September 9, 2025
Public Meeting

Welcome and Opening Remarks

Steven A. Geller, Commissioner, Broward County
Carolina Maran, Division Director, SFWMD

Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins

Section 203
C&SF Flood Resiliency Study for Broward Basins

Project Goals: To **develop, evaluate and recommend flood risk management measures and adaptation strategies** to build flood resiliency in the communities served by the C&SF system, now and in the future

Study Objective: Enhance C&SF Project **water control structures' functionality and capacity** to reduce flood damages and improve resiliency caused by inundation and changed conditions within the Study Area over the 50-year period of analysis of 2035–2085

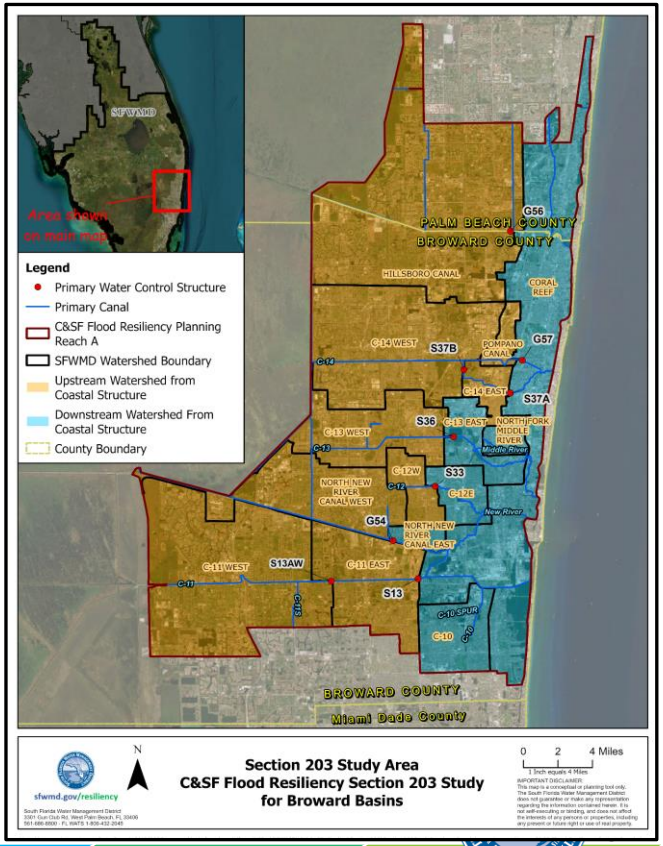
- Study using WRDA 1986 Section 203 process to complete an integrated Flood Resiliency Study and required NEPA documentation for Broward Basins
- SFWMD is the Non-Federal Sponsor in partnership and with funding support from FDEP and Broward County
- Study focuses on the primary canals and coastal water control structures in the managed watersheds that are part of the C&SF project
- Leveraging C&SF Flood Resiliency Study (216 Study) Milestones - Reach A
- Project management, modeling, and evaluations completed by SFWMD
- Consulting services providing technical, policy, modeling, and engineering support services
- Federal assistance from the USACE Jacksonville District
- Targeting authorization WRDA 2026

Section 203
C&SF Flood Resiliency Study for Broward Basins

Project Study Area – Managed Basins

- Nine (9) Upstream Inland Managed Watershed Basins
- Seven (7) Primary Canals
- Nine (9) Water Control Structures

MANAGED BASIN	PRIMARY CANAL	PRIMARY WATER CONTROL STRUCTURE
Hillsboro Canal Basin	G-08 (Hillsboro) Canal	G-56 Gated Spillway
Pompano Canal Basin	G-16 (Pompano) Canal	G-57 Gated Spillway
C-14 West Basin	C-14 (Cypress Creek) Canal	S-37B Gated Spillway
C-14 East Basin	C-14 (Cypress Creek) Canal	S-37A Gated Spillway
C-13 West Basin	C-13 (West Middle River) Canal	S-36 Gated Spillway
C-12 West Basin	C-12 (Plantation) Canal	S-33 Gated Spillway
North New River Canal West Basin	G-15 (North New River(Canal	G-54 Gated Spillway
C-11 West Basin	C-11 (South New River) Canal	S13AW Gated Culvert
C-11 East Basin	C-11 (South New River) Canal	S-13 Pump Station & Gated Spillway



PLAN FORMULATION AND STUDY APPROACH

Where Our Study Ideas Come From:

To build this project study, we pulled together ideas and information from many places, including:

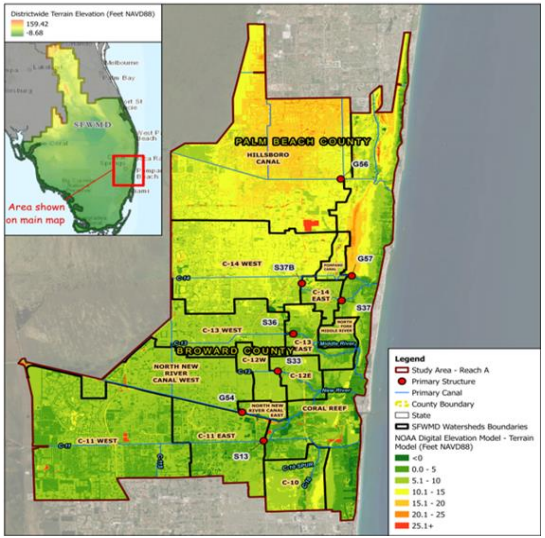
- The C&SF 216 Study (with an early list of options)
- The South Florida Water Management District's flood protection evaluations
- The District's Sea Level Rise and Flood Resiliency Plan
- Broward County's resiliency planning efforts
- Feedback from the Project Kickoff Meeting
- Comments from the Scoping Meeting and Scoping Letters

We took all these ideas and combined them into an **Initial Array of Alternatives** — basically, a set of different options for improving how we manage inland water. Then, we looked closely at how each option could work.

Central & Southern Florida Broward Basins Flood Resiliency Study

Section 203 Study Approach

Section 216 Public Involvement → **Reach A Management Measures**



Structural Management Measures:
- Expanding canal cross sections
- Raising canal banks
- Adding gates
- Moving existing gates
- Adding pump stations
- Upgrading existing pump stations
- Constructing flood barriers
- Hardening structures
- Removing coastal water control structures
- Relocating coastal water control structures
- Creating inter-basin transfers
- Creating well injection sites

Nature-based Management Measures:
- Enhancing floodplain restoration
- Freshwater wetlands
- Rain gardens

Non-structural Management Measures:
- House raising
- Flood proofing
- Floodplain management

Section 216 Process
Section 203 Process
Modeling/Data Analysis

Section 203 Study (Reach A) Plan Formulation

Informed by management measures collected from previous studies and presented in public engagement and kickoff meeting (included at the December 2024 Scoping Meeting):

INITIAL ARRAY TO FINAL ARRAY

The **Initial Array of Alternatives** underwent detailed assessments to determine the best solution to meet the project objectives. The detailed assessments and analyses included but were not limited to:

- Historic and Cultural Resource Assessments
- Environmental Assessments
- Geotechnical Investigations
- Topographic Surveys
- Additional Hydrology and Hydraulics Studies
- Traffic Impact Modeling
- Economic, Social & Environmental Benefits Analysis
- Business Interruption Analysis
- Real Estate evaluations

The results of these assessments were used to narrow down the Final Array which was then further analyzed to identify a Tentatively Selected Plan.

September 9, 2025
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Final Array of Alternatives and Comprehensive Benefits Analysis Results

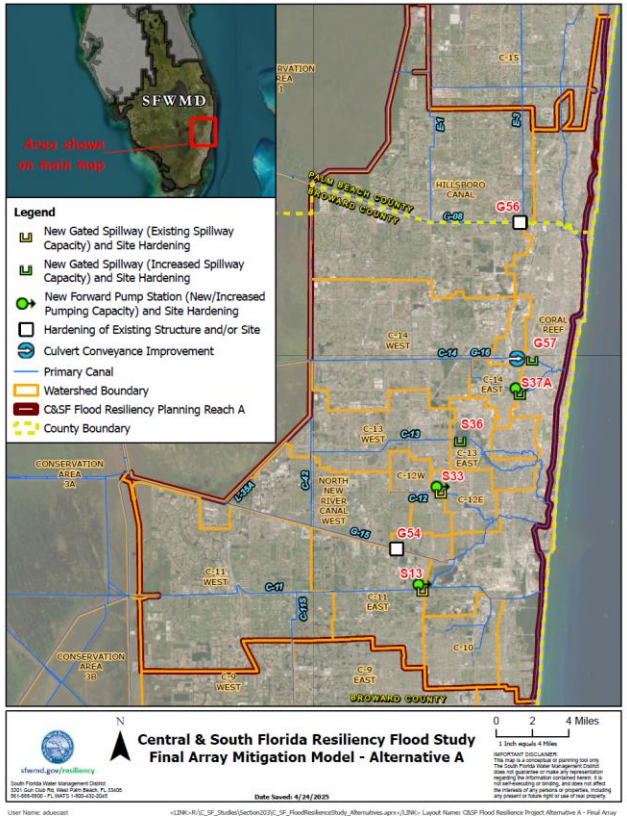
Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins

Walter Wilcox, Bureau Chief of Water Resources Systems Modeling, SFWMD
Katie Magoun, Planner/NEPA Specialist, J-Tec

FINAL ARRAY ANALYSIS

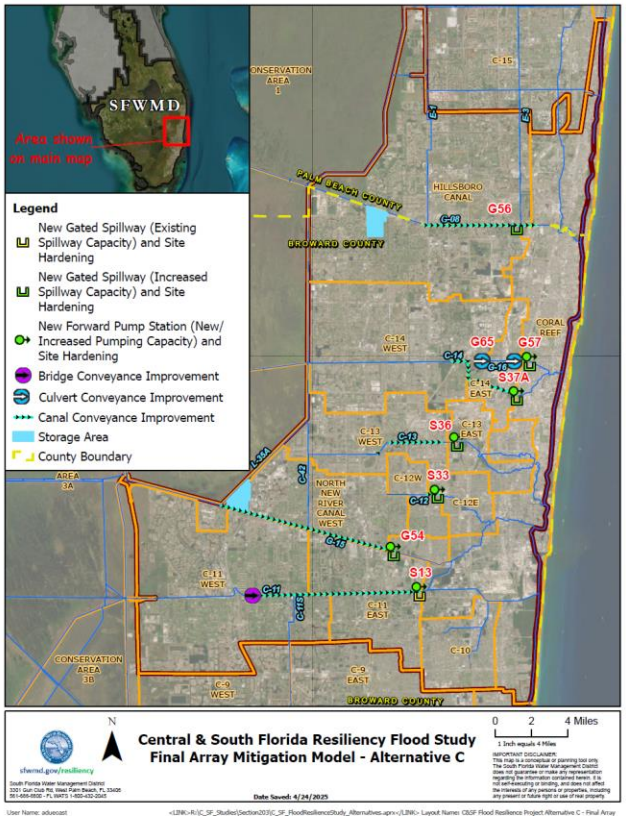
- Over the last several months, final array modeling and comprehensive benefit assessment have been completed (today's presentation).
  - Three alternatives comprised the final array with a progression from fewer features in Alternative A to progressively more features in Alternatives B & C.
  - Building on the extensive testing performed as part of the initial array, this final array evaluation helps to define highly performing and efficient project features.
  - Informed by these results, the project team has identified a DRAFT Tentatively Selected Plan which will be presented later today.
- All alternatives show improvement over the no action / future without project conditions, but both the absolute performance and the benefit to cost ratio varies.
- Today's meeting and the subsequent comment period provides an opportunity to share perspectives on the plan features that should be considered for the recommended plan.

ALTERNATIVE A



ALTERNATIVE B

ALTERNATIVE C



BBFR Final Array of Alternatives

Note: A test case (C1) exploring the addition of "non-structural" elements into Alternative C to reduce residual risk was also performed

Final Array of Alternatives, Structure Details

Site	Canal	Alternate A				Alternate B				Alternate C			
		New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features	New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features	New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features
		Design Pumping Capacity (cfs)	Mix of Pumps			Design Pumping Capacity (cfs)	Mix of Pumps			Design Pumping Capacity (cfs)	Mix of Pumps		
G56	G-08 (Hillsboro)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (4) 25' wide roller gates	Hillsboro Canal Improvement	1,005	(3) 335 cfs pumps	Gated Spillway w/ (4) 25' wide roller gates	Hillsboro Canal Improvement Hillsboro Storage
G57	G-16 (Pompano)	N/A	N/A	U/S Culvert 10"	N/A	N/A	N/A	Gated Spillway w/ (2) 21' wide roller gates + U/S Culvert 10"	N/A	300	(3) 100 cfs pumps	Gated Spillway w/ (2) 21' wide roller gates + U/S Culvert 10"	
S37B	C-14 (Cypress Creek)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (3) 25' wide roller gates	C14 West Canal Improvement	N/A	N/A	N/A	C14 West Canal Improvement
S37A	C-14 (Cypress Creek)	1,200 (+ aux.)	(3) 400 cfs pumps (1) 400 cfs aux. pump	Gated Spillway w/ (4) 25' wide roller gates	N/A	1,500	(3) 500 cfs pumps	N/A	N/A	1,200	(3) 400 cfs pumps	Gated Spillway w/ (4) 25' wide roller gates	C14 East Canal Improvement
S36	C-13 (Middle River)	N/A	N/A	Gated Spillway w/ (2) 25' wide roller gates	N/A	510	(3) 170 cfs pumps	N/A	N/A	600	(3) 200 cfs pumps	Gated Spillway w/ (2) 25' wide roller gates	C13 West Canal Improvement
S33	C-12 (Plantation)	510 (+ aux.)	(3) 170 cfs pumps (1) 170 cfs aux. pump	N/A	N/A	510	(3) 170 cfs pumps (1) 170 cfs aux. pump	Gated Spillway w/ (2) 20' wide roller gates	N/A	705	(3) 235 cfs pumps (1) 235 cfs aux. pump	Gated Spillway w/ (2) 20' wide roller gates	C12 West Canal Improvement
G54	G-15 (North New River)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (4) 20' wide roller gates	NNR West Storage	810	(3) 270 cfs pumps	Gated Spillway w/ (4) 20' wide roller gates	NNR Canal Improvement NNR West Storage
S13	C-11 (South New River)	700 (+ aux.)	(2) 115 cfs pumps (2) 235 cfs pumps (1) 235 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	N/A	1,080	(2) 180 cfs pumps (2) 360 cfs pumps (1) 360 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	C-11 West / C-11 East Canal Improvement	1,500	(2) 250 cfs pumps (2) 500 cfs pumps (1) 500 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	C-11 West / C-11 East Canal Improvement

