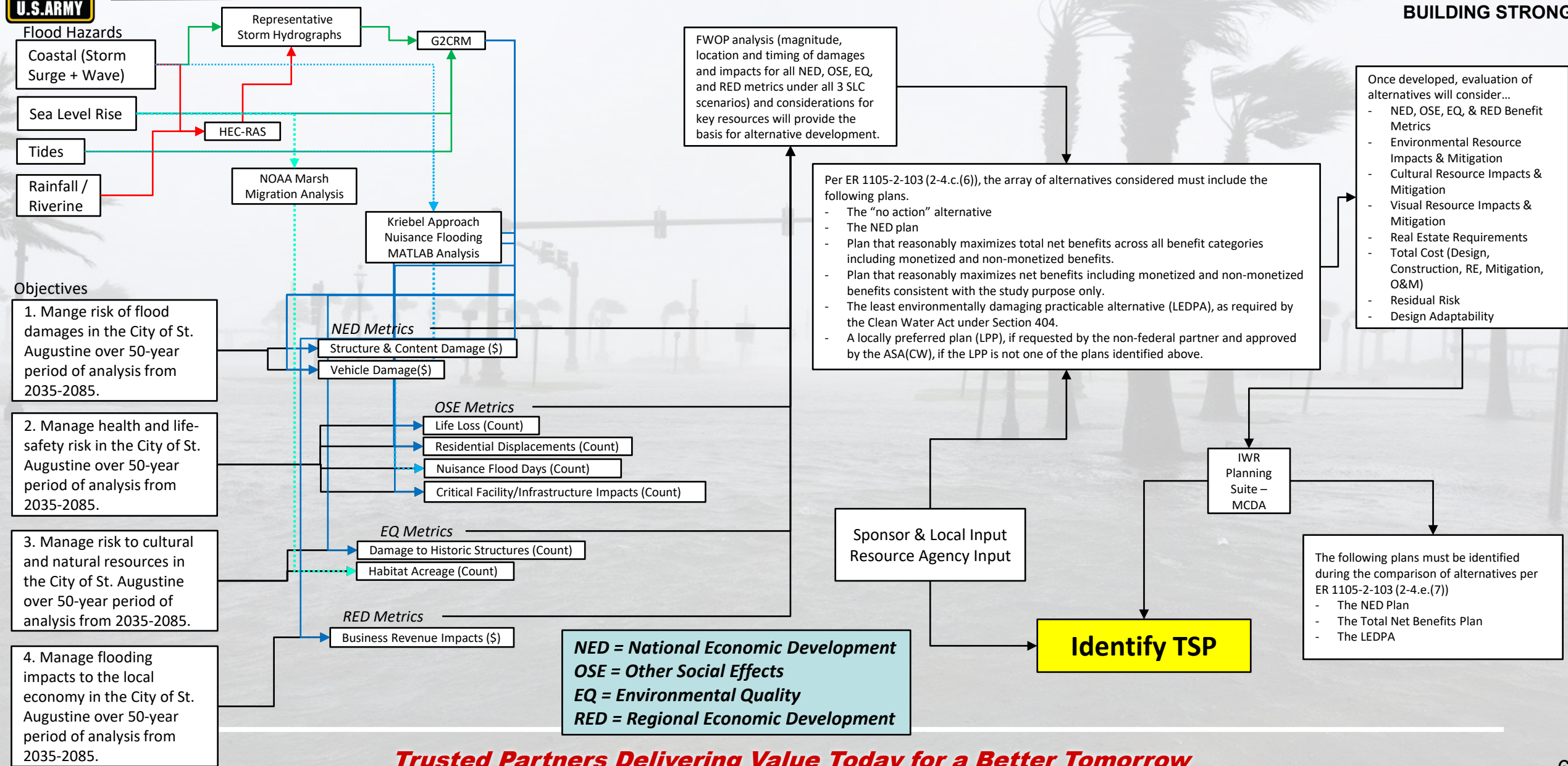


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PATH TO TENTATIVELY SELECTED PLAN (TSP)



