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Hurricanes Matthew and Irma Category B Emergency Berm Restoration Project

→ FSBPA 36th National Conference on Beach Preservation Technology
Feb 1-3, 2023

Welcome

Agenda



- Project Background, Overview and Volumes
- Challenges & Solutions
- Project Construction
- Storm Impacts and Project Performance
- Next Steps

Project Background

- St. Johns County (SJC) was impacted by two major hurricanes – Matthew (2016) and Irma (2017)
- FEMA Environmental Assessment - completed 2019
- SJC engages Continental Heavy Civil Corp (CHC) and GHD under contract as Design-Build (D-B) Team in March 2021
- D-B Team tasked with design, permitting and construction of repair of vulnerable upper beach berm and dune
 - 8 individual reaches comprising 20 miles of shoreline
 - up to 750,000 CY of sand sourced from inland mines and placement via truck haul
 - Joint Coastal Permit from FDEP
 - Construction sequencing dictated by marine turtle nesting densities in north County



Project Overview - Reach Volumes

St. Johns County – FEMA Category B Berms – Matthew & Irma Totals

		Length		Volume	
Beach	Reach	ft	mi	cy	cy/lf
Ponte Vedra Beach I	R1-R23	22,822	4.3	187,539	8.2
Ponte Vedra Beach I	R23-R46.2	24,106	4.6	194,490	8.1
South Ponte Vedra	R67-R76	9,366	1.8	68,031	7.3
Vilano Beach I	R117.5-R122	5,008	0.9	31,140	6.2
Vilano Beach II	R122-R122.37	370	0.07	1,308	3.5
Butler Beach	R151-R173	22,272	4.2	89,695	4.0
Crescent Beach	R173-R193.65	20,811	3.9	156,989	7.5
Summer Haven	R197-R198.4	1,671	0.3	18,933	11.3
	Totals	<u>106,426</u>	<u>20.16</u>	<u>748,125</u>	



Challenges & Solutions



- State and Federal agency coordination – FDEP, USFWS, FWC, and SHPO for project permits, relocate T&E species
- JCP (15-year) authorization: 750,000 CY over 20 miles of shoreline
- Actual construction - discontinuous sand placement (initial placement event ~400,000 CY of sand along 11.4 miles of County shoreline)
- Existing infrastructure – hundreds of dune walkovers, irrigation lines, and sand fencing

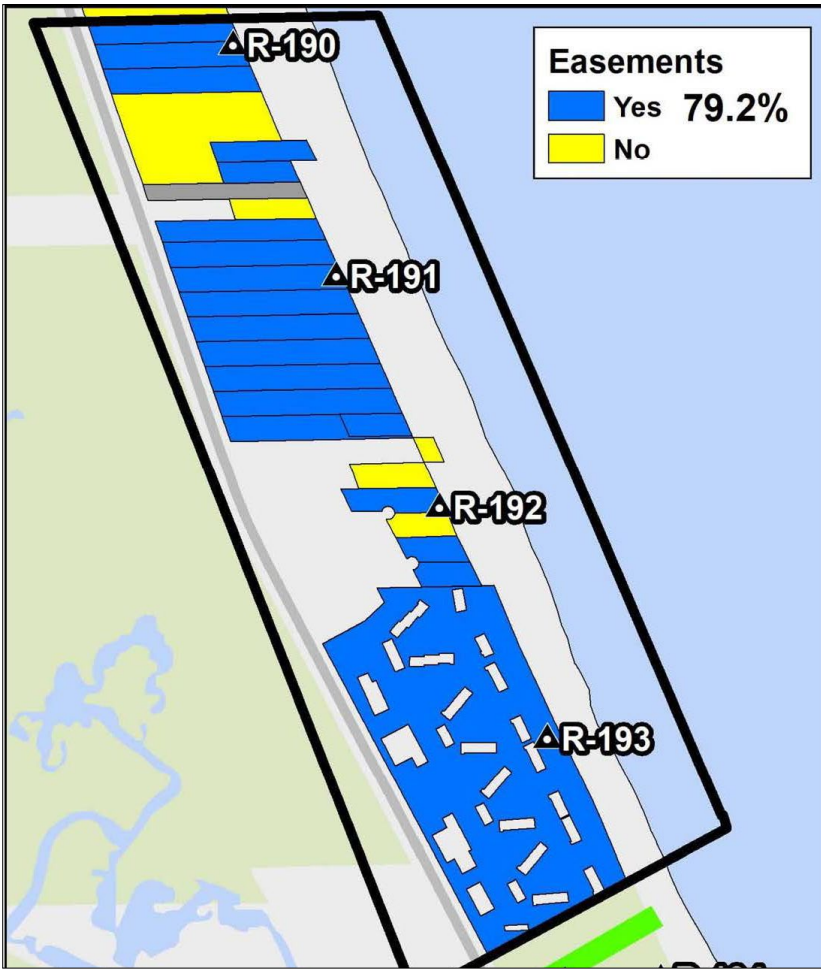




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- JCP (15-year) authorization: 750,000 CY over 20 miles of shoreline
- Actual construction - discontinuous sand placement (initial placement event ~402,000 CY of sand along 11.4 miles of County shoreline)
- Existing infrastructure – hundreds of dune walkovers, irrigation lines, and sand fencing



Easements



Threatened and Endangered species

Requirements:

- USFWS 2008 BO
- FEMA 2019 EA / FONSI

Wildlife Identified within project limits –

– Marine Turtles

- FWC approved permit holders able to survey, monitor, and relocate

– Piping Plover

- Nesting Season: July 15 through May 15

– Beach Mice

- Best management practices: Staging, access, and signage

– Gopher Tortoises

- Avoidance or relocation
- 125 adult and 5 juvenile gopher tortoises required relocation



Loggerhead Sea Turtle



Piping Plover



Beach Mice



Gopher Tortoise

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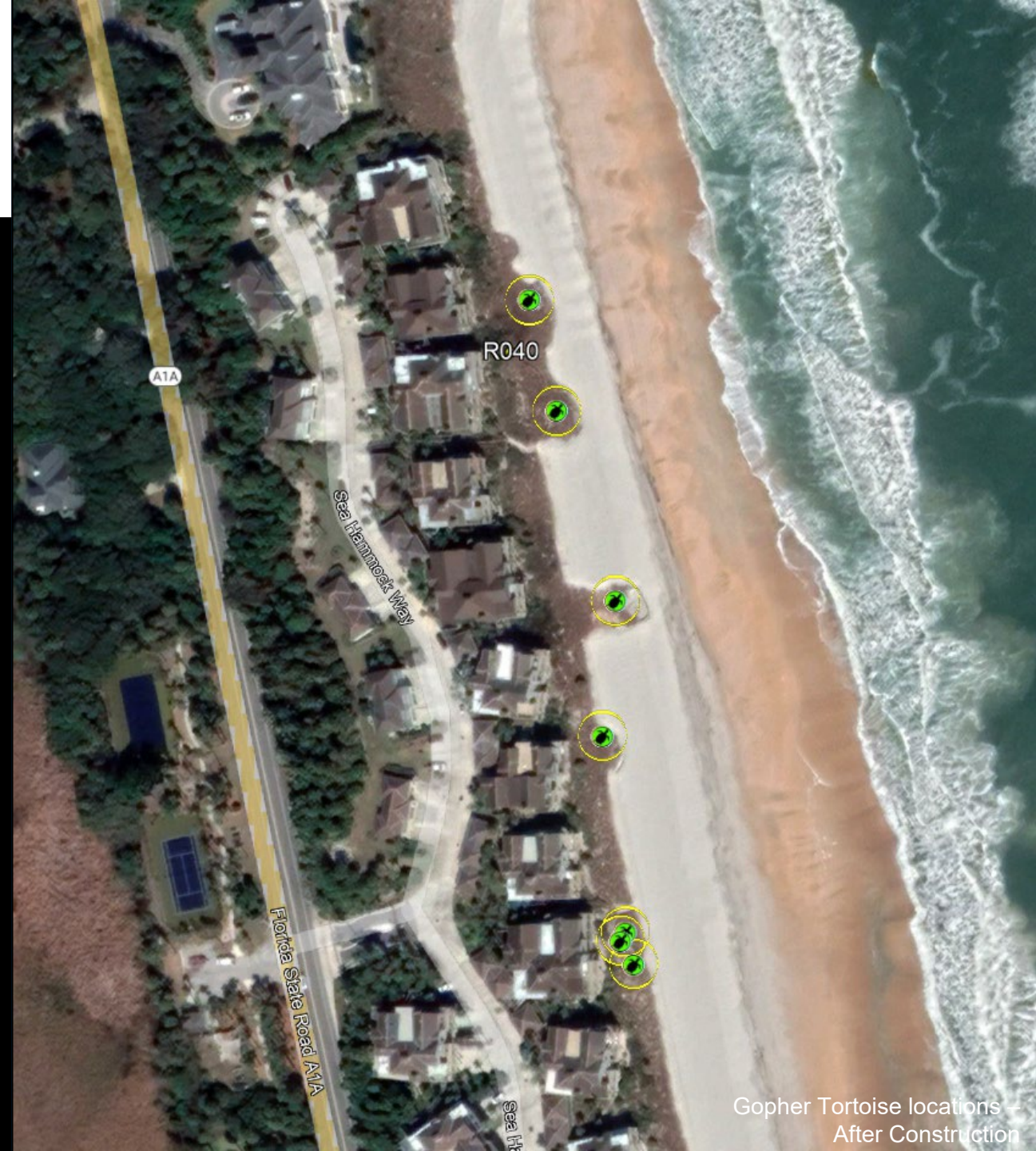
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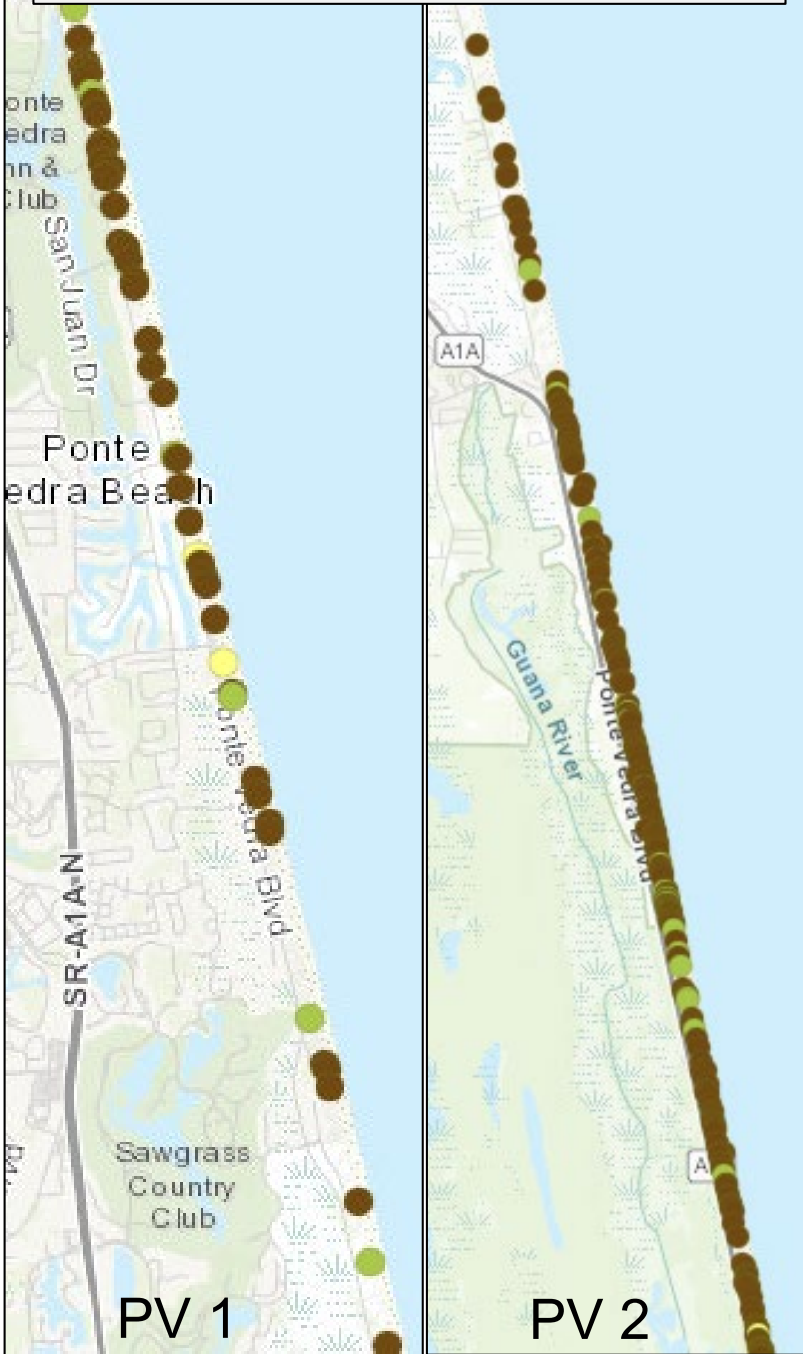
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2022 Turtle Nest Locations



