



Nassau County, Florida BOCC
Engineering Services

Thomas Creek PAS Results

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03/17/2017 08:55

Past Events

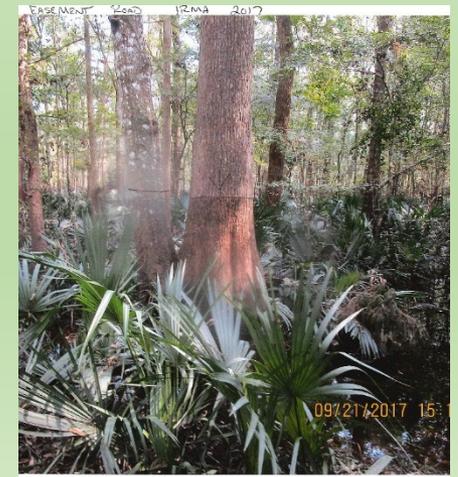
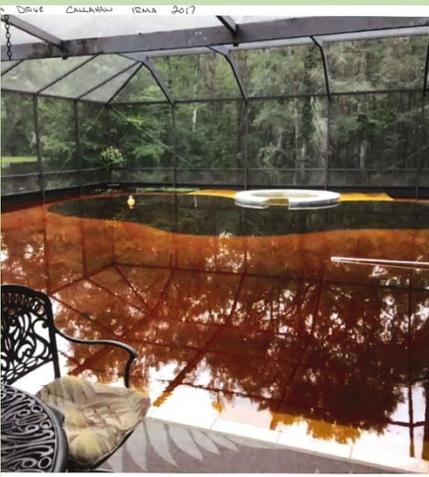
2008 - Tropical Storm Fay caused flooding to 33 homes along Thomas Creek between the Lee Stoner and Ratliff Road area of Callahan.

The estimated damage was \$475,000 from this storm.

2016 – Hurricane Matthew – 6.75 inches of rain fell at Jacksonville International Airport.

Moderate beach erosion occurred in Nassau County, Hurricane-force wind gusts caused widespread tree and powerline damage, along with some structural damage, mainly across the eastern portion of the county.

2017 - Hurricane Irma caused flooding along Thomas Creek once again. 12.70 inches of rain fell in Fernandina Beach. The Ratliff Rd and Lee Stoner areas were especially impacted. 18 homes in this same area sustained flood damage. The estimated damage was \$620,000 for this storm.



Past Efforts



Nassau County Engineering Services
96161 Nassau Place
Yulee, Florida 32097

J. Scott Herring, P.E.
Director

This grant was properly and timely filed. During your staff's review, they expressed concern that our request was not fundable by FEMA, because it was not a permanent improvement.

December 17, 2009

Florida Division of Emergency Management
Mitigation Section
Attn: Kathleen Marshall, Hazard Mitigation Grant Program
2555 Shumard Oak Boulevard
Tallahassee, Fl 32399-2100

RE: Status of Grant application for 'Flood Mitigation in Thomas Creek in Nassau County.

Dear Ms. Marshall:

Nassau County submitted a grant application requesting grant funds for damages from Tropical Storm Fay, FEMA 1785-DR-FL.

This grant was properly and timely filed. During your staff's review, they expressed concern that our request was not fundable by FEMA, because it was not a permanent improvement. However, the County has never been informed officially if our grant application was approved or disapproved. We request a status update on our grant application for our records and so we can inform interested parties.

Yours Truly,

Past Efforts: PAS Study started in 2019

AGREEMENT
BETWEEN
THE DEPARTMENT OF THE ARMY
AND
NASSAU COUNTY
FOR DEVELOPMENT OF A COMPREHENSIVE PLAN

Cm 2721

THIS AGREEMENT is entered into this 30th day of SEPTEMBER 2019, by and between the Department of the Army (hereinafter the "Government"), represented by the District Commander for the Jacksonville District (hereinafter the "District Commander") and the Nassau County (hereinafter the "Non-Federal Sponsor"), represented by the Chairman of its Board of County Commissioners.

WITNESSETH, THAT:

WHEREAS, Section 22 of the Water Resources Development Act of 1974, as amended (42 U.S.C. 1962d-16) authorizes the Secretary of the Army, acting through the Chief of Engineers, to provide assistance in the preparation of a comprehensive water resources plan (hereinafter the "Plan") to a State or non-Federal interest working with a State, and to establish and collect fees for the purpose of recovering 50 percent of the costs of such assistance except that Secretary may accept and expend non-Federal funds provided that are in excess of such fee; and

Modeling Task 1a: Gather Historical Data

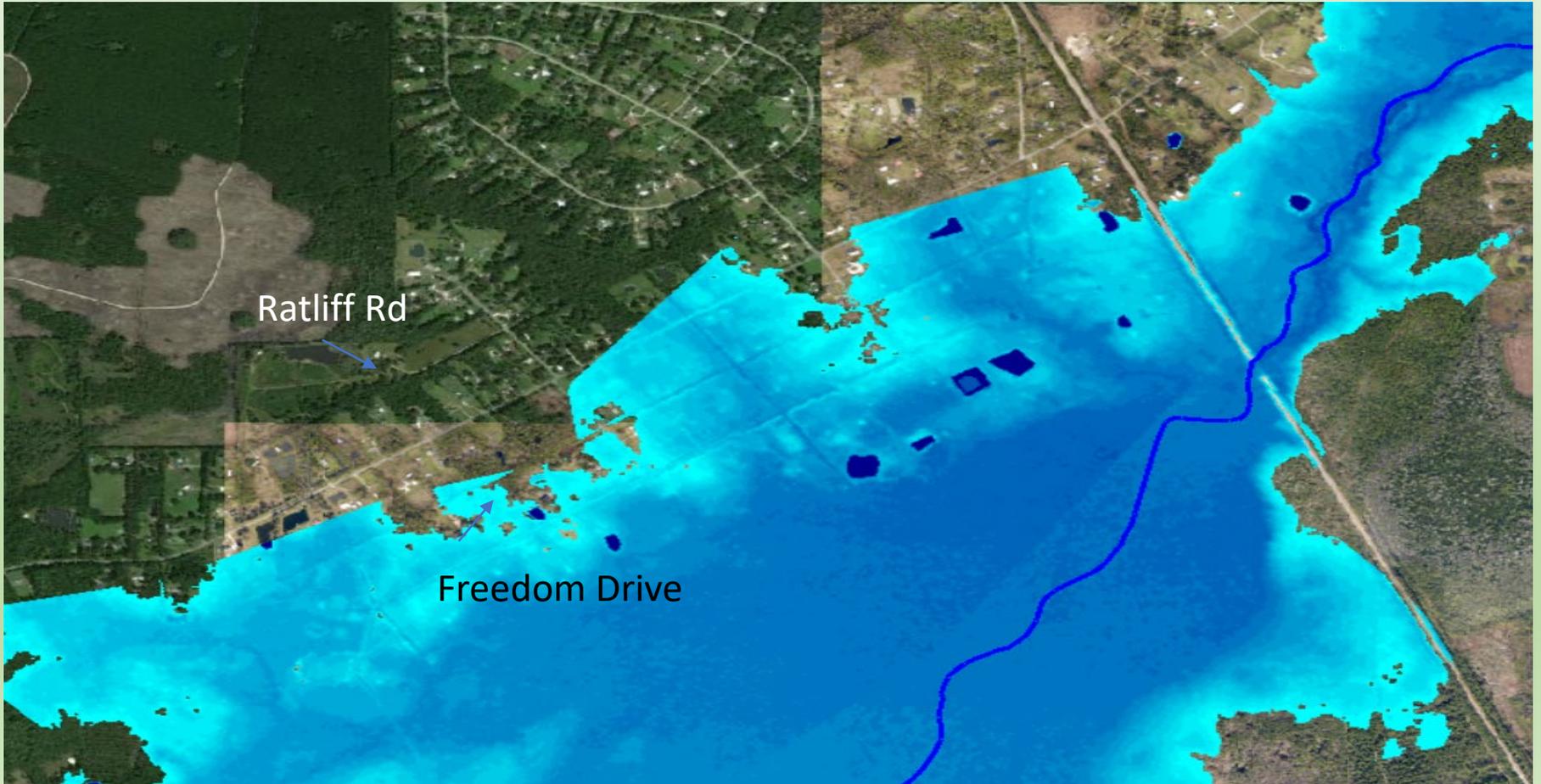
Lem Turner 1947 at Thomas Creek



Modeling Task 1b: Existing Conditions

Modeled:	What is happening currently as a metric for improvements
Result:	Model approximating FEMA established floodplain, and named storm event heights, therefore considered accurate

Cost: Part of Study



Modeling Task 1b: Existing Conditions

Modeled: What is happening currently as a metric for improvements
Result: Flood Levels for Standard Rain Events



PDS-based precipitation frequency estimates with 90% confidence intervals (in inches)