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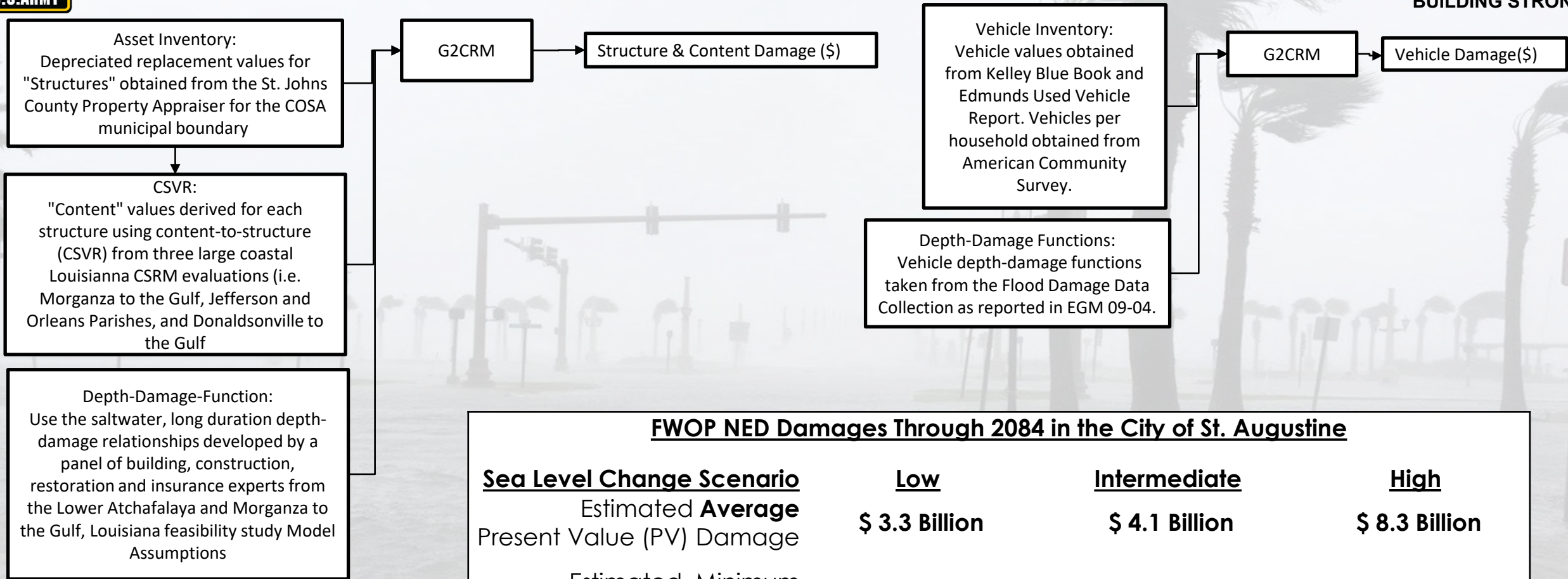
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NED STRUCTURE, CONTENT, & VEHICLE DAMAGE



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FWOP NED Damages Through 2084 in the City of St. Augustine

<u>Sea Level Change Scenario</u>	<u>Low</u>	<u>Intermediate</u>	<u>High</u>
Estimated Average Present Value (PV) Damage	\$ 3.3 Billion	\$ 4.1 Billion	\$ 8.3 Billion
Estimated Minimum PV Damages	> \$ 600 Million	> \$ 800 Million	> \$ 3 Billion
Estimated Maximum PV Damages	< \$ 9 Billion	< \$ 11 Billion	< \$ 16 Billion

Note: Values based on 100 iterations simulated in G2CRM.



OSE LIFE LOSS



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Population Data:
Obtained from the National
Structure Inventory (NSI) version
2 for daytime and nighttime for
structures in the COSA municipal
boundary

Life Loss Depth-Damage
Functions: Loss of life
calculations are separated out by
age categorization with under 65
being one category and 65 and
older being the second category.
There are three possible lethality
functions for structure
residents: safe, compromised,
and chance (i.e. Simplified
LifeSim Methodology).

EPZ: Define with the City input.
An evacuation planning zone
(EPZ) is a spatial area, defined by
a polygonal boundary that
determine the population
remaining in structures during a
storm (i.e. population that did
not evacuate).

G2CRM

Life Loss (Count)

FWOP Average Estimated Potential Life Loss Through 2084				
SLC	Davis Shore	Downtown	Western San Sebastian	Total
High	40.9	46.2	2.3	89.4
Intermediate	8.9	9.9	0.4	19.2
Low	5.4	6.3	0.2	11.9

*These estimates of potential future life loss are bases on model simulations. They are rough approximations used for the comparison of alternatives to be considered.



OSE RESIDENTIAL DISPLACEMENTS



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G2CRM

Post process results to count displacement events based on FEMA substantial damage thresholds (i.e. Model showing at least 50% or greater damage for a residential structure).