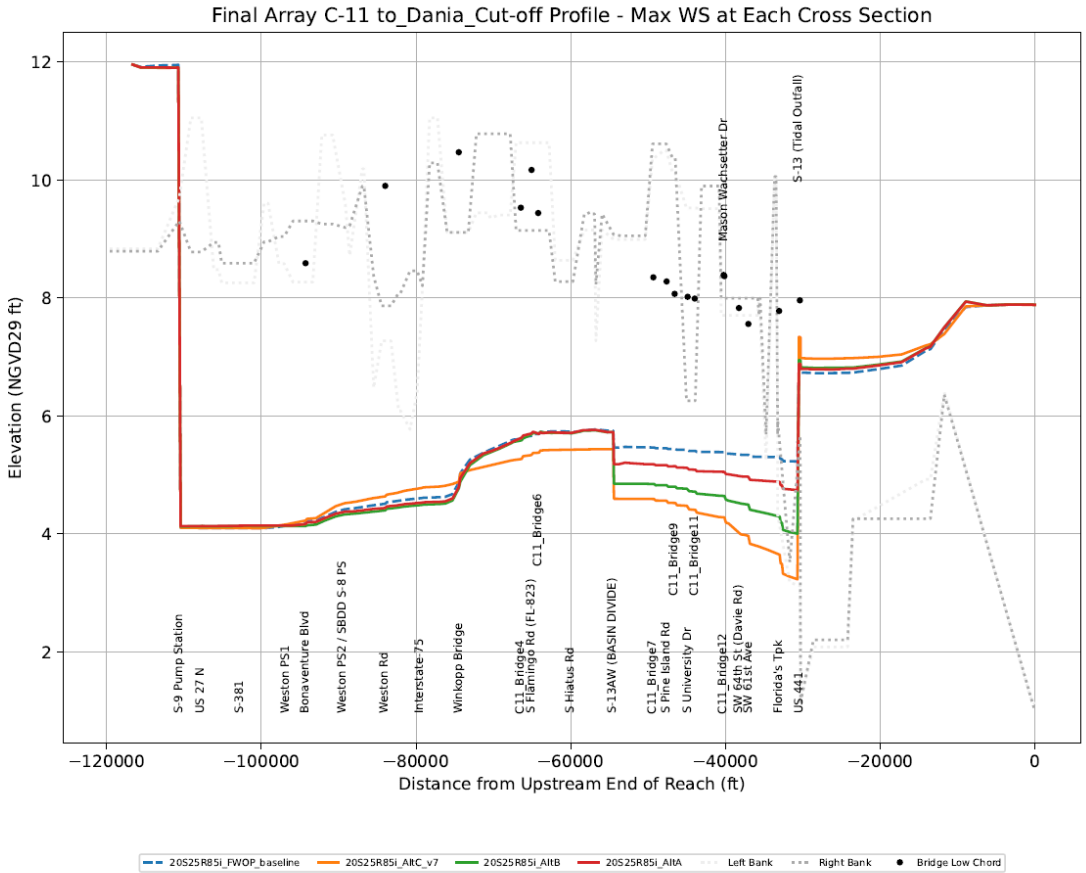
HYDROLOGIC & HYDRAULICS MODELING STRATEGY (RECAP)

- The total water level (i.e., compound flooding) due to multiple flood sources, including rainfall runoff, groundwater and coastal forcings was simulated with the MIKE SHE/MIKE Hydro model.

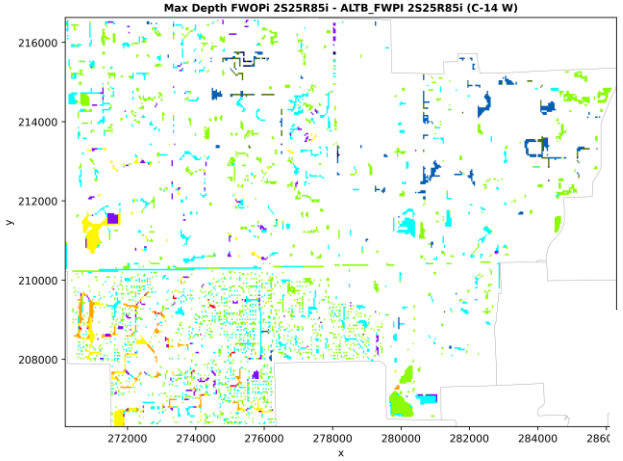
- Simulations include a variety of rainfall and coastal return frequency events. Sea level change is included in the coastal water level data & run in parallel for low, intermediate & high sea level scenarios.

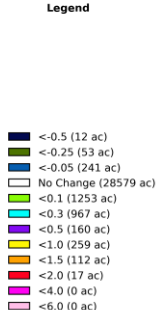
Coastal water level Return Period (CHS data)	Rainfall return period (NOAA Atlas14)
2-year	5-year
2-year	10-year
10-year	10-year
2-year	25-year
20-year	25-year
2-year	100-year
100-year	100-year
2-year	500-year

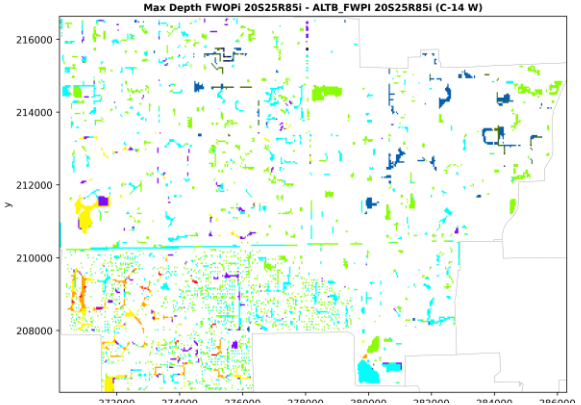
EXAMPLE MODEL OUTPUT: PEAK CANAL STAGE PROFILE

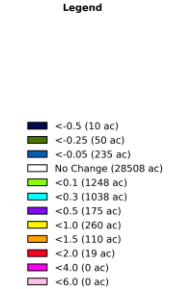


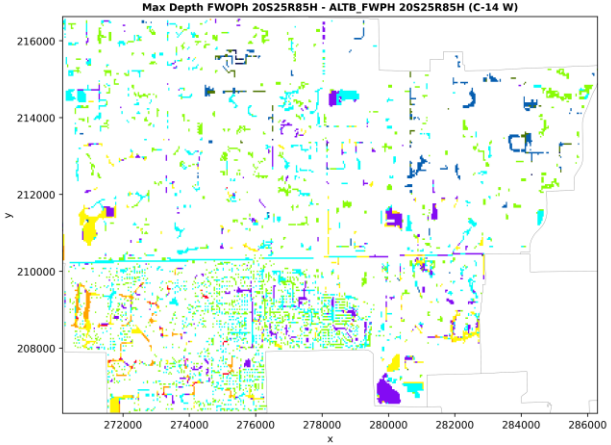
EXAMPLE MODEL OUTPUT: PEAK STAGE DIFFERENCE MAPS

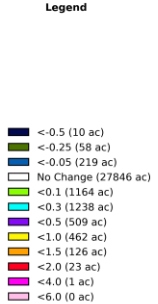








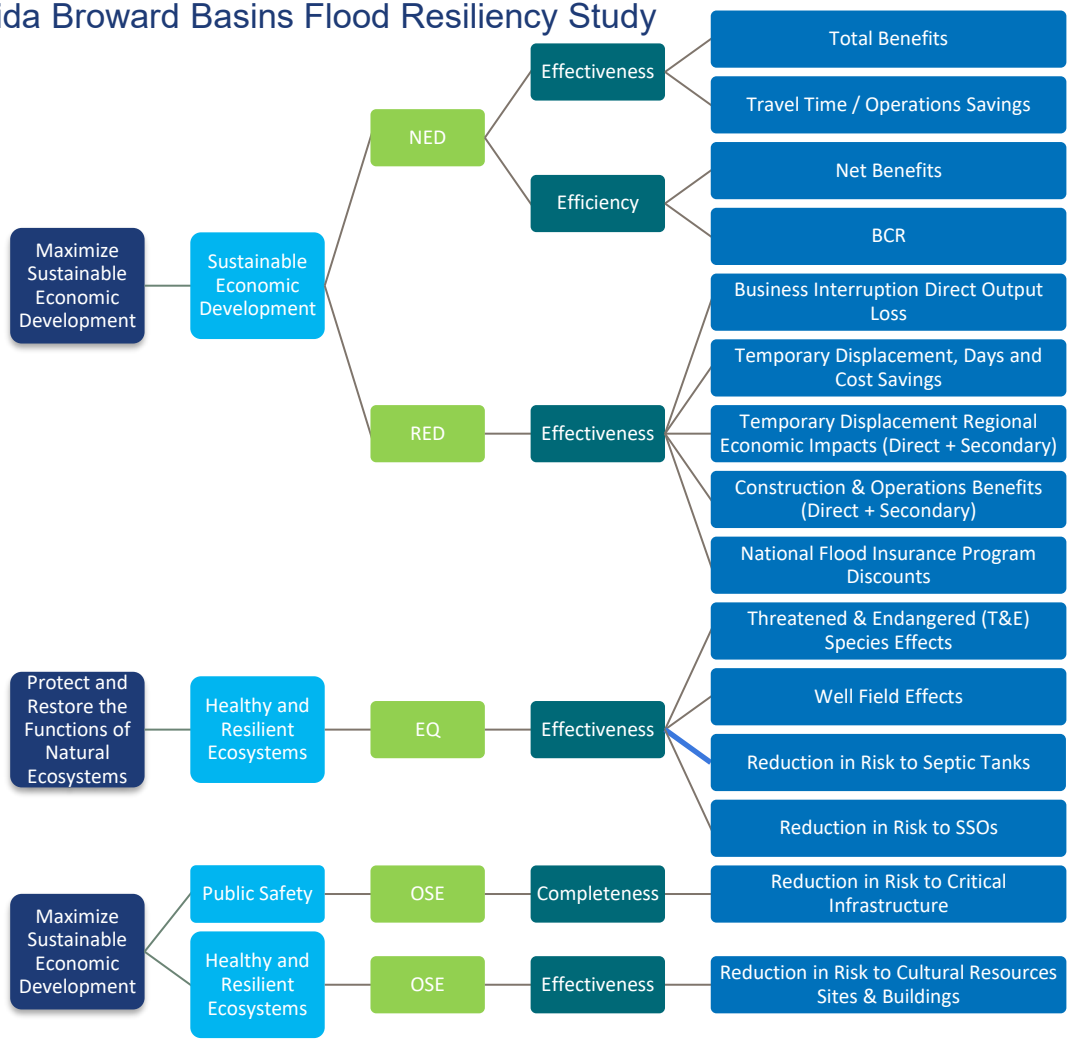




Central & Southern Florida Broward Basins Flood Resiliency Study

Table of Effects

- Federal Objective
- Guiding Principle
- P&G Account
- Evaluation Criteria
- Effects/Metric



Study Objective:
Enhance C&SF Project water control structures' **functionality** and **capacity** to reduce flood damages and **improve resiliency** caused by inundation and changed conditions within the Study Area over the 50-year period of analysis of 2035–2085.

Central & Southern Florida Broward Basins Flood Resiliency Study

National Economic Development (NED)

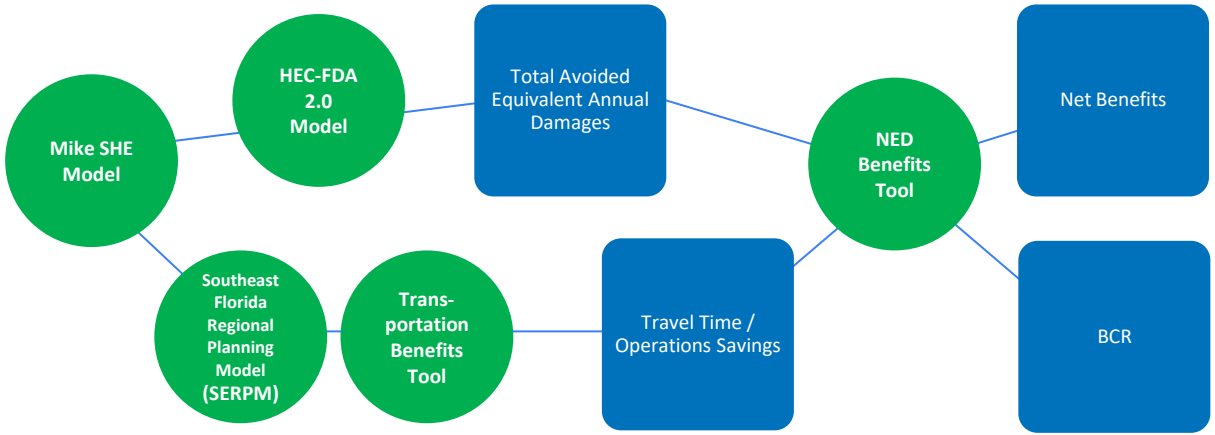
- Federal Objective
- Guiding Principle
- P&G Account
- Evaluation Criteria
- Effects/Metric
- Modeling/Analysis

Maximize Sustainable Economic Development → Sustainable Economic Development → NED

- Effectiveness
  - Total Avoided Equivalent Annual Damages
  - Travel Time / Operations Savings
- Efficiency
  - Net Benefits
  - BCR

Mike SHE and HEC-FDA analyses incorporate 8 compound frequency events (surge + rainfall).