Marine Turtles

- No nest relocated in 2021
- 85 marine turtle relocations for 2022 season

Upland sand sources



- Mechanical/ truck haul placement
- Sand sourced from Vulcan Material mines in Keystone Heights (~55 miles west of project)
- Miles of shoreline with limited public access locations
 - CHC coordinated private residential access points
 - Extensive parcel improvement and restoration required
 - Reduced access points increases haul distances and reduces efficiencies
- Labor shortage of drivers and truck availability
 - Limiting construction schedule based on material availability

Construction schedule & sequencing

- **Schedule**

Reach	Start	Completion
Crescent Beach	September 20, 2021	November 3, 2021
South Ponte Vedra	October 15, 2021	February 1, 2022
Ponte Vedra Beach I	November 29, 2021	August 17, 2022
Ponte Vedra Beach II	January 13, 2022	December 11 ,2022

- **Sequencing**

- Public Impact

- Full beach closures and beach access closures
 - Safety concerns with construction activity

- Environmental Impact

- Strategically started certain segments after peak marine turtle nesting season
 - Worked closely with turtle patrols to work while nests were present
 - Avoided Gopher tortoise habitat (relocation where necessary)

Project Construction



Project Construction



Project Construction



BEFORE



AFTER



BEFORE

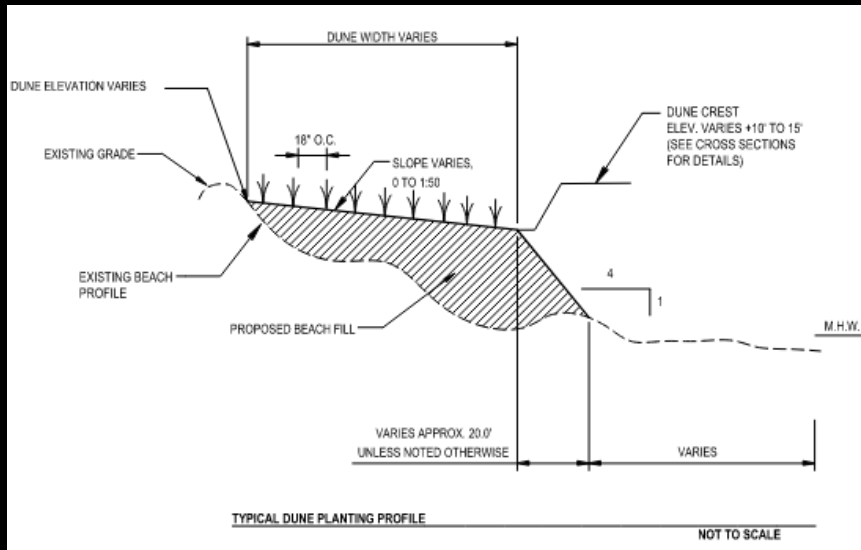


AFTER



Dune Planting

- 1.4 million Sea oats planted
- At least 4 emergent stems and no less than 8"
- Planted 18" OC
- Planted to depth of 6"-8"
- Fertilizer and Hydrogel



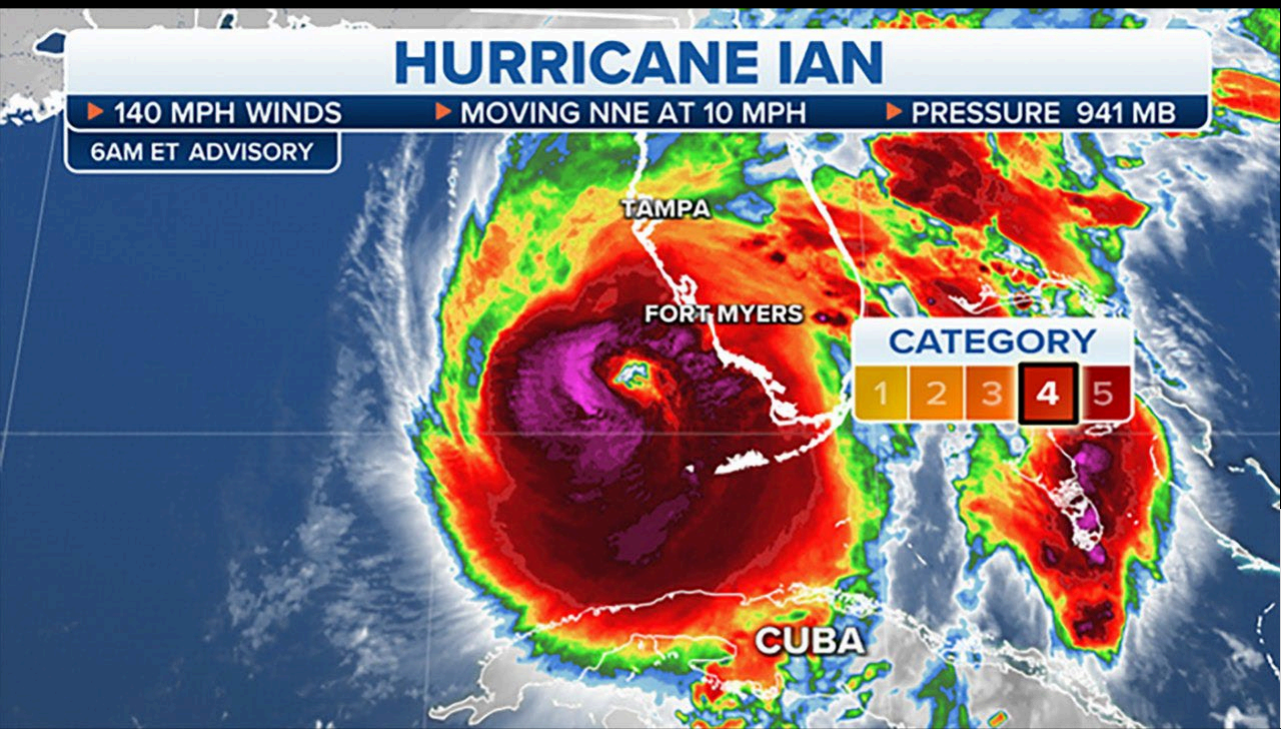
Storm Impacts

- County contracted with Woolpert to fly LiDAR pre- and post-storm events



Storm Impacts

- Hurricane Ian (September 2022)
 - County wide loss of ~1.9 million CY of sand above MHW