Residential Displacements (Count)

*For a subset of residences in the Oyster Creek and Ravenswood neighborhoods that, based on social factors, it is more likely that residents will not be able to rebuild and move back in. It is more important to stop temporary displacements in these areas in the first place.

Average # of FWOP Displacements through 2084

SLC	Davis Shore	Downtown	Western San Sebastian	Total
High	939	1293	135	2367
Intermediate	484	563	38	1085
Low	379	411	25	815

A **displacement** refers to an instance of a residential structure being damaged to the extent that the people living in it would need to move out of it for approximately a year while repairs and improvements are made to make the structure livable again.



OSE NUISANCE FLOOD DAYS

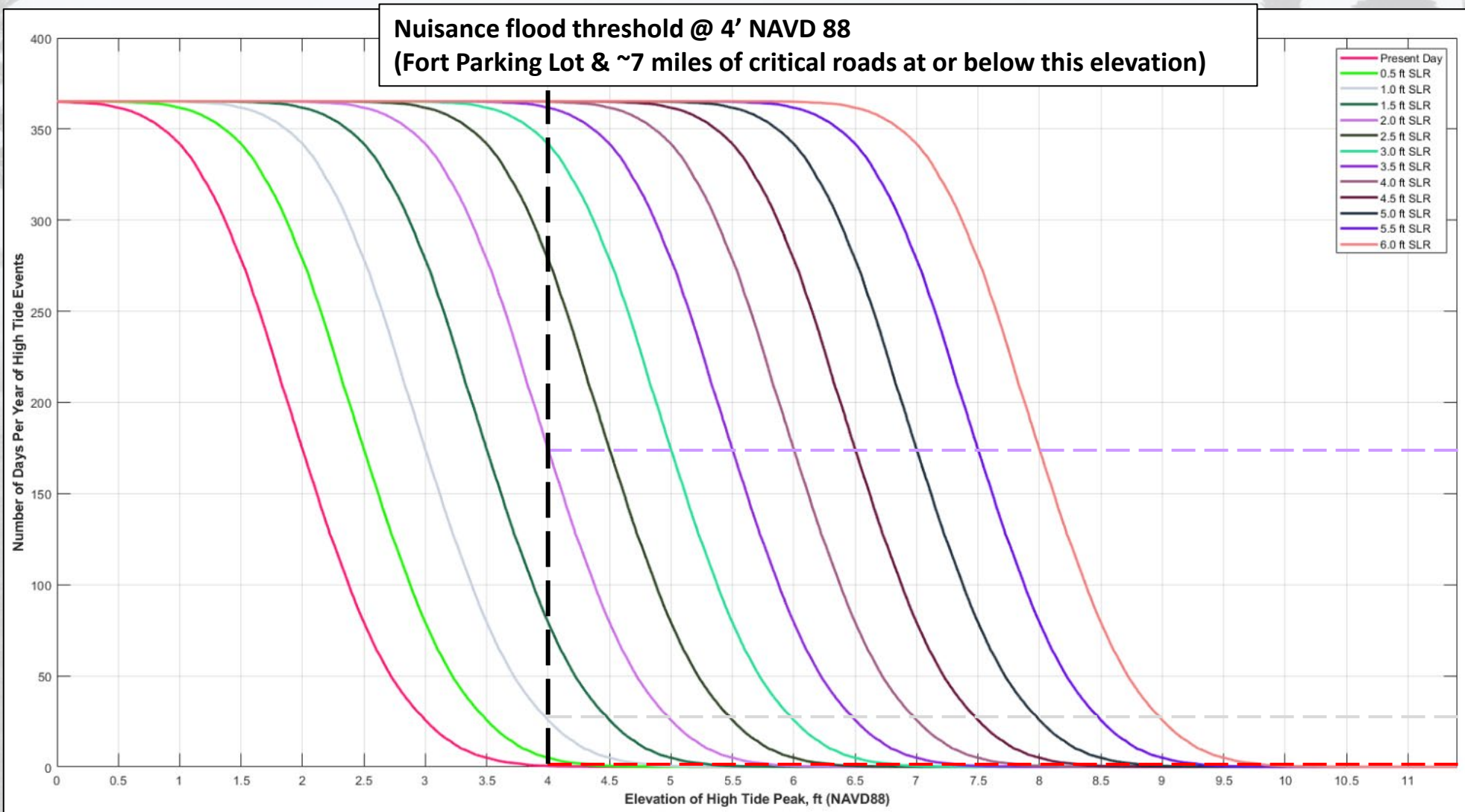


Nuisance flood threshold elevation,
Historic water level data, Sea level rise.