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200		
5-min	0.527 (0.447-0.630)	0.603 (0.511-0.722)	0.729 (0.614-0.875)	0.834 (0.698-1.01)	0.979 (0.784-1.23)	1.09 (0.850-1.40)	1.21 (0.898-1.59)	1.32 (0.933-1.80)		
10-min	0.772 (0.654-0.923)	0.884 (0.748-1.06)	1.07 (0.900-1.28)	1.22 (1.02-1.47)	1.43 (1.15-1.80)	1.60 (1.24-2.04)	1.76 (1.32-2.33)	1.93 (1.37-2.64)		
15-min	0.941 (0.798-1.13)	1.08 (0.912-1.29)	1.30 (1.10-1.56)	1.49 (1.25-1.80)	1.75 (1.40-2.19)	1.95 (1.52-2.49)	2.15 (1.60-2.84)	2.36 (1.67-3.22)		
30-min	1.41 (1.19-1.68)	1.62 (1.37-1.94)	1.97 (1.66-2.37)	2.27 (1.90-2.74)	2.67 (2.14-3.35)	2.99 (2.33-3.82)	3.31 (2.46-4.36)	3.63 (2.57-4.95)		
60-min	1.86 (1.57-2.22)	2.13 (1.80-2.55)	2.59 (2.18-3.11)	2.99 (2.50-3.61)	3.58 (2.88-4.52)	4.05 (3.16-5.21)	4.55 (3.40-6.03)	5.07 (3.59-6.96)	5.80 (3.91-8.23)	6.37 (4.16-9.19)
2-hr	2.31 (1.97-2.74)	2.63 (2.24-3.13)	3.20 (2.72-3.82)	3.72 (3.13-4.46)	4.48 (3.64-5.65)	5.12 (4.03-6.56)	5.79 (4.36-7.65)	6.51 (4.66-8.91)	7.53 (5.13-10.7)	8.35 (5.49-12.0)
3-hr	2.56 (2.19-3.03)	2.90 (2.48-3.44)	3.54 (3.01-4.20)	4.13 (3.48-4.93)	5.03 (4.12-6.36)	5.80 (4.60-7.44)	6.64 (5.03-8.78)	7.55 (5.43-10.3)	8.86 (6.07-12.5)	9.93 (6.56-14.2)
6-hr	3.01 (2.59-3.53)	3.41 (2.93-4.01)	4.17 (3.57-4.92)	4.91 (4.17-5.82)	6.07 (5.02-7.68)	7.10 (5.67-9.09)	8.22 (6.29-10.9)	9.48 (6.88-12.9)	11.3 (7.81-15.9)	12.8 (8.52-18.2)
12-hr	3.50 (3.03-4.08)	3.99 (3.45-4.66)	4.93 (4.24-5.78)	5.85 (5.00-6.89)	7.30 (6.08-9.19)	8.58 (6.91-10.9)	10.00 (7.70-13.1)	11.6 (8.46-15.7)	13.8 (9.66-19.4)	15.8 (10.6-22.2)
24-hr	4.03 (3.51-4.67)	4.65 (4.05-5.40)	5.83 (5.05-6.78)	6.95 (5.98-8.14)	8.71 (7.29-10.9)	10.2 (8.29-12.8)	11.9 (9.24-15.5)	13.8 (10.1-18.5)	16.5 (11.6-22.9)	18.7 (12.6-26.2)
2-day	4.65 (4.07-5.35)	5.42 (4.74-6.25)	6.85 (5.97-7.91)	8.18 (7.07-9.50)	10.2 (8.59-12.6)	12.0 (9.74-15.0)	13.9 (10.8-17.9)	16.0 (11.8-21.3)	18.9 (13.4-26.1)	21.4 (14.6-29.7)
3-day	5.12 (4.50-5.87)	5.96 (5.23-6.83)	7.48 (6.54-8.60)	8.88 (7.71-10.3)	11.0 (9.30-13.6)	12.9 (10.5-16.0)	14.9 (11.6-19.1)	17.0 (12.7-22.6)	20.1 (14.3-27.6)	22.7 (15.5-31.4)
4-day	5.52 (4.87-6.31)	6.39 (5.62-7.30)	7.95 (6.97-9.13)	9.40 (8.18-10.9)	11.6 (9.81-14.2)	13.5 (11.0-16.7)	15.5 (12.2-19.9)	17.7 (13.2-23.5)	20.9 (14.9-28.6)	23.5 (16.1-32.4)
7-day	6.51 (5.76-7.39)	7.43 (6.57-8.44)	9.08 (8.00-10.4)	10.6 (9.27-12.2)	12.9 (10.9-15.6)	14.8 (12.2-18.3)	16.9 (13.4-21.5)	19.2 (14.4-25.2)	22.4 (16.1-30.5)	25.1 (17.3-34.4)
10-day	7.38 (6.55-8.35)	8.35 (7.41-9.46)	10.1 (8.90-11.5)	11.6 (10.2-13.3)	14.0 (11.9-16.8)	15.9 (13.1-19.5)	18.0 (14.3-22.8)	20.3 (15.3-26.5)	23.5 (16.9-31.7)	26.1 (18.1-35.7)
20-day	9.93 (8.88-11.2)	11.1 (9.91-12.5)	13.1 (11.6-14.8)	14.8 (13.1-16.8)	17.2 (14.7-20.4)	19.2 (15.9-23.2)	21.2 (16.9-26.4)	23.4 (17.7-30.1)	26.3 (19.0-35.1)	28.5 (20.0-38.8)
30-day	12.1 (10.9-13.6)	13.5 (12.1-15.1)	15.8 (14.1-17.8)	17.7 (15.7-20.0)	20.4 (17.3-23.9)	22.4 (18.6-26.8)	24.4 (19.4-30.1)	26.5 (20.1-33.8)	29.2 (21.2-38.7)	31.3 (22.0-42.4)
45-day	14.9 (13.4-16.6)	16.7 (15.0-18.6)	19.5 (17.4-21.8)	21.7 (19.3-24.5)	24.7 (21.1-28.7)	26.9 (22.4-31.9)	29.1 (23.2-35.6)	31.2 (23.7-39.5)	33.8 (24.6-44.5)	35.8 (25.3-48.2)
60-day	17.4 (15.7-19.3)	19.5 (17.5-21.6)	22.8 (20.4-25.4)	25.4 (22.6-28.5)	28.7 (24.5-33.2)	31.2 (26.0-36.8)	33.5 (28.8-40.8)	35.7 (27.2-45.1)	38.5 (28.0-50.3)	40.4 (28.6-54.3)

April 2022 Storm
 Hurricane Irma

Storm Event	Inches
2-yr/24 hour	4.65
5-yr/24 hour	5.83
10-yr/24 hour	6.95
25-yr/24 hour	8.71
50-yr/24 hour	10.2
100-yr/24 hour	11.9

