

CONTRACT, LEASE, AGREEMENT CONTROL FORM

Date: 02/06/2023

Contract/Lease Control #: C18-2636-TDD

Procurement#: RFQ TDD 54-17

Contract/Lease Type: CONTRACT CLOSE-OUT

Award To/Lessee: TAYLOR ENGINEERING, INC.

Owner/Lessor: OKALOOSA COUNTY

Effective Date: 10/14/2017

Expiration Date: 10/03/2022

Description of: ENGINEERING & ARCHITECTURAL CONSULTING SERVICES

Department: TDD

Department Monitor: ADAMS

Monitor's Telephone #: 850-651-7131

Monitor's FAX # or E-mail: JADAMS@MYOKALOOSA.COM

Closed: 02/06/2023

CC: BCC RECORDS

CONTRACT CLOSE-OUT CHECKLIST
(To Be Prepared by the Contracts & Lease Coordinator)

DATE: January 17, 2023

TO: Finance Department

SUBJECT: Contract No. C18-2636-TDD

MANAGING DEPARTMENT: TDD

CONTRACTOR'S NAME: Taylor Engineering, Inc.

PROJECT TITLE: Coastal and Environmental Engineer Services

The attached has met the final payment contract requirement in subject contract.

Yes No

1. Final Invoice **X**

Yes No N/A

2. Close-Out Documents

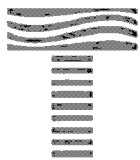
a. <u>Signed Release of Lien</u>	X
b. <u>Proof of Completion Advertisement</u>	X
c. <u>Certificate of Insurance</u>	X
d. <u>Consent of Surety to Final Payment</u>	X
e. <u>Proof of Performance/Payment Bond</u>	X
<u>Continuation 12 Months Following</u>	
<u>Final Payment</u>	
f. <u>Grants approval/signature</u>	X

3. Remarks

Faye Douglas Digitally signed by Faye Douglas
Date: 2023.01.17 09:32:19 -06'00'

OMB DIRECTOR

DATE



TAYLOR ENGINEERING, INC.

Delivering Leading-Edge Solutions

10199 Southside Blvd., Suite 310, Jacksonville, FL 32256

Tel. 904.731.7040 | Fax 904.731.9847 | www.taylorengineering.com

Alex Fogg
County of Okaloosa
Okaloosa County Public Works
1759 South Ferdon Blvd.
Crestview, FL 32536

January 06, 2023

Project No: C2022-031

Invoice No: 24001

Total Fee: 63,950.00

C18-2636-TDD

INVOICE - FINAL FOR CONTRACT

Task Order No. 13: 2022 Pre-Storm Beach Monitoring, Okaloosa County, Florida

Professional Services for the Period November 01, 2022 to December 31, 2022

Task	Task Amount	% Comp	Fee Earned	Prior Fee	Current Fee
1 Collect Topo & Bathy Profile Surveys	26,250.00	100.00	26,250.00	26,250.00	0.00
2 Western Destin Data Analysis & Rpting	22,700.00	100.00	22,700.00	20,430.00	2,270.00
3 Eastern Destin Data Analysis & Rpting	15,000.00	100.00	15,000.00	13,500.00	1,500.00
Total Fee	63,950.00		63,950.00	60,180.00	3,770.00
Totals					3,770.00
TOTAL DUE NOW					\$3,770.00

FINAL INVOICE

Alexander
Fogg

Digitally signed
by Alexander
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Date: 2023.01.11
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AP - Paid Stamp

OBSCHEDULESERVICE

2/2/2023 3:10:57 PM

This document was paid with check # 2302959 on 2/2/2023
For billing This document was 731-7040 or bwoolard@taylorengineering.com. Please remit payment to Taylor Engineering, Inc.,
10199 Southside Blvd., Suite 310, Jacksonville, FL 32256.

2022 Pre-Storm Beach Monitoring
1418 521422

TO Approved
TO Revised
TO Revised

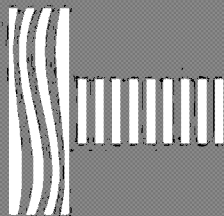
T.O. Total
63,950.00

[illegible]

2022 Pre-Storm Beach Monitoring
Okaloosa County, Florida
C2022-031
Page 1 of 1

September – December 2022

During this period Taylor Engineering completed preparation of the monitoring reports, associated figures and appendices and provided deliverables to County staff on December 15, 2022 to complete this Task Order.



Eastern Destin Fifteen-Year Post-Construction Monitoring Report

Okaloosa County, FL

December 2022



Prepared by: TAYLOR ENGINEERING, INC.
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Eastern Destin Fifteen-Year Post-Construction
Monitoring Report
Okaloosa County, FL

Prepared for

City of Destin and Okaloosa County, Florida
and
Florida Department of Environmental Protection

Taylor Engineering, Inc.
4300 Legendary Drive, Suite C246
Destin, FL 32541
(850) 460-7040

C2022-031

December 2022

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1.0 INTRODUCTION

1.1 Overview

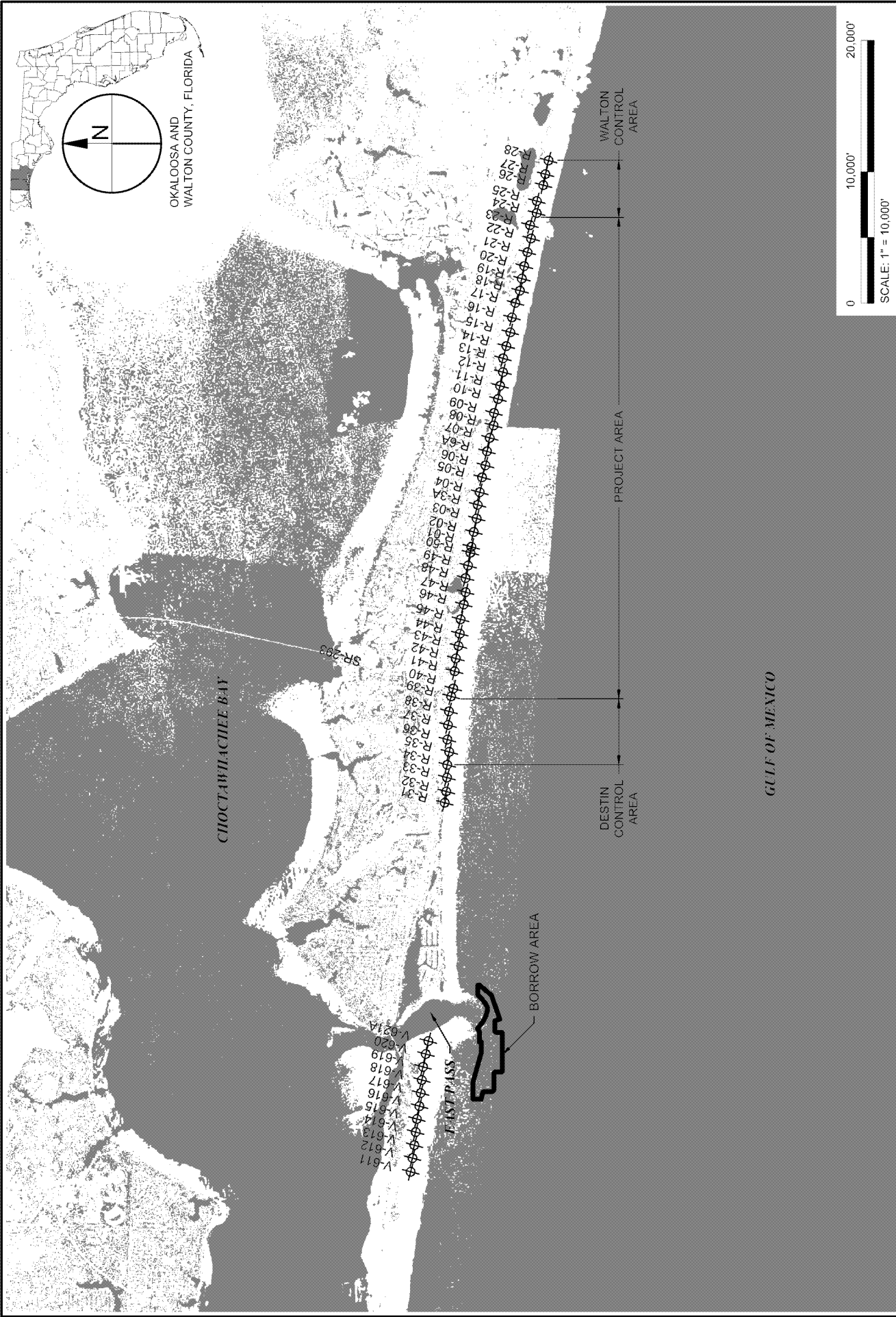
Department of the Army (DOA) Permit Number SAJ-2003-8314(IP-DEB) and Florida Department of Environmental Protection (FDEP) Permit No. 0218419-001-JC, issued to Walton County and the City of Destin, authorized the 2006/2007 Walton County/Destin Beach Restoration Project. The beach fill placement area extends from FDEP reference monument R-39 in Destin (Okaloosa County) to R-23.8 in Walton County. The permitted borrow site lies in the East Pass ebb shoal vicinity. Project construction occurred in three phases: February – May 2006 (R-6 – R-23.8 in Walton County), December – January 2007 (R-1 – R-6 in Walton County), and May – June 2007 (R-39 – R-50 in Okaloosa County). This report documents the fifteen-year post-construction monitoring results along the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration project. **Figure 1.1** and **Figure 1.2** provide an overview of the Walton County/Destin Beach Restoration Project and of the Destin monitoring area.

Project monitoring consisted of the collection and analysis of topographic and bathymetric data consistent with the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration project area (R-39 to R-50) and associated control area (R-33 to R-38). Although the Walton County/Destin Beach Restoration Project did not originally include FDEP reference monuments R-31 to R-33 in the west control area, this report includes monitoring R-31 to R-33 for the sake of completeness. Data analyses included comparisons between the August 2005 pre-construction, July 2007 post-construction, November 2020 post-storm, and June 2022 fifteen-year post-construction surveys to document project performance and general changes within the monitoring area. For clarity, “construction” event refers to the 2006/2007 Walton County/Destin Beach Restoration Project and “storm” event refers to 2020 Hurricane Sally.

Although the above-referenced FDEP permit has expired and does not require annual monitoring services of the 2006/2007 Walton County/Destin Beach Restoration Project in 2022, Okaloosa County's coastal management program relies on formal documentation of the beach condition, project performance, and erosional trends to assess the severity of storm impacts and the necessity of future nourishments. This report follows the same format as the previously submitted annual monitoring reports prepared for Okaloosa County, the City of Destin, and FDEP (to fulfill the post-construction monitoring obligations mandated by FDEP Permit No. 0218419-001-JC) and may serve as a basis for future monitoring of the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration Project.

1.2 Report Organization

Following this introduction, Chapter 2.0 reviews the nourishment history of the project area and provides details (e.g., date and coverage) of the relevant monitoring surveys. Chapter 3.0 documents the analysis of the 2006/2007 construction project, 2020 Hurricane Sally, and background littoral process effects on beach profiles, shoreline positions, and beach volumes in the project and control areas. Chapter 4.0 summarizes and concludes this study. A list of references follows Chapter 4.0. **Appendix A** contains beach profile plots of relevant surveys, and **Appendix B** illustrates the surveyed mean high water (MHW) contours overlain on 2015 aerial photos. **Appendix C** contains photographs of the June 2022 condition.



TAYLOR ENGINEERING INC.
 4300 LEGENDARY DRIVE SUITE C246
 DESTIN, FLORIDA 32541
 REGISTRY # 4815

FIGURE 1.1
 PROJECT OVERVIEW
 WALTON/DESTIN BEACH RESTORATION PROJECT
 EASTERN DESTIN FIFTEEN-YEAR POST-CONSTRUCTION MONITORING REPORT
 OKALOOSA COUNTY, FLORIDA

PROJECT	C2022-031	DRAWN BY	CAS
SHEET		DATE	OCT 2022

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.



 TAYLOR ENGINEERING INC. 4300 LEGENDARY DRIVE SUITE C246 DESTIN, FLORIDA 32541 REGISTRY # 4815	FIGURE 1.2 EASTERN DESTIN MONITORING AREA WALTON/DESTIN BEACH RESTORATION PROJECT EASTERN DESTIN FIFTEEN-YEAR POST-CONSTRUCTION MONITORING REPORT OKALOOSA COUNTY, FLORIDA		
	PROJECT	C2022-031	
	DRAWN BY	CAS	
	SHEET		
	DATE	OCT 2022	

PRELIMINARY DRAWINGS: THESE DRAWINGS ARE NOT IN FINAL FORM, BUT ARE BEING TRANSMITTED FOR AGENCY REVIEW.

2.0 DATA COLLECTION

2.1 Nourishment History

The 2006/2007 Walton County/Destin Beach Restoration Project, completed in the summer of 2007, restored approximately seven miles of beach extending from FDEP reference monument R-39 in Destin (Okaloosa County) to FDEP reference monument R-23.8 in Walton County (**Figure 1.1**). This project was the first restoration of the project area, and no subsequent nourishment has occurred. Project construction occurred in three phases: February – May 2006 (R-6 – R-23.8 in Walton County), December – January 2007 (R-1 – R-6 in Walton County), and May – June 2007 (R-39 – R-50 in Okaloosa County).

Based on the availability of beach-quality sand, the East Pass ebb shoal vicinity served as the borrow area for the beach restoration project. The City of Destin and Walton County contracted Great Lakes Dredge and Dock Co. (GLDD) to dredge approximately 3,000,000 cubic yards (cy) of sand from the borrow area with a hopper dredge.

2.2 Beach Profile Surveys

This study analyzed the 2006/2007 construction project's pre- and post-construction, post-storm (Hurricane Sally), and fifteen-year post-construction surveys (**Table 2.1**), which document conditions within the project and control areas. Surveyors applied traditional methods to collect all survey data in accordance with the Bureau of Beaches and Coastal Systems (BBCS) monitoring standards. All survey profiles extend beyond the -30 ft contour, referenced to the 1988 North American Vertical Datum (NAVD). Past monitoring reports provide additional information regarding survey history of the project area (Bridges, Trudnak, and Krecic, 2007; Malick, Trudnak, and Krecic, 2008; Trudnak and Arnouli, 2009; Trammell and Trudnak, 2010; Trammell and Trudnak, 2012; Trammell, Trudnak, and Greer, 2014).

Table 2.1 Eastern Destin Beach Monitoring Area Surveys

Survey Description	Date	Coverage	Surveyor
Pre-Construction	August 2005	Project and Control Areas	Morgan & Eklund
Post-Construction	July 2007	Project and Control Areas	FDEP
Post-Storm (Hurricane Sally)	November 2020	Project and Control Areas	Dewberry
Fifteen-Year Post-Construction	June 2022	Project and Control Areas	Seaside Engineering and Surveying

Table 2.2 lists the FDEP reference monument locations associated with the monitoring surveys. These monuments comprise an extensive network of survey control that the FDEP (formerly the Florida Department of Natural Resources) established and has maintained since the early 1970s. These locations serve as temporally consistent base points to originate beach profile surveys.

Notably, the Walton County/Destin Beach Restoration Project did not originally include FDEP reference monuments R-31 to R-33 in the west control area. However, the County included these monuments for a contiguous analysis in conjunction with the Western Destin monitoring area (R-17 – R-30). From the review of the profile plots (**Appendix A**), data is available for R-31, R-32, and R-33 for all surveys being analyzed.

Table 2.2 Okaloosa County Reference Monument Locations

FDEP Monument		Easting ¹ (ft)	Northing ¹ (ft)	Azimuth ² (°N)
R-31 to R-33	R-31	1,350,799.1	508,741.5	175
	R-32	1,351,659.1	508,622.3	180
	R-33	1,352,719.8	508,570.1	180
West Control Area	R-34	1,353,685.7	508,547.6	180
	R-35	1,354,672.1	508,399.4	180
	R-36	1,355,610.7	508,544.6	180
	R-37	1,356,715.1	508,493.3	185
	R-38	1,357,751.7	508,414.4	185
Project Area	R-39	1,358,895.5	508,254.0	185
	R-40	1,359,485.7	508,090.6	185
	R-41	1,360,801.8	507,980.2	185
	R-42	1,361,775.5	507,900.9	185
	R-43	1,362,726.4	507,695.0	185
	R-44	1,363,662.7	507,588.9	185
	R-45	1,364,749.2	507,535.8	185
	R-46	1,365,879.1	507,291.8	185
	R-47	1,366,817.3	507,150.7	185
	R-48	1,367,882.3	507,156.3	185
	R-49	1,368,834.2	506,966.6	185
	R-50	1,369,819.4	506,782.2	185

¹State Plane, Florida North Zone, North American Datum of 1983 (NAD83)

²Degrees clockwise from north

3.0 FILL PLACEMENT ANALYSIS

3.1 Overview

Project monitoring generally involves analyses of two parameters — changes to the shoreline position and the volume of fill remaining within the project area — to determine the evolution of beach fill over time. Calculating the distance from a given point (the survey monument) to a known elevation, in this case MHW, yields shoreline positions. Tracking volume changes between surveys within pre-determined boundaries reveals project evolution over time. Changes above MHW represent variations to the subaerial or dry beach — the area typically considered by the public as “the beach.” Changes below MHW — also called subaqueous changes — indicate material volume remaining within the active profile, frequently in bar formations.

Application of a controlling distance incorporates the cross-shore shoreline and volume data along a single transect (at each monument location) over an alongshore area. In general, a monument’s controlling distance extends between the halfway points of adjacent monuments; however, exceptions to the above definition exist in the project and control areas. Controlling distances are defined by the 2006/2007 Walton County/Destin Beach Restoration Project. A weighted averaging procedure associates the controlling distance with the MHW shoreline position and cross-shore volume at each monument location. This procedure serves to establish a comparative basis throughout an alongshore distance. In this case, the alongshore areas include R-31 to R-33, the western control area (R-34 – R-39), and the project area (R-39 – R-50). Notably, past project monitoring reports have considered R-34 as the western limit of the monitoring area. The analysis presented here extends that area to R-31 as each of the analyzed surveys includes profile data to this point. As such, readers should apply care when comparing results shown herein versus previous monitoring reports.

This chapter documents the 2022 fifteen-year post-construction conditions of the project and control area beach profiles, shoreline positions, and beach volumes in the project and control areas of the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration Project. Comparison between the pre-construction (August 2005) and fifteen-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the immediate post-construction survey (July 2007) and fifteen-year post-construction survey (June 2022) reveals the evolution of the project approximately fifteen years after construction. Comparison between the post-storm survey (November 2020) and fifteen-year post-construction survey (June 2022) reveals the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm.

Appendix A contains beach profile plots for the 2005 pre-construction, 2007 post-construction, 2020 post-storm, and 2022 nine-year post-construction surveys at each monument location listed in Table 2.2. The appendix presents two versions of the beach profile plots; the first plot captures the full extent of the profile while the second focuses on the nearshore beach placement area.

3.2 Shoreline Positions and Changes

Table 3.1 and **Figure 3.1** present the surveyed mean high water (MHW elevation = 0.65 ft- NAVD) shoreline position as a function of distance from each monument. **Table 3.2** and **Figure 3.2** present the MHW shoreline changes for the above-mentioned comparison periods. Straight lines connect the MHW

positions between reference monuments. A positive change in shoreline position indicates seaward shoreline advance, while a negative change indicates landward shoreline retreat.

Notably, **Appendix B** provides these MHW lines overlain on 2015 digital ortho-photography, a convenient qualitative comparison of project shoreline evolution for the monitoring area. Note, the undulating erosion control line (ECL), surveyed as a condition of the FDEP authorization in March 2004, reflects surveyed MHW positions approximately every 50 – 200 ft along the beach. In contrast, the monitoring survey MHW lines derive from the MHW positions at each profile line, spaced roughly 1,000 ft apart; straight lines connect the MHW positions between reference monuments.

3.2.1 Pre-Construction (August 2005) – Fifteen-Year Post-Construction (June 2022)

Comparisons between the 2005 pre-construction (August 2005) and 2022 fifteen-year post-construction (June 2020) MHW shoreline positions reveal changes brought about by construction of the 2013 project and the 2020 storm event. Throughout the monitoring area, all profiles remain seaward of the pre-construction shoreline position.

The project area experienced an average advance of 90.6 ft, with a minimum advance of 14.6 ft (R-42) and a maximum advance of 170.7 ft (R-50). The west control area experienced an average advance of 66.4 ft, with a minimum advance of 23.7 ft (R-37) and a maximum advance of 102.7 ft (R-36). Similarly, R-31 to R-33 experienced an average advance of 62.3 ft, with a minimum advance of 47.1 ft (R-31) and a maximum advance of 76.2 ft (R-32). The Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration shoreline changes generally reflect changes due to project construction with a maximum advance at R-50 (towards the center of the entire 2006/2007 project area) and diminishing shoreline advance towards the west project area limit. These changes, combined with the shoreline advance in the control areas, also indicate the anticipated planform equilibration (i.e., longshore diffusion) of the beach fill from the project area. A net shoreline advance throughout the monitoring area suggests a continued benefit from the 2006/2007 project.

3.2.2 Post-Construction (July 2007) – Fifteen-Year Post-Construction (June 2022)

Shoreline comparisons between the 2007 post-construction (July 2007) and 2022 fifteen-year post-construction (June 2022) surveys indicate the performance of the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration Project fifteen years after construction and include the effects of the 2020 storm event. The shoreline receded landward at all monuments in the project area except at the project extremities of R-39 and R-50, while the shoreline from R-31 to R-33 and in the west control area advanced seaward.

In the project area, the MHW shoreline change ranged from a landward retreat of -84.1 ft (R-40) to a seaward advance of 13.3 ft (R-39) with a weighted average landward retreat of -45.0 ft. The west control area experienced an average advance of 75.1 ft, with a minimum advance of 12.5 ft (R-37) and a maximum advance of 144.1 ft (R-36). Similarly, R-31 to R-33 experienced an average advance of 83.4 ft, with a minimum advance of 77.8 ft (R-31) and a maximum advance of 91.1 ft (R-33). The shoreline changes during this comparison period generally indicate a landward retreat within the project area and shoreline advance within the control area. This trend implies westward longshore sediment transport and suggests the control area experiences a continued benefit from the 2006/2007 project.

3.2.3 Post-Storm (November 2020) – Fifteen-Year Post-Construction (June 2022)

Comparisons between the 2020 post-storm (November 2020) and 2022 fifteen-year post-construction (June 2022) surveys reveal shoreline changes from Hurricane Sally one and a half years after the storm event. The monitoring area shoreline experienced mixed advance and retreat in the project area, advance in the control area except for at R-37, and advance from R-31 to R-33.

The project area experienced an average shoreline advance of 27.9 ft, with a maximum advance of 87.8 ft (R-44) and a maximum retreat of -22.9 ft (R-42). The west control area experienced an average advance of 49.6 ft, with a maximum advance of 83.5 ft (R-36) and a maximum retreat of -12.5 ft (R-37). R-31 to R-33 experienced an average advance of 24.4 ft, with a minimum advance of 6.5 ft (R-33) and a maximum advance of 60.5 ft (R-32). A net shoreline advance throughout the monitoring area for this comparison period is anticipated due to the storm event and seasonal evolution of beach profiles, as sand is generally eroded from the nearshore during the elevated wave climate of a storm event (shown by the November 2020 survey) and deposited in the nearshore during comparably calm summer conditions (shown by the June 2022 survey).

Table 3.1 MHW Shoreline Positions (ft from respective monument)

FDEP Reference Monument		Controlling Distance	2005 Pre-Const.	2007 Post-Const.	2020 Post-Storm	2022 15-Yr Post-Const.
			Aug 2005	Jul 2007	Nov 2020	Jun 2022
		ft	ft	ft	ft	ft
R-31 to R-33	R-31	1,549	244.9	214.1	272.6	291.9
	R-32	965	175.3	171.3	191.0	251.5
	R-33	1,497	188.7	166.7	251.3	257.9
Weighted Average R-31 to R-33			207.1	186.1	245.0	269.5
West Control Area	R-34	499	232.3	221.5	245.6	305.9
	R-35	974	177.6	184.1	213.5	236.2
	R-36	1,028	397.9	356.5	417.1	500.6
	R-37	1,073	401.5	412.7	437.7	425.2
	R-38	1,675	404.7	395.0	397.5	478.6
West Control Area Weighted Average R-34 to R-38			344.2	335.5	361.0	410.6
Project Area	R-39	306	354.4	441.4	426.0	454.7
	R-40	967	278.8	409.8	331.4	325.7
	R-41	1,149	334.7	470.9	356.1	434.5
	R-42	975	388.3	499.8	425.8	403.0
	R-43	958	300.3	440.0	339.3	386.0
	R-44	1,015	275.9	417.7	302.1	389.9
	R-45	1,122	368.5	472.4	430.9	425.0
	R-46	1,052	224.6	380.2	337.8	347.1
	R-47	1,007	224.8	372.2	291.2	319.5
	R-48	1,018	387.4	528.0	482.9	470.8
	R-49	986	315.9	463.4	385.1	440.4
	R-50	726	248.9	408.6	369.6	419.6
Project Area Weighted Average R-39 to R-50			307.7	443.3	370.4	398.3
Total Area Weighted Average R-31 to R-50			297.4	365.5	343.5	376.3

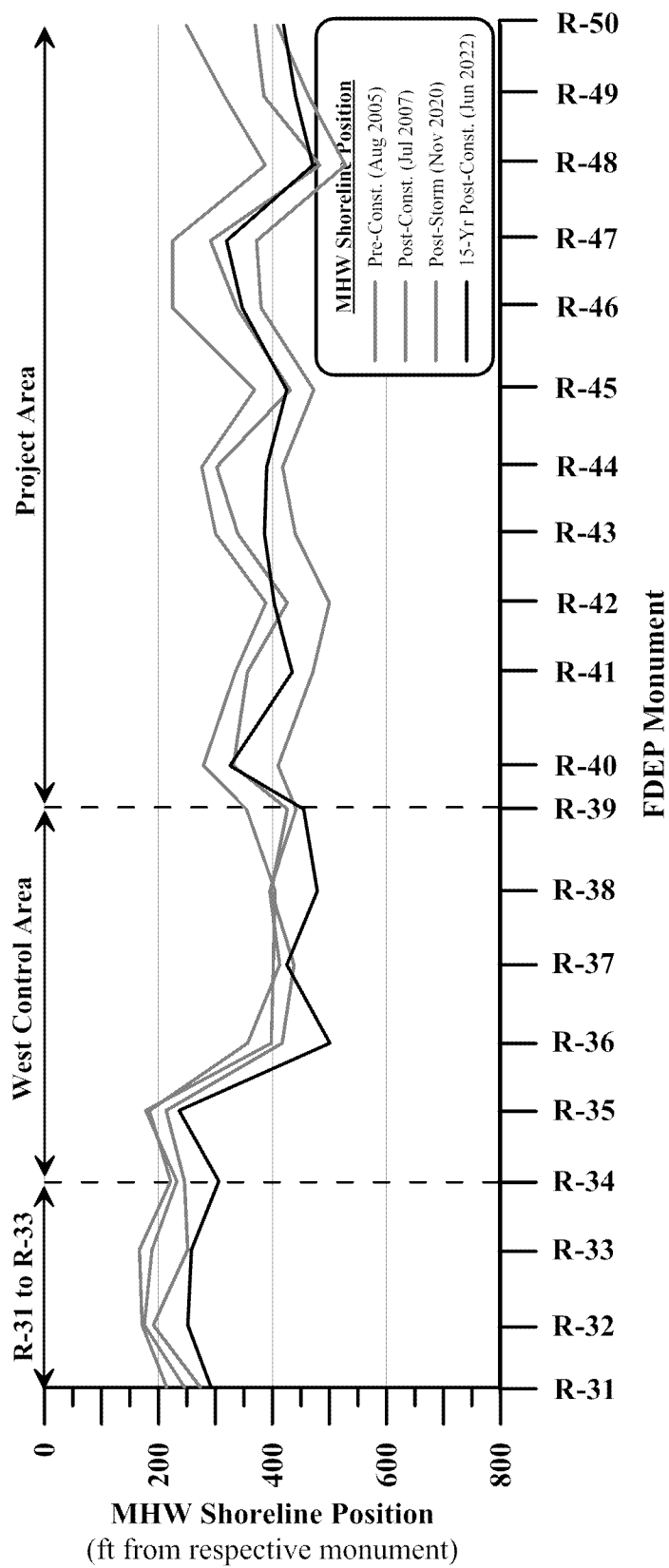


Figure 3.1 MHW Shoreline Position

Table 3.2 MHW Shoreline Position Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.	2007 Post-Const. - 2022 15-Yr Post-Const.	2020 Post-Storm - 2022 15-Yr Post-Const.
			Aug 2005 – Jun 2022	Jul 2007 - Jun 2022	Nov 2020 - Jun 2022
		ft	ft	ft	ft
R-31 to R-33	R-31	1,549	47.1	77.8	19.3
	R-32	965	76.2	80.2	60.5
	R-33	1,497	69.2	91.1	6.5
Weighted Average R-31 to R-33			62.3	83.4	24.4
West Control Area	R-34	499	73.6	84.4	60.3
	R-35	974	58.6	52.1	22.7
	R-36	1,028	102.7	144.1	83.5
	R-37	1,073	23.7	12.5	-12.5
	R-38	1,675	73.9	83.5	81.0
West Control Area Weighted Average R-34 to R-38			66.4	75.1	49.6
Project Area	R-39	306	100.3	13.3	28.7
	R-40	967	46.9	-84.1	-5.7
	R-41	1,149	99.8	-36.4	78.4
	R-42	975	14.6	-96.8	-22.9
	R-43	958	85.7	-53.9	46.7
	R-44	1,015	114.0	-27.8	87.8
	R-45	1,122	56.5	-47.4	-5.9
	R-46	1,052	122.5	-33.1	9.3
	R-47	1,007	94.7	-52.7	28.3
	R-48	1,018	83.4	-57.2	-12.1
	R-49	986	124.6	-23.0	55.3
	R-50	726	170.7	11.0	49.9
Project Area Weighted Average R-39 to R-50			90.6	-45.0	27.9
Total Area Weighted Average R-31 to R-50			78.9	10.8	32.8

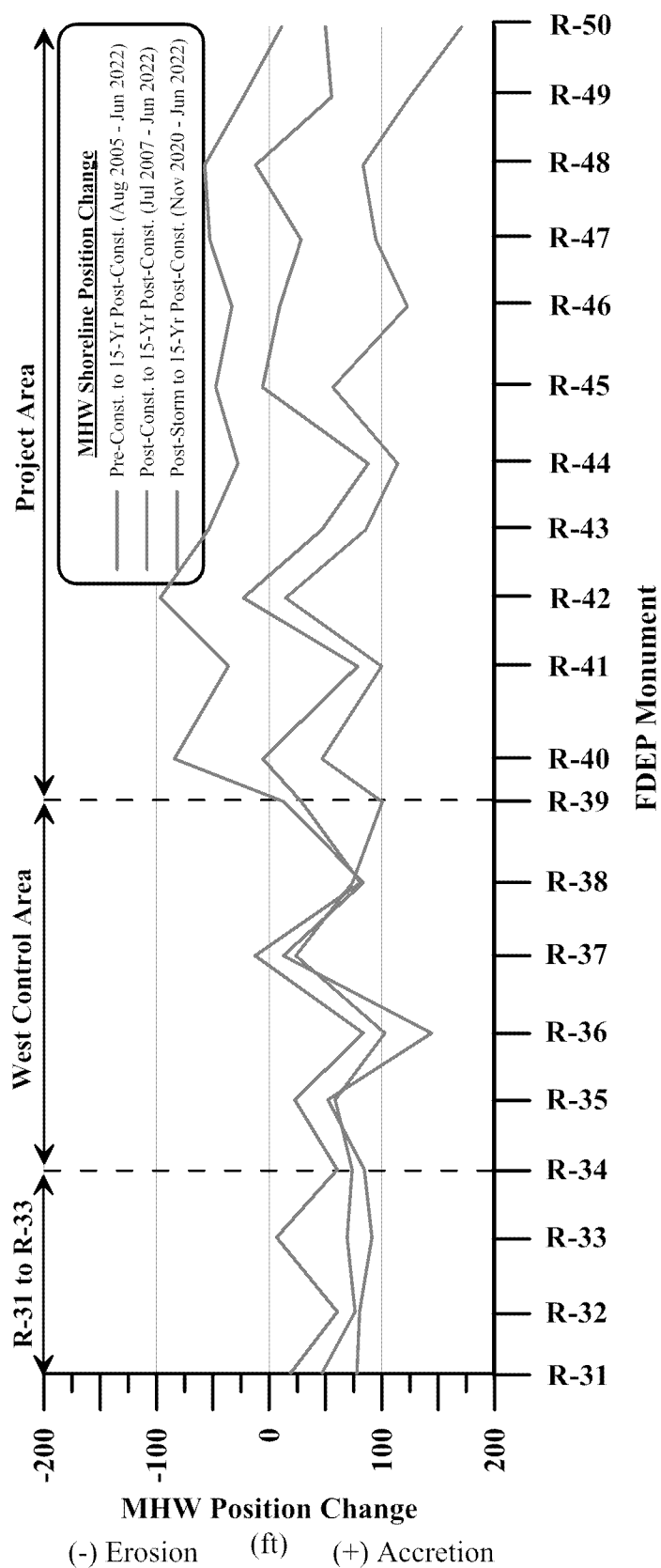


Figure 3.2 MHW Shoreline Position Change (ft)

3.3 Beach Volume Changes

As discussed in Section 3.1, beach volume changes also indicate project performance. Volume change calculations require two surveys for comparison purposes. Comparison between the pre-construction (August 2005) and fifteen-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the post-construction (July 2007) and fifteen-year post-construction (June 2022) surveys reveals the evolution of the project approximately fifteen years after construction. Comparison between the post-storm (November 2020) and fifteen-year post-construction (June 2022) surveys reveals the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm.

For each monument location, Taylor Engineering calculated volume changes within five vertical compartments along each profile — dune to MHW (0.65 ft-NAVD), MHW to MLW (-0.62 ft-NAVD), MLW to -20 ft-NAVD, -20 ft to -30 ft-NAVD, and -30 ft to -50 ft-NAVD. The sum of all vertical compartments yields the overall profile volume change across the profile. Volume changes above MHW represent variations to the subaerial or dry beach — the area the public typically considers “the beach.” Below MHW volume changes — also called subaqueous changes — indicate the submerged volume remaining. Notably, historical reports of the monitoring area (Trammell, Trudnak, and Greer, 2014) limited the offshore extent of the volume comparisons to -30 ft-NAVD, as the profiles generally converged beyond this contour. However, for the sake of completeness, this report includes the additional compartment below -30 ft-NAVD. From review of the profile plots (**Appendix A**), all profiles extend to -50 ft-NAVD.

The beach monitoring area consists of the project area, the west control area, and R-31 to R-33. **Table 3.3 – Table 3.10** and **Figure 3.3 – Figure 3.9** present beach volume changes in the above-mentioned compartments at each reference monument location. Straight lines connect the volume changes between reference monuments. With the beach volume changes rounded to tenths for cubic yard/foot (cy/ft) values and to hundreds for cubic yard (cy) values, some of the reported integrated values may not match exactly.

3.3.1 Pre-Construction (August 2005) – Fifteen-Year Post-Construction (June 2022)

Comparison of the 2005 pre-construction and the 2022 fifteen-year post-construction beach volume changes reveal overall changes brought about by the construction of the 2006/2007 project and the 2020 storm event. The monitoring area generally experienced accretion at all monuments throughout all vertical compartments above -20 ft-NAVD and erosion below -20 ft-NAVD with the exception of accretion at R-47 between -30 ft and -50 ft-NAVD.

Overall, the project area from dune to -30 ft-NAVD experienced net accretion of 832,400 cy (73.8 cy/ft). The net change included accretion between the dune and MHW (359,700 cy), MHW and MLW (53,300), and MLW and -20 ft-NAVD (817,400) and erosion between -20 ft and -30 ft-NAVD (-398,000 cy) and -30 ft and -50 ft-NAVD (-13,000 cy). Bridges et al. (2008) report the contractor placed 890,386 cy within the Destin portion of the project area above -20 ft-NAVD. Thus, the total volume changes above indicate that approximately -58,000 cy (6.5% of the volume placed) have eroded from the project area above -30 ft-NAVD. Notably, the accretion above -20 ft-NAVD totaled 1,230,400 cy — 340,014 cy more than the contractor placed. This result, together with the erosion evident below -20 ft-NAVD, suggests transport of offshore sediments in the onshore direction, a trend also evident in the control area. Similar findings have occurred in past monitoring reports.

Throughout the project and control areas, accretion occurred at all monument locations above MHW, between MHW and MLW, and between MLW and -20 ft-NAVD. In contrast, erosion occurred at all monument locations between -20 ft and -30 ft-NAVD and -30 ft and -50 ft-NAVD with an exception at R-47. Approximately 29% of the net accretion within the project area occurred on the dry beach (above MHW) and 71% occurred below MHW. The project area experienced, on average, 31.9 cy/ft accretion above MHW, 4.7 cy/ft accretion between MHW and MLW, 72.5 cy/ft accretion between MLW and -20 ft-NAVD, -35.3 cy/ft erosion between -20 ft and -30 ft-NAVD, and -1.1 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, the project area above -30 ft-NAVD experienced 73.8 cy/ft accretion and above -50 ft-NAVD experienced 72.7 cy/ft accretion on average. All profiles experienced accretion above -20 ft-NAVD and erosion below -20 ft-NAVD.

The west control area and R-31 to R-33 experienced trends similar to the project area, yet the overall volume changes were generally smaller in magnitude. Overall, the west control area from dune to -30 ft-NAVD experienced net accretion of 176,500 cy (33.6 cy/ft) and R-31 to R-33 experienced net accretion of 86,500 cy (21.6 cy/ft) from dune to -30 ft-NAVD. The control area experienced, on average, 30.9 cy/ft accretion above MHW, 3.4 cy/ft accretion between MHW and MLW, 40.1 cy/ft accretion between MLW and -20 ft-NAVD, -40.7 cy/ft erosion between -20 ft and -30 ft-NAVD, and -2.4 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, the control area experienced 33.6 cy/ft accretion above -30 ft-NAVD and 31.3 cy/ft accretion above -50 ft-NAVD on average. Similarly, R-31 to R-33 experienced, on average, 22.9 cy/ft accretion above MHW, 3.1 cy/ft accretion between MHW and MLW, 41.1 cy/ft accretion between MLW and -20 ft-NAVD, -45.6 cy/ft erosion between -20 ft and -30 ft-NAVD, and -3.1 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, R-31 to R-33 experienced 21.6 cy/ft accretion above -30 ft-NAVD and 18.5 cy/ft accretion above -50 ft-NAVD on average. Similar to the project area, the control area and R-31 to R-33 experienced accretion at all monuments above -20 ft-NAVD and erosion between -20 and -50 ft-NAVD. The erosion below -20 ft-NAVD in the entire monitoring area suggests onshore movement of the offshore bar and lowering of the seaward face of the bar. Overall, substantial accretion throughout the monitoring area indicates the Walton County/Destin Beach Restoration Project continues to provide a substantial benefit to the Okaloosa County/City of Destin portion of the project area.

3.3.2 Post-Construction (July 2007) – Fifteen-Year Post-Construction (June 2022)

Comparison of the 2007 post-construction and 2022 fifteen-year post-construction beach volume changes indicate the evolution of the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration project fifteen years after construction, including the effects of the 2020 storm. The project area generally experienced net erosion throughout all vertical compartments above MLW, accretion throughout all monuments between MLW and -20 ft-NAVD, and erosion at all monuments below -20 ft-NAVD. The control areas generally experienced accretion at all monuments throughout all vertical compartments above -20 ft-NAVD and erosion below -20 ft-NAVD with the exception of accretion at R-37 between -30 ft and -50 ft-NAVD.

Overall, the project area from dune to -30 ft-NAVD experienced net accretion of 124,800 cy (11.1 cy/ft). The project area experienced, on average, -3.3 cy/ft erosion above MHW, -1.9 cy/ft erosion between MHW and MLW, 51.4 cy/ft accretion between MLW and -20 ft-NAVD, -35.2 cy/ft erosion between -20 ft and -30 ft-NAVD, and -2.2 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, the project area above -30 ft-NAVD experienced 11.1 cy/ft accretion and above -50 ft-NAVD experienced 8.9 cy/ft accretion on average. All monument locations experienced accretion between MLW and -20 ft-NAVD, with mainly erosion occurring above MLW and below -20 ft-NAVD. Similar to the discussion above, the post-construction – fifteen-year post-construction profile changes indicate significant bar formation,

apparently resulting from the landward movement of the offshore sediment (below -20 ft NAVD) coupled with the seaward movement of nearshore sediment (most notable between the berm elevation and MLW).

The control area and R-31 to R-33 experienced slightly different trends than the project area. Overall, the west control area from dune to -30 ft-NAVD experienced net accretion of 280,400 cy (53.4 cy/ft), and R-31 to R-33 experienced net accretion of 200,200 cy (49.9 cy/ft) from dune to -30 ft-NAVD. The control area experienced, on average, 25.3 cy/ft accretion above MHW, 3.7 cy/ft accretion between MHW and MLW, 61.5 cy/ft accretion between MLW and -20 ft-NAVD, -37.1 cy/ft erosion between -20 ft and -30 ft-NAVD, and -1.5 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, the control area experienced 53.4 cy/ft accretion above -30 ft-NAVD and 52.0 cy/ft accretion above -50 ft-NAVD on average. R-31 to R-33 experienced, on average, 20.1 cy/ft accretion above MHW, 4.1 cy/ft accretion between MHW and MLW, 66.7 cy/ft accretion between MLW and -20 ft-NAVD, -41.1 cy/ft erosion between -20 ft and -30 ft-NAVD, and -1.9 cy/ft erosion between -30 ft and -50 ft-NAVD. In total, R-31 to R-33 experienced 49.9 cy/ft accretion above -30 ft-NAVD and 48.0 cy/ft accretion above -50 ft-NAVD on average. Again, the erosion between -20 ft and -30 ft NAVD throughout the monitoring area suggests landward movement of the offshore bar. The greater net accretion within the control area indicates westward diffusion of the beach fill.

3.3.3 Post-Storm (November 2020) – Fifteen-Year Post-Construction (June 2022)

Comparison of the 2020 post-storm and 2022 fifteen-year post-construction beach volume changes indicate the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm. The monitoring area generally experienced net accretion throughout all vertical compartments above -20 ft-NAVD, net erosion between -20 ft and -30 ft-NAVD, and accretion between -30 ft and -50 ft-NAVD.

Overall, the project area from dune to -30 ft-NAVD experienced net accretion of 70,900 cy (6.3 cy/ft). The project area experienced, on average, 4.4 cy/ft accretion above MHW, 1.7 cy/ft accretion between MHW and MLW, 0.4 cy/ft accretion between MLW and -20 ft-NAVD, -0.2 cy/ft erosion between -20 ft and -30 ft-NAVD, and 1.5 cy/ft accretion between -30 ft and -50 ft-NAVD. In total, the project area above -30 ft-NAVD experienced 6.3 cy/ft accretion and above -50 ft-NAVD experienced 7.7 cy/ft accretion on average.

The control area and R-31 to R-33 experienced similar trends to the project area. Overall, the west control area from dune to -30 ft-NAVD experienced net accretion of 68,300 cy (13.0 cy/ft) and R-31 to R-33 experienced net accretion of 48,700 cy (12.1 cy/ft) from dune to -30 ft-NAVD. The control area experienced, on average, 8.2 cy/ft accretion above MHW, 2.5 cy/ft accretion between MHW and MLW, 2.8 cy/ft accretion between MLW and -20 ft-NAVD, -0.5 cy/ft erosion between -20 ft and -30 ft-NAVD, and 1.5 cy/ft accretion between -30 ft and -50 ft-NAVD. In total, the control area experienced 13.0 cy/ft accretion above -30 ft-NAVD and 14.5 cy/ft accretion above -50 ft-NAVD on average. R-31 to R-33 experienced, on average, 4.0 cy/ft accretion above MHW, 1.1 cy/ft accretion between MHW and MLW, 8.1 cy/ft accretion between MLW and -20 ft-NAVD, -1.1 cy/ft erosion between -20 ft and -30 ft-NAVD, and 1.0 cy/ft accretion between -30 ft and -50 ft-NAVD. In total, R-31 to R-33 experienced 12.1 cy/ft accretion above -30 ft-NAVD and 13.2 cy/ft accretion above -50 ft-NAVD on average. Accretion in the nearshore is anticipated in post-storm recovery, as sand is eroded from the nearshore during the elevated wave climate of a storm event and deposited in the nearshore during comparably calm summer conditions. However, the net accretion experienced throughout the vertical compartments of the monitoring area

(excluding minor net erosion between -20 and -30 ft-NAVD) could be attributable to longshore sediment transport originating outside of the monitoring area.

Table 3.3 Dune to MHW Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	17.2	26,600	15.1	23,300	3.3	5,100
	R-32	965	21.9	21,100	18.4	17,800	11.9	11,500
	R-33	1,497	29.6	44,300	26.5	39,700	-0.3	-400
Weighted Average Total R-31 to R-33			22.9	92,000	20.1	80,800	4.0	16,200
West Control Area	R-34	499	29.7	14,800	21.8	10,900	8.5	4,300
	R-35	974	28.6	27,800	21.5	20,900	2.0	1,900
	R-36	1,028	40.8	42,000	38.3	39,400	16.7	17,200
	R-37	1,073	31.3	33,600	19.3	20,700	-0.7	-700
	R-38	1,675	26.2	43,900	24.4	40,800	12.1	20,300
West Control Area Weighted Average Total R-34 to R-38			30.9	162,100	25.3	132,700	8.2	43,000
Project Area	R-39	306	44.1	13,500	12.1	3,700	5.7	1,800
	R-40	967	18.6	17,900	-10.0	-9,700	-0.9	-900
	R-41	1,149	27.2	31,200	-10.0	-11,500	10.6	12,200
	R-42	975	29.5	28,800	-1.4	-1,400	-1.4	-1,300
	R-43	958	29.3	28,100	-8.0	-7,700	5.5	5,300
	R-44	1,015	30.2	30,600	-3.8	-3,900	15.7	15,900
	R-45	1,122	29.5	33,100	-2.4	-2,700	-0.5	-600
	R-46	1,052	42.6	44,800	3.9	4,100	0.3	300
	R-47	1,007	36.0	36,200	-2.5	-2,500	5.5	5,600
	R-48	1,018	27.2	27,600	-5.6	-5,700	-0.6	-600
	R-49	986	36.7	36,200	-2.3	-2,200	7.1	7,000
	R-50	726	43.7	31,700	3.1	2,200	6.4	4,700
Project Area Weighted Average Total R-39 to R-50			31.9	359,700	-3.3	-37,300	4.4	49,400
Total Area Weighted Average Total R-31 to R-50			29.9	613,800	8.6	176,200	5.3	108,600

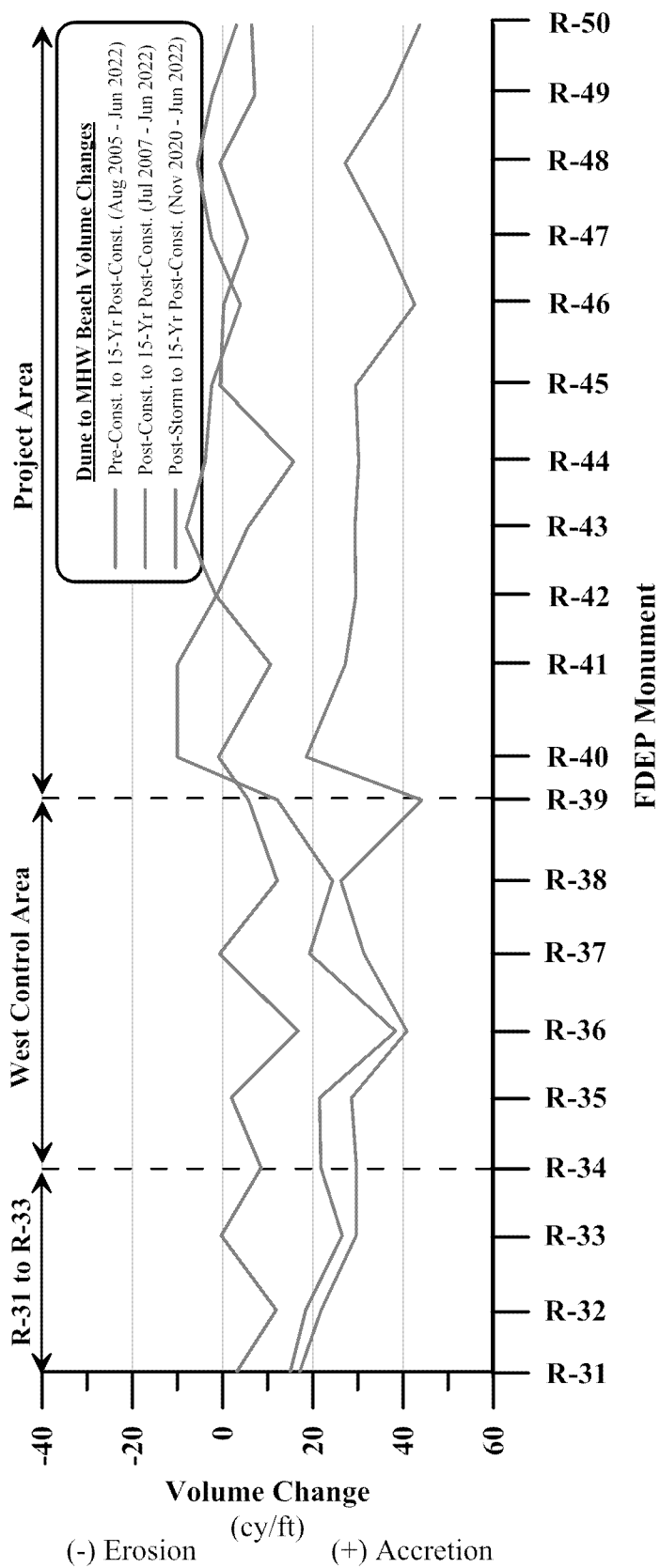
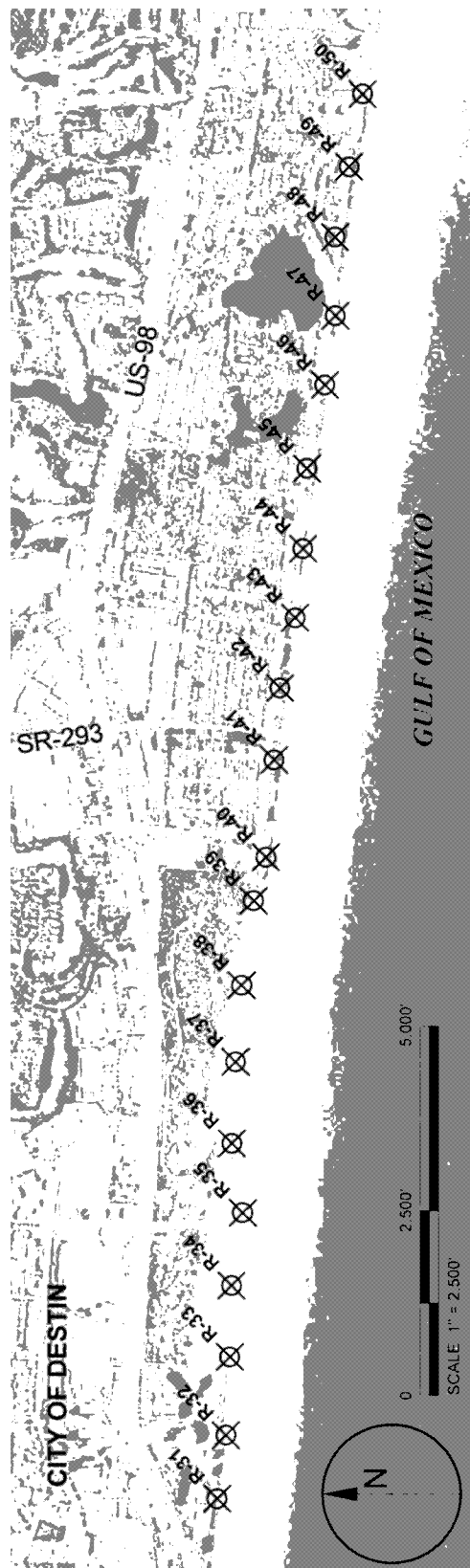


Figure 3.3 Dune to MHW Beach Volume Changes (cy/ft)

Table 3.4 MHW to MLW Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	2.6	4,100	4.0	6,300	1.0	1,600
	R-32	965	3.7	3,500	3.9	3,700	2.9	2,800
	R-33	1,497	3.3	5,000	4.3	6,400	0.0	0
Weighted Average Total R-31 to R-33			3.1	12,600	4.1	16,400	1.1	4,400
West Control Area	R-34	499	3.8	1,900	4.3	2,100	3.1	1,500
	R-35	974	3.4	3,300	3.0	3,000	1.5	1,500
	R-36	1,028	4.9	5,000	6.6	6,800	3.9	4,100
	R-37	1,073	1.2	1,300	0.7	700	-0.5	-500
	R-38	1,675	3.7	6,200	4.2	7,000	4.1	6,800
West Control Area Weighted Average Total R-34 to R-38			3.4	17,700	3.7	19,600	2.5	13,400
Project Area	R-39	306	4.9	1,500	0.6	200	1.5	500
	R-40	967	3.5	3,400	-2.8	-2,700	1.0	900
	R-41	1,149	5.0	5,700	-1.7	-2,000	4.0	4,600
	R-42	975	0.8	800	-4.8	-4,700	-1.0	-900
	R-43	958	4.7	4,500	-2.2	-2,100	2.7	2,600
	R-44	1,015	6.2	6,200	-0.9	-900	4.9	5,000
	R-45	1,122	2.8	3,100	-2.5	-2,800	-0.2	-200
	R-46	1,052	6.1	6,400	-1.4	-1,500	0.8	800
	R-47	1,007	5.0	5,000	-1.9	-1,900	1.9	1,900
	R-48	1,018	4.0	4,100	-2.8	-2,800	-0.6	-600
	R-49	986	6.4	6,300	-0.7	-700	3.1	3,000
	R-50	726	8.7	6,300	1.1	800	2.9	2,100
Project Area Weighted Average Total R-39 to R-50			4.7	53,300	-1.9	-21,100	1.7	19,700
Total Area Weighted Average Total R-31 to R-50			4.1	83,600	0.7	14,900	1.8	37,500

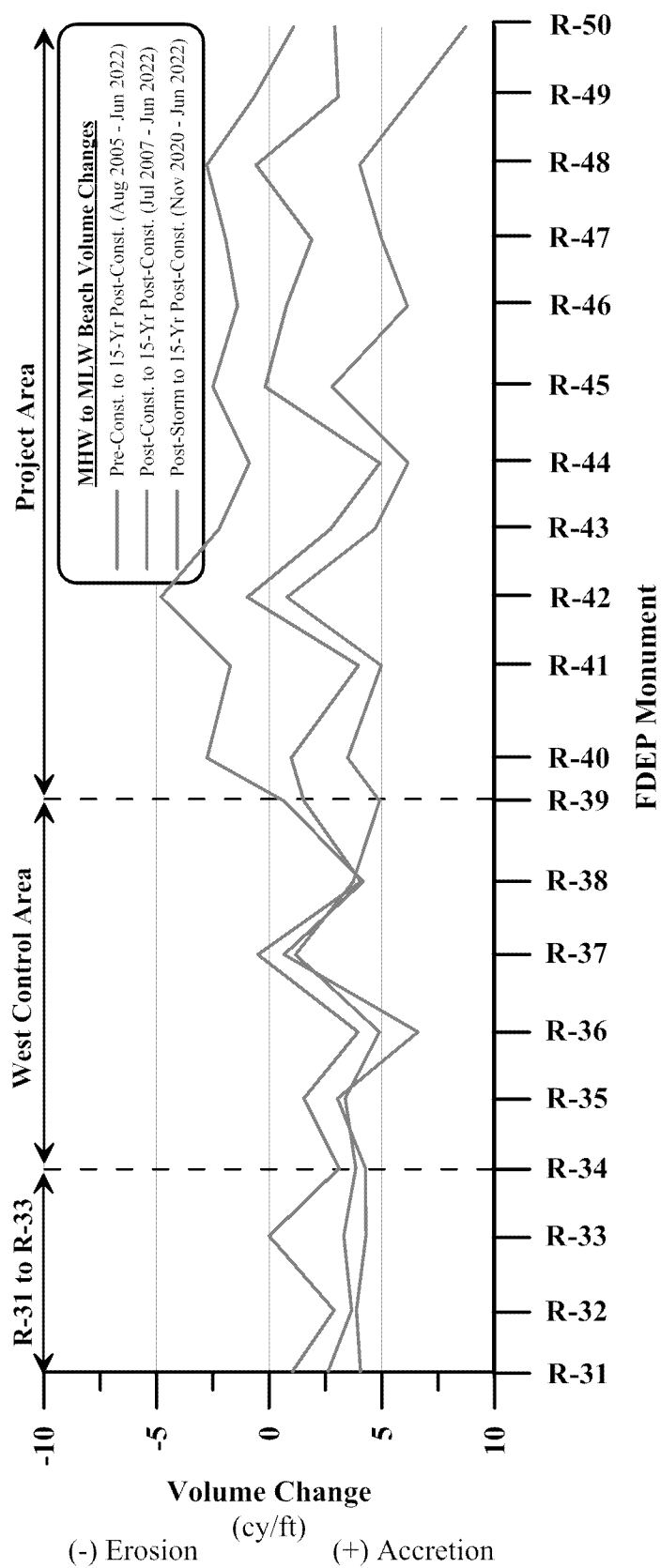
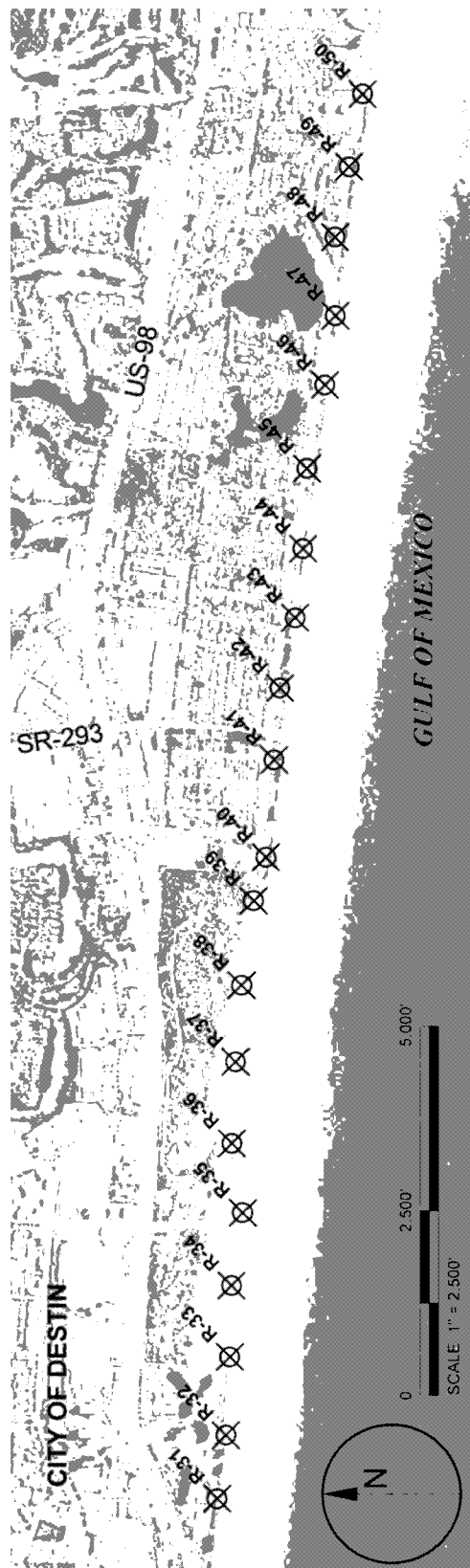


Figure 3.4 MHW to MLW Beach Volume Changes (cy/ft)

Table 3.5 MLW to -20 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	30.0	46,400	56.9	88,100	7.8	12,100
	R-32	965	29.8	28,800	60.2	58,100	-6.2	-5,900
	R-33	1,497	60.0	89,800	81.2	121,600	17.7	26,500
Weighted Average Total R-31 to R-33			41.1	165,000	66.7	267,800	8.1	32,700
West Control Area	R-34	499	57.0	28,400	59.4	29,600	1.9	900
	R-35	974	28.3	27,600	33.5	32,600	-24.8	-24,100
	R-36	1,028	54.4	55,900	102.0	104,800	28.3	29,100
	R-37	1,073	55.3	59,300	55.0	58,900	-8.4	-9,100
	R-38	1,675	23.4	39,200	57.8	96,900	10.6	17,800
West Control Area Weighted Average Total R-34 to R-38			40.1	210,400	61.5	322,800	2.8	14,600
Project Area	R-39	306	94.4	28,900	72.3	22,100	21.5	6,600
	R-40	967	64.5	62,300	51.6	49,900	-11.3	-10,900
	R-41	1,149	85.5	98,200	63.5	73,000	6.7	7,700
	R-42	975	55.6	54,200	65.3	63,600	-7.8	-7,600
	R-43	958	43.2	41,300	22.8	21,800	-9.6	-9,200
	R-44	1,015	72.7	73,800	54.8	55,600	1.2	1,200
	R-45	1,122	54.8	61,500	49.9	56,000	0.7	800
	R-46	1,052	108.7	114,400	66.8	70,300	13.2	13,900
	R-47	1,007	61.1	61,600	37.0	37,300	-6.9	-7,000
	R-48	1,018	69.0	70,300	38.2	38,900	-11.2	-11,400
	R-49	986	76.2	75,100	52.1	51,400	11.1	10,900
	R-50	726	104.3	75,800	55.7	40,500	12.4	9,000
Project Area Weighted Average Total R-39 to R-50			72.5	817,400	51.4	580,400	0.4	4,000
Total Area Weighted Average Total R-31 to R-50			58.1	1,192,800	57.0	1,171,000	2.5	51,300

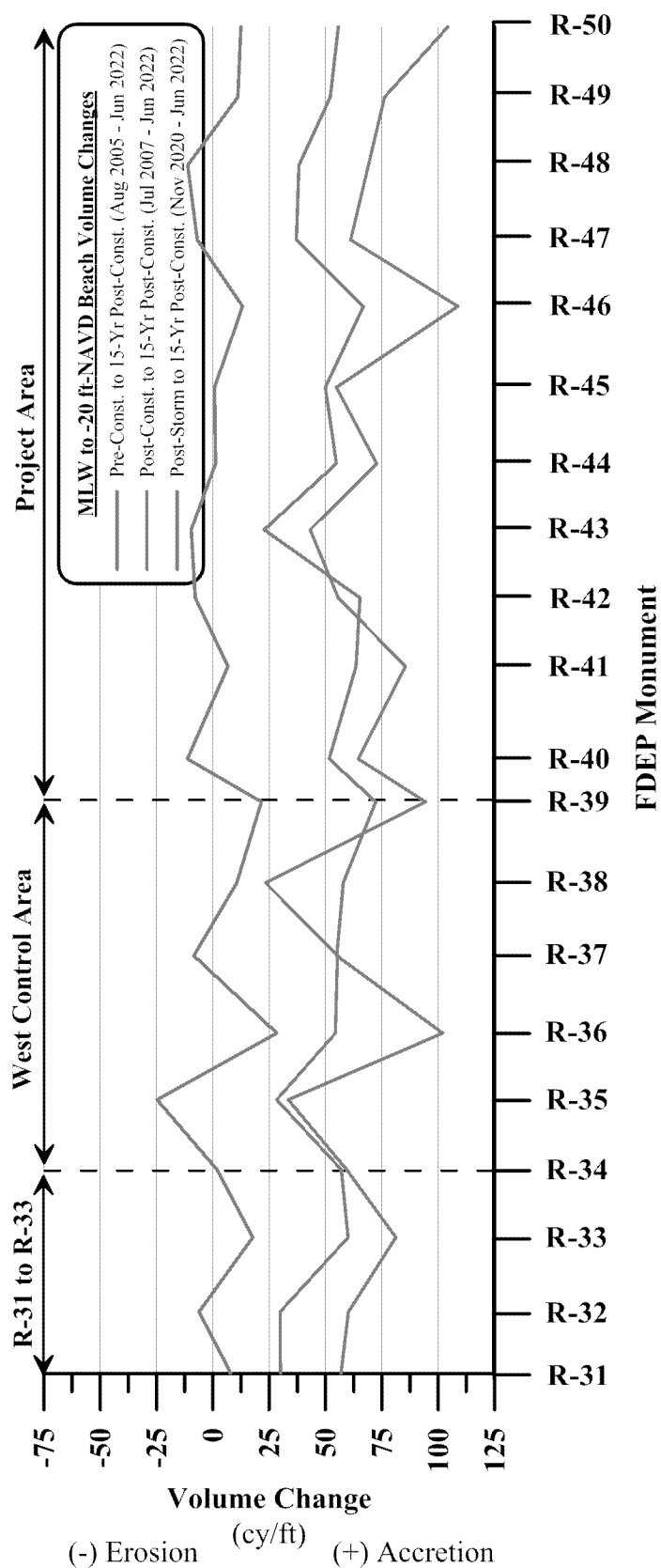


Figure 3.5 MLW to -20 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.6 -20 ft to -30 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	-48.9	-75,800	-43.2	-67,000	-1.3	-2,000
	R-32	965	-40.7	-39,300	-38.1	-36,800	-1.6	-1,500
	R-33	1,497	-45.4	-68,000	-40.7	-61,000	-0.6	-900
Weighted Average Total R-31 to R-33			-45.6	-183,100	-41.1	-164,800	-1.1	-4,400
West Control Area	R-34	499	-42.3	-21,100	-38.5	-19,200	-0.8	-400
	R-35	974	-41.3	-40,200	-36.5	-35,500	-1.6	-1,600
	R-36	1,028	-36.0	-37,000	-36.5	-37,500	0.0	0
	R-37	1,073	-35.2	-37,800	-31.8	-34,100	1.6	1,700
	R-38	1,675	-46.3	-77,600	-40.8	-68,400	-1.4	-2,300
West Control Area Weighted Average Total R-34 to R-38			-40.7	-213,700	-37.1	-194,700	-0.5	-2,600
Project Area	R-39	306	-38.4	-11,700	-37.3	-11,400	-0.2	-100
	R-40	967	-35.7	-34,500	-35.8	-34,600	-0.6	-600
	R-41	1,149	-37.8	-43,400	-36.7	-42,100	-0.7	-800
	R-42	975	-35.3	-34,400	-35.0	-34,100	-0.9	-900
	R-43	958	-39.6	-37,900	-36.1	-34,600	-0.4	-400
	R-44	1,015	-34.8	-35,300	-35.6	-36,100	0.0	0
	R-45	1,122	-36.3	-40,700	-33.7	-37,800	0.1	100
	R-46	1,052	-36.3	-38,200	-35.7	-37,500	0.8	900
	R-47	1,007	-30.4	-30,600	-32.8	-33,000	-0.8	-800
	R-48	1,018	-35.3	-35,900	-35.7	-36,300	0.4	400
	R-49	986	-34.3	-33,800	-35.3	-34,800	-0.3	-300
	R-50	726	-29.7	-21,600	-34.1	-24,800	0.1	100
Project Area Weighted Average Total R-39 to R-50			-35.3	-398,000	-35.2	-397,100	-0.2	-2,400
Total Area Weighted Average Total R-31 to R-50			-38.7	-794,800	-36.8	-756,600	-0.5	-9,400