Kriebel MATLAB code

Nuisance Flood Days (Count)

*Benefits will be **BUILDING STRONG**
based on alternative and location



~175 days per year seeing
nuisance flood conditions with +2'
SLR (2054 on USACE High SLC,
2099 on USACE Intermediate SLC)

~26 days per year seeing nuisance
flood conditions with 1' of SLR
(2033 on USACE High SLC, 2059 on
USACE Intermediate SLC)

~1 days per year seeing nuisance
flood conditions at current sea level
(MSL @ -0.5' NAVD88)



OSE CRITICAL FACILITY/INFRASTRUCTURE IMPACTS



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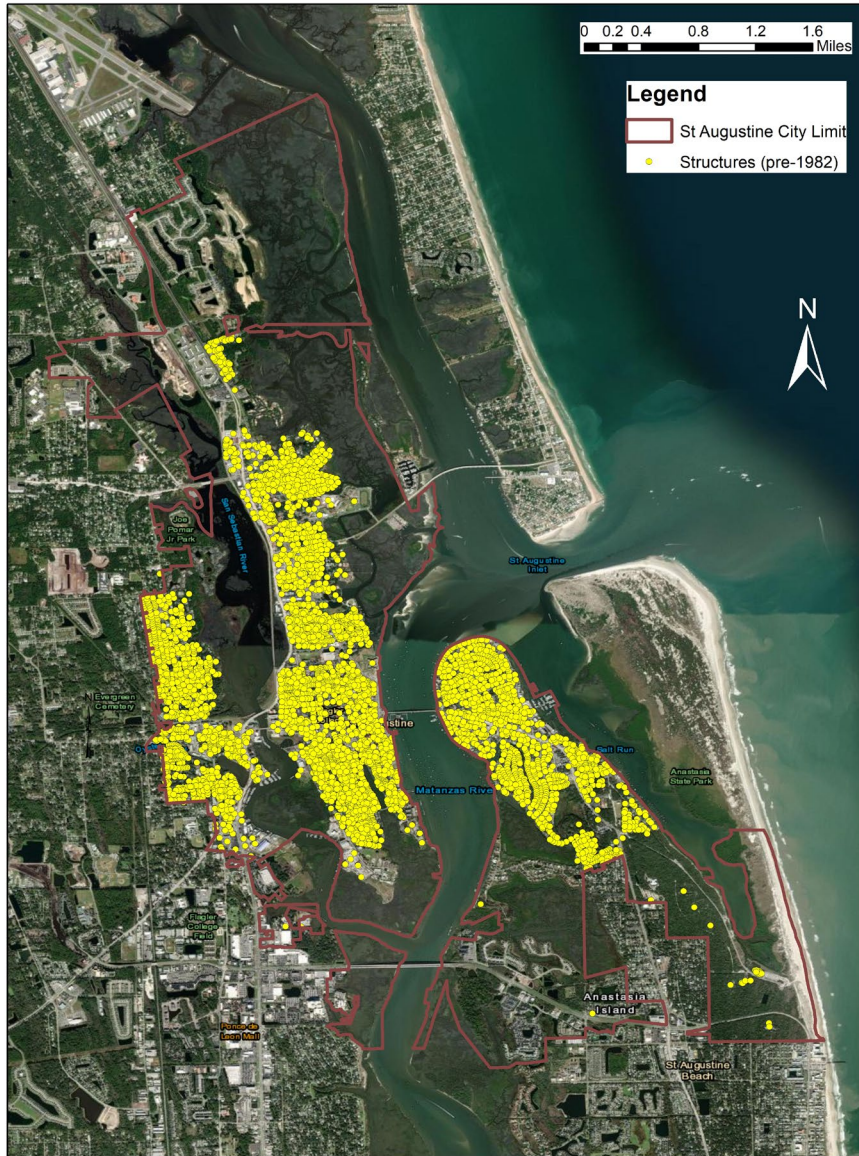
G2CRM Assets created to for the most critical city assets with flooding thresholds identified where impacts to the function of the asset would occur. **Inputs based on information in the VA study.**

G2CRM

Critical Facility/Infrastructure Impacts (Count)