SERPM model (traffic analysis) incorporates 1 event and one SLR scenario (Intermediate). ★



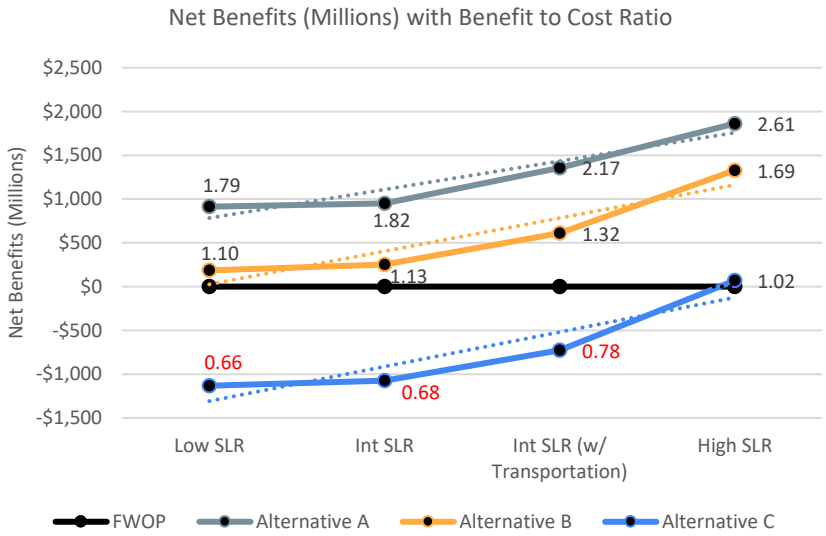
	Coastal Water Level Return Period (Reference: CHS) Year	Rainfall Return Period (NOAA-Atlas 14) year	Compound Flooding Frequency year	AEP % (Surge + Rainfall)
	2	5	8	12.50%
	2	10	14	7.14%
★	2	25	30	3.33%
	10	10	32	3.13%
	20	25	75	1.33%
	2	100	110	0.91%
	2	500	538	0.19%
	100	100	430	0.23%

NED Account – Total Benefits and Travel Time/Operations Savings

Federal Objectives & Policy Requirements of the Region	**Maximize Sustainable Economic Development**							
Guiding Principles	**Sustainable Economic Development**							
P&G Accounts	**NED**							
Formulation & Evaluation Criteria	**Effectiveness**							
Metrics	**Total Avoided Equivalent Annual Damages, January 2025 (Millions)**			**Travel Time/Operations Savings NPV ($1,000,000)**	**Total Benefits (Nominal Results, values escalated to account for inflation, Millions)**			
				2 yr coastal, 25 yr rainfall (0.033)				
	Low SLR	**Intermediate SLR**	**High SLR**	**Intermediate SLR**	**Low SLR**	**Intermediate SLR**	**Intermediate SLR (+ Transportation Benefits)**	**High SLR**
No Action Alternative	--	--	--	--	--	--	--	--
Alternative A	$34	$35	$67	$121.4	$2,071	$2,109	$2,513	$3,019
Alternative B	$35	$37	$58	$111.2	$2,118	$2,185	$2,542	$3,261
Alternative C	$37	$39	$61	$108.4	$2,242	$2,301	$2,646	$3,443

NED Account – Net Benefits and Benefit to Cost Ratio (BCR)

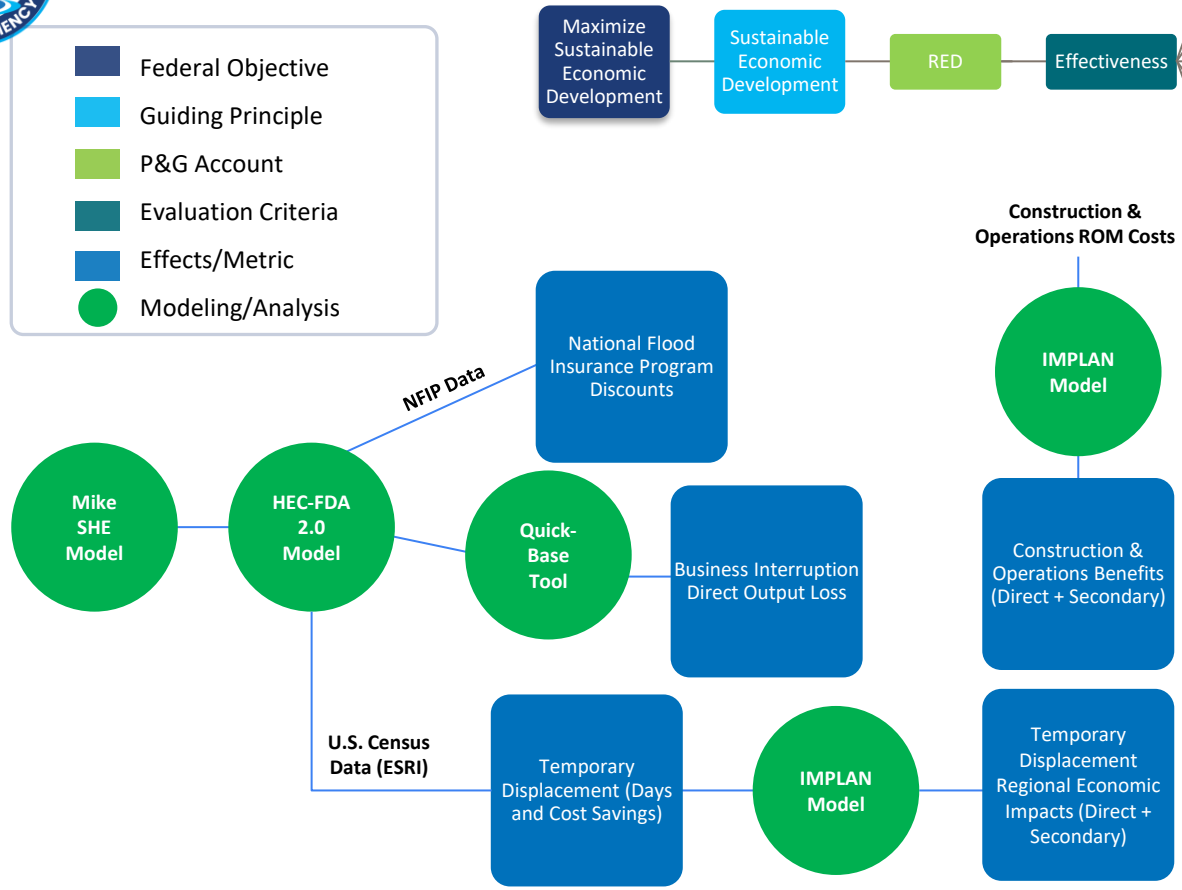
Federal Objectives & Policy Requirements of the Region	**Maximize Sustainable Economic Development**					
Guiding Principles	**Sustainable Economic Development**					
P&G Accounts	**NED**					
Formulation & Evaluation Criteria	**Efficiency**					
Metrics	**Net Benefits (Millions)**			**BCR**		
	Low SLR	**Int. SLR (+ Transportation Benefits)**	**High SLR**	**Low SLR**	**Int. SLR (+ Transportation Benefits)**	**High SLR**
No Action Alternative	--	--	--	--	--	--
Alternative A	$913	$952 ($1,356)	$1,862	1.79	1.82 (2.17)	2.61
Alternative B	$185	$252 ($609)	$1,328	1.10	1.13 (1.32)	1.69
Alternative C	-$1,132	-$1,073 (-$729)	$68	0.66	0.68 (0.78)	1.02



BCR < 1 → Project is not cost-effective
BCR > 1 → Project is cost-effective and economically justified

Central & Southern Florida Broward Basins Flood Resiliency Study

Regional Economic Development (RED)



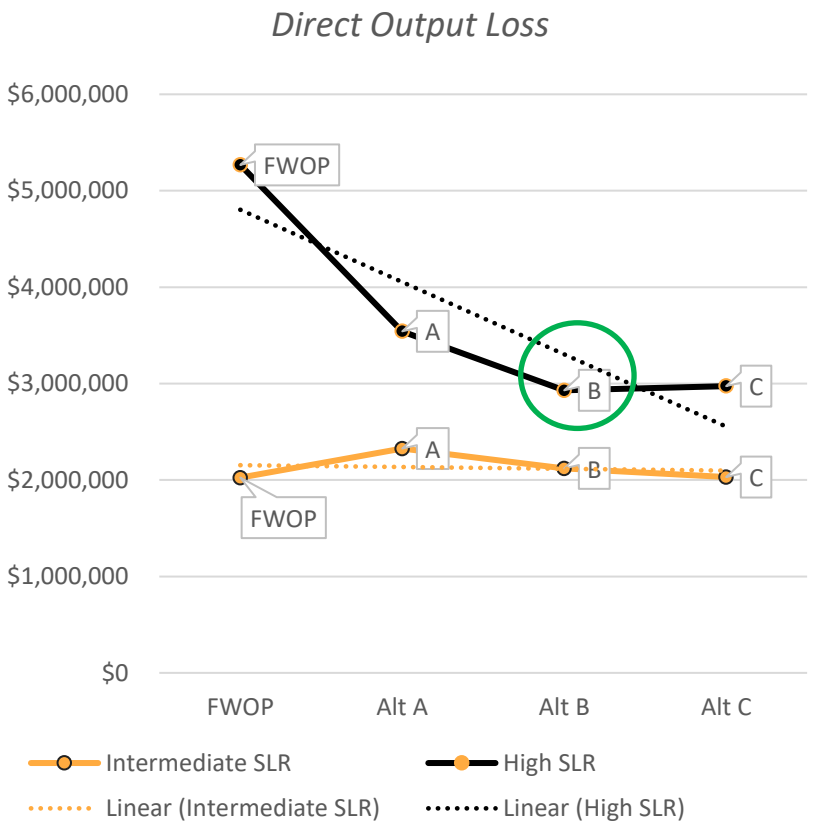
Incorporates three (3) compound frequency events (surge + rainfall).

Coastal Water Level Return Period (Reference: CHS) Year	Rainfall Return Period (NOAA-Atlas 14) year	Compound Flooding Frequency year	AEP % (Surge + Rainfall)
2	25	30	3.33%
2	100	110	0.91%
100	100	430	0.23%

Central & Southern Florida Broward Basins Flood Resiliency Study

RED Account – Business Interruption

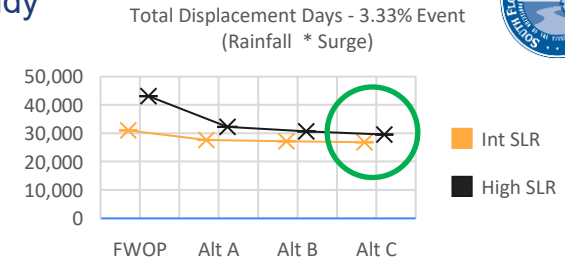
Federal Objectives & Policy Requirements of the Region	Maximize Sustainable Economic Development	
Guiding Principles	Sustainable Economic Development	
P&G Accounts	RED	
Formulation & Evaluation Criteria	Effectiveness	
Metrics	Business Interruption Direct Output Loss	
	Annualized Direct Output Loss ($2025), Int. SLR >0 feet Depth	Annualized Direct Output Loss ($2025), High SLR >0 feet Depth
No Action Alternative	$2,024,836	$5,268,073
Alternative A	$2,326,457	$3,542,135
Alternative B	$2,120,629	$2,930,316
Alternative C	$2,030,845	$2,973,709

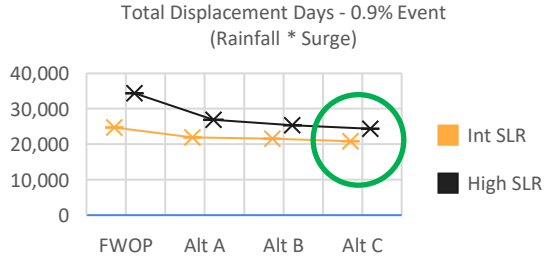


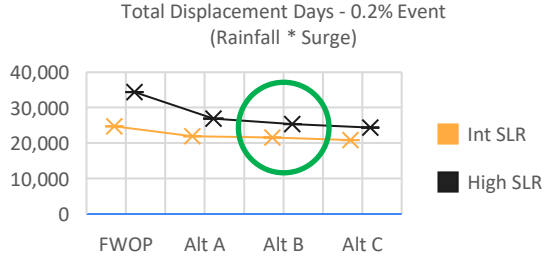
Central & Southern Florida Broward Basins Flood Resiliency Study

RED Account – Temporary Displacement

Federal Objectives & Policy Requirements of the Region	**Maximize Sustainable Economic Development**					
Guiding Principles	**Sustainable Economic Development**					
P&G Accounts	**RED**					
Formulation & Evaluation Criteria	**Effectiveness**					
Metrics	**Temporary Displacement, Net Change (Days Saved) and Net Value of Change ($ Saved, Millions)**					
	2 Year Surge, 25 Year Rainfall (3.33%)		**2 Year Surge, 100 Year Rainfall (0.91%)**		**100 Year Surge, 100 Year Rainfall (0.23%)**	
	Int. SLR	High SLR	Int. SLR	High SLR	Int. SLR	High SLR
Alternative A	3,420 / $1	10,852 / $2	2,841 / $1	7,556 / $2	845 / $0.2	3,437 / $1
Alternative B	3,858 / $1	12,425 / $3	3,204 / $1	9,103 / $2	1,169 / $0.2	4,921 / $1
Alternative C	4,178 / $1	13,585 / $3	3,903 / $1	10,069 / $2	1,250 / $0.2	3,582 / $1

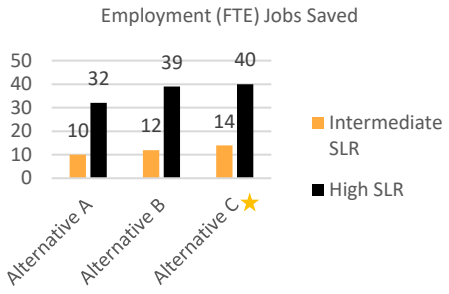


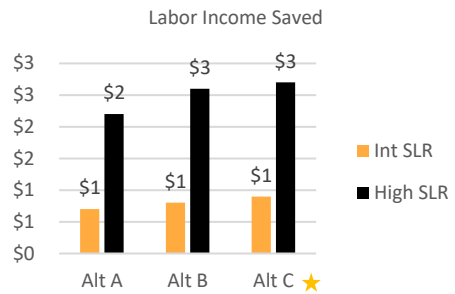


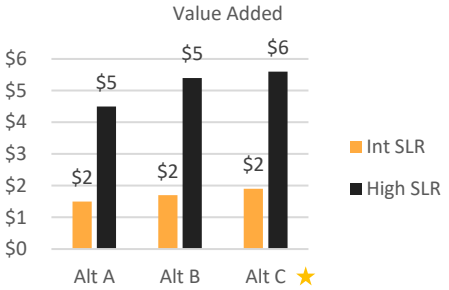


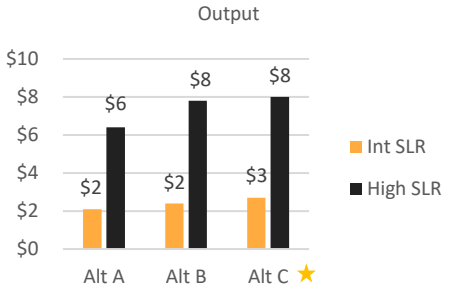
RED Account – Temporary Displacement Regional Economic Impacts

Federal Objectives & Policy Requirements of the Region	**Maximize Sustainable Economic Development**							
Guiding Principles	**Sustainable Economic Development**							
P&G Accounts	**RED**							
Formulation & Evaluation Criteria	**Effectiveness**							
Metrics	**Temporary Displacement Regional Economic Impacts, Annualized Avoided Impacts and Savings (Millions), Direct + Secondary**							
	Employment (Full-time Equivalent)		**Labor Income**		**Value Added**		**Output**	
	Int. SLR	**High SLR**	**Int. SLR**	**High SLR**	**Int. SLR**	**High SLR**	**Int. SLR**	**High SLR**
Alternative A	10	32	$1	$2	$1	$4	$2	$6
Alternative B	12	39	$1	$3	$2	$5	$2	$8
Alternative C	14	40	$1	$3	$2	$6	$3	$8