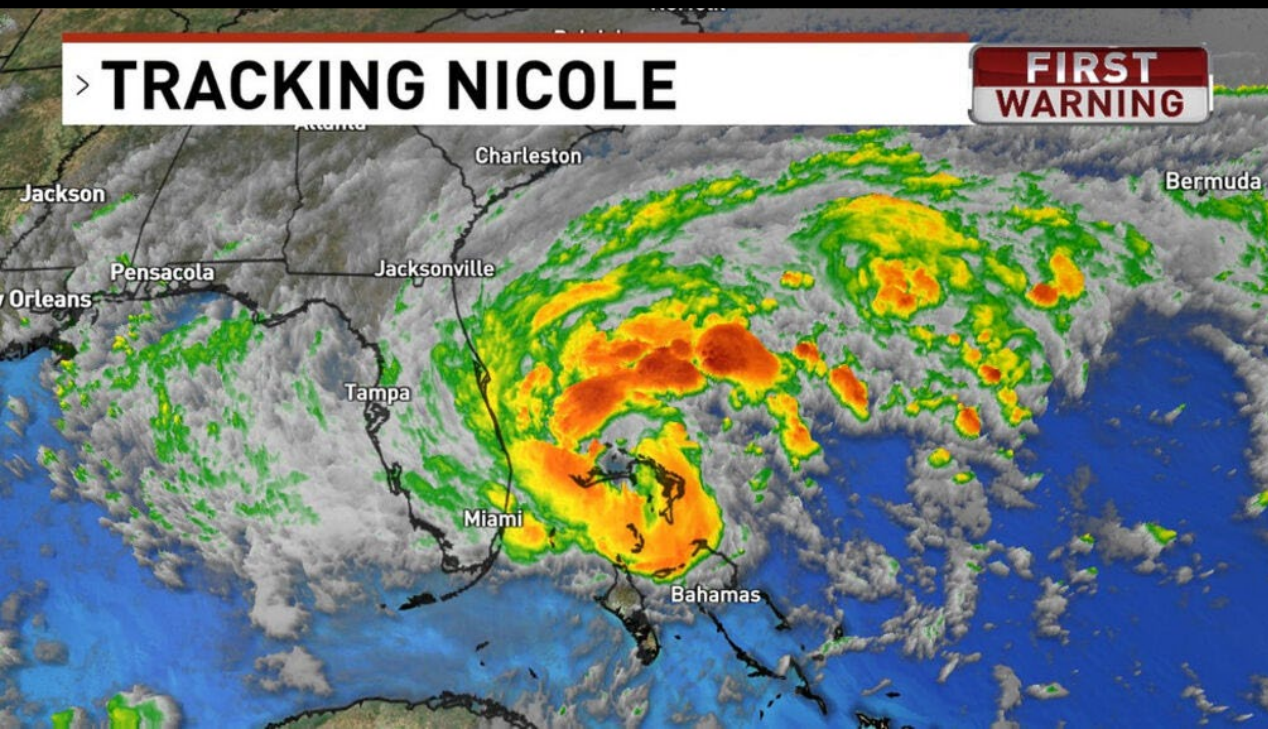


DRAFT				Pre-Ian to Post-Ian	
Reach	Location	Monuments	Reach Length (ft)	Approx Volume Change above MHW	
				Cy	Cy/Ft
1	Ponte Vedra Beach I	R1-R23	22,822	(228,141)	(10.0)
2	Ponte Vedra Beach II	R23-R46.2	24,106	(176,411)	(7.3)
4	South Ponte Vedra Beach I	R67-R84	17,921	(197,454)	(11.0)
5	South Ponte Vedra Beach II	R84-R100	16,447	(266,023)	(16.2)
6A	South Ponte Vedra Beach III	R100-R103	3,031	(47,540)	(15.7)
7	Vilano Beach	R117-R122	5,878	(51,817)	(8.8)
10	Butler Beach	R151-R173	22,272	(386,840)	(17.4)
11	Crescent Beach	R173-R193.6	20,818	(402,500)	(19.3)
13	Summer Haven Beach	R197-R209.5	13,076	(154,681)	(11.8)
Total			146,371	(1,911,407)	
Average					(13.1)

Notes:
 Negative volumes denote erosion
 Calculation excludes GTMNERR, CSR, Anastasia SP, SPP, Ft Matanzas NM
 Erosion underestimated at some locations due to lack of data
 PV2- Embedded in post Nicole data and calculations are about 41,000 cy of FEMA Cat B sand fill placed between Ian and Nicole fr
 Caution: Need to QA everything

Storm Impacts

- Hurricane Ian (September 2022)
 - County wide loss of ~1.9 million CY of sand above MHW
- Hurricane Nicole (November 2022)
 - County wide loss of ~260,000 CY of sand above MHW



> TRACKING NICOLE

FIRST WARNING

DRAFT				Post-Ian to Post Nicole	
Reach	Location	Monuments	Reach Length (ft)	Approx Volume Change above MHW	
				Cy	Cy/ft
1	Ponte Vedra Beach I	R1-R23	22,822	(37,352)	(1.6)
2	Ponte Vedra Beach II	R23-R46.2	24,106	20,271	0.8
4	South Ponte Vedra Beach I	R67-R84	17,921	63,099	3.5
5	South Ponte Vedra Beach II	R84-R100	16,447	(63,600)	(3.9)
6A	South Ponte Vedra Beach III	R100-R103	3,031	(6,720)	(2.2)
7	Vilano Beach	R117-R122	5,878	3,291	0.6
10	Butler Beach	R151-R173	22,272	(68,325)	(3.1)
11	Crescent Beach	R173-R193.6	20,818	(128,870)	(6.2)
13	Summer Haven Beach	R197-R209.5	13,076	(41,105)	(3.1)
Total			146,371	(259,311)	
Average					(1.8)

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Storm Impacts

- Hurricane Ian (September 2022)
 - County wide loss of ~1.9 million CY of sand above MHW
- Hurricane Nicole (November 2022)
 - County wide loss of ~260,000 CY of sand above MHW
- Total ~2,170,719 CY loss above MHW
 - For comparison in Matthew we lost 1.4 M CY of sand

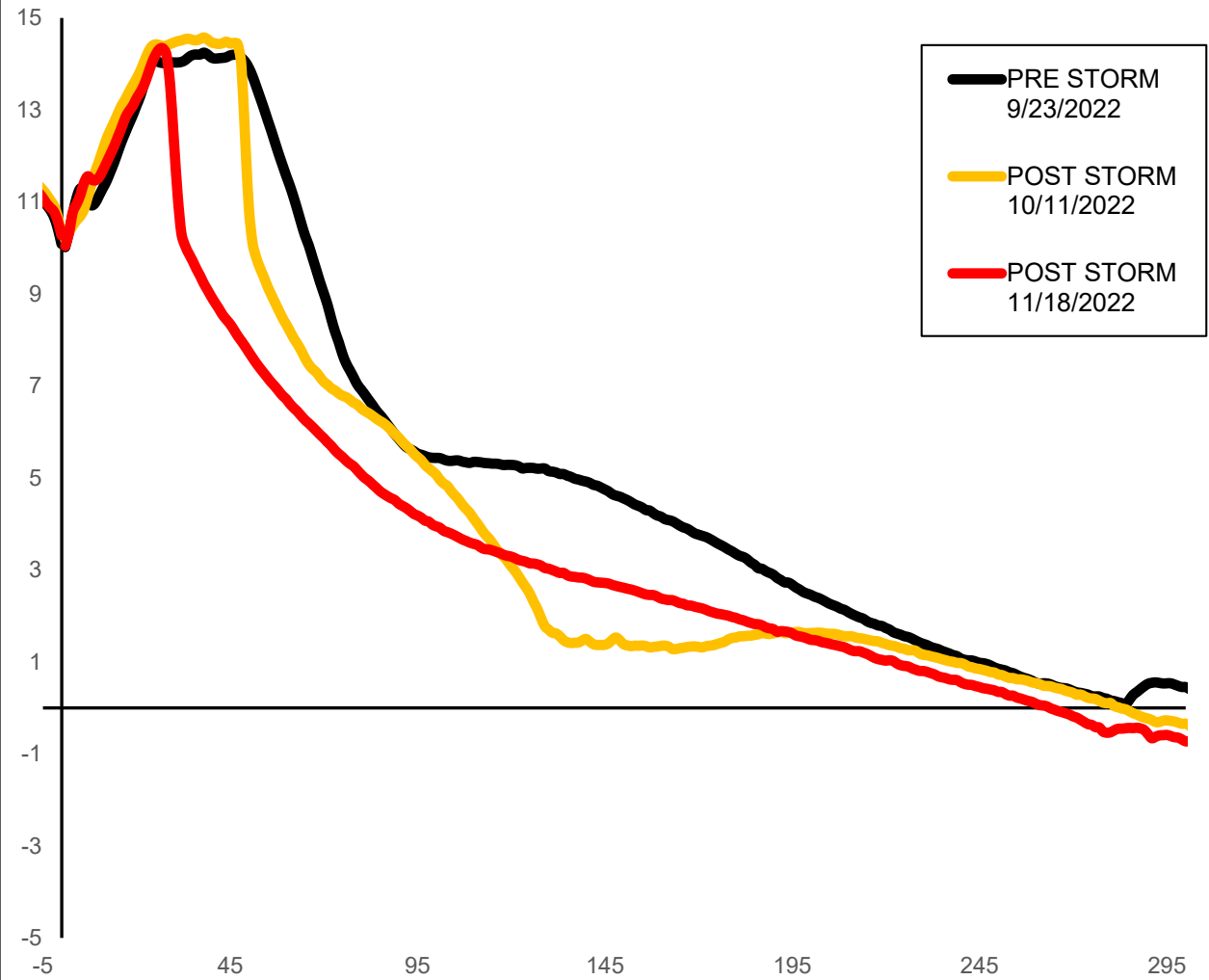


DRAFT				Pre-Ian to Post-Nicole	
Reach	Location	Monuments	Reach Length (ft)	Approx Volume Change about MHW	
				Cy/ft	Cy
1	Ponte Vedra Beach I	R1-R23	22,822	(265,493)	(11.6)
2	Ponte Vedra Beach II	R23-R46.2	24,106	(156,140)	(6.5)
4	South Ponte Vedra Beach I	R67-R84	17,921	(134,355)	(7.5)
5	South Ponte Vedra Beach II	R84-R100	16,447	(329,623)	(20.0)
6A	South Ponte Vedra Beach III	R100-R103	3,031	(54,260)	(17.9)
7	Vilano Beach	R117-R122	5,878	(48,526)	(8.3)
10	Butler Beach	R151-R173	22,272	(455,165)	(20.4)
11	Crescent Beach	R173-R193.6	20,818	(531,370)	(25.5)
13	Summer Haven Beach	R197-R209.5	13,076	(195,786)	(15.0)
			Total	146,371	-2,170,718
			Average		(14.8)