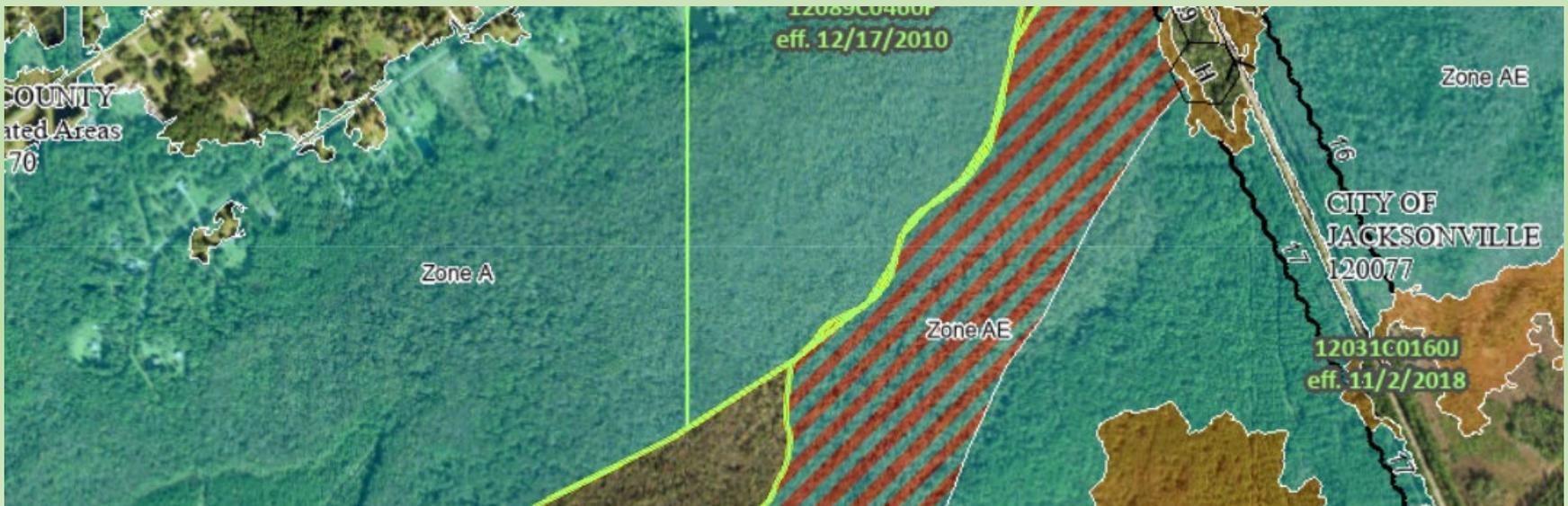
Modeling Task 1c: Existing Conditions

Modeled: What is happening currently as a metric for improvements

Result: Comparison to Duval side with AE Cross sections

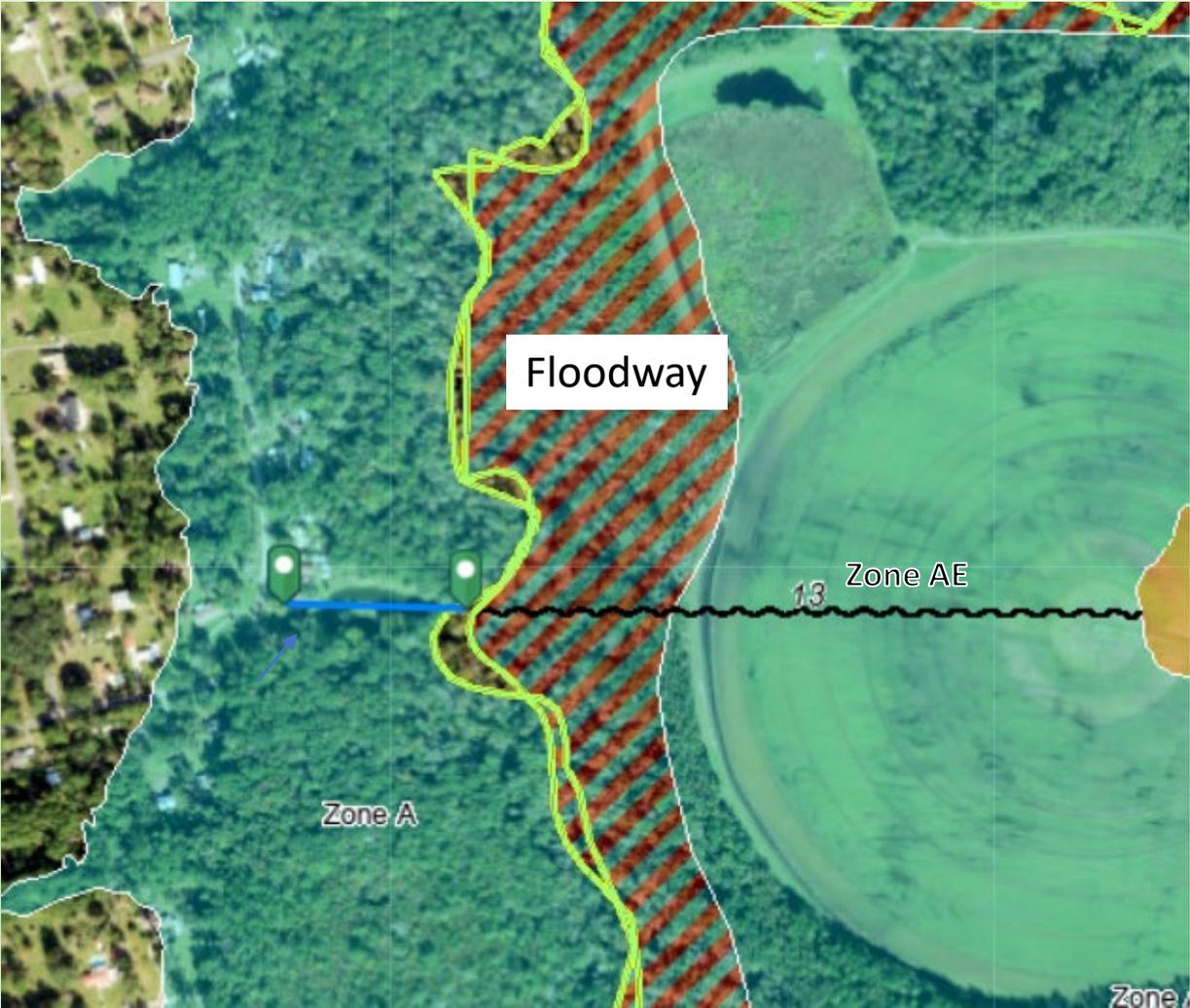
Cost: Part of Study

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)
Reach-1	121204	50-year	8906.90	5.29	15.98
Reach-1	119565	100-year	10659.50	4.97	17.04
Reach-1	119565	2-year	3144.70	4.97	11.53
Reach-1	119565	5-year	4346.40	4.97	12.66
Reach-1	119565	10-year	5502.20	4.97	13.64
Reach-1	119565	25-year	7322.50	4.97	14.97
Reach-1	119565	50-year	8906.90	4.97	15.98



Modeling Task 1d: Existing Conditions

Modeled:	What is happening currently as a metric for improvements	Cost: Part of Study
Result:	Comparison to Duval side with Floodway	

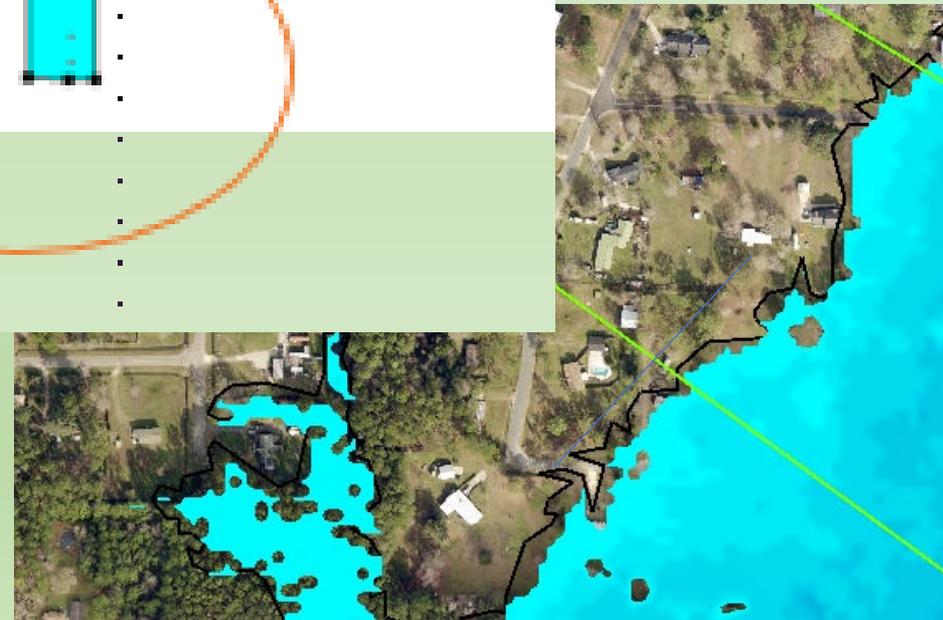
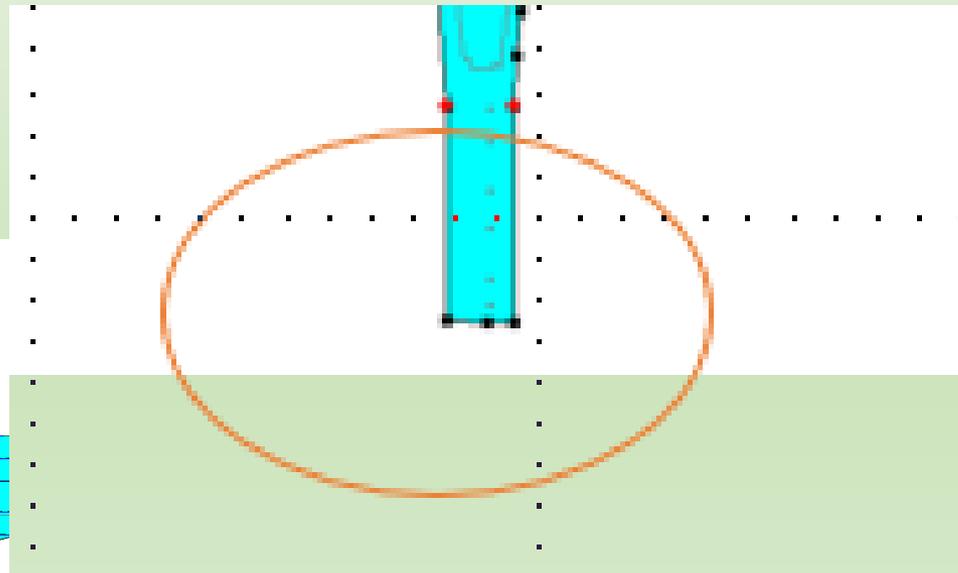
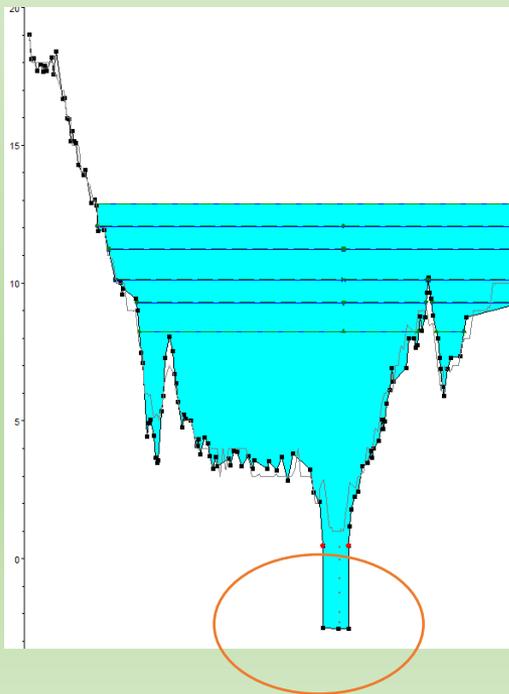