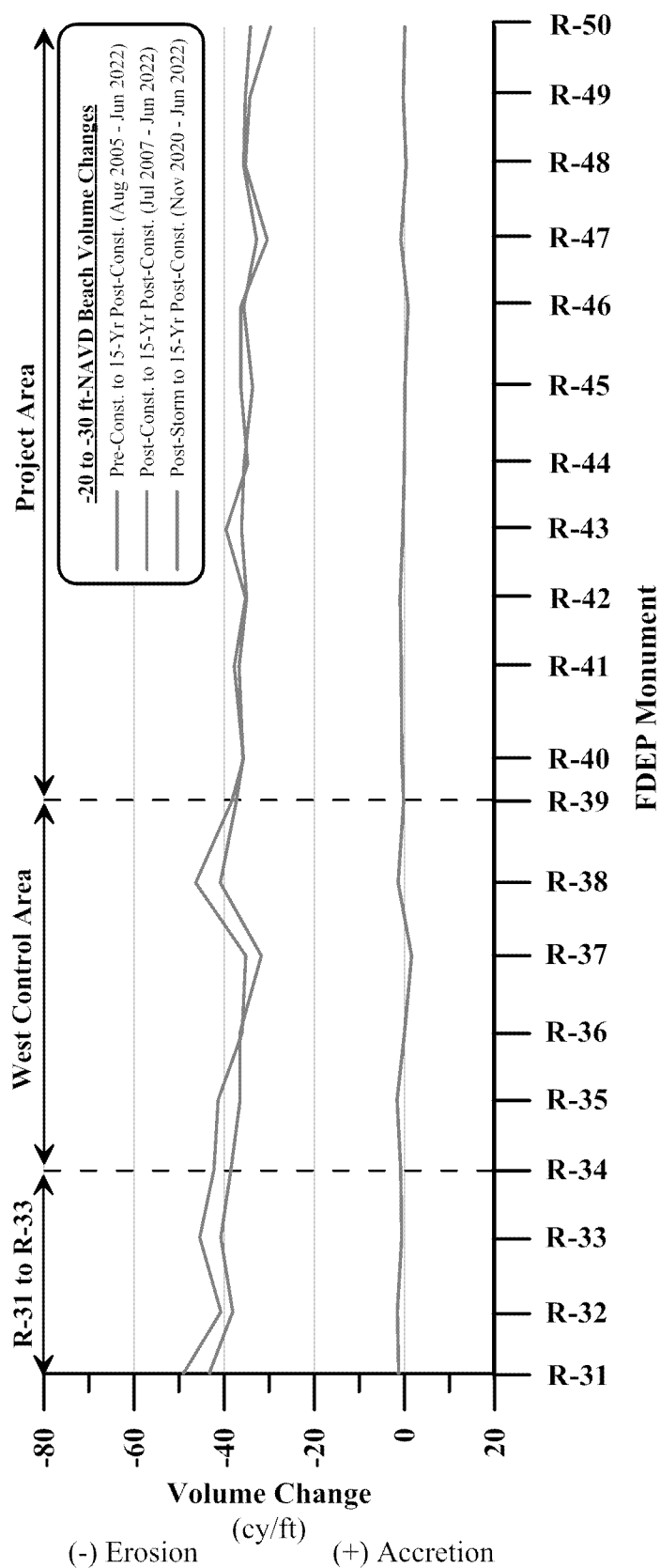
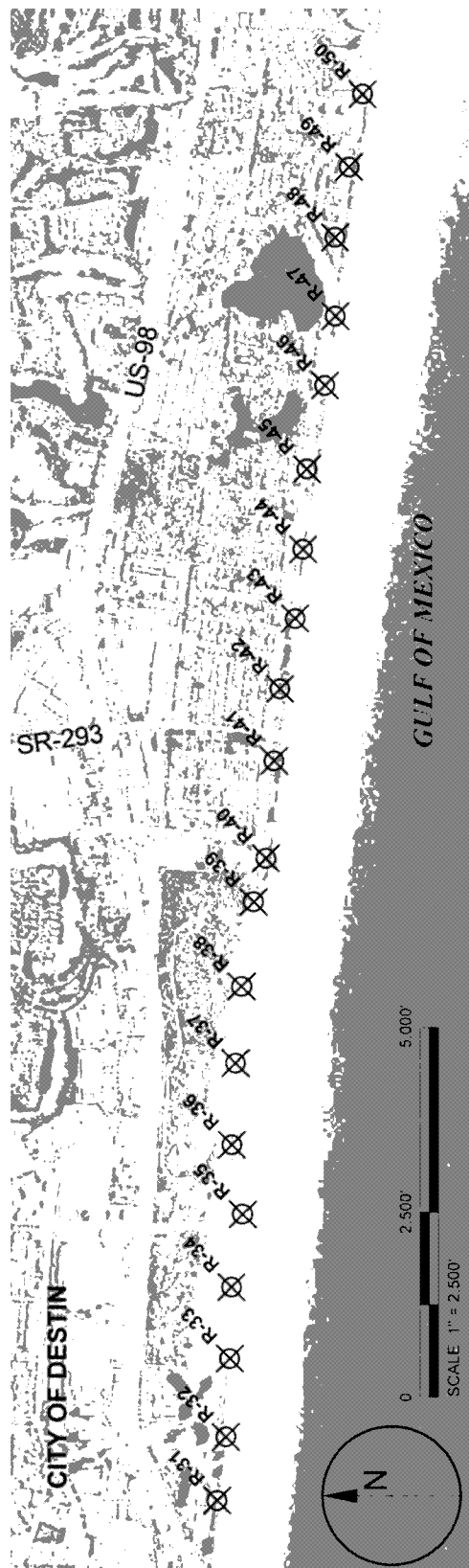


Figure 3.6 -20 to -30 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.7 -30 ft to -50 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	-4.7	-7,300	-2.2	-3,400	1.3	2,000
	R-32	965	-0.9	-800	-1.7	-1,700	0.8	800
	R-33	1,497	-2.8	-4,300	-1.8	-2,700	0.8	1,200
Weighted Average Total R-31 to R-33			-3.1	-12,400	-1.9	-7,800	1.0	4,000
West Control Area	R-34	499	-2.7	-1,300	-2.4	-1,200	0.7	400
	R-35	974	-1.3	-1,200	-1.0	-900	0.5	500
	R-36	1,028	-0.9	-900	-1.4	-1,400	0.7	700
	R-37	1,073	-3.1	-3,300	1.0	1,100	4.0	4,300
	R-38	1,675	-3.4	-5,700	-3.1	-5,200	1.2	2,000
West Control Area Weighted Average Total R-34 to R-38			-2.4	-12,400	-1.5	-7,600	1.5	7,900
Project Area	R-39	306	0.0	0	-2.2	-700	1.5	400
	R-40	967	-1.2	-1,200	-2.5	-2,400	1.0	900
	R-41	1,149	-3.0	-3,400	-2.6	-3,000	2.4	2,700
	R-42	975	-1.2	-1,200	-2.5	-2,500	1.1	1,000
	R-43	958	-0.9	-900	-0.9	-900	1.0	1,000
	R-44	1,015	-1.0	-1,000	-2.0	-2,000	1.6	1,600
	R-45	1,122	-1.7	-1,900	-2.3	-2,600	1.3	1,400
	R-46	1,052	-1.6	-1,700	-3.1	-3,300	1.6	1,700
	R-47	1,007	3.1	3,100	0.0	0	1.3	1,300
	R-48	1,018	-2.4	-2,500	-2.8	-2,800	1.6	1,700
	R-49	986	-1.0	-1,000	-2.5	-2,500	1.6	1,500
	R-50	726	-1.7	-1,300	-3.0	-2,200	1.4	1,000
Project Area Weighted Average Total R-39 to R-50			-1.1	-13,000	-2.2	-24,900	1.5	16,200
Total Area Weighted Average Total R-31 to R-50			-1.8	-37,800	-2.0	-40,300	1.4	28,100

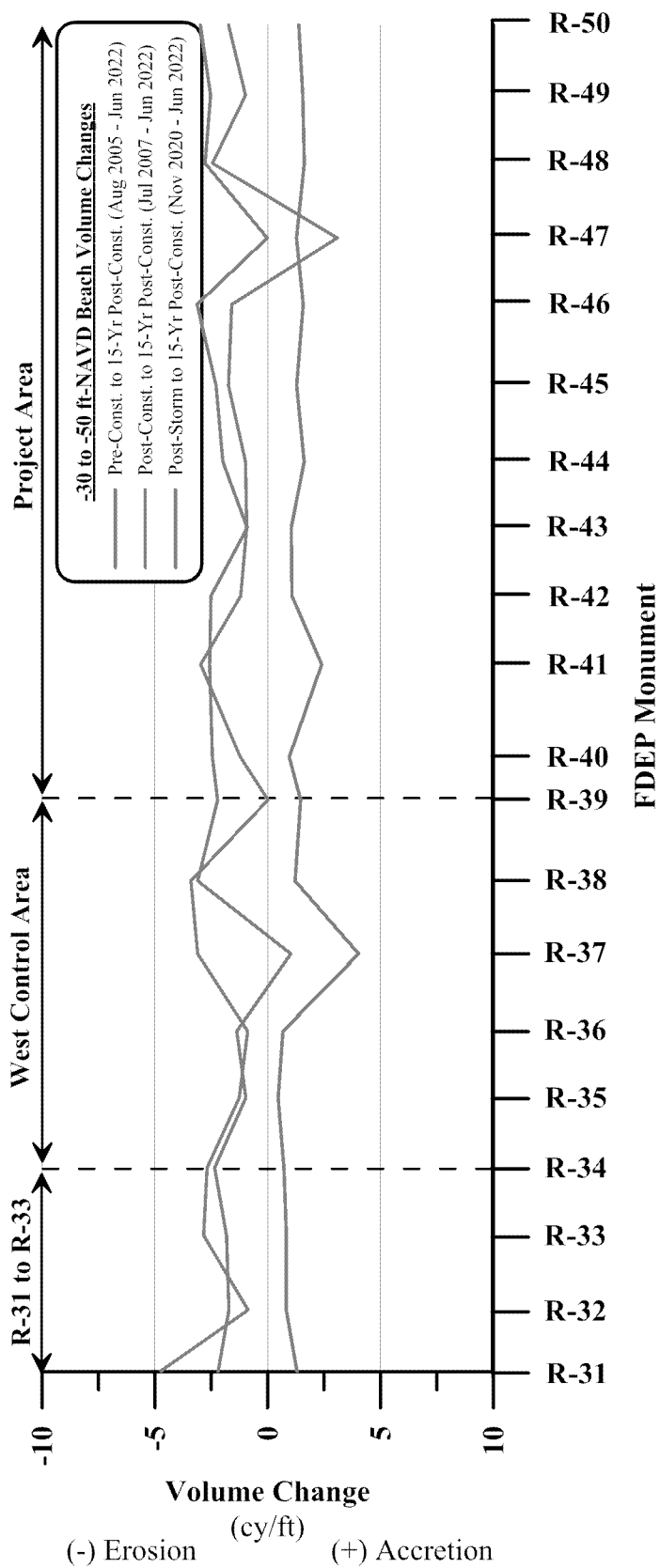
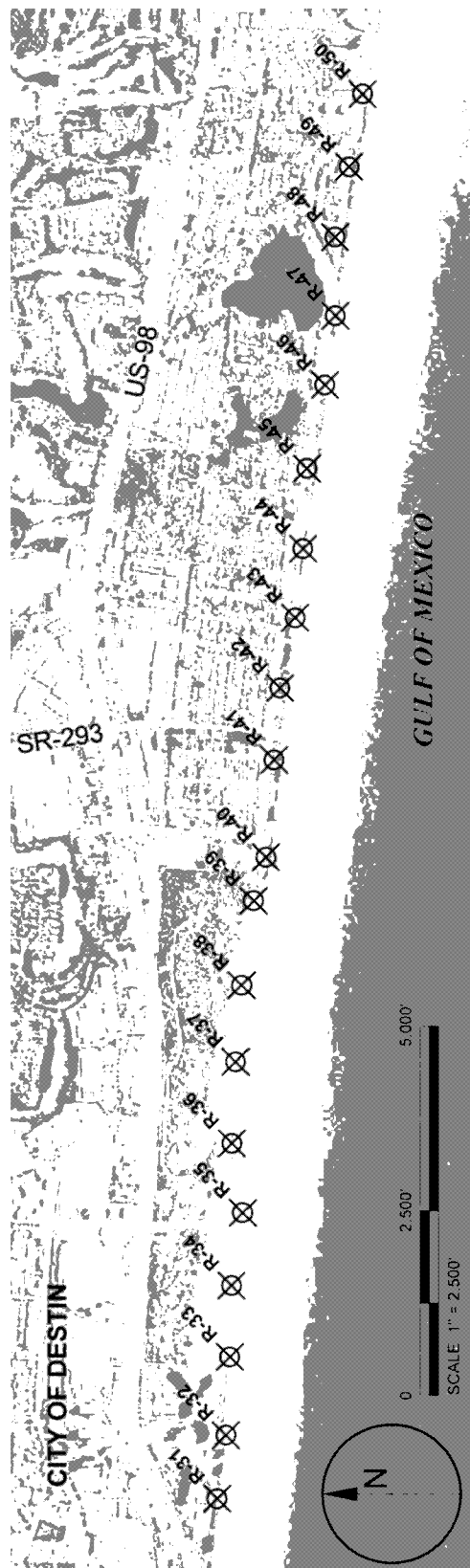


Figure 3.7 -30 to -50 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.8 Dune to -30 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	0.8	1,300	32.7	50,700	10.9	16,800
	R-32	965	14.6	14,100	44.3	42,800	7.0	6,800
	R-33	1,497	47.5	71,100	71.3	106,700	16.8	25,100
Weighted Average Total R-31 to R-33			21.6	86,500	49.9	200,200	12.1	48,700
West Control Area	R-34	499	48.2	24,100	46.9	23,400	12.7	6,300
	R-35	974	18.9	18,400	21.5	21,000	-22.9	-22,300
	R-36	1,028	64.1	65,900	110.4	113,500	49.0	50,400
	R-37	1,073	52.6	56,400	43.2	46,300	-8.0	-8,600
	R-38	1,675	7.0	11,700	45.5	76,200	25.4	42,500
West Control Area Weighted Average Total R-34 to R-38			33.6	176,500	53.4	280,400	13.0	68,300
Project Area	R-39	306	105.0	32,200	47.7	14,600	28.6	8,800
	R-40	967	50.8	49,100	3.0	2,900	-11.8	-11,400
	R-41	1,149	79.8	91,700	15.1	17,400	20.6	23,700
	R-42	975	50.7	49,400	24.0	23,400	-11.1	-10,800
	R-43	958	37.6	36,000	-23.6	-22,600	-1.7	-1,600
	R-44	1,015	74.2	75,300	14.5	14,700	21.8	22,100
	R-45	1,122	50.8	57,000	11.3	12,600	0.1	100
	R-46	1,052	121.1	127,400	33.7	35,500	15.0	15,800
	R-47	1,007	71.7	72,100	-0.2	-200	-0.3	-300
	R-48	1,018	64.9	66,100	-5.8	-5,900	-11.9	-12,100
	R-49	986	85.0	83,800	13.9	13,700	21.0	20,700
	R-50	726	127.0	92,300	25.7	18,700	21.9	15,900
Project Area Weighted Average Total R-39 to R-50			73.8	832,400	11.1	124,800	6.3	70,900
Total Area Weighted Average Total R-31 to R-50			53.3	1,095,400	29.5	605,400	9.1	187,900

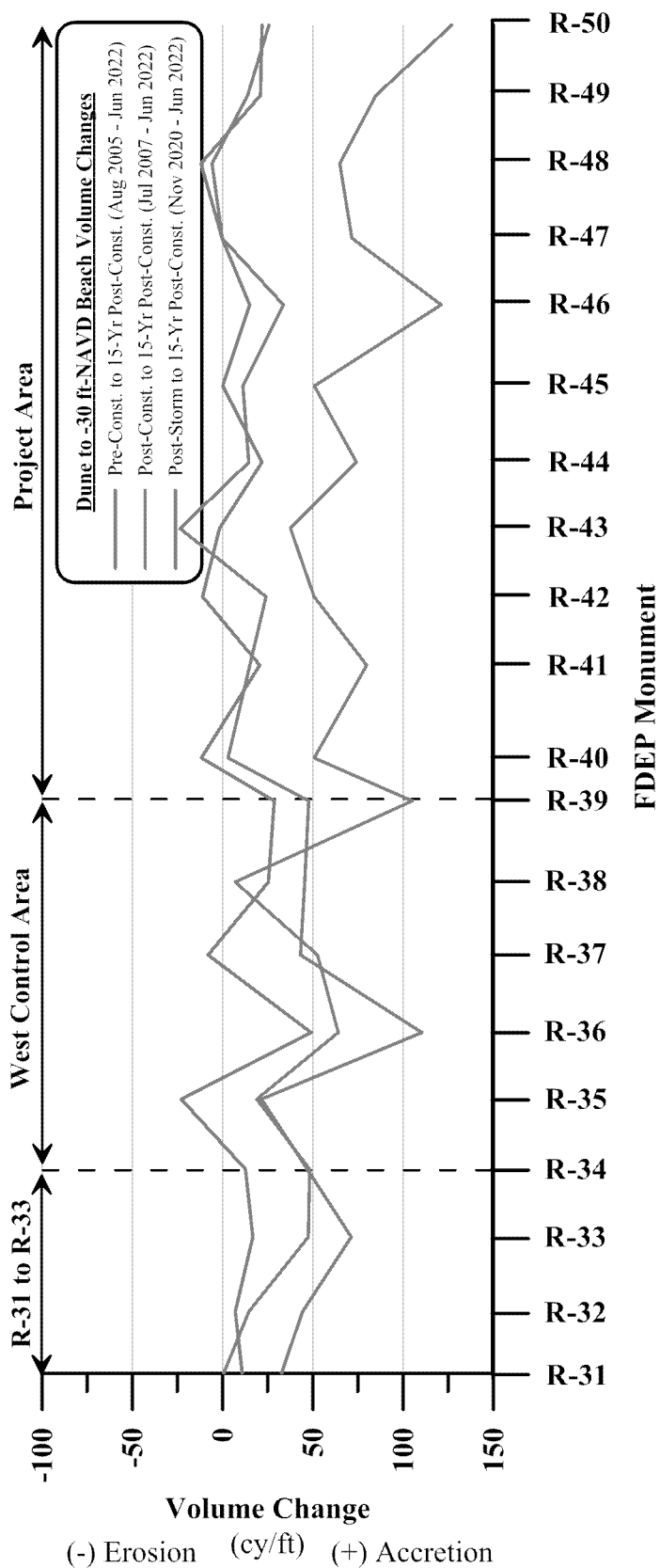
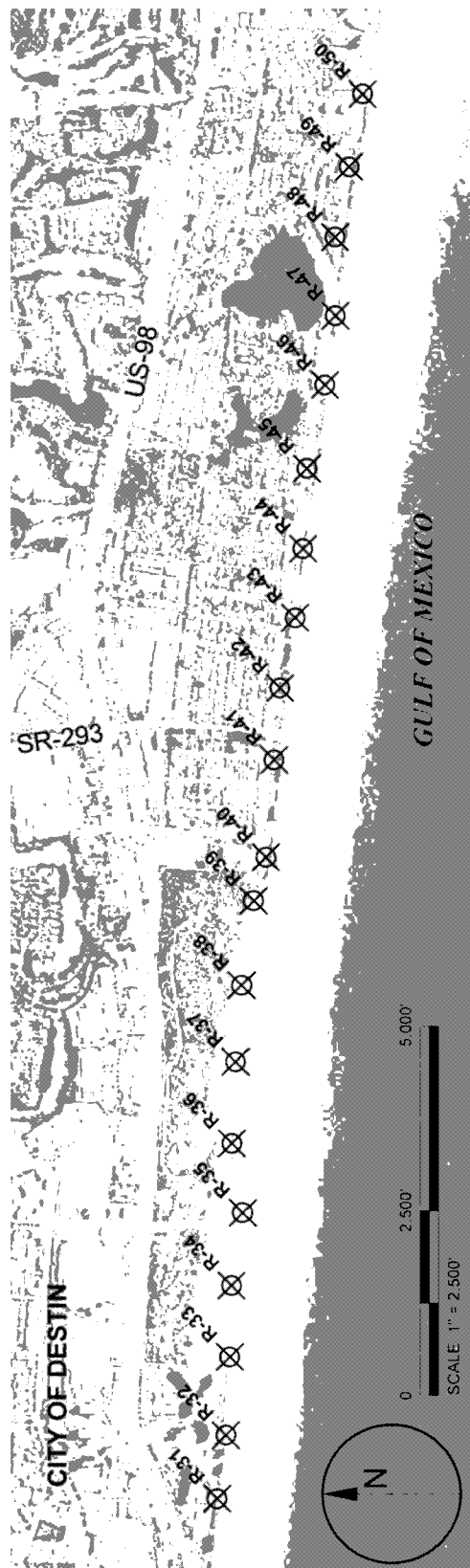


Figure 3.8 Dune to -30 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.9 Dune to -50 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2005 Pre-Const. - 2022 15-Yr Post-Const.		2007 Post-Const. - 2022 15-Yr Post-Const.		2020 Post-Storm - 2022 15-Yr Post-Const.	
			Aug 2005 - Jun 2022		Jul 2007 - Jun 2022		Nov 2020 - Jun 2022	
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy
R-31 to R-33	R-31	1,549	-3.9	-6,000	30.5	47,300	12.2	18,800
	R-32	965	13.7	13,200	42.6	41,100	7.9	7,600
	R-33	1,497	44.7	66,900	69.4	104,000	17.6	26,400
Weighted Average Total R-31 to R-33			18.5	74,100	48.0	192,400	13.2	52,800
West Control Area	R-34	499	45.6	22,700	44.6	22,200	13.4	6,700
	R-35	974	17.7	17,200	20.6	20,000	-22.4	-21,800
	R-36	1,028	63.2	64,900	109.1	112,100	49.7	51,100
	R-37	1,073	49.5	53,100	44.2	47,400	-4.0	-4,300
	R-38	1,675	3.6	6,000	42.4	71,000	26.6	44,600
West Control Area Weighted Average Total R-34 to R-38			31.3	163,900	52.0	272,700	14.5	76,300
Project Area	R-39	306	105.0	32,200	45.5	13,900	30.1	9,200
	R-40	967	49.6	47,900	0.6	500	-10.8	-10,500
	R-41	1,149	76.9	88,300	12.5	14,400	23.0	26,400
	R-42	975	49.5	48,300	21.5	21,000	-10.0	-9,800
	R-43	958	36.7	35,100	-24.5	-23,500	-0.7	-600
	R-44	1,015	73.2	74,300	12.5	12,700	23.4	23,800
	R-45	1,122	49.1	55,100	9.0	10,100	1.4	1,600
	R-46	1,052	119.5	125,800	30.6	32,200	16.6	17,400
	R-47	1,007	74.7	75,300	-0.2	-200	1.0	1,000
	R-48	1,018	62.5	63,600	-8.6	-8,800	-10.3	-10,500
	R-49	986	84.0	82,800	11.3	11,200	22.5	22,200
	R-50	726	125.3	91,000	22.7	16,500	23.3	16,900
Project Area Weighted Average Total R-39 to R-50			72.7	819,700	8.9	100,000	7.7	87,100
Total Area Weighted Average Total R-31 to R-50			51.5	1,057,700	27.5	565,100	10.5	216,200

Table 3.10 Total Beach Volume Change

Vertical Compartments		2005 Pre-Const. - 2022 15-Yr Post-Const.	2007 Post-Const. - 2022 15-Yr Post-Const.	2020 Post-Storm - 2022 15-Yr Post-Const.
		Aug 2005 - Jun 2022	Jul 2007 - Jun 2022	Nov 2020 - Jun 2022
		cy	cy	cy
R-31 to R-33	Dune to MHW	92,000	80,800	16,200
	MHW to MLW	12,600	16,400	4,400
	MLW to -20 ft-NAVD	165,000	267,800	32,700
	-20 to -30 ft-NAVD	-183,100	-164,800	-4,400
	-30 to -50 ft-NAVD	-12,400	-7,800	4,000
Sum Above -20 ft-NAVD		269,600	365,000	53,300
Sum Above -30 ft-NAVD		86,500	200,200	48,900
Sum Above -50 ft-NAVD		74,100	192,400	52,900
West Control Area	Dune to MHW	162,100	132,700	43,000
	MHW to MLW	17,700	19,600	13,400
	MLW to -20 ft-NAVD	210,400	322,800	14,600
	-20 to -30 ft-NAVD	-213,700	-194,700	-2,600
	-30 to -50 ft-NAVD	-12,400	-7,600	7,900
Sum Above -20 ft-NAVD		390,200	475,100	71,000
Sum Above -30 ft-NAVD		176,500	280,400	68,400
Sum Above -50 ft-NAVD		164,100	272,800	76,300
Project Area	Dune to MHW	359,700	-37,300	49,400
	MHW to MLW	53,300	-21,100	19,700
	MLW to -20 ft-NAVD	817,400	580,400	4,000
	-20 to -30 ft-NAVD	-398,000	-397,100	-2,400
	-30 to -50 ft-NAVD	-13,000	-24,900	16,200
Sum Above -20 ft-NAVD		1,230,400	522,000	73,100
Sum Above -30 ft-NAVD		832,400	124,900	70,700
Sum Above -50 ft-NAVD		819,400	100,000	86,900
Total	Dune to MHW	613,800	176,200	108,600
	MHW to MLW	83,600	14,900	37,500
	MLW to -20 ft-NAVD	1,192,800	1,171,000	51,300
	-20 to -30 ft-NAVD	-794,800	-756,600	-9,400
	-30 to -50 ft-NAVD	-37,800	-40,300	28,100
Sum Above -20 ft-NAVD		1,890,200	1,362,100	197,400
Sum Above -30 ft-NAVD		1,095,400	605,500	188,000
Sum Above -50 ft-NAVD		1,057,600	565,200	216,100

4.0 SUMMARY AND CONCLUSIONS

This report documents the fifteen-year post-construction conditions (June 2022) of the Okaloosa County/City of Destin portion of the Walton County/Destin Beach Restoration Project. The 2006/2007 Walton County/Destin Beach Restoration Project, completed in June 2007, restored approximately seven miles of beach extending from FDEP reference monument R-39 in Destin (Okaloosa County) to FDEP reference monument R-23.8 in Walton County. The Okaloosa County/City of Destin portion of the monitoring area includes FDEP reference monument R-31 to R-50. Monitoring of the project and control areas involved analyses of two parameters — changes to the shoreline position and beach volumes within the project and control areas. These analyses were used to determine the evolution of beach fill over time. Results of those analyses, together with analysis of beach profile plots, revealed project performance trends.

Comparison between the pre-construction (August 2005) and fifteen-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the post-construction (July 2007) and fifteen-year post-construction (June 2022) surveys reveals the evolution of the project approximately fifteen years after construction. Comparison between the post-storm (November 2020) and fifteen-year post-construction (June 2022) surveys reveals the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm.

As of the June 2022 fifteen-year post-construction survey, the project area experienced MHW shoreline advance of approximately 90.6 ft on average and gained 832,400 cy (73.8 cy/ft) of sand relative to 2005 pre-construction conditions above -30 ft-NAVD. Bridges et al. (2008) report the contractor placed 890,386 cy within the Destin portion of the project area above -20 ft-NAVD. As discussed in Section 3.3, these volume changes indicate a loss of 58,000 cy, or 6.5%, of the total volume placed during the 2006/2007 project exists in the project area. During this same period, the control area shoreline advanced 66.4 ft and gained approximately 176,500 cy (33.6 cy/ft) above -30 ft-NAVD, and R-31 to R-33 advanced 62.3 ft and gained 86,500 cy (21.6 cy/ft) above -30 ft-NAVD. As discussed in Section 3.3, a trend of accretion above -20 ft-NAVD and erosion below -20 ft-NAVD throughout the monitoring area suggests transport of offshore sediments in the onshore direction. The overall monitoring area from FDEP reference monument R-31 to R-50 gained approximately 1,095,400 cy (53.3 cy/ft) above -30 ft-NAVD, indicating a surplus (i.e., over 100%) of the total placed material remains within the beach monitoring area and that an additional 205,000 cy accumulated from natural accretion. The results indicate the project has exceeded performance expectations and is providing a noticeable benefit to the project areas, adjacent shorelines, and the local littoral system.

Comparison of the post-construction (July 2007) and 2022 fifteen-year post-construction surveys revealed that the project area experienced an average MHW shoreline retreat of approximately -45.0 ft and net accretion of 124,800 cy (11.1 cy/ft) above -30 ft-NAVD. All monument locations experienced accretion between MLW and -20 ft-NAVD, with mainly erosion occurring above MLW and below -20 ft-NAVD. Notably, the upland beach remains eroded compared to the 2007 condition. The control area and R-31 to R-33 experienced slightly different trends than the project area. The control area experienced an average MHW shoreline advance of 75.1 ft and 280,400 cy (53.4 cy/ft) of accretion overall above -30 ft-NAVD, and R-31 to R-33 advanced 83.4 ft and gained 200,200 cy (49.9 cy/ft) above -30 ft-NAVD. While the upland beach area has experienced noticeable shoreline growth and volume gains, the offshore portion of the profile experienced significant erosion. Throughout the monitoring area, the majority of the offshore erosion occurs between -20 and -30 ft-NAVD and appears to result from landward movement of

the offshore bar coupled with seaward cross-shore movement of nearshore sediment. Overall, the monitoring area shows a total volume increase of approximately 605,400 cy (29.5 cy/ft) above -30 ft-NAVD. These results indicate the project and monitoring areas continue to experience erosion as previously observed prior to construction, likely a result of increased storm and wave activity occurring over the past few years. However, the project has positively affected the project area and adjacent shorelines by offsetting the erosional conditions occurring prior to construction.

Over the past year and a half (November 2020 to June 2022), the project area shoreline advanced 27.9 ft and gained approximately 70,900 cy (6.3 cy/ft) above -30 ft-NAVD. The project area experienced net accretion throughout all vertical compartments above -20 ft-NAVD, mild net erosion between -20 ft and -30 ft-NAVD, and accretion between -30 ft and -50 ft-NAVD. The control area experienced an average MHW shoreline advance of 49.6 ft and 68,300 cy (13.0 cy/ft) of accretion overall above -30 ft-NAVD, and R-31 to R-33 advanced 24.4 ft and gained 48,700 cy (12.1 cy/ft) above -30 ft-NAVD. The volume changes for the overall monitoring area show 187,900 cy of accretion (9.1 cy/ft) between the dune and -30 ft-NAVD over the past year and a half. Accretion in the nearshore is anticipated in post-storm recovery, as sand is eroded from the nearshore during the elevated wave climate of a storm event and deposited in the nearshore during comparably calm summer conditions. However, the net accretion experienced throughout the vertical compartments of the monitoring area (excluding minor net erosion between -20 and -30 ft-NAVD) could be attributable to longshore sediment transport originating outside of the monitoring area.

4.1 Recommendations

The monitoring results indicate the Walton County/Destin Beach Restoration Project continues to provide a substantial benefit to the Okaloosa County/City of Destin portion of the project area by offsetting the background erosion that existed prior to project construction. Recent monitoring results have shown continued accretion of sand on the dry beach throughout the monitoring area compared to pre-construction conditions, however, in the project area, erosion has occurred on the dry beach since construction.

Accordingly, Taylor Engineering recommends that Okaloosa County and the City of Destin continue to implement annual beach profile surveys in the early summer months, as recommended in the FDEP-approved physical monitoring plan, to document beach conditions. Pre- and post-construction beach profile surveys provide crucial data necessary for regional long-term monitoring of the beach and inlet systems. This continued monitoring will help to develop an understanding of the overall coastal processes within the beach monitoring area. Should a tropical storm system significantly affect the beach, having readily available pre-storm data will prove beneficial for assessing storm impacts, developing appropriate emergency response measures, and meeting eligibility requirements for FEMA emergency assistance. In preparation for future storm damage, Taylor Engineering also recommends that the County seek a new permit to place sand on the subject beach if future erosional events occur.

REFERENCES

- Bridges, A., Trudnak, M., and Krecic, M. 2007. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2007 Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.
- Malick, L., Trudnak, M., and Krecic, M. 2008. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2008 Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.
- Taylor Engineering. 2021. *Walton County\Destin Beach Restoration Project, Okaloosa County, Florida East Destin Hurricane Sally Post-Storm Beach Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M., and Greer, D. 2014. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2014 Seven-year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., and Trudnak, M. 2013. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2013 Potential Borrow Area Impact Monitoring Summary Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M., and Greer, D. 2013. *Potential Borrow Area Impact Monitoring Summary Report Walton County\Destin Beach Restoration Project*. Taylor Engineering, Inc., Jacksonville, FL.
- Trammell, M., and Trudnak, M. 2012. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2012 Five-year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., and Trudnak, M. 2010. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2010 Three-year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.
- Trudnak, M., and Arnouli, D. 2009. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2009 Two-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.

APPENDIX A
Beach Profile Plots

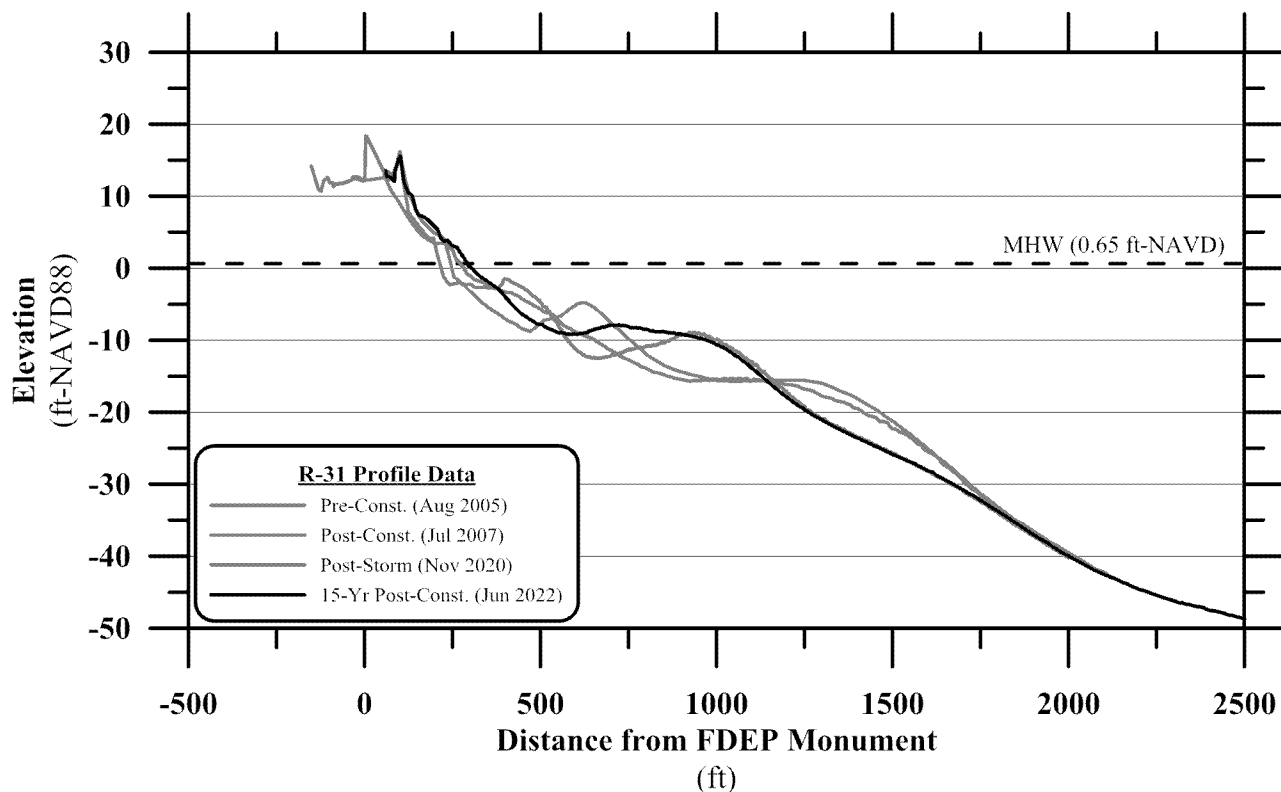


Figure A-1a Beach Profile Survey Data at FDEP Monument R-31.

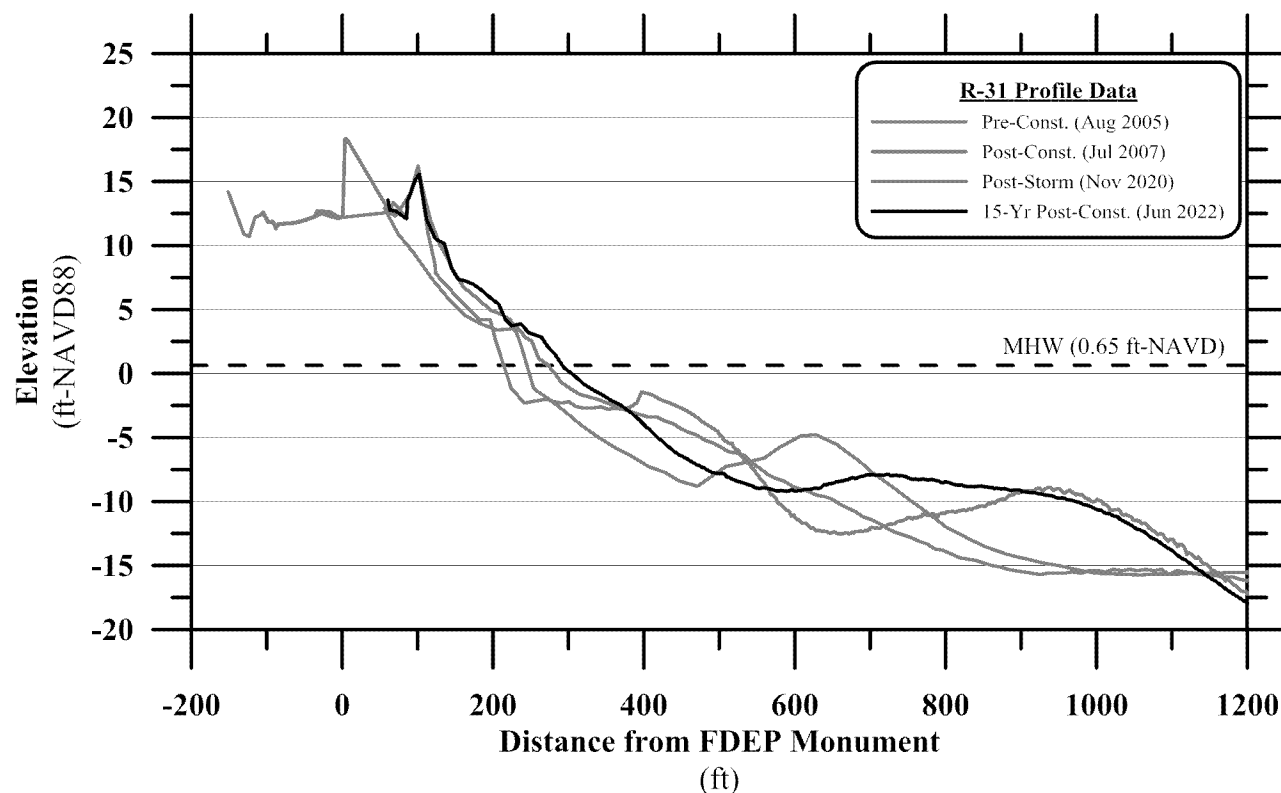


Figure A-1b Beach Profile Survey Data at FDEP Monument R-31.

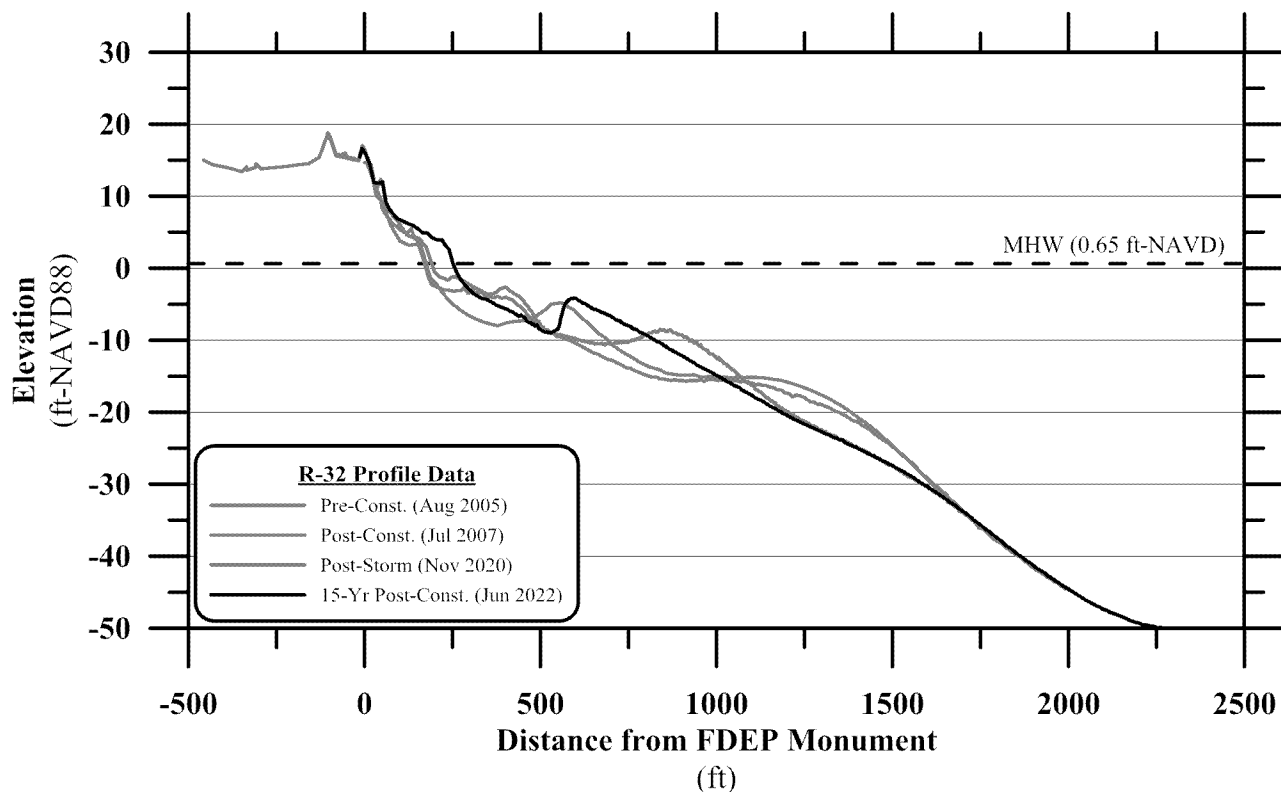


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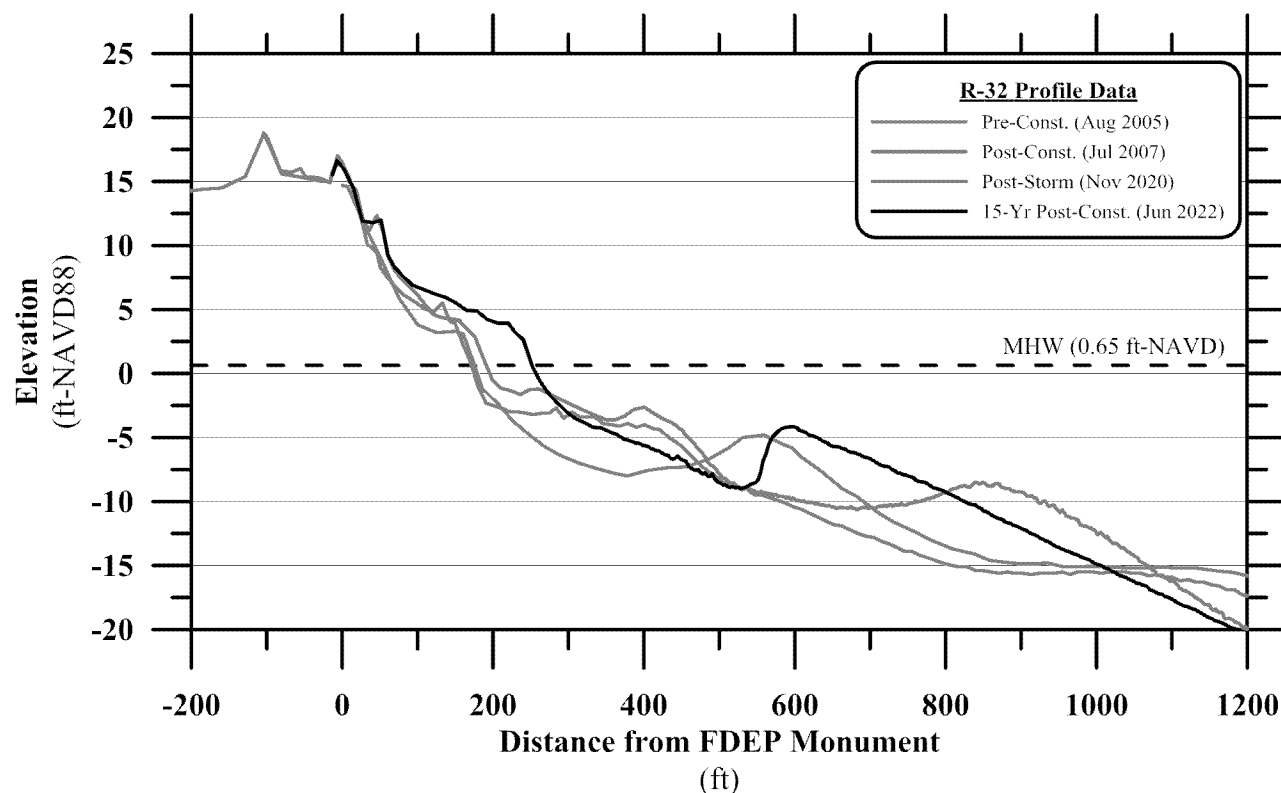


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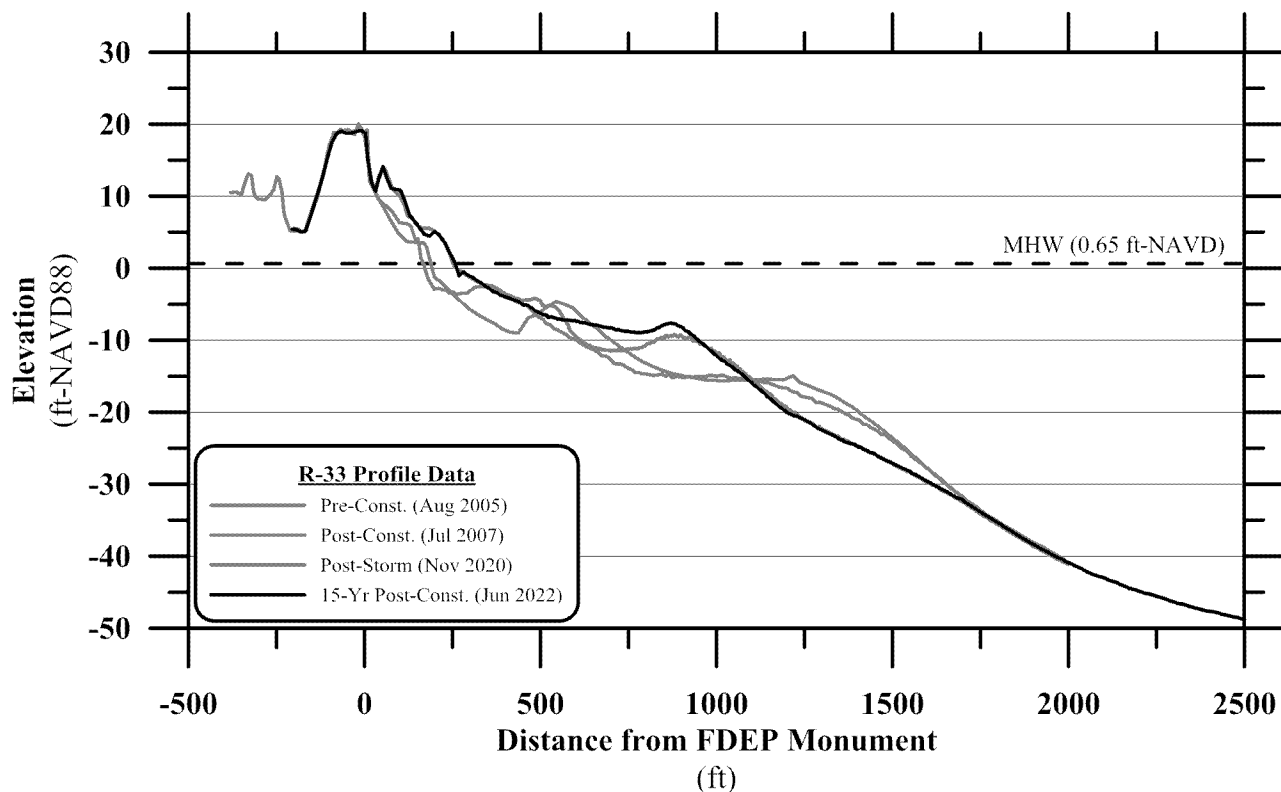


Figure A-3a Beach Profile Survey Data at FDEP Monument R-33.

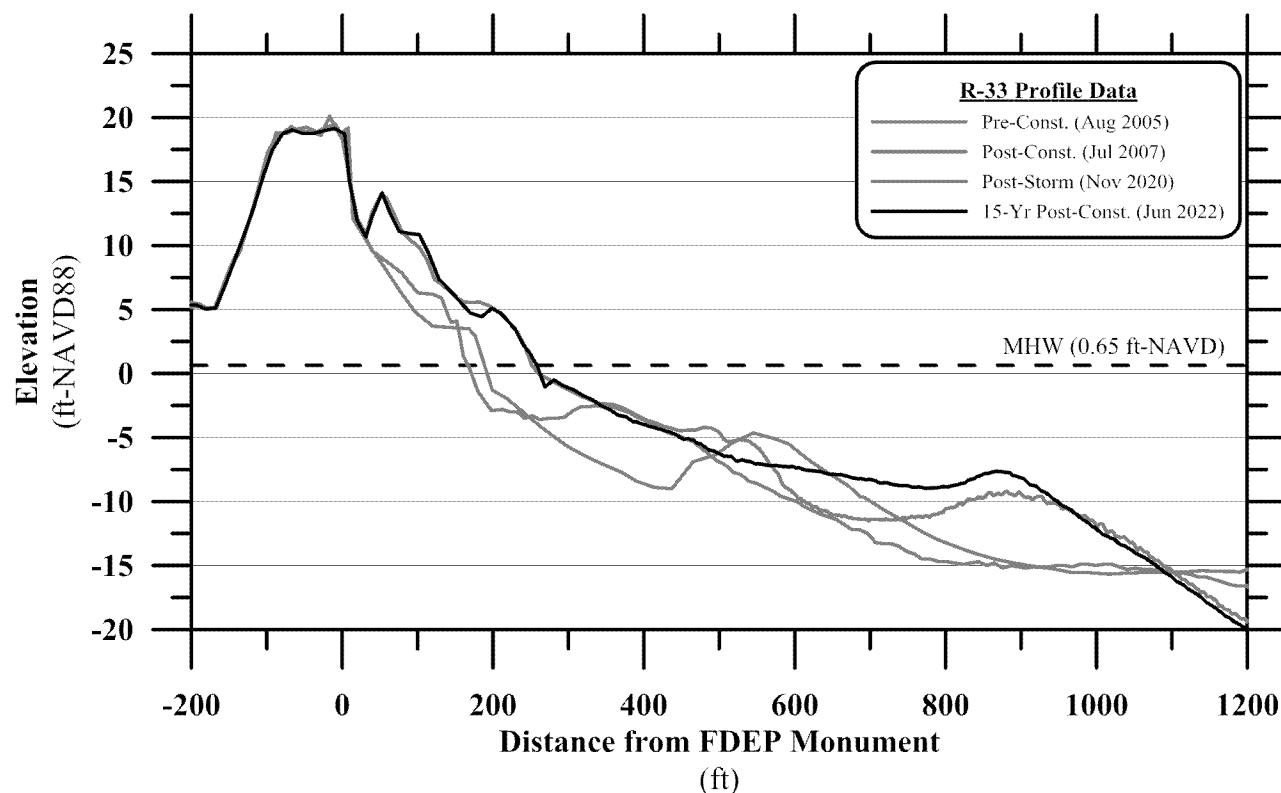


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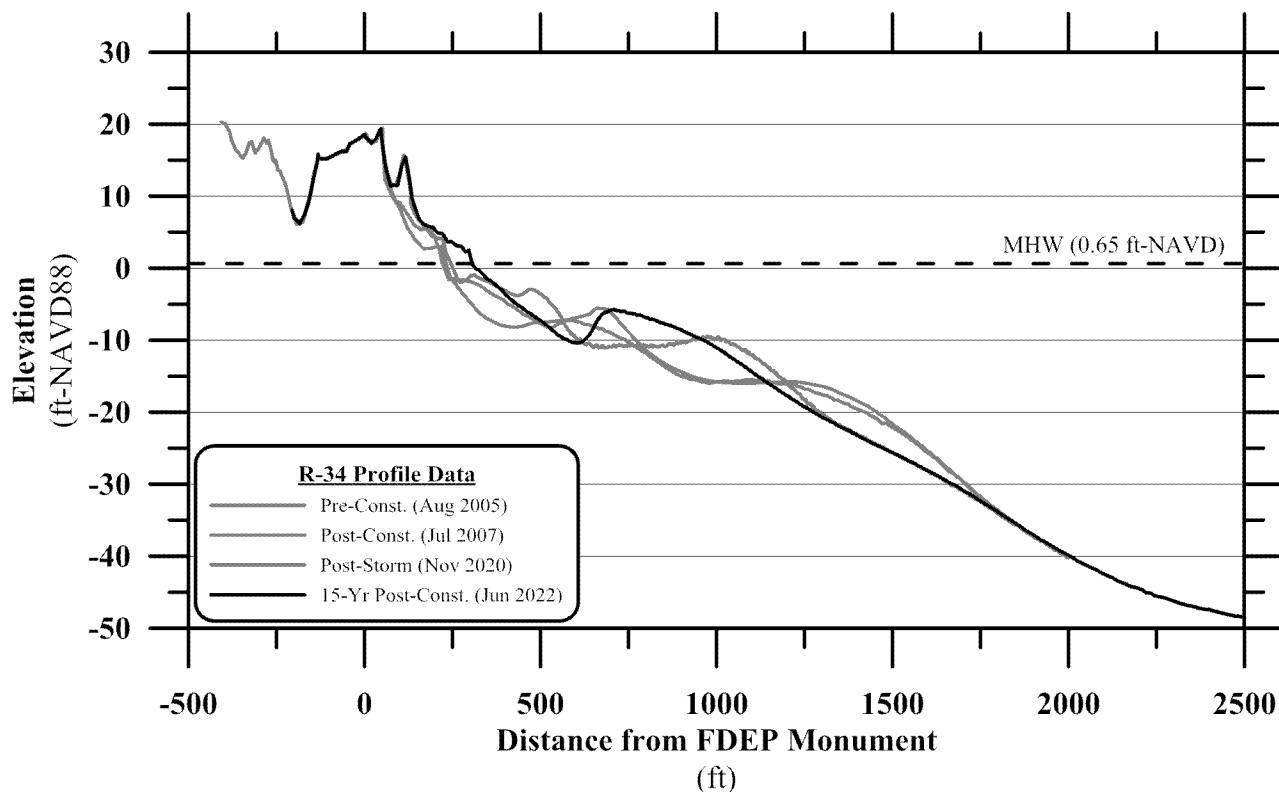


Figure A-4a Beach Profile Survey Data at FDEP Monument R-34.

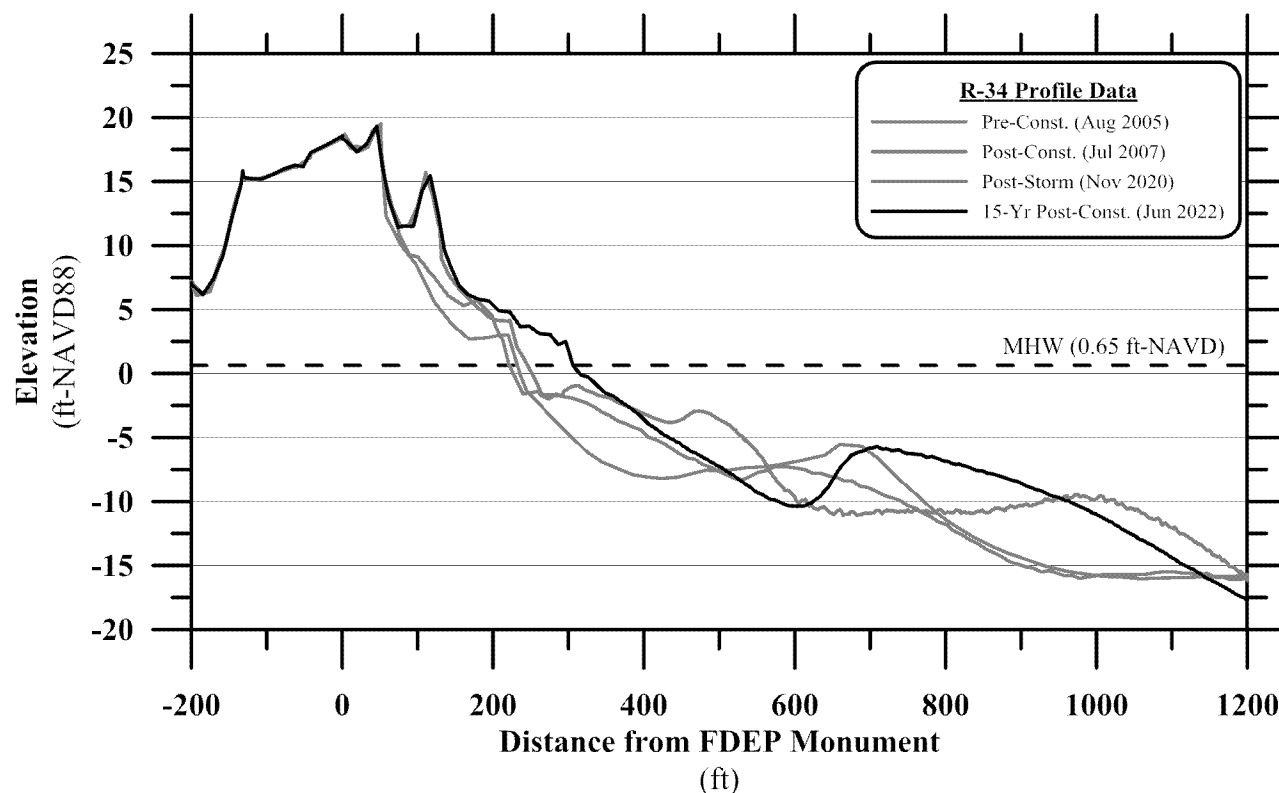


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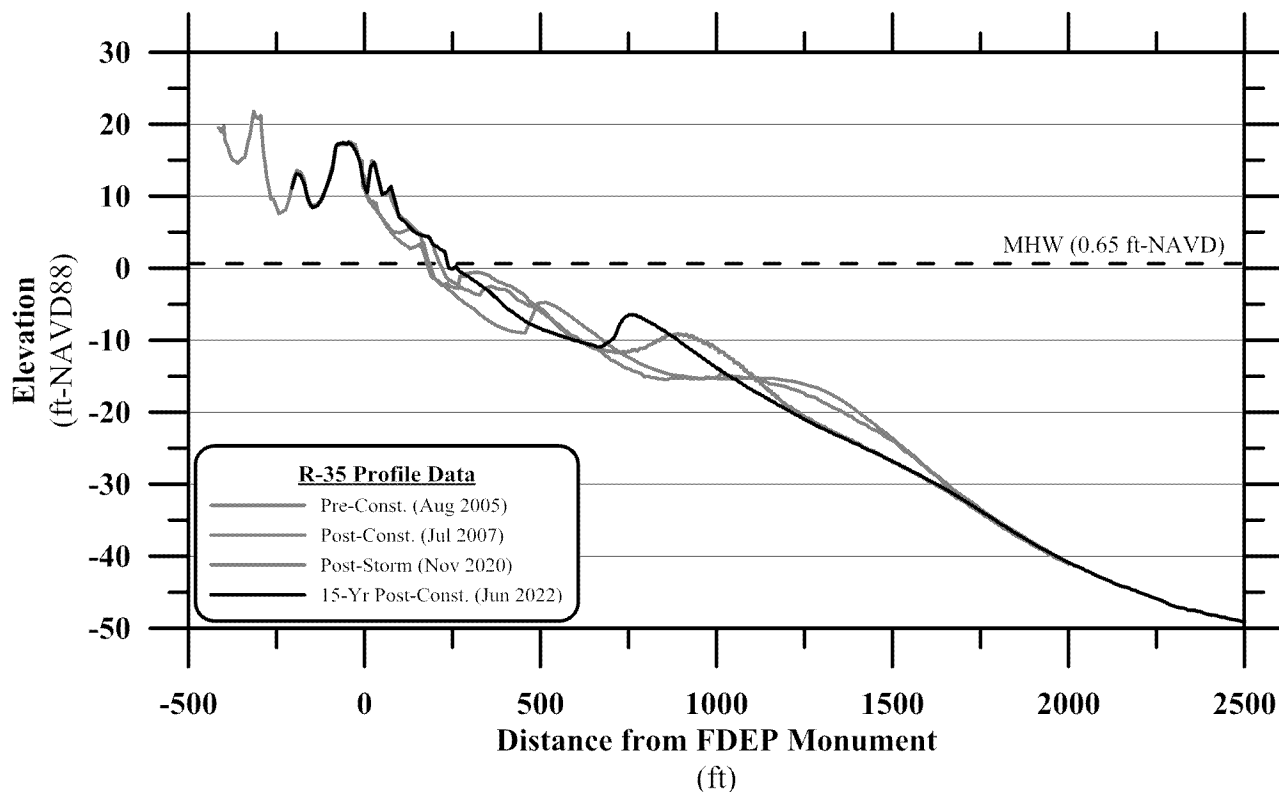


Figure A-5a Beach Profile Survey Data at FDEP Monument R-35.