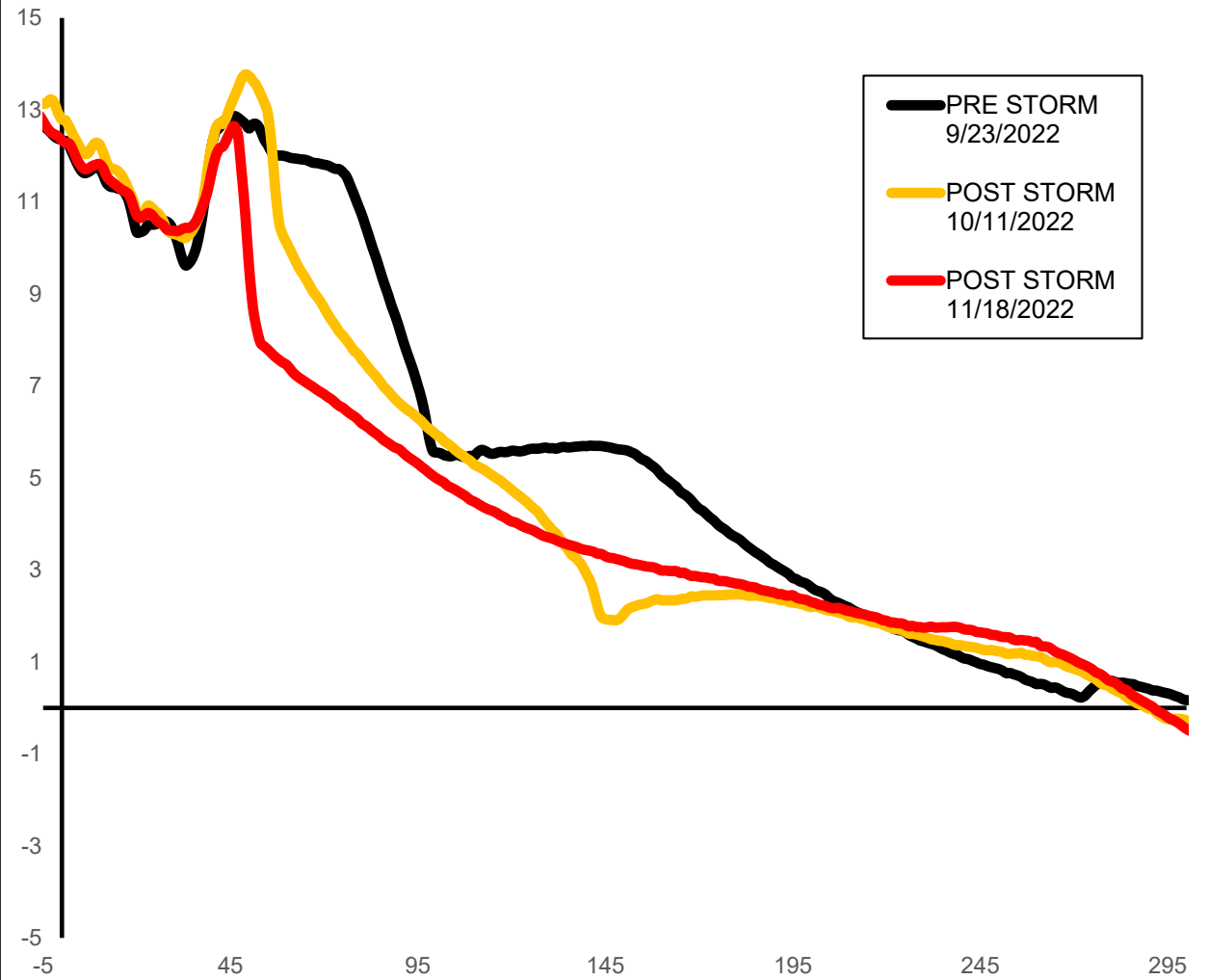
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Storm Impacts

Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7

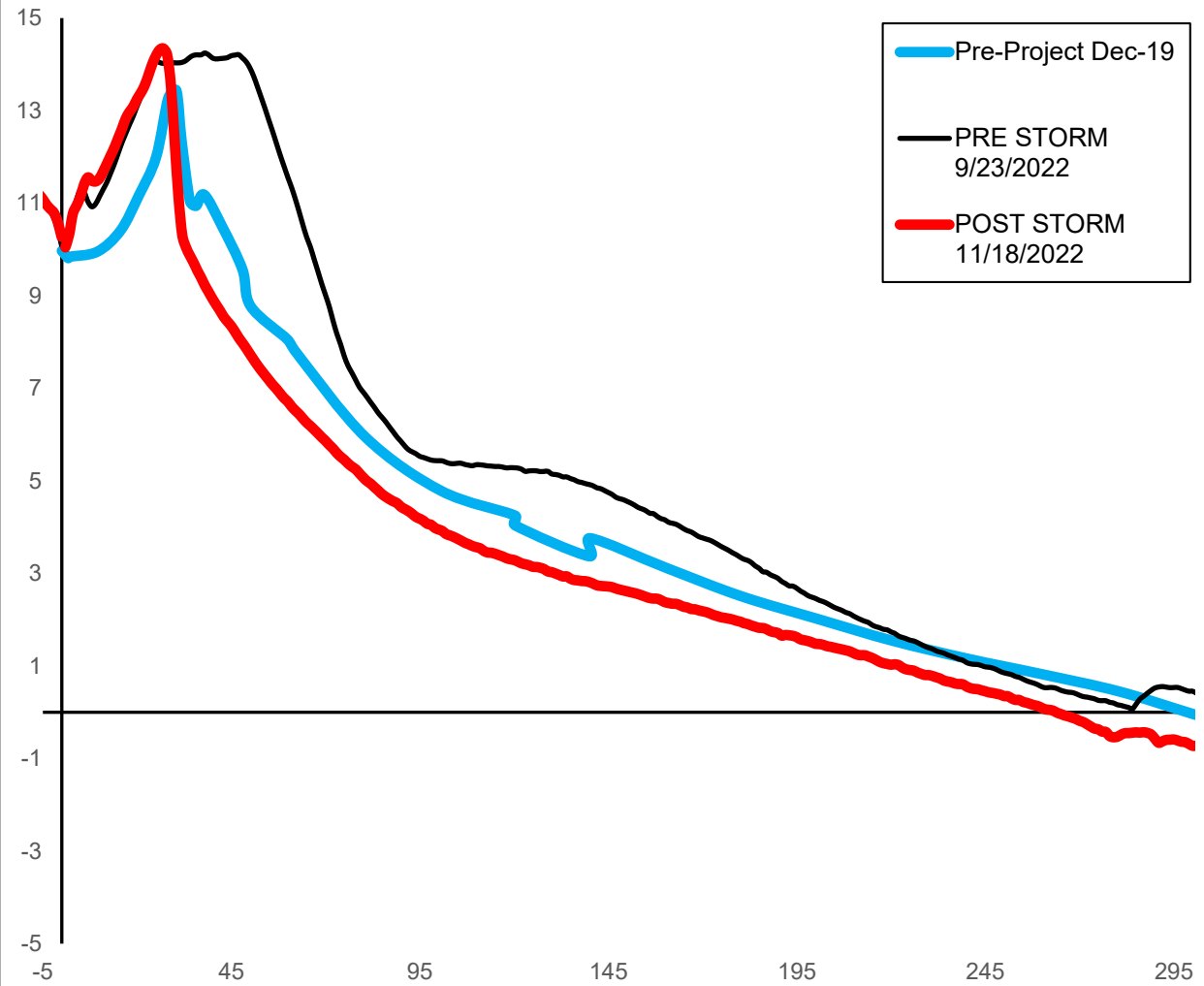


Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-11

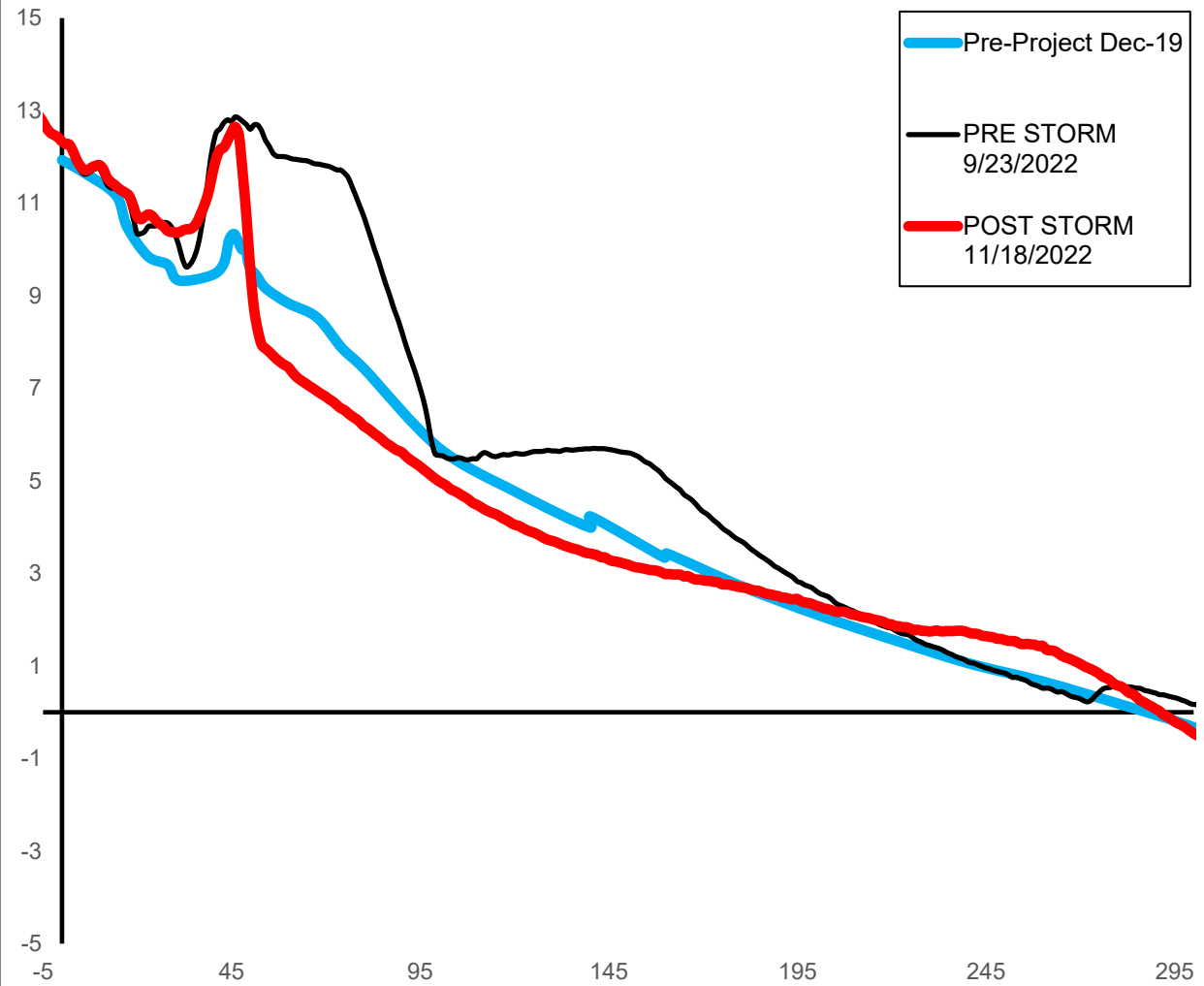


Storm Impacts

Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7



Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-11



Restored vs. untreated shoreline

Crescent Beach



FEMA Project

No Project

Restored vs. untreated shoreline



Next Steps

- FEMA Category B project for Hurricane Ian/Nicole impacts
 - Protection from a 5-year storm
 - “Based on the average expected erosion for a 5-year storm, FEMA only provides PA funding for emergency berms constructed with up to 6 cubic yards per linear foot of sand above the 5-year Stillwater level or the berm’s pre-incident profile, whichever is less.”
 - Timeline
 - Deadline to complete the project is 6 months from the declaration
 - FEMA may approve an additional 6 months
 - Cost share is 75% Federal, 12.5 % State, and 12.5% County
- FEMA Category G project
 - South Ponte Vedra Beach

