



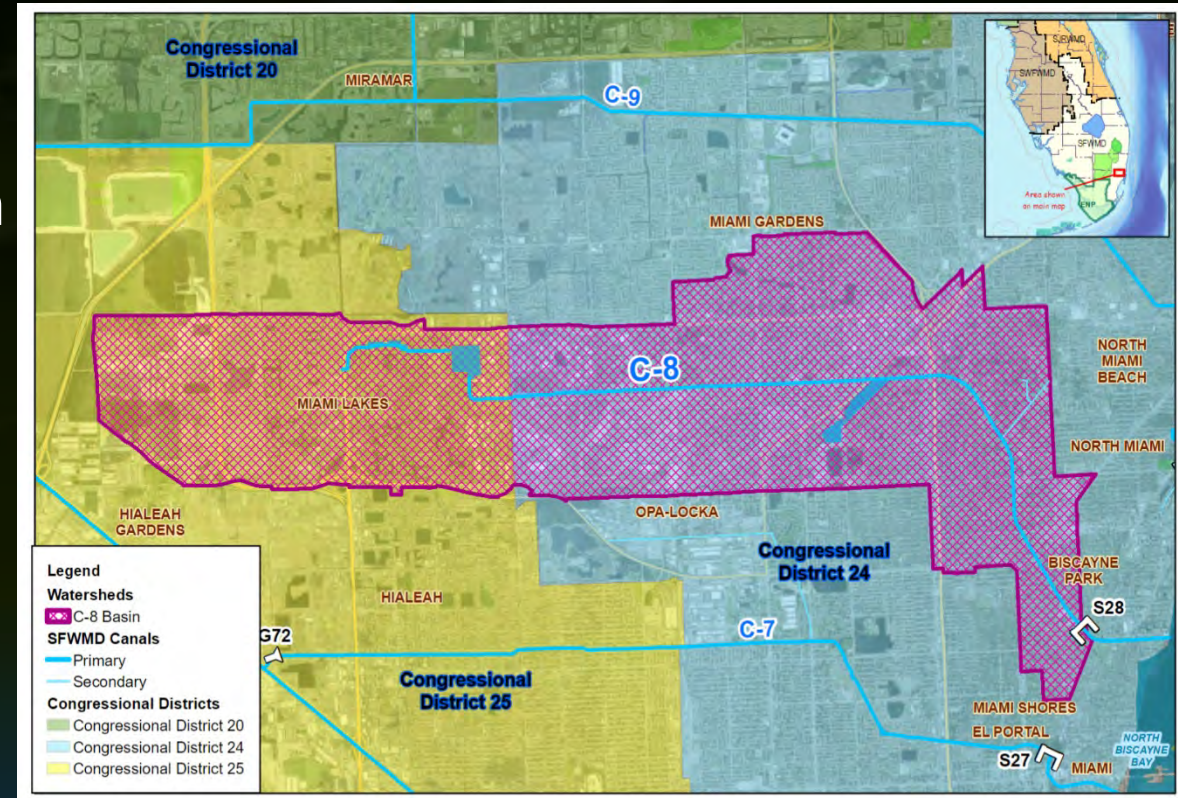
S-28 Coastal Structure Resiliency

Case Study to Highlight Changed Conditions and Impacts on a Basin-wide Scale

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C-8 Basin Information

- Population of approx. 270,000
 - 19% financially disadvantaged
- 28 square miles in the northeastern portion of Miami Dade County (8 cities/towns)
- Fully developed residential/commercial
- Critical assets supporting Community Lifelines include:
 - Fire stations, other emergency operations
 - Schools and emergency shelters
 - Utilities
 - Medical facilities and others