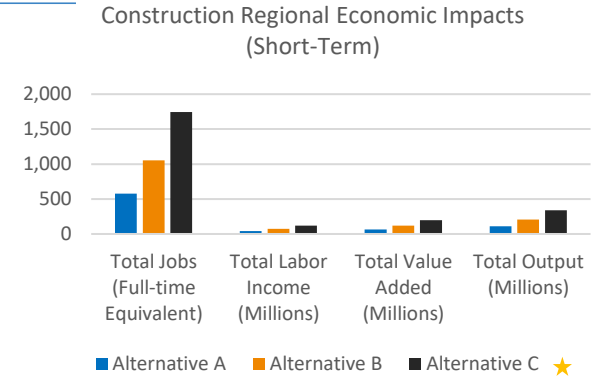


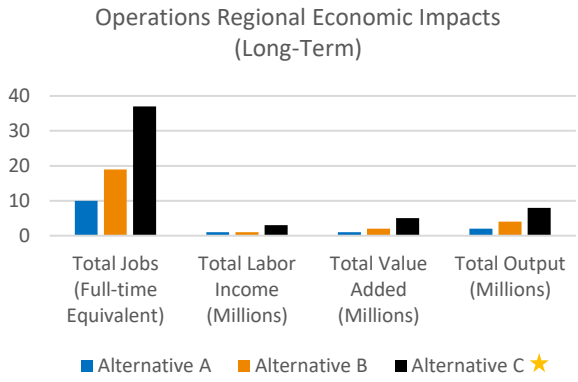


Central & Southern Florida Broward Basins Flood Resiliency Study

RED Account – Construction & Operations Benefits

Federal Objectives & Policy Requirements of the Region	Maximize Sustainable Economic Development							
Guiding Principles	Sustainable Economic Development							
P&G Accounts	RED							
Formulation & Evaluation Criteria	Effectiveness							
Metrics	Construction Impacts (Direct + Secondary)				Operations Impacts (Direct + Secondary)			
	Total Jobs (Full-time Equivalent)	Total Labor Income (Millions)	Total Value Added (Millions)	Total Output (Millions)	Direct Jobs (Full-time Equivalent)	Total Labor Income (Millions)	Total Value Added (Millions)	Total Output (Millions)
No Action Alternative	--	--	--	--	--	--	--	--
Alternative A	576	$40	$66	$112	10	$1	$1	$2
Alternative B	1,051	$72	$120	$204	19	$1	$2	$4
Alternative C	1,743	$120	$199	$338	37	$3	$5	$8





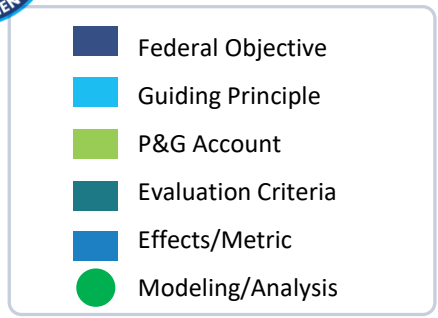
Central & Southern Florida Broward Basins Flood Resiliency Study

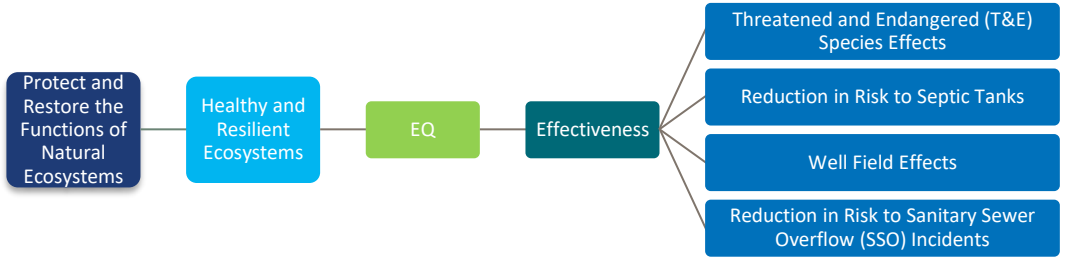
RED Account – National Flood Insurance Program Discounts

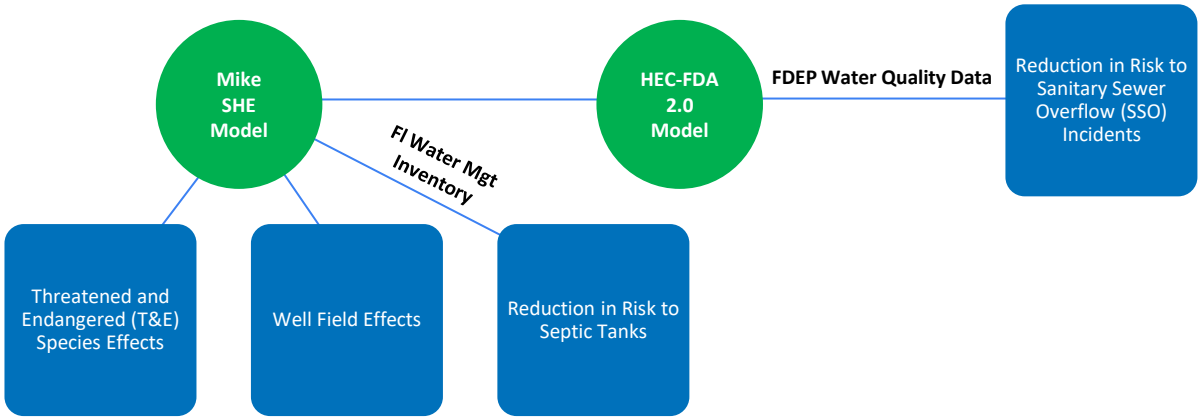
Federal Objectives & Policy Requirements of the Region	**Maximize Sustainable Economic Development**
Guiding Principles	**Sustainable Economic Development**
P&G Accounts	**RED**
Formulation & Evaluation Criteria	**Effectiveness**
Metrics	**National Flood Insurance Program Potential Discounts**
	Improvements to Flood Depths in AO, AE, AH Flood Zones
No Action Alternative	--
Alternative A	Acceptable
Alternative B ★	Highly Favorable
Alternative C	Favorable

Central & Southern Florida Broward Basins Flood Resiliency Study

Environmental Quality (EQ)





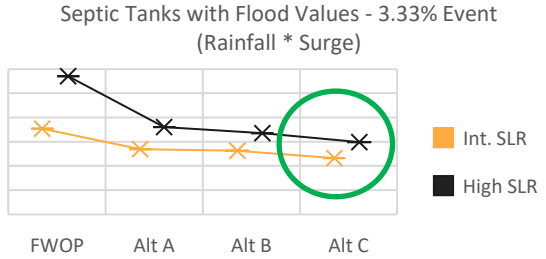


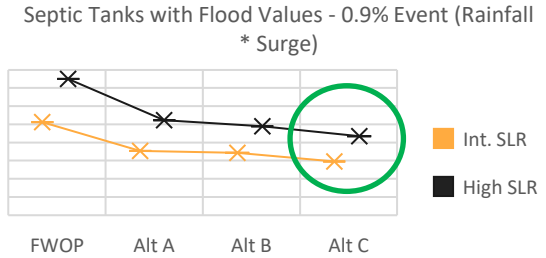
EQ Account – T&E Species

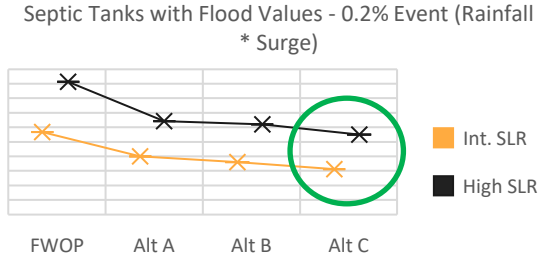
Federal Objectives & Policy Requirements of the Region	Protect and Restore the Functions of Natural Ecosystems Avoid Unwise Use of Floodplains and Flood Prone Areas	
Guiding Principles	**Healthy and Resilient Ecosystems**	**Public Safety**
P&G Accounts	**EQ**	**EQ**
Formulation & Evaluation Criteria	**Effectiveness**	**Effectiveness**
Metrics	**Threatened and Endangered (T&E) Species Effects**	**Well Field Effects**
No Action Alternative	--	--
Alternative A	*No significant effects*	Operational capacity to maintain higher freshwater levels that are protective of resources.
Alternative B	*No significant effects*	Greater operational capacity to maintain higher freshwater levels that are protective of resources.
Alternative C	*No significant effects*	Greatest operational capacity to maintain higher freshwater levels that are protective of resources.

EQ Account – Septic Tanks

Federal Objectives & Policy Requirements of the Region	Avoid the Unwise Use of Floodplains and Flood Prone Areas					
Guiding Principles	Floodplains					
P&G Accounts	EQ					
Formulation & Evaluation Criteria	Effectiveness					
Metrics	Reduction in Risk to Septic Tanks					
	2 yr coastal, 25 yr rainfall (0.033)		2 yr coastal, 100 yr rainfall (0.009)		100 yr coastal, 100 yr rainfall (0.002)	
	Int. SLR	High SLR	Int. SLR	High SLR	Int. SLR	High SLR
No Action Alternative	7,854	8,071	9,312	9,550	9,368	9,713
Alternative A	7,769	7,860	9,153	9,323	9,200	9,442
Alternative B	7,762	7,835	9,143	9,289	9,160	9,421
Alternative C	7,732	7,798	9,096	9,234	9,112	9,350



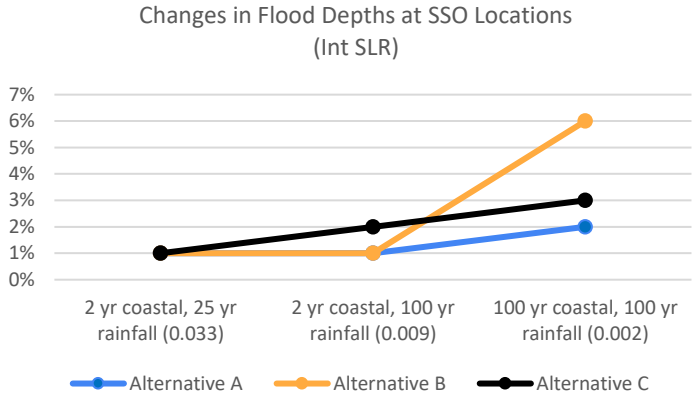


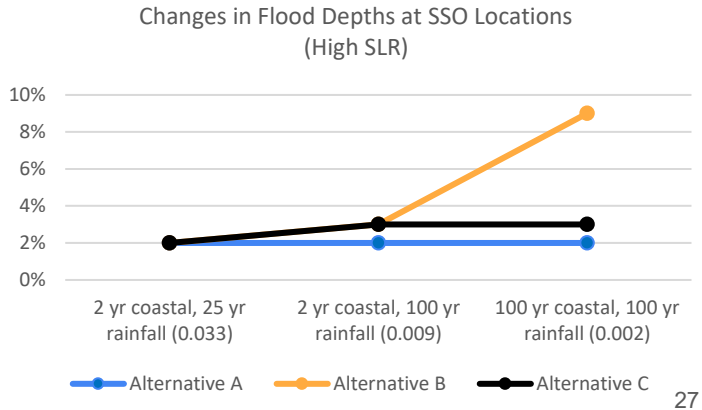


Central & Southern Florida Broward Basins Flood Resiliency Study

EQ Account – Sanitary Sewer Overflows (SSOs)

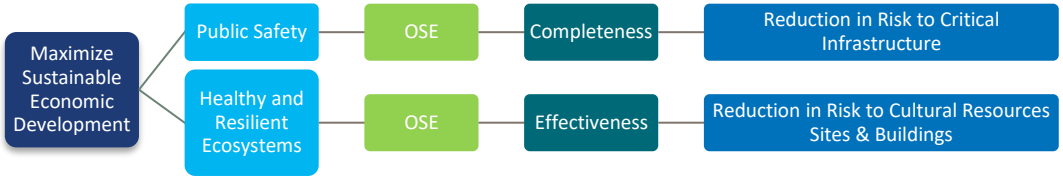
Federal Objectives & Policy Requirements of the Region	**Avoid the Unwise Use of Floodplains and Flood Prone Areas**					
Guiding Principles	**Floodplains**					
P&G Accounts	**EQ**					
Formulation & Evaluation Criteria	**Effectiveness**					
Metrics	**Reduction in Risk to Sanitary Sewer Overflow (SSO) Incidents**					
	2 yr coastal, 25 yr rainfall (0.033)		**2 yr coastal, 100 yr rainfall (0.009)**		**100 yr coastal, 100 yr rainfall (0.002)**	
	Int. SLR	**High SLR**	**Int. SLR**	**High SLR**	**Int. SLR**	**High SLR**
Alternative A	1%	2%	1%	2%	2%	2%
Alternative B	1%	2%	1%	3%	6%	9%
Alternative C	1%	2%	2%	3%	3%	3%

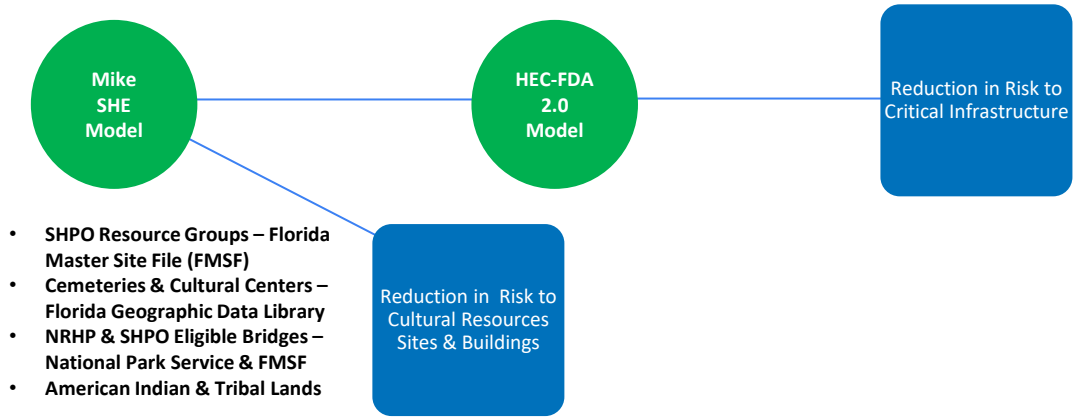




Other Social Effects (OSE)

- Federal Objective
- Guiding Principle
- P&G Account
- Evaluation Criteria
- Effects/Metric
- Modeling/Analysis