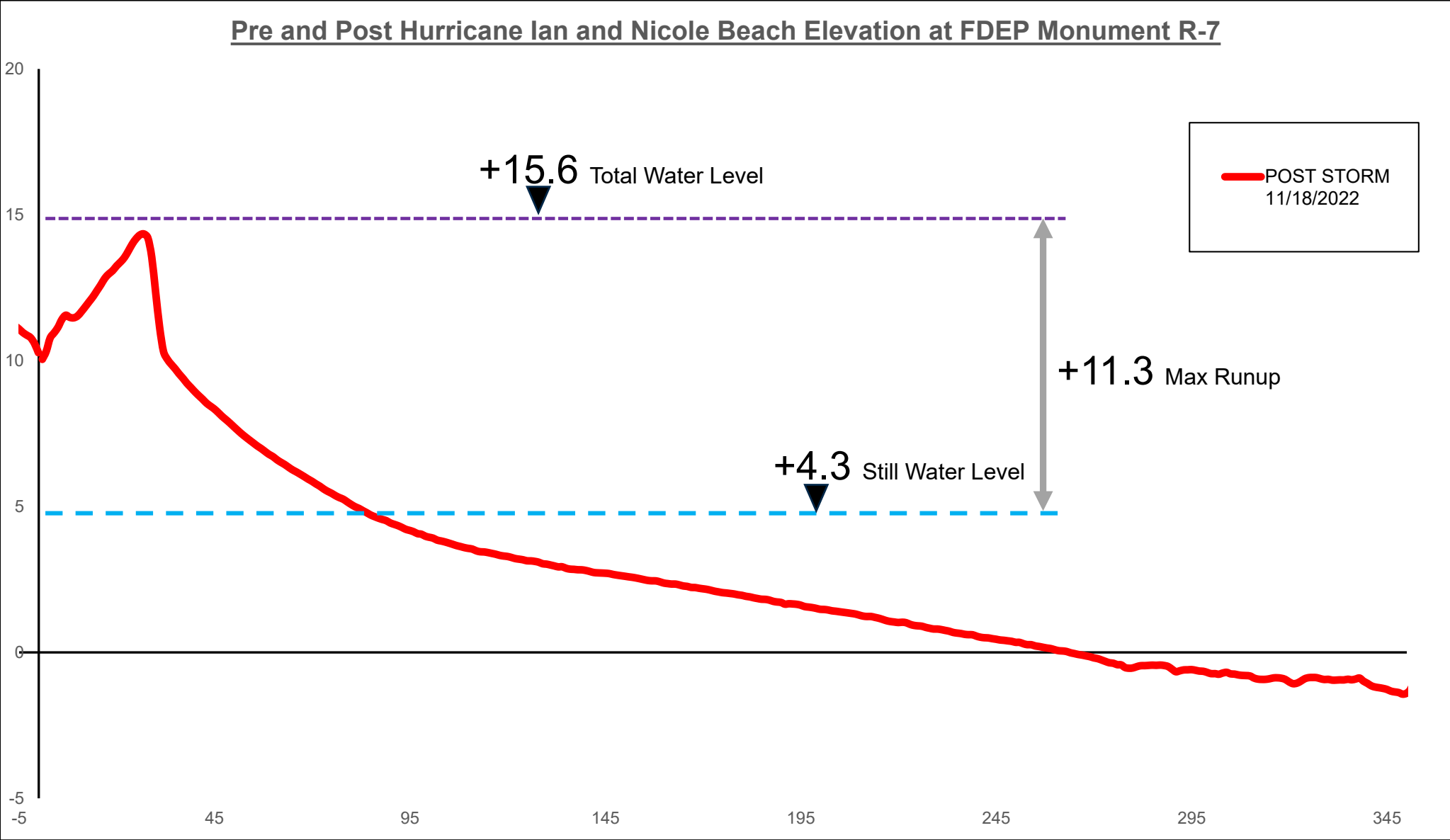
Next Steps

- Cat B example at FDEP R-07 & R19 in Ponte Vedra Beach:
 - Calculate the Total Water Level of a 5-year storm
 - Still Water Level from FDEP for this stretch of beach is ~4.3 ft NAVD88
 - Max wave runup is ~11.3 ft NAVD88 (Statistical analysis of USACE 41 year hindcast wave data and CEM wave runup methods)
 - Total Water Level of a 5-year storm varies between 13.3 and **15.6 ft** NAVD88 County wide.

