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Delivering Leading-edge Solutions

The Turtle-Friendly Beach Project
Profile Equilibration in Traditional vs. Turtle-Friendly Cells

February 12, 2014

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Overview

- Introduction
- Project background
- Construction details
- Equilibration
  - Traditional
  - Turtle-friendly

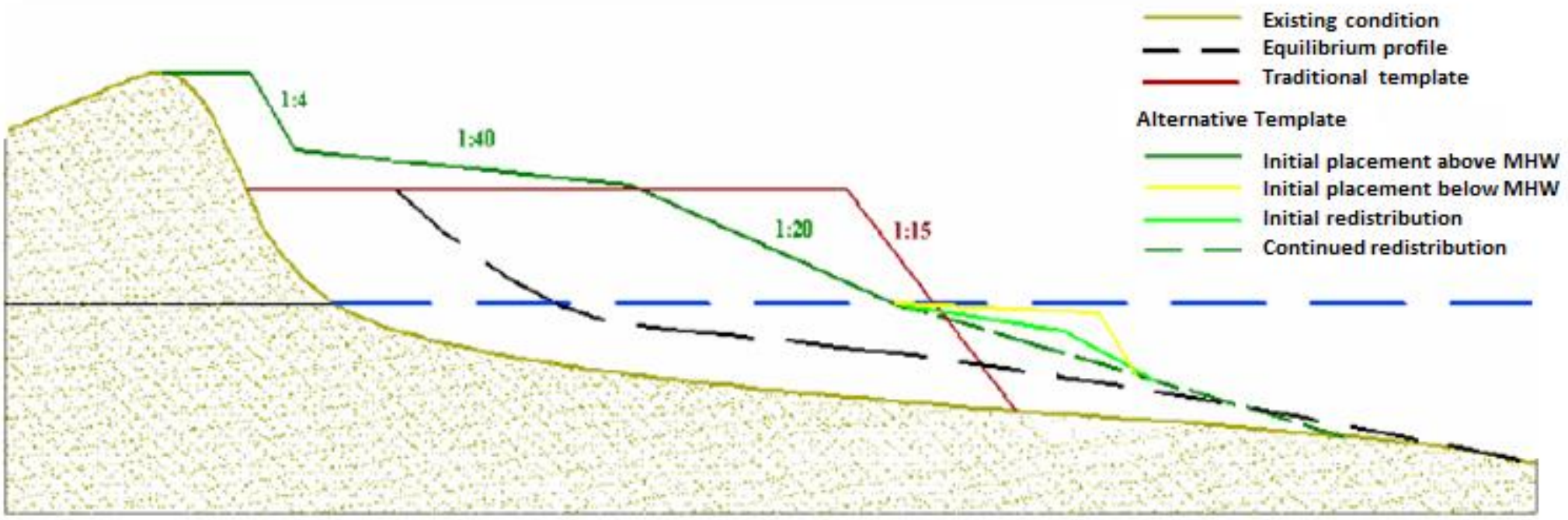
Introduction

- Noted decrease in sea turtle nesting within first year post-construction in beach nourishment
- FDEP 2007 study – key variables?
  - Borrow area sediment properties
  - Construction template
- Lack of data, large number of variables
  - Indication that large, flat berm negatively correlates to nesting success

Introduction

- Study recommendation – design and implement "turtle-friendly" construction template
- Closely approximate equilibrated beach slope
  - Specs should vary based on native beach characteristics
  - Native beach slope while including equivalent fill quantity
  - Resist tendency to induce escarpments and ponding