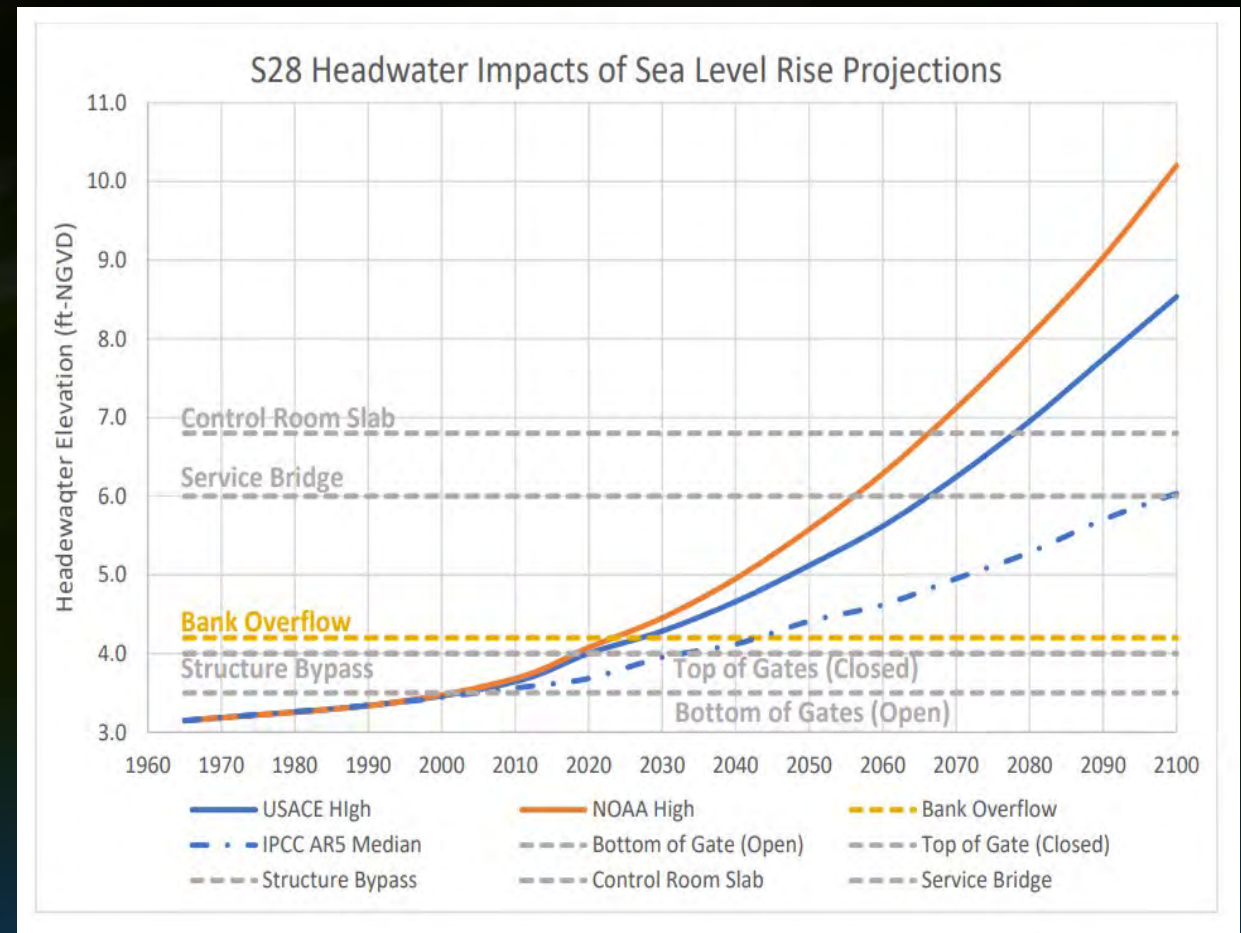
S-28 Coastal Structure Information

- Main flood control features are the C-8 Canal and S-28 Coastal Structure
- S-28 conveys floodwaters by gravity to Biscayne Bay
- C-8 Canal managed by SFWMD
- Secondary canals managed by Miami-Dade County