Management Measure 1: Dredging Wider/Deeper

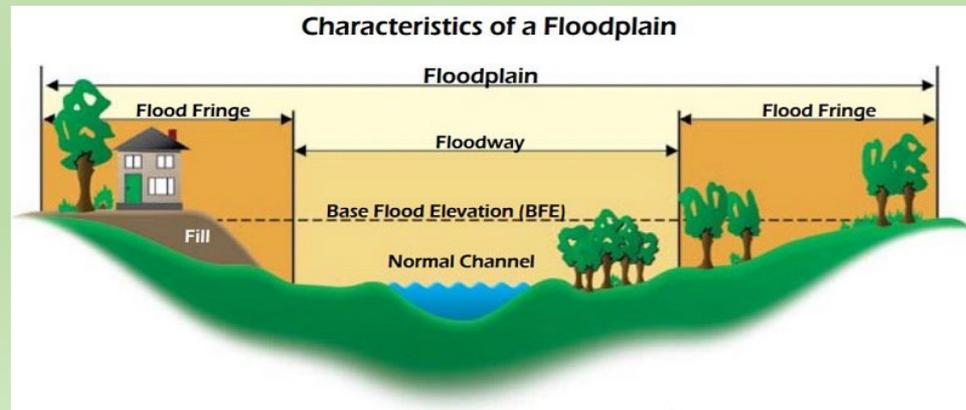
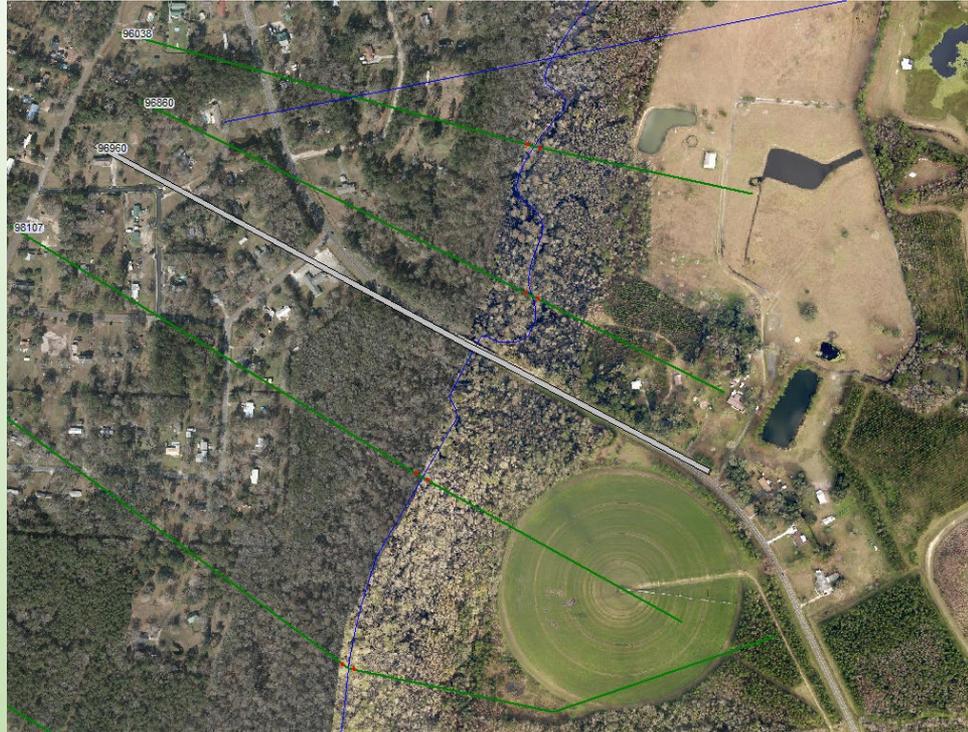
Modeled: Widen Thomas Creek to allow water out faster
Problems: Houses limited the width removed. CSX bridge limiting size

Result: **Model showed No structural improvements for storm events (right photo)**

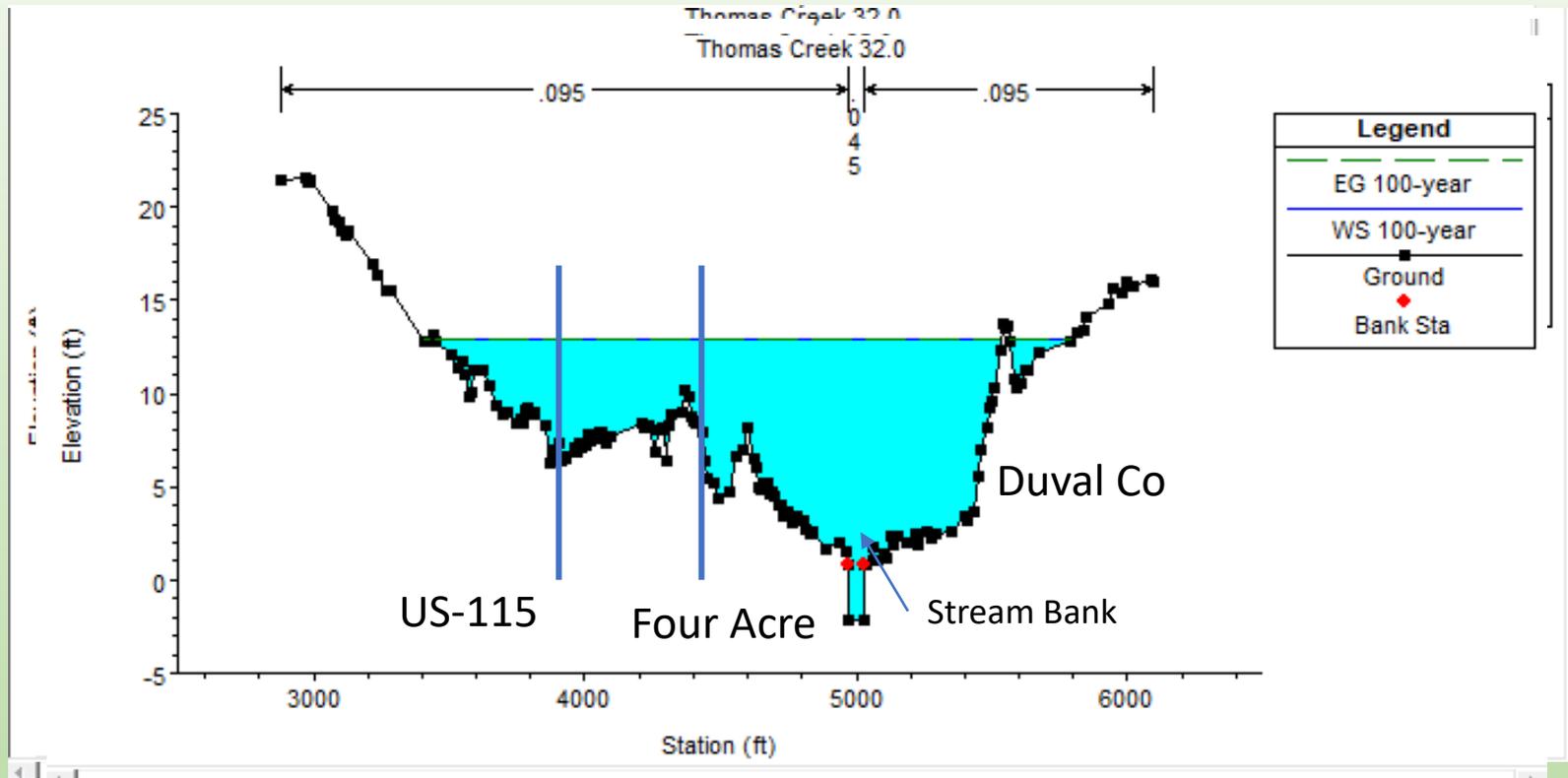
Cost: Mitigation Credits roughly \$1.6 Million for credits that currently do not exist in this basin.



Management Measure 1: Dredging Wider/Deeper



Management Measure 1: Dredging Wider/Deeper

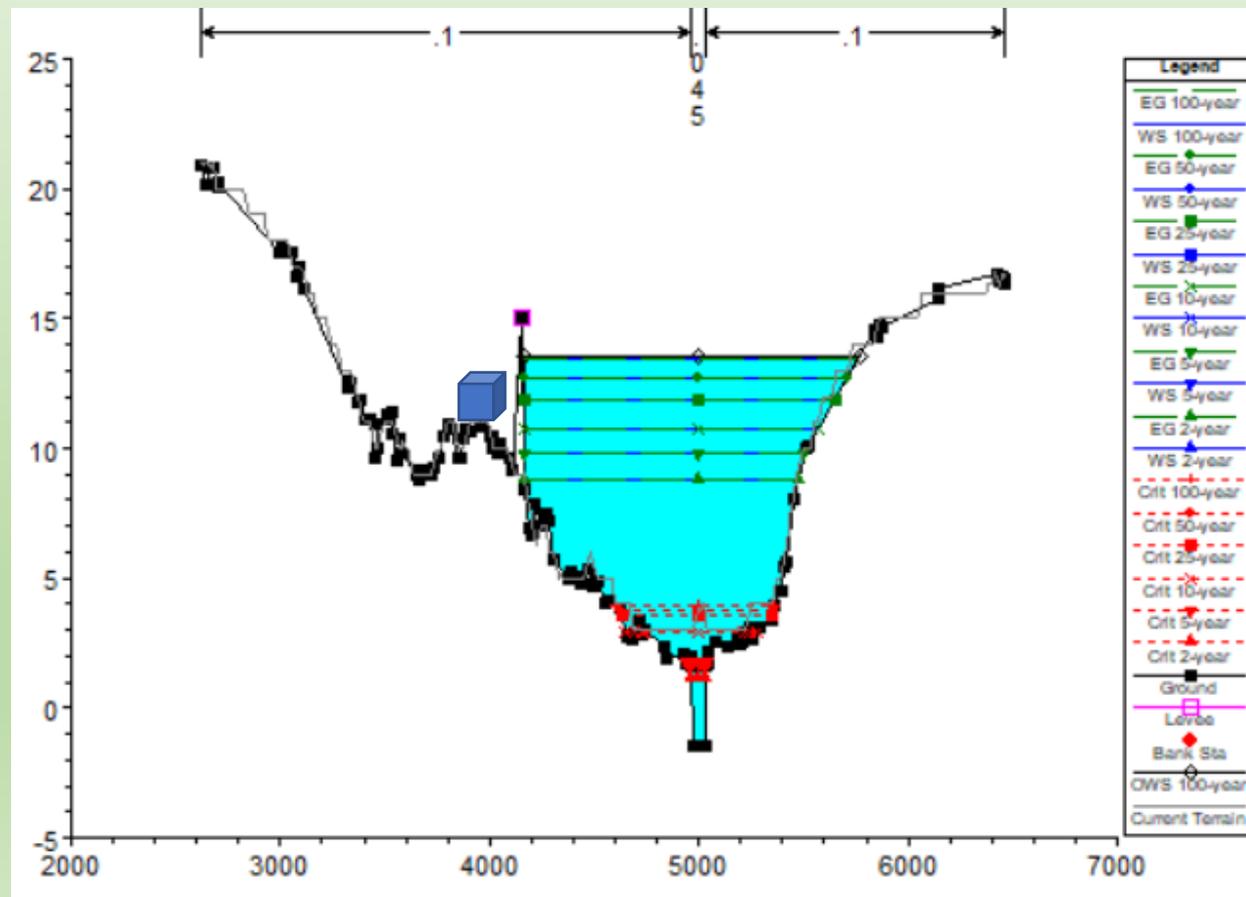


Management Measure 1: Dredging Wider/Deeper

Modeled: Widen Thomas Creek to allow water out faster
Problems: Houses limited the width removed. CSX bridge limiting size
Result: **Preapplication meeting with ACOE Permitting Section**

Cost: Mitigation Credits roughly \$1.6 Million for credits that currently do not exist in this basin for SJRWMD and additional for ACOE
Construction cost NOT included

Army Corps of Engineering discussing permitting, however, if the work doesn't meet the intent may not allow.