Next Steps

Eligible Volume

R-07

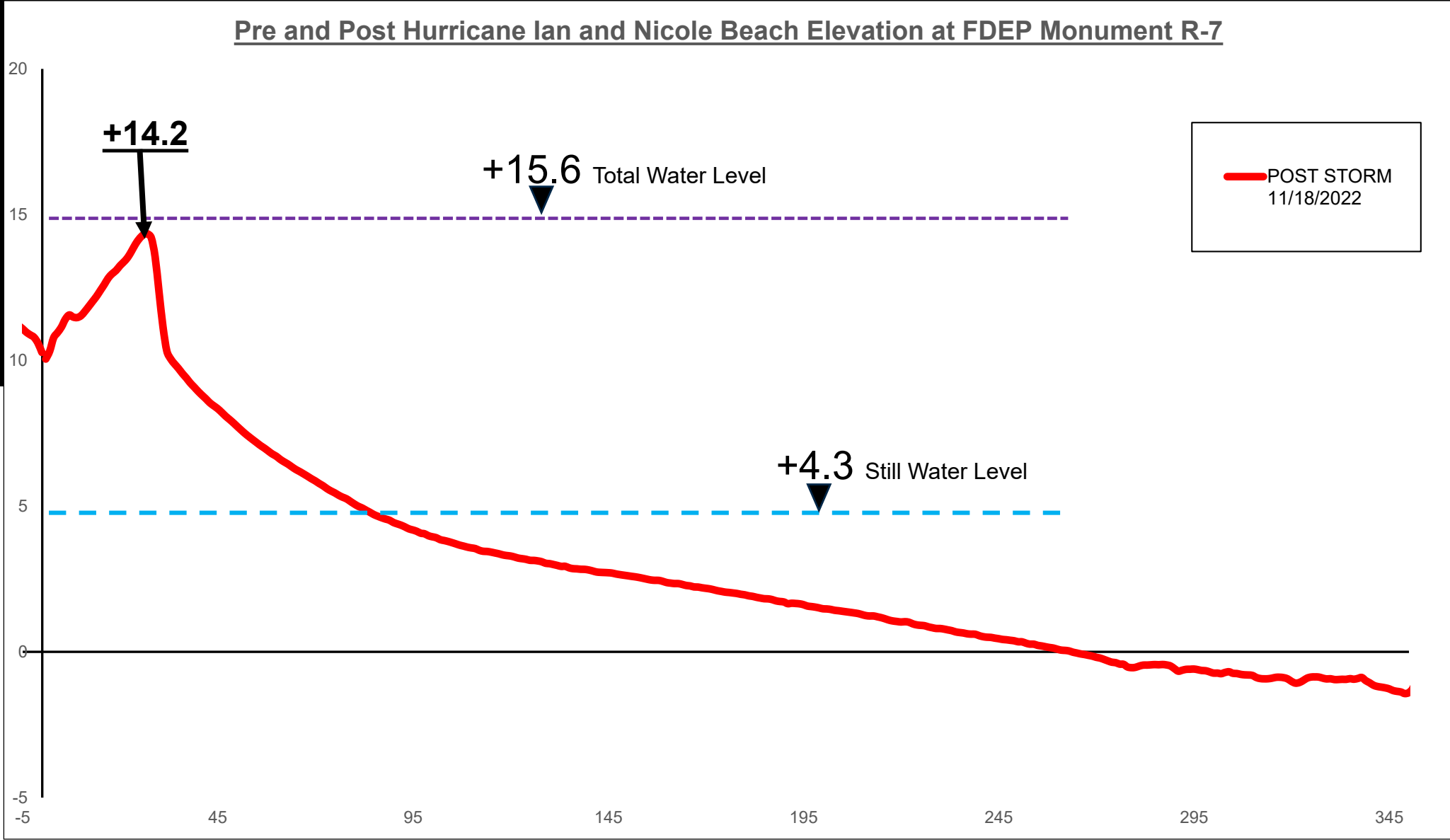


Next Steps

Eligible Volume

- +14.2 is less than total water level

Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7



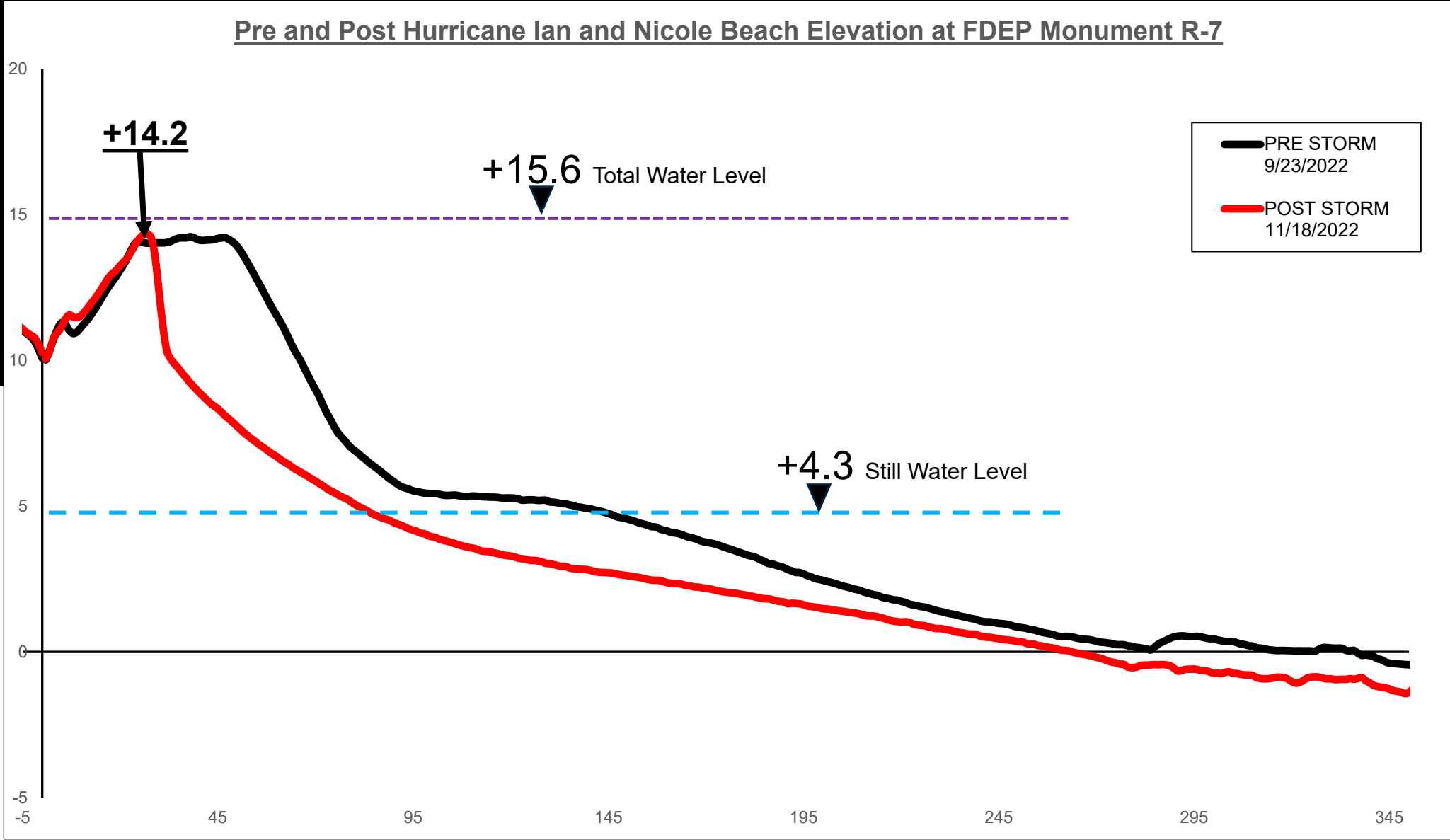
R-07

Next Steps

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Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7



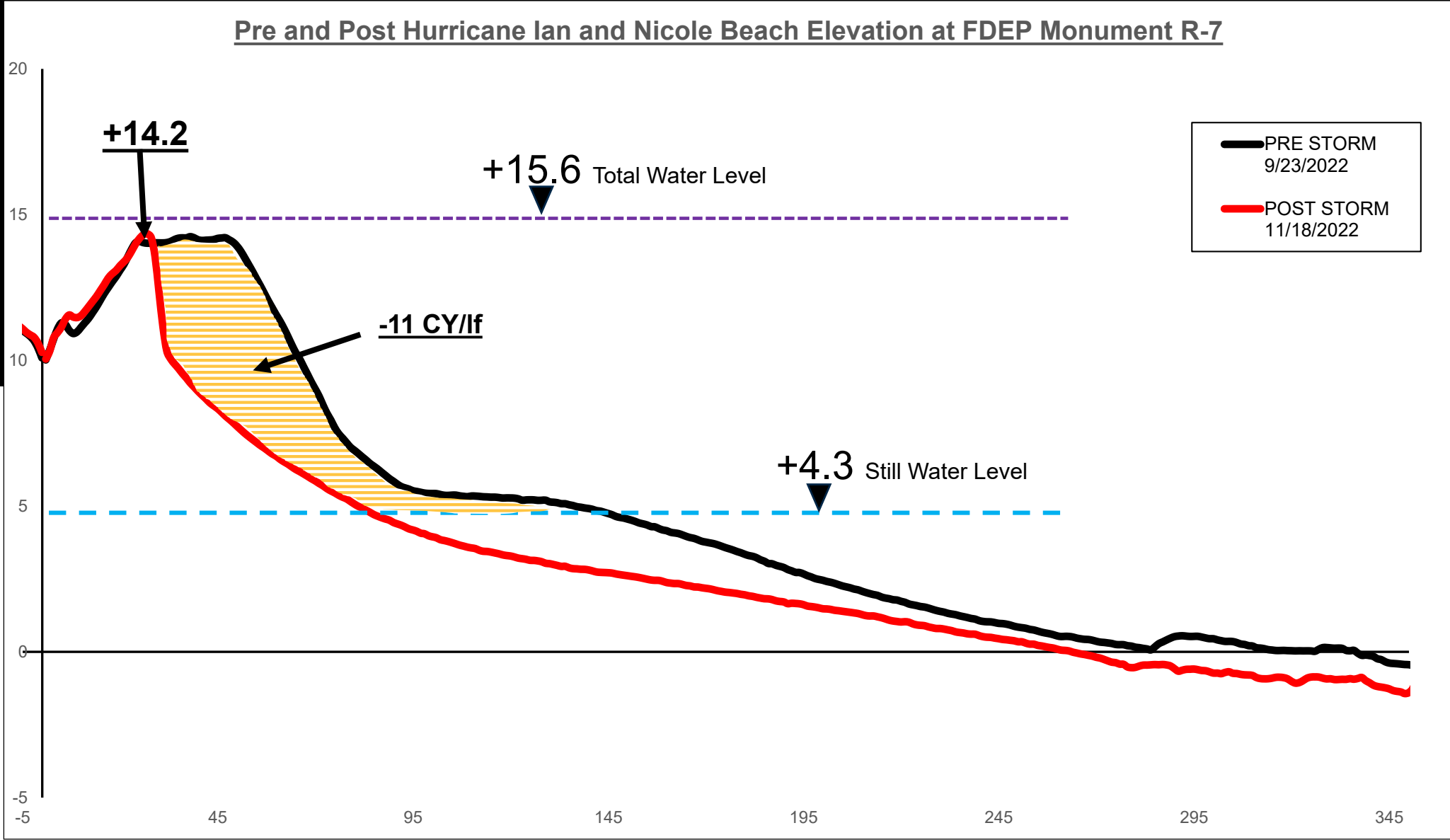
R-07

Next Steps

Eligible Volume

- +14.2 is less than total water level
- 11 CY/lf loss from storms

Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7



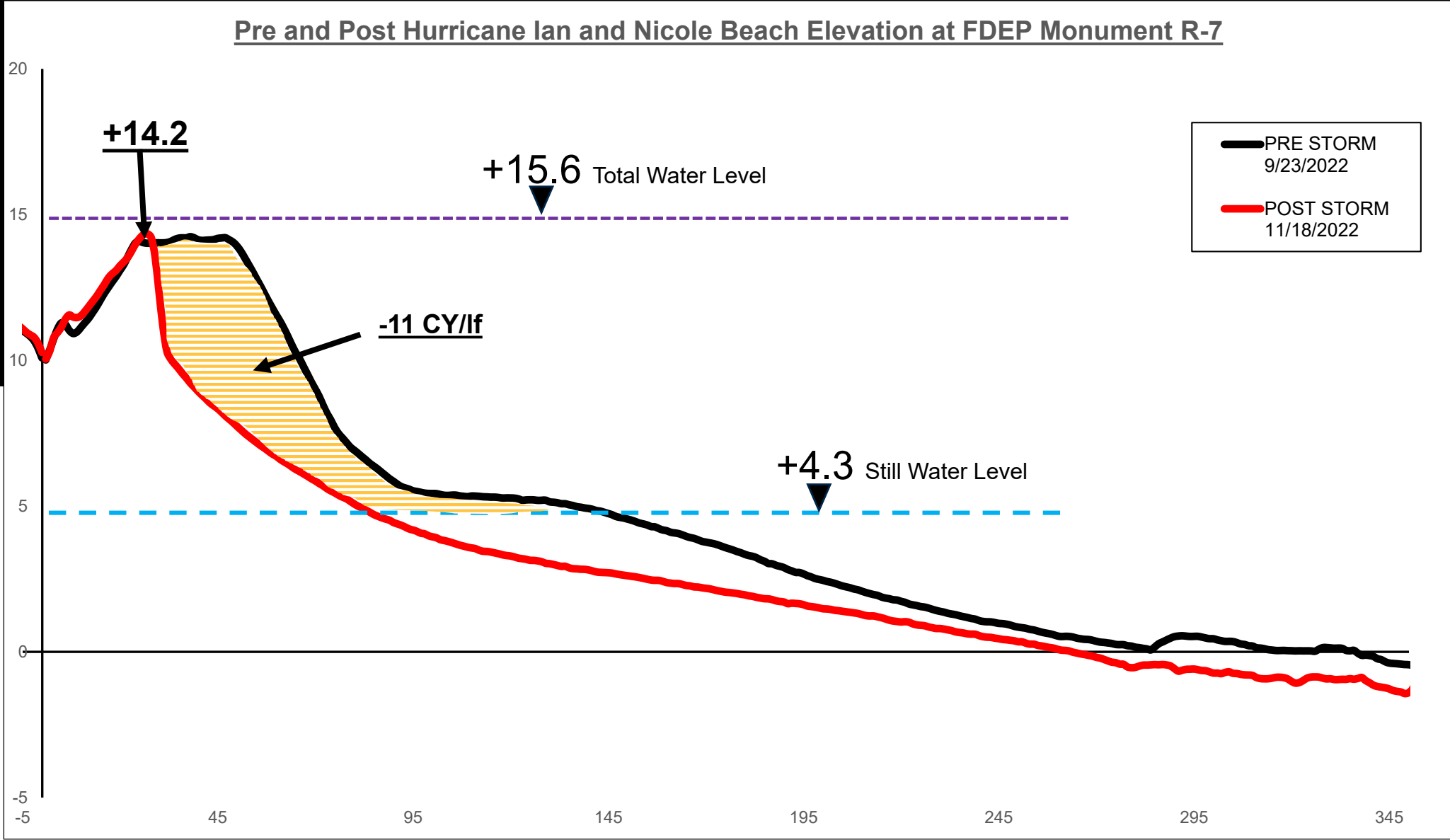
R-07

Next Steps

Eligible Volume

- +14.2 is less than total water level
- 11 CY/lf loss from storms
- Only eligible for a max 6 CY/lf