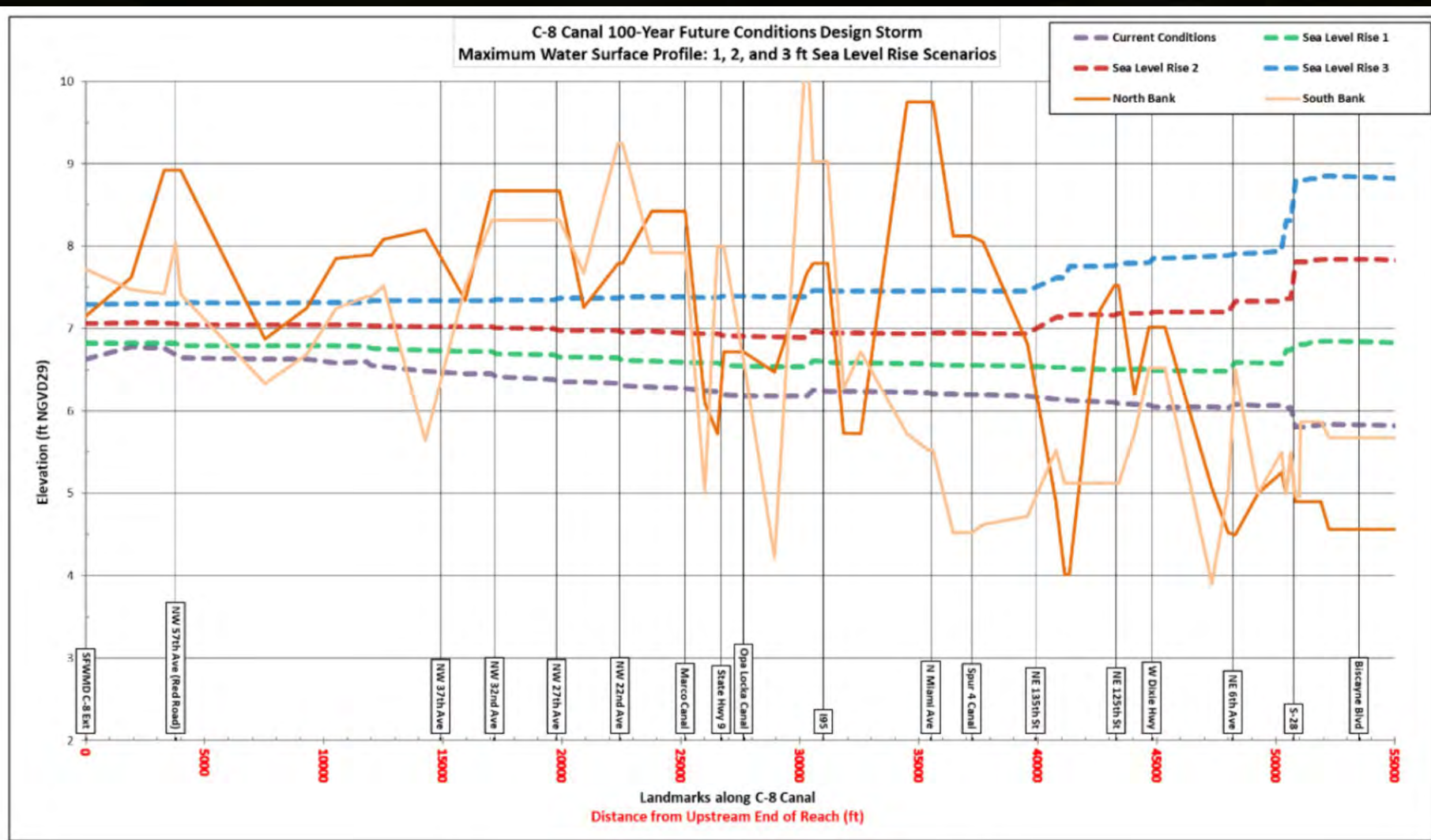


FPLOS: Flood Risks in the C-8 Basin

- Sea level rise is limiting the ability C-8 Canal and S-28 Structure to convey floodwaters by gravity
- Secondary canals have reduced conveyance due to higher stages in the C-8 Canal
- Serious flooding events have occurred recently in the C-8 Basin
- C-8 Canal and S-28 Structure (with no adaptations) predicted to provide:
 - 5-year level of service under 1 ft future sea level rise scenario
 - Less than 5-year level of service under 2 ft and 3 ft future sea level rise scenarios