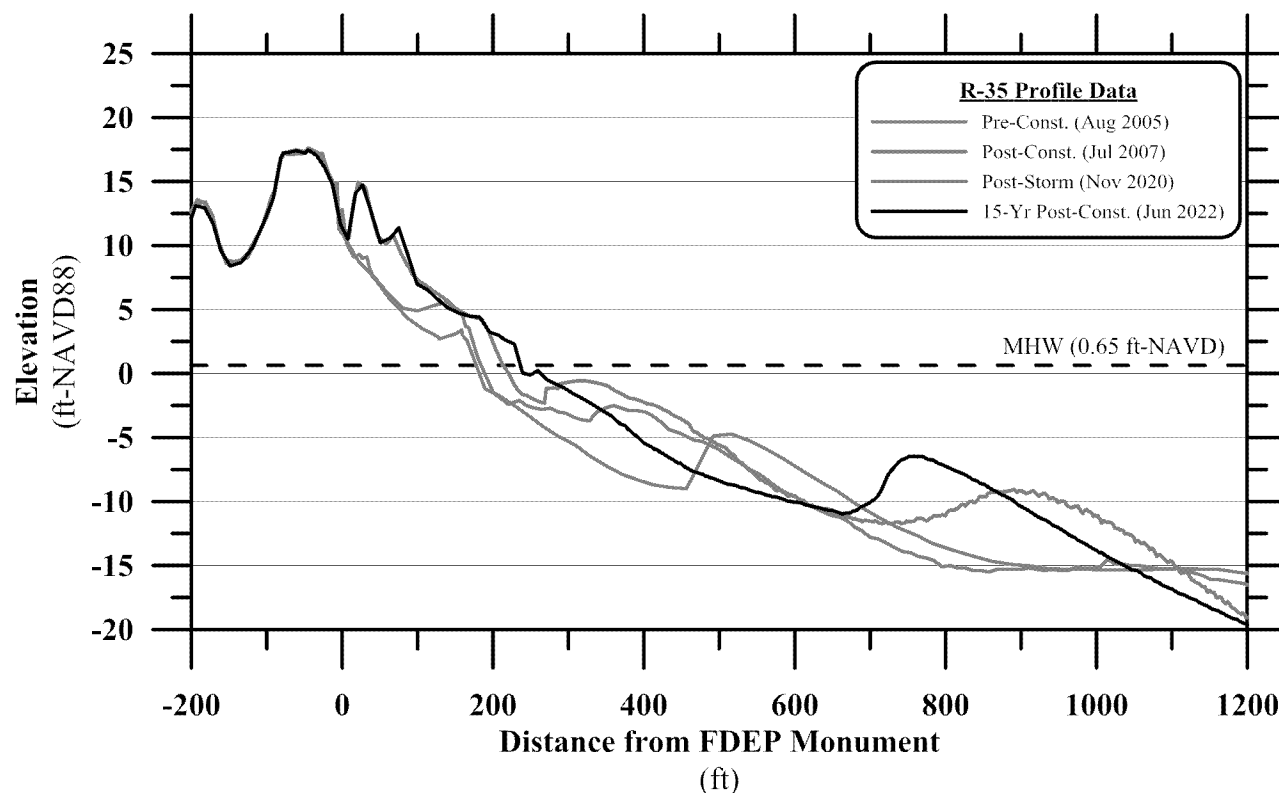


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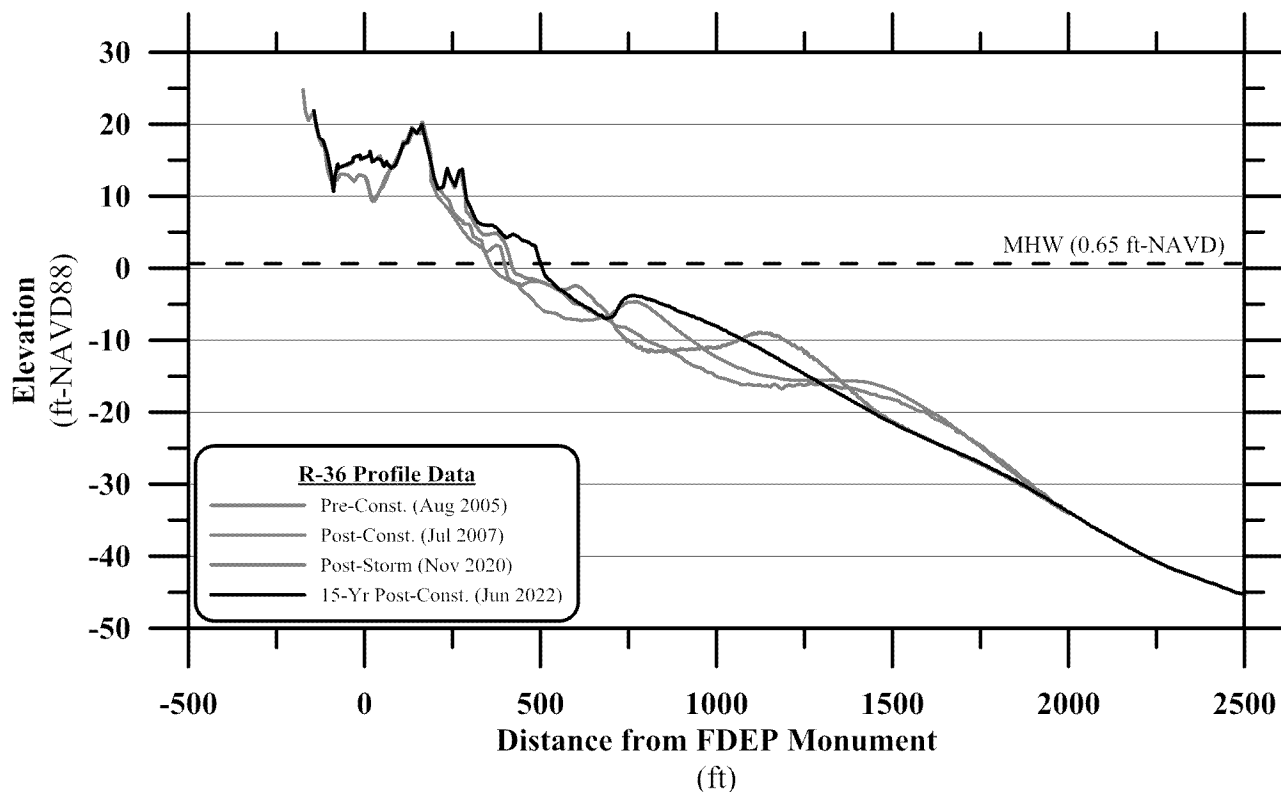


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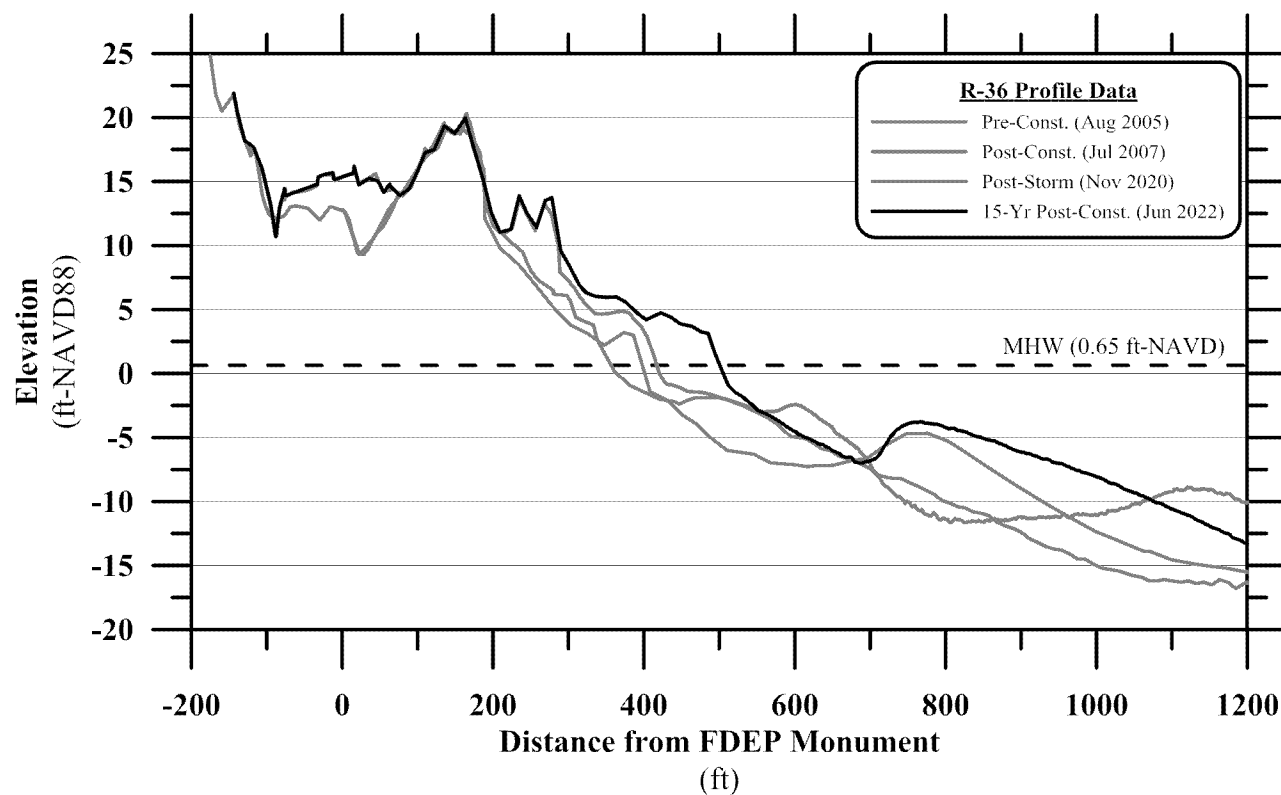


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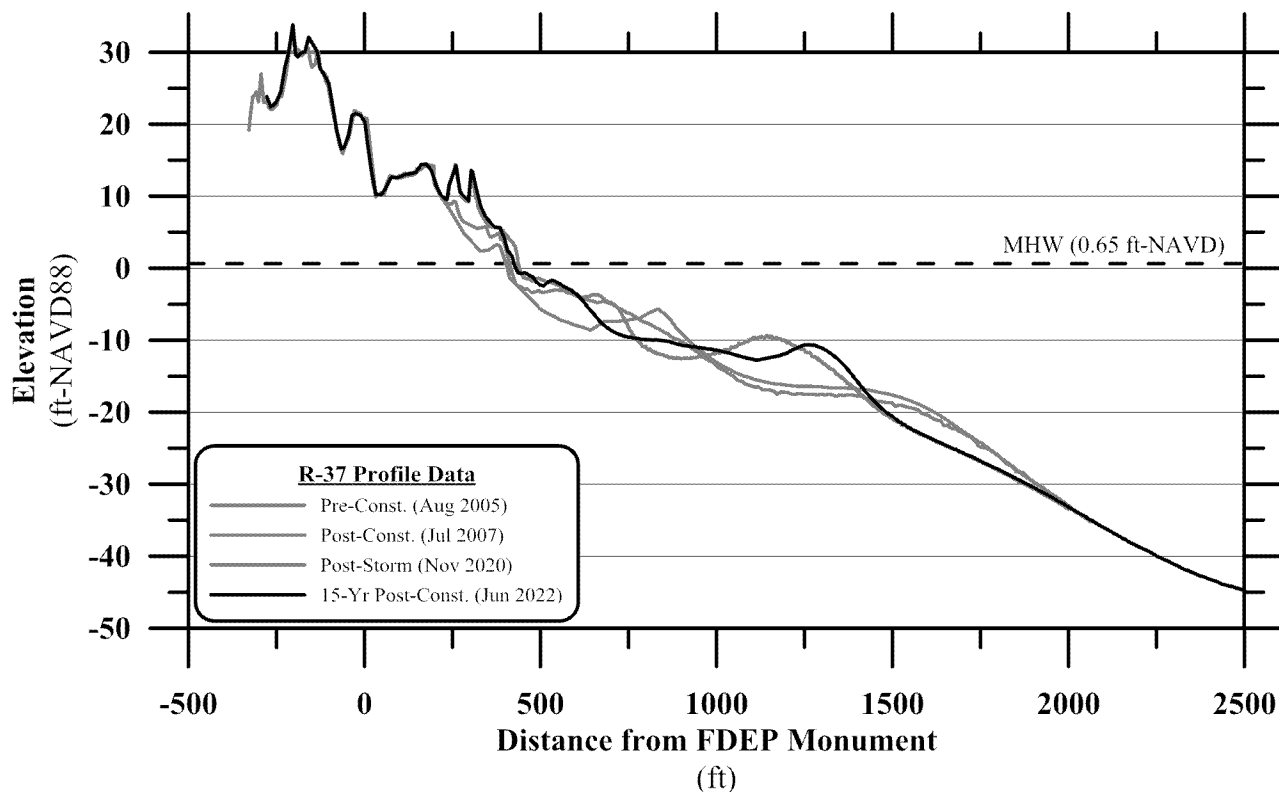


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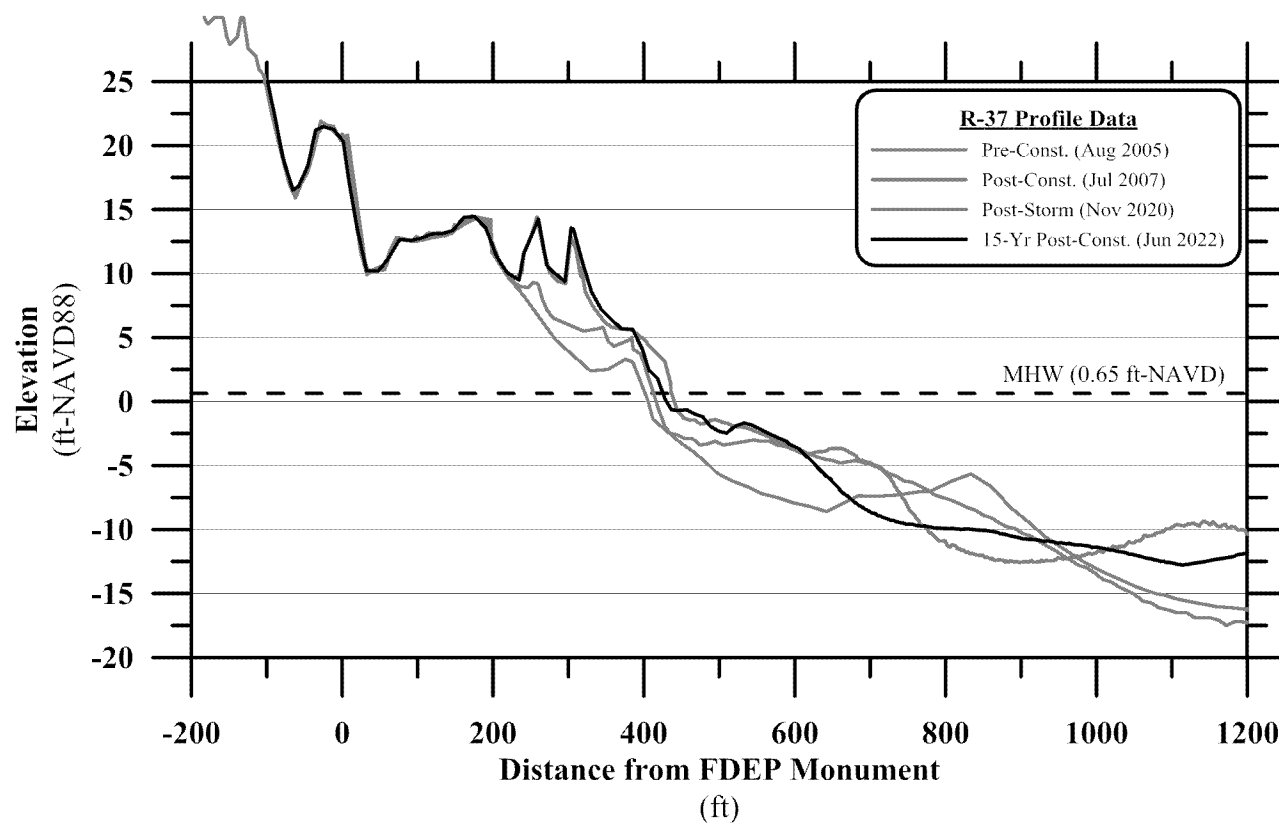


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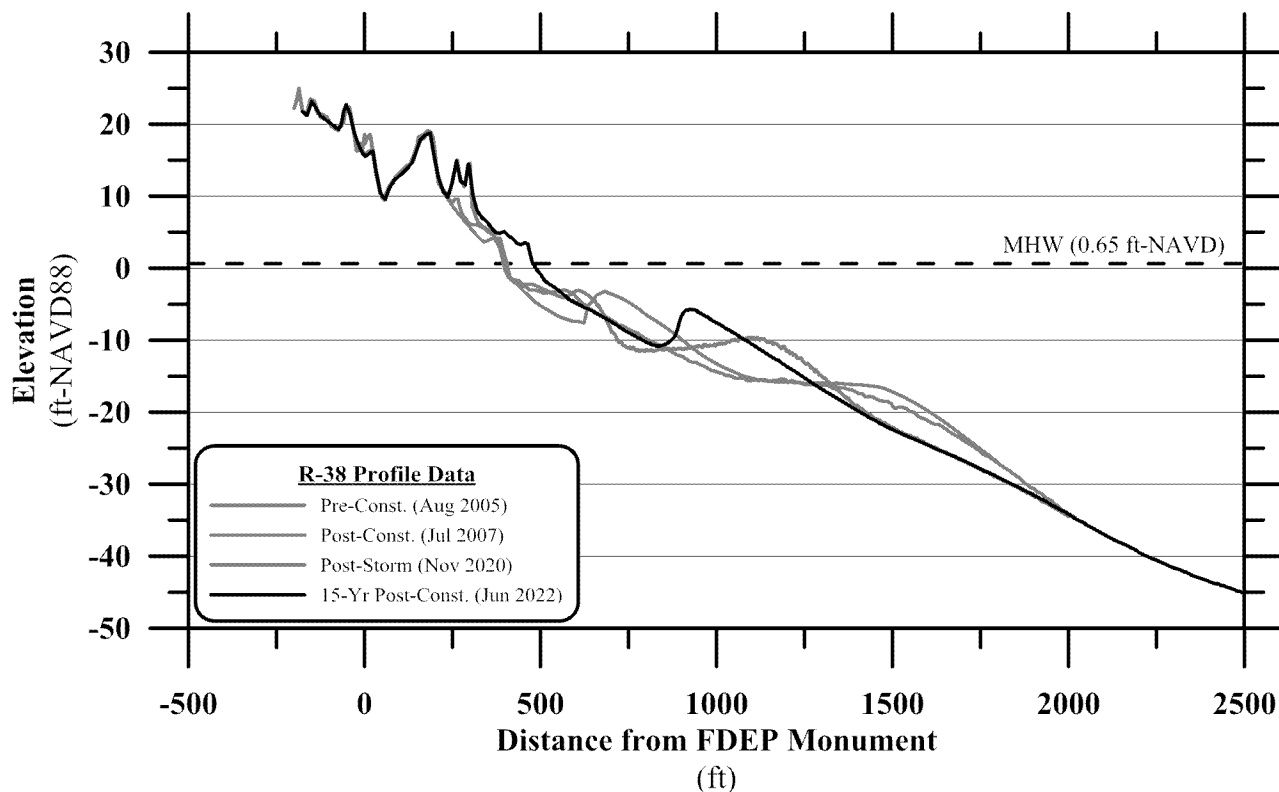


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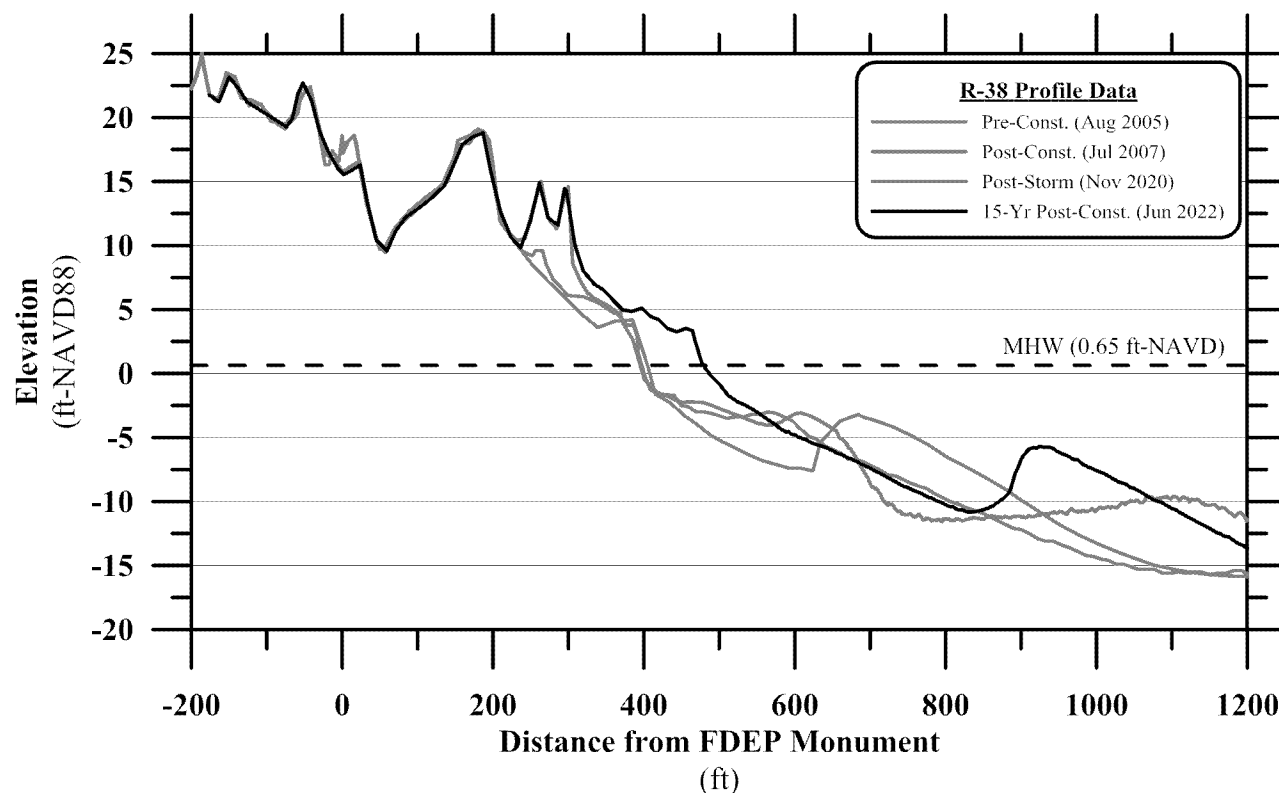


Figure A-8b Beach Profile Survey Data at FDEP Monument R-38.

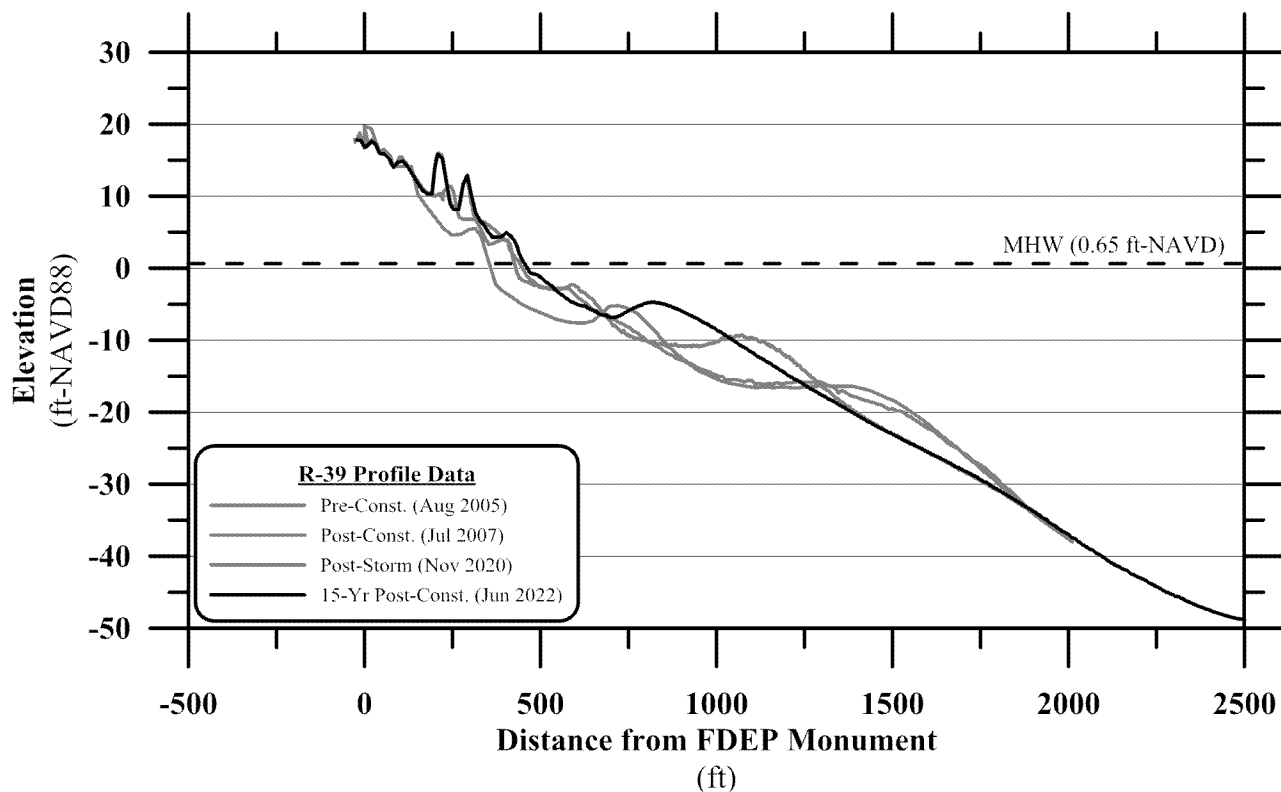


Figure A-9a Beach Profile Survey Data at FDEP Monument R-39.

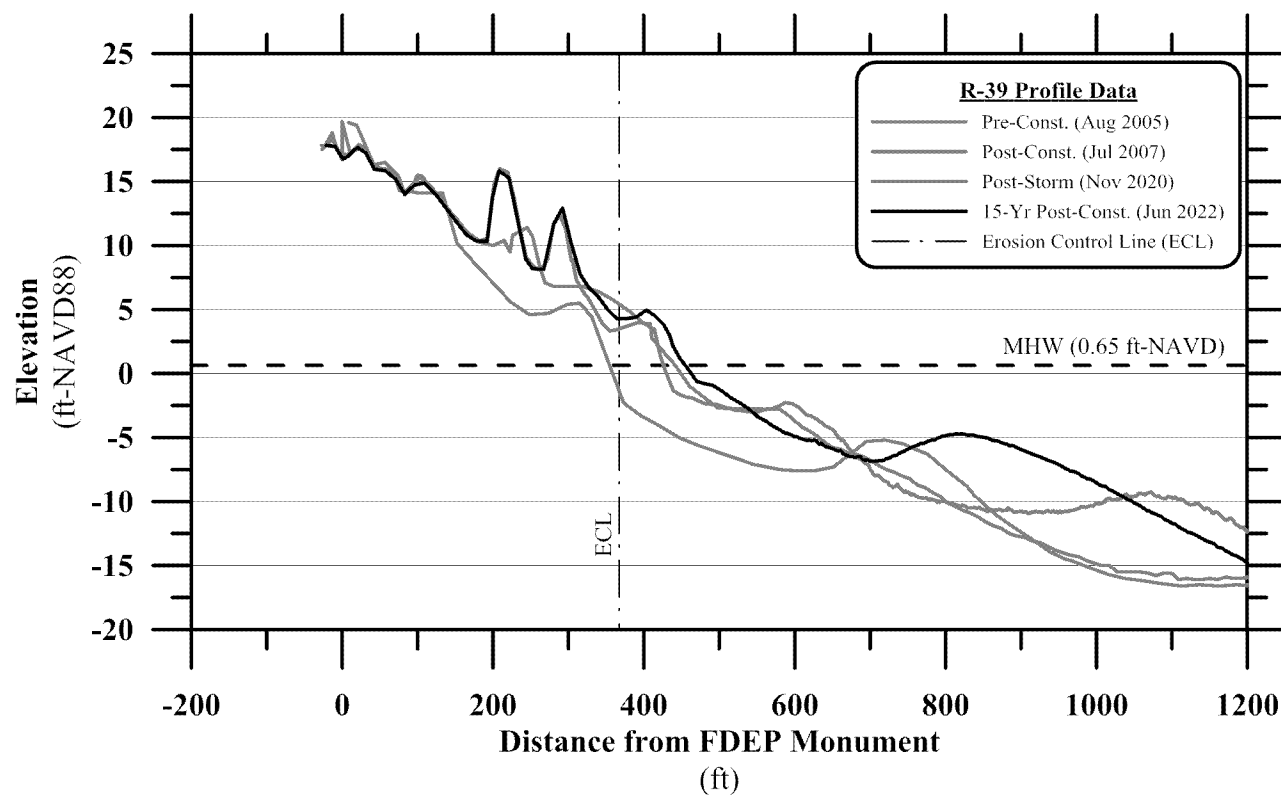


Figure A-9b Beach Profile Survey Data at FDEP Monument R-39.

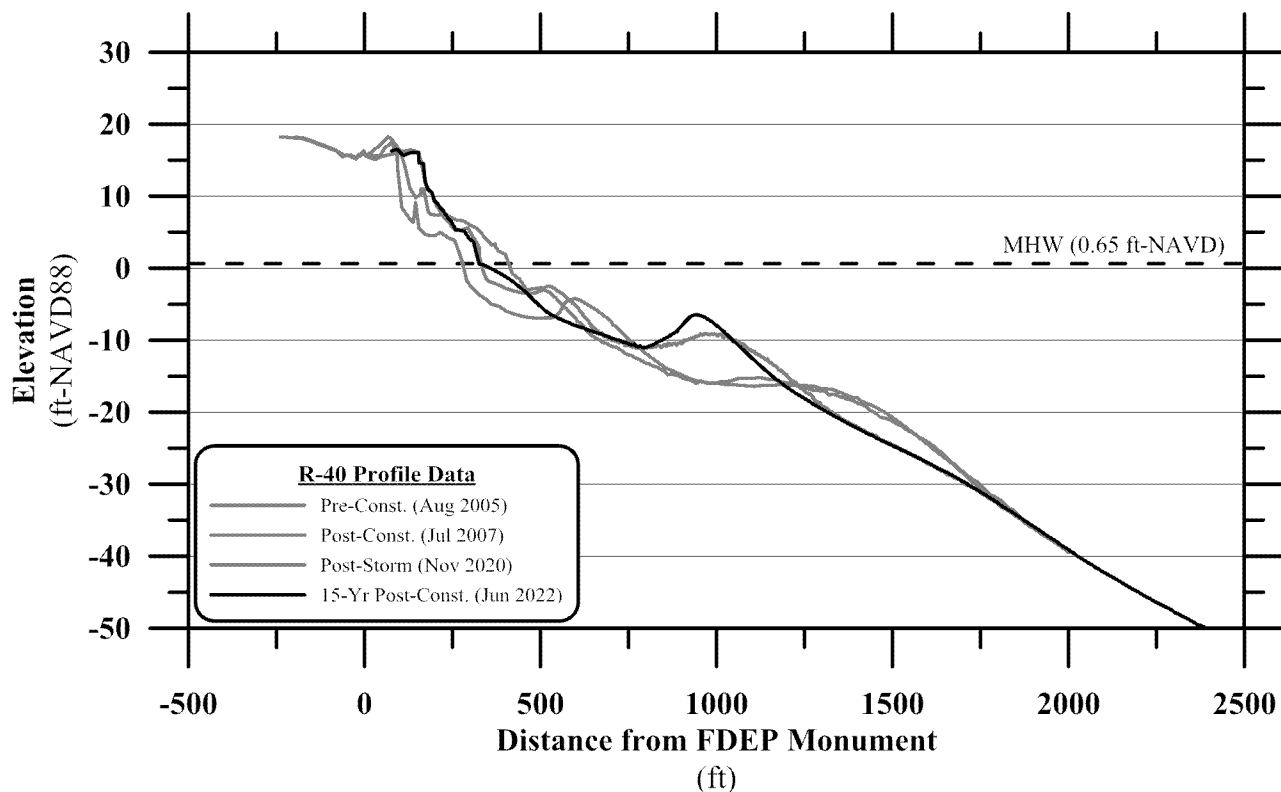


Figure A-10a Beach Profile Survey Data at FDEP Monument R-40.

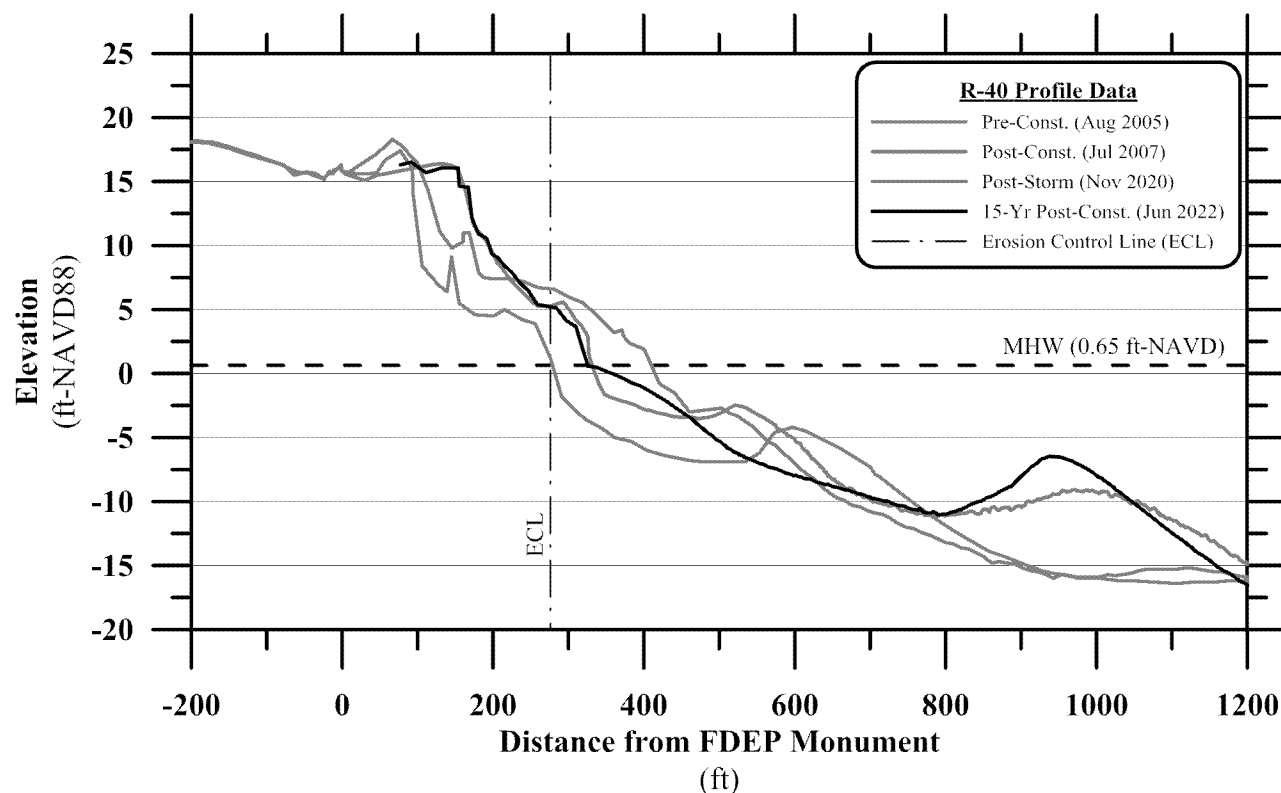


Figure A-10b Beach Profile Survey Data at FDEP Monument R-40.

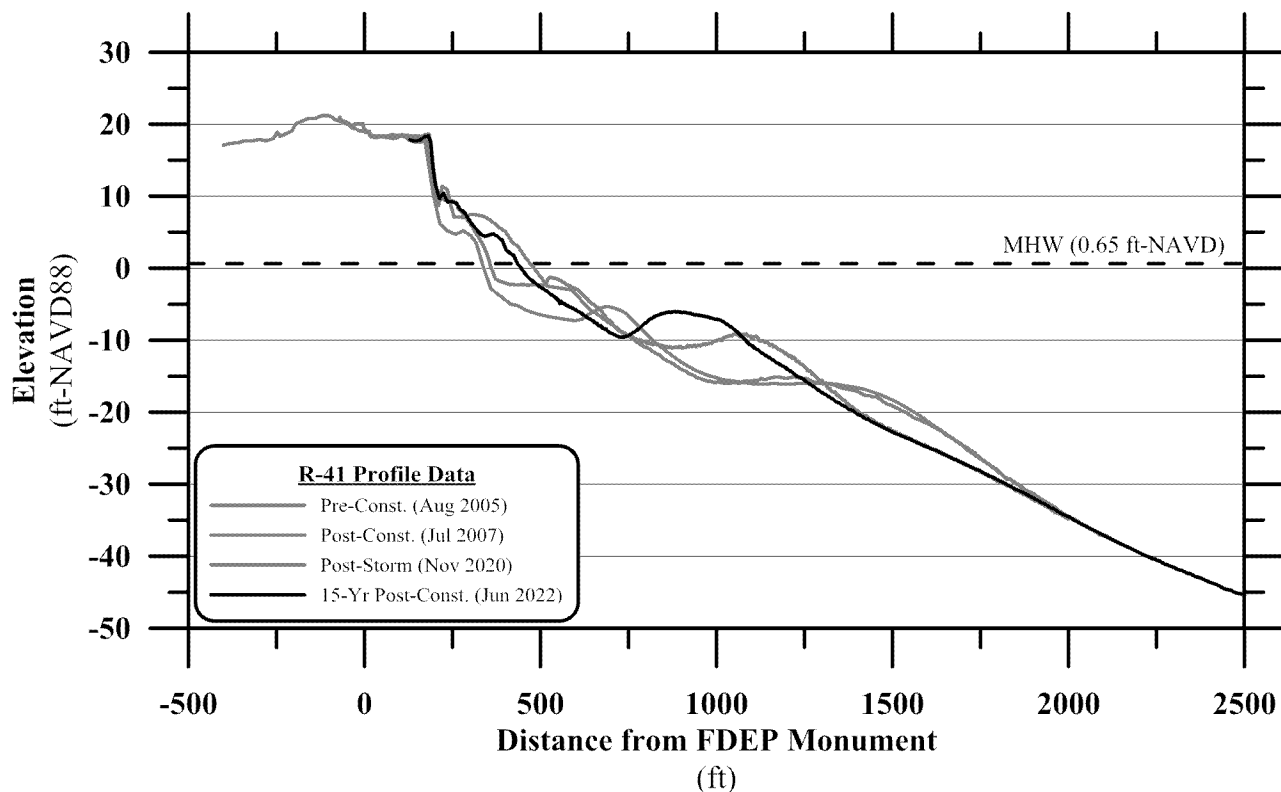


Figure A-11a Beach Profile Survey Data at FDEP Monument R-41.

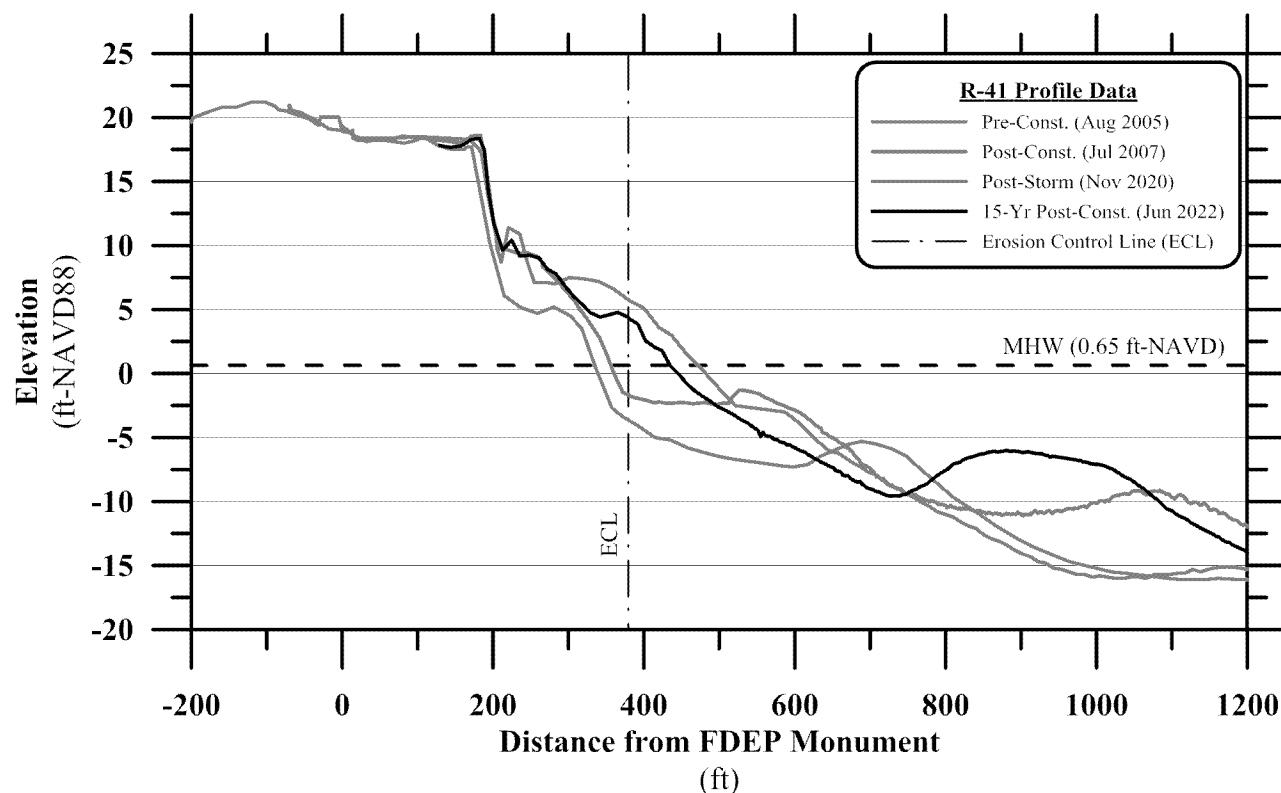


Figure A-11b Beach Profile Survey Data at FDEP Monument R-41.

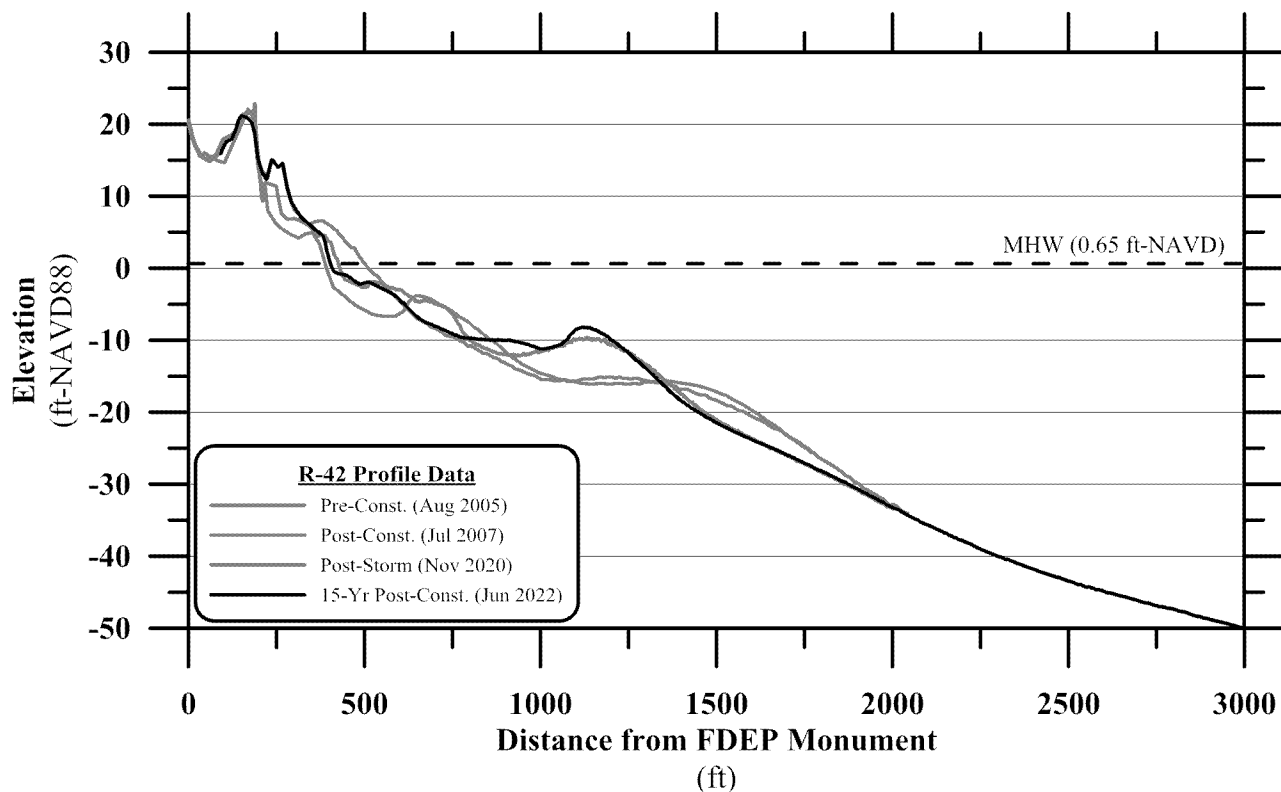


Figure A-12a Beach Profile Survey Data at FDEP Monument R-42.

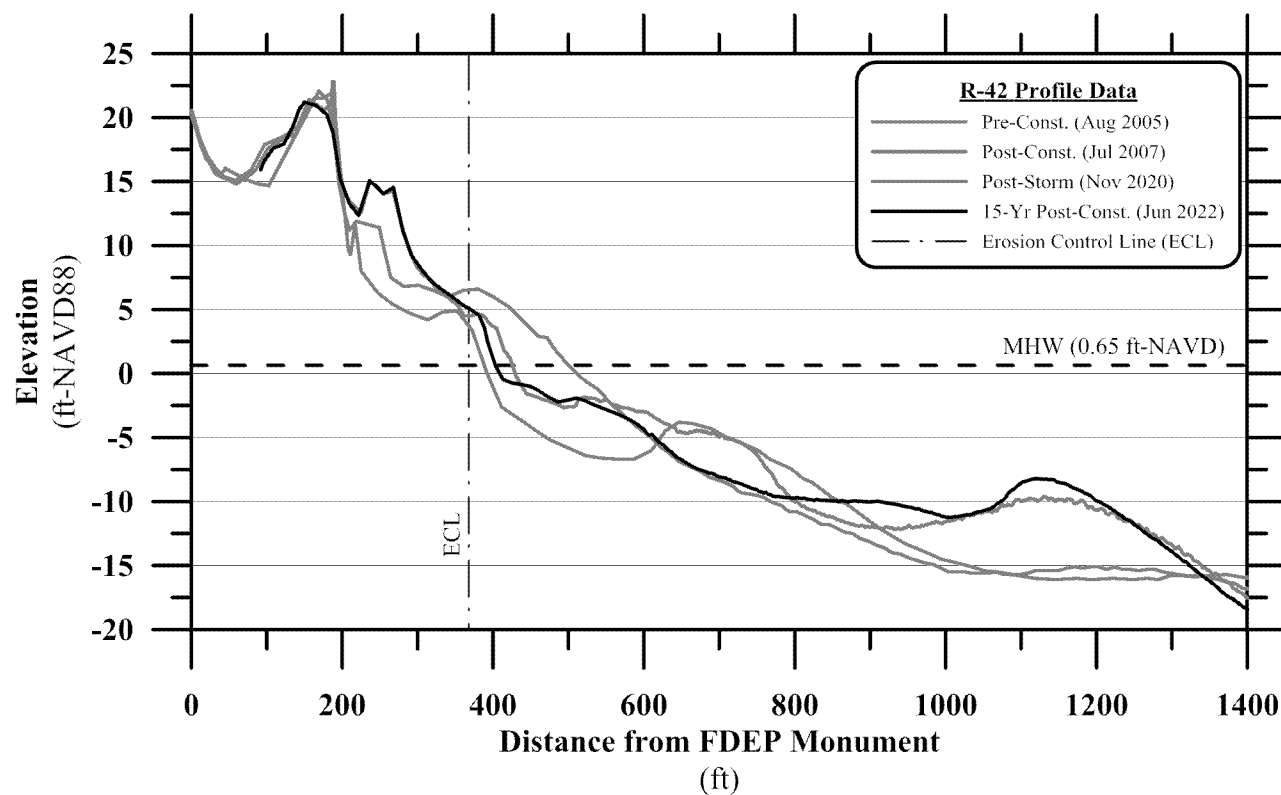


Figure A-12b Beach Profile Survey Data at FDEP Monument R-42.

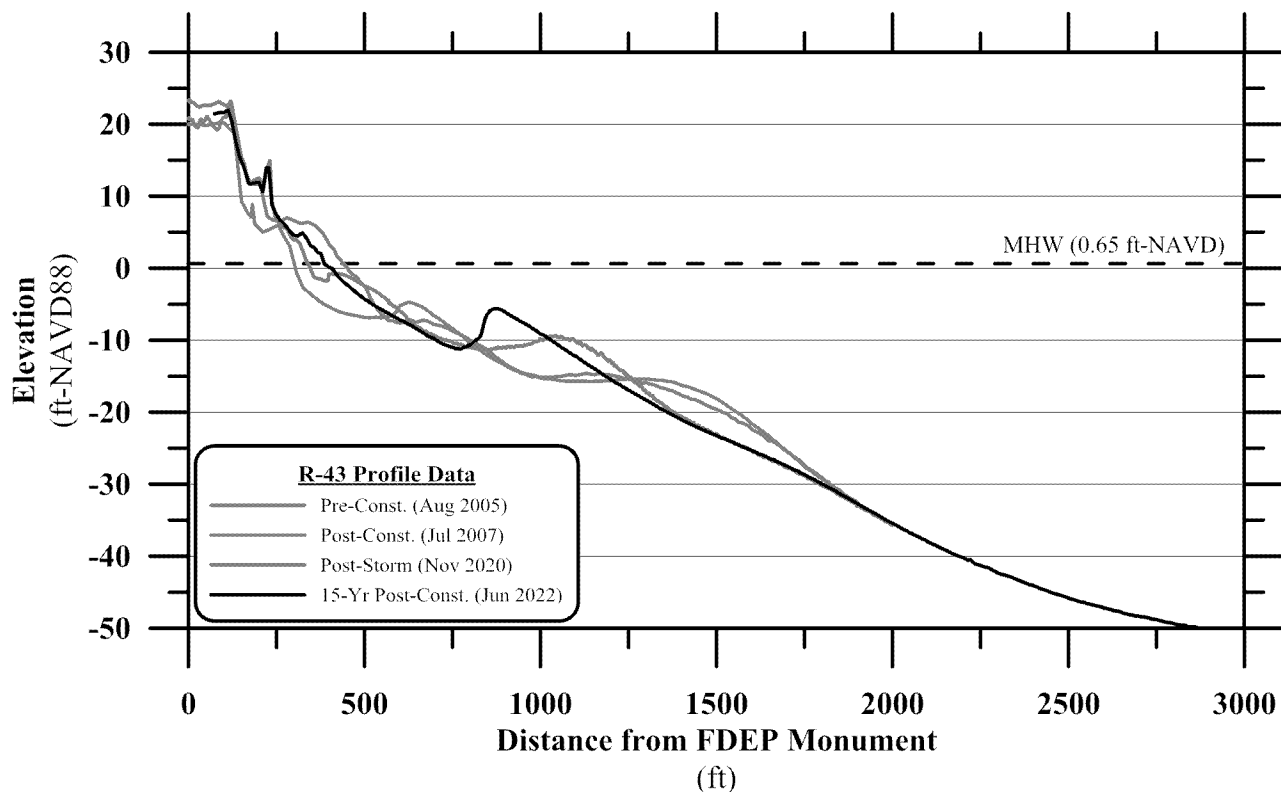


Figure A-13a Beach Profile Survey Data at FDEP Monument R-43.

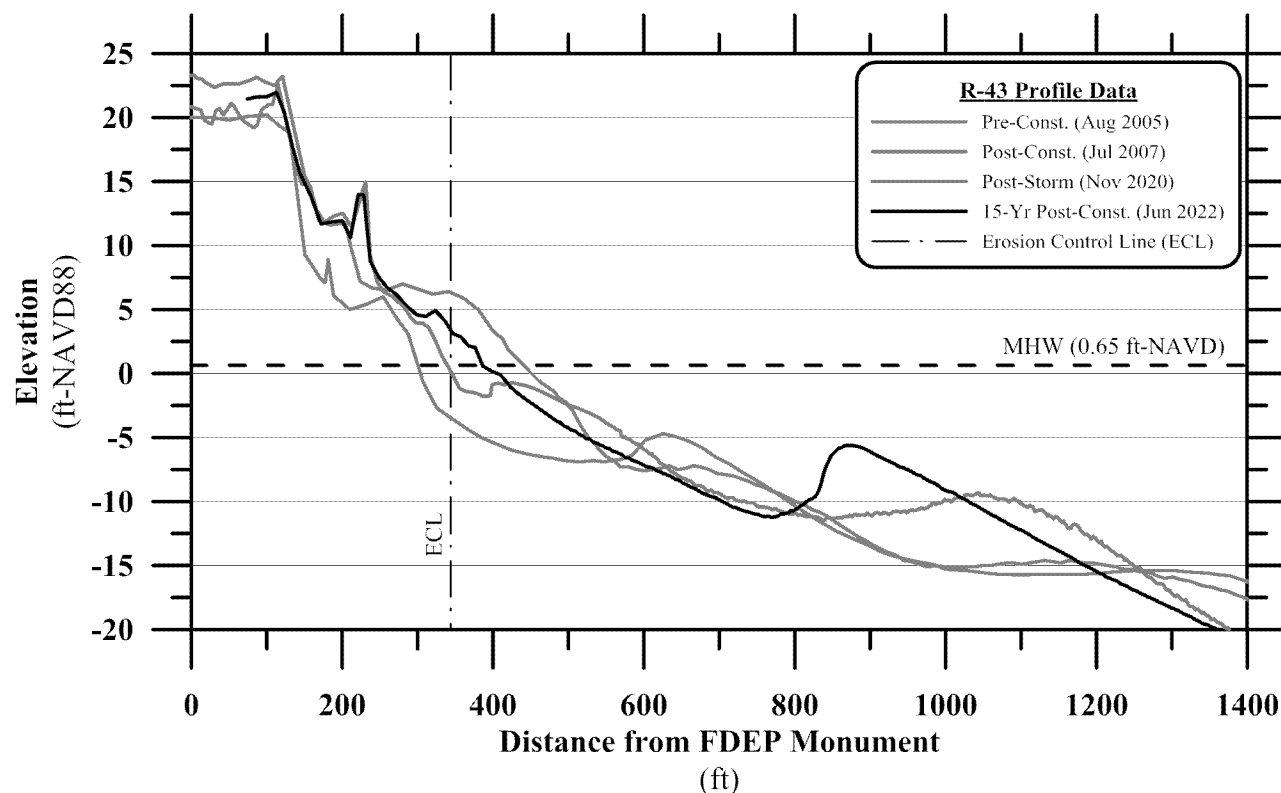


Figure A-13b Beach Profile Survey Data at FDEP Monument R-43.

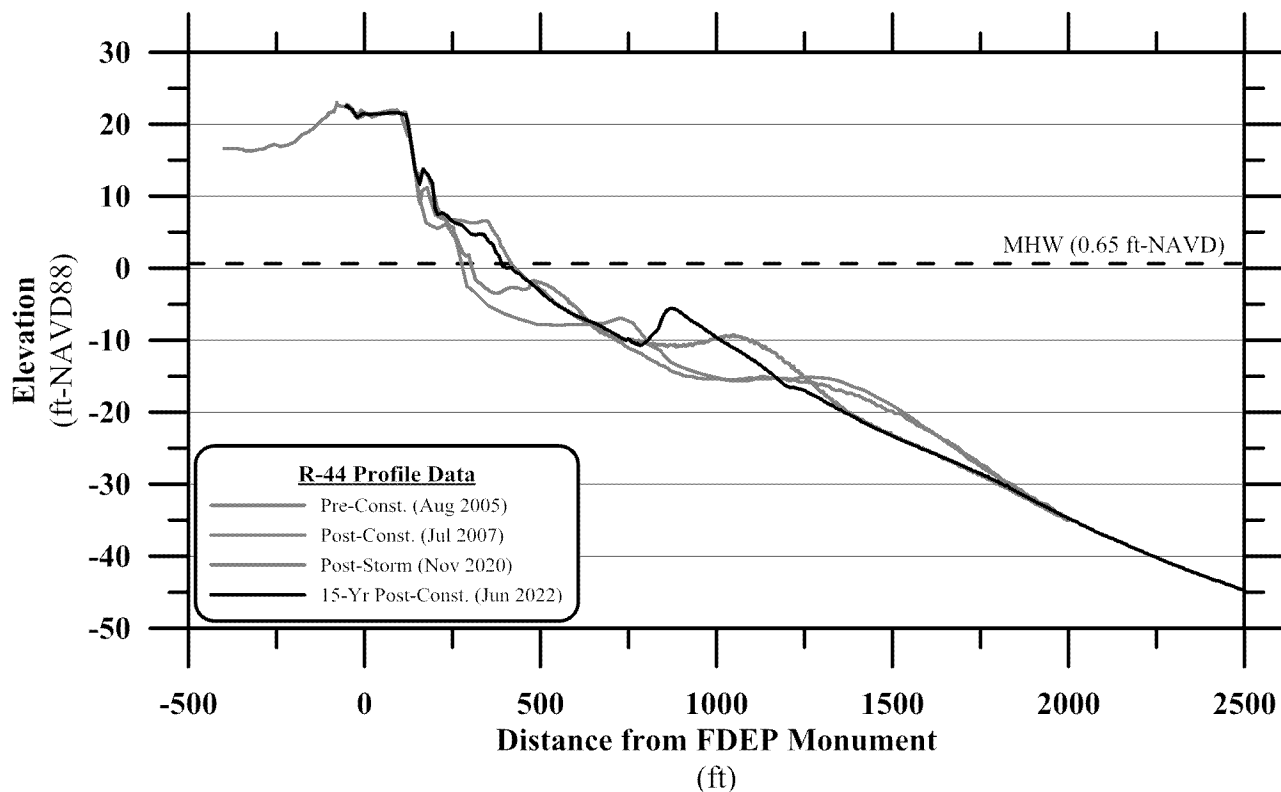


Figure A-14a Beach Profile Survey Data at FDEP Monument R-44.

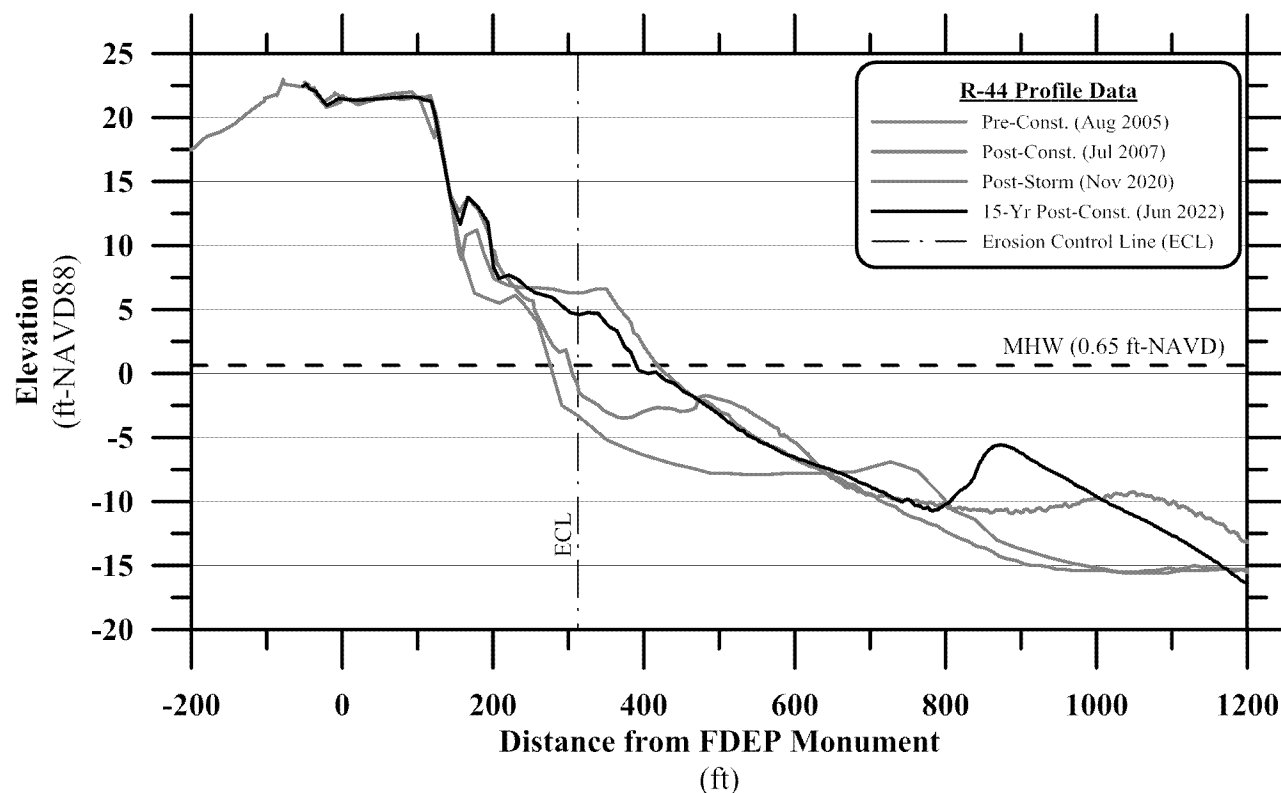


Figure A-14b Beach Profile Survey Data at FDEP Monument R-44.

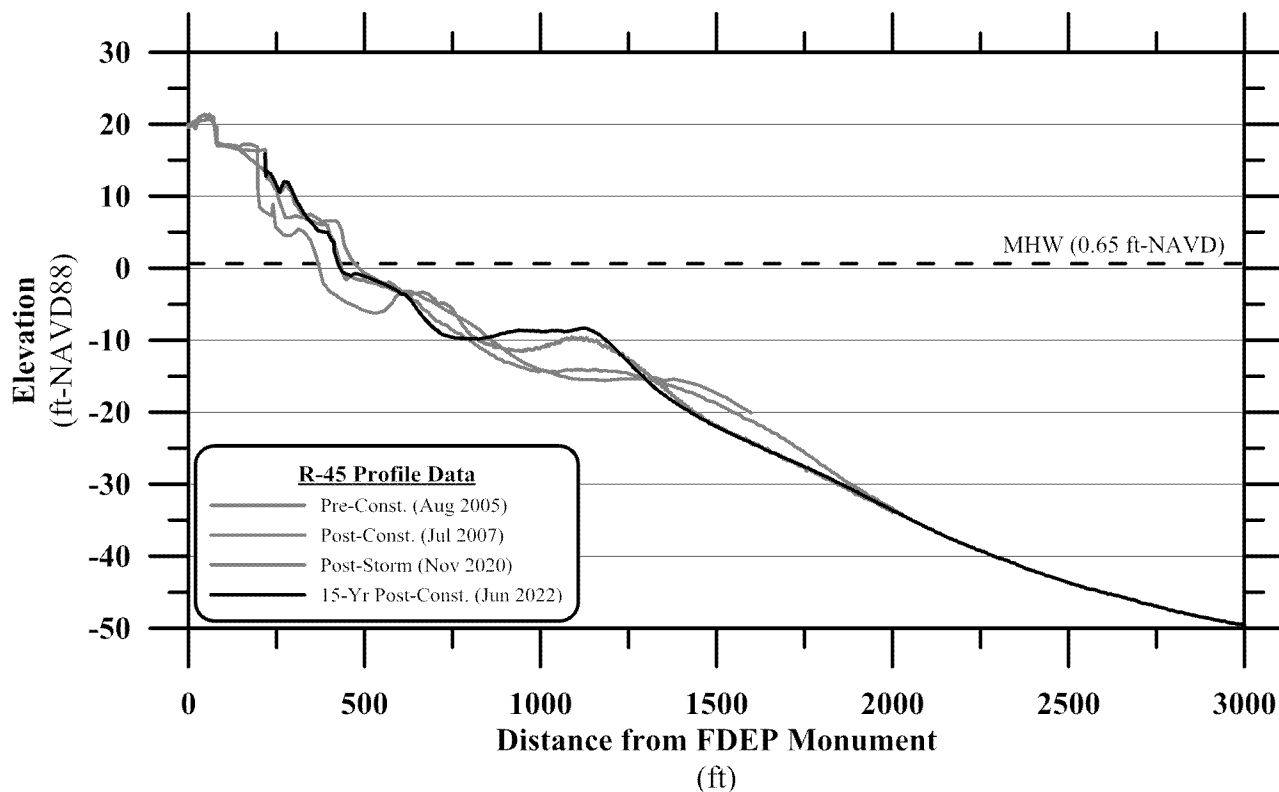


Figure A-15a Beach Profile Survey Data at FDEP Monument R-45.

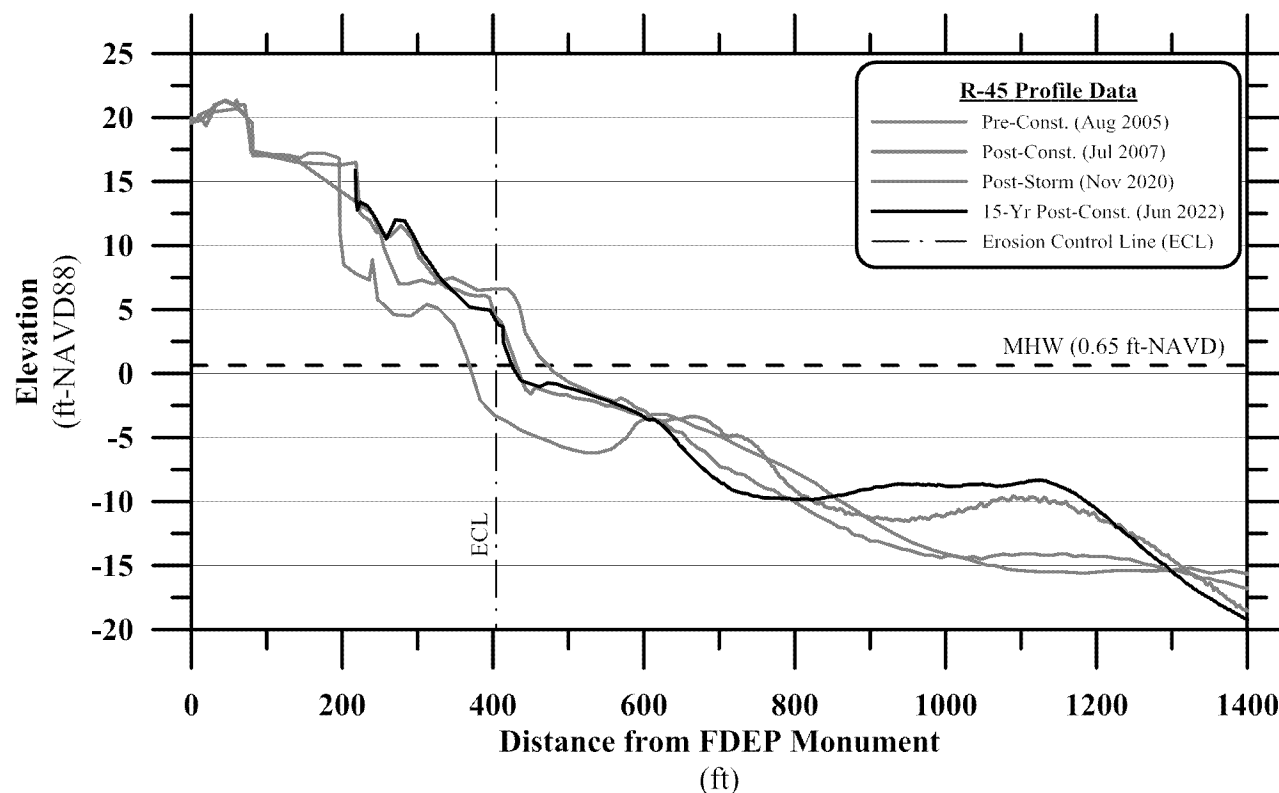


Figure A-15b Beach Profile Survey Data at FDEP Monument R-45.