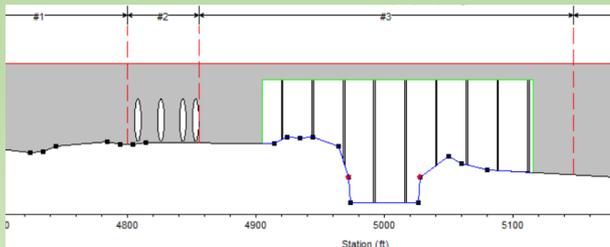
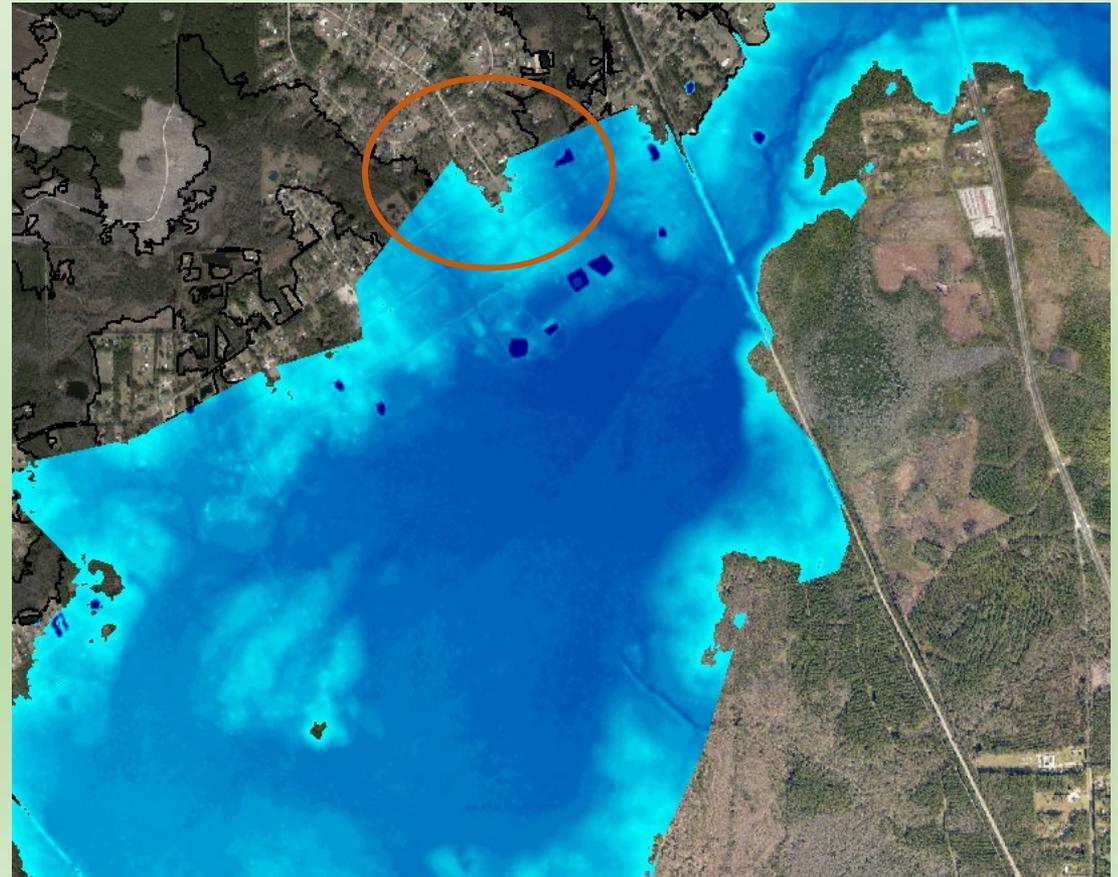
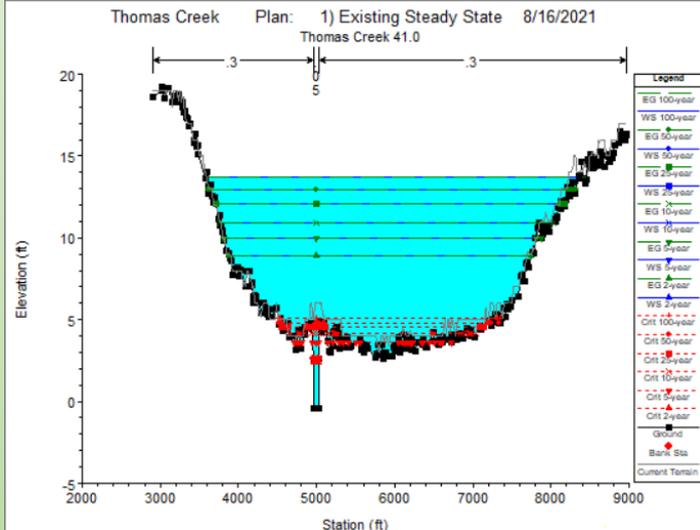
Management Measure 1a: Pipes Under CSX- Widen Channel

Modeled: Increasing Pipes Under CSX railroad, the smallest width of the Creek. CSX permitting, could not replace bridge

Problems: Houses and Bridges limited the width removed

Result: **Model showed No Structural improvements for storm events (right photo)**

Cost: Not priced because no benefit



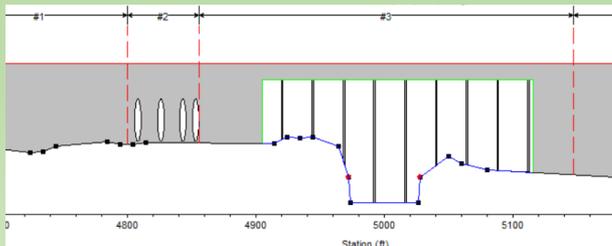
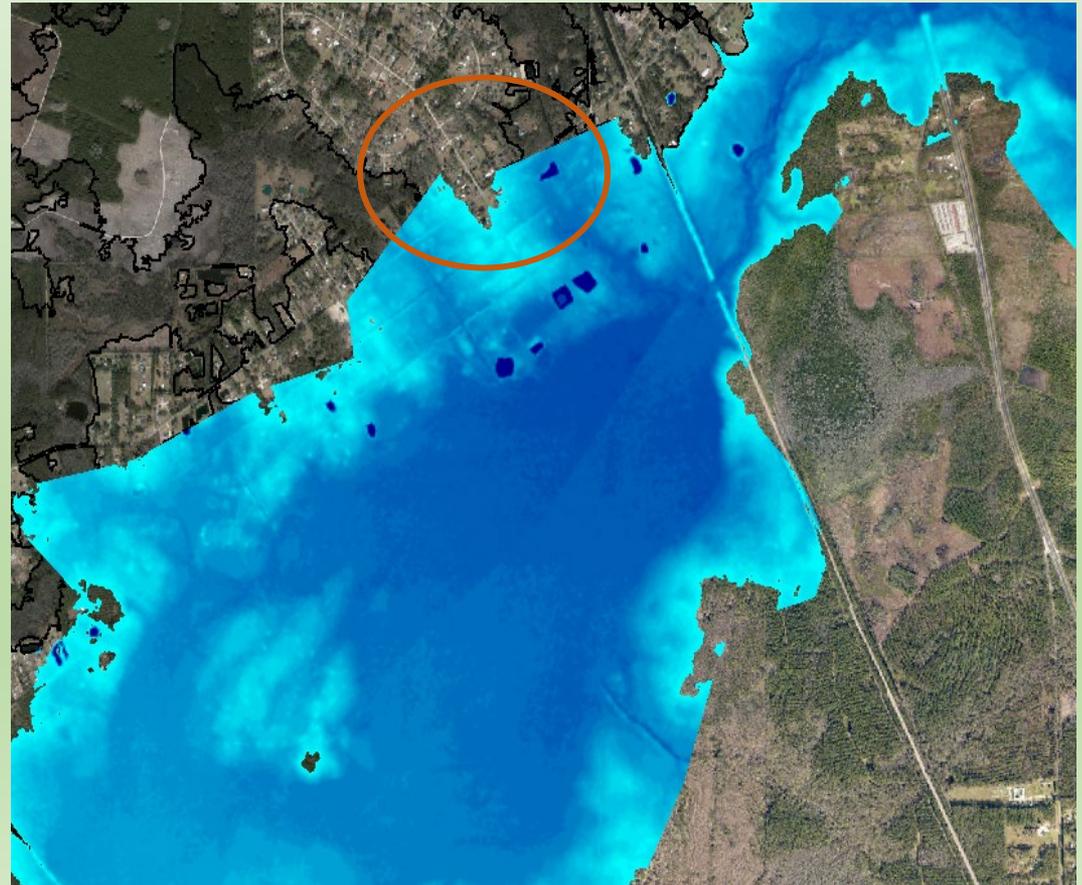
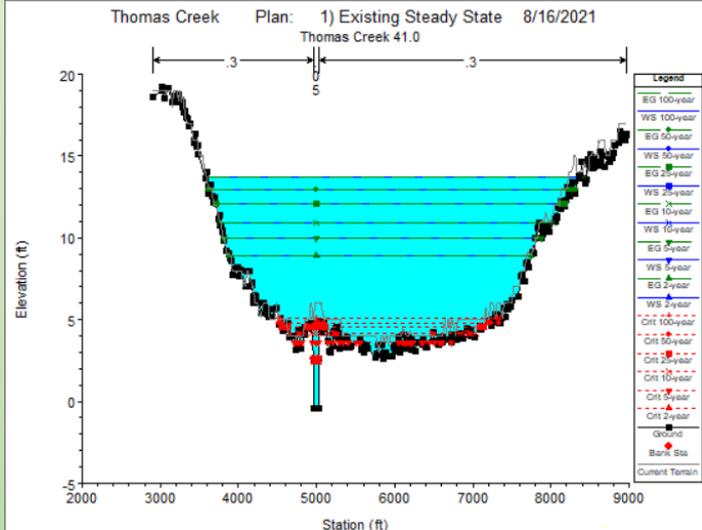
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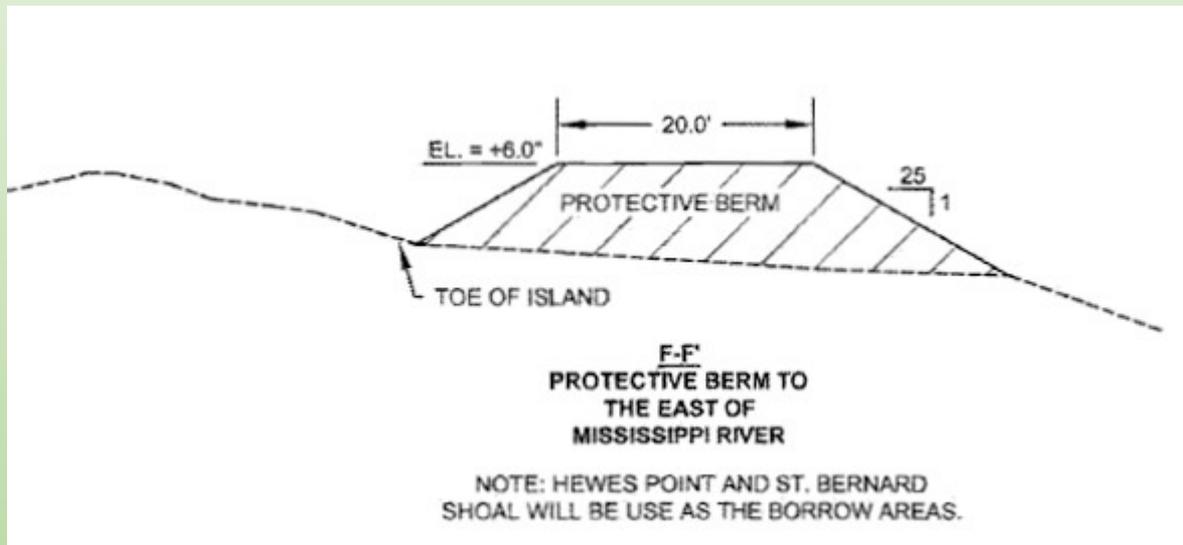
Cost: Not priced because no benefit