Flood Risks in the C-8 Basin - FPLOS PM1



Flood Risks in the C-8 Basin - FPLoS PM4

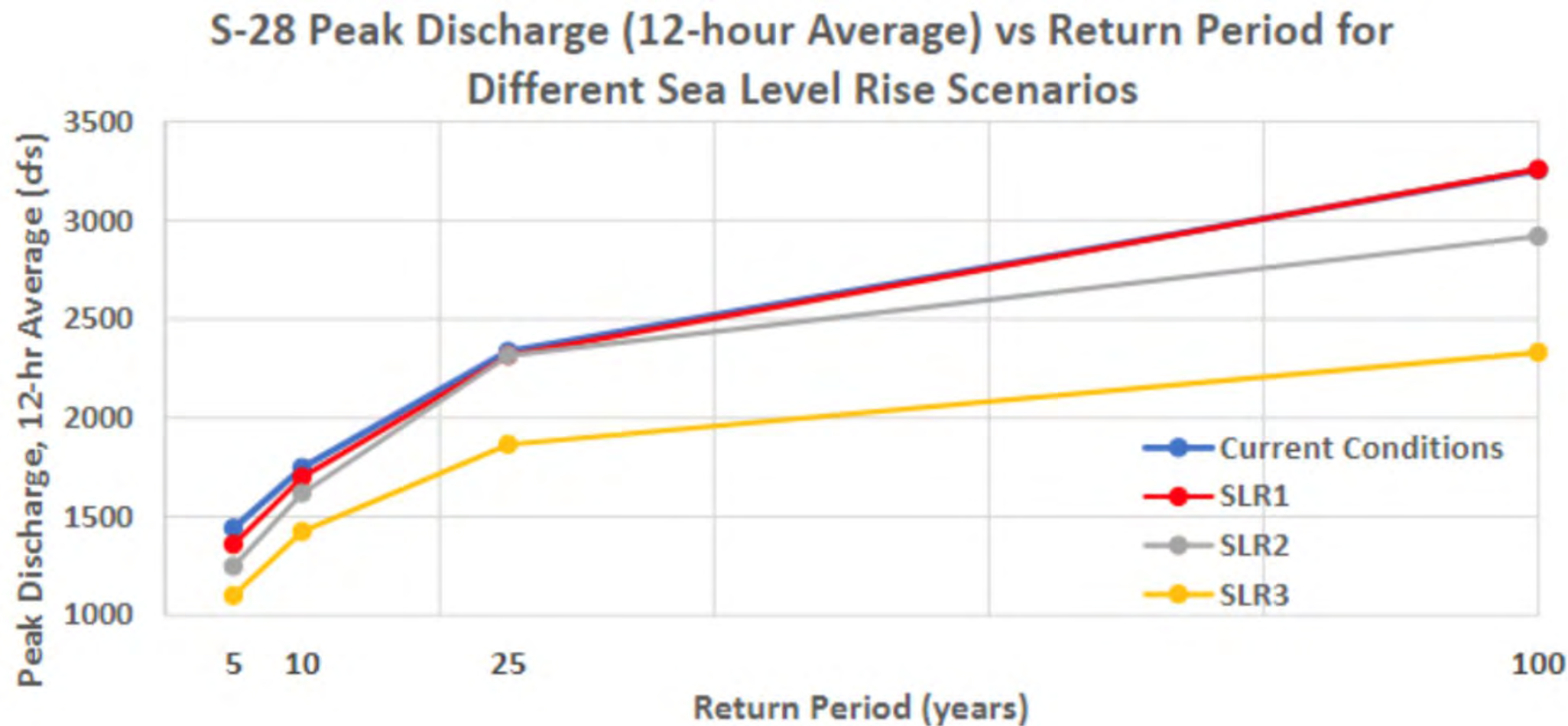


Figure 3: S-28 Peak Discharge 12-hr Average Reduction – Current vs Future SLR Scenarios