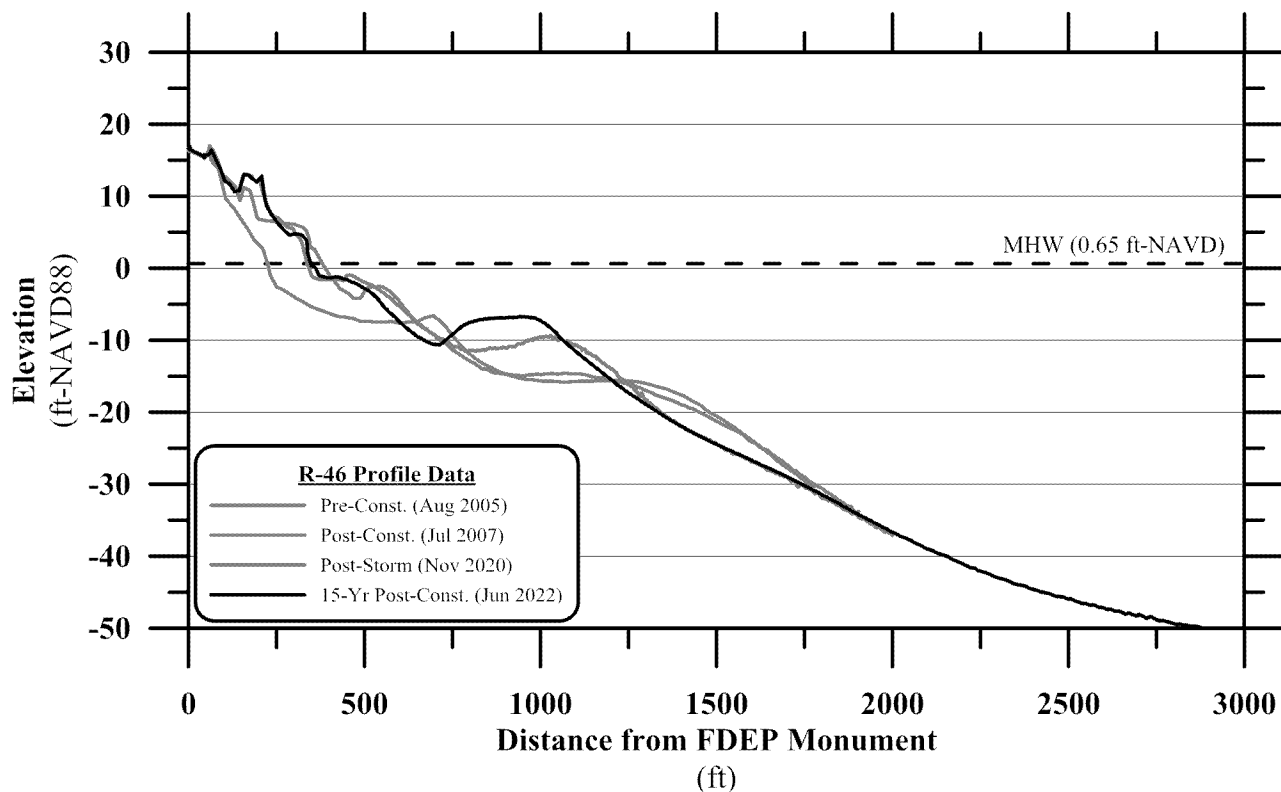


Figure A-16a Beach Profile Survey Data at FDEP Monument R-46.

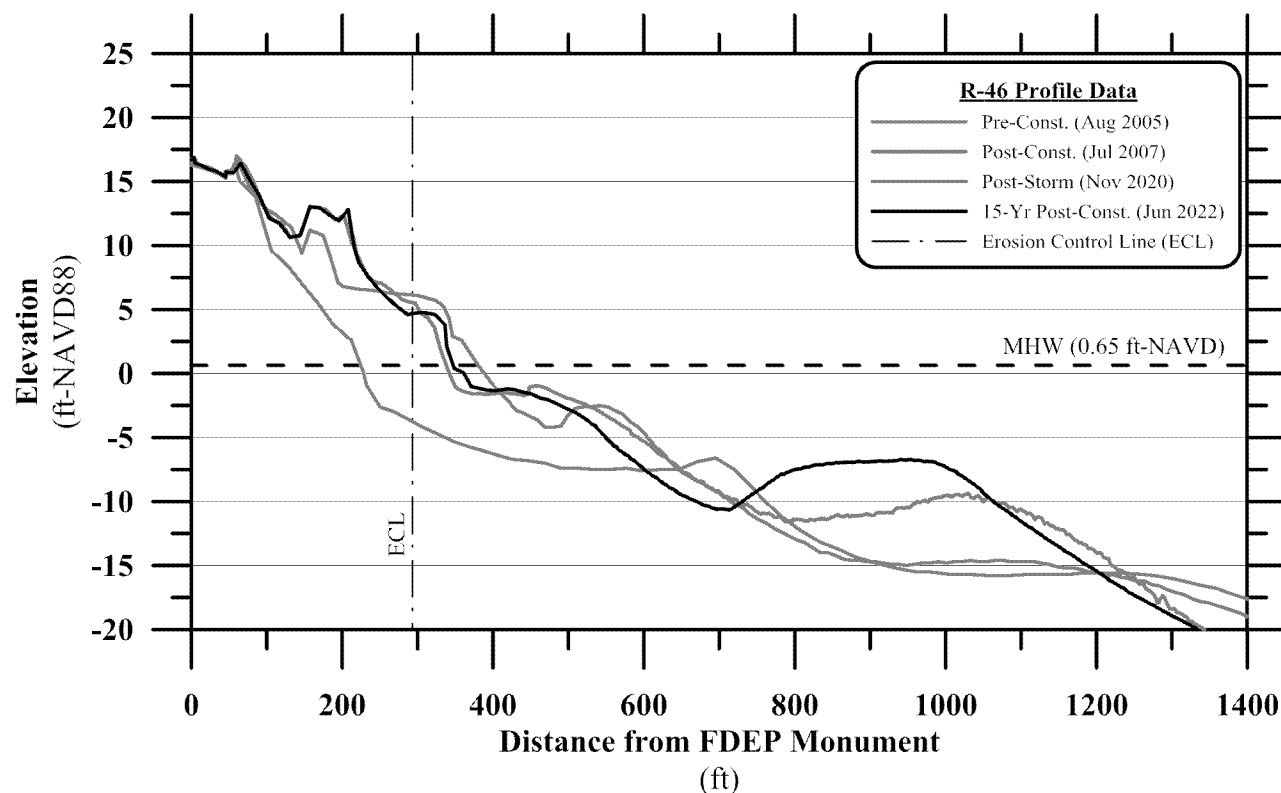


Figure A-16b Beach Profile Survey Data at FDEP Monument R-46.

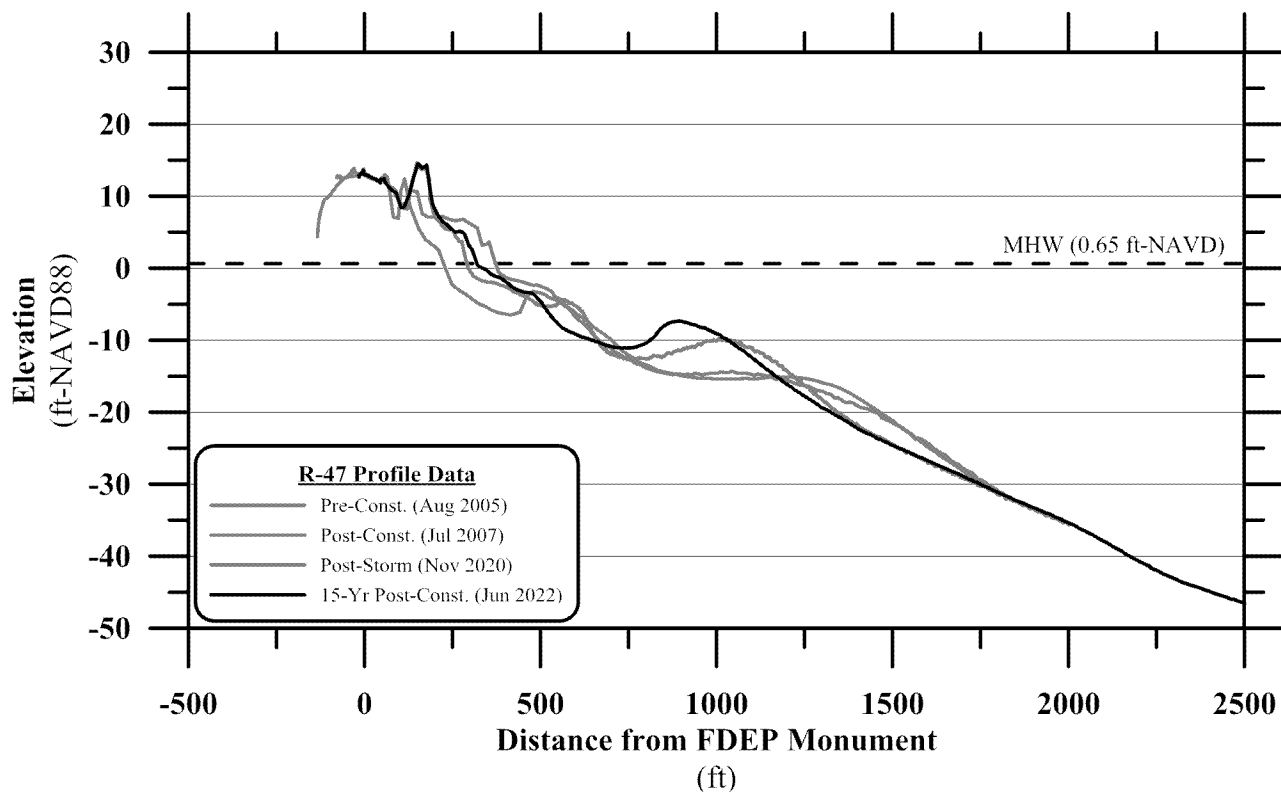


Figure A-17a Beach Profile Survey Data at FDEP Monument R-47.

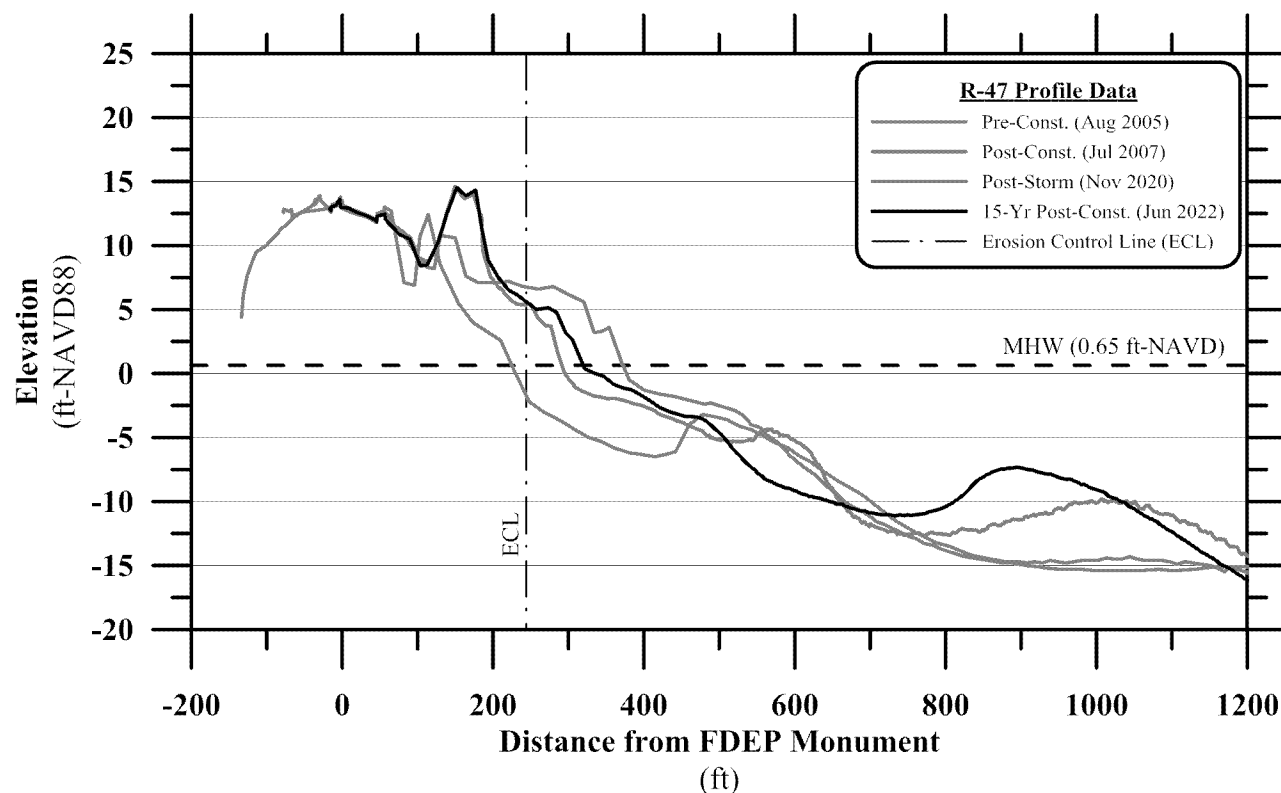


Figure A-17b Beach Profile Survey Data at FDEP Monument R-47.

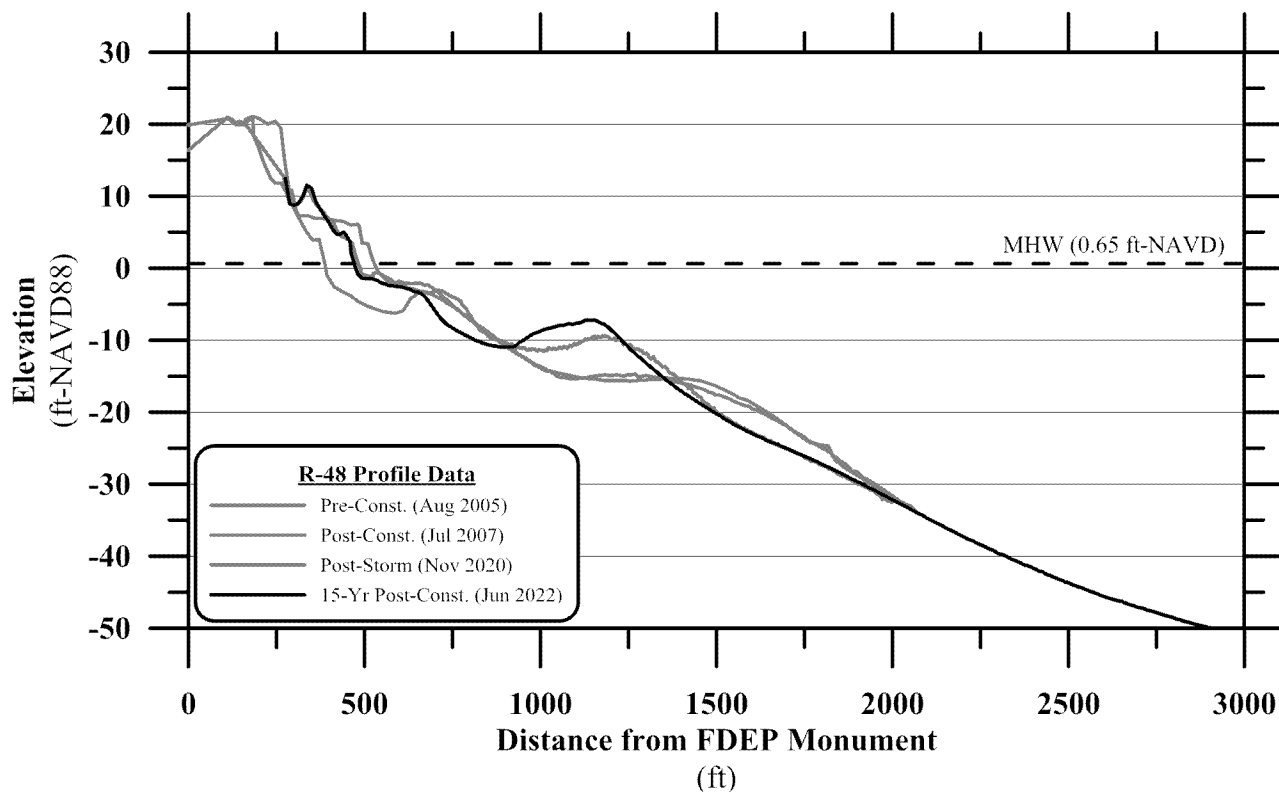


Figure A-18a Beach Profile Survey Data at FDEP Monument R-48.

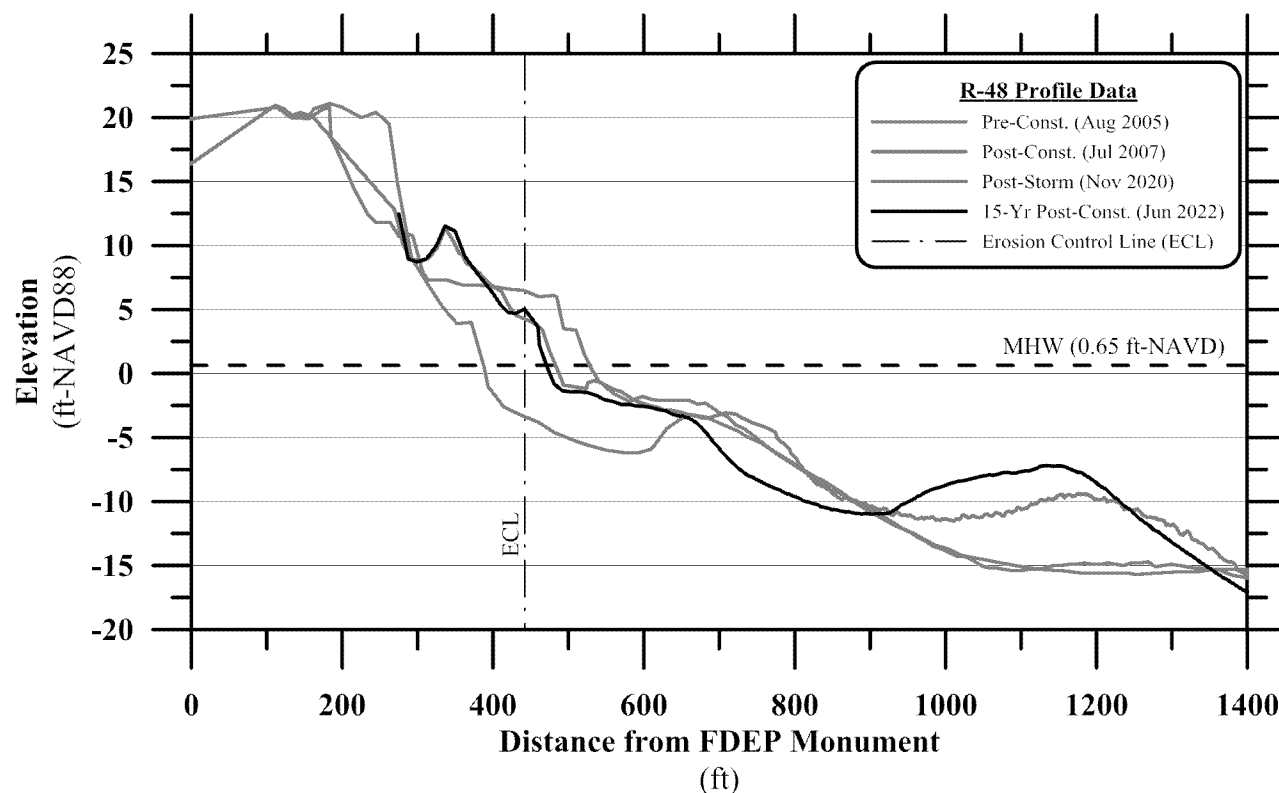


Figure A-18b Beach Profile Survey Data at FDEP Monument R-48.

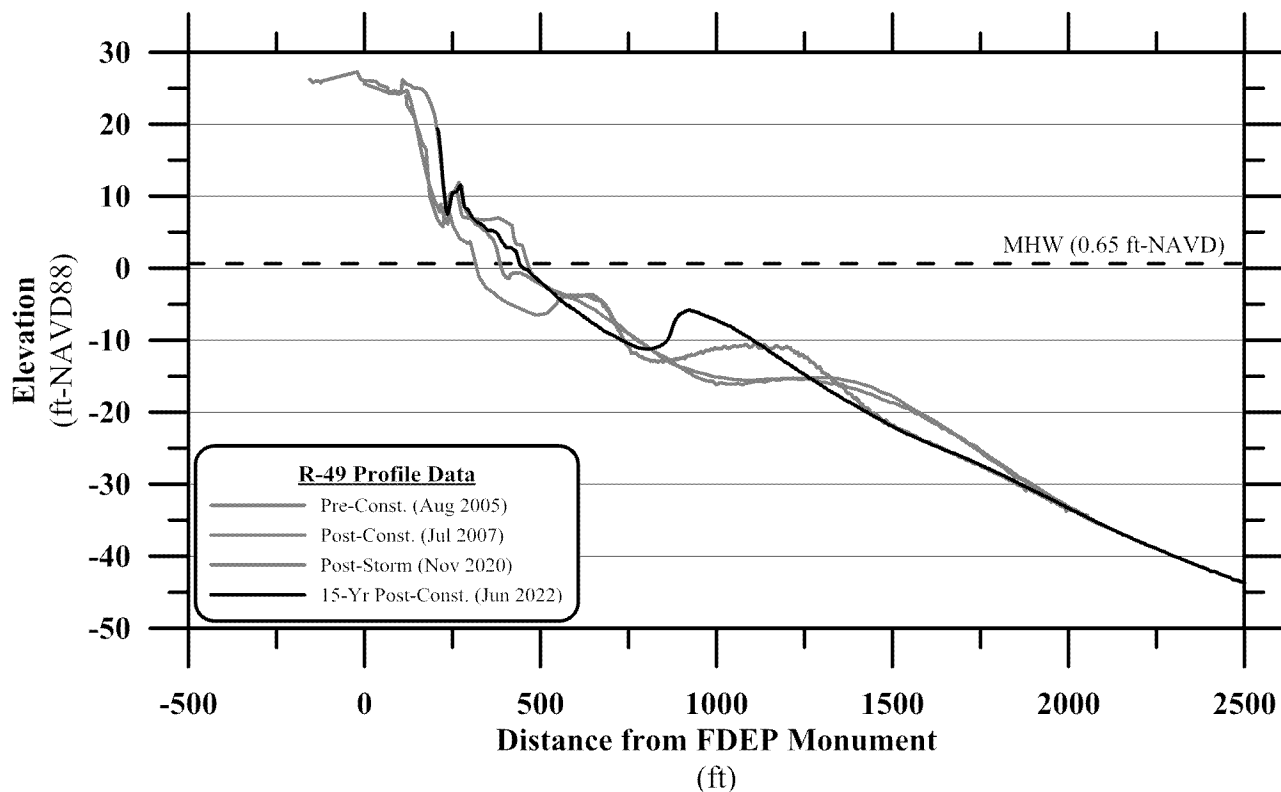


Figure A-19a Beach Profile Survey Data at FDEP Monument R-49.

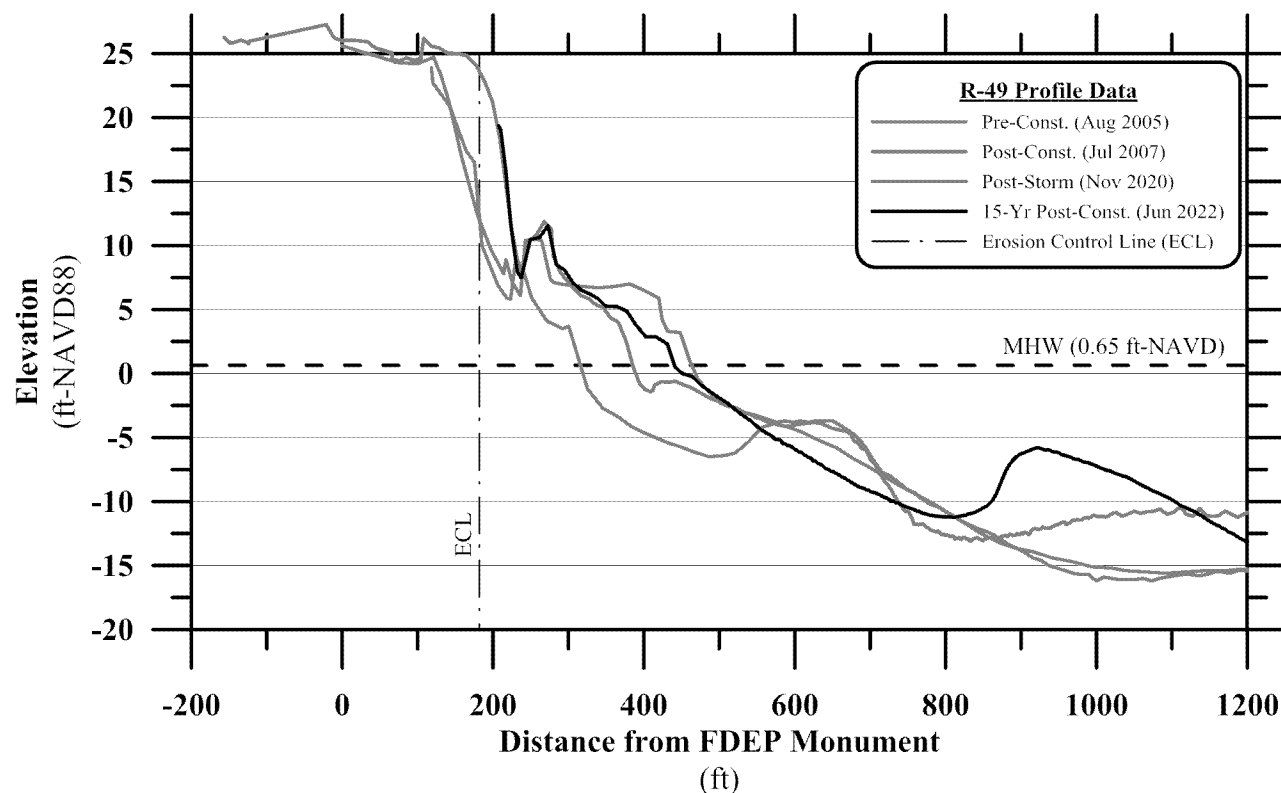


Figure A-19b Beach Profile Survey Data at FDEP Monument R-49.

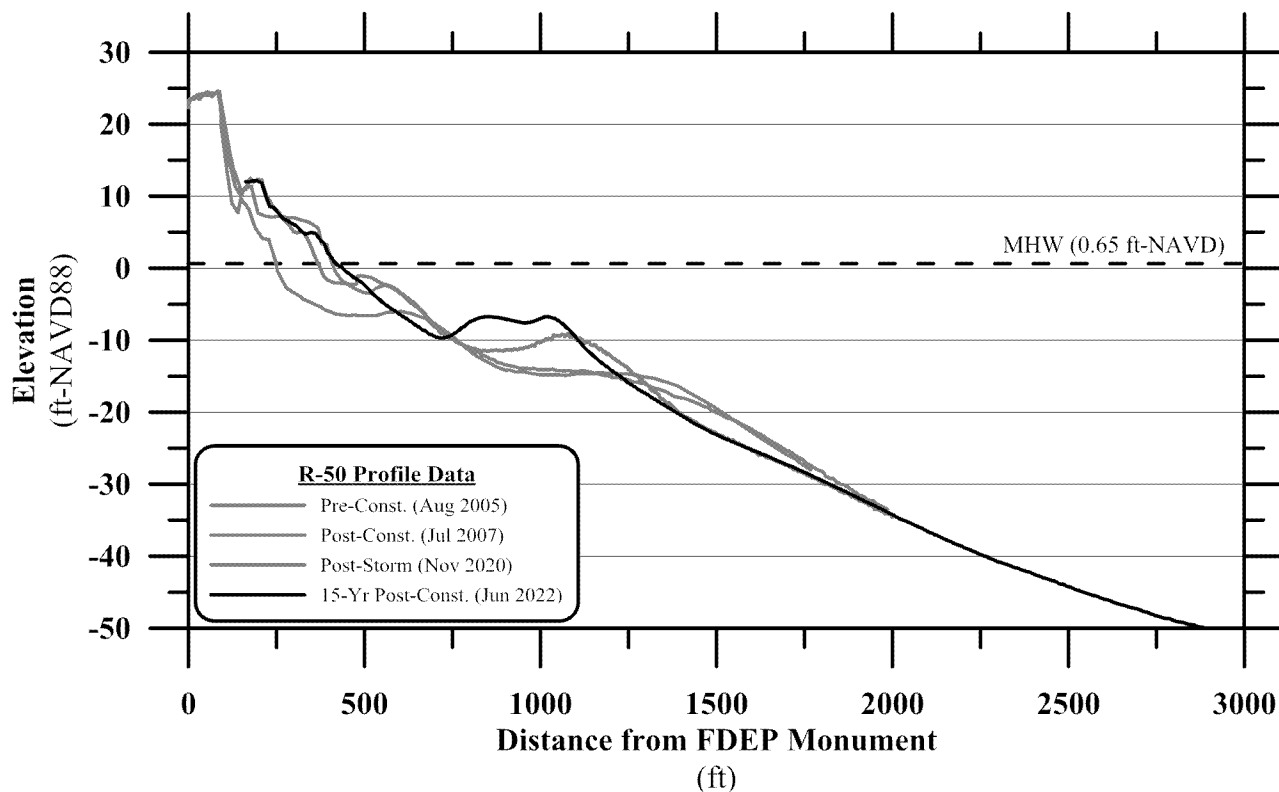


Figure A-20a Beach Profile Survey Data at FDEP Monument R-50.

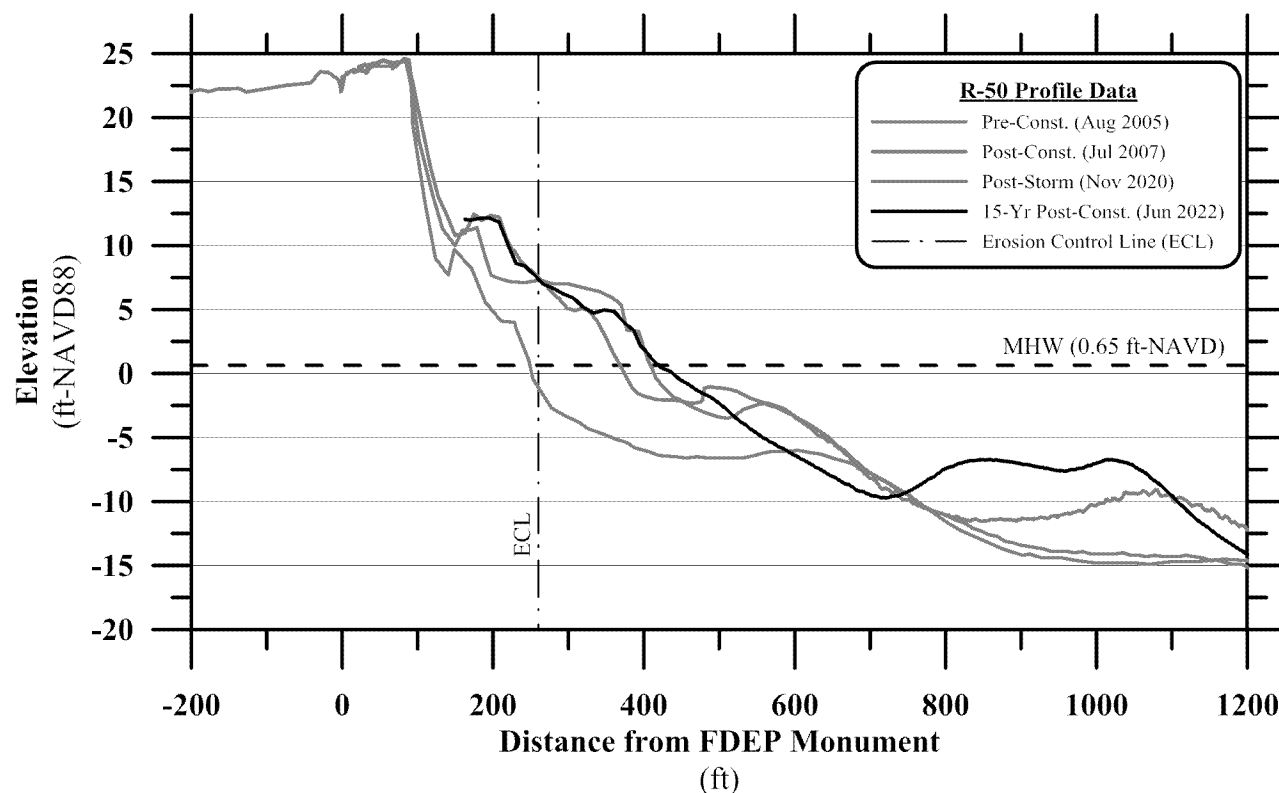
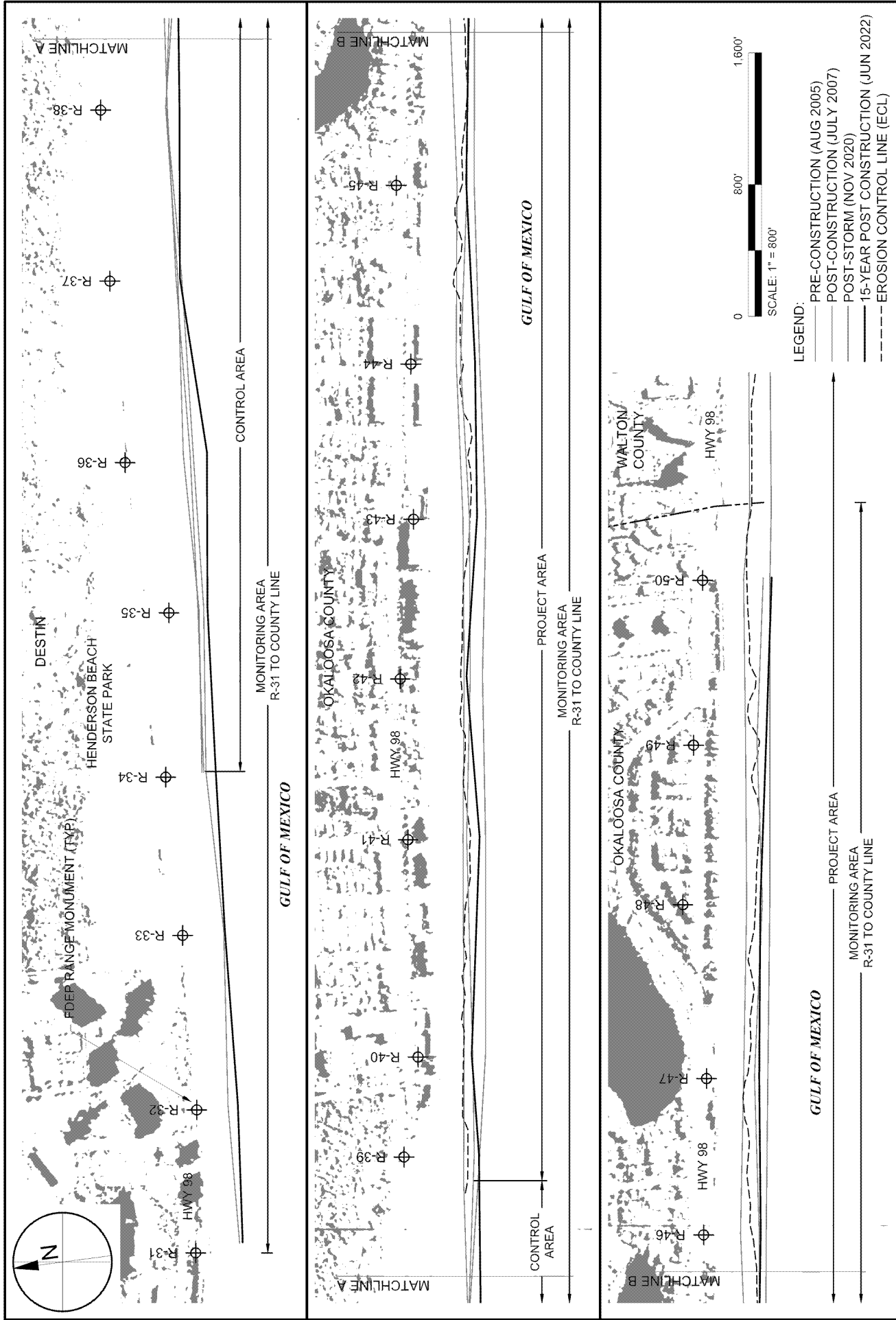
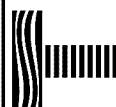


Figure A-20b Beach Profile Survey Data at FDEP Monument R-50.

APPENDIX B

MHW Contours on 2015 Aerials





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REGISTRY # 4815

APPENDIX B
MHW SHORELINE POSITIONS OVER AERIAL IMAGERY
WALTON/DESTIN BEACH RESTORATION PROJECT
EASTERN DESTIN FIFTEEN-YEAR POST-CONSTRUCTION MONITORING REPORT
OKALOOSA COUNTY, FLORIDA

PROJECT C2022-031
DRAWN BY CAS
SHEET
DATE OCT 2022

APPENDIX C

2022 Fifteen-Year Post-Construction Condition Photographs



Figure 1: Okaloosa County near R-32 looking East (6/29/2022)

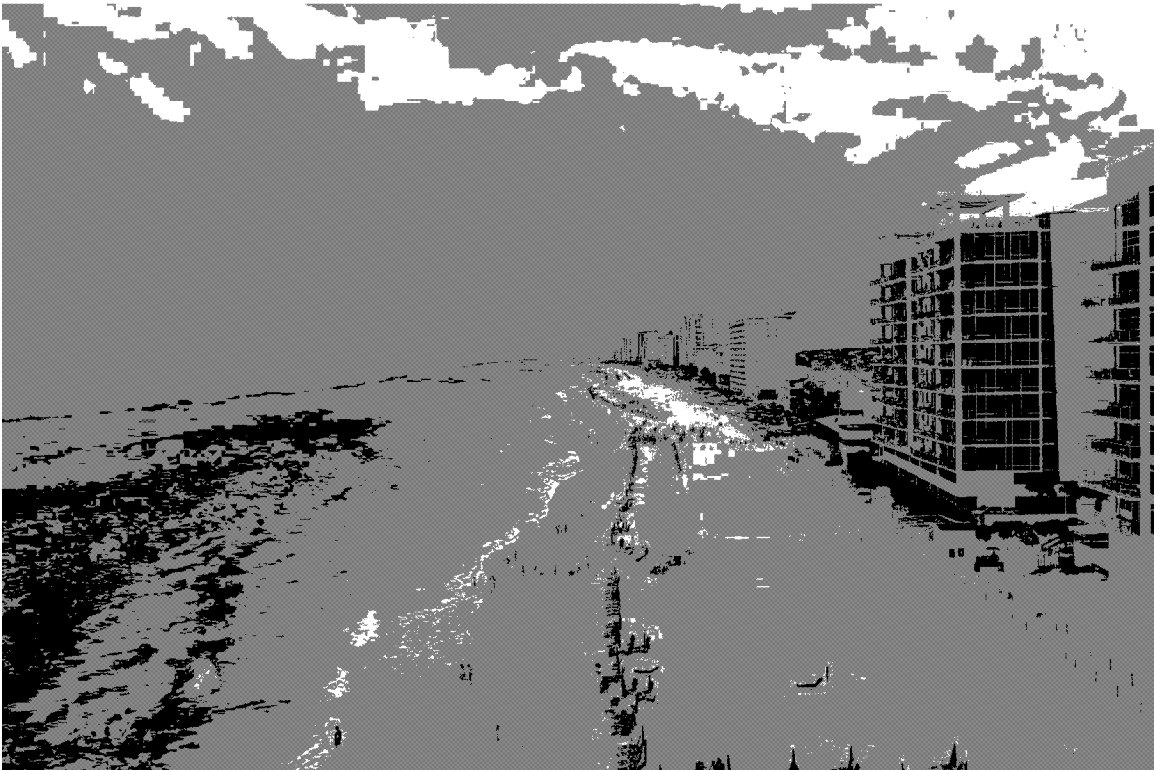


Figure 2: Okaloosa County near R-32 looking West (6/29/2022)



Figure 3: Okaloosa County near R-34 looking East (6/29/2022)



Figure 4: Okaloosa County near R-34 looking West (6/29/2022)



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Figure 6: Okaloosa County near R-36 looking West (6/29/2022)



Figure 7: Okaloosa County near R-38 looking East (6/29/2022)

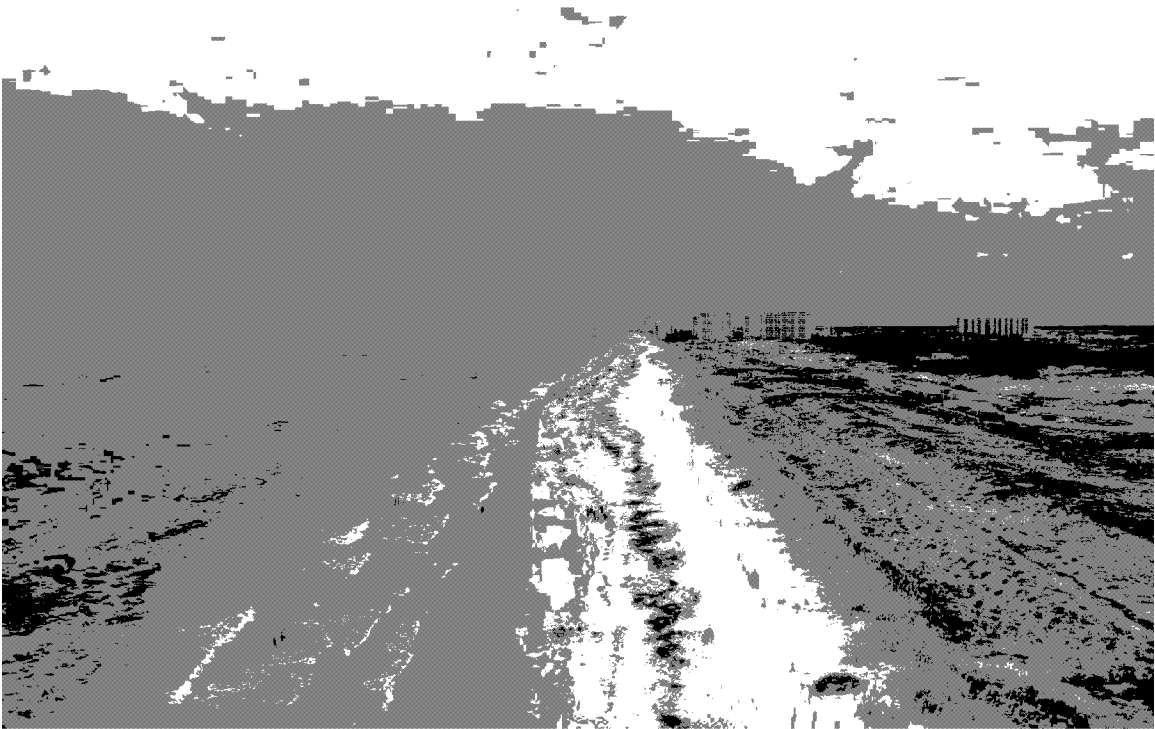


Figure 8: Okaloosa County near R-38 looking West (6/29/2022)

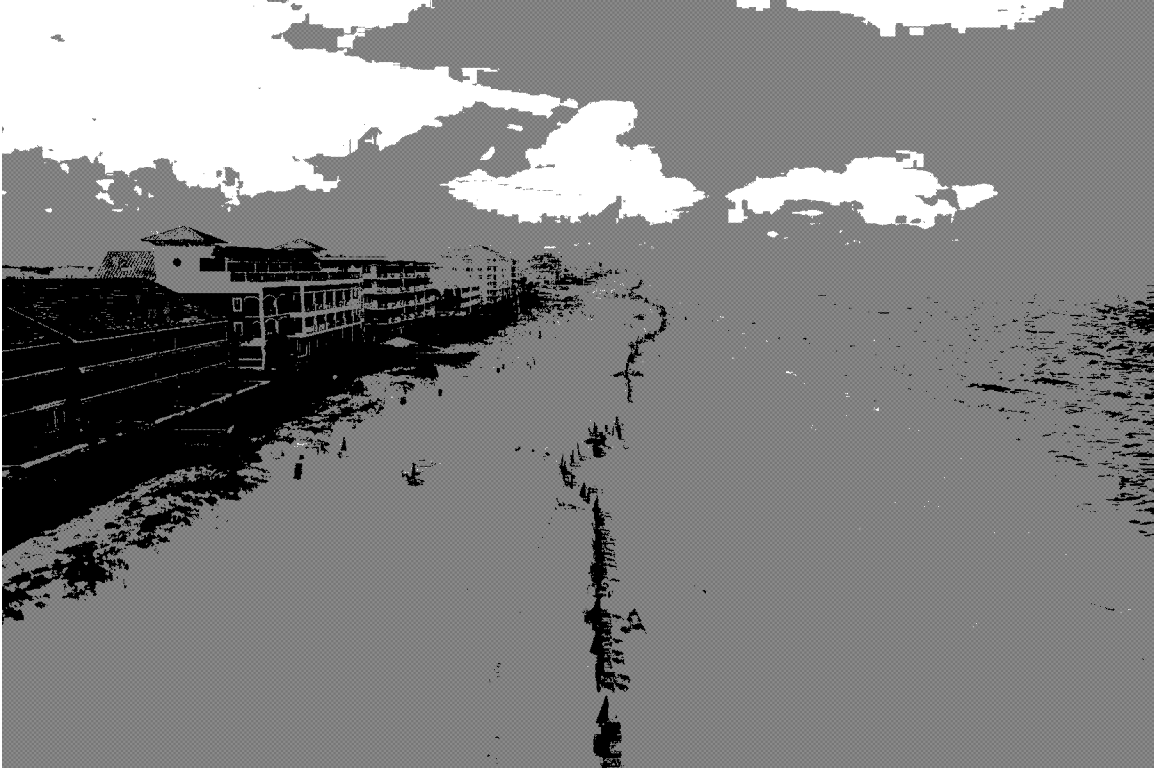


Figure 9: Okaloosa County near R-40 looking East (6/29/2022)

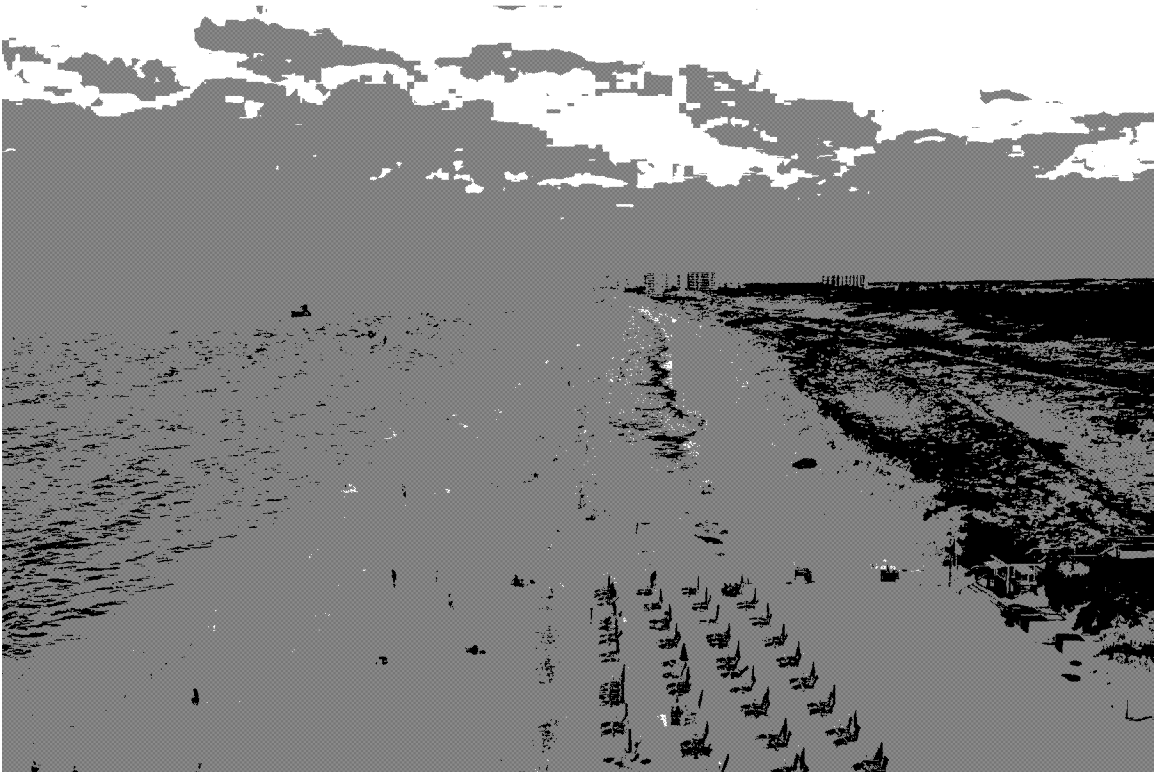


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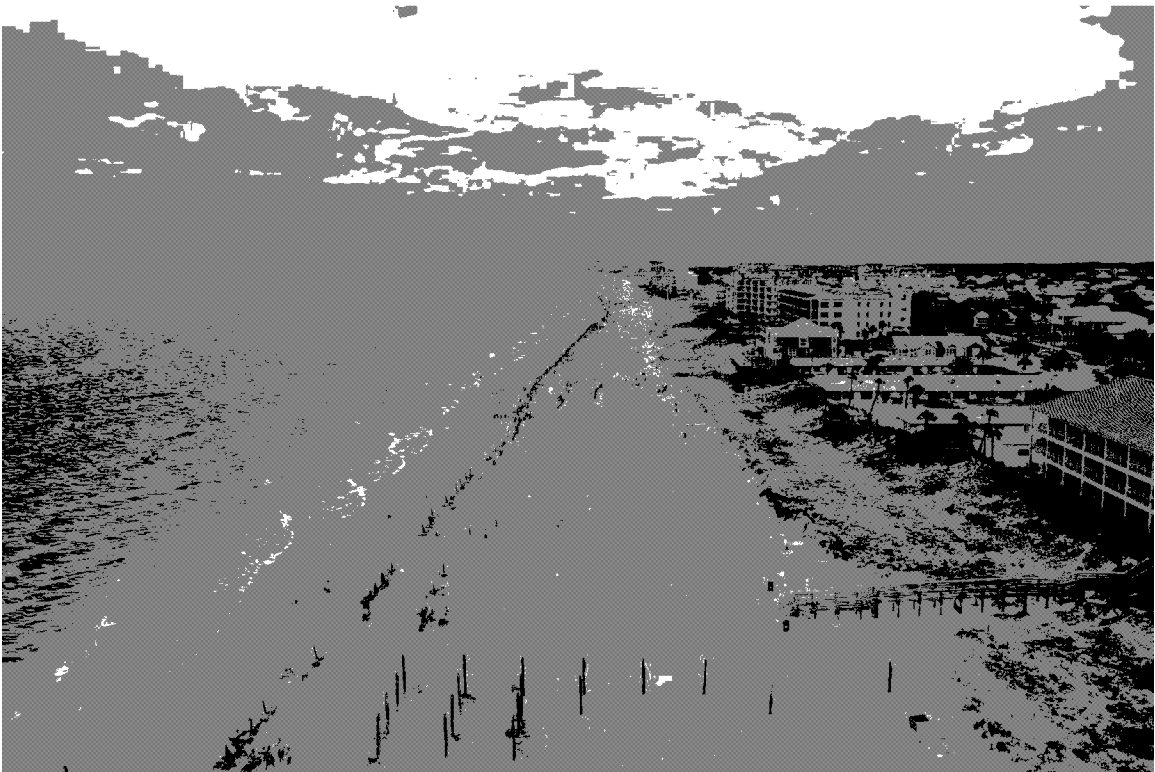


Figure 14: Okaloosa County near R-44 looking West (6/29/2022)

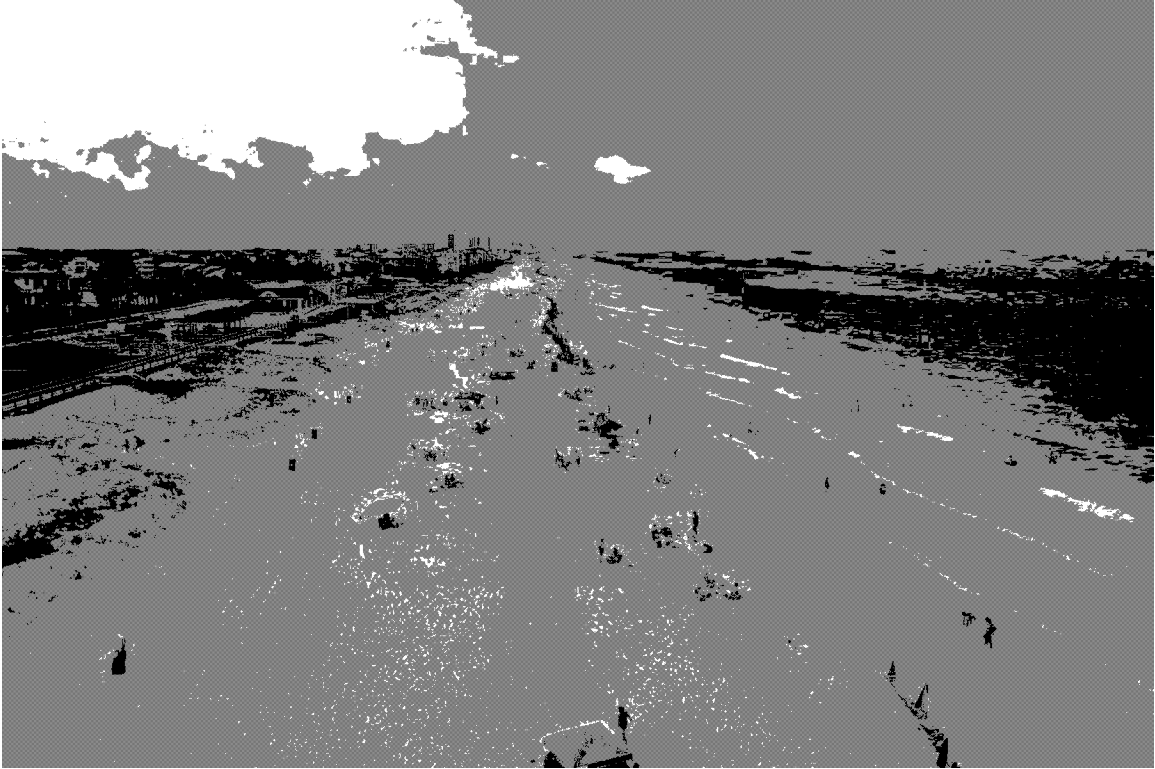


Figure 15: Okaloosa County near R-46 looking East (6/29/2022)

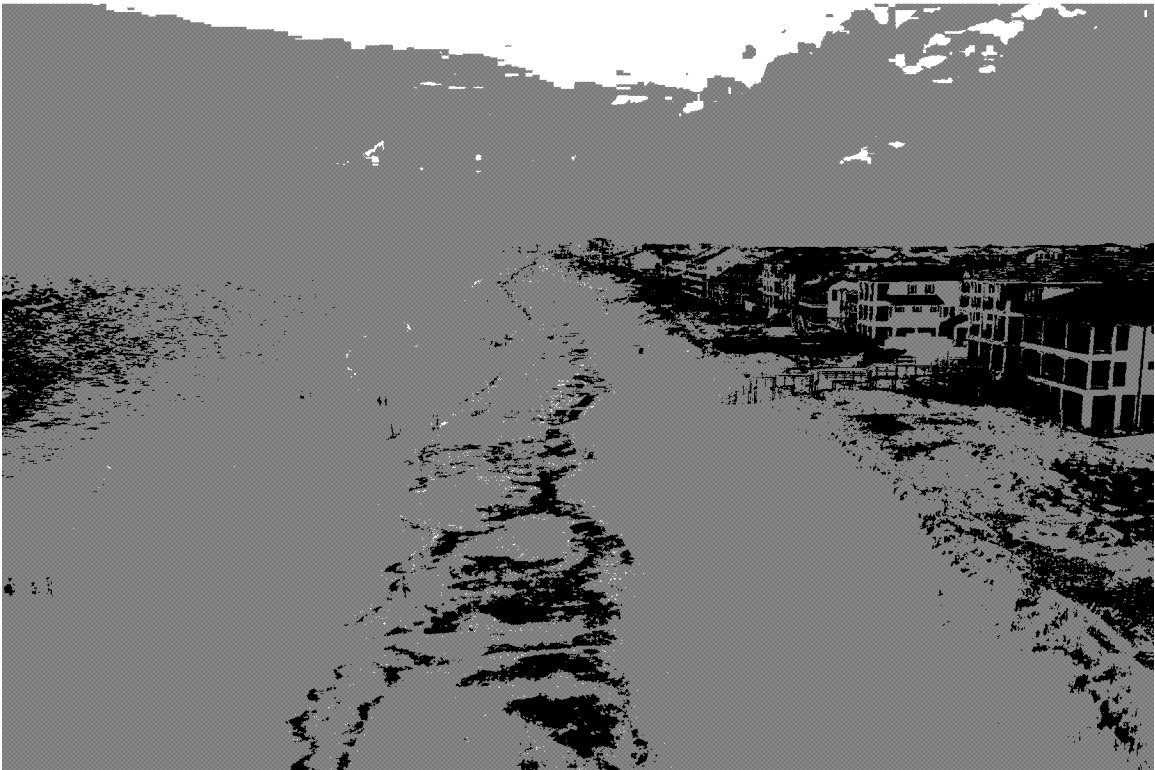


Figure 16: Okaloosa County near R-46 looking West (6/29/2022)



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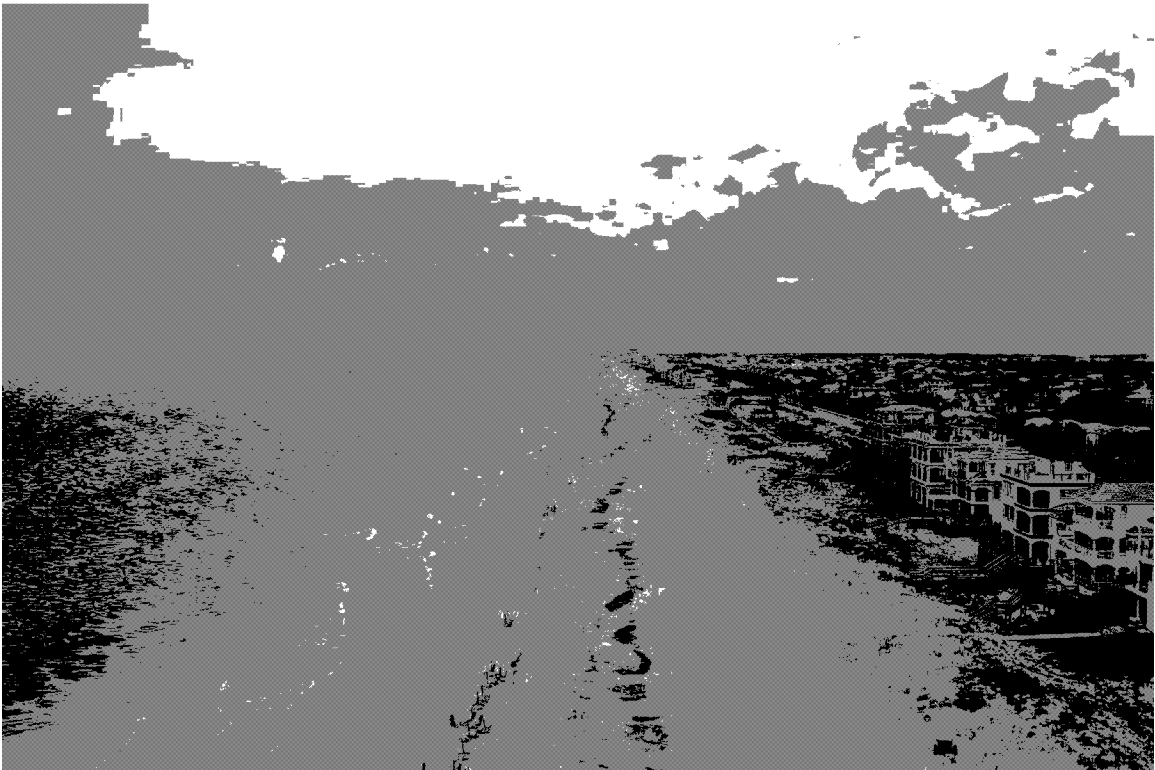


Figure 18: Okaloosa County near R-48 looking West (6/29/2022)

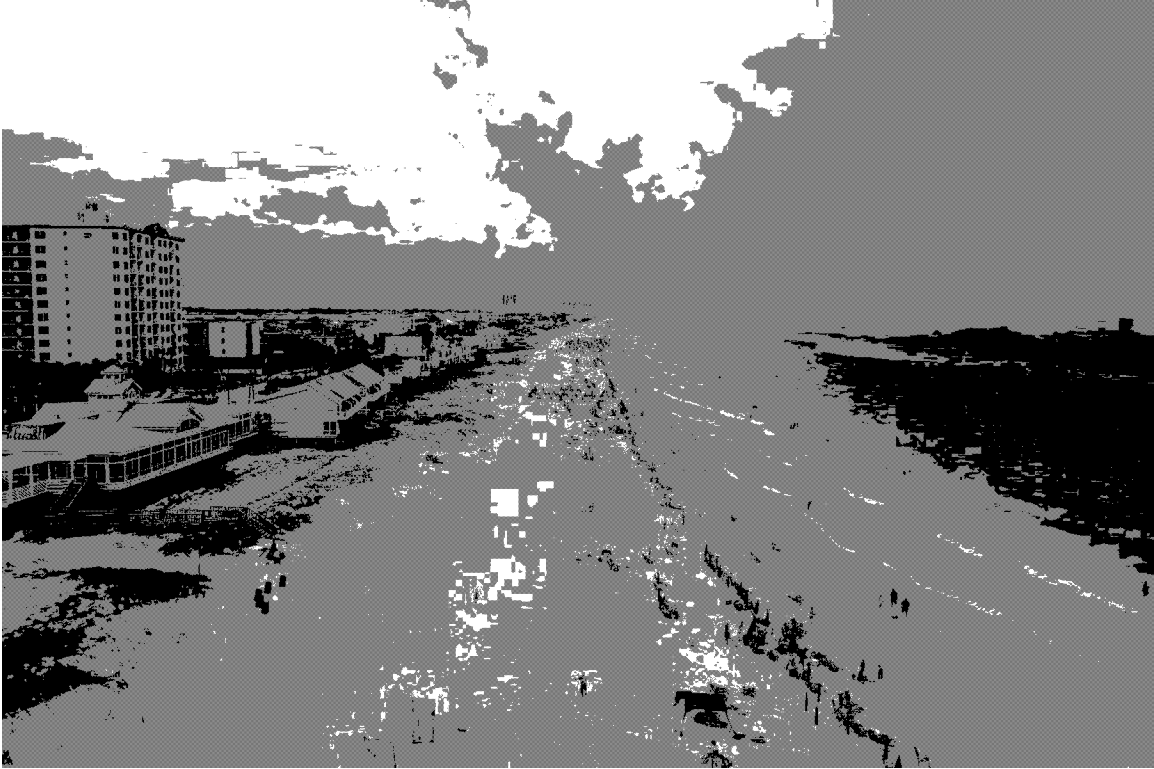


Figure 19: Okaloosa County near R-50 looking East (6/29/2022)

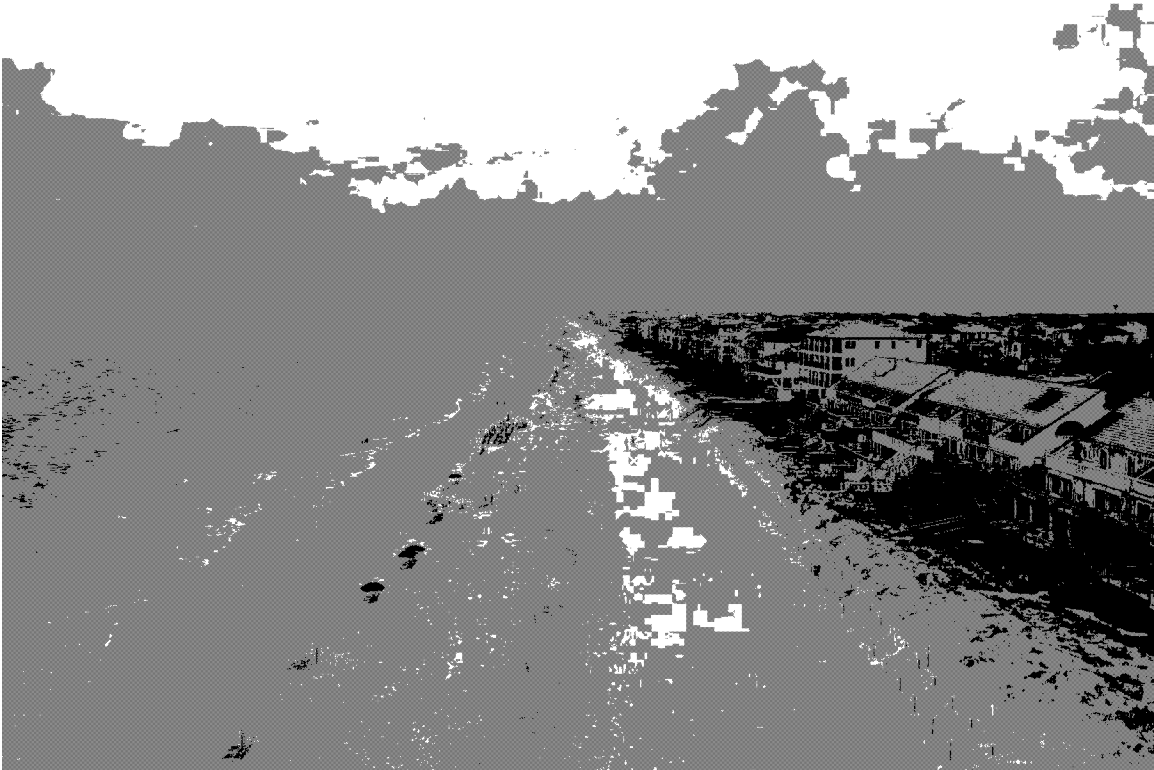
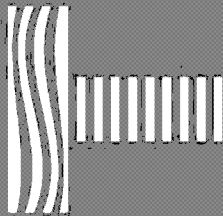
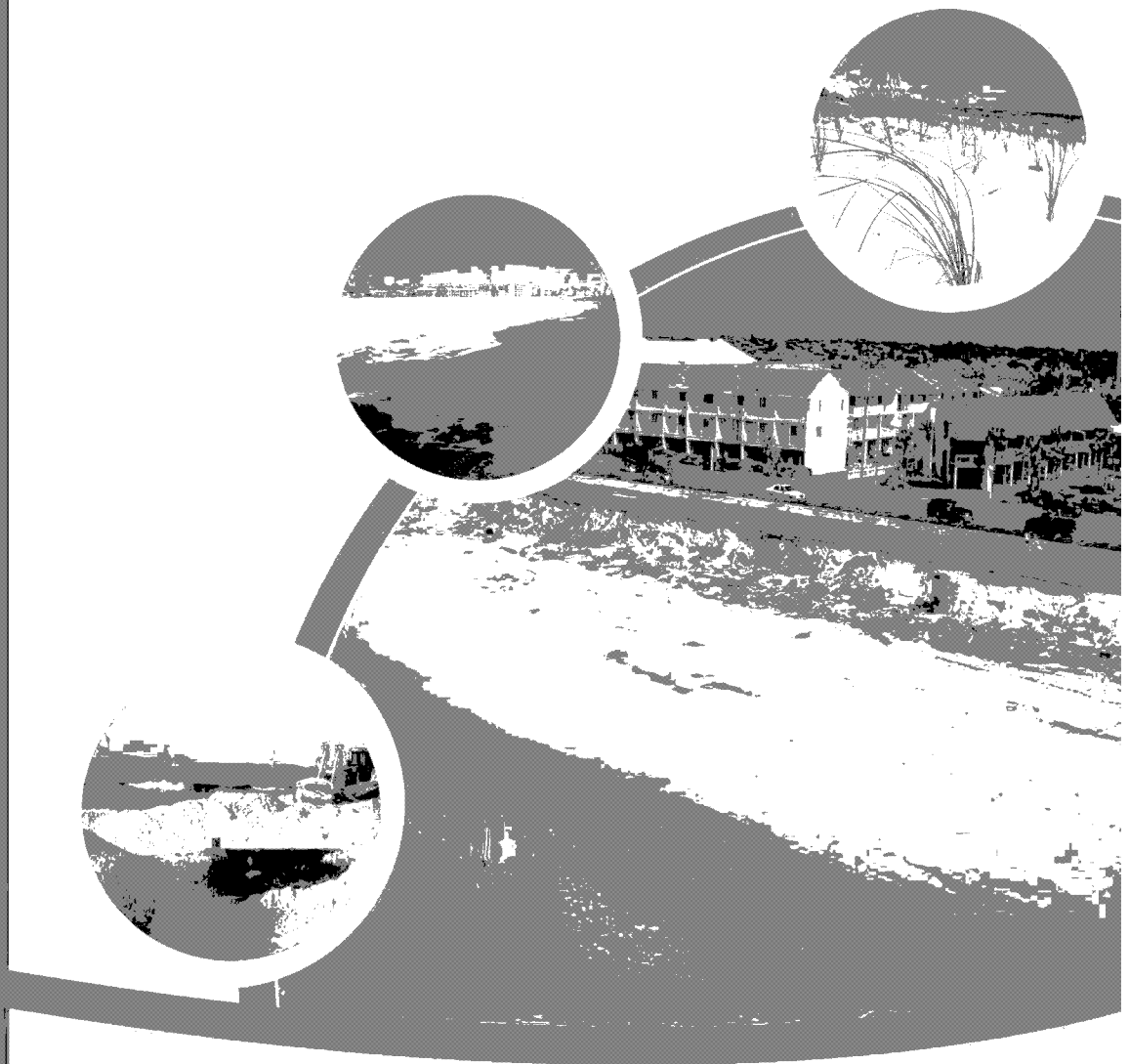


Figure 20: Okaloosa County near R-50 looking West (6/29/2022)



Western Destin Nine-Year Post-Construction Monitoring Report Okaloosa County, FL

December 2022



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Western Destin Nine-Year Post-Construction
Monitoring Report
Okaloosa County, FL

Prepared for

City of Destin and Okaloosa County, Florida
and
Florida Department of Environmental Protection

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4300 Legendary Drive, Suite C246
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C2022-031

December 2022

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1.0 INTRODUCTION

1.1 Overview

Department of the Army (DOA) Permit Number SAJ-2008-00895(IP-SWA) and SAJ-2007-04911(SP-TSH) and Florida Department of Environmental Protection (FDEP) Permit No. 0286575-001-JC and 0288799-003-JC, issued to Okaloosa County and the City of Destin, authorized the 2013 Western Destin Beach Restoration Project and the 2020 East Pass Maintenance Dredging Project. This report documents the nine-year post-construction monitoring results of the Restoration Project, constructed from January 29 – February 25, 2013.