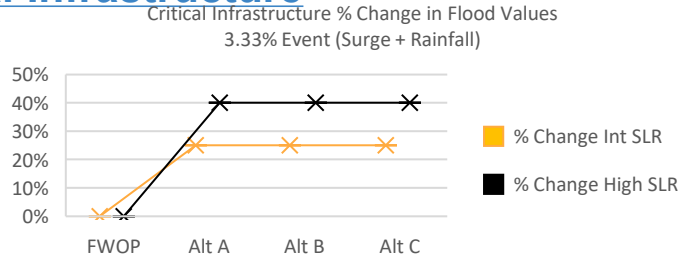


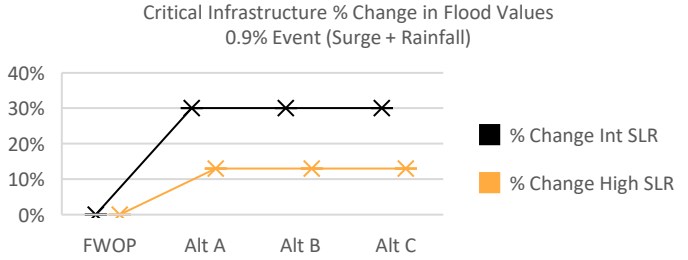


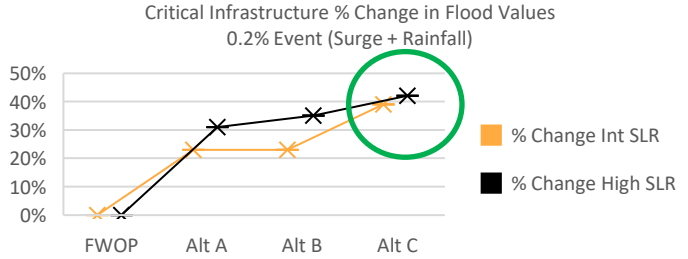
Central & Southern Florida Broward Basins Flood Resiliency Study

OSE Account – Reduction in Risk to Critical Infrastructure

Federal Objectives & Policy Requirements of the Region	Maximize Sustainable Development					
Guiding Principles	Public Safety					
P&G Accounts	OSE					
Formulation & Evaluation Criteria	Completeness					
Metrics	Reduction in Risk to Critical Infrastructure (% Reduction of Critical Infrastructure With Flood Values)					
	2 yr coastal, 25 yr rainfall (0.033)		2 yr coastal, 100 yr rainfall (0.009)		100 yr coastal, 100 yr rainfall (0.002)	
	% Change Int SLR	% Change High SLR	% Change Int SLR	% Change High SLR	% Change Int SLR	% Change High SLR
No Action Alternative	--	--	--	--	--	--
Alternative A	-25%	-40%	-30%	-13%	-23%	-31%
Alternative B	-25%	-40%	-30%	-13%	-23%	-35%
Alternative C	-25%	-40%	-30%	-13%	-39%	-42%

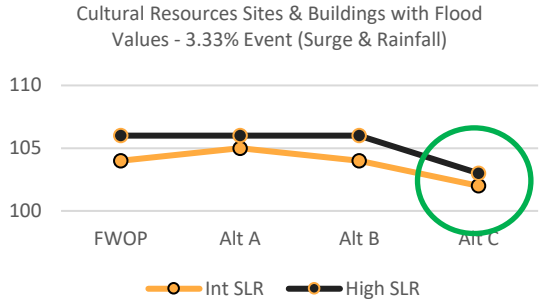


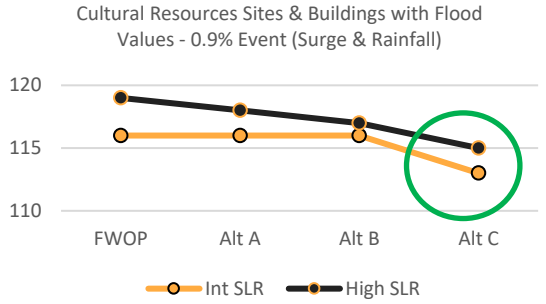


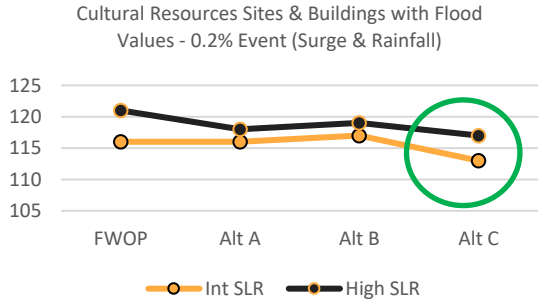


OSE Account – Reduction in Risk to Cultural Resources

Federal Objectives & Policy Requirements of the Region	Protect and Restore the Functions of Natural Ecosystems					
Guiding Principles	Healthy and Resilient Ecosystems					
P&G Accounts	OSE					
Formulation & Evaluation Criteria	Effectiveness					
Metrics	Cultural Resources Sites with Flood Values					
	2 yr coastal, 25 yr rainfall (0.033)		2 yr coastal, 100 yr rainfall (0.009)		100 yr coastal, 100 yr rainfall (0.002)	
	Int. SLR	High SLR	Int. SLR	High SLR	Int. SLR	High SLR
No Action Alternative	104	106	116	119	116	121
Alternative A	105	106	116	118	116	118
Alternative B	104	106	116	117	117	119
Alternative C	102	103	113	115	113	117

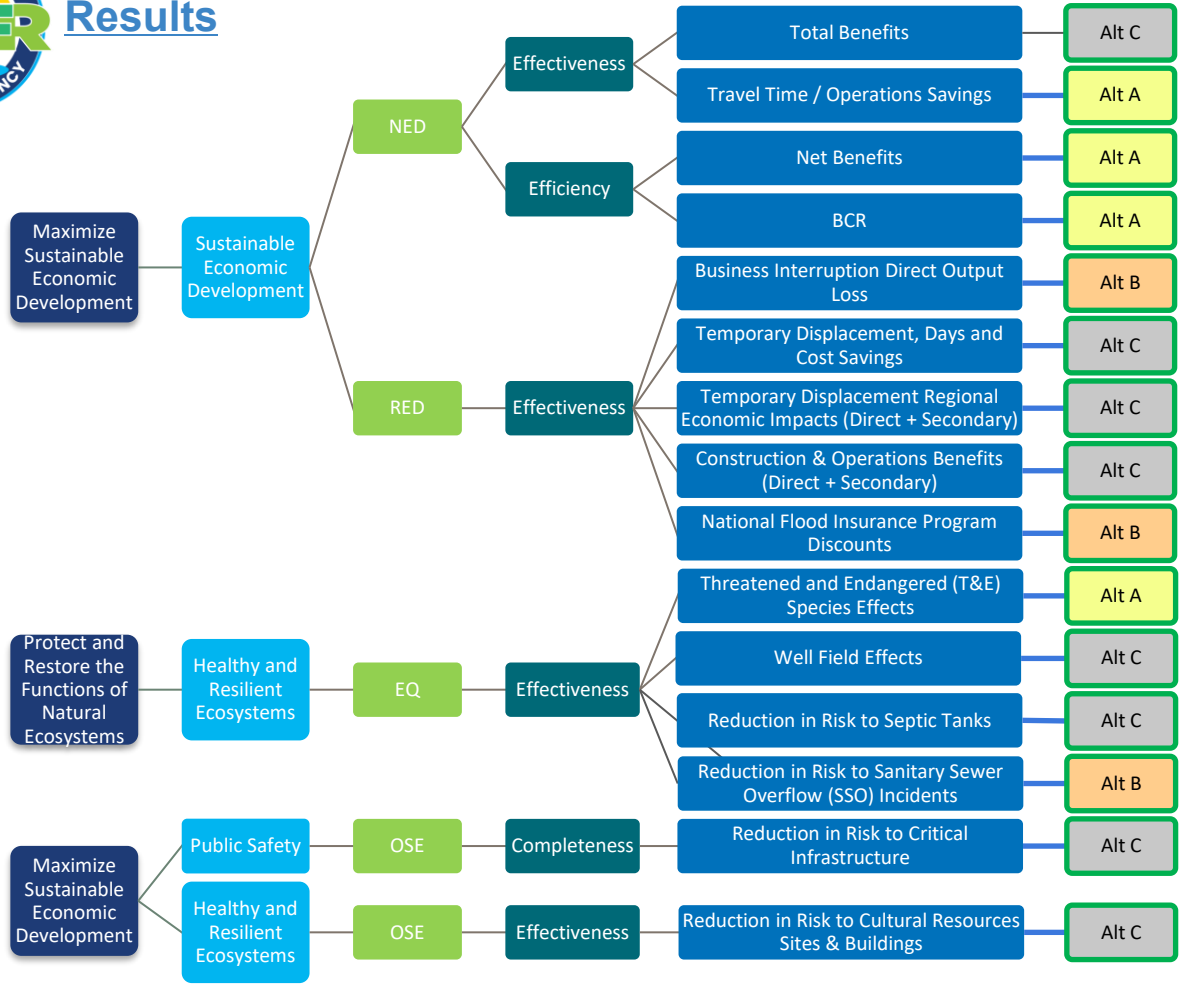






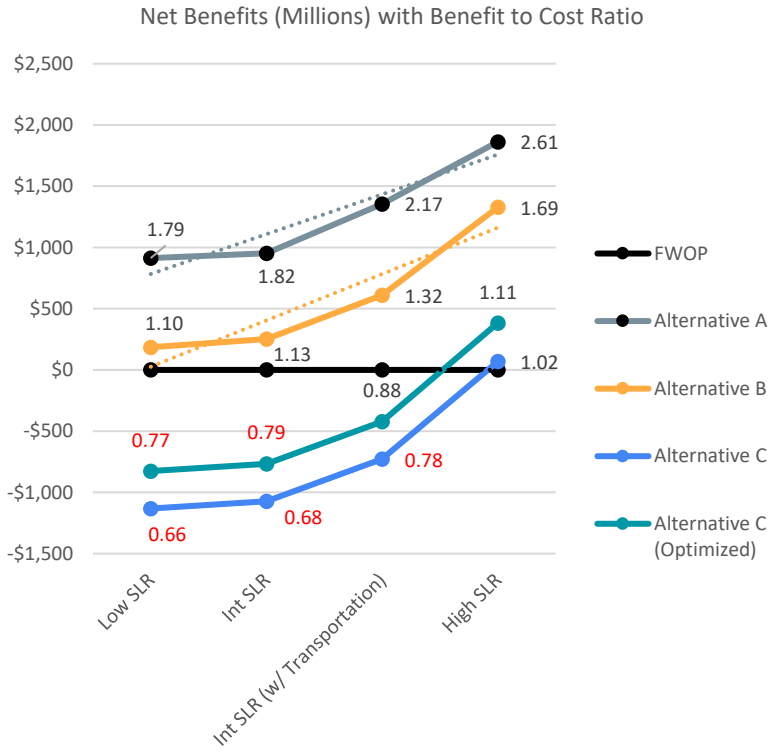
Central & Southern Florida Broward Basins Flood Resiliency Study

Results



Optimization Considerations for Alt C

Federal Objectives & Policy Requirements of the Region	Maximize Sustainable Economic Development					
Guiding Principles	Sustainable Economic Development					
P&G Accounts	NED					
Formulation & Evaluation Criteria	Efficiency					
Metrics	Net Benefits (Millions)			BCR		
	Low SLR	Int. SLR (+ Transportation Benefits)	High SLR	Low SLR	Int. SLR (+ Transportation Benefits)	High SLR
No Action Alternative	--	--	--	--	--	--
Alternative A	$913	$952 ($1,356)	$1,862	1.79	1.82 (2.17)	2.61
Alternative B	$185	$252 ($609)	$1,328	1.10	1.13 (1.32)	1.69
Alternative C	-$1,132	-$1,073 (-$729)	$68	0.66	0.68 (0.78)	1.02
Alternative C (Optimized)	*-$826*	*-766(-$421)*	*$383*	*0.77*	*0.79 (0.88)*	*1.11*



BCR < 1 → Project is not cost-effective
BCR > 1 → Project is cost-effective and economically justified

Policy Considerations – Watershed Approach

Guiding Principles	Watershed Approach
P&G Accounts	OSE
Formulation & Evaluation Criteria	Acceptability
Metrics	Maintains Integrity in Adjacent Watersheds
No Action Alternative	---
Alternative A	High Integrity
Alternative B	Moderate Integrity
Alternative C	Low Integrity

Potential effects evaluated across the final array of alternatives.

Potential effects vary between Alternatives A, B and C as engineering complexity increases.

Potential effects are greater in upstream watersheds.

TSP optimization will reduce tradeoffs through operational measures and provide mitigation plans if necessary.

September 9, 2025
Public Meeting

Draft Tentatively Selected Plan

Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins

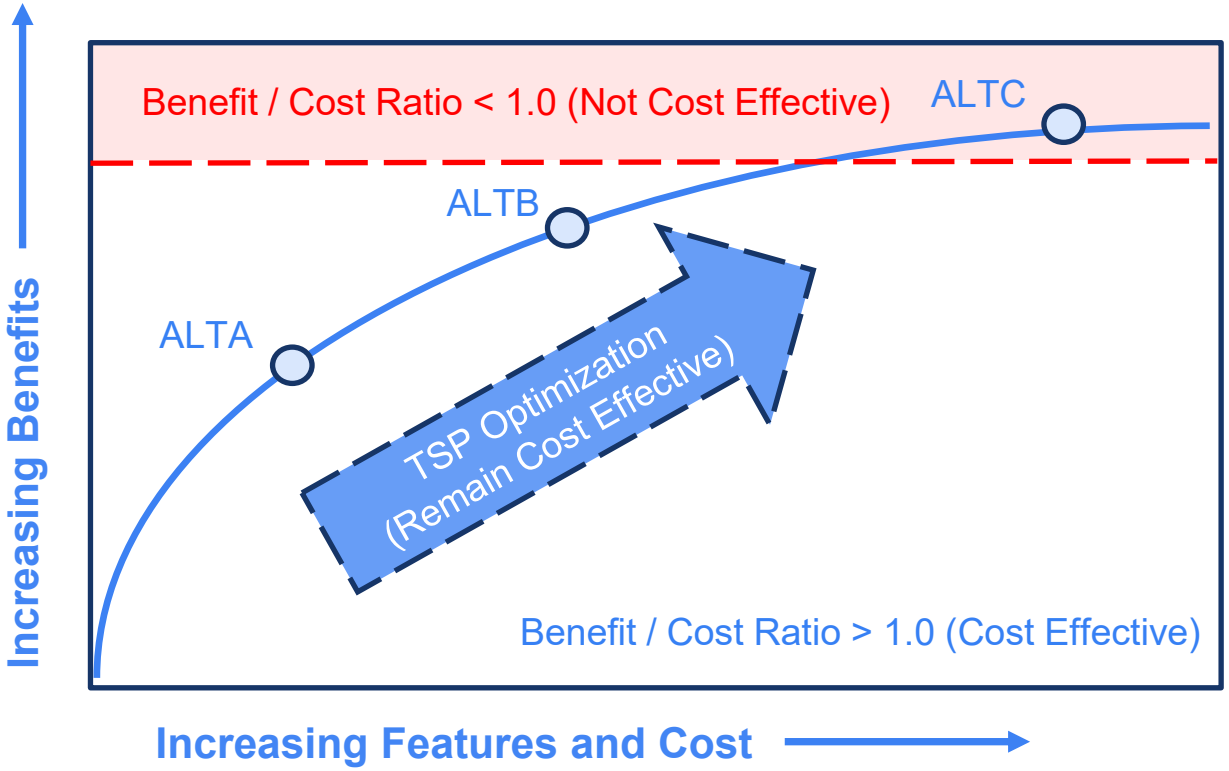
Walter Wilcox, Bureau Chief of Water Resources Systems Modeling, SFWMD