Flood Risks in the C-8 Basin - FPLoS PM5

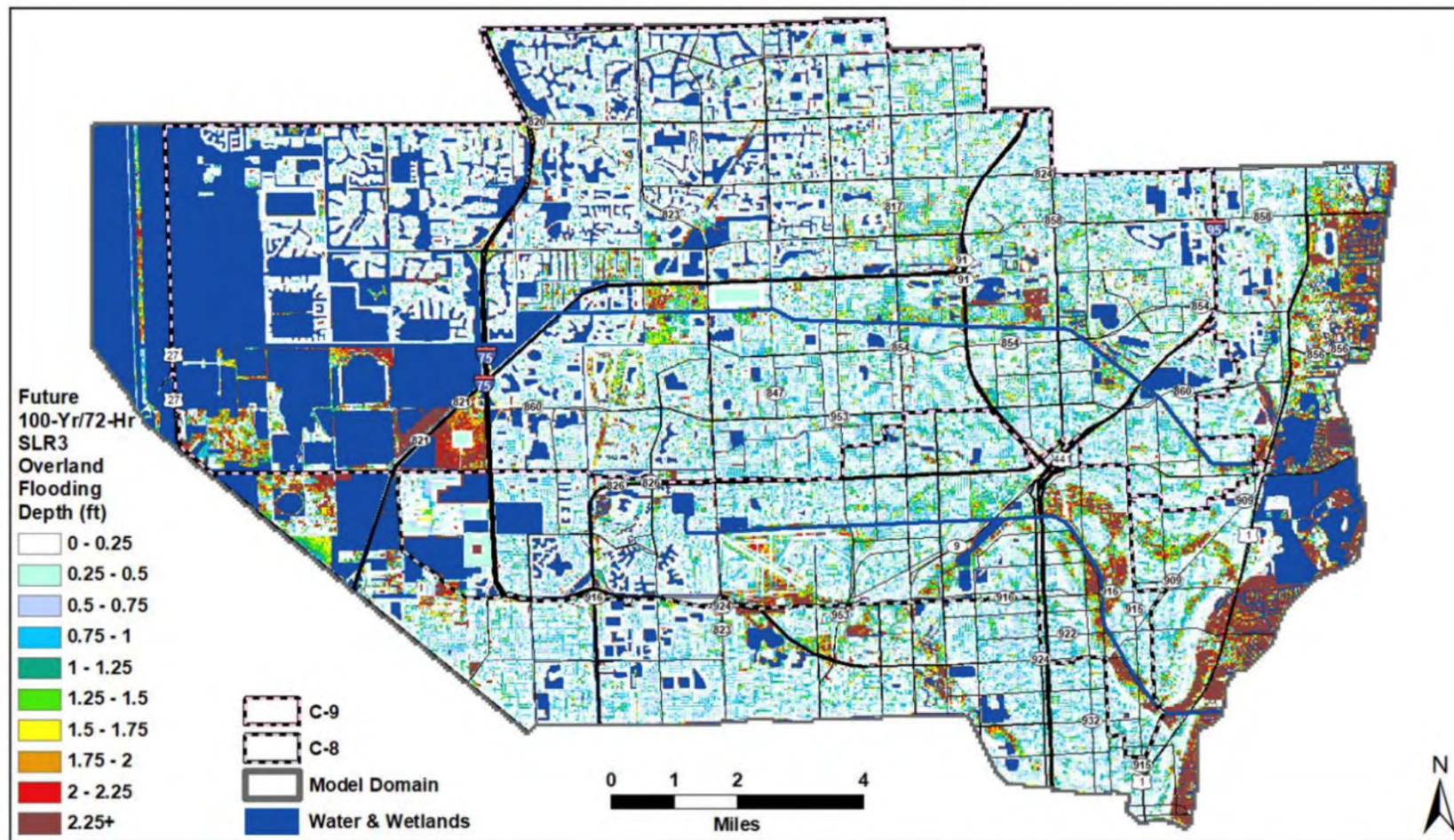


Figure 4: Flood Inundation Map for 100-Year Sea Level Rise 3 Design Storm Event

SFWMD FY21 FEMA BRIC Proposal @ C-8 Basin

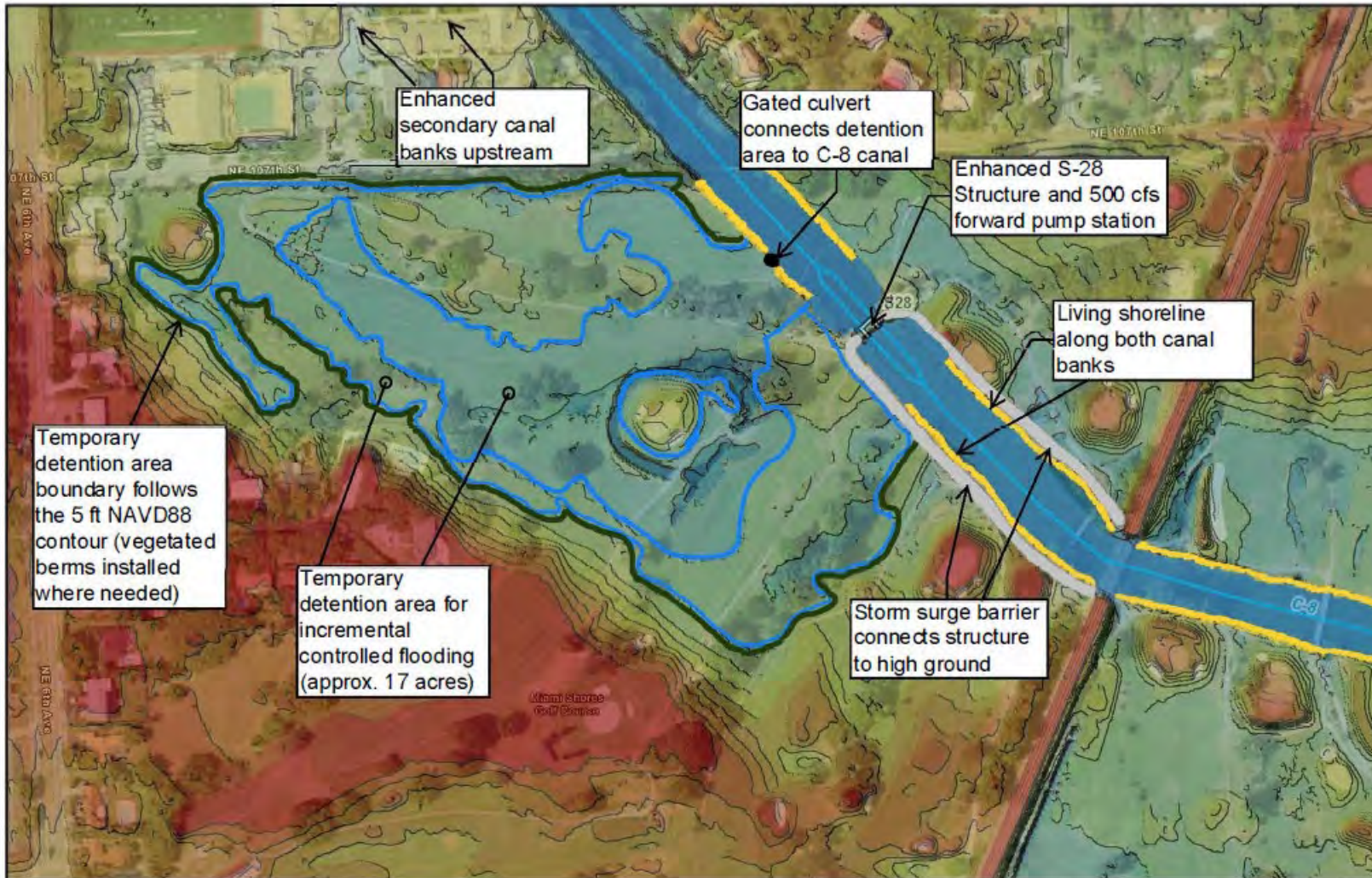
- Replacement of S-28 Structure with a more robust structure and elevated components to withstand the impacts of sea level rise and climate change
- Installation of a 500 cubic foot per second forward pump station adjacent to the S-28 structure to maintain basin discharge levels while sea levels rise.
- Construction of a flood barrier tying S-28 Structure to higher ground elevations to mitigate the impacts of sea level rise and storm surge.