The Western Destin Beach Restoration Project placement area includes two reaches of the Okaloosa County shoreline immediately east of Destin's East Pass. The Reach 1 project area (R-17 to R-20.5) extends from the eastern jetty of East Pass to the east property boundary of Destin on the Gulf, approximately 700 feet east of R-20. The Reach 2 project area (R-23.5 to R-25.5) extends from the western property boundary of Sandpiper Cove (approximately 500 ft east of R-23) to the eastern boundary of Southbay on the Gulf (approximately 500 ft east of R-25). The approximately 2,900-ft gap between Reach 1 and Reach 2 includes 18 single-family lots and 3 condominium properties. The beach quality material for the project originated from the northern portion of the regionally permitted borrow site — located approximately 1.3 miles offshore and 4 miles west of East Pass — previously used by the Holiday Isle Emergency Beach Restoration Project and the Eglin Air Force Base Beach Restoration Project.

Between February 29 – June 21, 2020, the US Army Corps of Engineers (USACE), City of Destin, and Okaloosa County performed maintenance dredging on portions of the East Pass Federal Navigation Channel. Dredged material was placed within the East Beach Disposal Area. The placement (i.e., beach fill) area for the 2020 East Pass Maintenance Dredging Project extends from approximately 500 ft east of FDEP Range Monument R-17 (R-17.5) to 700 ft east of R-20 (R-20.7). This area is nearly concurrent with Reach 1 of the Western Destin Beach Restoration Project, which extends from the eastern jetty of East Pass (500 ft west of R-17 [R-16.5]) to 700 ft east of R-20 (R-20.7). Notably, the maintenance dredging authorizations limit the placement areas to a “swash zone” template that extends from the +3 ft-NAVD contour seaward to the limit of the West Destin Beach Restoration Project fill template. The beach quality material for the project originated from two sections of the East Pass Federal Navigation Channel from Sta. 13+00 to 31+00 and Sta. 44+00 to 66+00. **Figure 1.1** and **Figure 1.2** provide an overview of the Western Destin Beach Restoration Project and of the beach fill monitoring area.

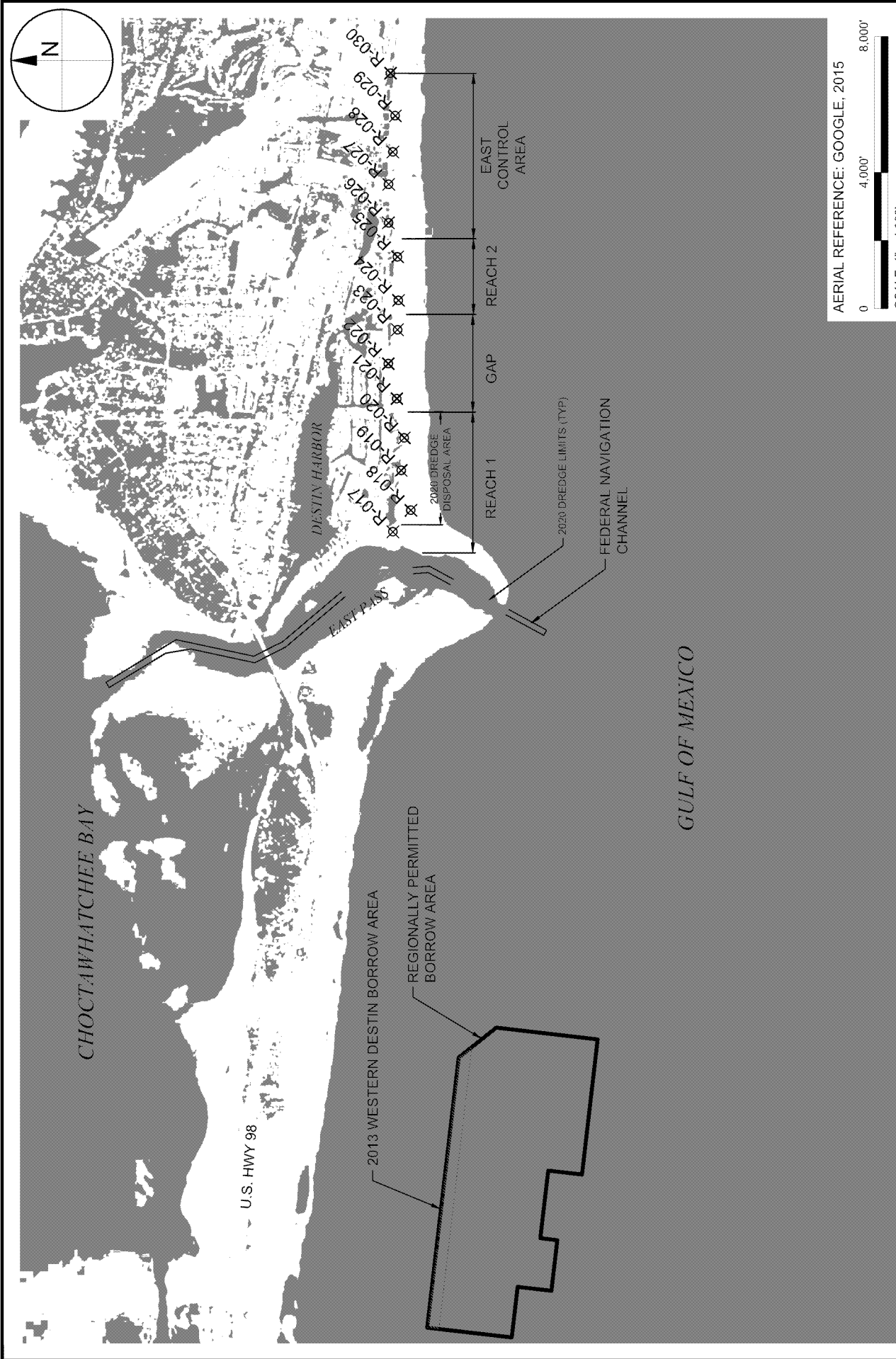
Project monitoring consisted of collection and analysis of topographic and bathymetric data consistent with the Western Destin Beach Restoration project and associated control areas. Control areas include the approximately 2,900-ft gap between the two Western Destin Beach Restoration project reaches and an approximately 4,900-ft beach segment extending eastward from Reach 2. Data analyses included comparisons between the January 2013 pre-construction, March 2013 post-construction, July 2020 seven-year post-construction (post-dredge), November 2020 post-storm (Hurricane Sally), and June 2022 nine-year post-construction surveys to document project performance and general changes within the monitoring area. Throughout this report, “construction” event refers to the 2013 Western Destin Beach Restoration Project, “dredge” event refers to the 2020 East Pass Maintenance Dredging Project, and “storm” event refers to 2020 Hurricane Sally.

Although the above-referenced FDEP permit does not require annual monitoring services of the 2013 Western Destin Beach Restoration Project in 2022, Okaloosa County's coastal management program

relies on formal documentation of the beach condition, project performance, and erosional trends to assess the severity of storm impacts and the necessity of future nourishments. This report follows the same format as the previously submitted annual monitoring reports prepared for Okaloosa County, the City of Destin, and FDEP (to fulfill the post-construction monitoring obligations mandated by FDEP Permit No. 0286575-001-JC) and may serve as a basis for future monitoring of the Western Destin Beach Restoration Project area.

1.2 Report Organization

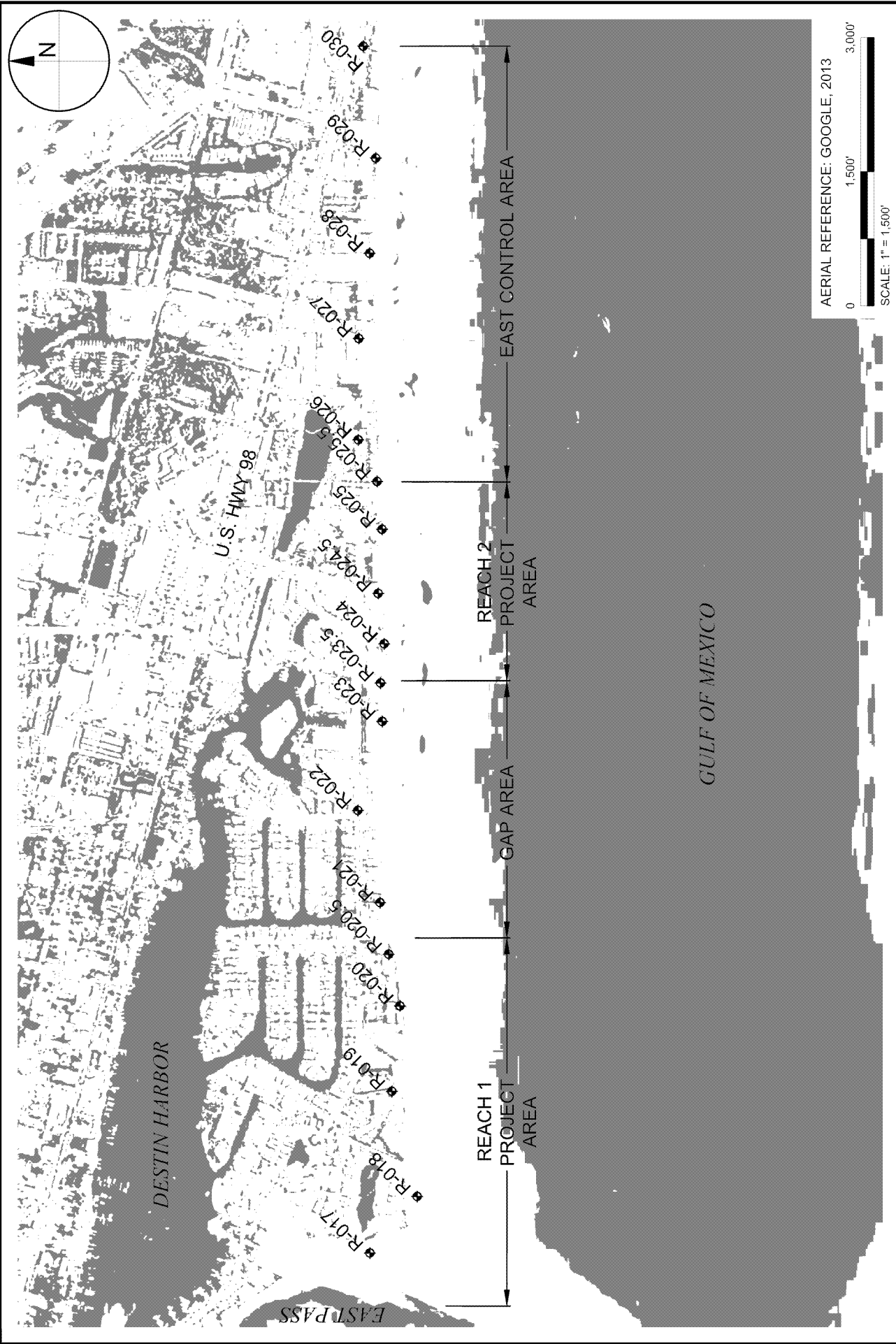
Following this introduction, Chapter 2.0 reviews the nourishment history of the project area and provides details (e.g., date and coverage) of the relevant monitoring surveys. Chapter 3.0 documents the analysis of the 2013 construction project, 2020 maintenance dredging project, 2020 Hurricane Sally, and background littoral process effects on beach profiles, shoreline positions, and beach volumes in the project and control areas. Chapter 4.0 summarizes and concludes this study. A list of references follows Chapter 4.0. **Appendix A** contains beach profile plots of relevant surveys, and **Appendix B** illustrates the surveyed mean high water (MHW) contours overlain on 2015 aerial photos. **Appendix C** contains photographs of the June 2022 condition. **Appendix D** summarizes the beach volume changes, excluding large volumetric changes caused by the ebb shoal at R-17.



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 DESTIN, FL 32541
 CERTIFICATE OF AUTHORIZATION # 4815

FIGURE 1.1
 PROJECT OVERVIEW
 WESTERN DESTIN BEACH RESTORATION PROJECT
 2022 NINE-YEAR POST-CONSTRUCTION MONITORING REPORT

PROJECT	C2022-031
DRAWN BY	AF
SHEET	
DATE	SEP 2022





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FIGURE 1.2
 BEACH FILL MONITORING AREA
 WESTERN DESTIN BEACH RESTORATION PROJECT
 2022 NINE-YEAR POST-CONSTRUCTION MONITORING REPORT

PROJECT	C2022-031
DRAWN BY	AF
SHEET	
DATE	SEP 2022

2.0 DATA COLLECTION

2.1 Nourishment History

The 2013 Western Destin Beach Restoration Project, constructed from January 29 – February 25, 2013, restored two shoreline segments totaling approximately 1.2 miles (**Figure 1.1**). The Reach 1 project area extends from the eastern jetty of East Pass to the east property boundary of Destin on the Gulf, approximately 700 feet east of R-20 (R-20.7). The Reach 2 project area extends from the western property boundary of Sandpiper Cove (R-23.5) to the eastern boundary of Southbay on the Gulf (R-25.5). The constructed project represents a subset of the originally planned 1.7-mile continuous project, modified by the City of Destin to remove appellants — located within the 2,900-ft gap between the reaches — from the project area. The beach-quality borrow material for the Western Destin Beach Restoration project originated from the northern portion of the regionally permitted borrow site located approximately 1.3 miles offshore and 4 miles west of East Pass (Trammell and Trudnak, 2013). Taylor Engineering designed the borrow site based on the availability of beach-quality sand and the proximity of the borrow site to the project area. The City of Destin contracted Great Lakes Dredge and Dock to dredge approximately 634,000 cubic yards (cy) of sand from the borrow site with a hopper dredge.

The 2020 East Pass Maintenance Dredging Project occurred between February 29 – June 21, 2020. The placement area (i.e., beach fill area) for the project extends from approximately 600 ft east of FDEP Range Monument R-17 to 700 ft east of R-20. The beach fill template extended from the approximate +3 ft contour of the pre-construction shoreline out to the seaward limit of the West Destin Beach Restoration Project fill template. The beach fill template was approximately 150 feet wide near the west and east fill limits (R-17.5 and R-20.5) and nearly 250 feet wide near the center of the fill area (R-19). The beach quality material for the project originated from two sections of the East Pass Federal Navigation Channel from Sta. 13+00 to 31+00 and Sta. 44+00 to 66+00 with respective estimated dredge quantities of approximately 123,000 cy and 80,000 cy. In total, the USACE contractor Mike Hooks, LLC hydraulically dredged approximately 203,000 cy from the East Pass Navigation Channel. Frequent storm activity during and immediately following dredge and fill operations resulted in dredge delays and periods of sand redistribution.

2.2 Beach Profile Surveys

This study analyzed the 2013 construction project's pre- and post-construction, seven-year post-construction (post-dredge), post-storm (Hurricane Sally), and nine-year post-construction surveys (**Table 2.1**) which document conditions within the project and control areas. Surveyors applied traditional methods to collect all survey data in accordance with the Bureau of Beaches and Coastal Systems (BBCS) monitoring standards. All survey profiles extend beyond the -40 ft contour, referenced to the 1988 North American Vertical Datum (NAVD). Past monitoring reports provide additional information regarding survey history of the project area (Trammell and Trudnak, 2012; Trammell, Trudnak, and Greer, 2013; Trammell, Trudnak, and Greer, 2014; Trammell, Trudnak, and Greer, 2015; Trammell, Trudnak, and Greer, 2016; Trammell, Trudnak, and Greer, 2017; Taylor Engineering, 2020).

Table 2.1 Western Destin Beach Monitoring Area Surveys

Survey Description	Date	Coverage	Surveyor
Pre-Construction	January 2013	Project Area	Seaside Engineering and Surveying
Post-Construction	March 2013	Project and Control Areas	Morgan & Eklund
Post-Dredge (Seven-Year Post-Construction)	July 2020	Project and Control Areas	Morgan & Eklund
Post-Storm (Hurricane Sally)	November 2020	R-17 to R-30 (whole monuments only)	Dewberry
Nine-Year Post-Construction	June 2022	Project and Control Areas	Seaside Engineering and Surveying

There are notable differences between referenced surveys and the monitoring requirements that affect calculations and reporting herein. These discrepancies are described in past monitoring reports and summarized below. The January 2013 Pre-Construction survey did not include data in the East Control Area from R-27 to R-30. The July 2020 post-dredge survey is adopted as the seven-year post-construction condition for the Western Destin Beach Restoration. While this survey includes the effects of the maintenance dredging disposal in Reach 1 of the Western Destin Beach Restoration monitoring area, it provides a summer survey comparison for all other monitoring areas, as historically performed to meet FDEP monitoring requirements. The November 2020 post-storm survey did not include data at half monument locations (R-20.5, R-23.5, R-24.5, and R-25.5).

Table 2.2 lists the FDEP reference monument locations associated with the monitoring surveys. These monuments comprise an extensive network of survey control that the FDEP (formerly the Florida Department of Natural Resources) established and has maintained since the early 1970s. These locations serve as temporally consistent base points to originate beach profile surveys.

Table 2.2 Okaloosa County Reference Monument Locations

FDEP Monument		Easting ¹ (ft)	Northing ¹ (ft)	Azimuth ² (°N)
Reach 1	R-17	1,336,217.4	508,888.5	190
	R-18	1,336,849.5	508,361.0	190
	R-19	1,338,024.4	508,645.2	190
	R-20	1,338,979.0	508,554.4	175
	R-20.5 ³	1,339,555.2	508,680.4	175
Gap	R-21	1,340,133.9	508,776.8	175
	R-22	1,341,163.6	509,024.8	175
	R-23	1,342,158.9	508,752.3	175
Reach 2	R-23.5 ³	1,342,589.6	508,772.3	175
	R-24	1,343,025.8	508,729.6	175
	R-24.5 ³	1,343,589.5	508,797.2	175
	R-25	1,344,306.9	508,754.2	175
	R-25.5 ³	1,344,841.4	508,809.6	175
East Control Area	R-26	1,345,305.3	509,018.4	175
	R-27	1,346,438.0	509,014.5	175
	R-28	1,347,391.8	508,891.1	175
	R-29	1,348,456.1	508,823.5	175
	R-30	1,349,707.0	508,963.5	175

¹State Plane, Florida North Zone, North American Datum of 1983 (NAD83)

²Degrees clockwise from north

³Half monument data not included in the November 2020 Post-Storm data set

3.0 FILL PLACEMENT ANALYSIS

3.1 Overview

Project monitoring generally involves analyses of two parameters — changes to the shoreline position and the volume of fill remaining within the project area — to determine the evolution of beach fill over time. Calculating the distance from a given point (the survey monument) to a known elevation, in this case MHW, yields shoreline positions. Tracking volume changes between surveys within pre-determined boundaries reveals project evolution over time. Changes above MHW represent variations to the subaerial or dry beach — the area typically considered by the public as “the beach.” Changes below MHW — also called subaqueous changes — indicate material volume remaining within the active profile, frequently in bar formations.

Application of a controlling distance incorporates the cross-shore shoreline and volume data along a single transect (at each monument location) over an alongshore area. In general, a monument’s controlling distance extends between the halfway points of adjacent monuments; however, exceptions to the above definition exist in the project and control areas. Controlling distances are defined by the 2013 Western Destin Beach Restoration Project. A weighted averaging procedure associates the controlling distance with the MHW shoreline position and cross-shore volume at each monument location. This procedure serves to establish a comparative basis throughout an alongshore distance. In this case, the alongshore areas include Reach 1 (East Pass East Jetty – R-20.7), the gap area (R-20.7 – R-23.5), Reach 2 (R-23.5 – R-25.5), and the east control area (monuments R-25.5 – R-30).

This chapter documents the 2022 nine-year post-construction conditions of the beach profiles, shoreline positions, and beach volumes in the project and control areas of the Western Destin Beach Restoration Project. Comparison between the pre-construction (January 2013) and nine-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, maintenance, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the post-construction (March 2013) and nine-year post-construction (June 2022) surveys reveals the evolution of the project approximately nine years after construction. Comparison between the seven-year post-construction (July 2020) and nine-year post-construction (June 2022) surveys reveals the evolution of the project two years after the 2020 East Pass Maintenance Dredging event. Comparison between the post-storm (November 2020) and nine-year post-construction (June 2022) surveys reveals the evolution of the project one and a half years after impacts from Hurricane Sally.

Appendix A contains beach profile plots for the 2013 pre-construction, 2013 post-construction, 2020 seven-year post-construction, 2020 post-storm, and 2022 nine-year post construction surveys at each available monument location listed in **Table 2.2**. The appendix presents two versions of the beach profile plots; the first plot captures the full extent of the profile while the second focuses on the nearshore beach placement area.

3.2 Shoreline Positions and Changes

Table 3.1 and **Figure 3.1** present the surveyed mean high water (MHW elevation = 0.77 ft- NAVD) shoreline position as a function of distance from each monument for the 2013 pre-construction, 2013 post-construction, 2020 seven-year post-construction, 2020 post-storm, and 2022 nine-year post-construction conditions. **Table 3.2** and **Figure 3.2** present the MHW shoreline changes for the above-mentioned comparison periods. Straight lines connect the MHW positions between reference

monuments. As noted in Section 2.2, the post-storm November 2020 survey did not include data at half monument locations, therefore, straight lines connect the MHW positions between the nearest whole monuments for the November 2020 survey. A positive change in shoreline position indicates seaward shoreline advance while a negative change indicates landward shoreline retreat.

Notably, **Appendix B** provides these MHW lines overlain on 2015 digital ortho-photography, a convenient qualitative comparison of project shoreline evolution for the monitoring area. Note, the undulating erosion control line (ECL), surveyed as a condition of the FDEP authorization in September 2008, reflects surveyed MHW positions approximately every 50 – 100 ft along the beach. In contrast, the monitoring survey MHW lines derive from the MHW positions at each profile line, spaced roughly 500 – 1,000 ft apart; straight lines connect the MHW positions between reference monuments. Again, straight lines connect the MHW positions between the nearest whole monuments for the November 2020 survey.

3.2.1 Pre-Construction (January 2013) – Nine-Year Post-Construction (June 2022)

Comparisons between the 2013 pre-construction (January 2013) and 2022 nine-year post-construction (June 2022) MHW shoreline positions reveal changes brought about by the 2013 construction event, 2020 dredging event, and 2020 storm event. Throughout the monitoring area (Reach 1 and Reach 2 project areas, gap and control areas), all profiles remain seaward of the pre-construction shoreline position.

Reach 1 experienced an average advance of 104.4 ft, with a minimum advance of 75.7 ft (R-20) and a maximum advance of 127.1 ft (R-18). Reach 2 experienced an average advance of 33.9 ft, with a minimum advance of 7.3 ft (R-25.5) and maximum advance of 59.8 ft (R-24). The Reach 1 and Reach 2 shoreline changes generally reflect changes due to the 2013 project construction and 2020 dredging event with maximum advance mid reach and diminishing shoreline advance towards the reach limits. These changes, combined with the shoreline advance in the control areas (discussed below), also indicate the anticipated planform equilibration (i.e., longshore diffusion) of the beach fill from the project areas. The shoreline advances in Reach 2 are in a similar magnitude to the adjacent gap area and east control area (R-26) changes, indicating this section of the shoreline may be at or approaching an equilibrated condition.

The gap area advanced 40.7 ft on average, with a minimum advance of 25.4 ft at the eastern limit (R-23) and a maximum of 60.3 ft at the western limit (R-21). The increasing shoreline changes to the west in the gap area and the average shoreline change indicates the gap area continues to experience a benefit from longshore diffusion of the beach fill. Similarly, the east control area (R-26) advanced 29.9 ft.

3.2.2 Post-Construction (March 2013) – Nine-Year Post-Construction (June 2022)

Shoreline comparisons between the 2013 post-construction (March 2013) and 2022 nine-year post-construction (June 2022) surveys indicate the performance of the Western Destin Beach Restoration project nine years after construction and include the effects of the 2020 dredge fill placement and 2020 storm event. The shoreline receded landward at all monuments in Reach 1 and Reach 2. The shoreline in the gap area advanced seaward, and the east control area experienced mixed advance and recession.

Reach 1 experienced an average recession of -99.1 ft, with a minimum recession of -37.8 ft (R-20.5) and a maximum recession of -164.2 ft (R-17). Shoreline recession at R-17 dominates the comparison period, as documented in previous monitoring reports (Trammell, et al., 2014, 2015, 2016, 2017, 2020). Reach 2 experienced an average recession of -83.7 ft, with a minimum recession of -46.1 ft (R-23.5) and a maximum recession of -99.1 ft (R-24.5). Excluding the recession at R-17, Reach 1 and Reach 2 experience

a shoreline recession trend with higher erosion in the center of the project areas and reduced erosion at the project area limits. The reduced erosion near the project limits likely results from the partially equilibrated condition of the post-construction survey combined with the longshore diffusion of the central project area to both the west and east. This erosion, together with the shoreline advances observed in the gap area (discussed below), suggests the area continues to approach an equilibrated condition.

The gap area MHW shoreline advanced seaward an average of 28.5 ft with a maximum advance of 54.2 ft at R-21 and a minimum of 7.6 ft at R-23. Longshore diffusion from the 2013 project in Reach 1 and Reach 2 and the 2020 dredging event in Reach 1 likely caused the shoreline advances within the gap area.

The east control area experienced mixed shoreline advance and recession. Overall, the control area experienced an average shoreline recession of -4.1 ft, with a maximum recession of -56.2 ft at R-26 and a maximum advance of 40.0 ft at R-30. Shoreline advances at R-29 and R-30 suggest a continued benefit of the 2013 project.

3.2.3 Seven-Year Post-Construction (July 2020) – Nine-Year Post-Construction (June 2022)

Comparisons between the 2020 seven-year post-construction (July 2020) and 2022 nine-year post-construction (June 2022) surveys reveal shoreline changes over the last two years and changes brought about by the 2020 dredging event and as affected by Hurricane Sally. The monitoring area shoreline experienced significant average recession in Reach 1, average recession in the gap area and Reach 2, and mixed advance and recession in the east control area.

Reach 1 experienced an average shoreline recession of -76.9 ft, with a maximum recession of -140.0 ft at R-20 and a maximum advance of 8.0 ft at R-17. The Reach 1 project area generally experienced higher erosion in the center of the project area and minor erosion and accretion at the project area limits. Shoreline recession typically occurs after beach fill placement as the beach fill equilibrates and longshore diffusion transports the material away from the project area. The recession in Reach 1 is a likely result of the fill placement from the 2020 East Pass Maintenance Dredging Project.

Reach 2 experienced average shoreline retreat of -23.1 ft, with a maximum retreat of -34.6 ft (R-24.5) and a minimum retreat of -3.0 ft (R-23.5). The recession in Reach 2 during this monitoring period could be a result of increased tropical storm activity. The shoreline retreats in Reach 2 are in similar magnitude to the adjacent gap area and east control area changes (discussed below), indicating this section of the shoreline may be at or approaching an equilibrated condition.

The gap area MHW shoreline receded an average of -18.2 ft with a maximum recession of -35.7 ft (R-23) and a minimum recession of -3.7 ft (R-22).

The east control area experienced average shoreline retreat of -16.7 ft with a maximum recession of -49.0 ft (R-27) and a maximum advance of 13.1 ft (R-30). The area generally experienced mild erosion and accretion with the exception of increased erosion at R-27 (-49.0 ft). The undulation between erosion and accretion at these monuments and throughout the east control area could be indicative of a beach cusp horn (e.g., nearshore bar welding onshore). This tendency toward cusped formation is seen regularly throughout this region.

3.2.4 Post-Storm (November 2020) – Nine-Year Post-Construction (June 2022)

Comparisons between the 2020 post-storm (November 2020) and 2022 nine-year post-construction (June 2022) surveys reveal shoreline changes one and a half years following Hurricane Sally. The monitoring area shoreline experienced retreat in Reach 1, minor average advance in the gap area, and advance in Reach 2 and the east control area. As noted in Section 2.2, the post-storm November 2020 survey did not include data at half monument locations (R-20.5, R-23.5, R-24.5, and R-25.5). The increased longshore resolution provided by the half monuments is not possible in the post-storm data set.

Reach 1 experienced an average shoreline recession of -29.2 ft, with a maximum recession of -56.0 ft (R-17) at the western limit and a minimum recession of -13.7 ft (R-20) near the eastern limit. Again, shoreline retreat at R-17 dominates the comparison period. While erosion within Reach 1 is greatly reduced relative to the preceding comparison period (i.e., Reach 1 lost -76.9 ft on average between July 2020 – June 2022), the project area continues to experience erosion throughout, likely a result of continued dispersion of fill placement from the 2020 East Pass Maintenance Dredging Project.

Throughout the remainder of the monitoring area, the MHW shoreline generally advanced seaward with some relative uniformity, except for minor retreat at R-23 in the gap area. Reach 2 experienced an average shoreline advance of 18.2 ft, with a maximum advance of 55.8 ft (R-24) and a minimum advance of 20.7 ft (R-25). The gap area MHW shoreline advanced an average of 6.2 ft, with a maximum advance of 17.9 ft (R-22) and a maximum retreat of -11.0 ft (R-23). The east control area experienced an average shoreline advance of 34.4 ft, with a maximum advance of 62.4 ft (R-29) and a minimum advance of 14.5 ft (R-27). These changes are anticipated due to the storm event and seasonal evolution of beach profiles, as sand is generally eroded from the nearshore during the elevated wave climate of a storm event (shown by the November 2020 survey) and deposited in the nearshore during comparably calm summer conditions (shown by the June 2022 survey).

Table 3.1 MHW Shoreline Positions (ft from respective monument)

FDEP Reference Monument		Controlling Distance	2013 Pre-Const.	2013 Post-Const.	2020 7-Yr Post-Const.	2020 Post-Storm	2022 9-Yr Post-Const.
			Jan 2013	Mar 2013	Jul 2020	Nov 2020	Jun 2022
		ft	ft	ft	ft	ft	ft
Reach 1	R-17	787	705.9	950.2	778.1	842.1	786.1
	R-18	911	93.0	294.0	300.9	244.2	220.1
	R-19	1,088	256.2	477.8	499.4	418.4	380.2
	R-20	827	143.2	320.0	358.9	232.5	218.8
	R-20.5	464	234.3	377.7	341.5	-	339.9
Reach 1 Weighted Average East Jetty to R-20.7			281.1	484.5	462.4	424.2	385.5
Gap Area	R-21	937	301.8	307.8	378.7	351.5	362.1
	R-22	1,008	486.3	499.2	526.5	504.9	522.8
	R-23	915	196.1	213.9	257.3	232.5	221.5
Gap Area Weighted Average R-20.7 to R-23.5			333.0	345.2	391.9	367.5	373.8
Reach 2	R-23.5	215	231.1	293.2	250.1	-	247.1
	R-24	499	157.1	312.2	228.7	161.0	216.9
	R-24.5	639	202.6	338.3	273.7	-	239.2
	R-25	624	164.1	279.2	219.8	171.7	192.4
	R-25.5	269	246.6	302.1	276.4	-	253.9
Reach 2 Weighted Average R-23.5 to R-25.5			189.8	307.4	246.8	166.9	223.7
East Control Area	R-26	1,044	415.7	501.9	465.0	419.3	445.7
	R-27	1,034	-	413.9	451.9	388.4	402.9
	R-28	997	-	308.0	292.2	285.2	303.2
	R-29	1,156	-	248.2	299.3	211.5	273.9
	R-30	629	-	460.5	487.4	445.8	500.5
East Control Weighted Average R-25.5 to R-30			415.7	377.7	390.3	339.2	373.6
Total Project Area Weighted East Jetty to R-30			289.3	390.9	388.6	354.8	353.1

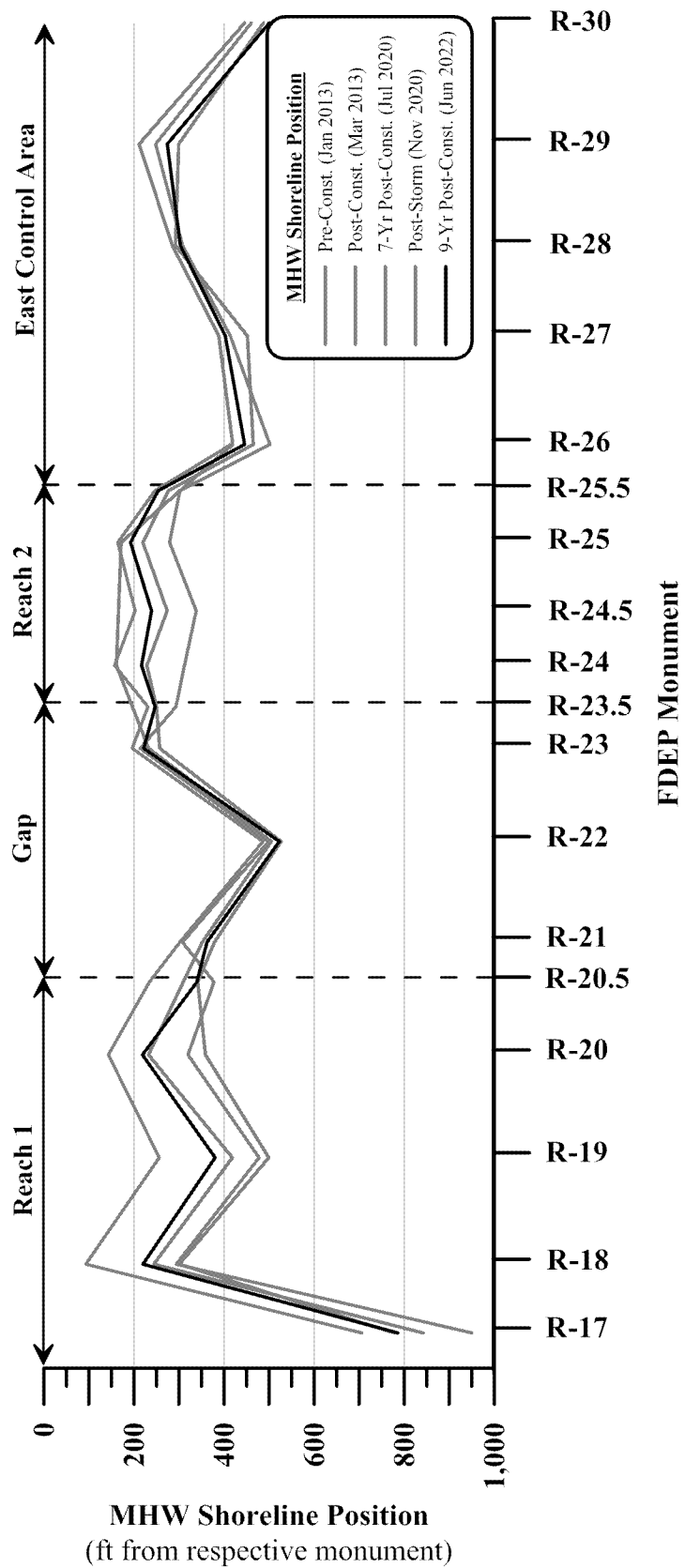


Figure 3.1 MHW Shoreline Position

Table 3.2 MHW Shoreline Position Changes

FDEP Reference Monument	Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
		Jan 2013 - Jun 2022		Mar 2013 - Jun 2022		Jul 2020 - Jun 2022		Nov 2020 - Jun 2022	
		ft		ft		ft		ft	
Reach 1	R-17	787	80.2	-164.2		8.0		-56.0	
	R-18	911	127.1	-73.9		-80.8		-24.1	
	R-19	1,088	124.1	-97.6		-119.2		-38.2	
	R-20	827	75.7	-101.1		-140.0		-13.7	
	R-20.5	464	105.6	-37.8		-1.6		-	
Reach 1 Weighted Average East Jetty to R-20.7			104.4	-99.1		-76.9		-29.2	
Gap Area	R-21	937	60.3	54.2		-16.6		10.5	
	R-22	1,008	36.5	23.6		-3.7		17.9	
	R-23	915	25.4	7.6		-35.7		-11.0	
Gap Area Weighted Average R-20.7 to R-23.5			40.7	28.5		-18.2		6.2	
Reach 2	R-23.5	215	16.0	-46.1		-3.0		-	
	R-24	499	59.8	-95.3		-11.8		55.8	
	R-24.5	639	36.6	-99.1		-34.6		-	
	R-25	624	28.2	-86.8		-27.5		20.7	
	R-25.5	269	7.3	-48.2		-22.5		-	
Reach 2 Weighted Average R-23.5 to R-25.5			33.9	-83.7		-23.1		18.2	
East Control Area	R-26	1,044	29.9	-56.2		-19.3		26.3	
	R-27	1,034	-	-11.0		-49.0		14.5	
	R-28	997	-	-4.8		11.0		18.0	
	R-29	1,156	-	25.8		-25.4		62.4	
	R-30	629	-	40.0		13.1		54.7	
East Control Weighted Average R-25.5 to R-30			29.9	-4.1		-16.7		34.4	
Total Project Area Weighted East Jetty to R-30			63.5	-37.8		-35.5		8.6	

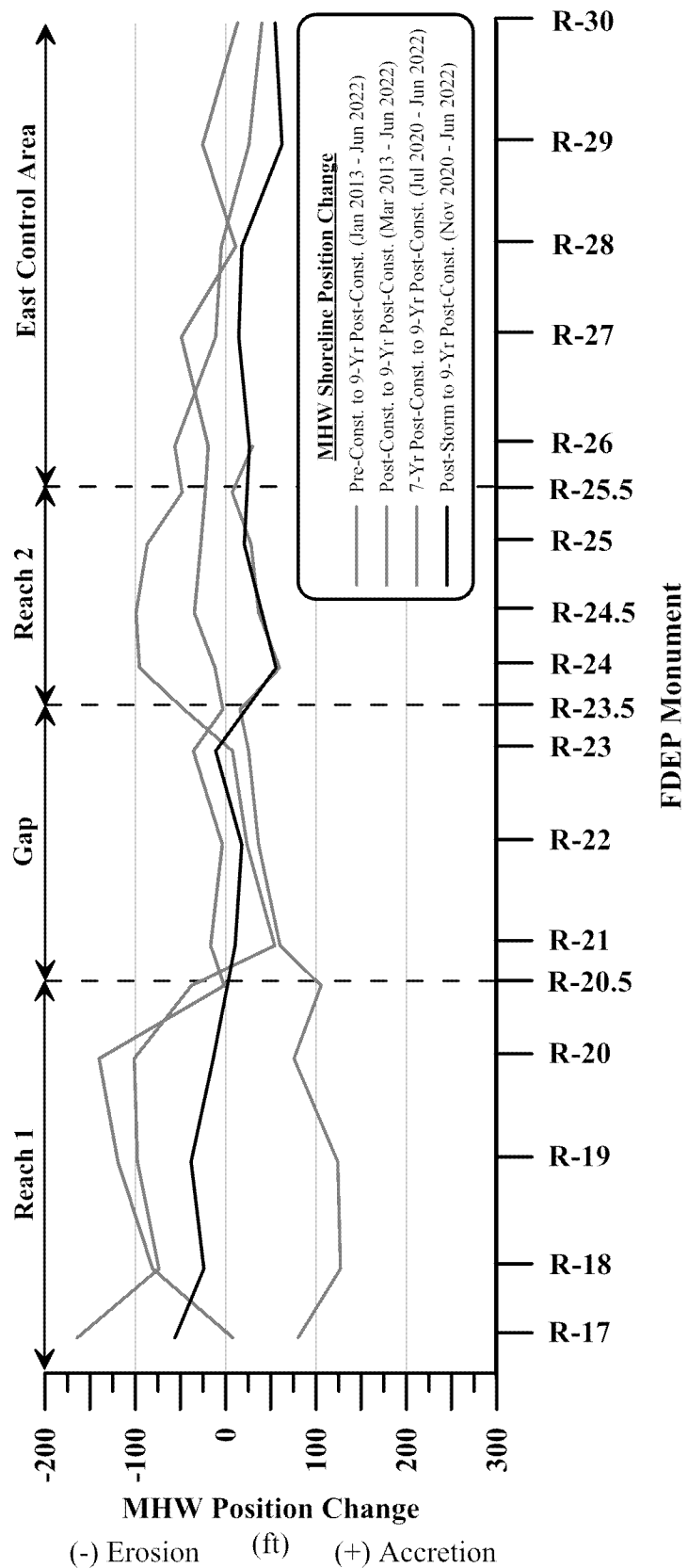


Figure 3.2 MHW Shoreline Position Change (ft)

3.3 Beach Volume Changes

As discussed in Section 3.1, beach volume changes also indicate project performance. Volume change calculations require two surveys for comparison purposes. Comparison between the pre-construction (January 2013) and nine-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the post-construction (March 2013) and nine-year post-construction (June 2022) surveys reveals the evolution of the project approximately nine years after construction. Comparison between the seven-year post-construction (July 2020) and nine-year post-construction (June 2022) surveys reveals the evolution of the project two years after the 2020 East Pass Maintenance Dredging event. Comparison between the post-storm (November 2020) and nine-year post-construction (June 2022) surveys reveals the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm.

For each monument location, Taylor Engineering calculated volume changes within five vertical compartments along each profile — dune to MHW (0.77 ft-NAVD), MHW to MLW (-0.47 ft-NAVD), MLW to -20 ft-NAVD, -20 ft to -30 ft-NAVD, and -30 ft to -50 ft-NAVD. The sum of all vertical compartments yields the overall profile volume change across the profile. Volume changes above MHW represent variations to the subaerial or dry beach — the area the public typically considers “the beach.” Below MHW volume changes — also called subaqueous changes — indicate the submerged volume remaining. Notably, historical reports of the monitoring area (Trammell and Trudnak, 2010) limited the offshore extent of the volume comparisons to -30 ft-NAVD, as the profiles generally converged beyond this contour. However, for the sake of completeness, this report includes the additional compartment below -30 ft-NAVD. From review of the profile plots (**Appendix A**), all profiles extend to -50 ft-NAVD except for R-17, R-18, and R-19 due to the shallower waters in the ebb shoal vicinity.

The beach monitoring area consists of the two project areas (Reach 1 and Reach 2), the gap area and the east control area. **Table 3.3 – Table 3.10** and **Figure 3.3 – Figure 3.9** present beach volume changes in the above-mentioned compartments at each reference monument location. Straight lines connect the volume changes between reference monuments. As noted in Section 2.2, the post-storm November 2020 survey did not include data at half monument locations, therefore, straight lines connect the volume changes between the nearest whole monuments for the November 2020 survey. With the beach volume changes rounded to tenths for cubic yard/foot (cy/ft) values and to hundreds for cubic yard (cy) values, some of the reported integrated values may not match exactly.

Notably, recent monitoring reports have documented growth of the East Pass ebb shoal at R-17. The profile plot in **Appendix A (Figure A-1a)** illustrates this continued accumulation of sand within the profile, beginning near range 1,200 ft at depth of -8 ft-NAVD. The resultant volume of sand within the vertical compartments below MLW dominates the volumetric analysis for the entire monitoring area. Compared to pre-construction survey, ebb shoal growth at R-17 contributed ~450,000 cubic yards to the analysis. To present these data, **Appendix D** Total Beach Volume Change truncates the R-17 profile to exclude the ebb shoal. Additional discussion of the ebb shoal and its influence to the project follows.

3.3.1 Pre-Construction (January 2013) – Nine-Year Post-Construction (June 2022)

Comparison of the 2013 pre-construction and the 2022 nine-year post-construction beach volume changes reveal overall changes brought about by construction of the 2013 and 2020 projects and the 2020 storm event. Accretion generally occurred at all monuments in Reach 1 and Reach 2 throughout all vertical compartments above -20 ft-NAVD, and the project areas generally experienced mixed erosion and

accretion below -20 ft-NAVD (excluding R-17 and R-18, that experienced accretion throughout all vertical compartments). Overall, Reach 1 experienced net accretion of 724,200 cy (177.6 cy/ft) above -30 ft-NAVD and Reach 2 experienced net accretion of 76,800 cy (34.2 cy/ft) above -30 ft-NAVD.

The overall Reach 1 volume changes (dune to -30 ft-NAVD), on a monument-by-monument basis, show accretion across the project area with a trend of increasing accretion to the west (except for a slight decrease in accretion at R-20) and noticeably larger increases at R-17. Likely causes of the accretion trend include the larger fill volumes placed in the western portion of the 2013 project and placement mid-reach in 2020, the littoral barrier to the west (the East Pass jetty) reducing westerly longshore dispersion of the fill, and losses of the 2013 project fill at the east end from eastward longshore dispersion of the fill into the gap area. However, the volume change tables indicate noticeably larger accretion rates at reference monument R-17 as compared to the overall Reach 1 project area. Similar to the previous monitoring results, the profile plots of R-17 (**Appendix A**) clearly indicate the large volume changes between MLW and -20 ft-NAVD result from ebb shoal growth offshore of the project area and the nine-year post-construction survey reveals increased ebb shoal changes below -20 ft-NAVD. While a portion of the ebb shoal growth may result from offshore transport of the beach restoration project, determining the root causes of the ebb shoal changes requires further in-depth analyses of the entire ebb shoal and inlet system. As documented in previous monitoring reports, the ebb shoal growth likely results from the ebb-tide dominance of the inlet and the increased rain events in the local area over the past years transporting additional sediments from the bay and inlet system offshore; however, a portion of the sand accumulation along the eastern edge of the ebb shoal may result from longshore and offshore transport from the project area. While **Table 3.3 – Table 3.10** present overall beach volume changes and include ebb shoal changes, **Appendix D** summarizes the beach volume changes excluding these ebb shoal changes at R-17 (~1,200 to 3,500 ft offshore).

General volume change trends in Reach 2 include noticeable gains resulting from the construction of the 2013 project above -20 ft-NAVD. In comparison to the central project area, decreasing accretion at the limits of Reach 2 likely results from the anticipated longshore dispersion of the fill. The overall volume changes show larger gains along the western portion of the project area. A reduced westerly transport gradient from the project area, possibly resulting from the gap area receiving material from both Reach 1 and Reach 2, may explain the higher accretion towards the west end.

The gap area experienced net accretion of 97,900 cy (34.2 cy/ft) above -30 ft-NAVD, and the east control area, which only includes FDEP monument R-26 for this comparison period, experienced net erosion of -2,100 cy (-2.0 cy/ft) above -30 ft-NAVD. Pre-construction survey data are unavailable for R-27 – R-30; however, significant changes in this area are unlikely to have occurred within the short timeframe between the 2013 pre- and post-construction surveys. The gap area and east control area experienced accretion above -20 ft-NAVD and erosion below -20 ft-NAVD, excluding minor gains below -30 ft-NAVD at R-21 and R-26. The western portions of the gap area experienced increased accretion, mostly above MHW, indicating these areas experienced a noticeable benefit from construction of the 2013 and 2020 projects. Overall volume changes indicate higher accretion occurring along the western portion of the gap area that likely results from a higher easterly transport gradient into the gap area from higher fill densities in Reach 1.

Trammell and Trudnak (2013) reported the Western Destin Beach Restoration contractor placed about 634,300 cy within the project areas above -20 ft-NAVD (487,000 cy within Reach 1 and 147,300 cy within Reach 2). As previously discussed, the 2020 East Pass Maintenance Dredging fill placement amounted to 203,000 cy within Reach 1, resulting in a combined fill of about 690,000 cy in Reach 1. From

the above volume changes, Reach 1 gained approximately 614,200 cy above -20 ft-NAVD indicating approximately 75,800 cy or ~11% of the volume placed, eroded from the Reach 1 project area. Extending the Reach 1 volume calculations to -30 ft-NAVD increases the gain to 724,200 cy, indicating a surplus of 34,200 cy. However, the ebb shoal growth offshore of the western project area limits largely influenced these Reach 1 volume changes. Excluding the significant ebb shoal changes at R-17 (~1,200 to 3,500 ft offshore), Reach 1 gained 347,300 cy above -20 ft-NAVD, indicating that 342,700 cy of the volume placed, or ~50% of the total fill, has eroded from the Reach 1 project area (**Appendix D**). Excluding ebb shoal changes above -30 ft-NAVD, Reach 1 gained 325,700 cy, indicating that approximately 364,300 cy of the volume placed, or ~53% of the total fill, has eroded from the Reach 1 project area (**Appendix D**). In Reach 2, accretion of 117,900 cy above -20 ft-NAVD indicates that 29,400 cy or ~20% of the volume placed, eroded from the Reach 2 project area. Above -30 ft-NAVD, Reach 2 accreted 76,800 cy indicating that 70,500 cy or ~48% of the volume placed, eroded from the project area.

During this same period, the gap area gained approximately 155,700 cy above -20 ft-NAVD and 97,800 cy above -30 ft-NAVD (~23 to 14% of the volume placed in 2013 and 2020), and the east control area gained 20,200 cy above -20 ft-NAVD (~3% of the volume placed in 2013) and lost -2,100 cy above -30 ft-NAVD. The overall monitoring area from the East Jetty to FDEP reference monument R-26 (Reaches 1 and 2, gap area, and east control area) gained approximately 908,000 cy above -20 ft-NAVD and 896,700 cy above -30 ft-NAVD, indicating a surplus (i.e., over 100%) of the total placed material remains within the beach monitoring area and that an additional 70,700 cy to 59,400 cy accumulated from natural accretion. Disregarding the ebb shoal growth at the far western limit of Reach 1, the overall monitoring area gained 641,100 cy above -20 ft-NAVD and 498,300 cy above -30 ft-NAVD — indicating that approximately 23 to 40% of the overall volume placed by the 2013 and 2020 projects has eroded from the monitoring area. Again, these analyses disregard any additional material that may have been transported further east than R-26 (approximately 1,000 ft east of the Reach 2 eastern project limits) as pre-construction survey data are unavailable for this area.

3.3.2 Post-Construction (March 2013) – Nine-Year Post-Construction (June 2022)

Comparison of the 2013 post-construction and 2022 nine-year post-construction beach volume changes indicate the performance of the Western Destin Beach Restoration project nine years after construction, including the effects of the 2020 dredge fill placement and Hurricane Sally. Reach 1 experienced erosion throughout all vertical compartments, except for significant accretion at R-17 in vertical compartments below MLW and accretion at R-18 in vertical compartments below -20 ft-NAVD. Reach 2 experienced net erosion in all vertical compartments except for minor net accretion between MLW and -20 ft-NAVD. Reach 1 experienced net accretion of 151,800 cy (37.2 cy/ft) above -30 ft-NAVD and Reach 2 experienced net erosion of -88,900 cy (-39.6 cy/ft) above -30 ft-NAVD.

In Reach 1, changes in vertical compartments between profiles are minor in comparison to the significant accretion at R-17 in vertical compartments between MLW and -30 ft-NAVD — primarily due to the previously mentioned East Pass ebb shoal growth. From the profile plots, and similar to previous monitoring results, erosion throughout Reach 1 appears to result from cross-shore and planform equilibration of the beach fill; however, as offshore accretion is not evident in the majority of the project area profiles, longshore diffusion appears to be the dominant process. Further volumetric analyses of the R-17 profile, the ebb shoal growth near the middle of the profile (approximately between 1,200 to 3,050 ft offshore) accounts for approximately 236,400 cy of accretion (**Appendix D**). Disregarding the ebb shoal changes, the MLW to -20 ft-NAVD volume changes for R-17 would be -16,900 cy (-21.5 cy/ft). The volume changes from MLW to -20-ft-NAVD show increased erosion at R-18 and decreasing erosion to the east,

likely a result of longshore transport losses from the project area. At R-17, significant accretion continues to result from the ebb shoal evolution offshore of this area while the upland remains eroded compared to the 2013 condition.

In Reach 2, net erosion occurred in all vertical compartments, except for minor net accretion between MLW and -20 ft-NAVD. The upland and offshore erosional losses in Reach 2 appear to result from both cross-shore and longshore transport (i.e., continued project equilibration) with longshore diffusion appearing to be the dominant process. The increased erosion at the center of the project area and the reduced erosion near the project limits suggest eastward and westward diffusion of the beach fill from the center of Reach 2.

The gap area experienced a net gain of 43,200 cy (average 15.1 cy/ft) above -30 ft-NAVD, with accretion generally occurring above -20 ft-NAVD and erosion occurring below -20 ft-NAVD. The western end of the gap area (R-21) experienced larger accretion and reduced erosion, indicating longshore dispersion of the project areas has clearly had a positive effect on the beach stability within the gap. Monitoring reports prior to 2017 documented noticeable gains within the gap area between the dune and -30 ft-NAVD; however, the current overall results show more minor gains between the post-construction and nine-year post-construction volume changes. While the upland beach area has experienced noticeable shoreline growth and volume gains, the offshore portion of the profile experienced increased erosion recently resulting in minor net change since project construction. The majority of the offshore erosion occurs between -20 and -30 ft-NAVD and appears to result from profile steepening within this area. Such changes typically coincide with gains in the nearshore compartments (i.e., sand moving from the offshore profile into nearshore bar formations).

The east control area experienced a net gain of 36,500 cy (7.5 cy/ft) above -30 ft-NAVD. Generally, the east control area shows accretion above MHW, a mix of erosion and accretion between MHW and -20 ft-NAVD and below -30 ft-NAVD, and erosion between -20 ft and -30 ft-NAVD. Above -20 ft-NAVD, the east control area gained 132,400 cy, predominantly due to noticeably larger accretion at R-27. These large accretion volumes above -20 ft-NAVD possibly result from easterly longshore dispersion of the Reach 2 beach fill and largely influence the overall volume changes for the east control area. As documented in previous monitoring reports, the continued easterly movement of large accretional areas likely indicates further easterly transport from the Reach 2 project area, and possibly a transport nodal point (easterly transport from the Reach 2 project area combining with westerly longshore transport from areas further to the east). The current results indicate the project continues to have a positive effect to overcome the erosion previously occurring along these areas.

Combining the volume gains above -30 ft-NAVD within the Reach 1 project area, the gap area, and the east control area with the volume losses within the Reach 2 project area, the overall monitoring area experienced a net gain of approximately 142,600 cy. Disregarding the ebb shoal accretion previously discussed, the entire monitoring area lost approximately -218,100 cy. While the nearshore and upland accretion occurring within the gap area and east control area accounts for a small portion of the material lost from Reach 1 and Reach 2, the majority of the losses may result from material transported from Reach 1 into the ebb shoal or further beyond the monitoring area boundaries (cross-shore transport below the survey limits or further alongshore beyond R-30).

3.3.3 Seven-Year Post-Construction (July 2020) – Nine-Year Post-Construction (June 2022)

Comparison of the 2020 seven-year post-construction and 2022 nine-year post-construction beach volume changes reveal project performance of the 2020 dredging fill placement with the storm

event. Overall, the Reach 1 and Reach 2 project areas from dune to -30 ft-NAVD experienced net erosion of -100,900 cy (-24.8 cy/ft on average) and -7,000 cy (-3.1 cy/ft on average).

Reach 1 generally experienced mixed erosion and accretion at all monuments above -30 ft-NAVD, and accretion occurred below -30 ft-NAVD. Above 20 ft-NAVD, Reach 1 lost -128,900 cy (-31.6 cy/ft) and, excluding the ebb shoal changes (from 1,200 – 3500 ft offshore of R-17), lost -151,400 cy (-37.1 cy/ft) attributable to the movement of the offshore ebb shoal feature. Increased erosion occurs above -20 ft-NAVD in the center of the Reach 1 and decreases towards the east and west limits, indicative of dispersion of the 2020 beach fill. Notably, the R-17 profile plots in **Appendix A** show growth of the ebb shoal over the last two years, extending the -10 ft contour an additional ~500 ft offshore and steepening the offshore transition significantly.

The Reach 2 project area experienced minor to mild erosion at nearly all monuments above MLW, mixed erosion and accretion from MLW to -20 ft-NAVD, erosion from -20 ft to -30 ft-NAVD, and primarily accretion below -30 ft-NAVD. The overall changes are relatively uniform across Reach 2, with the exception of increased accretion at R-24.5 and R-25.5 between MLW and -20 ft-NAVD, that appears to result from movement of the offshore bar feature.

The gap area experienced net accretion of 30,600 cy (average 10.7 cy/ft) above -30 ft-NAVD. Overall, and above -20 ft-NAVD, the east and west limits of gap (R-21 and R-23) experienced mixed minor erosion and accretion while the center of the gap (R-22) experienced greater accretion. Below -20 ft-NAVD, there is minimal erosion and increased accretion at R-22 and mainly erosion at R-21 and R-23. Overall, the volume changes suggest a continued benefit of the 2013 and 2020 projects. While the center of the gap area experienced greater accretion than the east and west ends overall, the changes do not appear to suggest a dominant longshore transport direction.

The east control area experienced a net gain of 76,000 cy (average 15.6 cy/ft) above -30 ft-NAVD. The control area shows a mix of minor accretion and erosion above MLW with noticeably higher accretion from R-27 to R-30 between MLW and -20 ft-NAVD. Mixed minor accretion and erosion occurs again between -20 and -30 ft-NAVD, while predominantly accretion occurs between -30 and -50 ft-NAVD. Overall, and above -20 ft-NAVD, the east control gained 78,000 cy, predominantly due to noticeably larger accretion at R-27. As noted above, these large accretion volumes above -20 ft-NAVD possibly result from easterly longshore dispersion of the Reach 2 beach fill and largely influence the overall volume changes for the east control area. As documented in previous monitoring reports, the continued easterly movement of large accretional areas likely indicates further easterly transport from the Reach 2 project area, and possibly a transport nodal point (easterly transport from the Reach 2 project area combining with westerly longshore transport from areas further to the east). The current results indicate the project continues to have a significant positive effect to overcome the erosion previously occurring along these areas.

The volume changes for the overall monitoring area show -1,300 cy of erosion (-0.1 cy/ft) between the dune and -30 ft-NAVD over the past two years. As previously discussed, the ebb shoal movement offshore of the western project area limits influenced the Reach 1 and overall volume changes. Disregarding the ebb shoal movement, the Reach 1 project area lost approximately -148,800 cy and the entire monitoring area lost -48,900 cy above -30 ft-NAVD. These total volume changes result from large scale erosion in Reach 1 following the 2020 project due to the dispersion of fill placement. East of Reach 1 and offshore of the 2020 project area, the most recent offshore volume changes indicate the nearshore and offshore portions of the project and monitoring areas continue to equilibrate and respond to increased (erosive) coastal conditions experienced during this period.

3.3.4 Post-Storm (November 2020) – Nine-Year Post-Construction (June 2022)

Comparison of the 2020 post-storm and 2022 nine-year post-construction beach volume changes reveal project performance of the 2020 dredging placement after the storm event. Overall, Reach 1 experienced net erosion of -22,000 cy (-5.4 cy/ft) and Reach 2 experienced minor accretion of 4,100 cy (1.8 cy/ft) above -30 ft-NAVD. As noted in Section 2.2, the post-storm November 2020 survey did not include data at half monument locations (R-20.5, R-23.5, R-24.5, and R-25.5). The increased longshore resolution provided by the half monuments is not possible in the post-storm data set.

Reach 1 generally experienced net erosion above -20 ft-NAVD and net accretion below -20 ft-NAVD, with noticeable differences occurring at R-17 throughout all volume compartments. Above -20 ft-NAVD, Reach 1 lost -50,200 cy (-12.3 cy/ft) and, excluding the ebb shoal changes (from 1,200 – 3500 ft offshore of R-17), lost -101,600 cy (-24.9 cy/ft) attributable to the movement of the offshore ebb shoal feature. Increased erosion occurs between MLW and -20 ft-NAVD in the center of Reach 1 and decreases towards the east limit, indicative of the dispersion of the 2020 fill placement.

The Reach 2 project area experienced accretion at R-24 throughout all volume compartments and mixed erosion and accretion at R-25. The overall changes are relatively minimal across Reach 2, with the exception of increased erosion at R-25 between MLW and -20 ft-NAVD, that appears to result from movement of the offshore bar feature.

The gap area experienced net accretion of 12,800 cy (average 4.5 cy/ft) above -30 ft-NAVD. Overall, the gap area experienced accretion above MHW, mixed erosion and accretion between MHW and -30 ft-NAVD, and uniform accretion below -30 ft-NAVD. The volume changes suggest a continued benefit of the 2013 and 2020 projects. While the center of the gap area experienced greater overall accretion than the east and west ends, the changes do not appear to suggest a dominant longshore transport direction.

The east control area experienced a net gain of 38,500 cy (average 7.9 cy/ft) above -30 ft-NAVD. The control area shows minor accretion above MLW and mixed erosion and accretion between MLW and -20 ft-NAVD with noticeably higher accretion at R-27 and higher erosion at R-26. Mixed minor accretion and erosion occurs between -20 and -30 ft-NAVD, while accretion occurs below -30 ft-NAVD. Overall, and above -20 ft-NAVD, the east control gained 44,300 cy. The current results indicate the project continues to have a significant positive effect to overcome the erosion previously occurring along these areas.

The volume changes for the overall monitoring area show 33,400 cy of accretion (2.4 cy/ft) between the dune and -30 ft-NAVD over the past one and a half years. As previously discussed, the ebb shoal movement offshore of the western project area limits influenced the Reach 1 and overall volume changes. Disregarding the ebb shoal movement, the Reach 1 project area lost approximately -91,400 cy and the entire monitoring area lost -36,000 cy above -30 ft-NAVD. These total volume changes result from large scale erosion in Reach 1 following the 2020 project due to the dispersion of fill placement and movement of the offshore ebb shoal feature at R-17. East of Reach 1 and offshore of the 2020 project area, the most recent offshore volume changes indicate the nearshore and offshore portions of the project and monitoring areas continue to equilibrate and respond to increased (erosive) coastal conditions experienced during this period. The increases in volume east of Reach 1, although very minimal, are anticipated due to the storm event and seasonal evolution of beach profiles, as sand is generally eroded from the nearshore during the elevated wave climate of a storm event (shown by the November 2020 survey) and deposited in the nearshore during comparably calm summer conditions (shown by the June 2022 survey).

3.3.5 *Future Nourishment*

As mentioned in previous monitoring reports, Reaches 1 and 2 have performed better than predicted to date. However, continued erosion, particularly from tropical storms and hurricanes, will eventually require beach nourishment to restore the intended functions of the project. The City of Destin has two regulatory-authorized alternatives for nourishing the beach — full beach nourishment (i.e., reconstructing the fill template originally constructed in February 2013) or swash zone nourishment (i.e., constructing a +3 ft NAVD elevation berm extending from the existing beach) as authorized under FDEP Permit No. 0288799-003-JC (East Pass and Destin Harbor Maintenance Dredging Permit).

As of June 2022, construction of the full beach nourishment option would require approximately 264,000 cy for Reaches 1 and 2 combined. The regional borrow area, which contains approximately 5.7 million cy of sand (an ample amount for a nourishment project as well as other regional projects), would serve as the borrow area. Over the last few years, numerous tropical storms and hurricanes have impacted the area. Continued annual losses from the project areas or severe erosion from tropical storms or hurricanes have reduced the functionality of the remaining project fill and may require an accelerated construction schedule following a severe event. Despite the recent berm-only placement within Reach 1, the constructed dune system is eroded compared to post-construction conditions and provides reduced protection to upland property. Accordingly, the City of Destin (as the project permittee) should consider taking steps to plan for a future nourishment project.