Pre and Post Hurricane Ian and Nicole Beach Elevation at FDEP Monument R-7

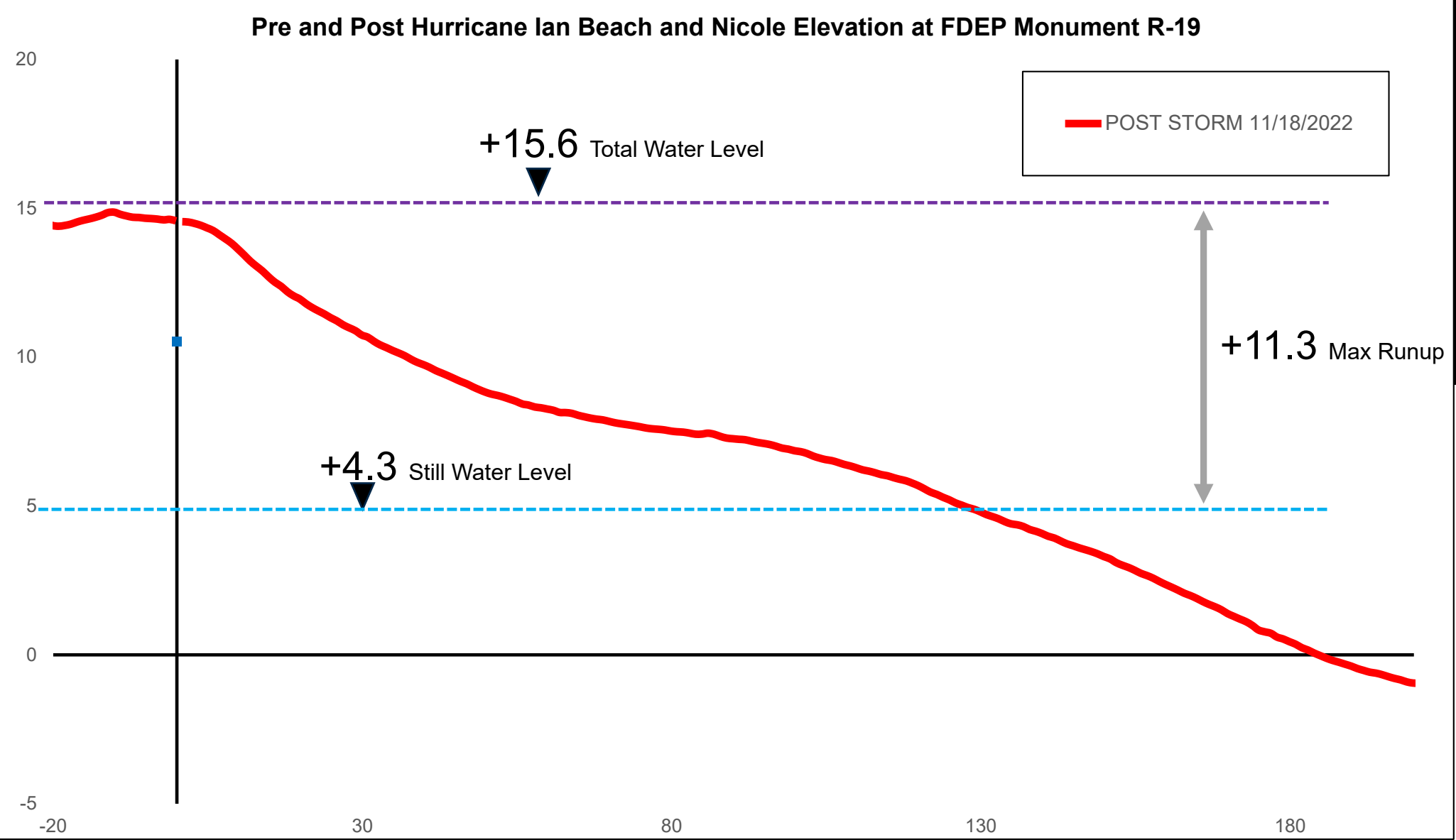


R-07

Next Steps

Eligible Volume

R-019

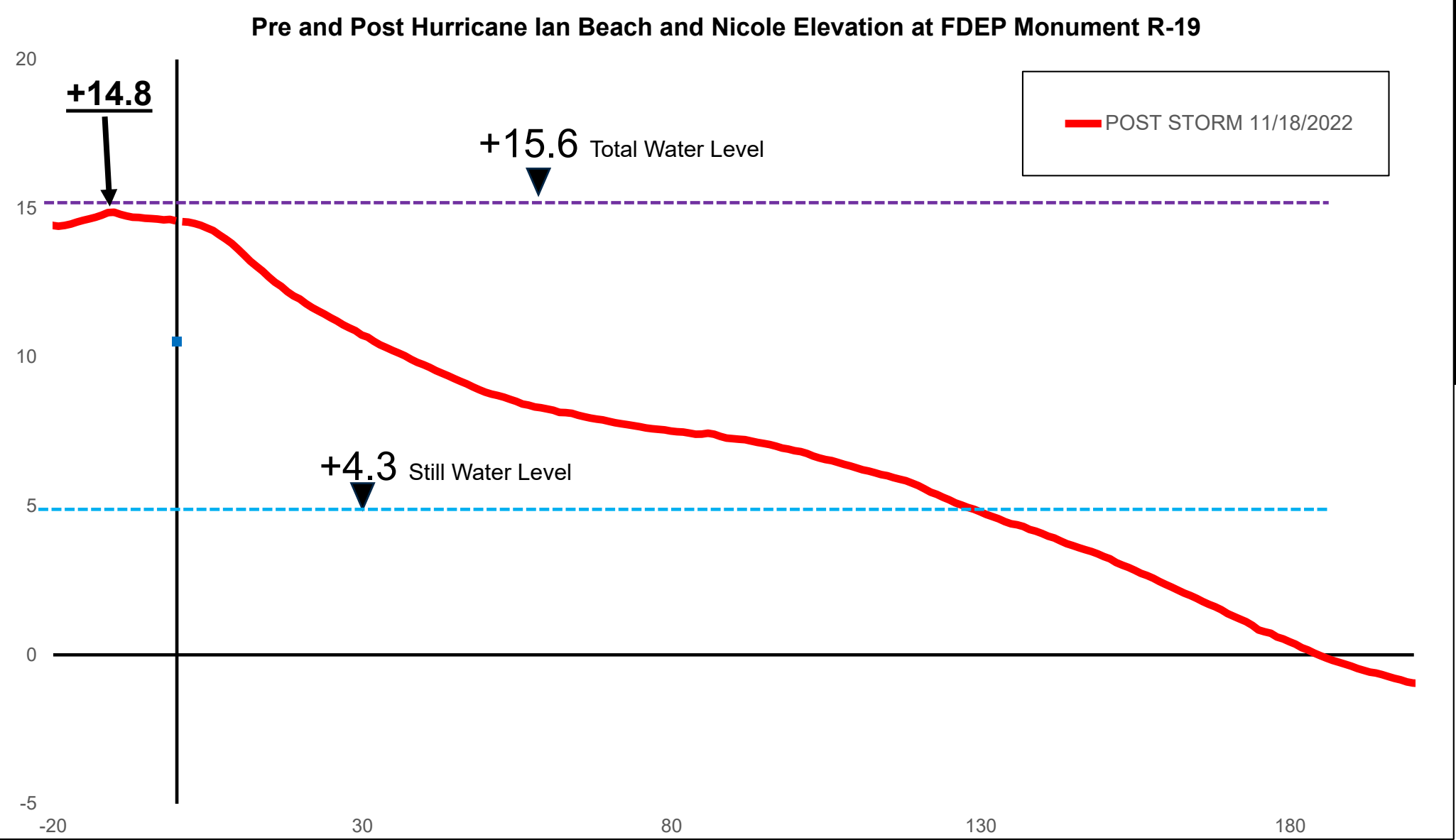


Next Steps

Eligible Volume

- +14.8 is less than total water level

Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-19



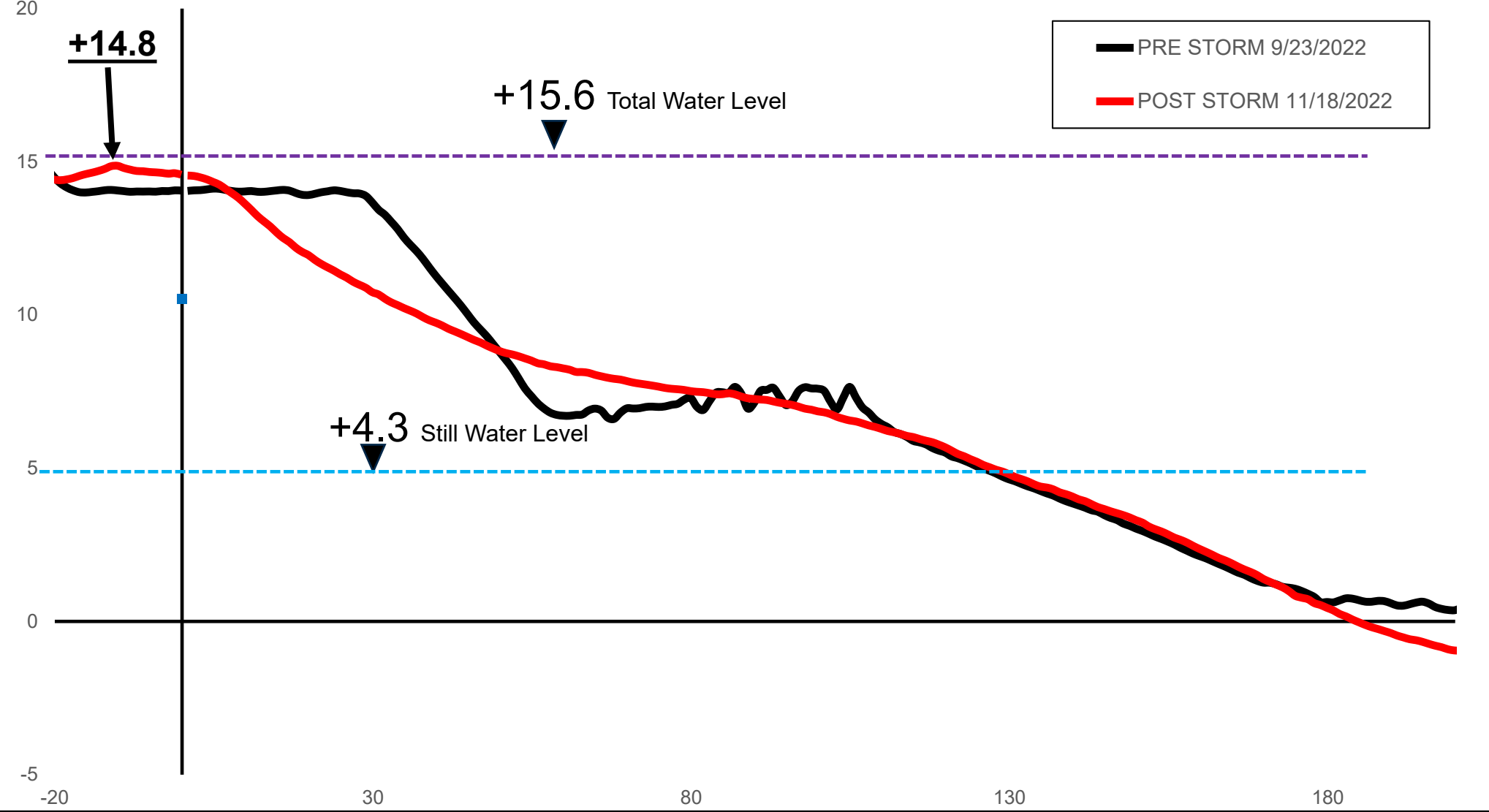
R-019

Next Steps

Eligible Volume

- +14.8 is less than total water level

Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-19



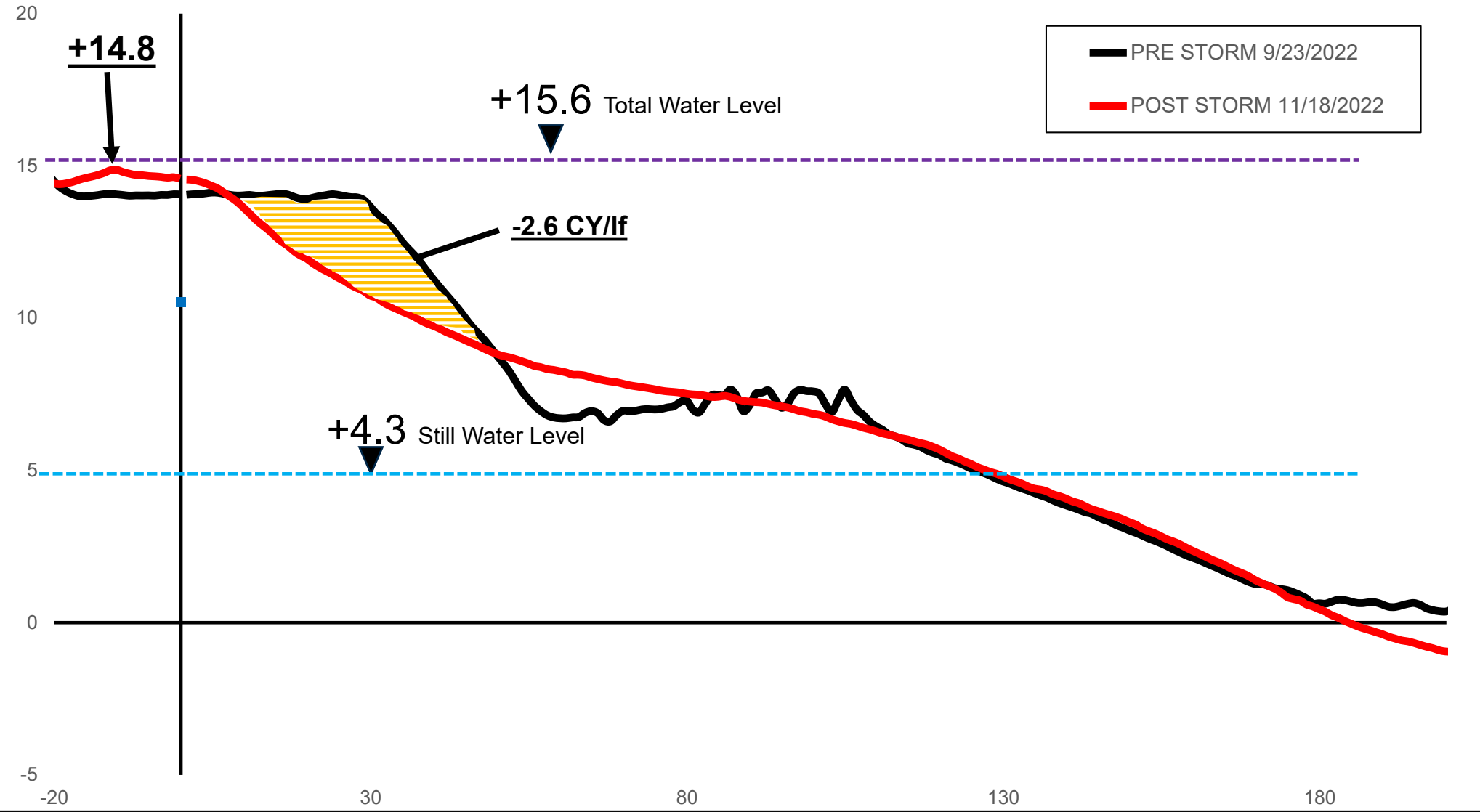
R-019

Next Steps

Eligible Volume

- +14.8 is less than total water level
- 2.6 CY/lf loss from storms

Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-19



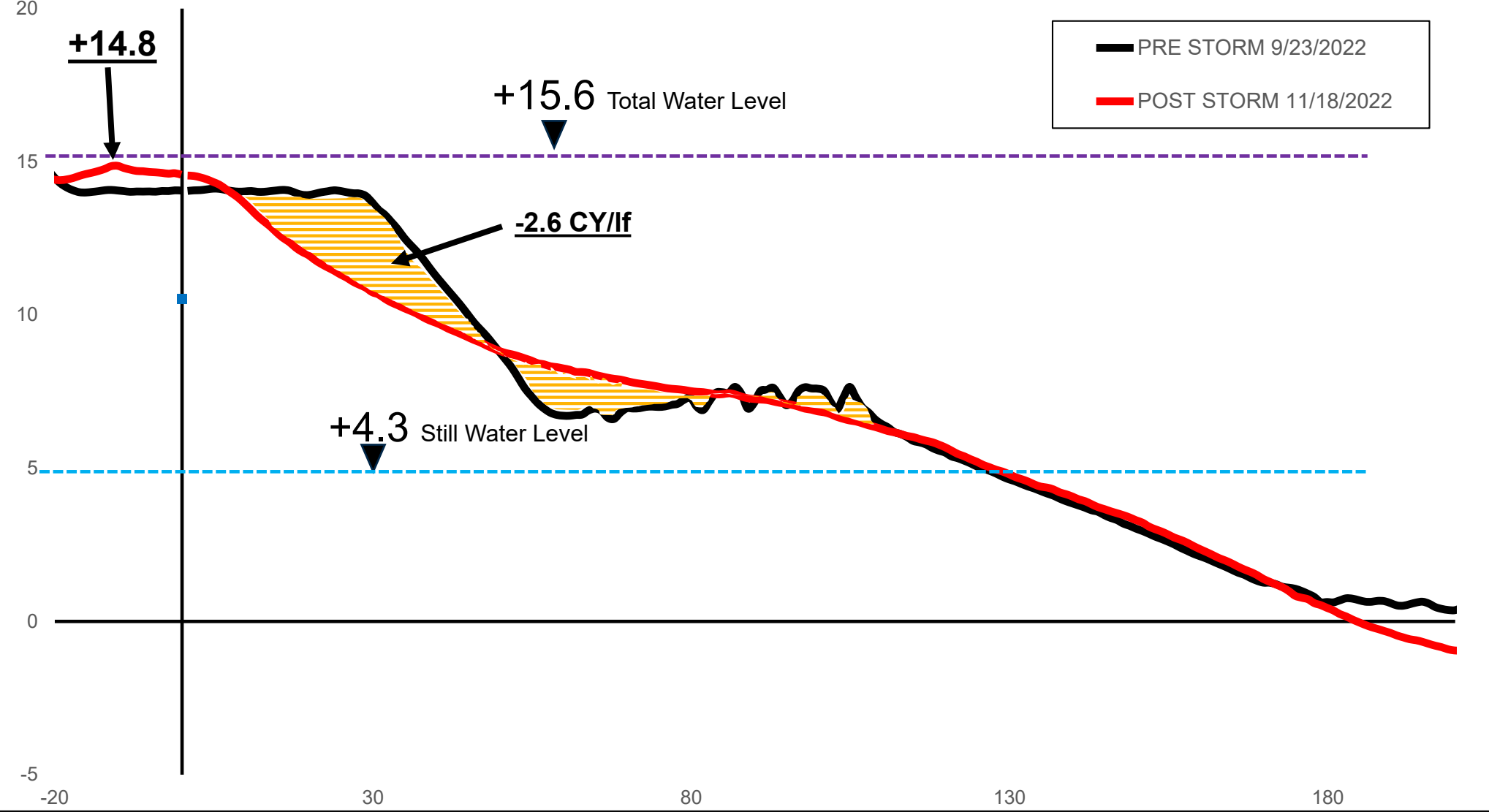
R-019

Next Steps

Eligible Volume

- +14.8 is less than total water level
- 2.6 CY/lf loss from storms
- Have to choose the lesser of loss or 6 CY

Pre and Post Hurricane Ian Beach and Nicole Elevation at FDEP Monument R-19



R-019

Next Steps

- Easements
 - Seeking Perpetual Easements

RECEIVED EASEMENT PERCENTAGE BY REACH				Mail Date	Due Date
REACH	TOTAL	RECEIVED	%		