GOALS: reduce flood risk under sea-level rise, by restoring the structure discharge capacity and the basin's flood level of service to enhancing quality of life in the region

SFWMD FY21 FEMA BRIC Proposal @ C-8 Basin

- Enhancement of secondary canal banks to improve flood control throughout the basin.
- Construction of a temporary floodwater detention area in a portion of the Miami Shores Golf Course near the S-28 Structure to provide temporary storage of floodwaters during extreme rainfall events.
- Installation of nature-based features such as living shoreline along the C-8 Canal and vegetated flood control berms to enhance flood protection.

GOALS: reduce flood risk under sea-level rise, by restoring the structure discharge capacity and the basin's flood level of service to enhancing quality of life in the region



C-8 Basin Conceptual Plan

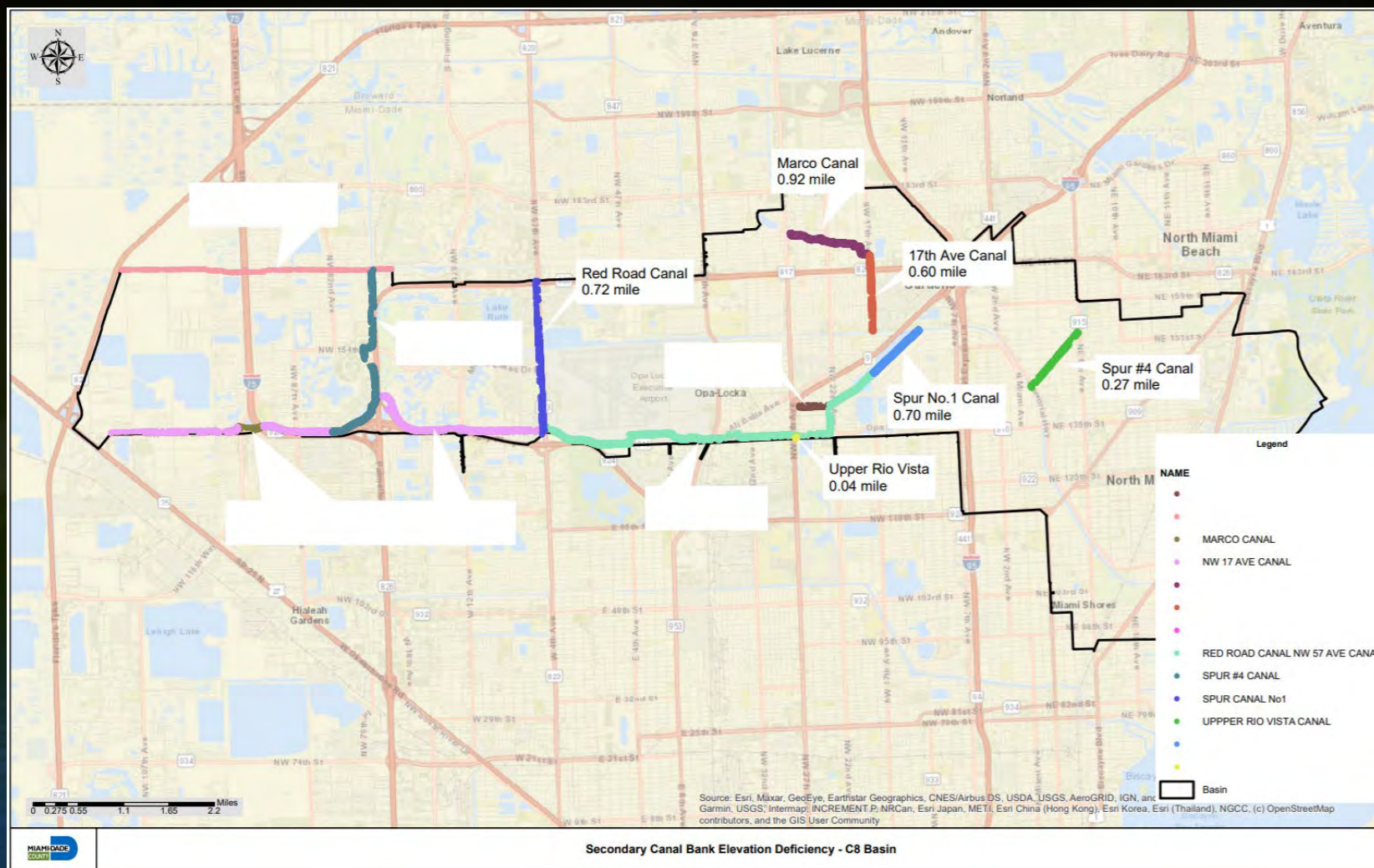


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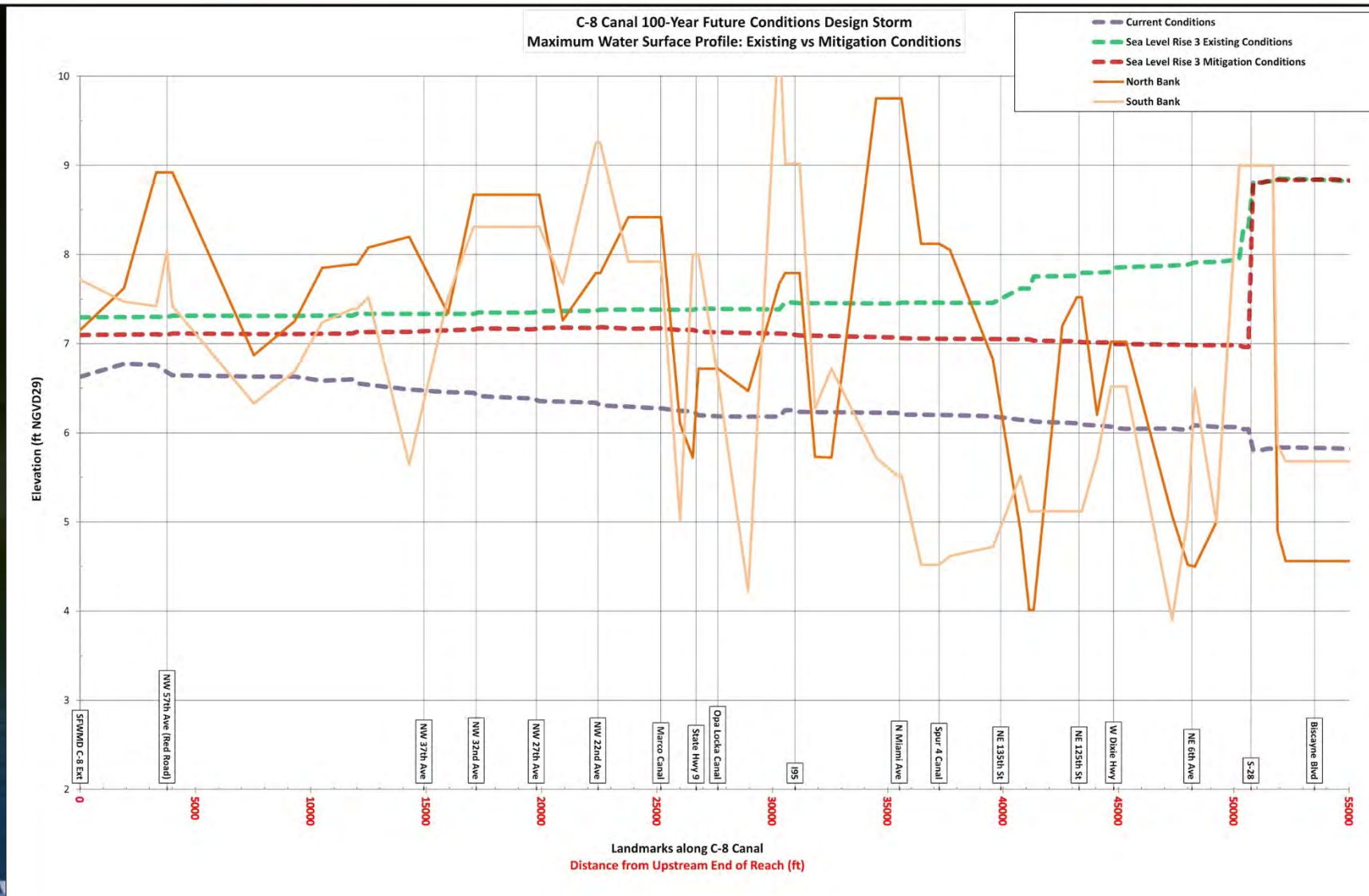


DISCLAIMER:
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Resiliency Plan in the C-8 Basin



Modeling Results - Current vs. With Mitigation



A comparison of maximum flood depths with and without mitigation measures under 3 feet sea level rise