FWOP Average # of times impacted through 2084

Asset	Description	Elevation (ft NAVD88)	Exposure Depth (inches)	Impact Elevation (ft NAVD88)	Low SLC	Intermediate SLC	High SLC
Roads & Bridges < 5'	11.6 miles of critical transportation and evacuation routes	5	12	6	13.29	19.15	38.07
Roads & Bridges < 7'	22.6 miles of critical transportation and evacuation routes	7	12	8	3.52	4.56	12.42
Roads & Bridges < 9'	29.0 miles of critical transportation and evacuation routes	9	12	10	0.56	0.95	3.04
Roads & Bridges < 11'	30.9 miles of critical transportation and evacuation routes	11	12	12	0	0.05	0.6
Roads & Bridges < 13'	33.6 miles of critical transportation and evacuation routes	13	12	14	0	0	0.03
Roads & Bridges < 15'	34.0 miles of critical transportation and evacuation routes	15	12	16	0	0	0
Electric Facility - St. Augustine	FP&L Facility in DTP model area off of Riberia Street.	4.5	0	4.5	37.89	46.65	53.46
Electric Facility - Lewis	FP&L Facility in WSS model area south of the SR 16 bridge.	6	0	6	13.29	19.15	38.07
Wastewater Infrastructure	Approximately half of the wastewater facility infrastructure (plants, lift stations, etc.) within the COSA would be impacted. This would likely cause significant impacts to the systems function for treating wastewater.	8.1	0	8.1	3.34	4.36	11.61
Railroad Tracks	Low portion of the FECRR track adjacent to US 1, north of the King St. Bridge.	4.6	12	5.6	17.73	25.7	43.13
Trash Compactors	4 COSA trash compactors located in the DTP model area.	6.4	0	6.4	9.67	14.18	32.68
Drinking Water Infrastructure	Water Treatment Plants in WSS & DTP model areas along with several other water system infrastructure locations would be impacted.	8.8	0	8.8	2.03	2.94	7.33
Disaster Recovery Center	The Ketterlinus Elementary School Gym which serves as a disaster recovery area in the DTP model area.	6.5	0	6.5	8.84	13.1	31.36
Health Care Facilities	Approximately half of the health care facilities (urgent care, pharmacies, assisted living, etc) within the COSA would be impacted.	10	0	10	0.56	0.95	3.04
Fire Station	Fire Station in the DTP model area.	7.9	0	7.9	3.74	4.83	13.46
Police Station	Police Station in the DTP model area.	8	0	8	3.52	4.56	12.42
Radio Communications Towers	Approximately half of the radio communications towers within the COSA would be impacted.	7.2	6	7.7	4.09	5.4	15.71
Local Government Facilities	Approximately half of local government facilities would be impacted.	8.5	0	8.5	2.6	3.58	8.74
Military Installations	Florida National Guard Arsenal Annex in the DTP model area.	7	0	7	6.35	9.14	24.97
Schools	Approximately half of the school buildings (including preschools and day cares) within the COSA would be impacted.	9	0	9	1.58	2.56	6.53



FWOP Average # of Historic Structures impacted through 2084				
SLC	Davis Shores	Downtown	Western San Sebastian	Total
High	972	2474	526	3972
Intermediate	946	2456	360	3762
Low	934	2421	316	3671
Out of	1005	2477	929	4411