SELECTING A DRAFT TENTATIVELY SELECTED PLAN

Several considerations are important to consider when identifying elements of a TSP, including:

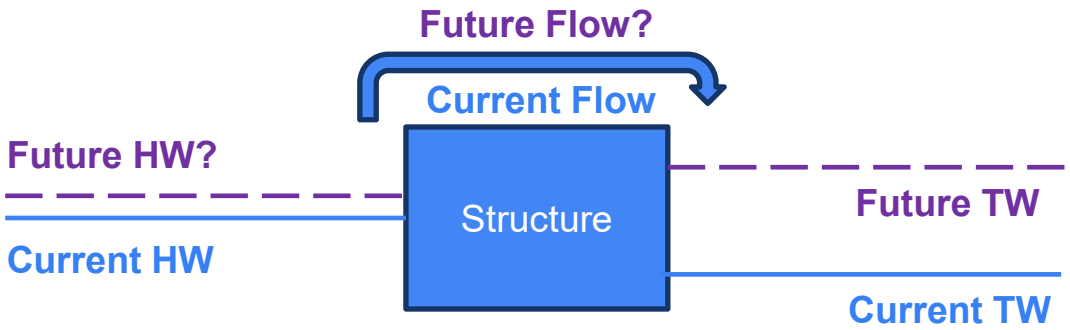
- Comprehensive benefits absolute performance
- Benefit to cost efficiency – i.e. Are the additional benefits worth the additional investment? Are there features that add cost but don't improve performance or resiliency?
- Plan completeness and robustness in the face of uncertain and changing conditions
- Environmental effects
- Downstream effects

TSP FORMULATION STRATEGY



Focusing in on the performance of the "primary" infrastructure, a normalized index examining structure headwater (HW) and volume conveyed gives additional insight:

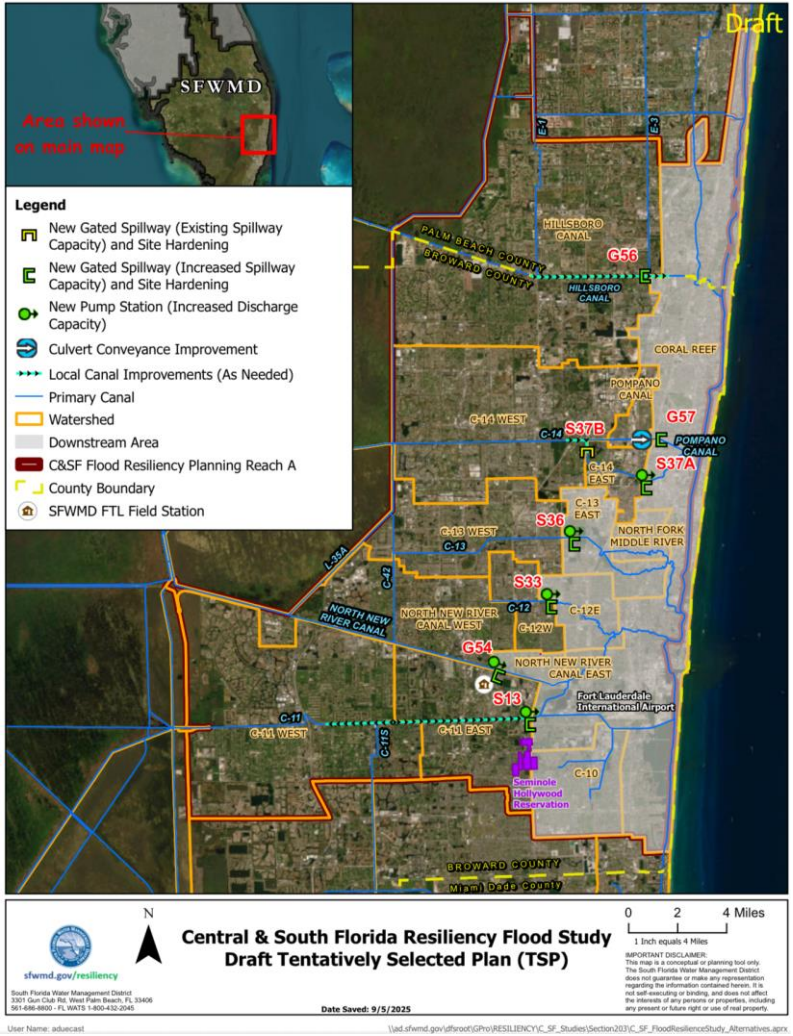
Basin	Structure	ECB	2085L				2085i				2085h			
			FWOPL	AltA	AltB	AltC	FWOPi	AltA	AltB	AltC	FWOPH	AltA	AltB	AltC
Hillsboro Canal	G-56	1.00	0.98	0.95	0.96	0.95	0.93	0.91	0.92	0.92	0.71	0.77	0.77	0.78
Pompano Canal	G-57	1.00	0.96	0.95	0.95	0.96	0.88	0.89	0.89	0.90	0.60	0.57	0.55	0.75
C-14 West Basin	S-37B	1.00	0.98	0.99	1.00	1.00	0.93	0.94	1.00	0.98	0.73	0.83	0.87	0.85
C-14 East Basin	S-37A	1.00	0.95	0.99	0.99	0.99	0.86	0.90	0.92	0.94	0.45	0.68	0.72	0.67
C-13 West Basin	S-36	1.00	0.94	0.98	1.00	1.00	0.80	0.91	0.93	0.98	0.35	0.40	0.70	0.83
C-12 Basin	S-33	1.00	0.97	0.97	0.97	0.99	0.90	0.93	0.94	0.97	0.65	0.83	0.83	0.92
North New River Canal West Basin	G-54	1.00	0.91	0.96	0.98	1.00	0.77	0.87	0.82	0.97	0.26	0.37	0.25	0.79
C-11 East and West Basins	S-13	1.00	0.95	0.94	0.93	0.92	0.87	0.88	0.87	0.86	0.49	0.68	0.66	0.65



Section 203 Draft Tentatively Selected Plan Features*

Site	Canal	Alternate A				Alternate B				Alternate C			
		New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features	New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features	New Pump Sta.		New Gated Structure (nominal gate widths provided)	Local Canal Improvements / Storage & Nature Based Features
		Design Pumping Capacity (cfs)	Mix of Pumps			Design Pumping Capacity (cfs)	Mix of Pumps			Design Pumping Capacity (cfs)	Mix of Pumps		
G56	G-08 (Hillsboro)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (4) 25' wide roller gates	Hillsboro Canal Improvement	1,005	(3) 335 cfs pumps	Gated Spillway w/ (4) 25' wide roller gates	Hillsboro Canal Improvement Hillsboro Storage
G57	G-16 (Pompano)	N/A	N/A	U/S Culvert 10"	N/A	N/A	N/A	Gated Spillway w/ (2) 21' wide roller gates + U/S Culvert 10"	N/A	300	(3) 100 cfs pumps	Gated Spillway w/ (2) 21' wide roller gates + U/S Culvert 10"	
S37B	C-14 (Cypress Creek)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (3) 25' wide roller gates	C14 West Canal Improvement	N/A	N/A	N/A	C14 West Canal Improvement
S37A	C-14 (Cypress Creek)	1,200 (+ aux.)	(3) 400 cfs pumps (1) 400 cfs aux. pump	Gated Spillway w/ (4) 25' wide roller gates	N/A	1,500	(3) 500 cfs pumps	N/A	N/A	1,200	(3) 400 cfs pumps	Gated Spillway w/ (4) 25' wide roller gates	C14 East Canal Improvement
S36	C-13 (Middle River)	N/A	N/A	Gated Spillway w/ (2) 25' wide roller gates	N/A	510	(3) 170 cfs pumps	N/A	N/A	600	(3) 200 cfs pumps	Gated Spillway w/ (2) 25' wide roller gates	C13 West Canal Improvement
S33	C-12 (Plantation)	510 (+ aux.)	(3) 170 cfs pumps (1) 170 cfs aux. pump	N/A	N/A	510	(3) 170 cfs pumps (1) 170 cfs aux. pump	Gated Spillway w/ (2) 20' wide roller gates	N/A	705	(3) 235 cfs pumps (1) 235 cfs aux. pump	Gated Spillway w/ (2) 20' wide roller gates	C12 West Canal Improvement
G54	G-15 (North New River)	N/A	N/A	N/A	N/A	N/A	N/A	Gated Spillway w/ (4) 20' wide roller gates	NNR West Storage	810	(3) 270 cfs pumps	Gated Spillway w/ (4) 20' wide roller gates	NNR Canal Improvement NNR West Storage
S13	C-11 (South New River)	700 (+ aux.)	(2) 115 cfs pumps (2) 235 cfs pumps (1) 235 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	N/A	1,080	(2) 180 cfs pumps (2) 360 cfs pumps (1) 360 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	C-11 West / C-11 East Canal Improvement	1,500	(2) 250 cfs pumps (2) 500 cfs pumps (1) 500 cfs aux. pump	Gated Box Culvert w/ (1) 25' wide roller gate	C-11 West / C-11 East Canal Improvement

* Draft TSP reflects some modifications to pre-determined alternatives features.



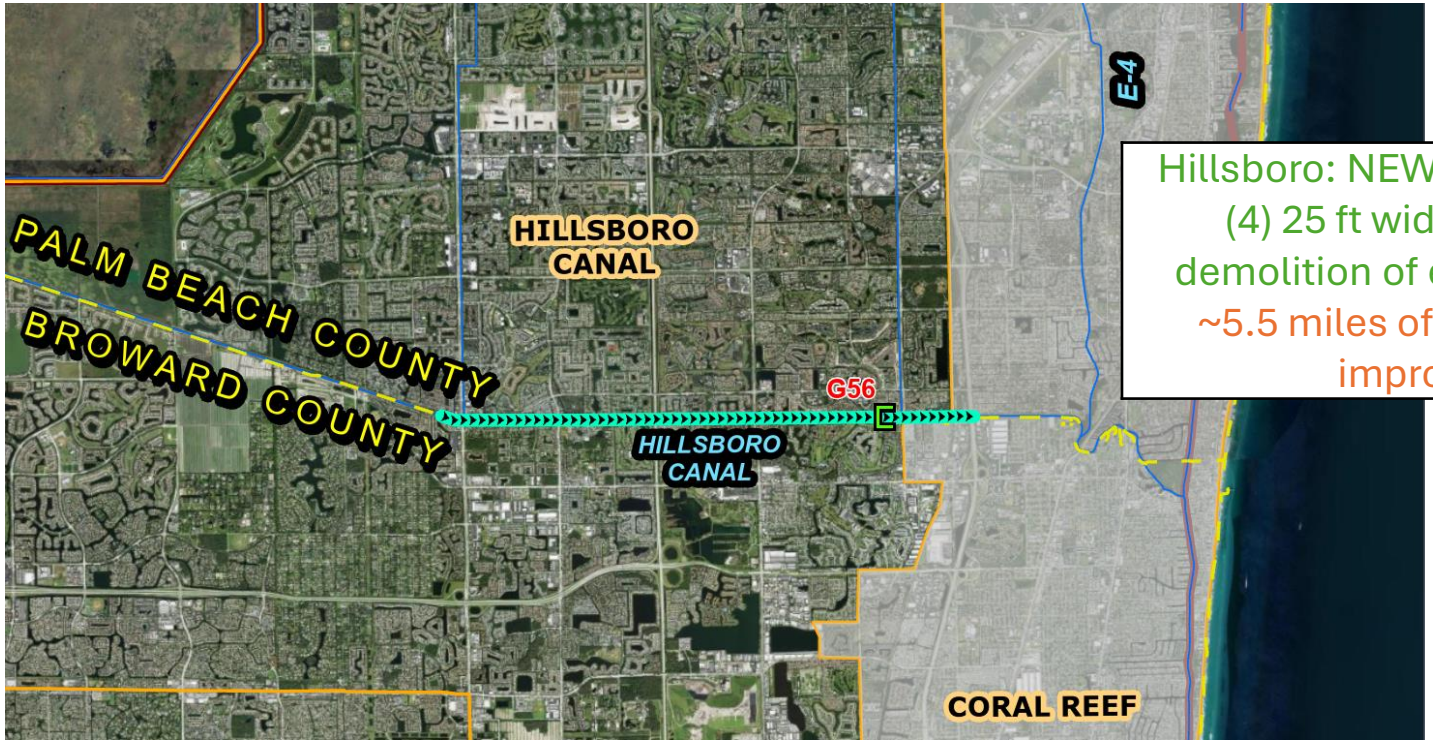
Section 203

Draft Tentatively Selected Plan (TSP)

Section 203
Draft Tentatively Selected Plan (TSP)