Table 3.3 Dune to MHW Beach Volume Changes

FDEP Reference Monument	Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
		Jan 2013 - Jun 2022		Mar 2013 - Jun 2022		Jul 2020 - Jun 2022		Nov 2020 - Jun 2022	
		cy/ft	cy	cy/ft	cy	cy/ft	cy	cy/ft	cy
Reach 1	R-17	58.5	46,000	-14.6	-11,500	4.4	3,400	-11.2	-8,800
	R-18	52.4	47,800	-15.2	-13,900	-1.3	-1,100	-0.6	-500
	R-19	52.8	57,400	-15.9	-17,300	-20.3	-22,100	-2.7	-2,900
	R-20	33.2	27,500	-24.6	-20,300	-25.7	-21,300	2.4	3,100
	R-20.5	41.4	19,200	-10.9	-5,100	1.5	700	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7		48.5	197,900	-16.7	-68,100	-9.9	-40,400	-2.3	-9,100
Gap Area	R-21	23.8	22,300	21.7	20,400	-1.8	-1,700	2.5	2,300
	R-22	15.7	15,800	15.1	15,300	3.3	3,300	4.6	4,600
	R-23	9.7	8,900	6.8	6,200	-6.2	-5,700	1.5	1,400
Gap Area Weighted Average Total R-20.7 to R-23.5		16.4	47,000	14.6	41,900	-1.4	-4,100	2.9	8,300
Reach 2	R-23.5	14.7	3,200	2.9	600	-6.3	-1,400	-	-
	R-24	21.7	10,800	-26.8	-13,400	-9.1	-4,500	7.9	8,200
	R-24.5	13.0	8,300	-31.4	-20,100	-4.8	-3,000	-	-
	R-25	13.5	8,400	-23.2	-14,500	-9.3	-5,800	-1.3	-1,500
	R-25.5	9.5	2,600	1.1	300	-1.4	-400	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5		14.8	33,300	-20.9	-47,100	-6.7	-15,100	3.0	6,700
East Control Area	R-26	12.8	13,400	3.9	4,100	-0.6	-700	7.8	8,200
	R-27	-	-	13.2	13,600	-4.3	-4,500	2.8	2,900
	R-28	-	-	9.7	9,700	2.6	2,600	4.1	4,100
	R-29	-	-	6.6	7,700	2.3	2,700	9.5	10,900
	R-30	-	-	12.6	7,900	3.3	2,100	6.9	4,400
East Control Weighted Average Total R-25.5 to R-30		12.8	13,400	8.8	43,000	0.5	2,200	6.3	30,500
Total Project Area Weighted Average Total East Jetty to R-30		28.5	291,600	-2.2	-30,300	-4.1	-57,400	2.6	36,400

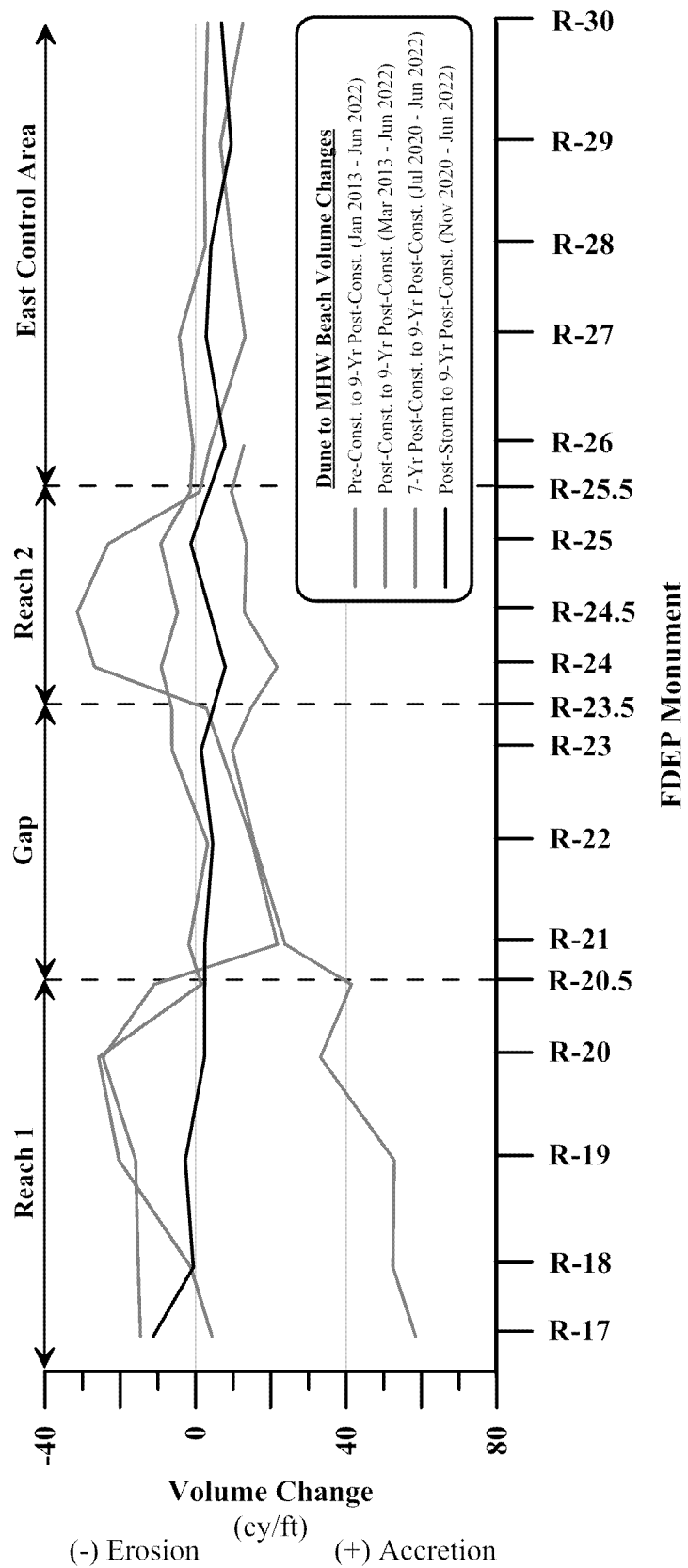


Figure 3.3 Dune to MHW Beach Volume Changes (cy/ft)

Table 3.4 MHW to MLW Beach Volume Changes

FDEP Reference Monument	Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
		Jan 2013 - Jun 2022		Mar 2013 - Jun 2022		Jul 2020 - Jun 2022		Nov 2020 - Jun 2022	
		cy/ft	cy	cy/ft	cy	cy/ft	cy	cy/ft	cy
Reach 1	R-17	787	2,900	-7.4	-5,900	0.5	400	-2.7	-2,100
	R-18	911	5,200	-3.7	-3,400	-4.0	-3,700	-1.0	-1,000
	R-19	1,088	5,700	-4.5	-4,900	-5.5	-5,900	-1.7	-1,900
	R-20	827	2,600	-4.7	-3,900	-6.4	-5,300	-1.0	-1,300
	R-20.5	464	2,100	-1.7	-800	0.0	0	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7		4.6	18,500	-4.6	-18,900	-3.6	-14,500	-1.5	-6,300
Gap Area	R-21	937	2,500	2.6	2,400	-0.7	-600	-0.2	-200
	R-22	1,008	1,600	0.6	600	-0.2	-200	0.9	900
	R-23	915	1,300	0.3	300	-1.4	-1,300	-0.5	-400
Gap Area Weighted Average Total R-20.7 to R-23.5		1.9	5,400	1.1	3,300	-0.8	-2,100	0.1	300
Reach 2	R-23.5	215	200	-2.5	-500	-0.2	-100	-	-
	R-24	499	1,400	-4.1	-2,100	-0.4	-200	2.7	2,800
	R-24.5	639	1,000	-4.7	-3,000	-1.6	-1,000	-	-
	R-25	624	1,100	-3.3	-2,100	-0.7	-400	1.6	1,900
	R-25.5	269	100	-2.8	-800	-1.1	-300	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5		1.7	3,800	-3.7	-8,500	-0.9	-2,000	2.1	4,700
East Control Area	R-26	1,044	1,500	-2.5	-2,700	-1.1	-1,100	1.0	1,000
	R-27	1,034	-	-0.6	-600	-2.3	-2,300	0.7	700
	R-28	997	-	-0.6	-600	0.5	500	0.4	400
	R-29	1,156	-	0.9	1,100	-1.1	-1,200	3.0	3,500
	R-30	629	-	1.4	900	0.6	400	2.1	1,300
East Control Weighted Average Total R-25.5 to R-30		1.4	1,500	-0.4	-1,900	-0.8	-3,700	1.4	6,900
Total Project Area Weighted Average Total East Jetty to R-30		2.9	29,200	-1.8	-26,000	-1.6	-22,300	0.4	5,600

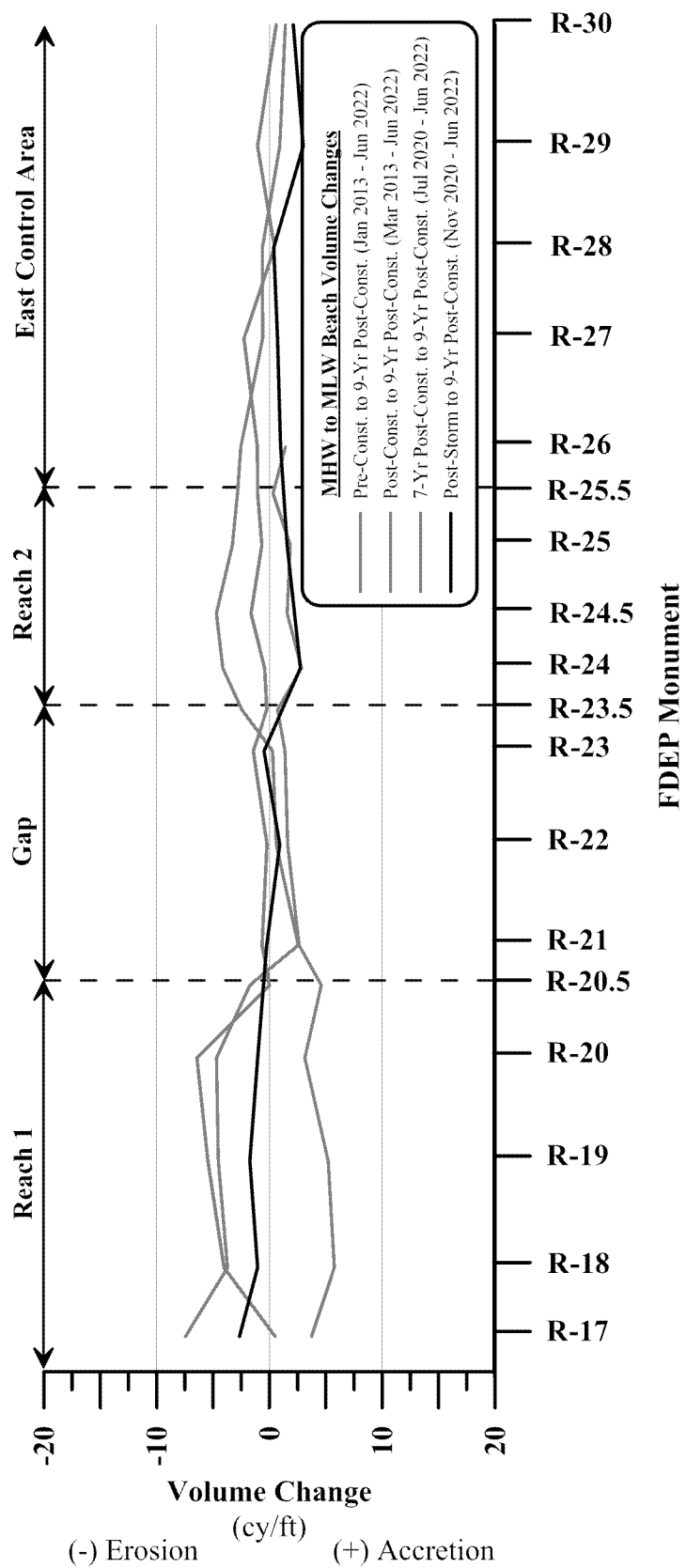


Figure 3.4 MHW to MLW Beach Volume Changes (cy/ft)

Table 3.5 MLW to -20 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
			Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022	cy/ft	cy	cy/ft	cy
Reach 1	R-17	787	365.4	287,600	278.9	219,500	14.8	11,600	38.3	30,100
	R-18	911	2.9	2,600	-46.3	-42,200	-59.2	-53,900	-33.9	-30,900
	R-19	1,088	41.3	45,000	-11.6	-12,600	-27.8	-30,200	-38.0	-41,400
	R-20	827	47.9	39,600	-2.6	-2,200	-4.2	-3,500	5.7	7,400
	R-20.5	464	49.5	23,000	-1.4	-600	4.3	2,000	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7			97.5	397,800	39.7	161,900	-18.1	-74,000	-8.5	-34,800
Gap Area	R-21	937	28.6	26,800	19.3	18,100	7.4	7,000	-10.0	-9,400
	R-22	1,008	48.3	48,700	21.6	21,700	29.9	30,200	14.6	14,700
	R-23	915	30.3	27,800	26.9	24,600	13.3	12,200	0.7	600
Gap Area Weighted Average Total R-20.7 to R-23.5			36.1	103,300	22.5	64,400	17.2	49,400	2.1	5,900
Reach 2	R-23.5	215	11.4	2,400	-14.3	-3,100	-0.7	-100	-	-
	R-24	499	39.4	19,600	3.0	1,500	-13.3	-6,700	4.3	4,400
	R-24.5	639	58.4	37,300	11.6	7,400	44.3	28,300	-	-
	R-25	624	21.1	13,200	1.8	1,100	-16.6	-10,400	-9.0	-10,900
	R-25.5	269	30.9	8,300	24.7	6,600	25.0	6,700	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5			36.0	80,800	6.1	13,500	8.0	17,800	-2.9	-6,500
East Control Area	R-26	1,044	5.1	5,300	-8.5	-8,900	-2.0	-2,100	-32.0	-33,500
	R-27	1,034	-	-	71.6	74,000	38.3	39,600	33.4	34,500
	R-28	997	-	-	16.9	16,800	16.3	16,200	9.5	9,500
	R-29	1,156	-	-	-2.5	-2,900	16.5	19,000	-9.5	-11,000
	R-30	629	-	-	19.5	12,300	10.9	6,800	11.7	7,400
East Control Weighted Average Total R-25.5 to R-30			5.1	5,300	18.8	91,300	16.4	79,500	1.4	6,900
Total Project Area Weighted Average Total East Jetty to R-30			57.4	587,200	23.6	331,100	5.2	72,700	-2.0	-28,500

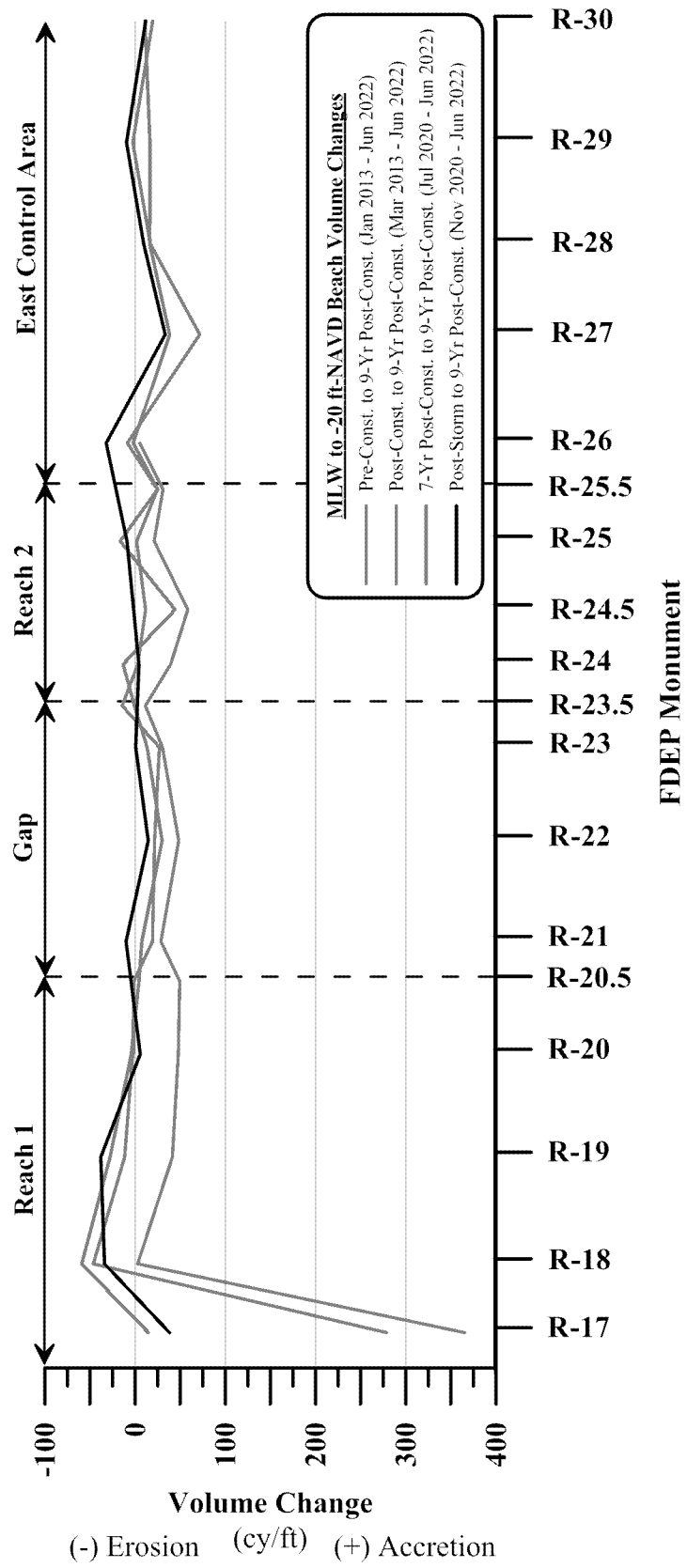


Figure 3.5 MLW to -20 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.6 -20 ft to -30 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
			Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022	cy/ft	cy	cy/ft	cy
		ft	cy/ft	cy	cy/ft	cy	cy/ft	cy	cy/ft	cy
Reach 1	R-17	787	167.2	131,600	157.5	124,000	32	25,500	22.9	18,000
	R-18	911	24.3	22,100	4.2	3,800	9.9	9,100	8.7	7,900
	R-19	1,088	-20.1	-21,900	-23.3	-25,400	-1.0	-1,100	1.4	1,500
	R-20	827	-16.9	-14,000	-20.1	-16,600	-4.6	-3,800	0.7	800
	R-20.5	464	-16.8	-7,800	-19.2	-8,900	-3.5	-1,600	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7			27.0	110,000	18.8	76,900	6.9	28,100	6.9	28,200
Gap Area	R-21	937	-16.5	-15,500	-17.8	-16,700	-5.7	-5,400	0.0	0
	R-22	1,008	-22.2	-22,300	-27.4	-27,700	-1.4	-1,500	-1.1	-1,100
	R-23	915	-21.9	-20,000	-24.0	-22,000	-6.2	-5,700	-0.6	-600
Gap Area Weighted Average Total R-20.7 to R-23.5			-20.2	-57,800	-23.2	-66,400	-4.4	-12,600	-0.6	-1,700
Reach 2	R-23.5	215	-16.5	-3,500	-20.8	-4,500	-0.1	0	-	-
	R-24	499	-15.1	-7,500	-15.6	-7,800	-2.4	-1,200	0.5	500
	R-24.5	639	-19.4	-12,400	-23.8	-15,200	-4.6	-2,900	-	-
	R-25	624	-21.4	-13,400	-21.9	-13,700	-4.7	-2,900	-1.1	-1,400
	R-25.5	269	-16.1	-4,300	-22.1	-5,900	-2.4	-600	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5			-18.3	-41,100	-21.0	-47,100	-3.4	-7,600	-0.4	-900
East Control Area	R-26	1,044	-21.3	-22,300	-21.9	-22,900	-1.3	-1,300	-1.3	-1,300
	R-27	1,034	-	-	-19.4	-20,100	0.7	800	-0.9	-900
	R-28	997	-	-	-17.4	-17,300	-2.7	-2,700	-2.0	-2,000
	R-29	1,156	-	-	-21.0	-24,300	2.4	2,800	-1.1	-1,300
	R-30	629	-	-	-18.0	-11,300	-2.2	-1,400	-0.2	-200
East Control Weighted Average Total R-25.5 to R-30			-21.3	-22,300	-19.7	-95,900	-0.4	-1,800	-1.2	-5,700
Total Project Area Weighted Average Total East Jetty to R-30			-1.1	-11,200	-9.4	-132,500	0.4	6,100	1.4	19,900

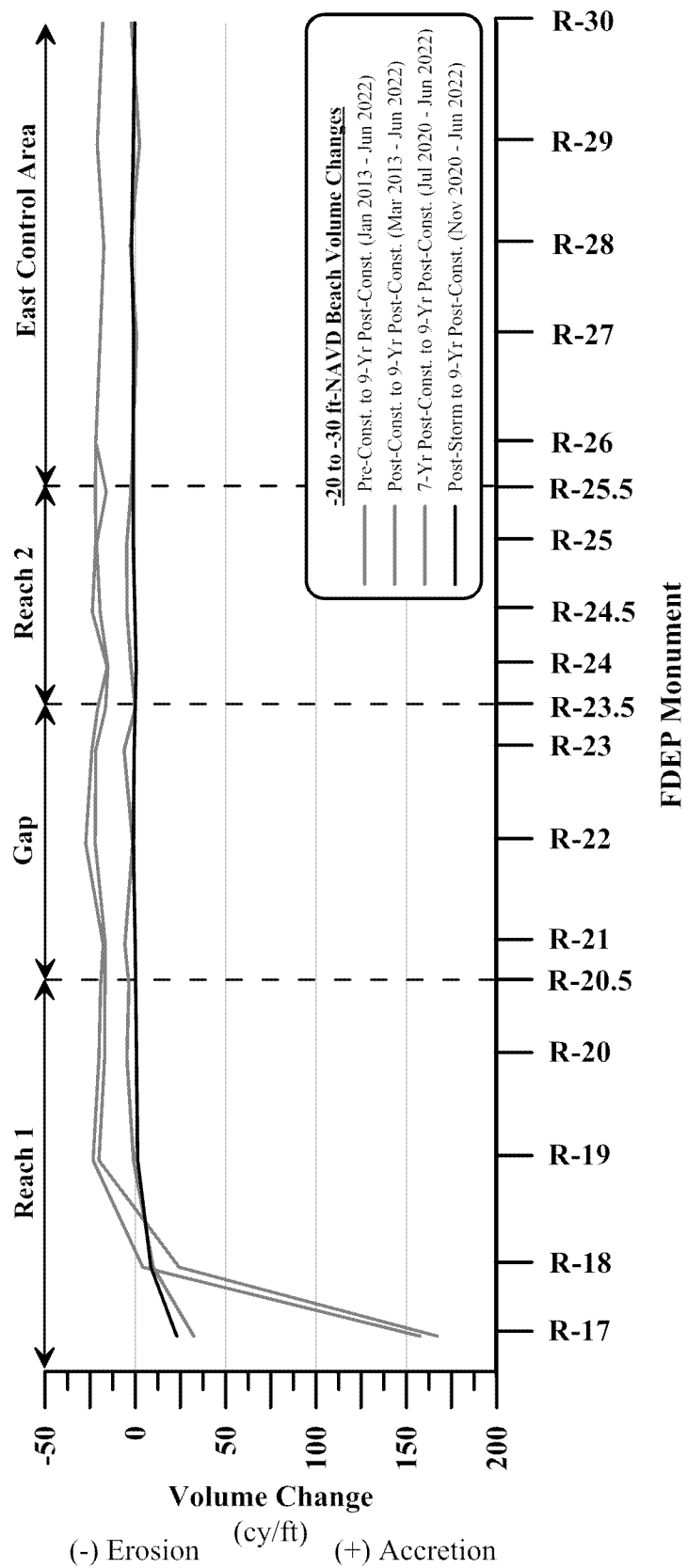


Figure 3.6 -20 to -30 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.7 -30 ft to -50 ft-NAVD Beach Volume Changes

FDEP Reference Monument		Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.		
			Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022	cy/ft	cy	cy/ft	cy	
Reach 1	ft	R-17	787	74.8	58,900	61.1	48,100	8.6	6,800	2.8	2,200
		R-18	911	43.9	40,000	41.0	37,400	17.6	16,000	14.0	12,800
		R-19	1,088	4.3	4,600	-1.3	-1,400	9.5	10,300	10.2	11,100
		R-20	827	0.8	700	-5.0	-4,100	2.2	1,900	7.4	9,600
	R-20.5	464	0.0	0	-7.4	-3,400	3.0	1,400	-	-	
Reach 1 Weighted Average Total East Jetty to R-20.7			25.6	104,200	18.8	76,600	8.9	36,400	8.8	35,700	
Gap Area	R-21	937	4.2	3,900	7.4	7,000	-0.2	-200	4.9	4,600	
	R-22	1,008	-3.8	-3,800	-6.7	-6,800	7.9	8,000	6.8	6,800	
	R-23	915	-0.5	-500	-1.1	-1,000	0.3	300	4.4	4,000	
Gap Area Weighted Average Total R-20.7 to R-23.5			-0.1	-400	-0.3	-800	2.8	8,100	5.4	15,400	
Reach 2	R-23.5	215	3.7	800	-4.4	-1,000	7.0	1,500	-	-	
	R-24	499	2.3	1,100	3.5	1,700	3.3	1,600	5.0	5,200	
	R-24.5	639	6.2	4,000	0.6	400	7.3	4,700	-	-	
	R-25	624	-0.1	0	-4.5	-2,800	-0.7	-500	3.4	4,100	
	R-25.5	269	1.4	400	-6.1	-1,600	5.6	1,500	-	-	
Reach 2 Weighted Average Total R-23.5 to R-25.5			2.8	6,300	-1.5	-3,300	3.9	8,800	4.1	9,300	
East Control Area	R-26	1,044	1.6	1,700	6.2	6,500	4.9	5,200	2.5	2,600	
	R-27	1,034	-	-	-2.4	-2,400	11.6	12,000	6.8	7,000	
	R-28	997	-	-	0.5	500	-1.4	-1,400	3.9	3,900	
	R-29	1,156	-	-	-2.5	-2,800	9.4	10,800	6.0	7,000	
	R-30	629	-	-	6.8	4,300	5.4	3,400	7.5	4,700	
East Control Weighted Average Total R-25.5 to R-30			1.6	1,700	1.2	6,100	6.2	30,000	5.2	25,200	
Total Project Area Weighted Average Total East Jetty to R-30			10.9	111,800	5.6	78,600	5.9	83,300	6.1	85,600	

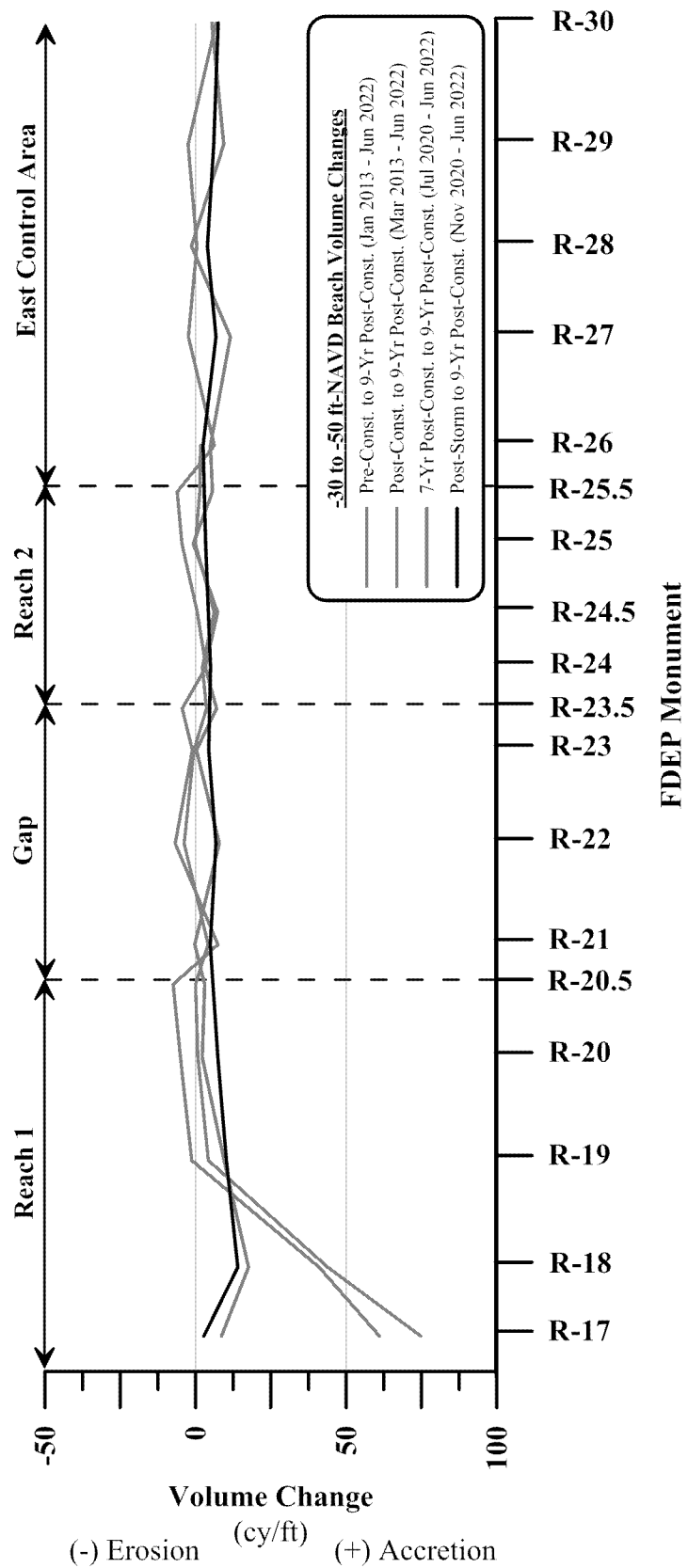


Figure 3.7 -30 to -50 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.8 Dune to -30 ft-NAVD Beach Volume Changes

FDEP Reference Monument	Controlling Distance ft	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
		Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022	cy/ft	cy	cy/ft	cy
Reach 1	R-17	594.8	468,100	414.3	326,100	52.0	40,900	47.4	37,300
	R-18	85.4	77,800	-61.1	-55,600	-54.5	-49,700	-26.8	-24,500
	R-19	79.2	86,200	-55.4	-60,300	-54.5	-59,300	-41.1	-44,700
	R-20	67.3	55,600	-52.0	-43,000	-41.0	-33,900	7.7	9,900
	R-20.5	78.7	36,500	-33.2	-15,400	2.3	1,100	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7		177.6	724,200	37.2	151,800	-24.8	-100,900	-5.4	-22,000
Gap Area	R-21	937	36,100	25.8	24,200	-0.7	-700	-7.8	-7,300
	R-22	1,008	43,800	9.9	9,900	31.5	31,800	19.0	19,100
	R-23	915	17,900	10.0	9,100	-0.5	-500	1.1	1,000
Gap Area Weighted Average Total R-20.7 to R-23.5		34.2	97,800	15.1	43,200	10.7	30,600	4.5	12,800
Reach 2	R-23.5	215	2,200	-34.7	-7,500	-7.3	-1,600	-	-
	R-24	499	24,400	-43.5	-21,700	-25.2	-12,600	15.5	16,000
	R-24.5	639	34,200	-48.2	-30,800	33.3	21,300	-	-
	R-25	624	9,400	-46.7	-29,100	-31.3	-19,500	-9.8	-11,900
	R-25.5	269	6,600	0.9	200	20.1	5,400	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5		34.2	76,800	-39.6	-88,900	-3.1	-7,000	1.8	4,100
East Control Area	R-26	1,044	-2,100	-29.1	-30,300	-5.0	-5,300	-24.5	-25,600
	R-27	1,034	-	64.8	67,000	32.4	33,500	36.0	37,200
	R-28	997	-	8.6	8,600	16.6	16,600	12.0	11,900
	R-29	1,156	-	-16.0	-18,500	20.1	23,300	1.8	2,100
	R-30	629	-	15.4	9,700	12.6	7,900	20.5	12,900
East Control Weighted Average Total R-25.5 to R-30		-2.0	-2,100	7.5	36,500	15.6	76,000	7.9	38,500
Total Project Area Weighted Average Total East Jetty to R-30		87.7	896,700	10.1	142,600	-0.1	-1,300	2.4	33,400

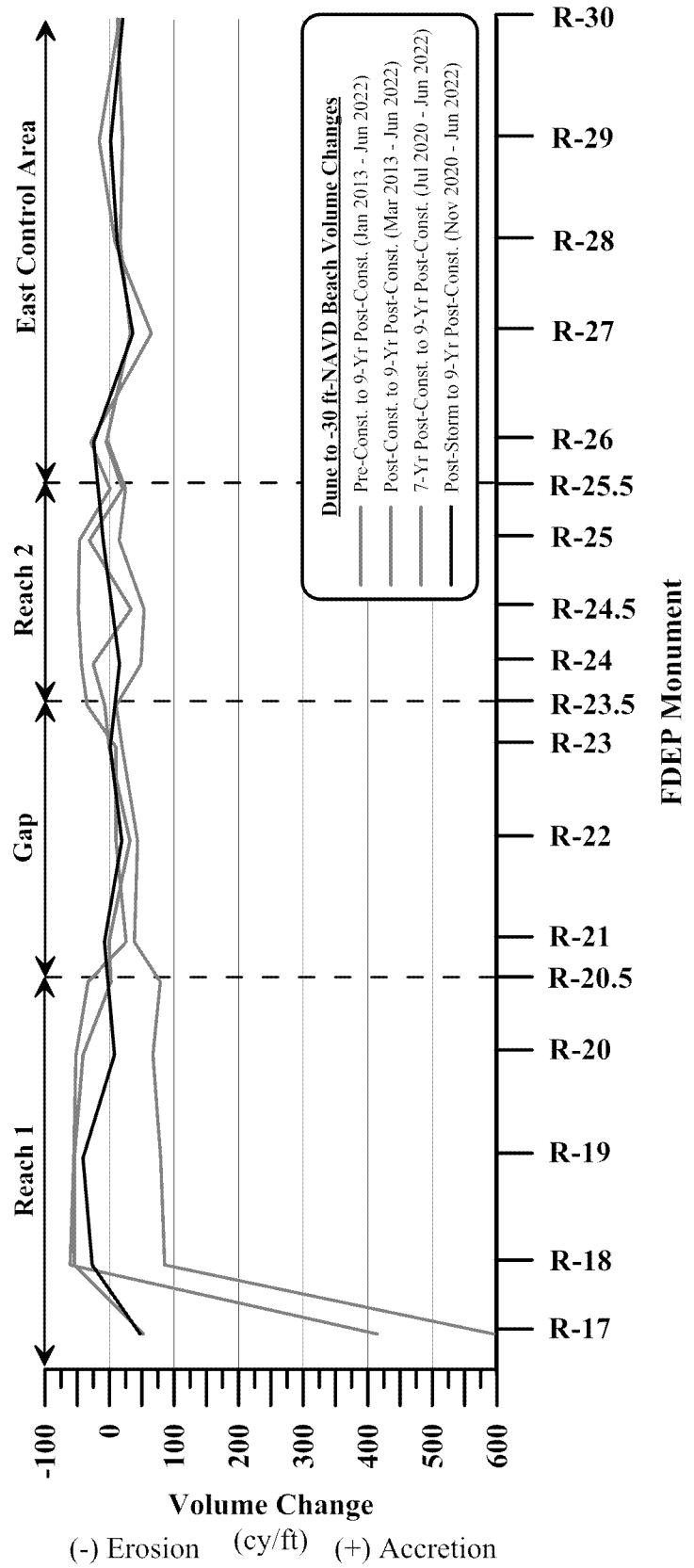


Figure 3.8 Dune to -30 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.9 Dune to -50 ft-NAVD Beach Volume Changes

FDEP Reference Monument	Controlling Distance	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
		Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022	cy	cy/ft	cy	cy/ft
Reach 1	R-17	669.6	527,000	475.4	374,200	60.6	47,700	50.1	39,500
	R-18	129.3	117,800	-20.0	-18,300	-36.9	-33,600	-12.8	-11,700
	R-19	83.5	90,800	-56.7	-61,600	-45.0	-49,000	-30.9	-33,600
	R-20	68.1	56,300	-57.0	-47,200	-38.8	-32,100	15.1	19,500
	R-20.5	78.7	36,500	-40.6	-18,900	5.3	2,500	-	-
Reach 1 Weighted Average Total East Jetty to R-20.7		203.2	828,400	56.0	228,200	-15.8	-64,500	3.4	13,700
Gap Area	R-21	42.7	40,000	33.2	31,100	-1.0	-900	-2.9	-2,800
	R-22	39.7	40,000	3.1	3,100	39.4	39,800	25.8	26,000
	R-23	19.0	17,400	8.9	8,100	-0.2	-200	5.5	5,000
Gap Area Weighted Average Total R-20.7 to R-23.5		34.1	97,400	14.8	42,300	13.5	38,700	9.9	28,200
Reach 2	R-23.5	13.9	3,000	-39.1	-8,400	-0.3	-100	-	-
	R-24	51.1	25,500	-40.0	-20,000	-22.0	-11,000	20.4	21,100
	R-24.5	59.8	38,200	-47.7	-30,500	40.7	26,000	-	-
	R-25	15.0	9,400	-51.2	-31,900	-32.0	-20,000	-6.4	-7,800
	R-25.5	26.1	7,000	-5.2	-1,400	25.7	6,900	-	-
Reach 2 Weighted Average Total R-23.5 to R-25.5		37.0	83,100	-41.0	-92,200	0.8	1,800	5.9	13,300
East Control Area	R-26	-0.3	-400	-22.8	-23,800	-0.1	-100	-22.0	-22,900
	R-27	-	-	62.4	64,500	44.0	45,500	42.8	44,300
	R-28	-	-	9.1	9,000	15.3	15,200	15.9	15,900
	R-29	-	-	-18.5	-21,400	29.5	34,100	7.8	9,100
	R-30	-	-	22.3	14,000	18.0	11,300	28.0	17,600
East Control Weighted Average Total R-25.5 to R-30		-0.3	-400	8.7	42,300	21.8	106,000	13.1	64,000
Total Project Area Weighted Average Total East Jetty to R-30		98.6	1,008,500	15.7	220,600	5.8	82,000	8.5	119,200

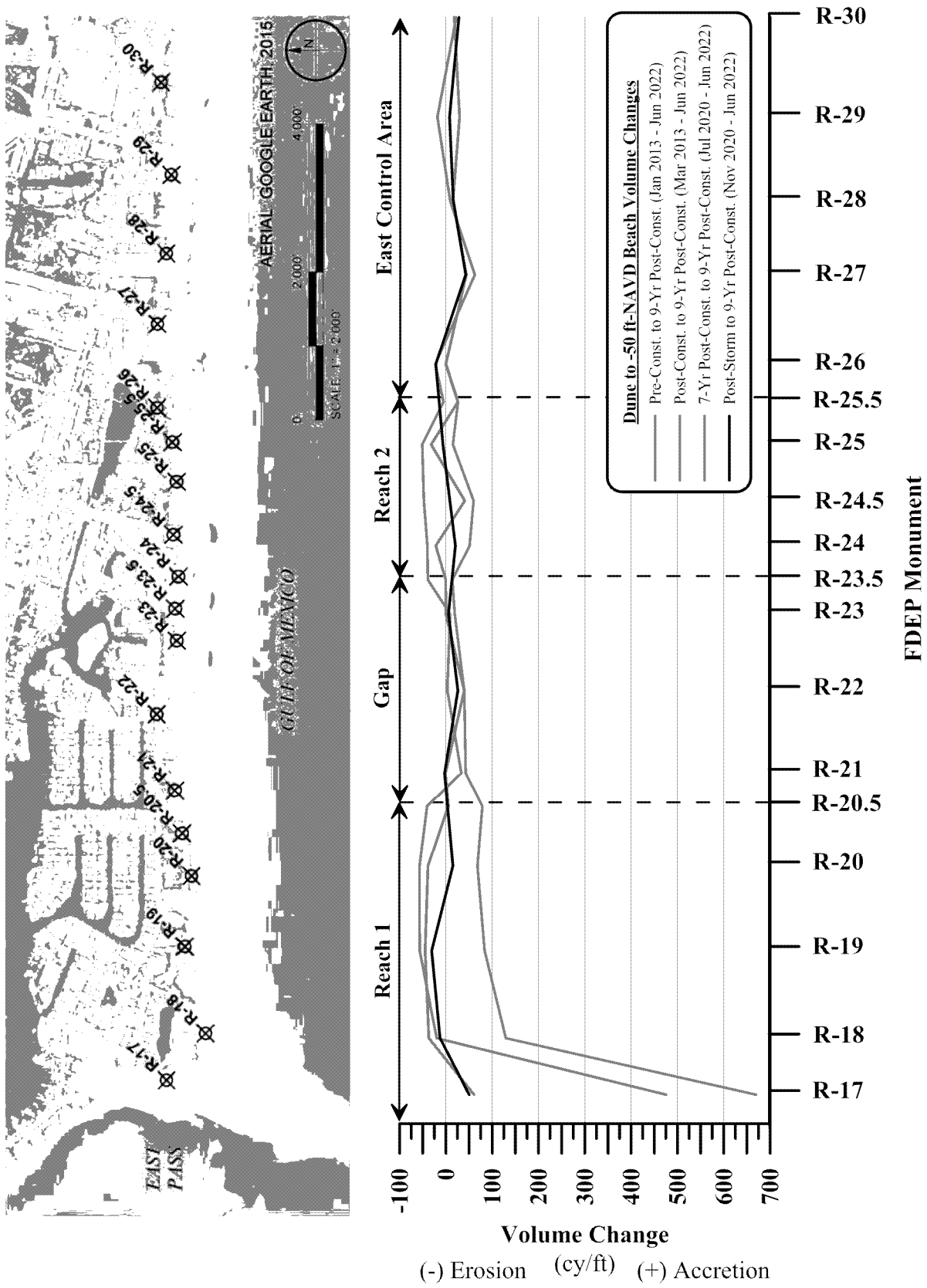


Figure 3.9 Dune to -50 ft-NAVD Beach Volume Changes (cy/ft)

Table 3.10 Total Beach Volume Change

Vertical Compartments	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
	Jan 2013 - Jun 2022		Mar 2013 - Jun 2022		Jul 2020 - Jun 2022		Nov 2020 - Jun 2022	
	cy/ft		cy		cy/ft		cy	
Reach 1	Dune to MHW	197,900	-68,100	-40,400	-9,100			
	MHW to MLW	18,500	-18,900	-14,500	-6,300			
	MLW to -20 ft-NAVD	397,800	161,900	-74,000	-34,800			
	-20 to -30 ft-NAVD	110,000	76,900	28,100	28,200			
	-30 to -50 ft-NAVD	104,200	76,600	36,400	35,700			
	Sum Above -20 ft-NAVD	614,200	74,900	-128,900	-50,200			
	Sum Above -30 ft-NAVD	724,200	151,800	-100,800	-22,000			
	Sum Above -50 ft-NAVD	828,400	228,400	-64,400	13,700			
Gap	Dune to MHW	47,000	41,900	-4,100	8,300			
	MHW to MLW	5,400	3,300	-2,100	300			
	MLW to -20 ft-NAVD	103,300	64,400	49,400	5,900			
	-20 to -30 ft-NAVD	-57,800	-66,400	-12,600	-1,700			
	-30 to -50 ft-NAVD	-400	-800	8,100	15,400			
	Sum Above -20 ft-NAVD	155,700	109,600	43,200	14,500			
	Sum Above -30 ft-NAVD	97,900	43,200	30,600	12,800			
	Sum Above -50 ft-NAVD	97,500	42,400	38,700	28,200			
Reach 2	Dune to MHW	33,300	-47,100	-15,100	6,700			
	MHW to MLW	3,800	-8,500	-2,000	4,700			
	MLW to -20 ft-NAVD	80,800	13,500	17,800	-6,500			
	-20 to -30 ft-NAVD	-41,100	-47,100	-7,600	-900			
	-30 to -50 ft-NAVD	6,300	-3,300	8,800	9,300			
	Sum Above -20 ft-NAVD	117,900	-42,100	700	4,900			
	Sum Above -30 ft-NAVD	76,800	-89,200	-6,900	4,000			
	Sum Above -50 ft-NAVD	83,100	-92,500	1,900	13,300			

Vertical Compartments	2013 Pre-Const. - 2022 9-Yr Post-Const.		2013 Post-Const. - 2022 9-Yr Post-Const.		2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.		2020 Post-Storm - 2022 9-Yr Post-Const.	
	Jan 2013 - Jun 2022		Mar 2013 - Jun 2022		Jul 2020 - Jun 2022		Nov 2020 - Jun 2022	
	cy/ft		cy		cy/ft		cy	
East Control Area	Dune to MHW	13,400	43,000	2,200	30,500			
	MHW to MLW	1,500	-1,900	-3,700	6,900			
	MLW to -20 ft-NAVD	5,300	91,300	79,500	6,900			
	-20 to -30 ft-NAVD	-22,300	-95,900	-1,800	-5,700			
	-30 to -50 ft-NAVD	1,700	6,100	30,000	25,200			
Sum Above -20 ft-NAVD		20,200	132,400	78,000	44,300			
Sum Above -30 ft-NAVD		-2,100	36,500	76,200	38,600			
Sum Above -50 ft-NAVD		-400	42,600	106,200	63,800			
Total	Dune to MHW	291,600	-30,300	-57,400	36,400			
	MHW to MLW	29,200	-26,000	-22,300	5,600			
	MLW to -20 ft-NAVD	587,200	331,100	72,700	-28,500			
	-20 to -30 ft-NAVD	-11,200	-132,500	6,100	19,900			
	-30 to -50 ft-NAVD	111,800	78,600	83,300	85,600			
Sum Above -20 ft-NAVD		908,000	274,800	-7,000	13,500			
Sum Above -30 ft-NAVD		896,800	142,300	-900	33,400			
Sum Above -50 ft-NAVD		1,008,600	220,900	82,400	119,000			

4.0 SUMMARY AND CONCLUSIONS

This report documents the nine-year post-construction conditions (June 2022) following the 2013 Western Destin Beach Restoration Project and 2020 East Pass Maintenance Dredging Project. The 2013 Western Destin Beach Restoration Project, completed February 2013, restored approximately 1.2 miles of beach extending from FDEP reference monument R-17 to R-20.7 and R-23.5 to R-25.5. The 2020 East Pass Maintenance Dredging Project, completed July 2020, placed dredged sands within the “swash zone” of the East Beach Disposal Area, extending from R-17.5 to R-20.7. Monitoring of the project and control areas involved analyses of two parameters — changes to the shoreline position and beach volumes within the project and control areas. These analyses were used to determine the evolution of beach fill over time. Results of those analyses, together with analysis of beach profile plots, revealed project performance trends.

Comparison between the pre-construction (January 2013) and nine-year post-construction (June 2022) surveys reveals overall changes (project performance) due to project construction, project evolution, and storm impacts in Okaloosa County/Destin. Comparison between the post-construction (March 2013) and nine-year post-construction (June 2022) surveys reveals the evolution of the project approximately nine years after construction. Comparison between the seven-year post-construction (July 2020) and nine-year post-construction (June 2022) surveys reveals the evolution of the project two years after the 2020 East Pass Maintenance Dredging event. Comparison between the post-storm (November 2020) and nine-year post-construction (June 2022) surveys reveals the impacts of Hurricane Sally on the evolution of the project one and a half years after the storm.

As of the June 2022 nine-year post-construction survey, Reach 1 experienced MHW shoreline advance of approximately 104.4 ft on average and gained 724,200 cy of sand relative to 2013 pre-construction conditions above -30 ft-NAVD. Reach 2 experienced MHW shoreline advance of approximately 33.9 ft on average and gained 76,800 cy of sand relative to pre-construction conditions above -30 ft-NAVD. Trammell and Trudnak (2013) reported the Western Destin Beach Restoration contractor placed about 634,300 cy within the project areas above -20 ft-NAVD (487,000 cy within Reach 1 and 147,300 cy within Reach 2). As previously discussed, the 2020 East Pass Maintenance Dredging fill placement placed 203,000 cy within Reach 1, resulting in a combined fill of about 690,000 cy in Reach 1. As discussed in Section 3.3, these volume changes indicate a surplus of 34,200 cy, or 105% of the total volume placed during the 2013 and 2020 projects, exists within the Reach 1 project area above -30 ft-NAVD and 70,500 cy, or 48% of the placed volume, has eroded from Reach 2 above -30 ft-NAVD. Disregarding ebb shoal changes, Reach 1 lost 364,300 cy, or 53%, of the total volume placed. Further, comparing the 2013 contractor’s initial construction volume and the total volume change above -30 ft-NAVD (less the 2020 dredge fill placement volume of 203,000 cy in Reach 1), the monitoring results indicate Reach 1 still contains approximately 149% of the original volume placed in 2013; or, disregarding the ebb shoal growth, that 33% of the 2013 fill in Reach 1 has eroded after nine years. During this same period, the gap area shoreline between Reach 1 and Reach 2 advanced 40.7 ft and gained approximately 97,800 cy above -30 ft-NAVD (~15% of the volume placed in 2013), and the east control area accreted 29.9 ft and lost -2,100 cy above -30 ft-NAVD (~0% of the volume placed in 2013). The overall monitoring area from the East Jetty to FDEP reference monument R-26 (Reaches 1 and 2, gap area, and east control area) gained approximately 896,700 cy above -30 ft-NAVD, indicating a surplus (i.e., over 100%) of the total placed material remains within the beach monitoring area and that an additional 59,400 cy accumulated from natural accretion. Disregarding the ebb shoal growth at the far western limit of Reach 1, the overall monitoring area gained 498,300 cy above -30 ft-NAVD — indicating that approximately 60%

of the overall volume placed by the 2013 and 2020 projects remains within the monitoring area. The results compared to previous shoreline and volume change predictions indicate the project has exceeded the performance expectations and is providing a noticeable benefit to the project areas, adjacent shorelines, and the local littoral system.

Comparison of the post-construction (March 2013) and 2022 nine-year post-construction surveys revealed that Reach 1 experienced an average MHW shoreline retreat of approximately -99.1 ft and net accretion of 151,800 cy (37.2 cy/ft) above -30 ft-NAVD or erosion of -208,600 cy (-51.2 cy/ft) excluding ebb shoal changes at R-17). Reach 2 experienced an average MHW shoreline retreat of approximately -83.7 ft and net erosion of -88,900 cy (-39.6 cy/ft) above -30 ft-NAVD. In Reach 1, changes appear to result mostly from ebb shoal changes at R-17 (approximately 236,400 cy of accretion) and from differences between the fill templates of the 2013 and 2020 projects. Notably, the upland beach remains eroded compared to the 2013 condition. Reach 2 experienced continued net erosion in all vertical compartments except for between MLW and -20 ft-NAVD, that appears to result from both cross-shore and longshore transport (i.e., continued project equilibration) with longshore diffusion appearing to be the dominant process. In contrast to the project area erosion, the gap area experienced an average MHW shoreline advance of 28.5 ft and 43,200 cy of accretion (average 15.1 cy/ft) overall above -30 ft-NAVD. The western end of the gap area (R-21) experienced the largest amount of accretion (and reduced erosion), indicating longshore dispersion of the project areas has clearly had a positive effect on the beach stability within the gap. While the upland beach area has experienced noticeable shoreline growth and volume gains, the offshore portion of the profile experienced increased erosion recently resulting in reduced net change since project construction. The majority of the offshore erosion occurs between -20 and -30 ft-NAVD and appears to result from profile steepening within this area. The east control area experienced average shoreline retreat of -4.1 ft and a net gain of 36,500 cy (7.5 cy/ft) above -30 ft-NAVD, generally showing accretion above MHW, a mix of erosion and accretion between MHW and -20 ft-NAVD and below -30 ft-NAVD, and erosion between -20 ft and -30 ft-NAVD. Overall, the monitoring area (from R-17 to R-30) shows a total volume increase of approximately 142,600 cy (10.1 cy/ft) above -30 ft-NAVD (or lost -218,100 cy disregarding the ebb shoal accretion at R-17). While the nearshore and upland accretion occurring within the gap area and east control area accounts for a small portion of the material lost from Reach 1 and Reach 2, the majority of the losses may result from material transported from Reach 1 into the ebb shoal or further beyond the monitoring area boundaries. These results indicate the project and monitoring areas continue to experience erosion as previously observed prior to construction, likely a result of increased storm and wave activity occurring over the past few years. However, the project has positively affected the project area and adjacent shorelines by offsetting the erosional conditions occurring prior to construction and continuing over the past year.

Two years following the 2020 dredge event (July 2020 to June 2022), the Reach 1 shoreline eroded -76.9 ft and lost approximately -100,900 cy (-24.8 cy/ft) above -30 ft-NAVD; the Reach 2 shoreline eroded -23.1 ft and lost -7,000 cy (-3.1 cy/ft) above -30 ft-NAVD. Excluding ebb shoal changes, Reach 1 experienced erosion of -148,800 cy. Significant erosion in Reach 1 was likely a result of material being transported alongshore following the 2020 dredge event. Reach 2 experienced minor to mild erosion at nearly all monuments above MLW, mixed erosion and accretion from MLW to -20 ft-NAVD, erosion from -20 ft to -30 ft-NAVD, and primarily accretion below -30 ft-NAVD. Increased tropical storm activity over the last three years appears to have caused continued erosion of the dry beach. The gap area experienced a shoreline retreat of -18.2 ft and 30,600 cy accretion (10.7 cy/ft) above -30 ft-NAVD. The east control area experienced shoreline retreat of -16.7 ft and accretion of 76,000 cy (15.6 cy/ft) above -30 ft-NAVD. The volume changes for the overall monitoring area show -1,300 cy of erosion (-0.1 cy/ft) between the dune and -30 ft-NAVD over the past two years. Disregarding the ebb shoal movement, the entire

monitoring area lost -48,900 cy above -30 ft-NAVD. These total volume changes result from large scale erosion in Reach 1 following the 2020 project due to the dispersion of fill placement. East of Reach 1 and offshore of the 2020 project area, the most recent offshore volume changes indicate the nearshore and offshore portions of the project and monitoring areas continue to equilibrate and respond to increased (erosive) coastal conditions experienced during this period.

Since Hurricane Sally (November 2020 to June 2022), the Reach 1 shoreline retreated -29.2 ft and lost -22,000 cy (-5.4 cy/ft) above -30 ft-NAVD; the Reach 2 shoreline advanced 18.2 ft and gained 4,100 cy (1.8 cy/ft) above -30 ft-NAVD. Excluding ebb shoal changes, Reach 1 experienced erosion of -91,400 cy, attributable to the movement of the offshore ebb shoal feature. The overall changes are relatively minimal across Reach 2, with the exception of increased erosion at R-25 between MLW and -20 ft-NAVD that appears to result from movement of the offshore bar feature. During this period, the gap area experienced average shoreline advance of 6.2 ft and net accretion of 12,800 cy (4.5 cy/ft) above -30 ft-NAVD. The east control area experienced average shoreline advance of 34.4 ft and net accretion of 38,500 cy (7.9 cy/ft) above -30 ft-NAVD. The volume changes for the overall monitoring area show 33,400 cy of accretion (2.4 cy/ft) between the dune and -30 ft-NAVD over the past one and a half years. Disregarding the ebb shoal movement, the monitoring area lost -36,000 cy above -30 ft-NAVD. These total volume changes result from large scale erosion in Reach 1 following the 2020 project due to the dispersion of fill placement and movement of the offshore ebb shoal feature at R-17. East of Reach 1 and offshore of the 2020 project area, the most recent offshore volume changes indicate the nearshore and offshore portions of the project and monitoring areas continue to equilibrate and respond to increased (erosive) coastal conditions experienced during this period. The increases in volume east of Reach 1, although very minimal, are anticipated due to the storm event and seasonal evolution of beach profiles, as sand is generally eroded from the nearshore during the elevated wave climate of a storm event (shown by the November 2020 survey) and deposited in the nearshore during comparably calm summer conditions (shown by the June 2022 survey).

4.1 Recommendations

The monitoring results indicate the Western Destin Beach Restoration Project continues to meet or exceed performance expectations and provides a substantial benefit to the project areas by offsetting the background erosion that existed prior to project construction. However, recent monitoring results have shown continued and increased erosion of the project areas, gap area, and east control area, and excluding changes within the ebb shoal, indicate a sand deficit within the monitoring area. The reduced storm protection provided by the beach system, a consequence of the sand deficit, together with recent erosion observations following Hurricane Sally, support the recommendation for the City to commence planning for beach nourishment in accordance with existing authorizations as a protective measure to reduce the risk of storm damage to upland property, infrastructure, and critical habitat. Additionally, a healthy and wide beach provides increased recreational opportunities to the City's citizens and visitors, promotes tourism and increases revenue streams to local businesses, and provides significant environmental habitat to marine and terrestrial wildlife and shorebirds.

Accordingly, Taylor Engineering recommends the City of Destin begin discussions and coordination with project stakeholders to re-nourish the two project reaches. The City of Destin has two alternatives for nourishing the beach 1) full beach nourishment or 2) berm-only nourishment; however, advanced planning should commence soon to ensure the continuing erosion does not further compromise the existing beach and dune system and reduce available storm protection to upland properties, recreational areas, and critical habitat.

Finally, given the persistent long-term erosion combined with recent storm-related erosion observations following Hurricane Sally, planning for and implementing a nourishment strategy in the near future will also reduce the potential for further background erosion losses or increased losses due to a severe storm event or, at a minimum, help the City respond quickly should a severe storm impact the area prior to the next nourishment project. As of June 2022, construction of the full beach nourishment option would require approximately 264,000 cy for Reaches 1 and 2 combined. The regional borrow area, which contains approximately 5.7 million cy of sand (an ample amount for a nourishment project as well as other regional projects), would serve as the borrow area.

Taylor Engineering also recommends that Okaloosa County and the City of Destin continue to implement annual beach profile surveys in the early summer months, as recommended in the FDEP-approved physical monitoring plan, to document beach conditions. Pre- and post-construction beach profile surveys provide crucial data necessary for regional long-term monitoring of the beach and inlet systems. This continued monitoring will help to develop an understanding of the overall coastal processes within the beach monitoring area. Should a tropical storm system significantly affect the beach, having readily available pre-storm data will prove beneficial for assessing storm impacts, developing appropriate emergency response measures, and meeting eligibility requirements for FEMA emergency assistance.

REFERENCES

- Taylor Engineering. 2020. *Western Destin Beach Restoration Project – 2020 East Pass Dredging Project and Seven-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Taylor Engineering. 2021. *Western Destin Beach Restoration Project, Okaloosa County, Florida West Destin Hurricane Sally Post-Storm Beach Condition Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., and Trudnak, M. 2010. *Holiday Isle Emergency Beach Fill Project, Okaloosa County, Florida. 2010 Post-Construction Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.
- Trammell, M., and Trudnak, M. 2012. *Holiday Isle Emergency Beach Fill Project, Okaloosa County, Florida. 2011 One-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Jacksonville, FL.
- Trammell, M., 2012. *Re: Western Destin Beach Restoration Project – Planform Evolution and Shoreline Change Modeling*. Letter Report. Taylor Engineering Inc., Destin, FL.
- Trammell, M., Trudnak, M., and Greer, D. 2013. *Holiday Isle Emergency Beach Fill Project 2012 Two-Year Post-Construction & Western Destin Beach Restoration Project 2013 Post-Construction Monitoring Report, Okaloosa County, Florida*. Taylor Engineering, Inc., Jacksonville, FL.
- Trammell, M., Trudnak, M, and Greer, D. 2014. *Walton County\Destin Beach Restoration Project, Walton County and Okaloosa County, Florida 2014 Seven-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M, and Greer, D. 2014. *Western Destin Beach Restoration Project - 2014 One-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M, and Greer, D. 2015. *Western Destin Beach Restoration Project - 2015 Two-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M, and Greer, D. 2016. *Western Destin Beach Restoration Project - 2015 Three-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.
- Trammell, M., Trudnak, M, and Greer, D. 2017. *Western Destin Beach Restoration Project - 2017 Four-Year Post-Construction Monitoring Report*. Taylor Engineering, Inc., Destin, FL.

APPENDIX A

Beach Profile Plots

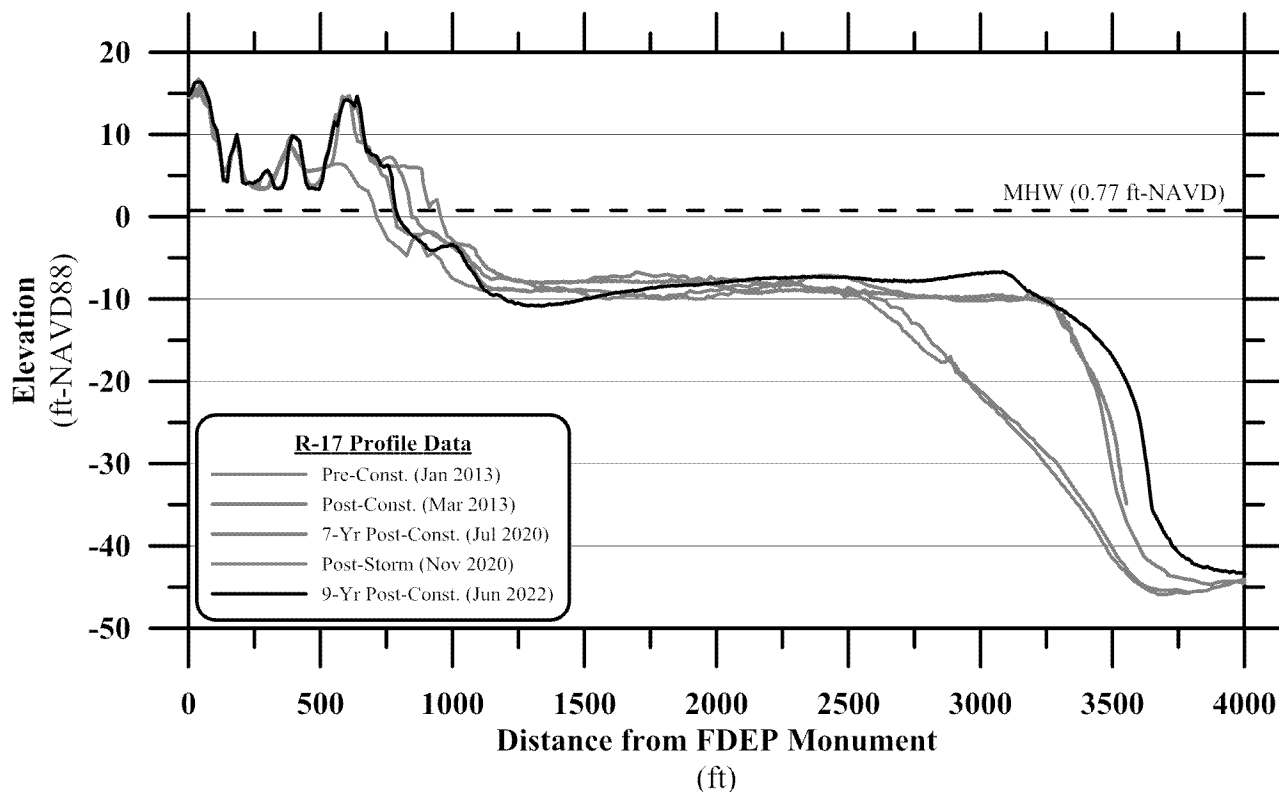


Figure A-1a Beach Profile Survey Data at FDEP Monument R-17.

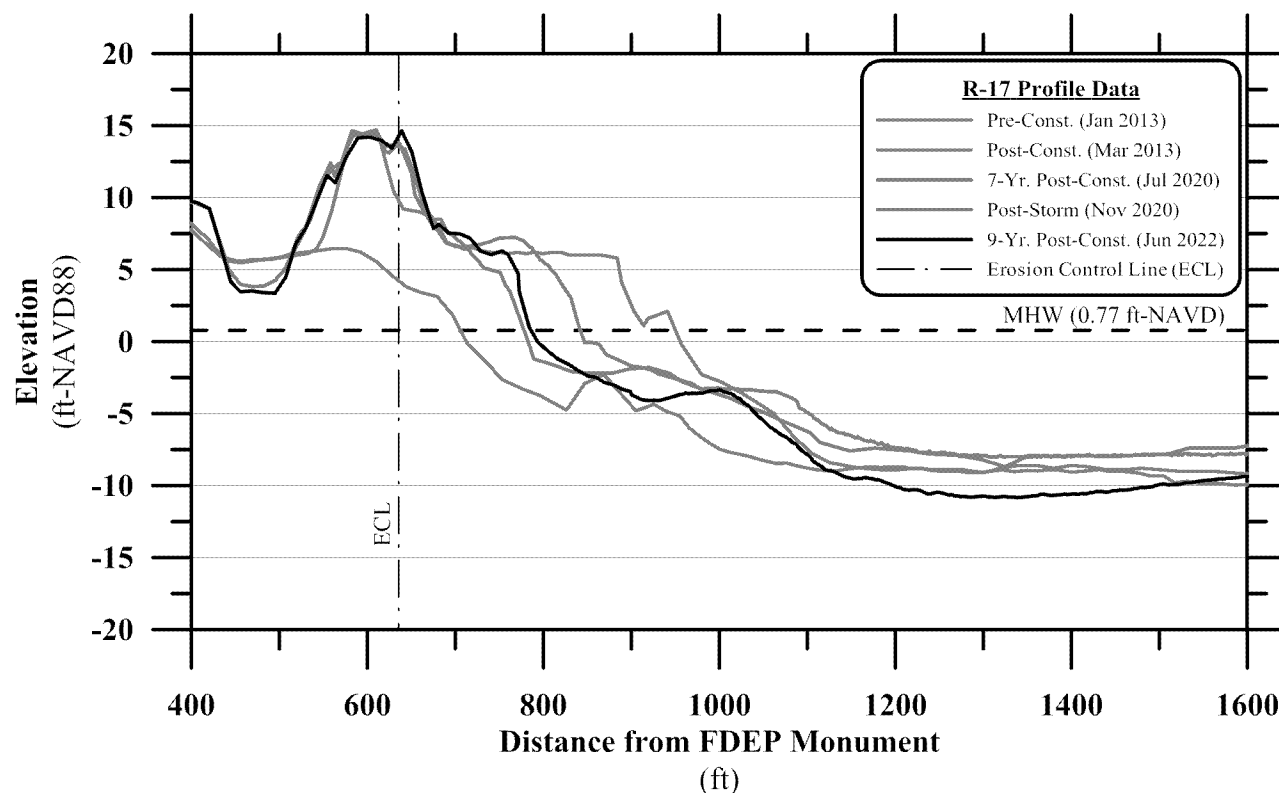


Figure A-1b Beach Profile Survey Data at FDEP Monument R-17.