Management Measure 2: Earthen Berm

Modeled: Berm as a wall on program
Problems: Berm constructability not feasible due to environmental impacts and established homes, and land required (21 feet wide +)
Result: Similar to sheet pile wall- **effective for a 10 year storm**, but environmental impacts greater.

Cost: \$125,000 a credit for mitigation was as far as the cost analysis went
dirt hauling (out muck in sturdy soils)
land acquisition/ easements
Comments: SJRWMD said doubtful it would be permitted



Management Measure 4: Wall

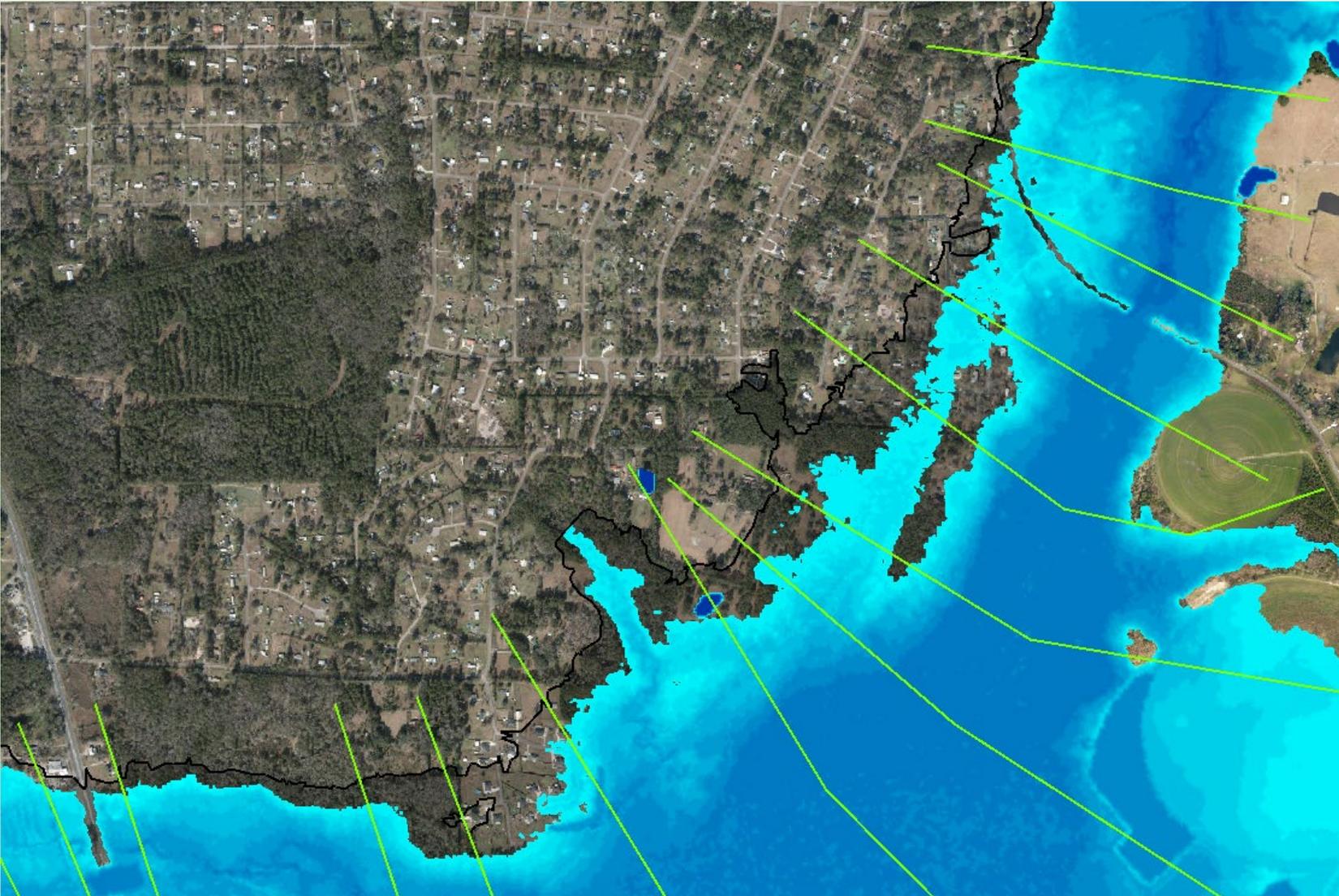
Modeled:	Modeled 1 ft above 10 year storm event (Lem Turner height is limiting factor)	Cost:	\$68 Million Dollars
Problem:	Did not meet 100 year storm study requirement	Perspective:	Buyout of homes at full market value in the area:
Problem:	Could only be constructed along parts of the Creek		\$8.3 Million Dollars
Result:	Functioned for 10 year storm event from US-1 to US-115 Evergreen Subdivision		