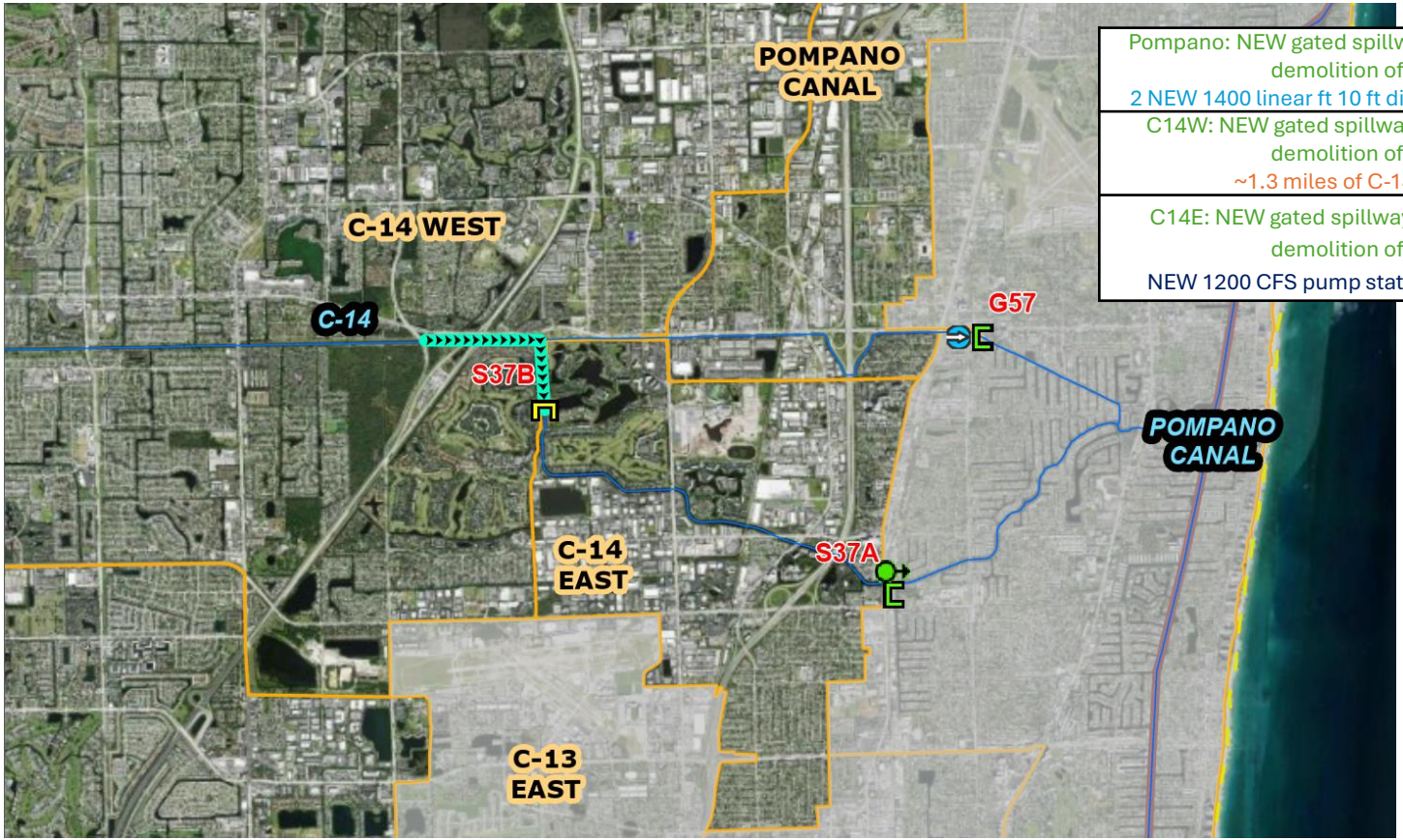
Basin	Structure	Existing Condition	Final Array Alternative	Tentatively Selected Plan (TSP)
Hillsboro Canal	G-56 Gated Spillway	(3) 20 ft wide spillway gates	Alternative B	NEW gated spillway w/ (4) 25 ft wide roller gates / demolition of existing structure ~5.5 miles of Hillsboro Canal improvement
Pompano Canal	G-57 Gated Spillway	(2) 14 ft wide spillway gates (1) 1400 linear ft 10 ft diam. culvert (upstream of G-57)	Alternative B	NEW gated spillway w/ (2) 21 ft wide roller gates / demolition of existing structure 2 NEW 1400 linear ft 10 ft diam. culverts (upstream of G-57)
C-14 West Basin	S-37B Gated Spillway	(2) 25 ft wide spillway gates	Alternative A (modified)	NEW gated spillway w/ (2) 25 ft wide roller gates / demolition of existing structure ~1.3 miles of C-14 Canal improvement
C-14 East Basin	S-37A Gated Spillway	(2) 25 ft wide spillway gates	Alternative A (modified)	NEW gated spillway w/ (3) 25 ft wide roller gates / demolition of existing structure NEW 1200 CFS pump station w/ 400 CFS auxiliary pump
C-13 West Basin	S-36 Gated Spillway	(1) 25 ft wide spillway gate	Alternative B (modified)	NEW gated spillway w/ (2) 16 ft wide roller gates / demolition of existing structure NEW 510 CFS pump station
C-12 Basin	S-33 Gated Spillway	(1) 20 ft wide spillway gate	Alternative B	NEW gated spillway w/ (2) 20 ft wide roller gates / demolition of existing structure NEW 510 CFS pump station w/ 170 CFS auxiliary pump
North New River Canal West Basin	G-54 Gated Spillway	(3) 16 ft wide spillway gates	Alternative B (modified)	NEW gated spillway w/ (4) 20 ft wide roller gates / demolition of existing structure NEW 810 CFS pump station
C-11 East and West Basins	S-13 Pump Station and Gated Spillway	540 CFS pump station with (1) 16 ft wide spillway gate	Alternative B (modified)	NEW gated spillway w/ (2) 14 ft wide roller gates / demolition of existing structure NEW 1080 CFS pump station w/360 CFS auxiliary pump ~8.4 miles of C-11 Canal improvement

HILLSBORO CANAL / G56



Hillsboro: NEW gated spillway w/ (4) 25 ft wide roller gates / demolition of existing structure
~5.5 miles of Hillsboro Canal improvement

C-14, POMPANO CANAL / S37A & S37B AND G57



Pompano: NEW gated spillway w/ (2) 21 ft wide roller gates / demolition of existing structure
2 NEW 1400 linear ft 10 ft diam. culverts (upstream of G-57)

C14W: NEW gated spillway w/ (2) 25 ft wide roller gates / demolition of existing structure
~1.3 miles of C-14 Canal improvement

C14E: NEW gated spillway w/ (3) 25 ft wide roller gates / demolition of existing structure
NEW 1200 CFS pump station w/ 400 CFS auxiliary pump

C-13 / S36

C13: NEW gated spillway w/ (2) 16 ft wide roller gates / demolition of existing structure

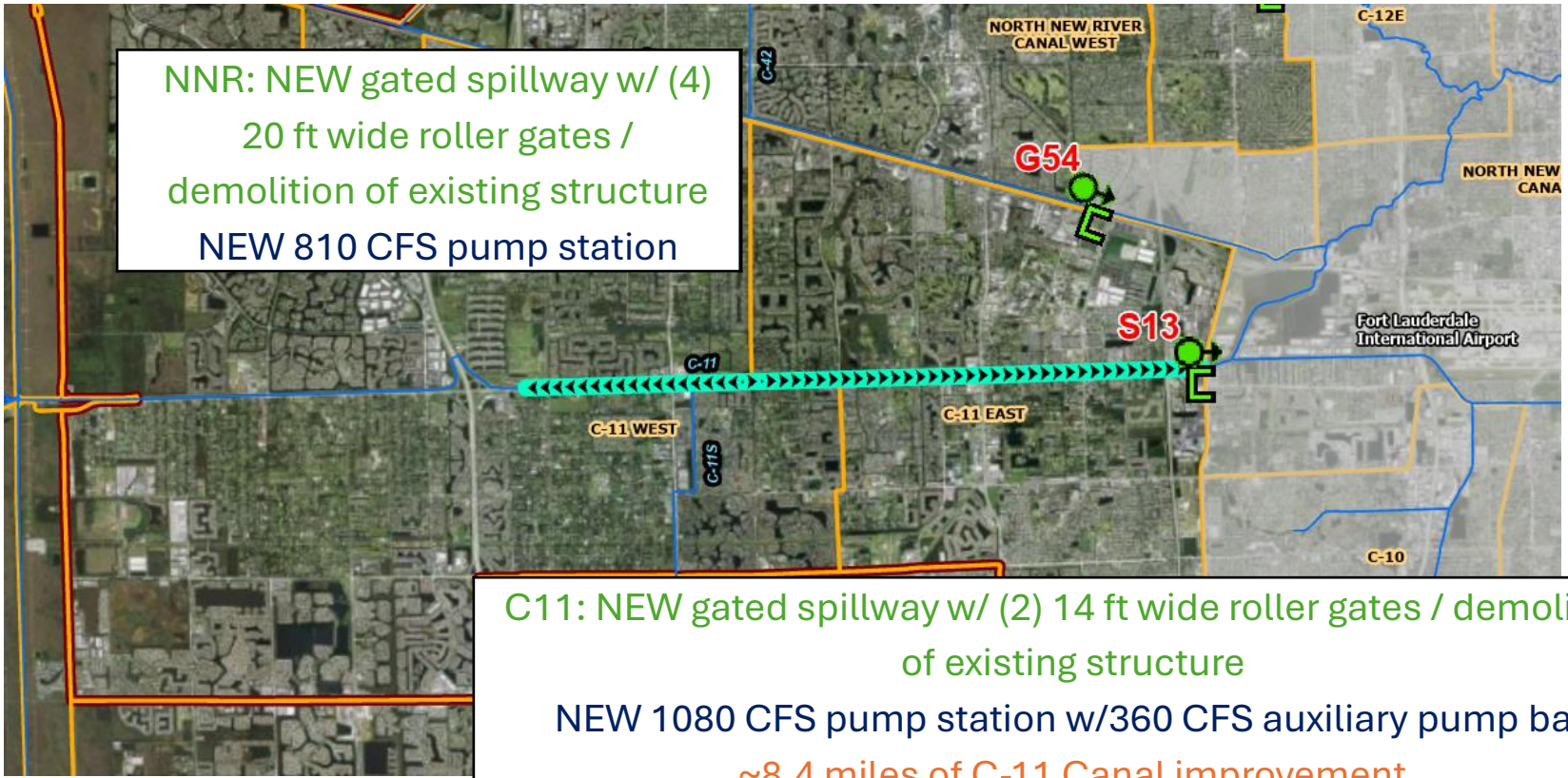
NEW 510 CFS pump station

C-12, NORTH FORK NEW RIVER/ S33

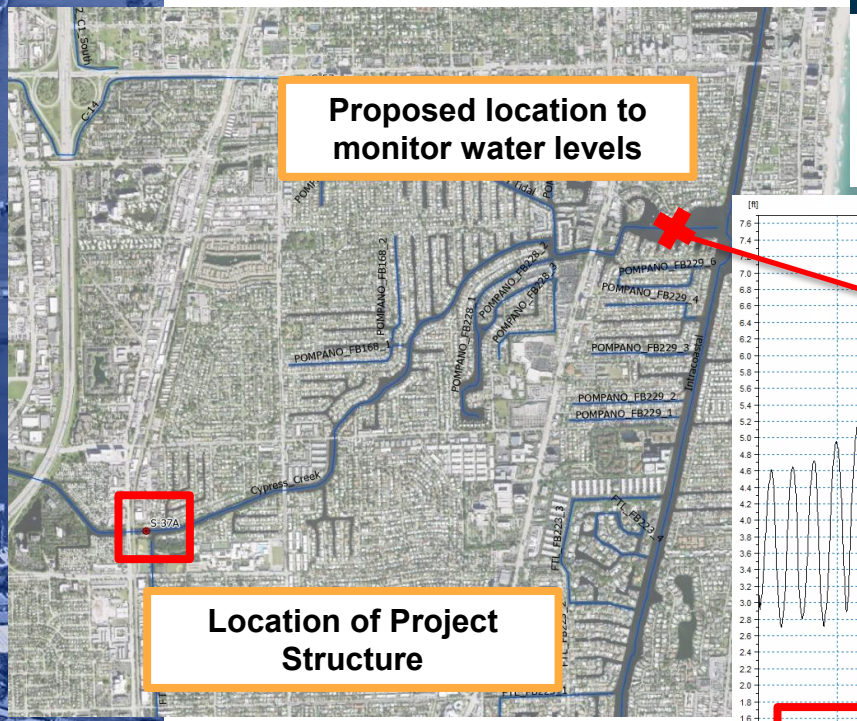
C12: NEW gated spillway w/ (2) 20 ft wide roller gates / demolition of existing structure

NEW 510 CFS pump station w/ 170 CFS auxiliary pump bay

NORTH NEW RIVER CANAL /G54



ADDITIONAL OPERATIONS REFINEMENT OF TSP



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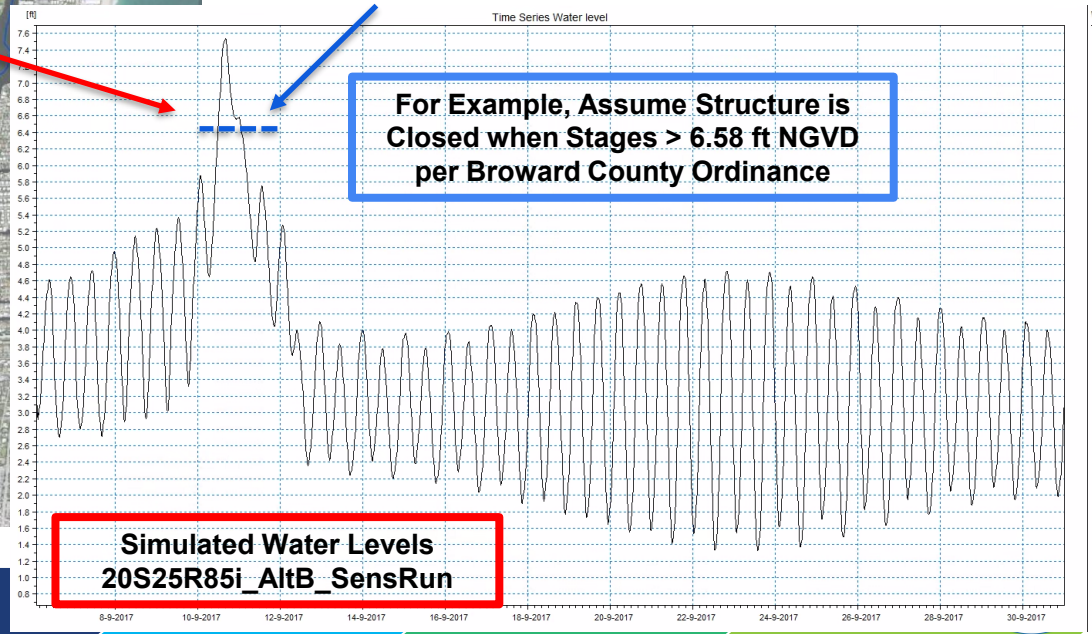
impermeable water barrier to tidal flooding.

Tidally influenced area means the real property adjacent to, or affected by, a waterway with water level changes in response to the daily tide.