PVB 1	156	111	71.15%	11/25/2022	1/24/2023
PVB 2	117	74	63.25%	12/2/2022	1/31/2023
SPVB 1	91	33	36.26%	12/3/2022	2/1/2023
SPVB 2	273	105	38.46%	12/10/2022	2/8/2023
VB	60	12	20.00%	12/16/2022	2/14/2023
BB	190	42	22.11%	12/30/2022	2/28/2023
CB	164	33	20.12%	12/30/2022	2/28/2023
SH	17	6	35.29%	12/30/2022	2/28/2023
TOTAL	1068	416	38.95%		

Conclusions and Next Steps

The FEMA Category B project worked!

- In the areas that received sand from the project there was minimal damage to upland infrastructure.
- Very few places saw erosion into the pre-project profile. Meaning the project sand protected the existing shoreline.
- Place the sand as far landward as possible.

Next Steps

- We are quickly working towards a new Hurricane Ian/Nicole FEMA Dune Enhancement Project.
- We have hired a consultant to calculate the eligible volumes.
- Coastal Management Easement drive underway
- Category G project (South Ponte Vedra Beach)



Contacts

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➔ sjcfl.us/CoastalProjects/FEMADunes.aspx

➔ chcivil.com/

➔ ghd.com/



Thank you

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