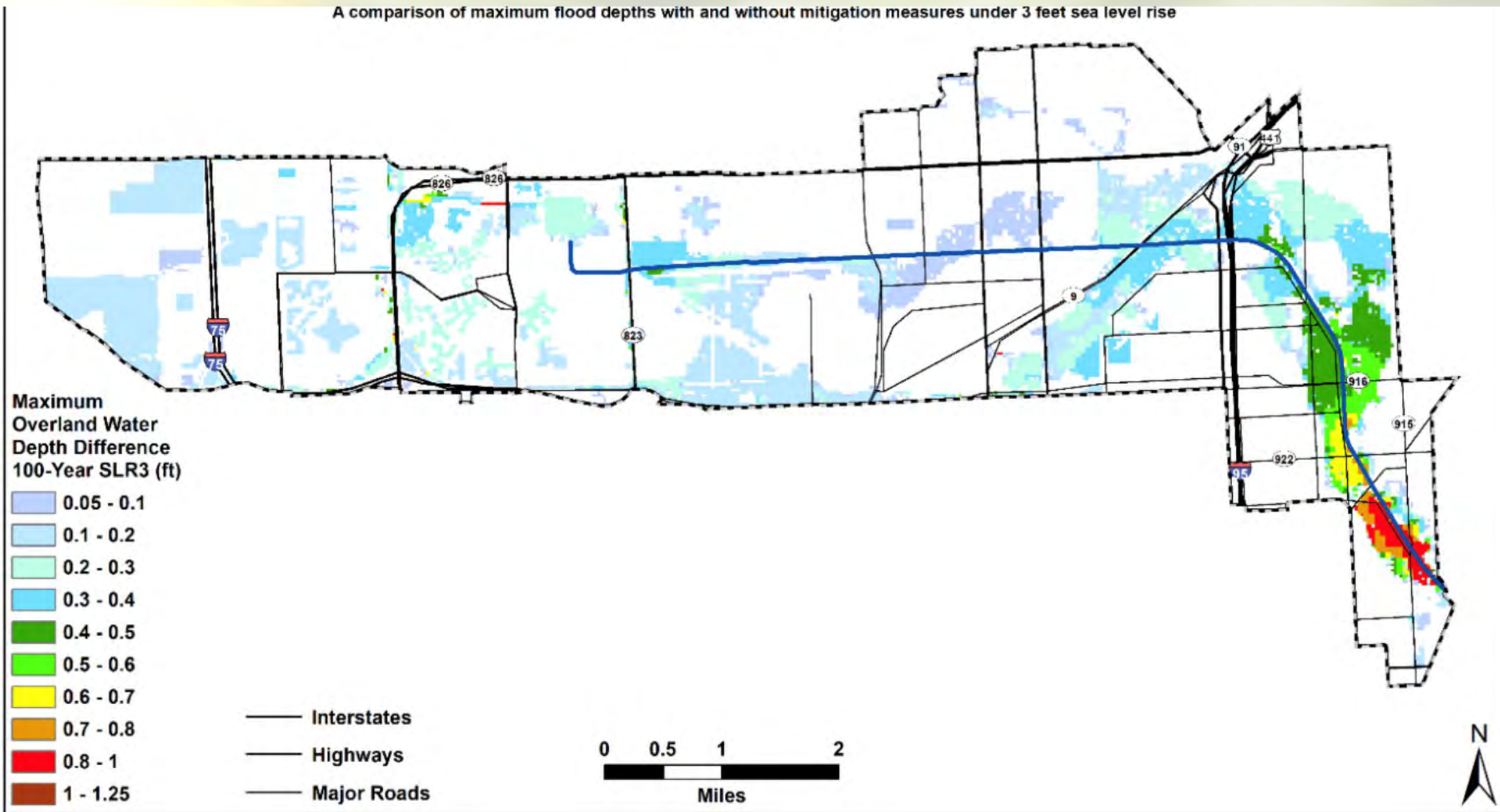


Figure 6: Maximum Flood Overland Depth Difference at C-8 Basin – Existing versus Mitigation Implementation

Cost Benefit Analysis: Flood Damage Cost Estimate using SFWMD FIAT Tool

Total Damage RP5	Total Damage RP10	Total Damage RP25	Total Damage RP100	EAD
\$ 1,871,247,765	\$ 2,346,093,611	\$ 3,202,734,771	\$ 4,836,521,207	\$ 534,205,224

MITIGATION 3FT SLR

Total Damage RP5	Total Damage RP10	Total Damage RP25	Total Damage RP100	EAD
\$ 1,792,393,968	\$ 2,278,674,886	\$ 3,104,097,370	\$ 4,702,260,804	\$ 517,269,057

USD REDUCTION

Total Damage RP5	Total Damage RP10	Total Damage RP25	Total Damage RP100	EAD
\$ 78,853,798	\$ 67,418,725	\$ 98,637,401	\$ 134,260,404	\$ 16,936,167

Total Cost including O&M = \$78,245,151

Total Benefits = \$233,731,730

Benefit Cost Ratio = 2.98

Damages calculated using SFWMD-FIAT Tool: Flood Depth Maps – FPLOS Model Simulation Results; Exposure Data – SFWMD latest spatial databases; Damage functions – USACE IWR for single family residents, other RES types, COM, EDU light industrial; FEMA Hazus 4.0 for remaining building occupancy types, roads with 100% damage at 0.6ft flood depth



Overall Findings

- Flood barrier tying S-28 Structure to higher ground elevations provide major significant benefits for the upstream areas
- Forward Pump provides overall reduction in canal stages (basinwide benefits)
- No significant flood reduction benefits from golf course area / GI Features – restricted to run off reduction
 - additional simulations currently being performed as part of FPLOS Phase II show overall storage (and other GI benefits) limitations in the C-8 basin, as well as limited conveyance capacity in the C-8 Canal
- Concerns with Downstream Impacts
 - exacerbated flood risks (no consideration of storm surge propagation inland, neither comprehensive evaluation of compound flood impacts)
 - pollution discharges at Biscayne Bay (water quality issues)

Thanks!

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