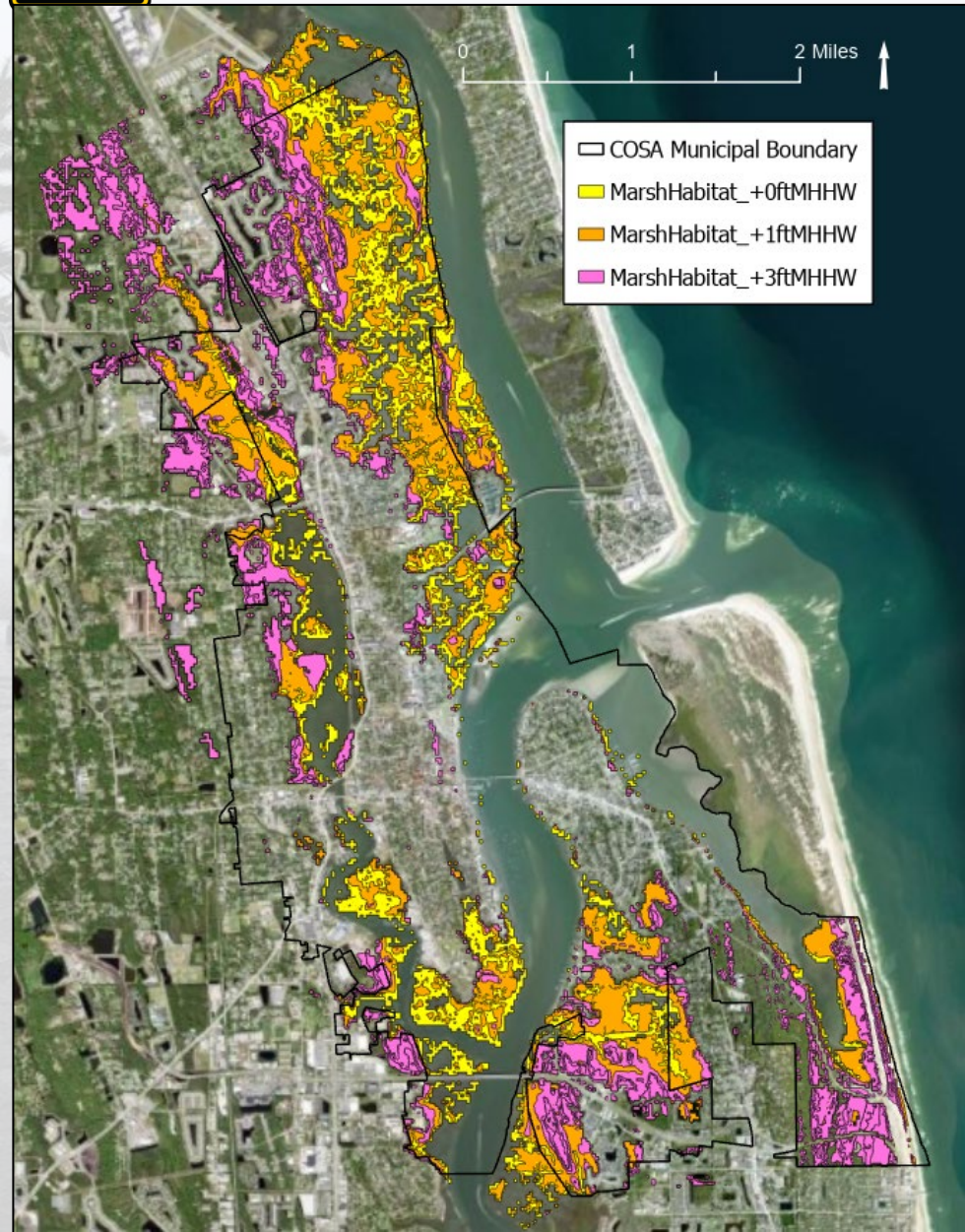


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EQ HABITAT ACREAGE



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NOAA Marsh
Migration Tool

Simple
Comparison of
FWOP to FWP
Habitat Acreage

Habitat Acreage
(Count)

Select Future Year	Habitat Acres Lost Per USACE Sea Level Projections		
	Low	Intermediate	High
2045	260	260	630
2065	260	430	1,200
2085	430	630	1,420

*Approximately 2,820 acres of existing
Saltwater Marsh in the Study Area.

*Benefits will be “all or nothing” based on alternative and location

*UMAM used for alternative direct impacts to habitat impacts and mitigation separately



RED BUSINESS REVENUE IMPACTS



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G2CRM

COSA 2020 Resilient Heritage Study used as the basis for costal storm flooding impacts on businesses through lost revenue. Estimates of lost revenue associated with Mathew and Irma flooding (inflated to todays dollars using CPI) projected for similar or greater magnitude flood events simulated in G2CRM.

Business Revenue Impacts (\$)

3.5.3.3 Economic Impact of Lost Visitation Following Weather Events

Another way to think about the numbers above: every day that St. Augustine is shut down because of an extreme weather event is a day when these expenditures, jobs, and labor income are *NOT* being generated.

The model developed from the Castillo de San Marcos visitation data demonstrates the scale of deviation from expected visitation seen during a weather event. Those lost visitors also mean a loss of their expenditures, which has a significant negative impact on jobs and income in St. Augustine. The analysis below (Table 3.12-Table 3.14) looks at that impact over a two-month period beginning 5 days before the event and ending when visitation begins to pick up again. Over those two months following a weather event, St. Augustine sees a loss of nearly \$20 million in tourist expenditures.

Table 3.12 Estimated Tourist Expenditures

Expenditures	
Lodging	\$4,450,669
Restaurants	\$4,617,915
Shopping	\$4,138,273
Entertainment/Amusements	\$4,328,187
Transportation	\$1,603,325
Other	\$819,047
Total	\$19,957,415

The loss of those tourist expenditures results in a negative impact on both jobs and labor income. Over those two months, over 300 year-round direct, indirect and induced jobs are lost. This amounts to over \$12 million in forgone labor income.