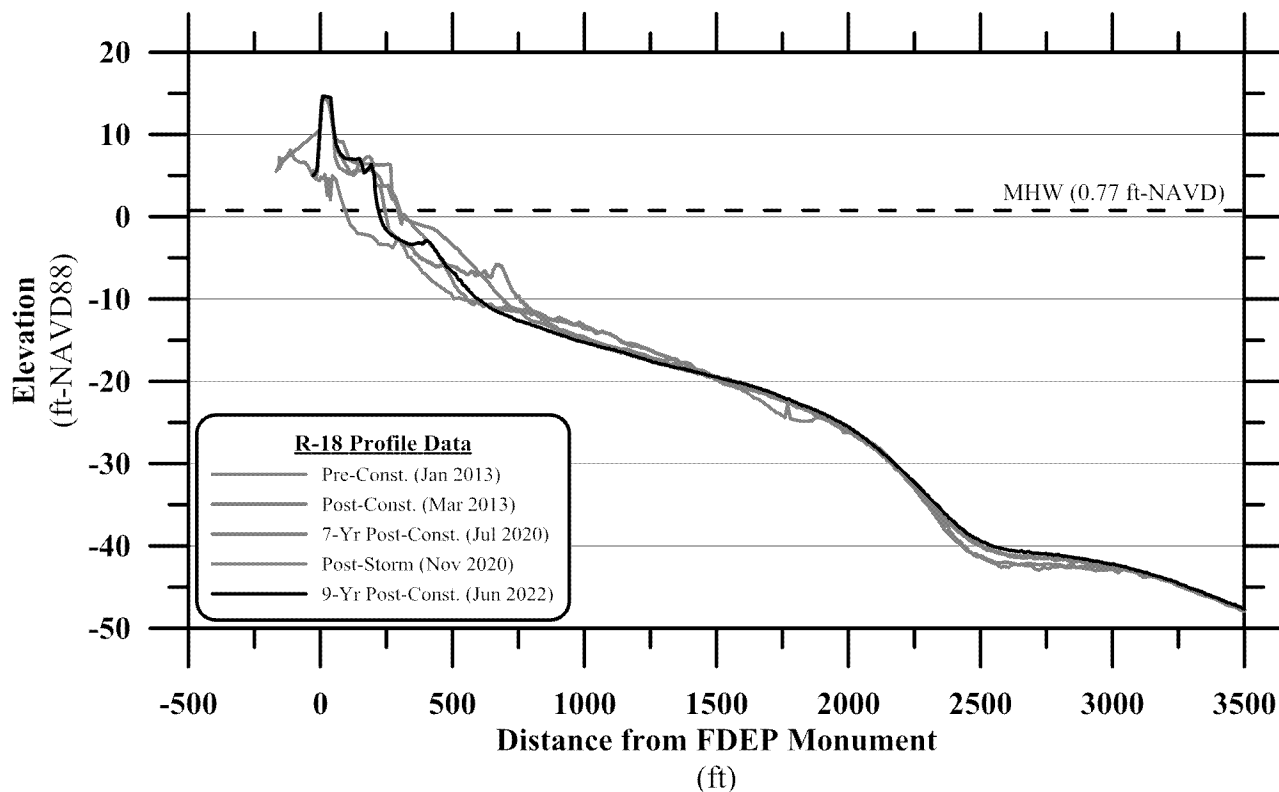


Figure A-2a Beach Profile Survey Data at FDEP Monument R-18.

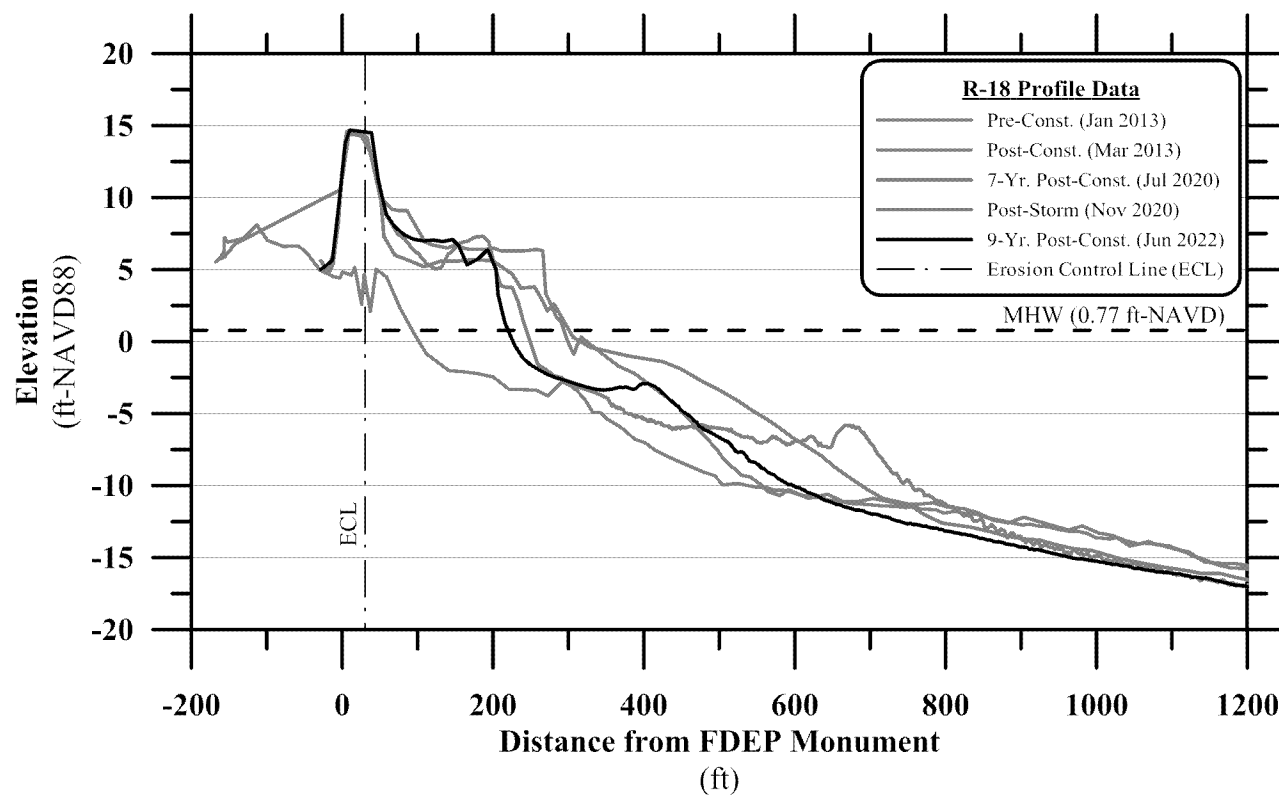


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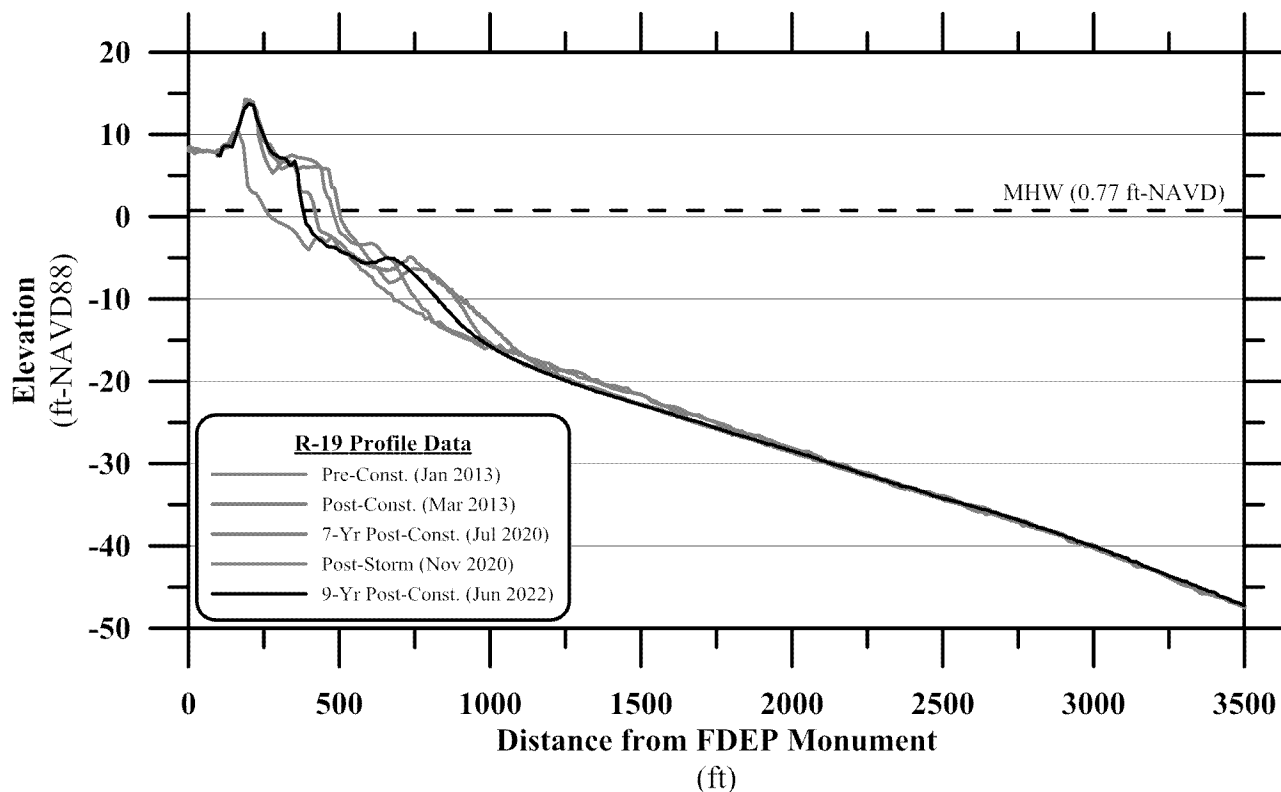


Figure A-3a Beach Profile Survey Data at FDEP Monument R-19.

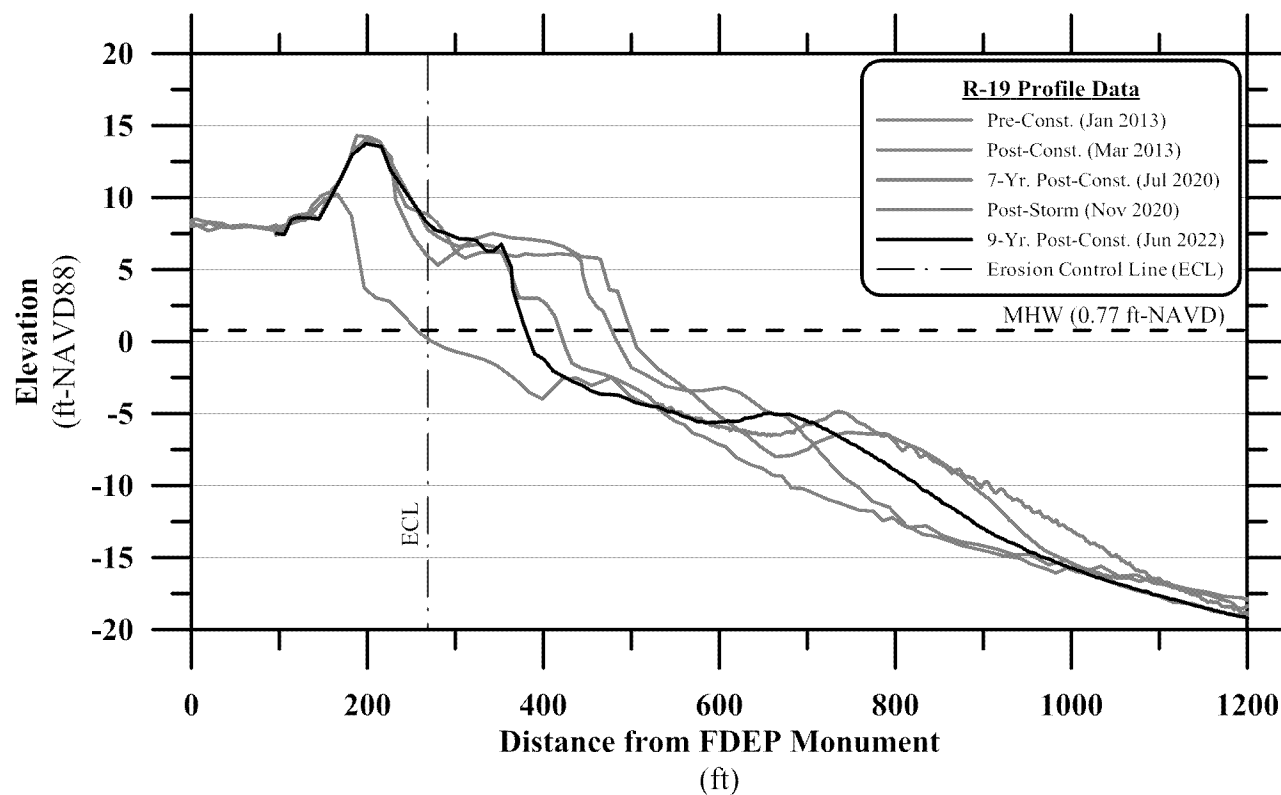


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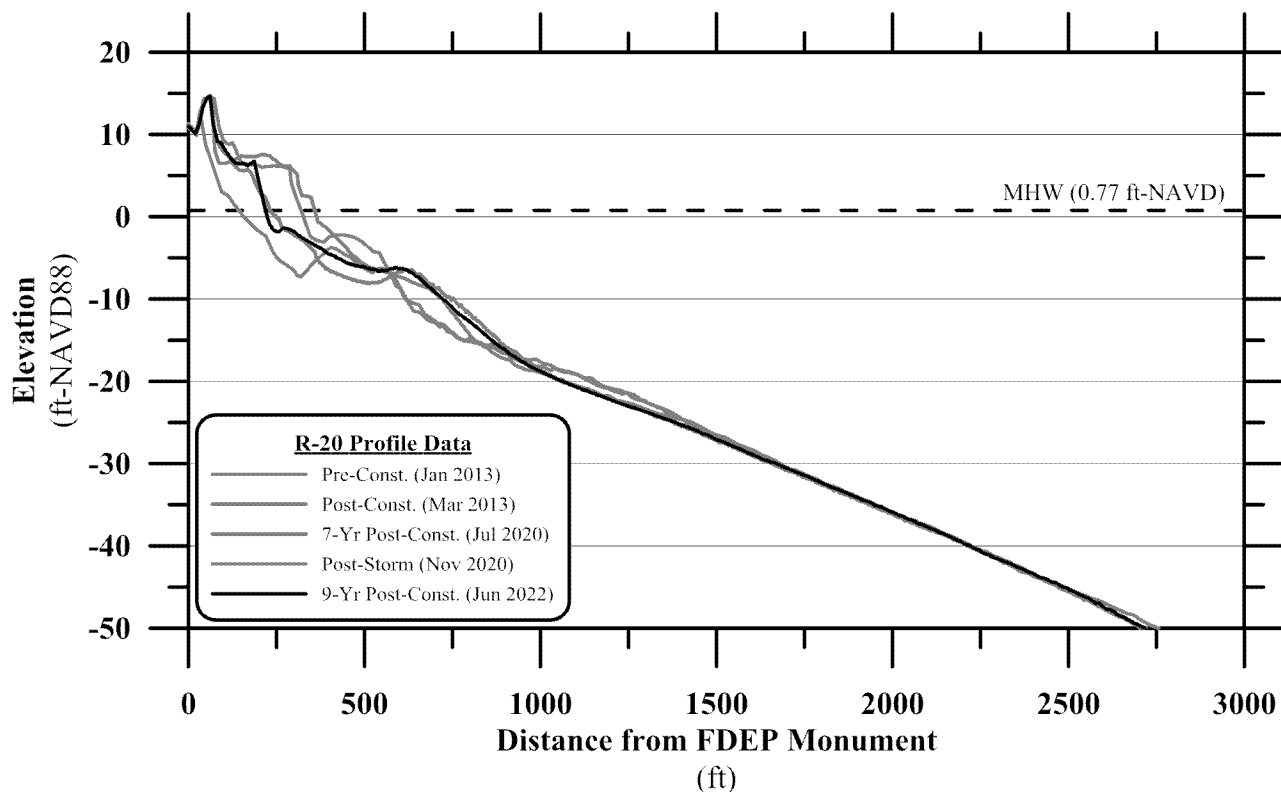


Figure A-4a Beach Profile Survey Data at FDEP Monument R-20.

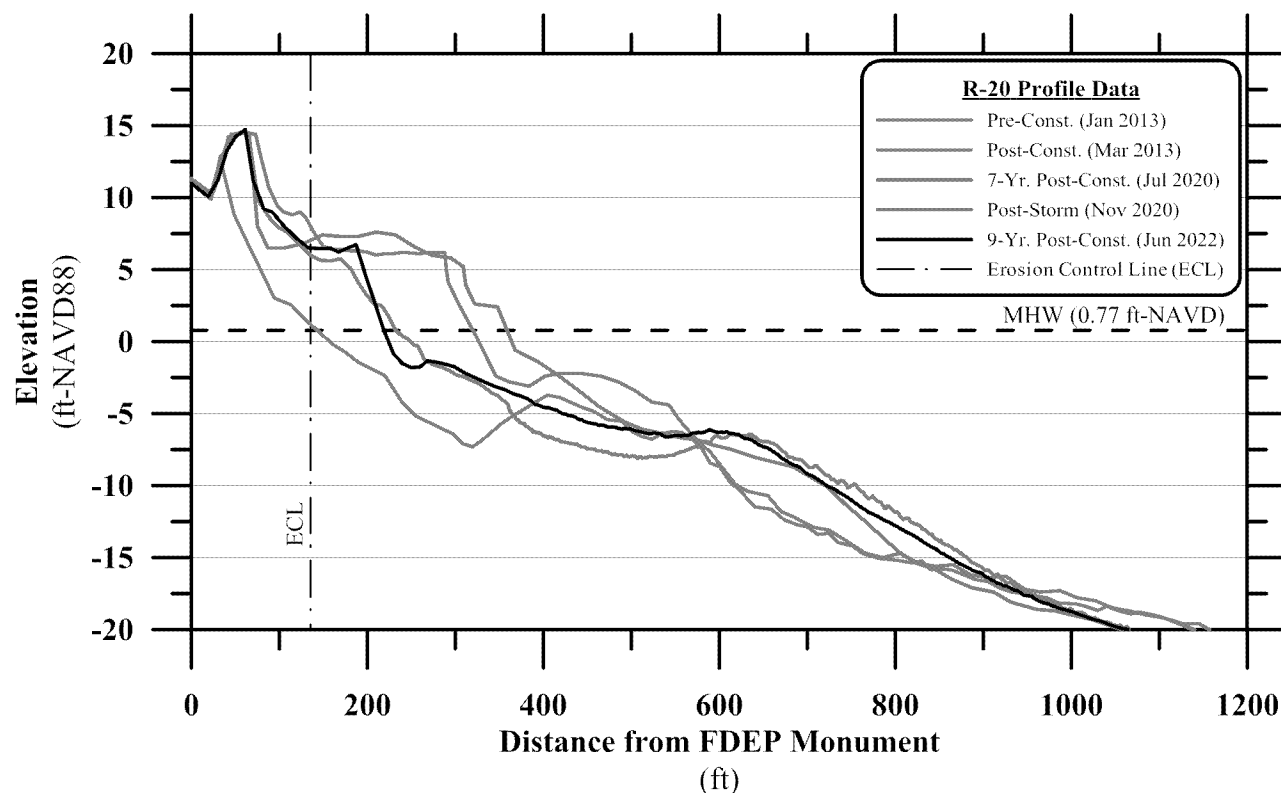


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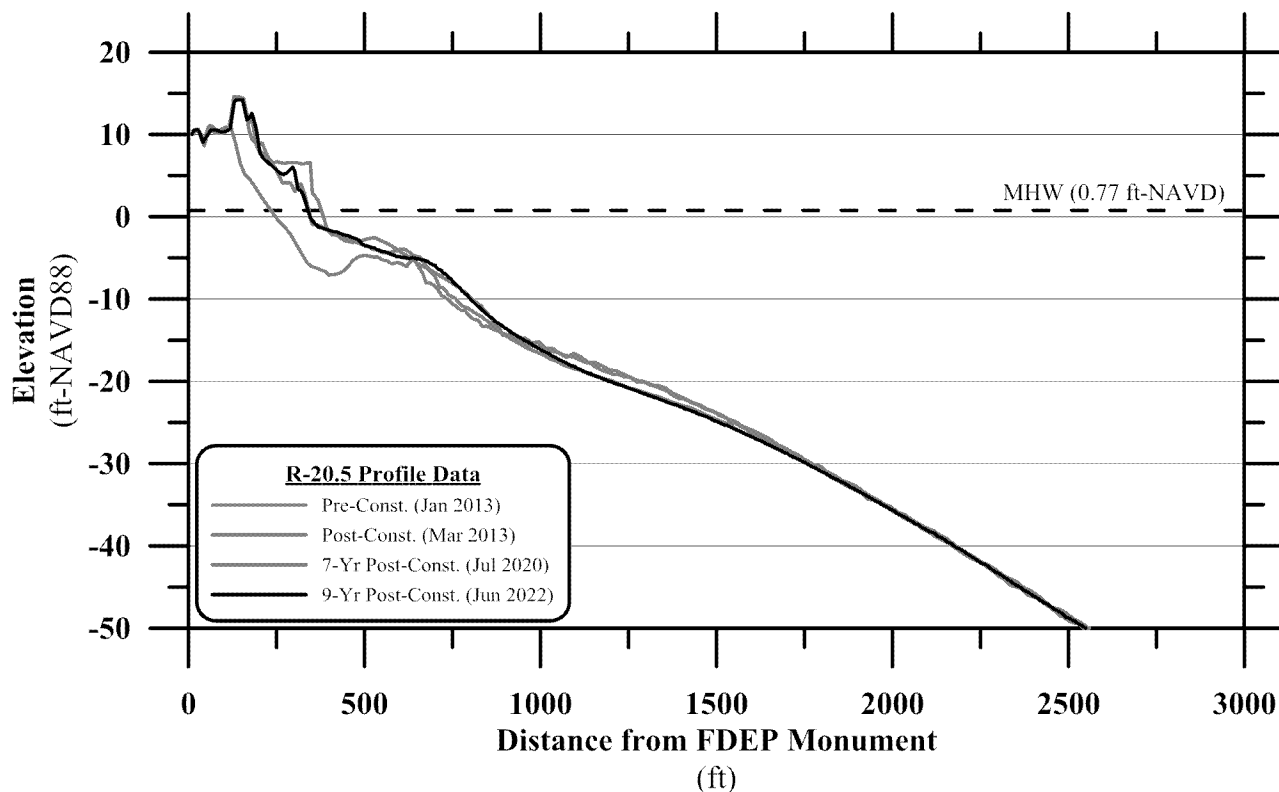


Figure A-5a Beach Profile Survey Data at FDEP Monument R-20.5.

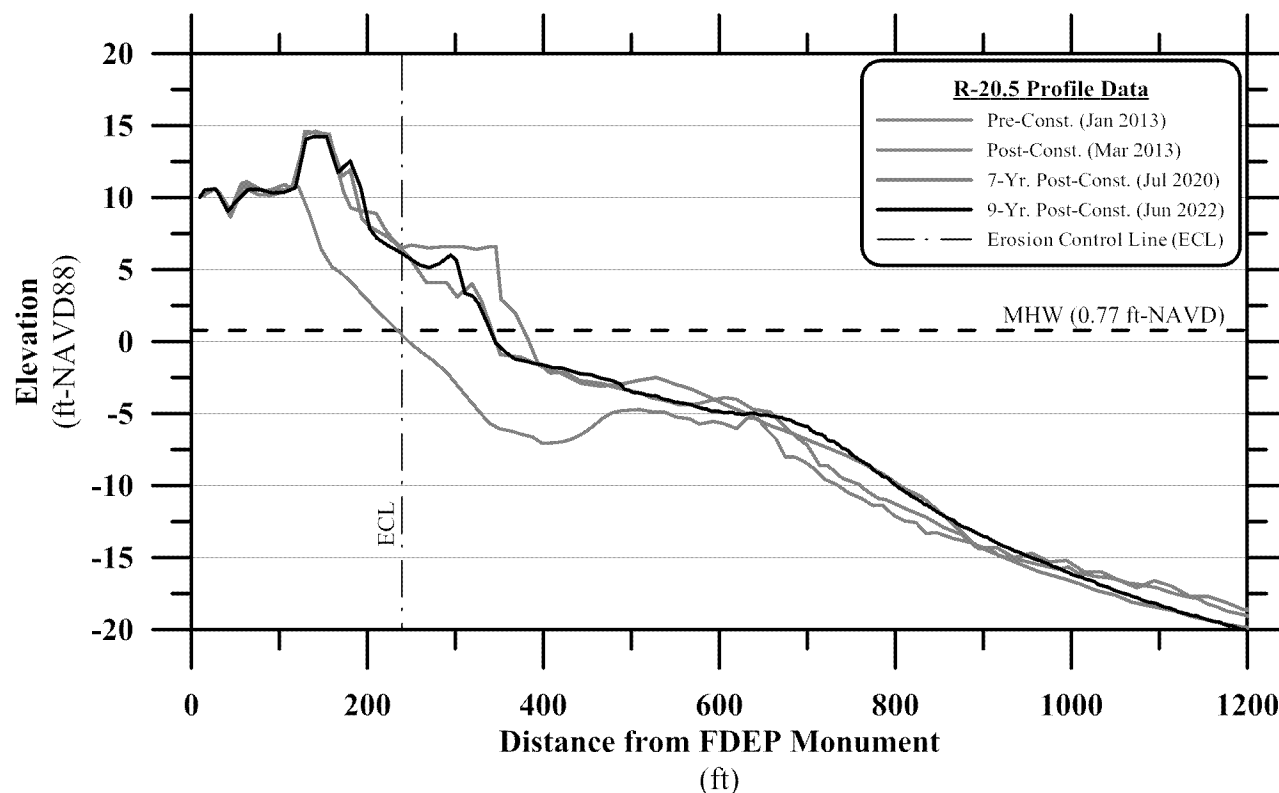


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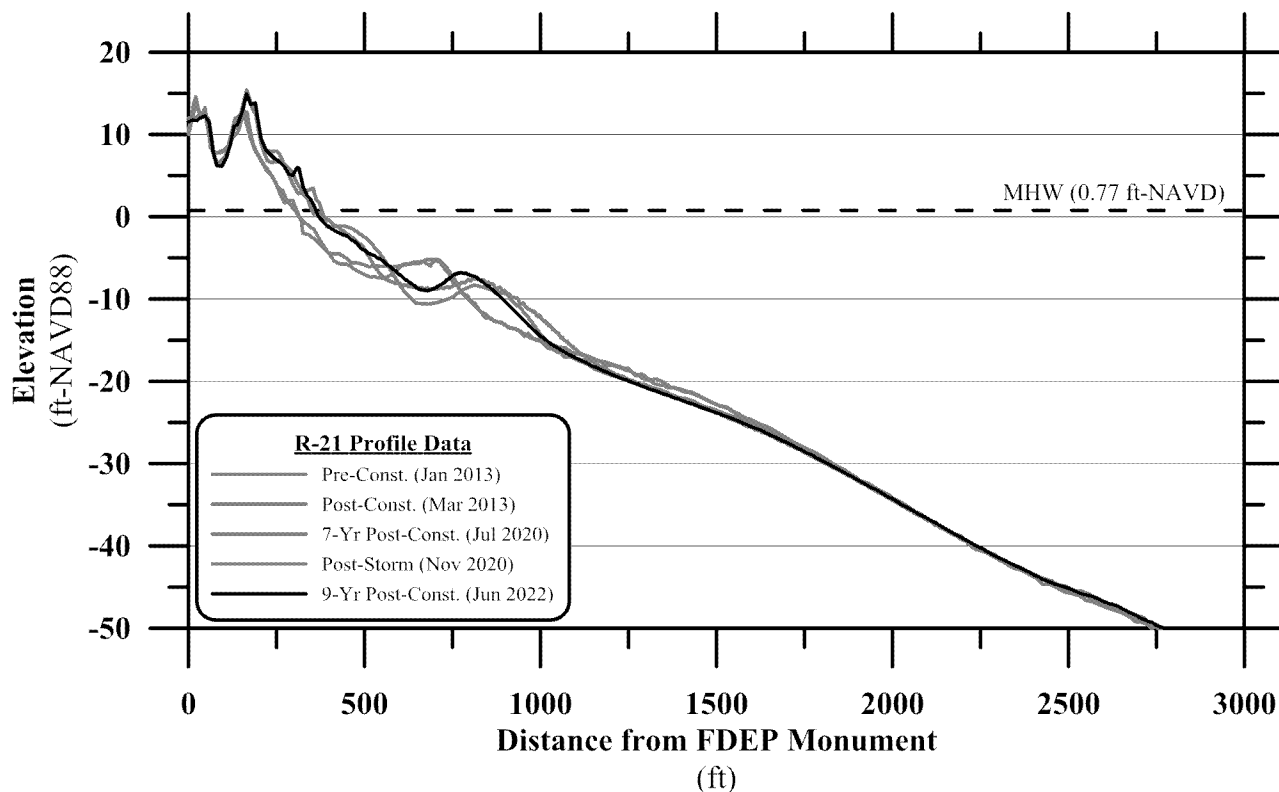


Figure A-6a Beach Profile Survey Data at FDEP Monument R-21.

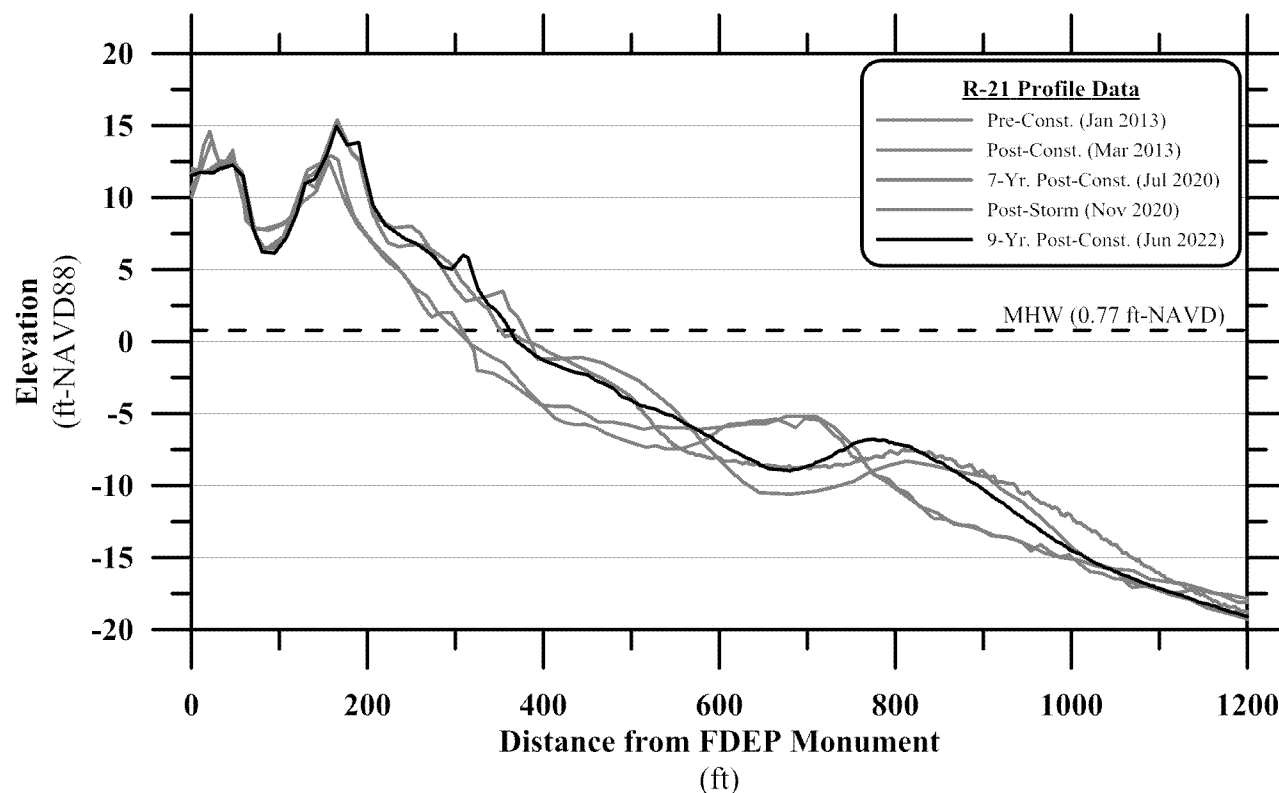


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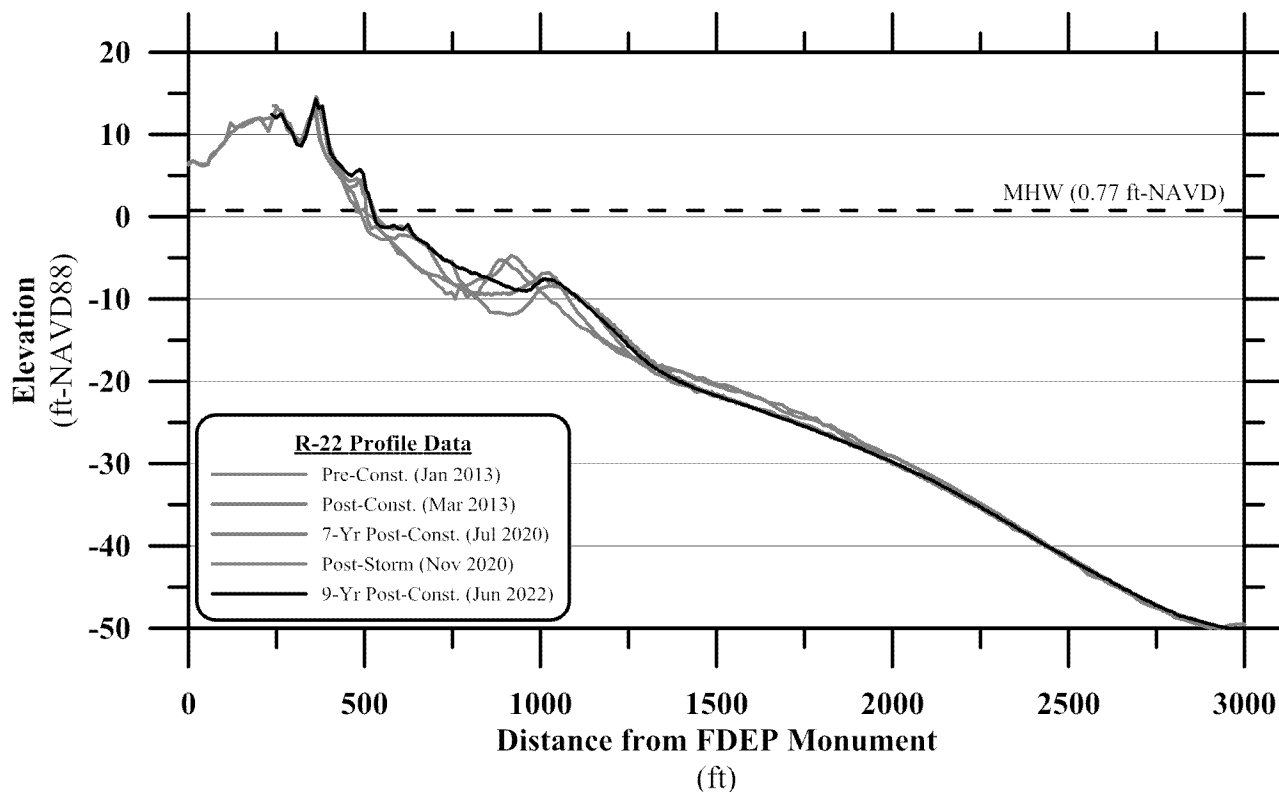


Figure A-7a Beach Profile Survey Data at FDEP Monument R-22.

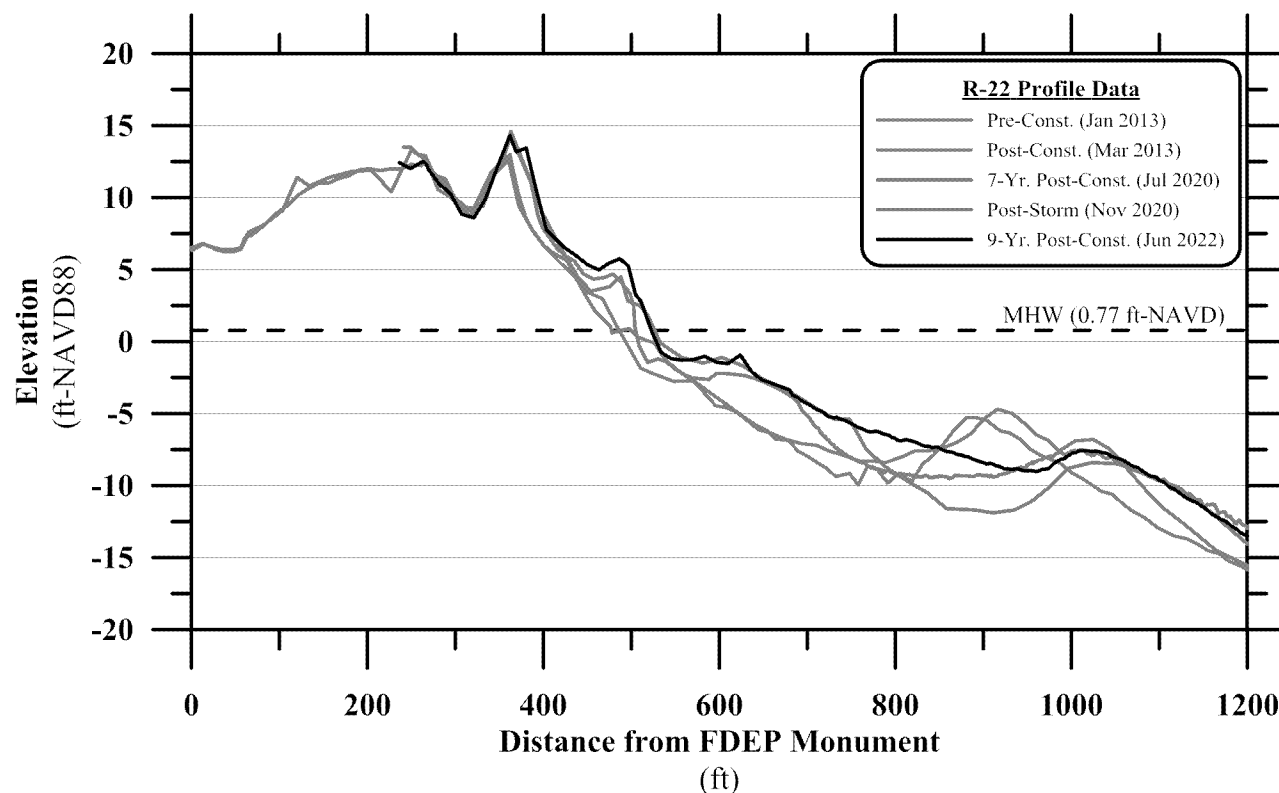


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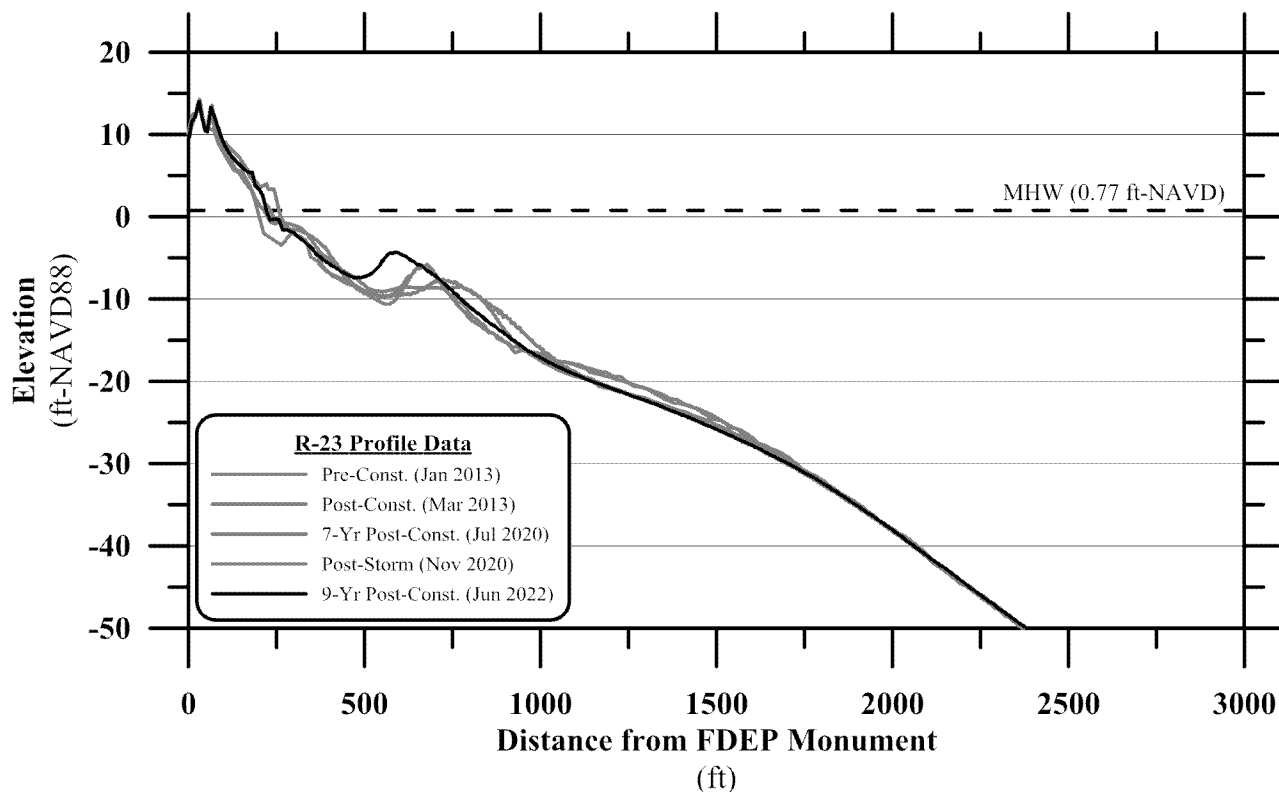


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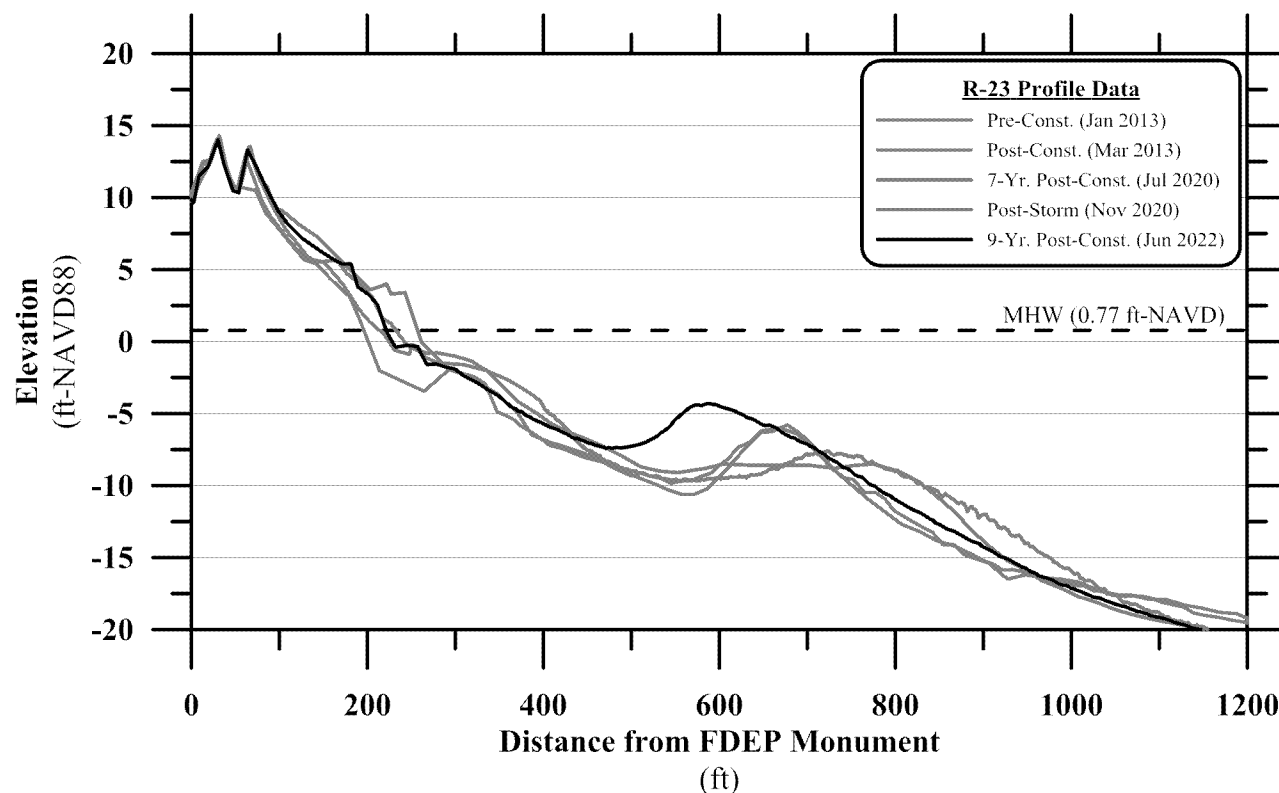


Figure A-8b Beach Profile Survey Data at FDEP Monument R-23.

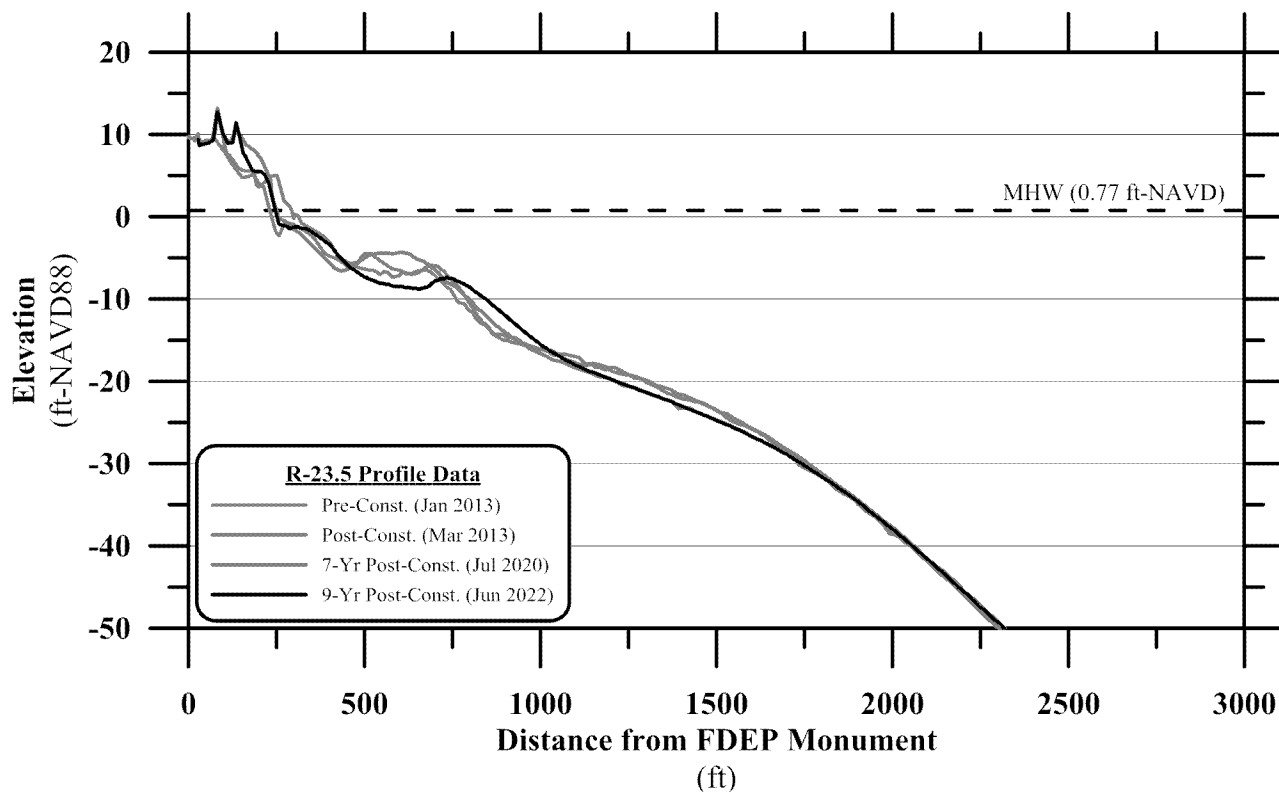


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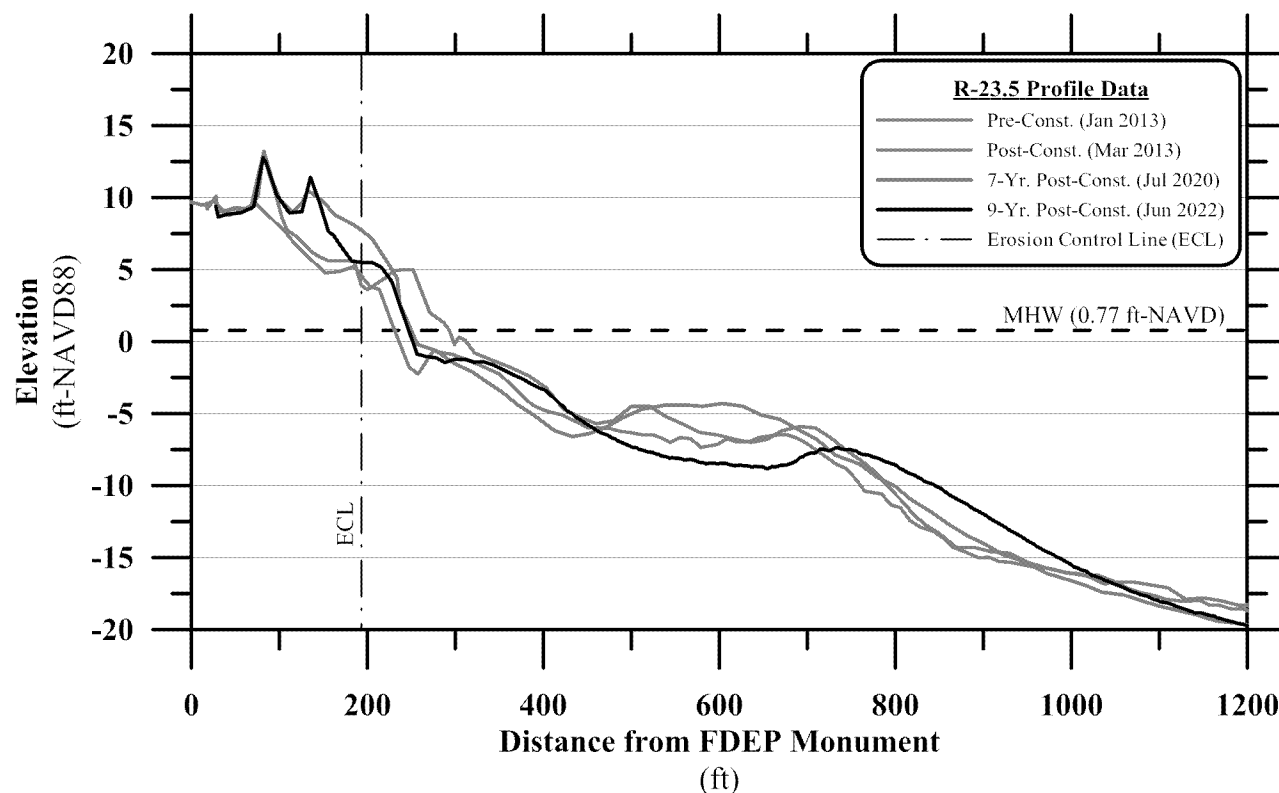


Figure A-9b Beach Profile Survey Data at FDEP Monument R-23.5.

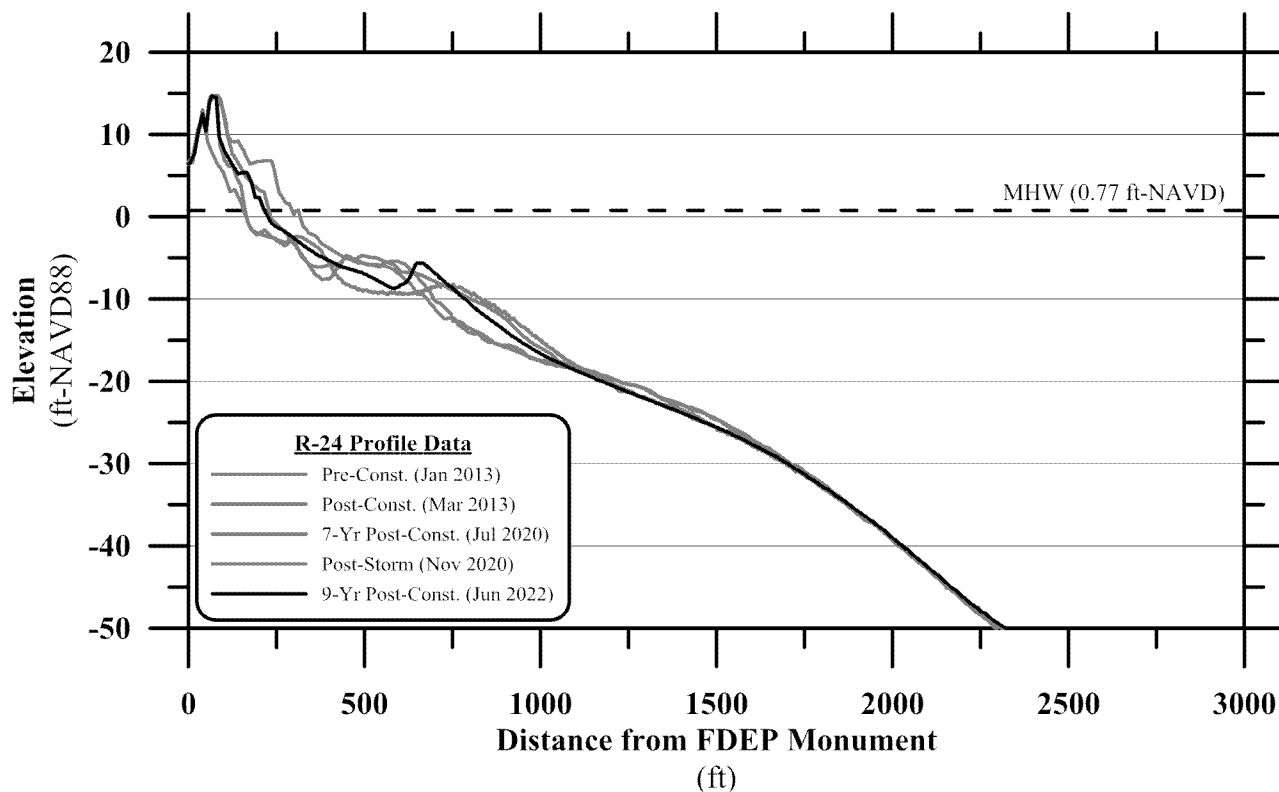


Figure A-10a Beach Profile Survey Data at FDEP Monument R-24.

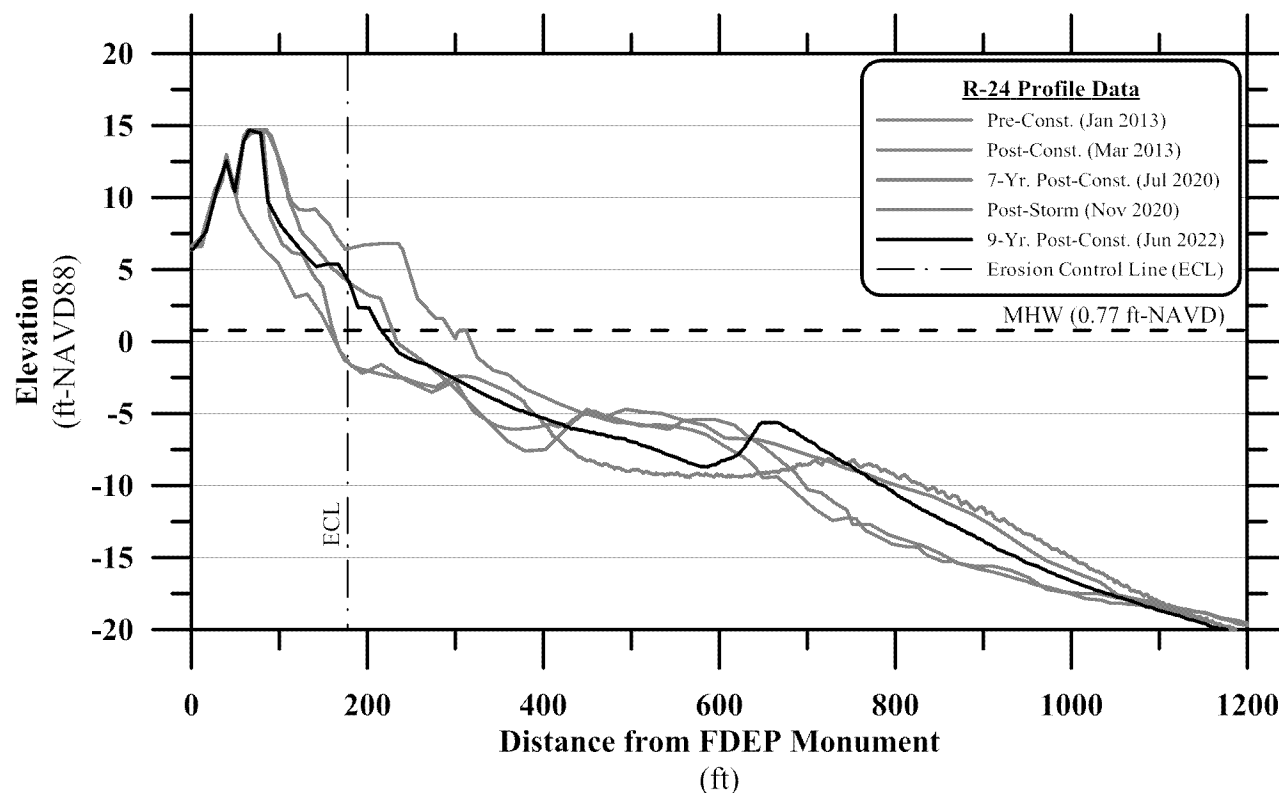


Figure A-10b Beach Profile Survey Data at FDEP Monument R-24.

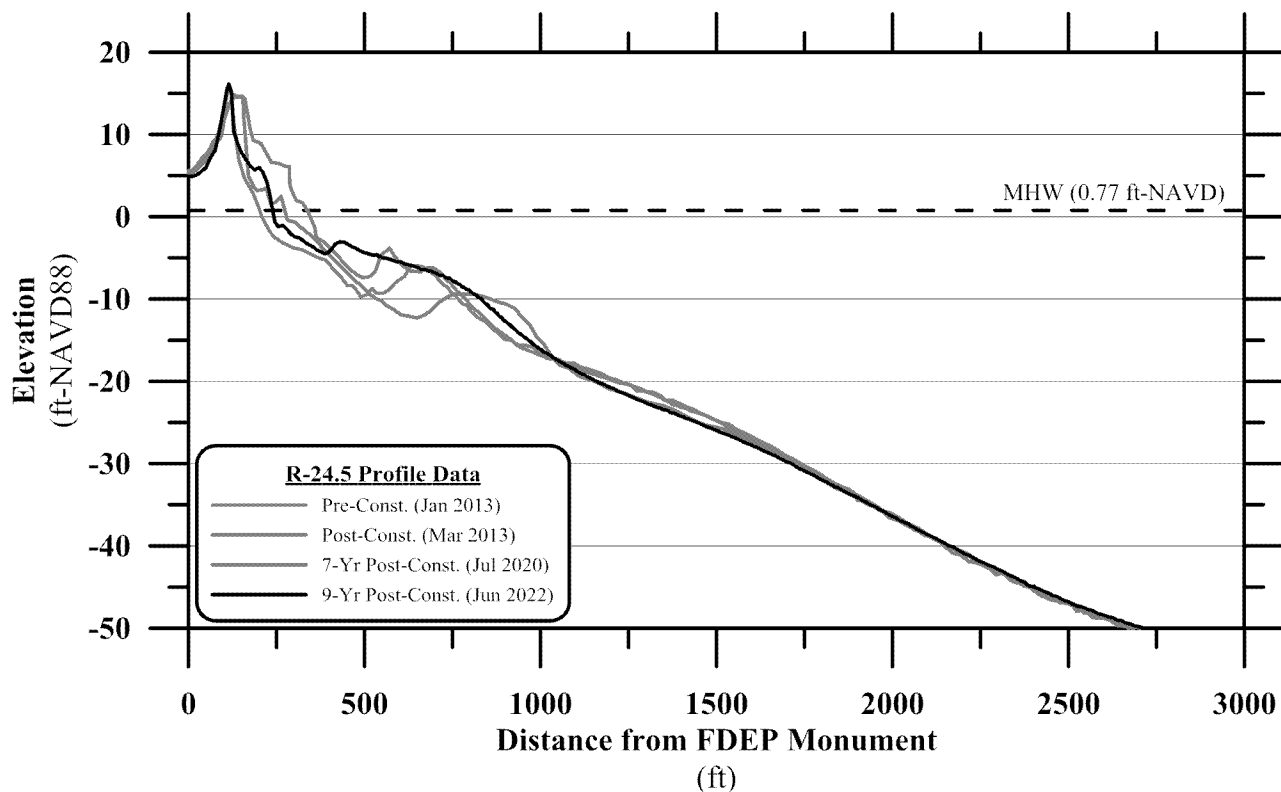


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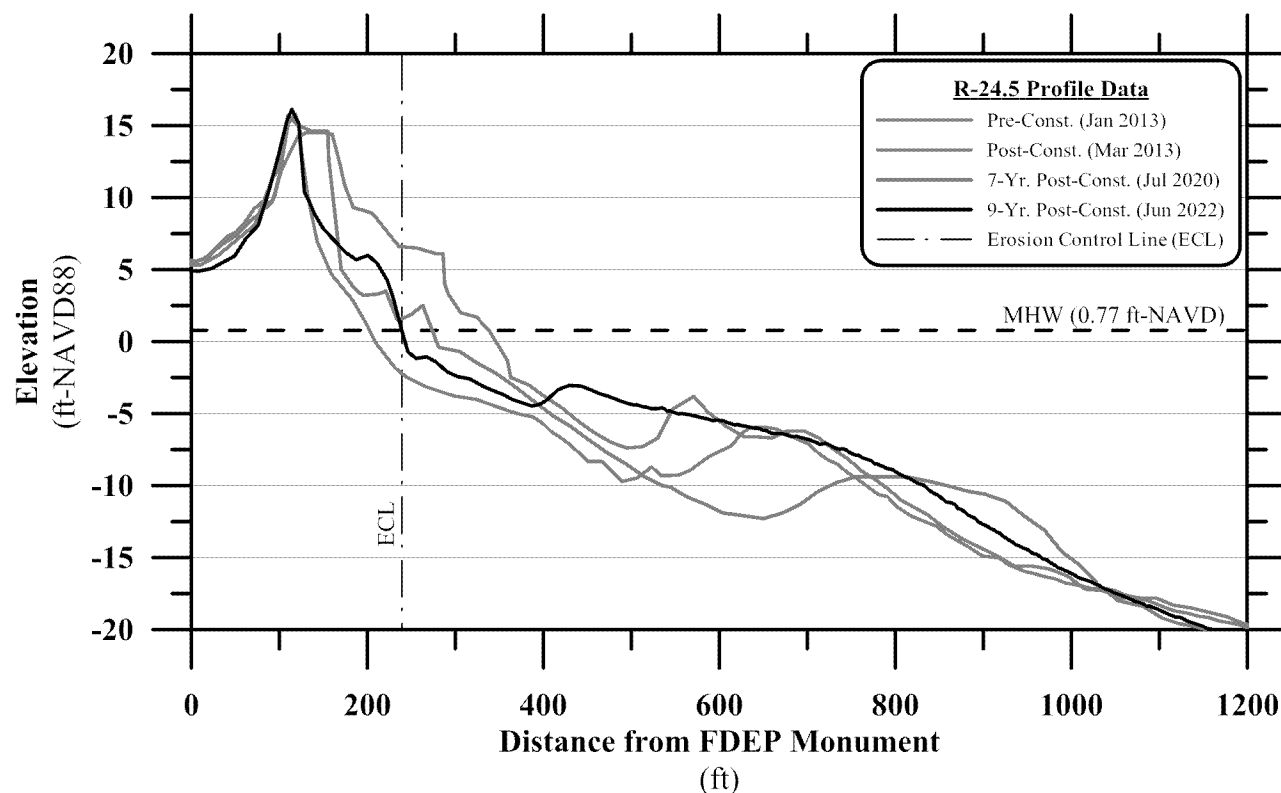


Figure A-11b Beach Profile Survey Data at FDEP Monument R-24.5.

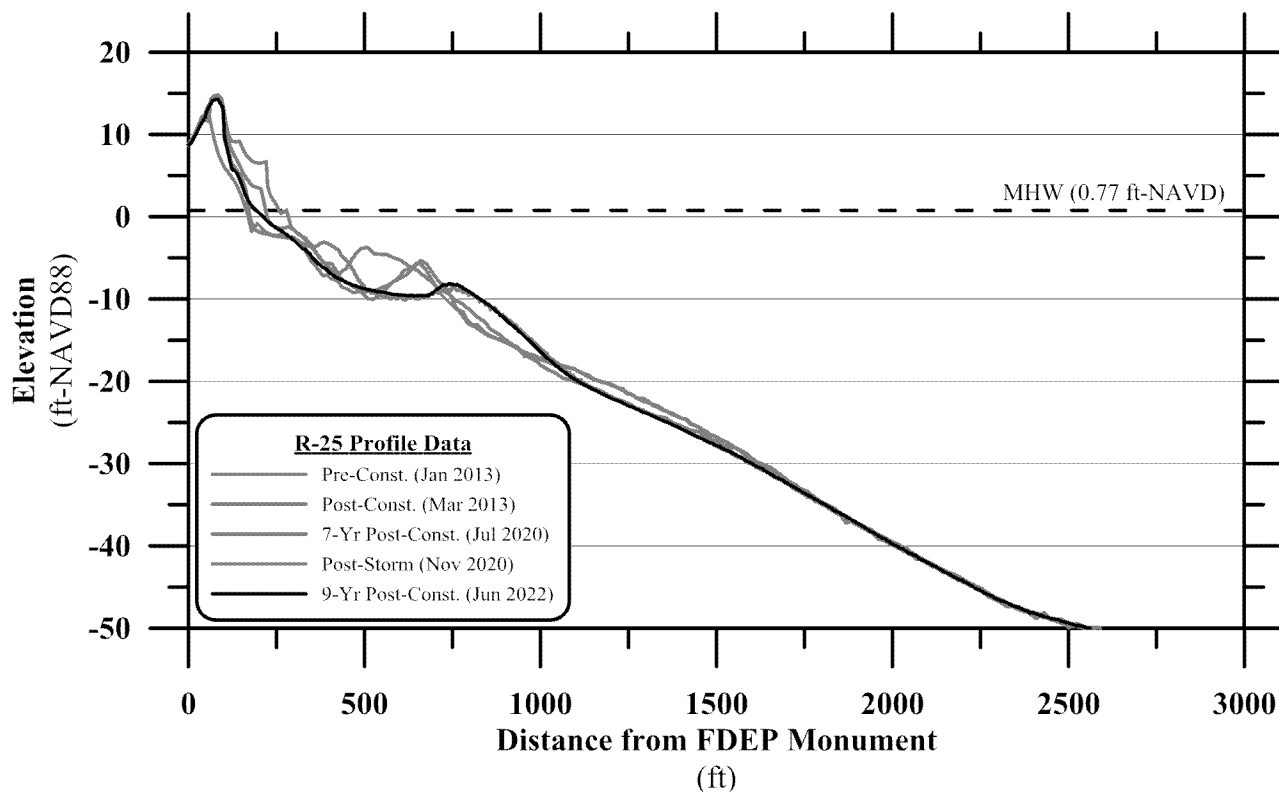


Figure A-12a Beach Profile Survey Data at FDEP Monument R-25.