Wall must tie into bridge elevation at 11 ft

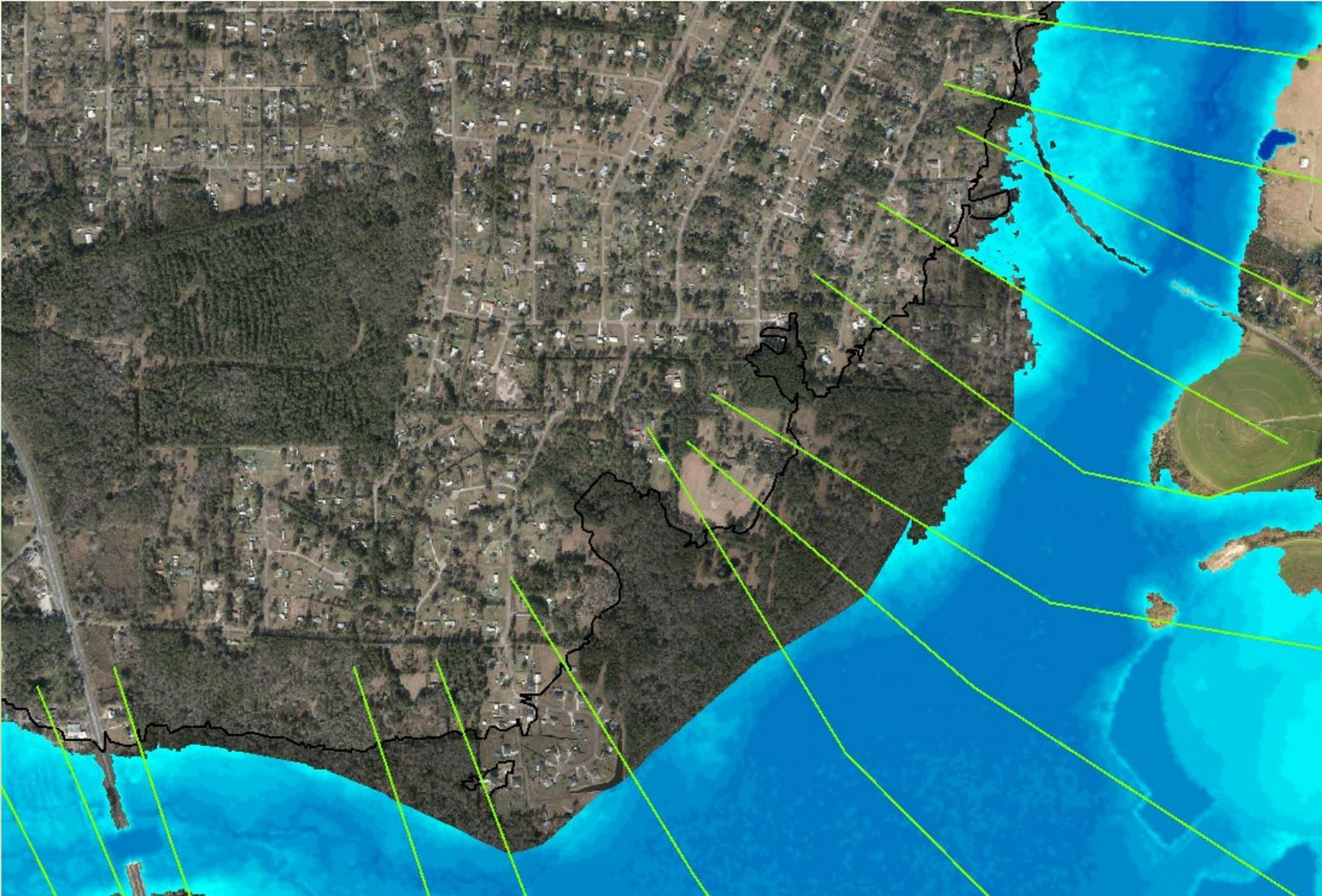
Management Measure 4: Wall

Decision: Cost prohibited 10 year storm: before wall



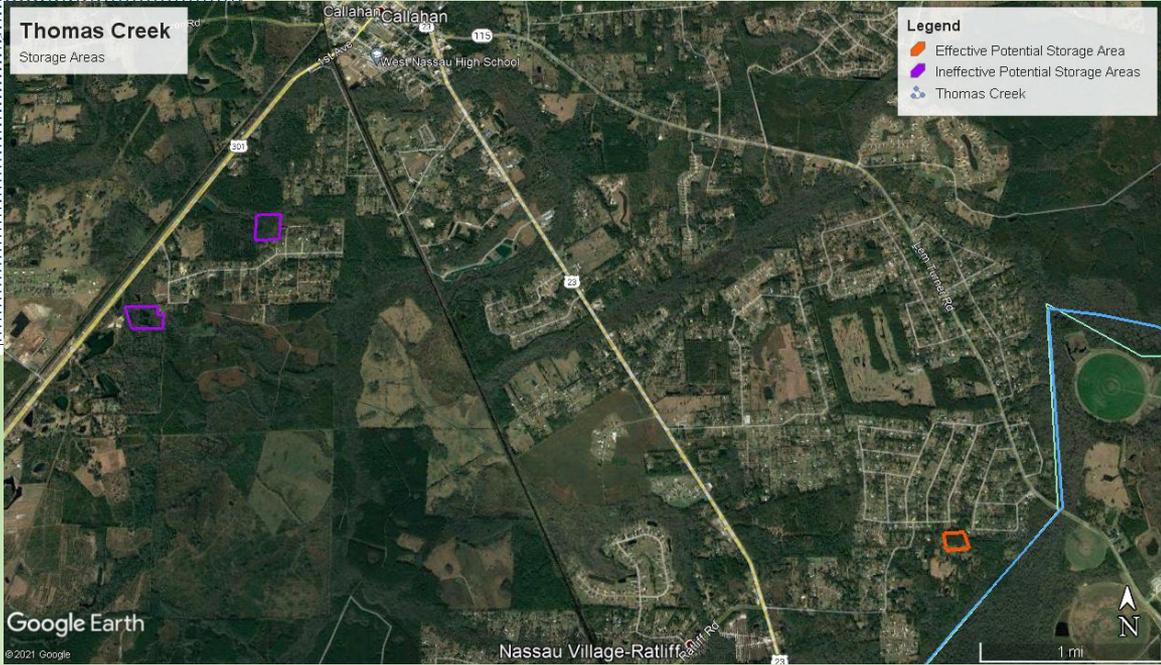
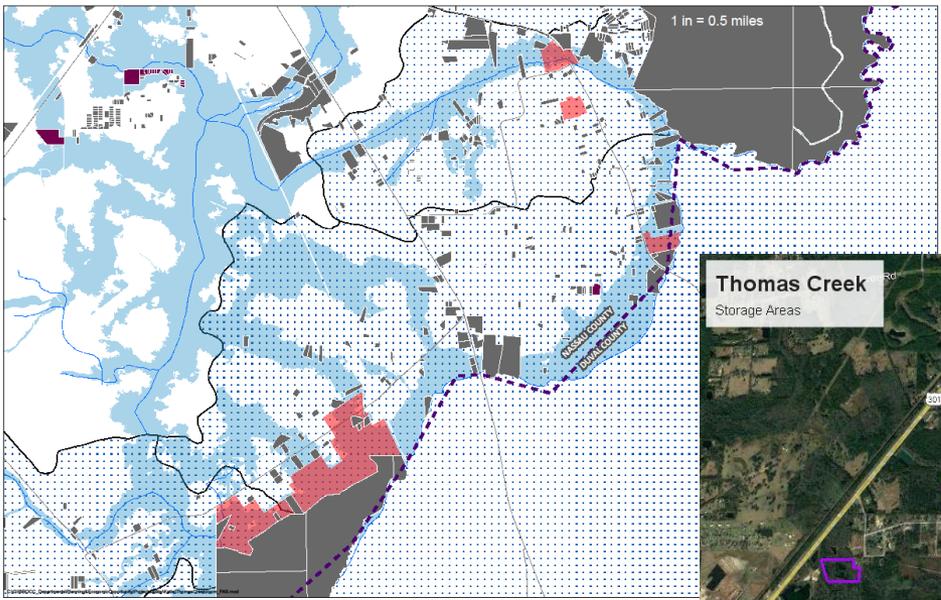
Management Measure 4: Wall

Decision: Cost prohibited 10 year storm: after wall



Management Measure 3a: Regional Detention

Modeled: Picked location based on county owned or vacant lots. Routed Stormwater through ponds to meter out floodwaters	Cost: Regional Ponds not Priced
Problems: overland/ sheet flow not the source of flooding	
Result: Floodwaters not lowered by detention	



Management Measure 3b: Local Detention

Modeled: Picked location based on county owned or vacant lots. Routed Stormwater through ponds to meter out floodwaters

Problems: Pond too small for watershed

Result: **Handles half of Sheffield Village's stormwater**
(Armstrong Valley Rd)

Cost: \$308,000

Benefit: After ditches rerouted, pond would capture water to keep it from overtopping the road, and meter out water slower downstream not to overwhelm the system with the added benefit of some water quality. (pre-vs-post)



Management Measure 3a: Detention



Decision: Staff is focusing on the north side of Sheffield Village and is not pursuing this design.

(PAS) Management Measure Refinement Summary

Measure	Result
Berm	<i>Large amount of land needed and impacts to wetlands would not be able to be permitted (only handles 10-year storm)</i>
Floodwall and Pumps	<i>Cost is too expensive (\$68 million) and flood risk not addressed for larger storm events (only handles 10-year storm)</i>
<i>Channel Clearing and Widening</i>	<i>Model showed no structural improvements for storm events</i>
CSX Bridge Widening (Culverts Added)	<i>Model shows no structural improvements for storm events</i>
Detention Ponds – Local	<i>Benefits small localized flooding only</i>
Detention Ponds – Regional	<i>Floodwaters not lowered by regional detention ponds</i>
Snagging and Clearing Thomas Creek (Previous Efforts)	<i>Not sustainable</i>