SLC Scenario	Average # of Events Greater than or Equal to 6ft NAVD88	Potential Lost Tourism Expenditures (through 2084, not considering discounting)
High	38	\$917,700,000
Intermediate	18	\$434,700,000
Low	13	\$313,950,000

*Can qualitatively discuss how foregone income likely relates to hourly wage employees living in EJ communities in or adjacent to the study area.

Table 3.13 Forgone Jobs Due to Lost Visitation Over Two Months

	Direct	Indirect/Induced	Total
Lodging	40.4	15.6	56
Restaurants	56.6	15.2	71.8
Shopping	56.7	13.5	70.2
Entertainment/Amusements	78.6	37.1	115.7
Transportation	32.5	7.9	40.4
Other	10.5	2.9	13.4
Total	275.3	92.2	367.5

Table 3.14 Forgone Income Due to Lost Visitation

	Direct	Indirect/Induced	Total
Lodging	\$1,742,773	\$629,650	\$2,372,423
Restaurants	\$1,444,245	\$637,127	\$2,081,372
Shopping	\$1,331,140	\$534,283	\$1,865,423
Entertainment/Amusements	\$3,369,139	\$1,363,702	\$4,732,841
Transportation	\$494,527	\$343,894	\$838,421
Other	\$260,371	\$119,247	\$379,618
Total	\$8,642,195	\$3,627,902	\$12,270,097



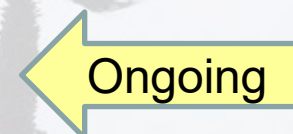
PATH FORWARD

KEY SCHEDULE ACTIVITIES - LOOK AHEAD



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Key Activities	Finish Date
FCSA Executed	1/9/2023
AMM Milestone Meeting	5/1/2023
Initial Flood Driver Screening (Scope Decision Point)	5/17/2023
End of FY23	9/30/2023
G2CRM FWOP Production Runs	2/21/2024
Establish Initial Array of Alternatives	8/21/2024
End of FY24	9/30/2024
G2CRM FWP Initial Alternatives Production Runs & Post Processing	5/15/2025
Establish Final Array of Alternatives (Scope Decision Point)	6/4/2025
G2CRM FWP Final Alternatives Production Runs & Post Processing	9/22/2025
End of FY25	9/30/2025
Identify National Economic Development (NED) Plan	12/22/2025
Identify Comprehensive Benefits Plan/Locally Preferred Plan (LPP)	3/17/2026
Identify the TSP	5/18/2026
End of FY26	9/30/2026
Exceptions/Waivers Approved by Assistant Secretary to the Army (ASA)	11/20/2026
TSP Milestone Meeting	2/2/2027
Release Draft Report for Concurrent Reviews	4/2/2027
End of FY27	9/30/2027
ADM Meeting	11/3/2027
Final Report Submittal Package to HQ	5/22/2028
Chief's Report Signature	9/15/2028





UPCOMING PUBLIC ENGAGEMENT



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Dates	Events
July 18 th , 2024 @ 1:00pm	Monthly Webinar
August 6 th & 7 th	Environmental and Cultural Resource Sub-Team Meeting
August 15 th , 2024 @ 1:00pm	Monthly Webinar
September 19 th , 2024 @ 1:00pm	Monthly Webinar
October 2024	In Person Public Workshop Location TBD



DISCIPLINE SPECIFIC UPDATES/ACTIONS



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- **Planning Technical Lead:** Marty Durkin
- **Engineering Technical Lead:** Patrick Snyder
- **Economics Lead:** Vongmony Var
- **Environmental Lead:** Katie Lebow
- **Cultural Resources Lead:** Zuzana Chovanec
- **Real Estate Lead:** Chris Bukolt
- **Office of Counsel:** Katie Gwin
- **Landscape Architecture Lead:** Sabrina Collins



PUBLIC OUTREACH (STUDY WEBSITE)



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St. Augustine Back Bay Study - V x +

experience.arcgis.com/experience/06bb9c98d9184bd9a374a244f6d27474/

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St. Augustine, FL Back Bay Coastal Study

Engineering Economics Environmental Cultural Resources Real Estate About

U.S. Army Corps of Engineers – Jacksonville District Main Website

Welcome to the St. Augustine, Florida Back Bay Coastal Storm Risk Management (CSRM) Web Experience Homepage

Upcoming Events: Our Next Public Meeting will be held on October 4th, 2023 at 6:30pm. < Prev Next >

This Web Experience Homepage is a visual representation of the ongoing St. Augustine CSRM Study. During the study, this page will be updated with the latest information to include meeting agendas, minutes, graphics, etc. to keep the public and agencies engaged as partners in developing a long term solution to flooding within the City of St. Augustine.