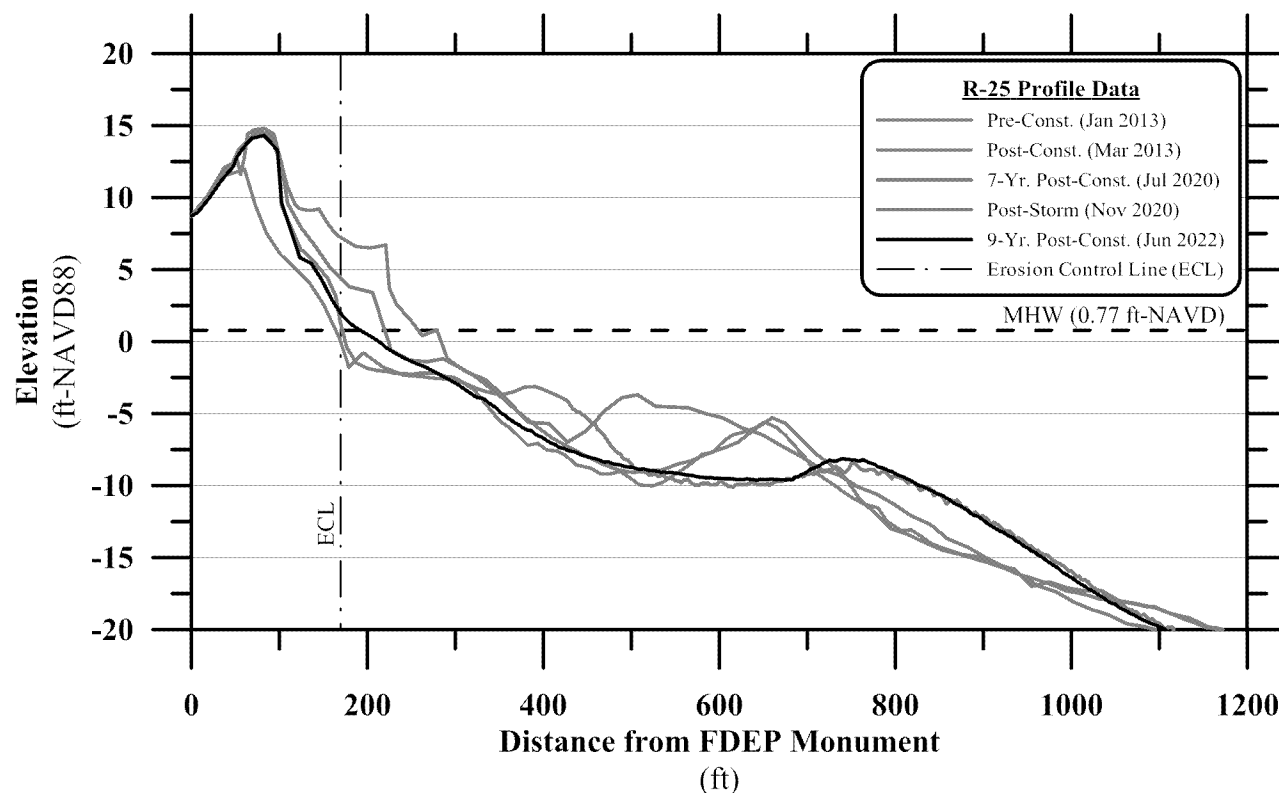


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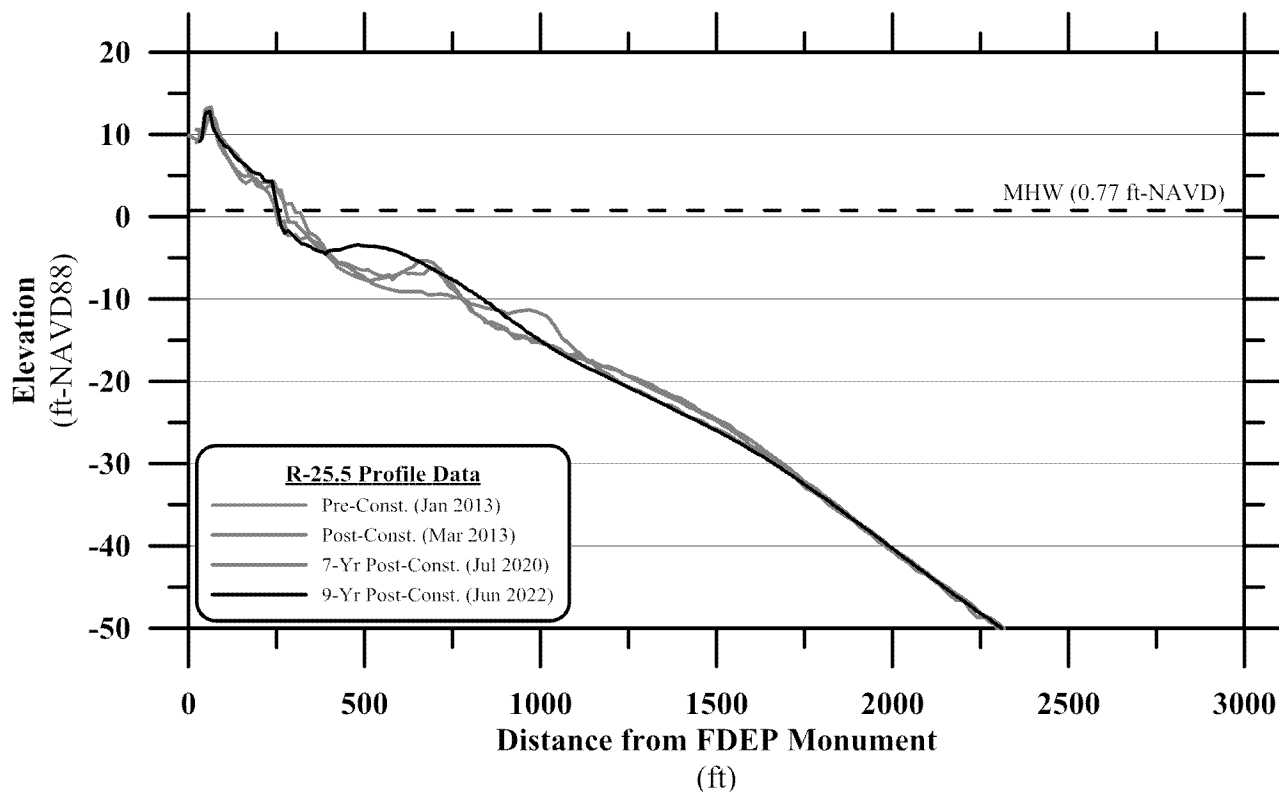


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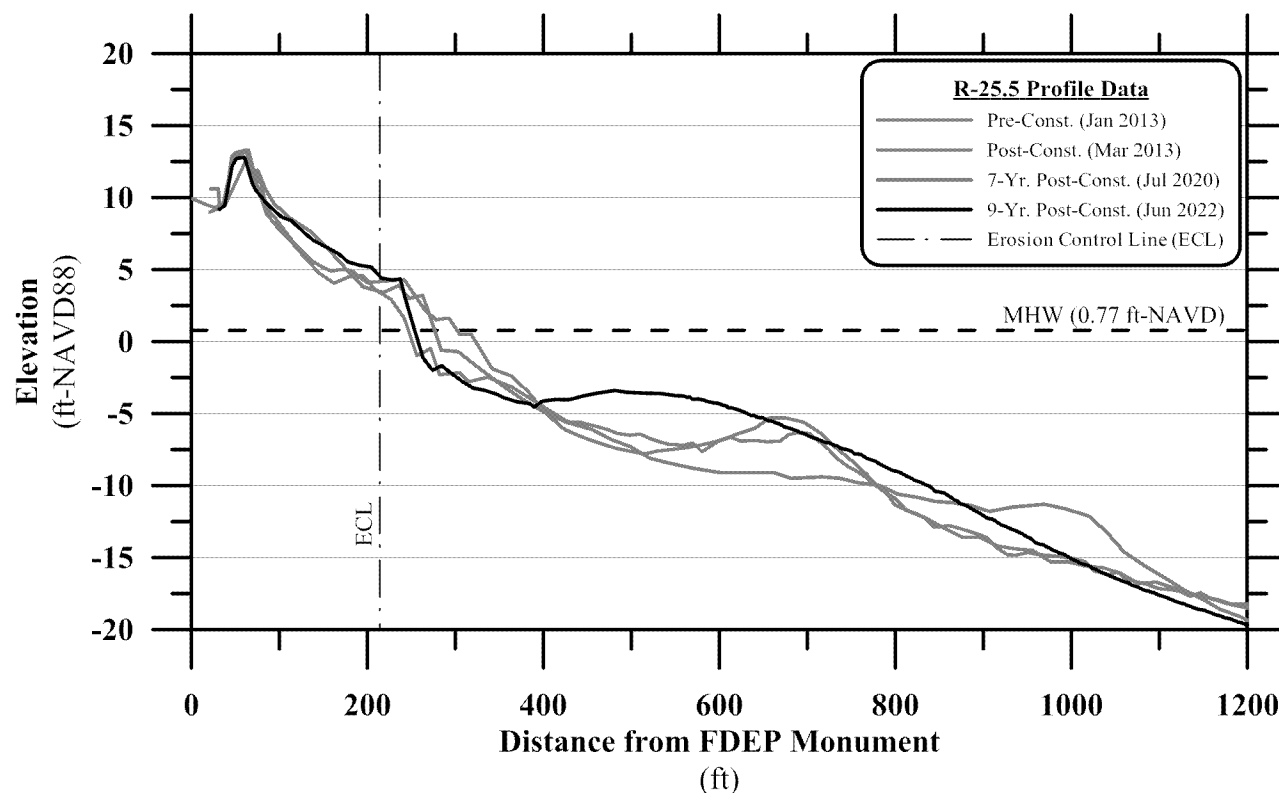


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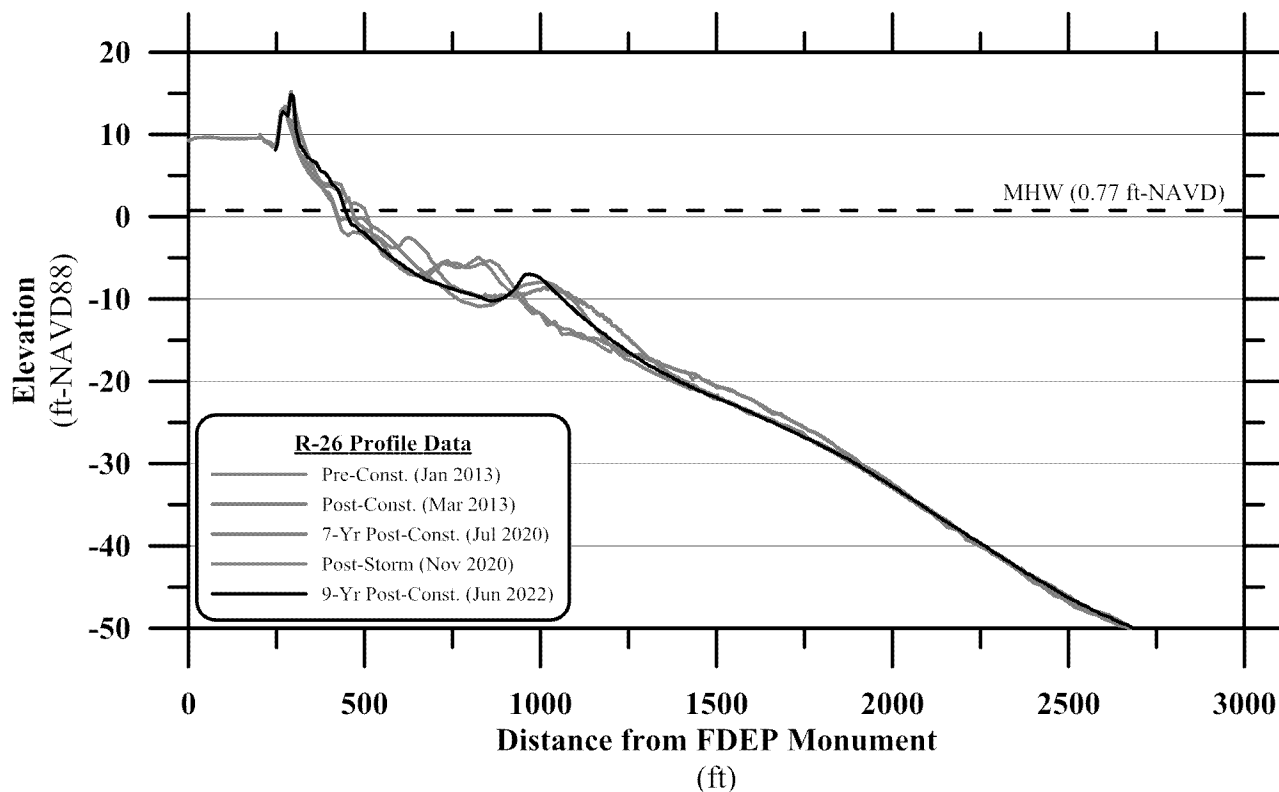


Figure A-14a Beach Profile Survey Data at FDEP Monument R-26.

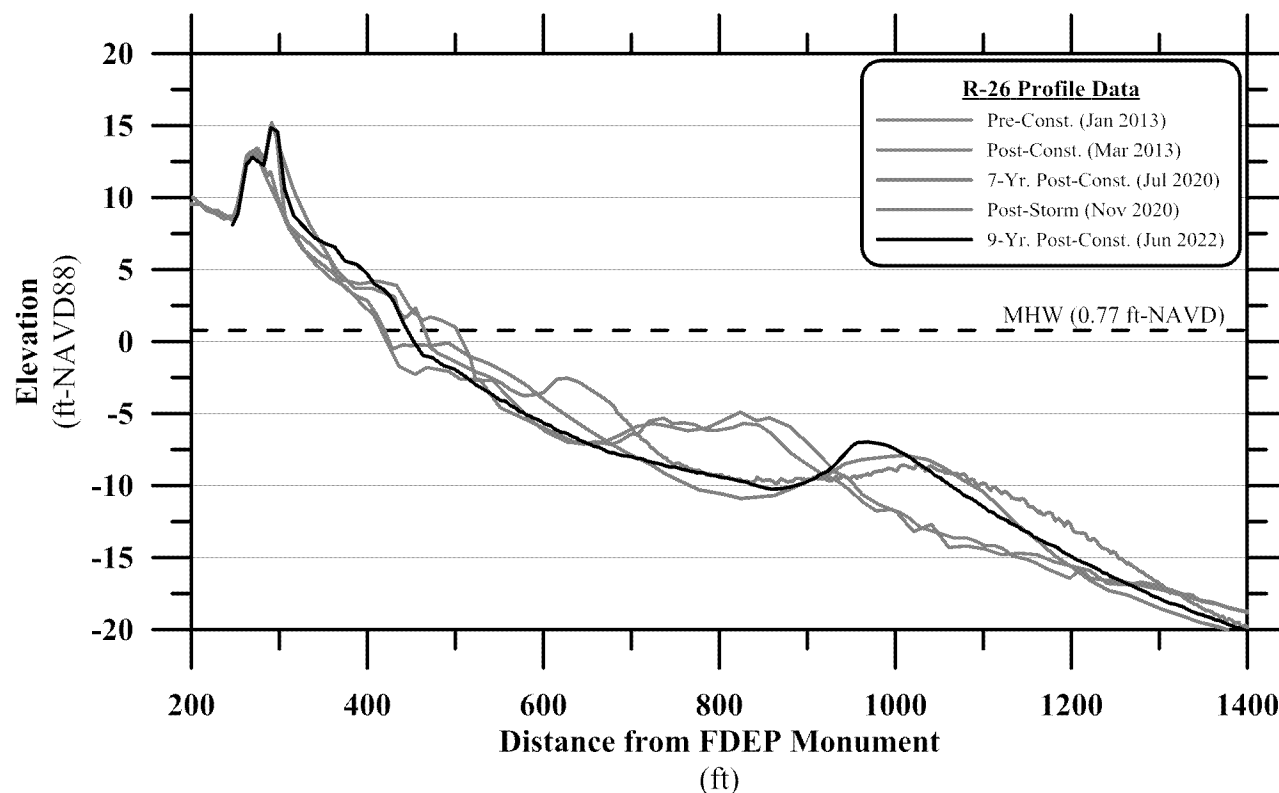


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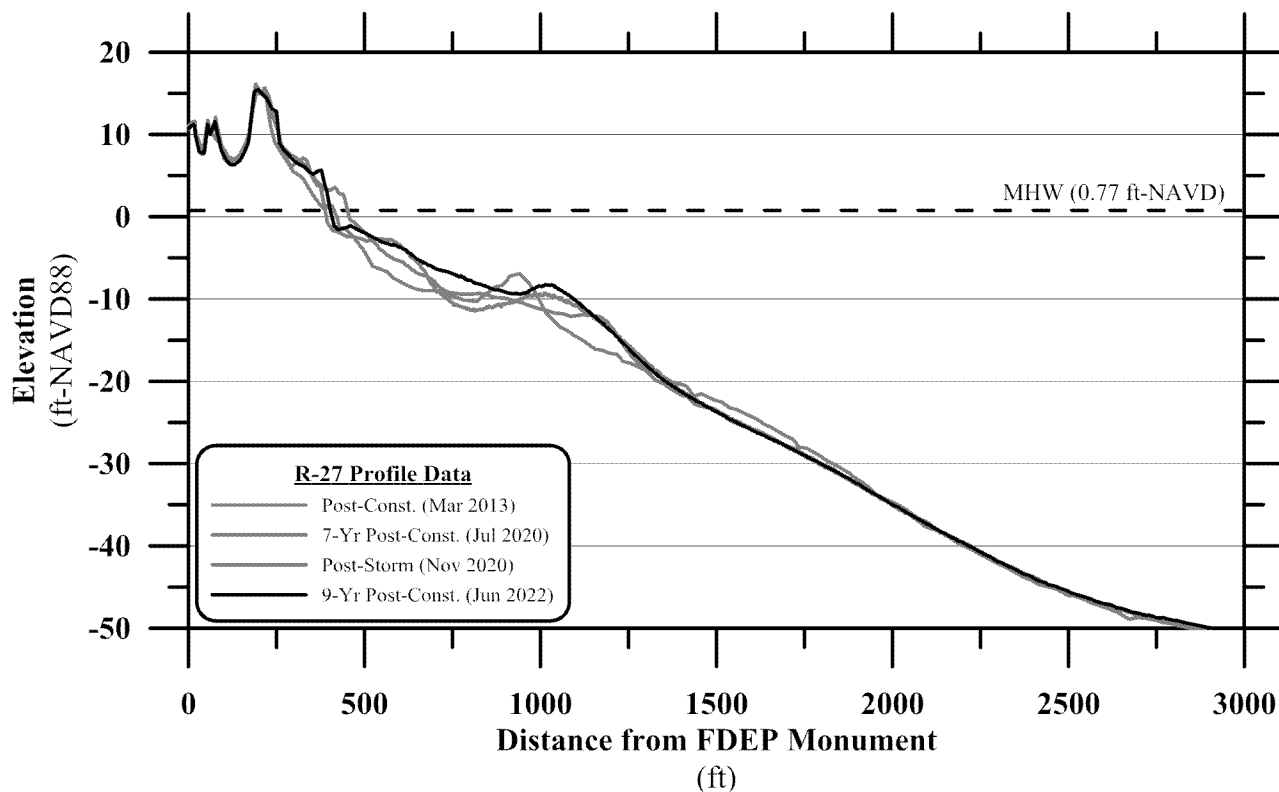


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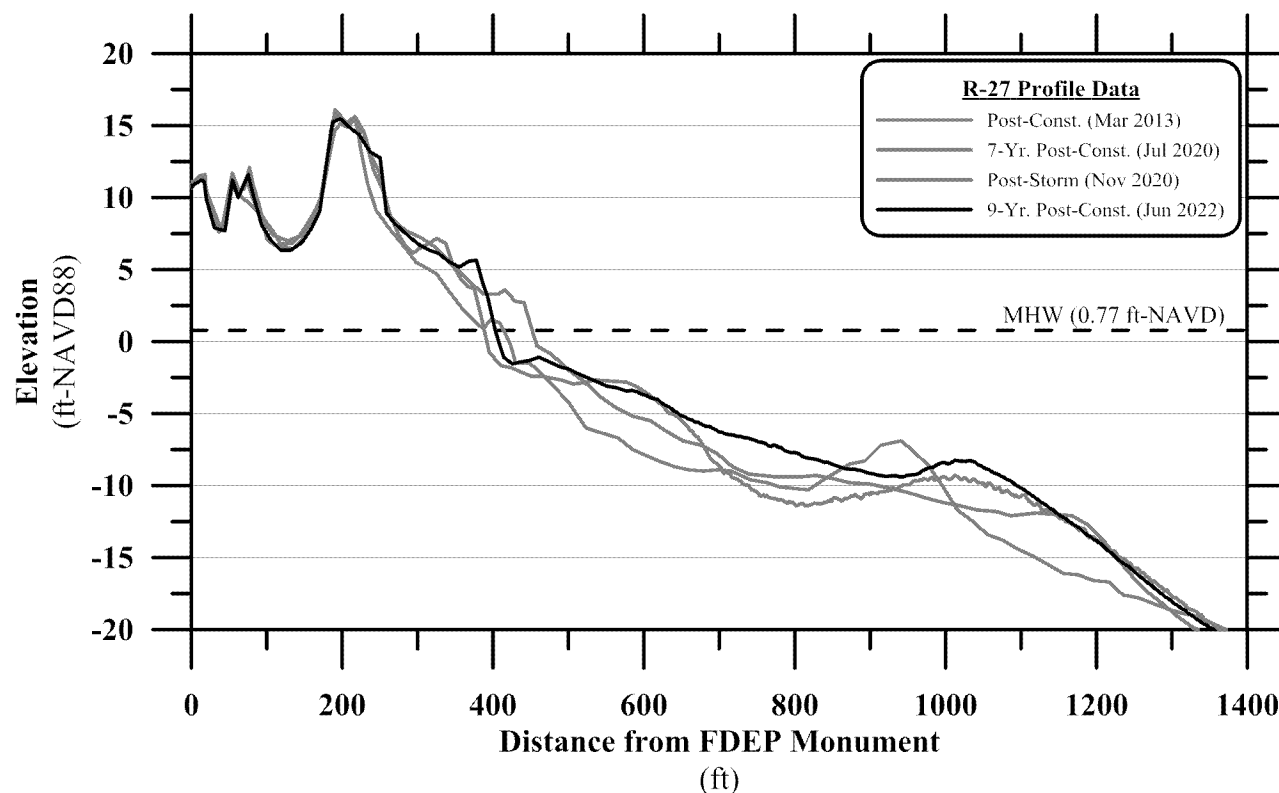


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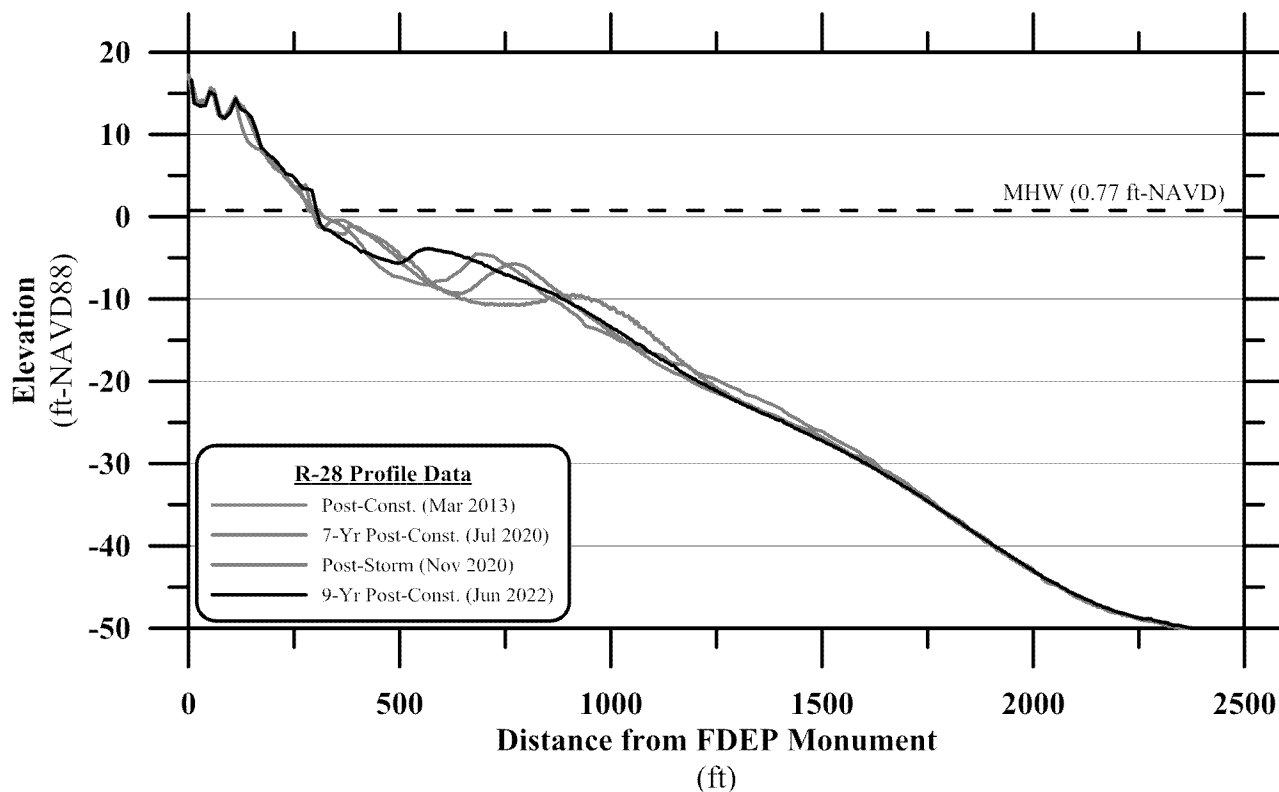


Figure A-16a Beach Profile Survey Data at FDEP Monument R-28.

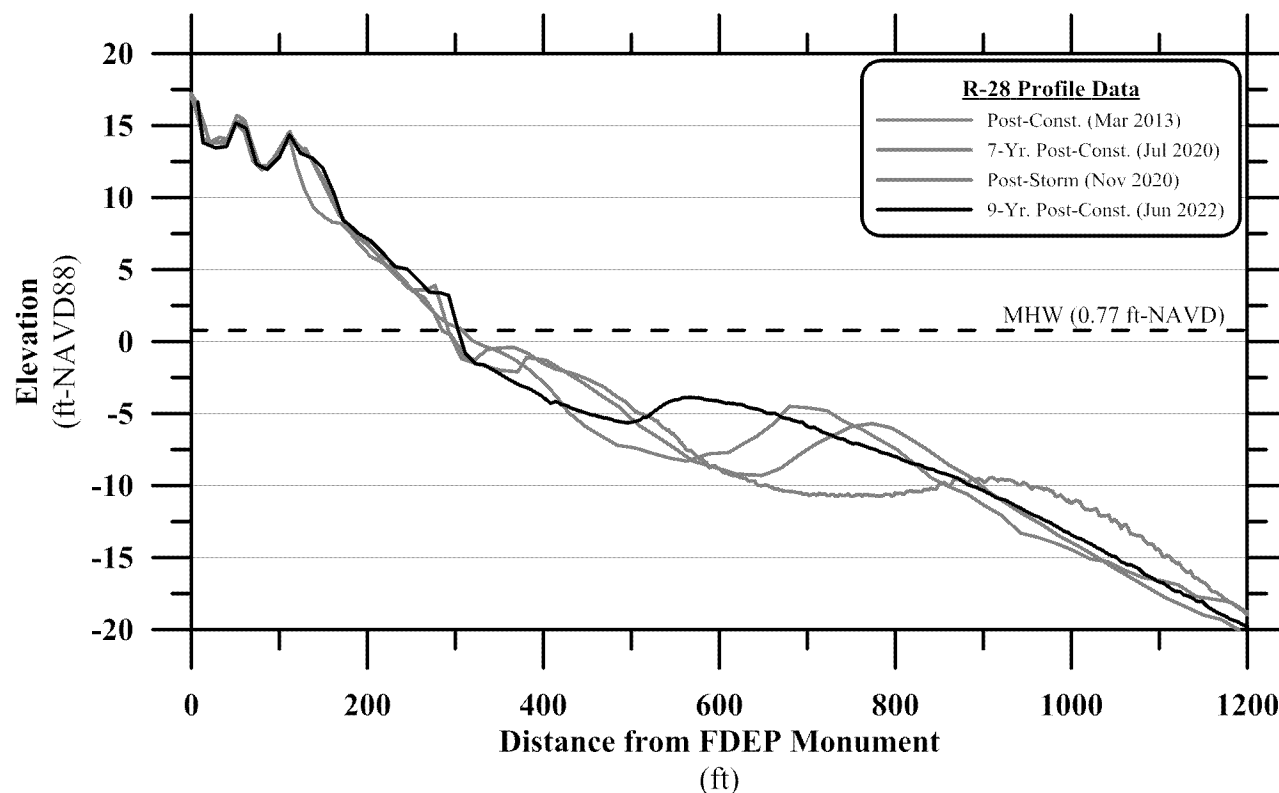


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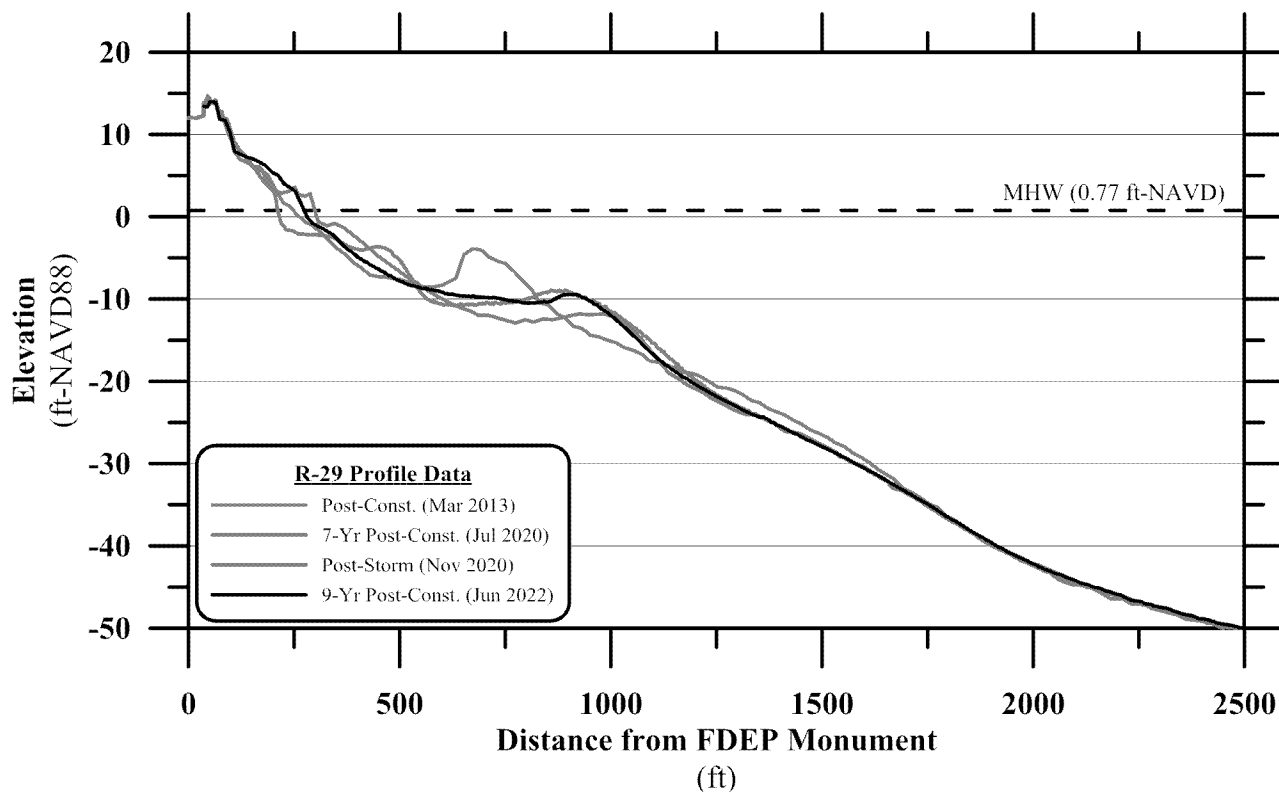


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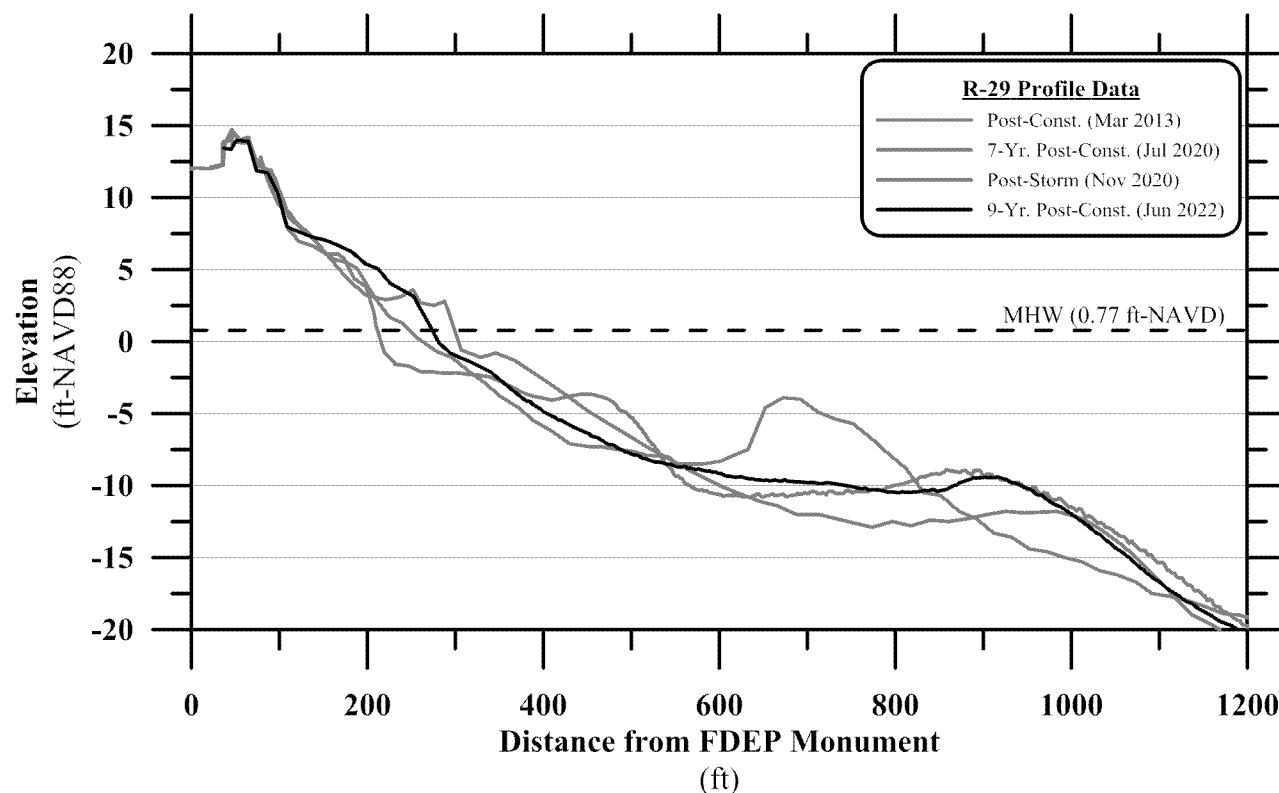


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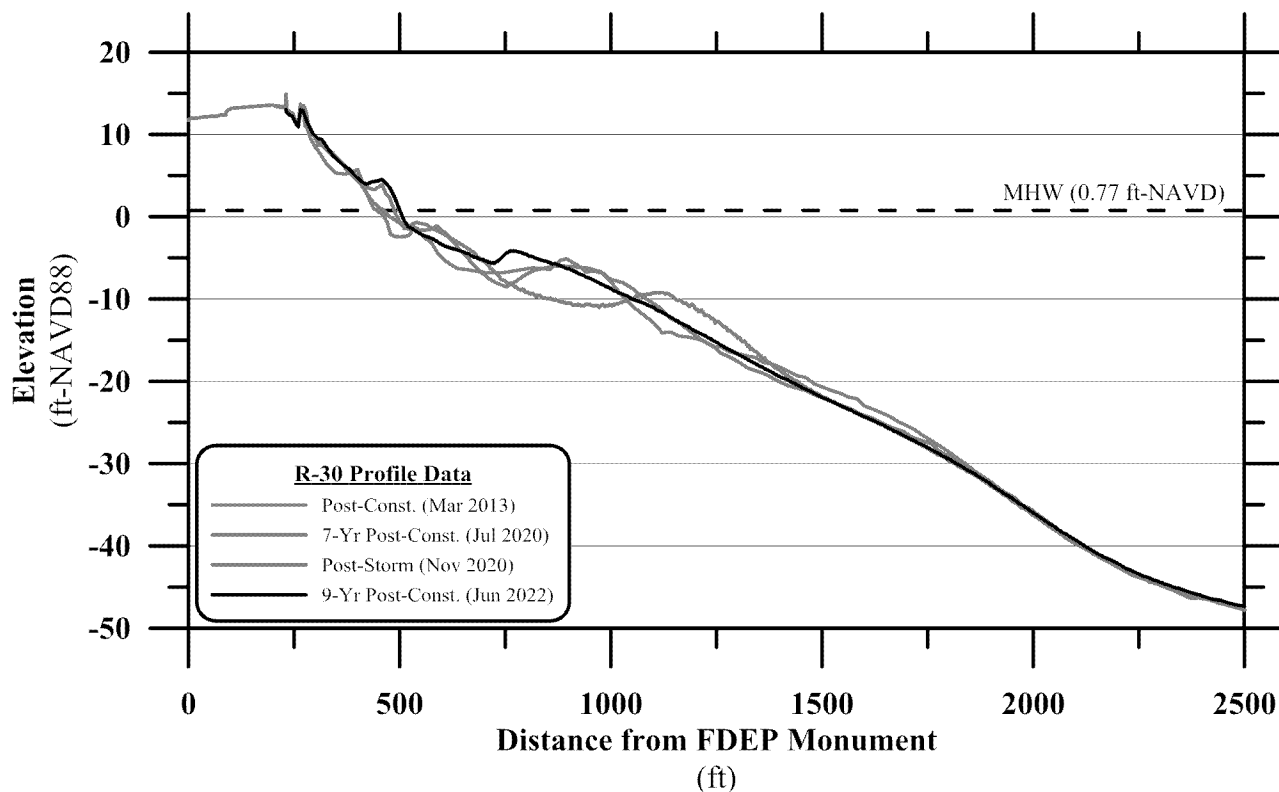


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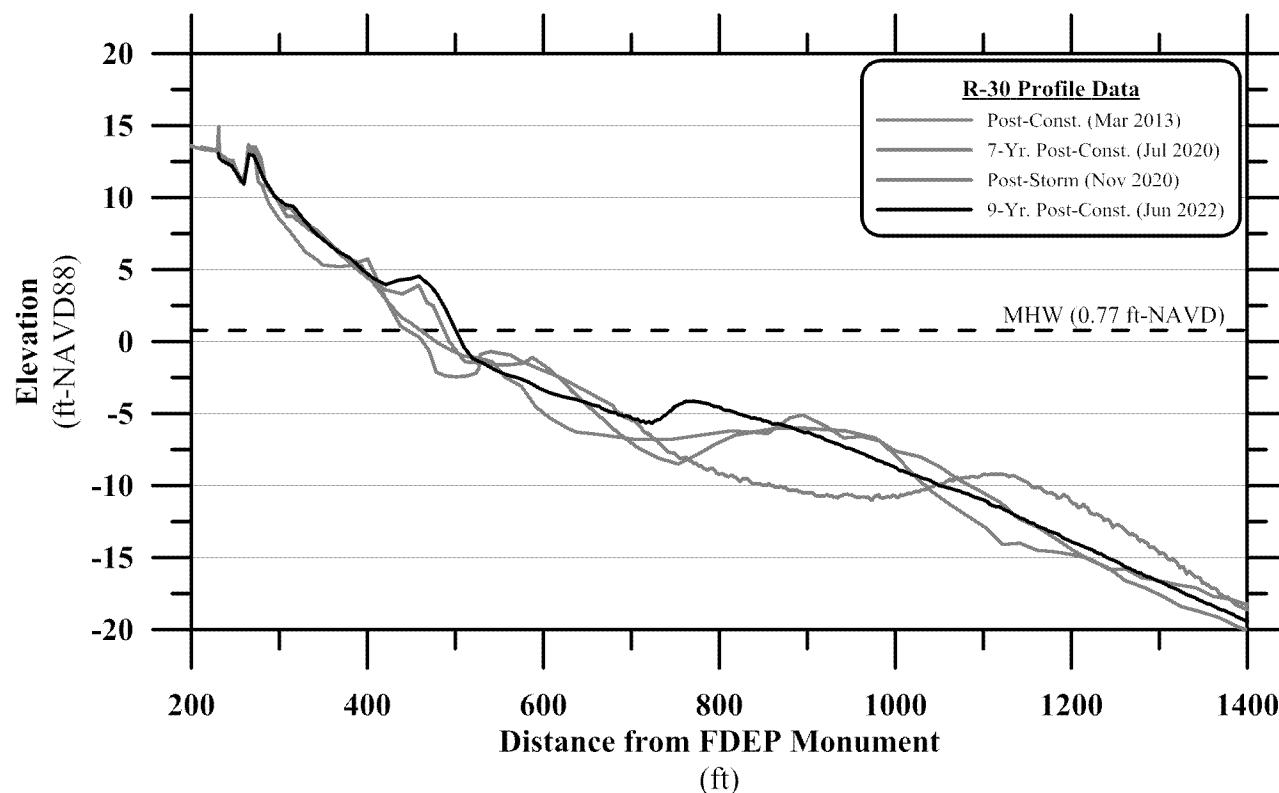
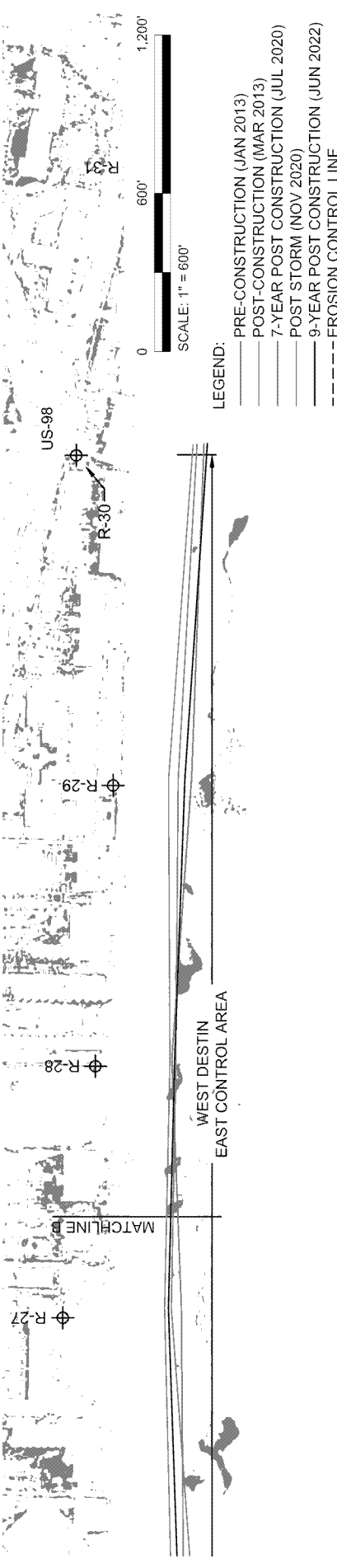
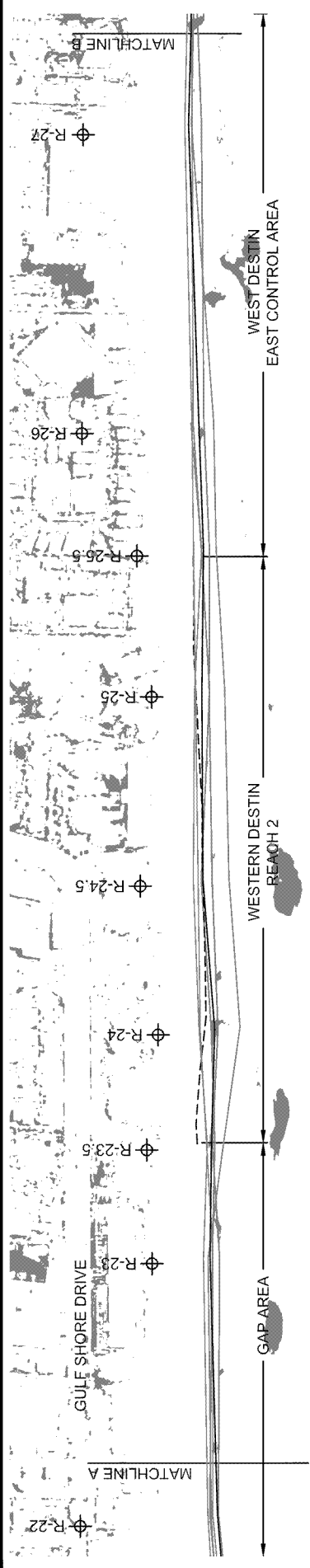
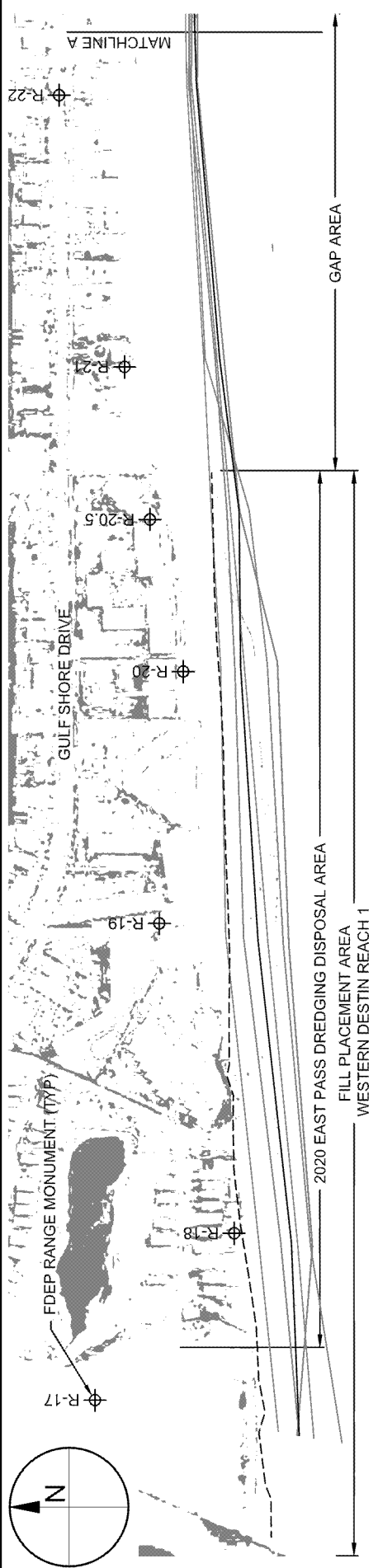
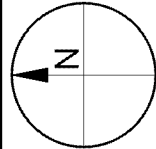


Figure A-18b Beach Profile Survey Data at FDEP Monument R-30.

APPENDIX B

MHW Contours on 2015 Aerials



- LEGEND:
- PRE-CONSTRUCTION (JAN 2013)
 - POST-CONSTRUCTION (MAR 2013)
 - 7-YEAR POST CONSTRUCTION (JUL 2020)
 - POST STORM (NOV 2020)
 - 9-YEAR POST CONSTRUCTION (JUN 2022)
 - EROSION CONTROL LINE

 TAYLOR ENGINEERING INC. 4300 LEGENDARY DRIVE SUITE C246 DESTIN, FLORIDA 32541	APPENDIX B MHW SHORELINE POSITIONS OVER AERIAL IMAGERY WESTERN DESTIN BEACH RESTORATION PROJECT 2022 NINE-YEAR POST-CONSTRUCTION MONITORING REPORT OKALOOSA COUNTY, FLORIDA		PROJECT C2022-031
	DRAWN BY AF		SHEET
DATE SEP 2022		DATE SEP 2022	

APPENDIX C

2022 Nine-Year Post-Construction Condition Photographs



Figure 1: Okaloosa County near East Pass Jetty (R-17) looking East (6/29/2022)

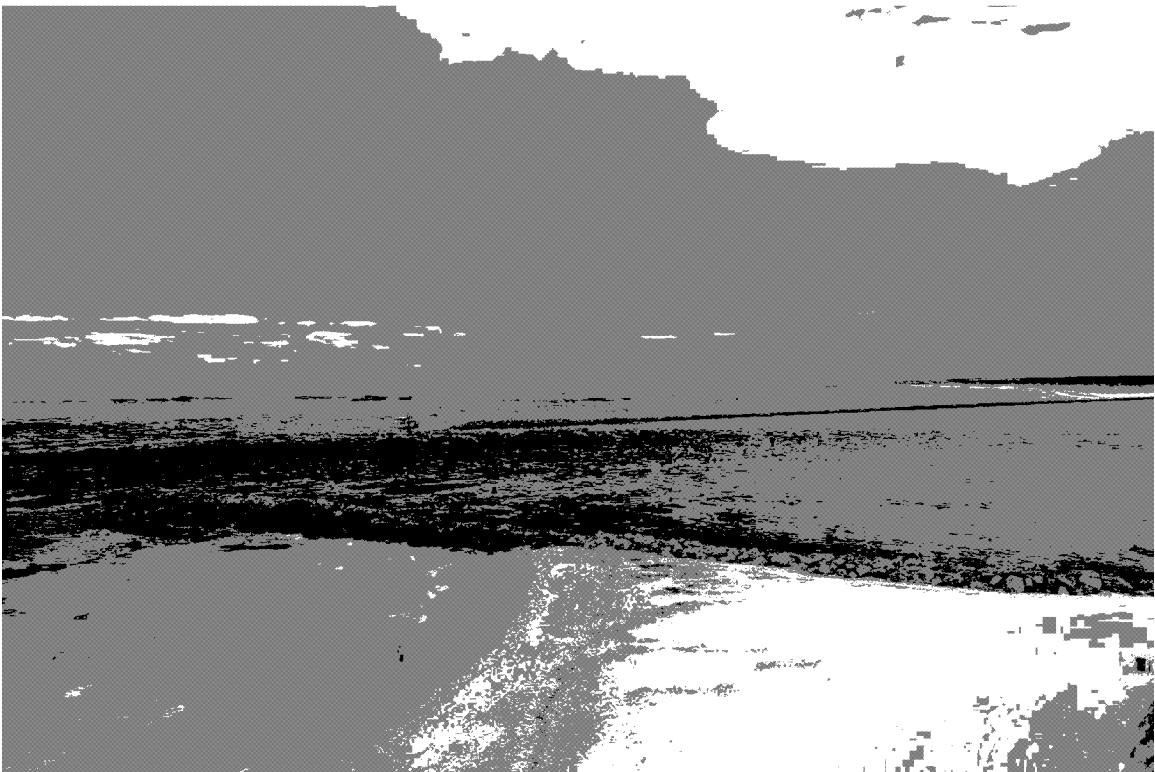


Figure 2: Okaloosa County near East Pass Jetty (R-17) looking West (6/29/2022)



Figure 3: Okaloosa County near R-18.5 looking East (6/29/2022)



Figure 4: Okaloosa County near R-18.5 looking West (6/29/2022)

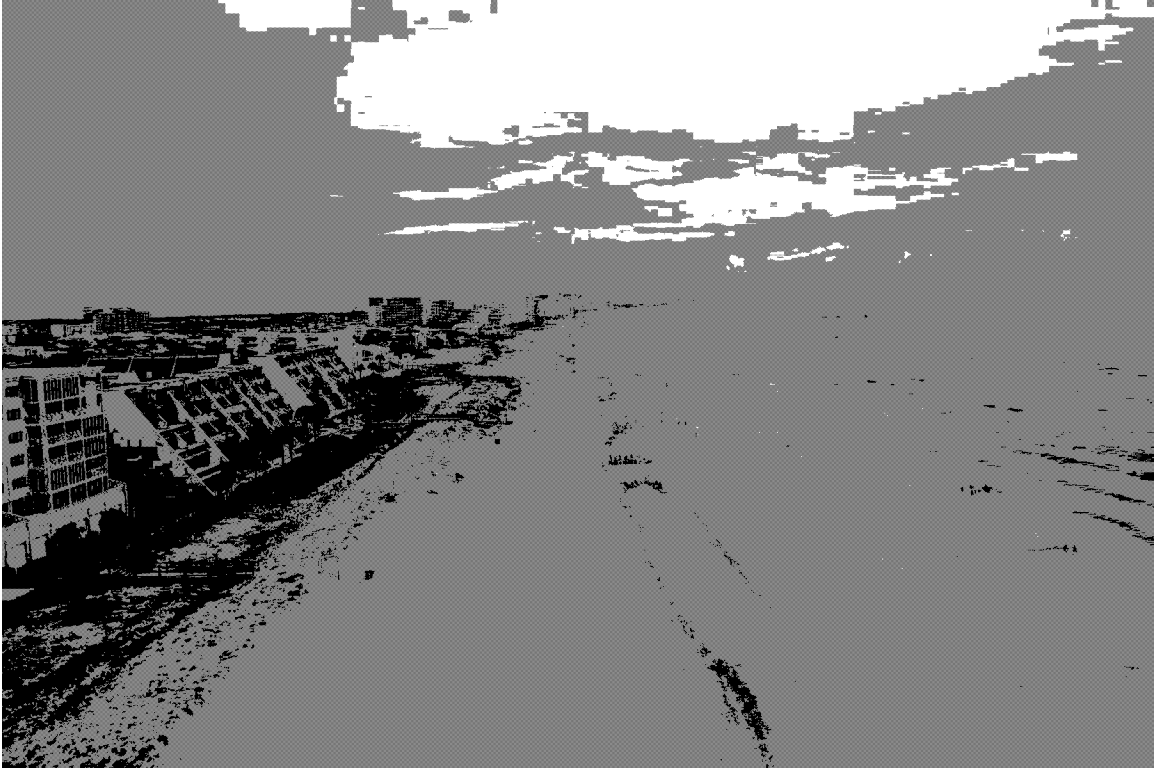


Figure 5: Okaloosa County near R-20 looking East (6/29/2022)



Figure 6: Okaloosa County near R-20 looking West (6/29/2022)



Figure 7: Okaloosa County near R-23 looking East (6/29/2022)

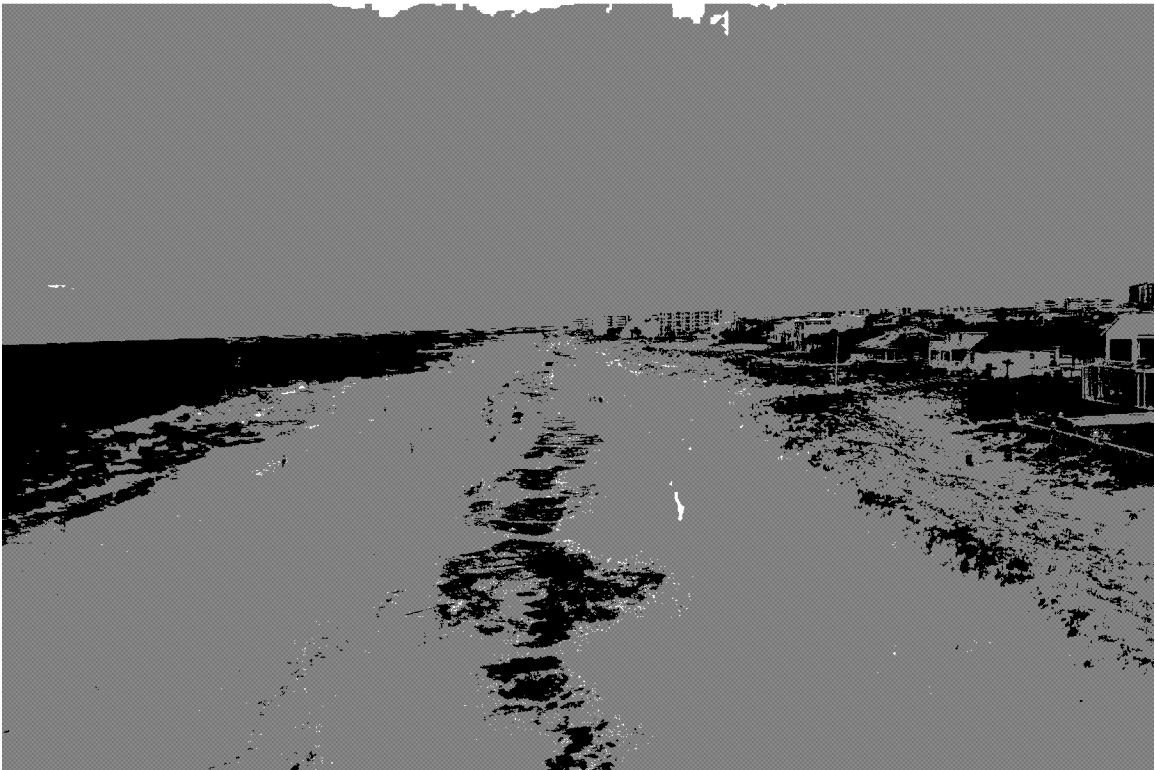


Figure 8: Okaloosa County near R-23 looking West (6/29/2022)



Figure 9: Okaloosa County near R-24 looking East (6/29/2022)



Figure 10: Okaloosa County near R-24 looking West (6/29/2022)



Figure 11: Okaloosa County near R-25 looking East (6/29/2022)

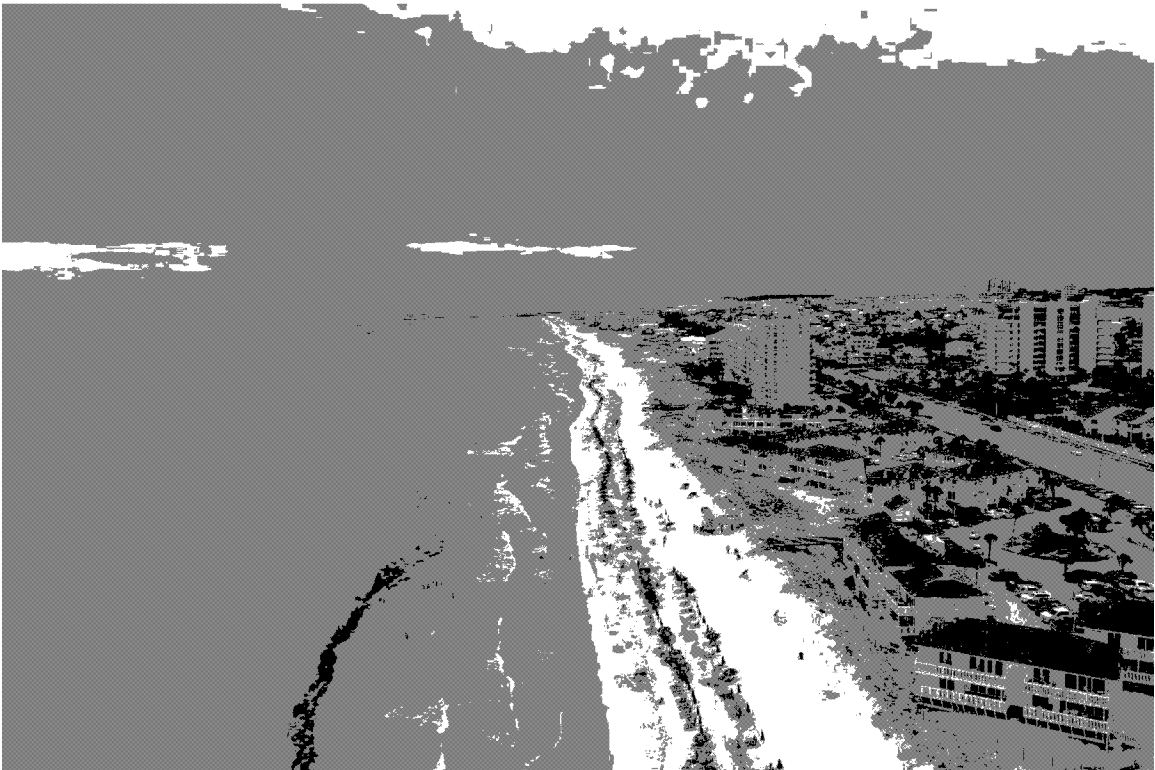


Figure 12: Okaloosa County near R-25 looking West (6/29/2022)



Figure 13: Okaloosa County near R-28 looking East (6/29/2022)



Figure 14: Okaloosa County near R-28 looking West (6/29/2022)



Figure 15: Okaloosa County near R-30 looking East (6/29/2022)



Figure 16: Okaloosa County near R-30 looking West (6/29/2022)

APPENDIX D

Total Beach Volume Change Excluding Ebb Shoal at R-17

Table D.1 Total Beach Volume Change

Vertical Compartments		2013 Pre-Const. - 2022 9-Yr Post-Const.	2013 Post-Const. - 2022 9-Yr Post-Const.	2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.	2020 Post-Storm - 2022 9-Yr Post-Const.
		Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022
		cy/ft	cy	cy/ft	cy
Reach 1¹	Dune to MHW	197,900	-68,100	-40,400	-9,100
	MHW to MLW	18,500	-18,900	-14,500	-6,300
	MLW to -20 ft-NAVD	130,900	-74,500	-96,500	-86,200
	-20 to -30 ft-NAVD	-21,600	-47,100	2,600	10,200
	-30 to -50 ft-NAVD	45,300	28,500	29,600	33,500
Sum Above -20 ft-NAVD		347,300	-161,500	-151,400	-101,600
Sum Above -30 ft-NAVD		325,700	-208,600	-148,800	-91,400
Sum Above -50 ft-NAVD		371,000	-180,100	-119,200	-57,900
Gap	Dune to MHW	47,000	41,900	-4,100	8,300
	MHW to MLW	5,400	3,300	-2,100	300
	MLW to -20 ft-NAVD	103,300	64,400	49,400	5,900
	-20 to -30 ft-NAVD	-57,800	-66,400	-12,600	-1,700
	-30 to -50 ft-NAVD	-400	-800	8,100	15,400
Sum Above -20 ft-NAVD		155,700	109,600	43,200	14,500
Sum Above -30 ft-NAVD		97,900	43,200	30,600	12,800
Sum Above -50 ft-NAVD		97,500	42,400	38,700	28,200
Reach 2	Dune to MHW	33,300	-47,100	-15,100	6,700
	MHW to MLW	3,800	-8,500	-2,000	4,700
	MLW to -20 ft-NAVD	80,800	13,500	17,800	-6,500
	-20 to -30 ft-NAVD	-41,100	-47,100	-7,600	-900
	-30 to -50 ft-NAVD	6,300	-3,300	8,800	9,300
Sum Above -20 ft-NAVD		117,900	-42,100	700	4,900
Sum Above -30 ft-NAVD		76,800	-89,200	-6,900	4,000
Sum Above -50 ft-NAVD		83,100	-92,500	1,900	13,300

Vertical Compartments		2013 Pre-Const. - 2022 9-Yr Post-Const.	2013 Post-Const. - 2022 9-Yr Post-Const.	2020 7-Yr Post-Const. - 2022 9-Yr Post-Const.	2020 Post-Storm - 2022 9-Yr Post-Const.
		Jan 2013 - Jun 2022	Mar 2013 - Jun 2022	Jul 2020 - Jun 2022	Nov 2020 - Jun 2022
		cy/ft	cy	cy/ft	cy
East Control Area	Dune to MHW	13,400	43,000	2,200	30,500
	MHW to MLW	1,500	-1,900	-3,700	6,900
	MLW to -20 ft-NAVD	5,300	91,300	79,500	6,900
	-20 to -30 ft-NAVD	-22,300	-95,900	-1,800	-5,700
	-30 to -50 ft-NAVD	1,700	6,100	30,000	25,200
Sum Above -20 ft-NAVD		20,200	132,400	78,000	44,300
Sum Above -30 ft-NAVD		-2,100	36,500	76,200	38,600
Sum Above -50 ft-NAVD		-400	42,600	106,200	63,800
Total	Dune to MHW	291,600	-30,300	-57,400	36,400
	MHW to MLW	29,200	-26,000	-22,300	5,600
	MLW to -20 ft-NAVD	320,300	94,700	50,200	-79,900
	-20 to -30 ft-NAVD	-142,800	-256,500	-19,400	1,900
	-30 to -50 ft-NAVD	52,900	30,500	76,500	83,400
Sum Above -20 ft-NAVD		641,100	38,400	-29,500	-37,900
Sum Above -30 ft-NAVD		498,300	-218,100	-48,900	-36,000
Sum Above -50 ft-NAVD		551,200	-187,600	27,600	47,400

¹Volume changes exclude ebb shoal changes at R-17 (~1,200 to 3,500 ft offshore)