(PAS) Management Measure Refinement Summary

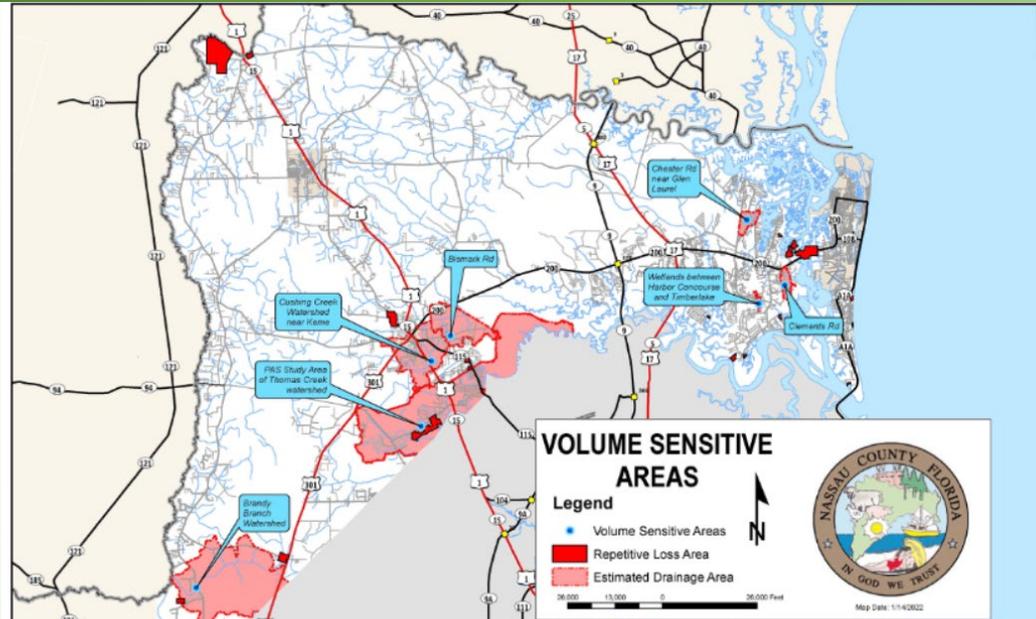
Measure	Result
Snagging and Clearing from Drainage Ditch Systems	<i>Two locations added to Road Department Maintenance Projects</i>
Raising First Floor Elevations	<i>Individual Homeowner Effort</i>
Flood-Proofing	<i>Individual Homeowner Effort</i>
Land Acquisition/ Home Buy-outs	<i>Implementation Plan (board directive)</i>
Modify location of structure on site	<i>Implementation Plan (board directive)</i>
Update FEMA Floodplain Maps	<i>Implementation Plan (board directive)</i>

Path Forward

- 6 months to achieve an implementation plan- December 31, 2022
- Land Acquisition from Freedom Drive to Vontz Circle touching the creek, repetitive loss areas, and roadways impassable
 - Ranking system, community input, funding

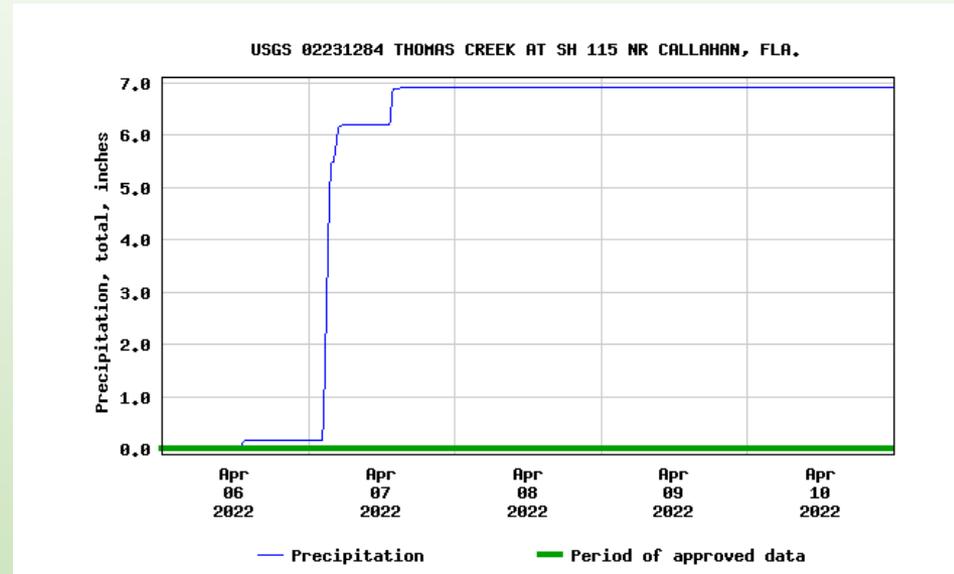


Current Efforts



Effort	Action/Result
Stormwater Code Changes	<i>Went into effect May 2022</i>
Stormwater Department	<i>Mapping critical infrastructure, budgeted '23 FY</i>
FEMA Floodplain Map Implementation	<i>In progress</i>
Road Department Maintenance	<i>Priority cases, pre-storm routes</i>
Beavers Obstructing Thomas Creek	<i>In progress</i>
Implementation Plan	<i>Currently working on – Due December 2022</i>
Gathering Partners/ Grants/ Ranking Criteria	<i>In progress --- timeline based on funding and voluntary participants</i>

Current Efforts



<https://waterdata.usgs.gov/monitoring-location/02231284/>

Effort	Action/Result
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Funding Sources: Federal and State

Funding Source	Type	Match	Contingency
FEMA	FMA, PDM, HGMP,	See chart next page	Repetitive loss property, FEMA Insurance
HUD	Development Block Grant Disaster Recovery (CDBG-DR) Assistance	Up to 100% (if awarded)	Presidentially declared Emergencies
FDEP	Resilient Florida (Statewide Flooding and Sea Level Rise Resilience Plan) Septic*	Up to 100% for certain types 50/50 for others	Vulnerability and Planning
NRCS (USDA)	Emergency Watershed Protection Program (Floodplain Easement)	Up to 100%	Land conservation
NRCS (USDA)	Agricultural Conservation Easement Program (ACEP)	-Pays 100 % of the permanent easement value -Pays 75% to 100% restoration costs	Farmed or converted wetland that can be successfully and cost-effectively restored
Florida Department of Economic Opportunity (DEO)	Rebuild Florida Housing Repair and Replacement Program	Up to 100%	Hurricane Irma and Hurricane Michael

- Grants are competitive but come around annually to apply for

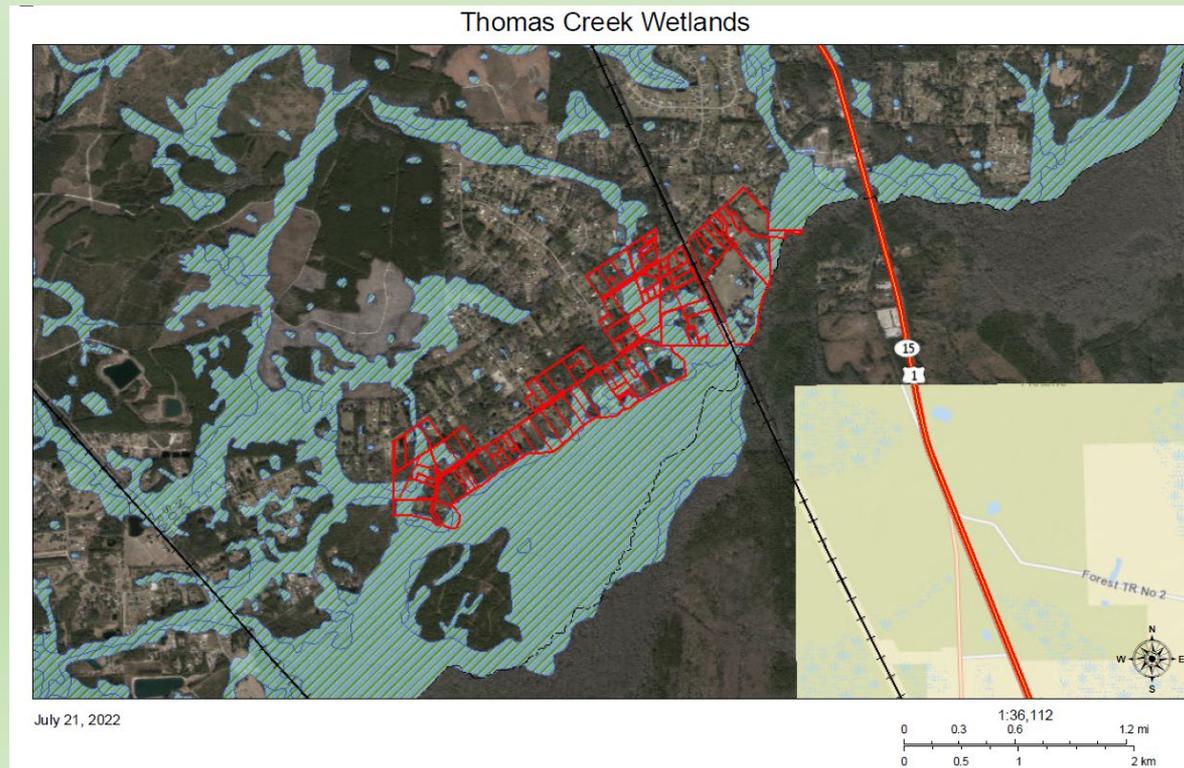
Funding Sources: Federal and State

Funding Source	Type	Match	Contingency
National Fish and Wildlife Foundation (NFWF)	America the Beautiful Challenge (ATBC)	100% - DOD 90/10 - DOI 50/50 – NRCS 80/20 - USFS	Strengthen Ecosystem and Community Resilience
FDEP	Septic Grants – Wastewater Grant Program (WWGP)	50/50	Connect septic systems to central sewer facilities
Saint Johns River Water Management District (SJRWMD)	Rural Economic Development Initiative (REDI) Innovative Projects Cost-Share Funding	25/75 – Flood protection 50/50 – Water conservation	Funding is limited exclusively to construction-related costs

- Grants are competitive but come around annually to apply for

Funding Sources: CLAM

- Gather Insurance information, claims and receipts
- CLAM Committee to finalize on August 12th the Thomas Creek project as a Priority Project (top 15)
 - Hoping inclusion in the top 15 will allow to leverage additional funding



Interested Parties

- ✓ Please sign in on our sign in sheet and provide us with important information



Thomas Creek Community Meeting Sign-In

<u>Name</u>	<u>Address</u>	<u>Phone #</u>	<u>Email</u>	Request Meeting w/ Staff	<u>Option 1</u> Buyout	<u>Option 2</u> Modify Structure
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Interested Parties

- ✓ Ready for Land Acquisition?
- ✓ Do you have FEMA Flood Insurance?
 - ✓ Gather flood claim information
- ✓ Ready for Structure Modification on property?

Questions?

Katie Peay, PE CFM | Sr. Stormwater Engineer

Nassau County | Engineering Services

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