Page Contents

- Study Overview
- Plan Formulation
- Monthly Planning Meetings
- Interactive Map
- Public Meetings/Workshops
- News, Social Media, Helpful Links
- Scope, Schedule, and Budget
- Contact Information

For better viewing experience, please use Google Chrome or Mozilla Firefox browsers. Also, please use a PC to interact with the web experience homepage.

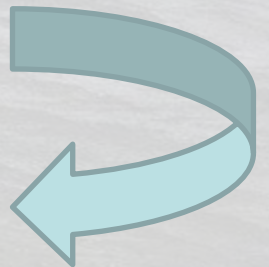
ArcGIS Experience Builder technology animates the complicated concepts considered by the design team by allowing users to:

- See the improvements and reduced flooding impacts from this study in the City of St. Augustine (COSA)
- Experience the various alternatives and recommended plan with detailed artistic graphics and renderings
- Examine Engineering, Economic, Cultural, and Key Environmental Features

STUDY OVERVIEW

Study Authority

This study is being conducted under the authority from the June 21, 2000, House Resolution 2646 that granted authority for a Coastal Storm Risk Management (CSRM) study in St. Johns County, Florida:
"Resolved by the Committee on Transportation and Infrastructure of the United States House



<https://experience.arcgis.com/experience/06bb9c98d9184bd9a374a244f6d27474/>

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PUBLIC OUTREACH (SPONSOR SITES)



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Submit Public Comment

US Army Corps of Engineers Jacksonville
District: St. Augustine Florida Back Bay
Feasibility Study

Scoping Meeting and Comment Period
Notice Letter for USACE St. Augustine
Back Bay Coastal Storm Risk Management
(CSRM) Feasibility Study (PDF)

[Home](#) > [Government](#) > [Resiliency](#) > [Planning/Studies](#) > Back Bay Feasibility Study with the Army Corps of Engineers

Back Bay Feasibility Study with the Army Corps of Engineers

The objectives of the study include (1) reduce flooding caused by coastal storms, extreme high tides, and future projected sea level rise in the study area; (2) explore opportunities to increase community resiliency from future coastal storms. Issues that are anticipated include concern for aesthetics, cultural resources, recreation, socioeconomic, environmental justice, wetlands, fish and wildlife resources, threatened and endangered species, and water quality. CSRM measures to be evaluated may include a combination of structural (i.e., tidal gates, seawalls, revetments, levees, drainage improvements, building elevation, etc.), non-structural (i.e., relocation, buyouts, etc.), and natural and nature-based features (i.e., living shorelines, vegetated features, oyster reefs, and maritime forests). Public Comments will be accepted throughout the life of the study.

Back Bay Signing Ceremony January 9th, 2023



Submit Public Comment



Email: BackBay@citystaug.com



**US Army Corps
of Engineers**®
Jacksonville District

[Jacksonville District Website](#)

[Monthly Project Delivery Team \(PDT\) Meetings](#)

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<https://twitter.com/citystaug>



PUBLIC OUTREACH



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 U.S. Army Corps of Engineers, Jacksonville District  1 d · 




Join USACE Jacksonville and the City of St. Augustine Thursday, Sept. 21, from 1-2:30 p.m. for the monthly St. Augustine Back Bay Study planning meeting. Join online at <https://usace1.webex.com/meet/jason.s.harrah> or dial in at 1-844-800-2712; enter access code 199 927 9909 when prompted. @CityStAug

St. Augustine, Florida, Back Bay CSRM Feasibility Study Monthly Planning Webinar
Sept. 21, 2023, 1-2:30 p.m.

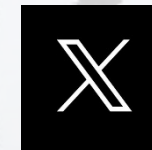



Presented by U.S. Army Corps of Engineers
and the City of St. Augustine

Join online
<https://usace1.webex.com/meet/jason.s.harrah>

Call in
Dial 1-844-800-2712
Enter access code 199 927 9909

CITY OF ST. AUGUSTINE
EST. 1565





CLOSING REMARKS/QUESTIONS



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- **Sponsor Remarks**
- **Federal Agency Questions/Comments**
- **State Agency Questions/Comments**
- **Local Agency Questions/Comments**
- **Public Comments**