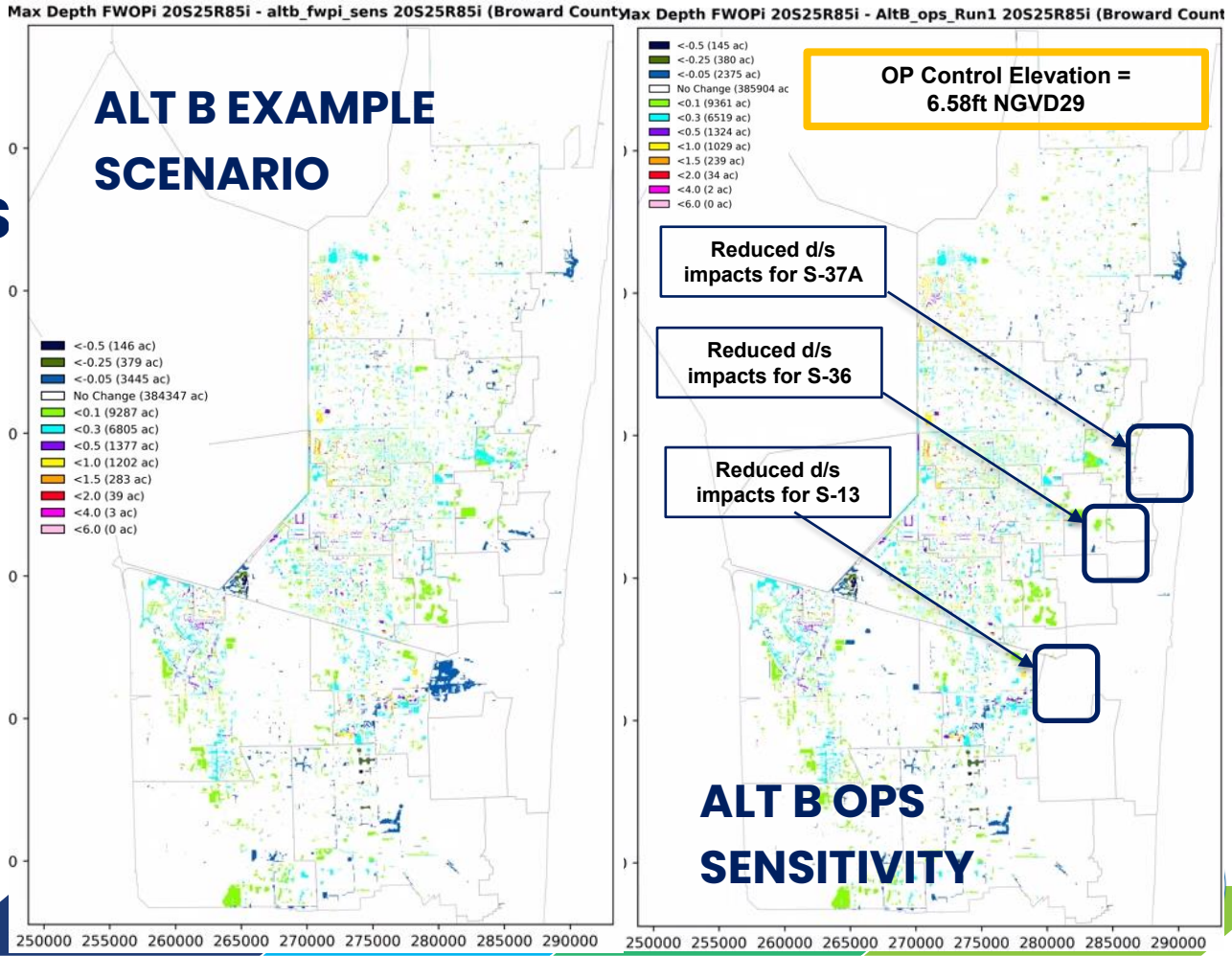
Sec. 39-407. Minimum elevations for coastal infrastructure within tidally influenced areas.

(a) All new or substantially repaired or substantially rehabilitated banks, berms, green-grey infrastructure, seawalls, seawall caps, upland stem walls, or other similar infrastructure shall be designed and constructed to perform as tidal flood barriers. Tidal flood barriers shall have a minimum elevation of five (5) feet NAVD88. Applications for new or substantially repaired or substantially rehabilitated tidal flood barriers submitted prior to January 1, 2035, may be permitted a minimum elevation of four (4) feet NAVD88, if designed and constructed to accommodate a minimum elevation of five (5) feet NAVD88 by January 1, 2050.



OPERATIONS SENSITIVITY TESTING RESULTS

Note: HEC-FDA testing shows a <1% change in upstream benefits



SUMMARY – BBFR TENTATIVELY SELECTED PLAN

- Public project scoping, examination of a broad range of potential project management measures and multiple rounds of modeling & evaluation have culminated in a DRAFT TSP that meets the project objectives and is cost effective.
- Every basin in the study contains project elements and all primary structures in the study are replaced or improved with hardening and canal modifications also proposed.
  - 5 new or expanded pump stations
  - Significant improvements in gravity conveyance
  - Redundancy in pump bays and gates ensures operation even during maintenance or offline periods
- This project is focused on improving the primary system infrastructure, but these actions will be complemented by other efforts at the county or local level.

September 9, 2025
Public Meeting

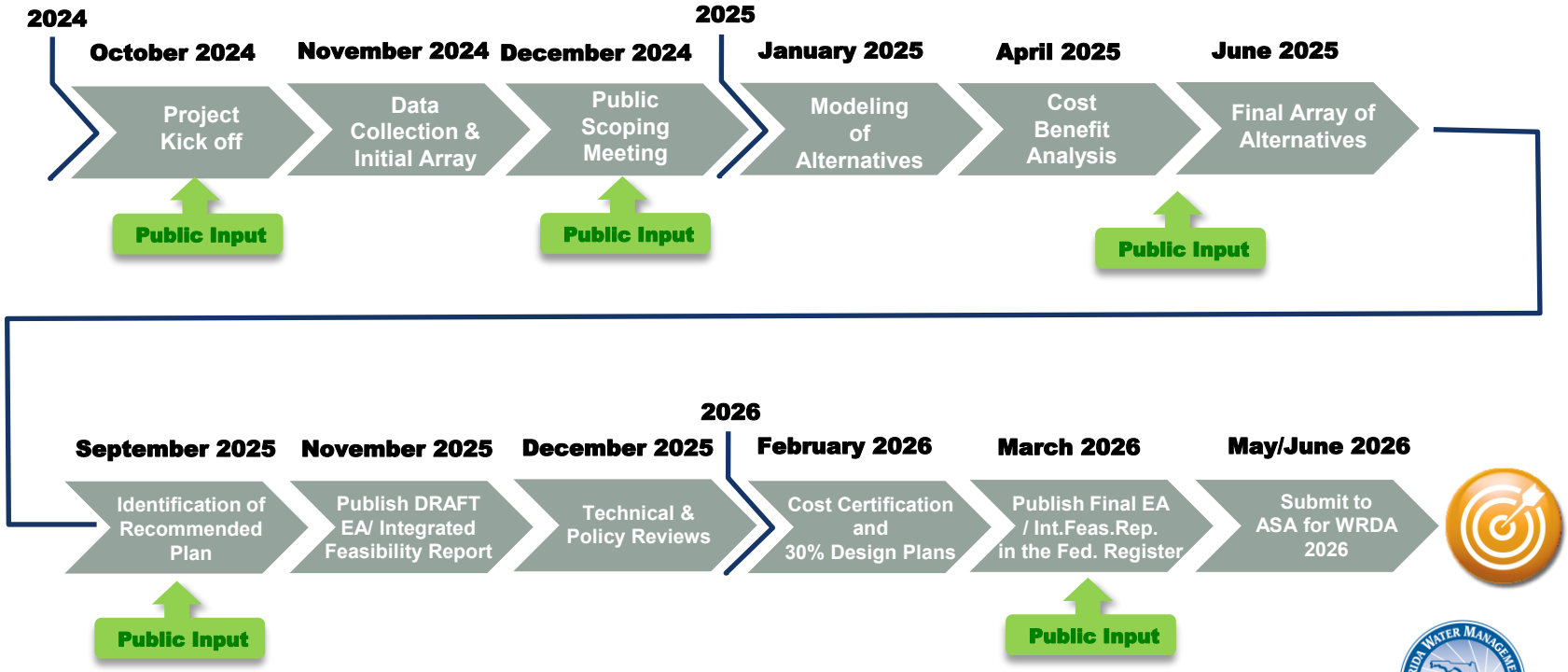
Next Steps

Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins

David Griffin CFM, PWS,, Resiliency Project Manager, SFWMD

Project Schedule

Targeting June 2026 - Deliver Final Feasibility Report and Environmental Assessment (EA) to ASA Civil Works



Project Agency Technical Review (ATR) and Independent External Field Review (IEPR)

- Agency Technical Review (ATR)
  - Mandatory process within the U.S. Army Corps of Engineers (USACE) that ensures the quality and credibility of USACE decision documents and supporting data.
  - Involves an independent review conducted by a team of experts outside the project's home district to verify adherence to regulations, guidance, and best practices.
  - Provided Project orientation, identified and obtained HQ approval of selected panel members for the ATR.
- Independent External Peer Review (IEPR)
  - Quality assurance process used by the U.S. Army Corps of Engineers (USACE) for its Civil Works projects.
  - Provides an independent assessment of a project's technical, economic, and environmental soundness, ensuring the quality and credibility of USACE's decision-making and project delivery.
  - Provided Project orientation and reviewed project schedule. Identified and obtained HQ approval of selected panel members for the IEPR. Developed charge questions on HTRW, Cultural Resources, Resiliency and Constructability as requested by HQ. Received Final IEPR Work Plan.

Technical/Policy Guidance and Reviews

Routine Re-occurring Monthly Project Coordination Meetings

- ASA Civil Works – Planning and Policy Guidance, Reviews
- USACE HQ - Engineering and Design Requirements
- Planning Center of Expertise (PCX) - Planning tool assistance, troubleshooting and tool approval for project use
- Walla Walla District - Review and certify the project cost

EA/FS Report and NEPA Review

Federal Activities, under development by USACE Jacksonville District

- Agencies Consultation
- Public notification and comments
- Review of NEPA Document
- Review of Feasibility Study Report

April 29, 2025
Public Meeting

Public Comment

Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins

ADDITIONAL COMMENT OPPORTUNITIES

Email: resiliency@sfwmd.gov

Comments due no later than September 19, 2025

September 9, 2025
Public Meeting

Closing Remarks

Central & Southern Florida System Flood Resiliency Study (Section 203) for Broward Basins

Carolina Maran, Division Director, Flood Control and
Water Supply Planning, Chief of District Resiliency, SFWMD

Central & Southern Florida
Broward Basins Flood Resiliency Study

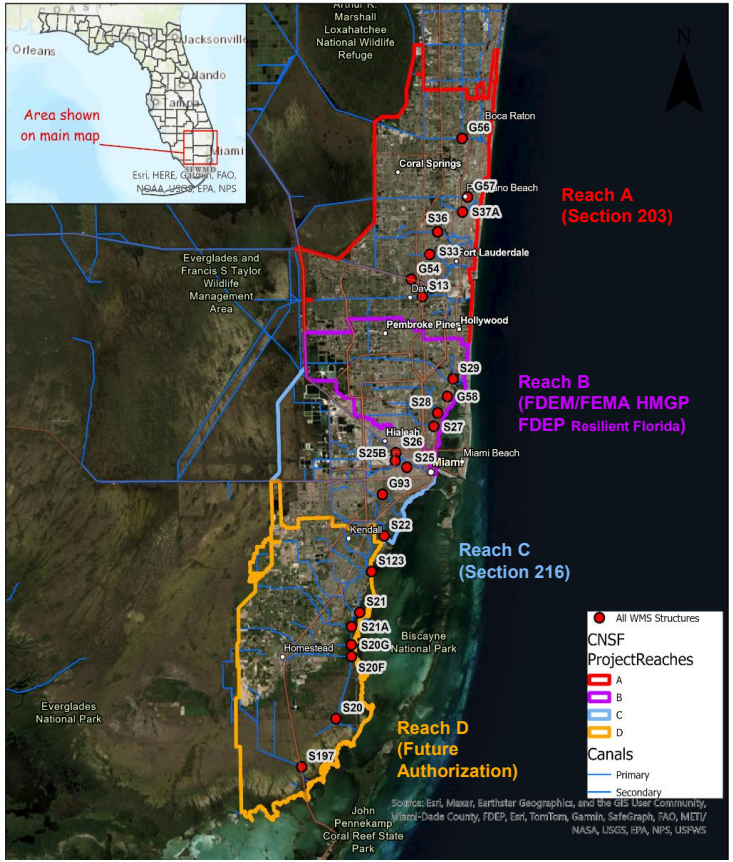
C&SF Flood Resilience: Integrated Path Forward

Planning Reach A - Broward County Basins
- Section 203 Feasibility Study – Target WRDA 26
- Funding support from FDEP and Broward County

Planning Reach B - C-7, C-8, C-9 Basins
- FDEM / FEMA Hazard Mitigation
- Resilient Florida Grant
- Support from Miami Dade County

Planning Reach C – Miami River Basins
- C&SF Flood Resiliency Study – Section 216 Authorization – Final VTAM Approval
- Feasibility Study - Target WRDA28 or WRDA30

Planning Reach D - South Dade Basins
- CS&F Comprehensive Study or future planning studies



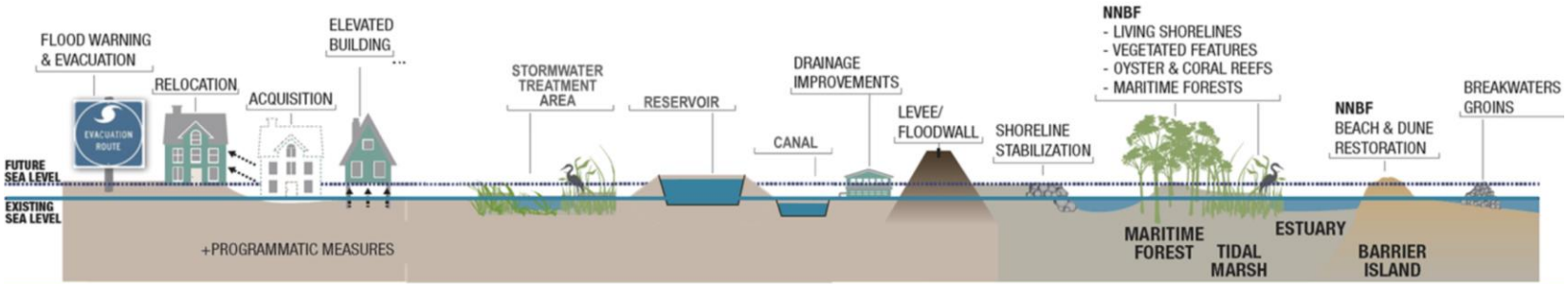
Resiliency Initiatives Coordination

Integrating Inland and Coastal Flood Mitigation Strategies

Counties Studies/ Projects	Water Control Districts and Municipalities Projects	USACE Studies/ Projects	Regional Climate Compacts	Other Partners

POTENTIAL MEASURES TO IMPROVE RESILIENCE AND SUSTAINABILITY

Graphic modified from https://ewn.el.erdc.dren.mil/nnbf/other/5_ERDC-NNBF_Brochure.pdf



September 9, 2025
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Adjourn

Central & Southern Florida System
Flood Resiliency Study (Section 203) for Broward Basins