Introduction

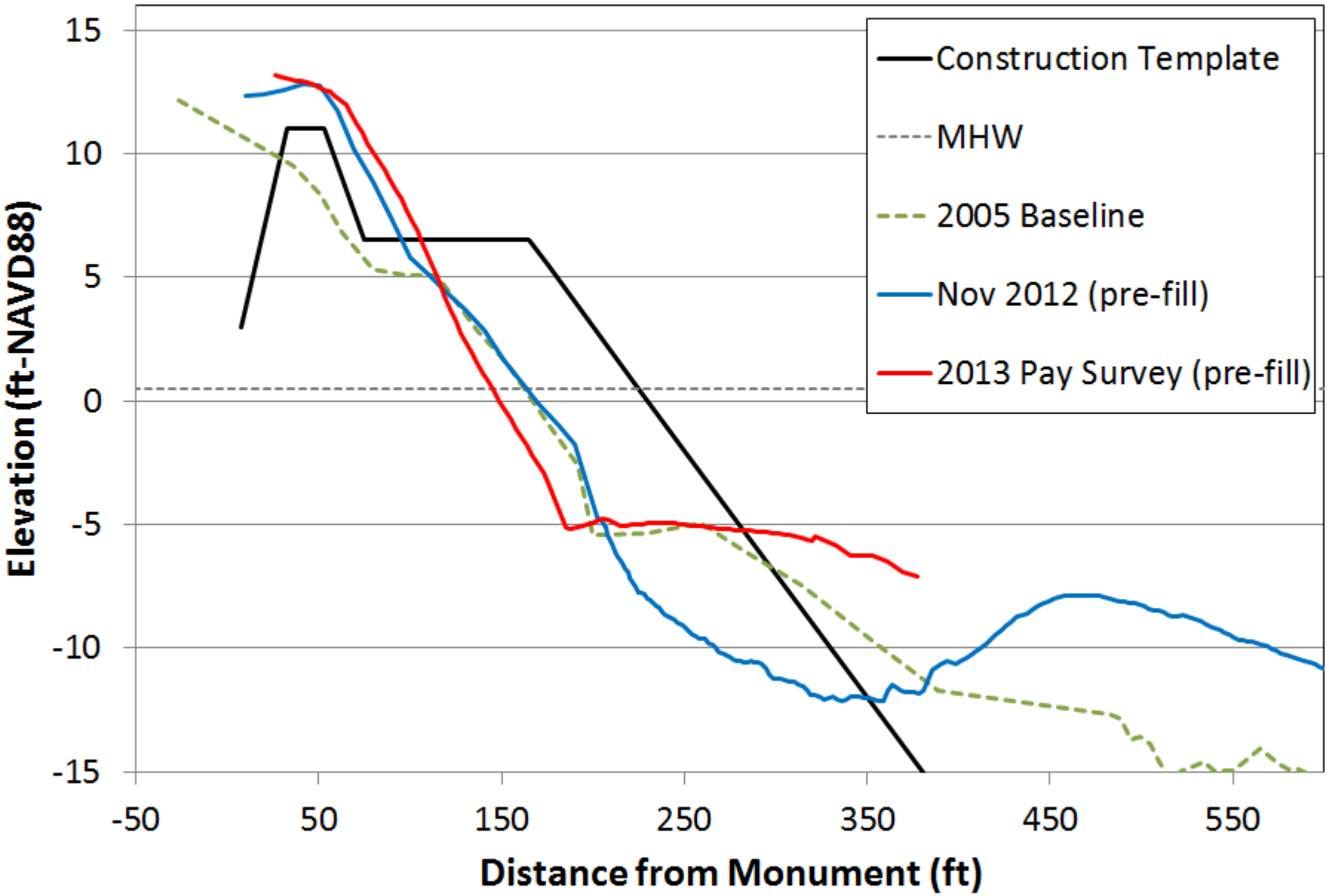


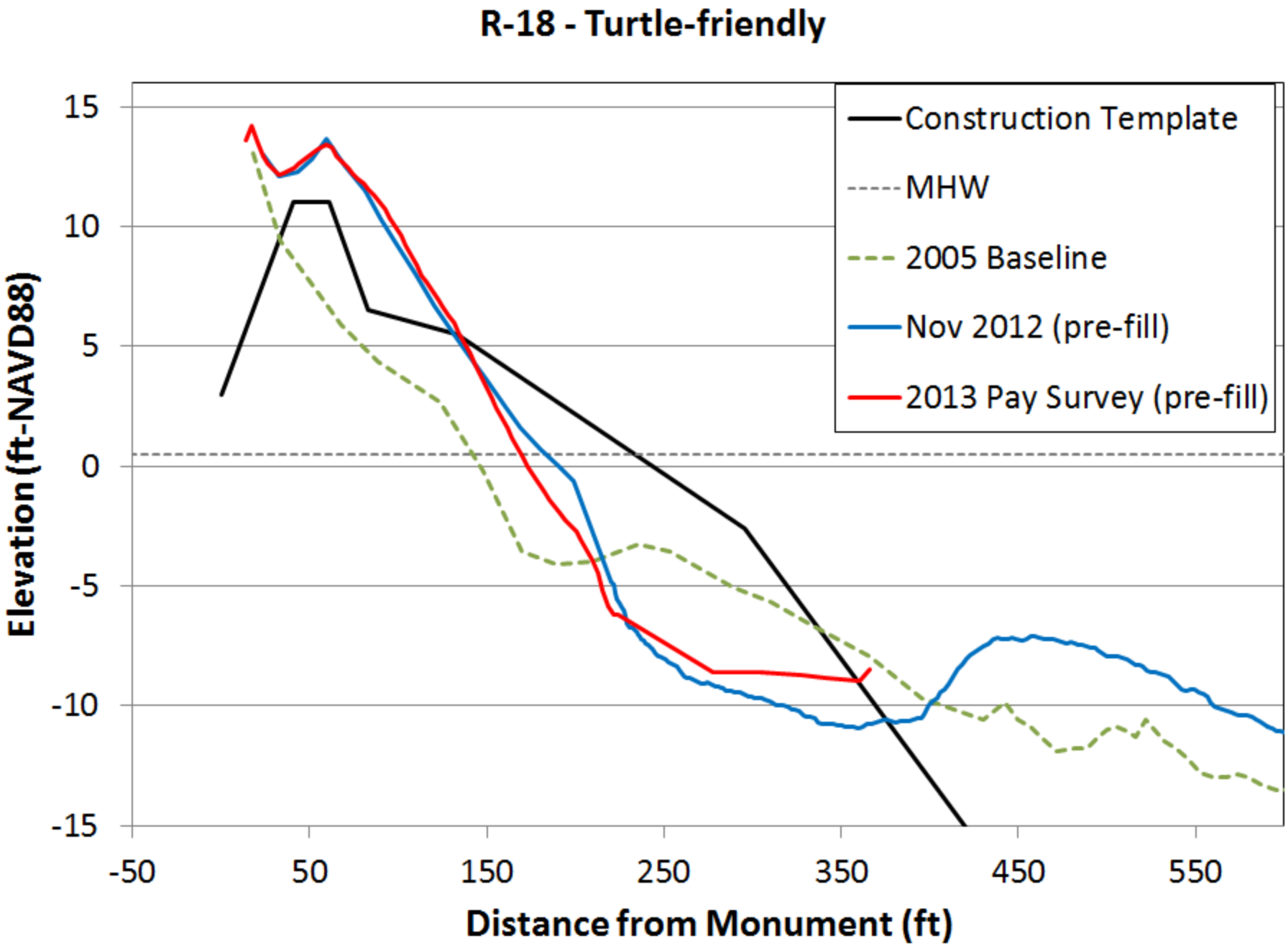
PBS&J 2007

Project background

- 2013 Martin County Shore Protection Project
  - Historical biological monitoring program
  - High nesting density
  - Sufficient project length

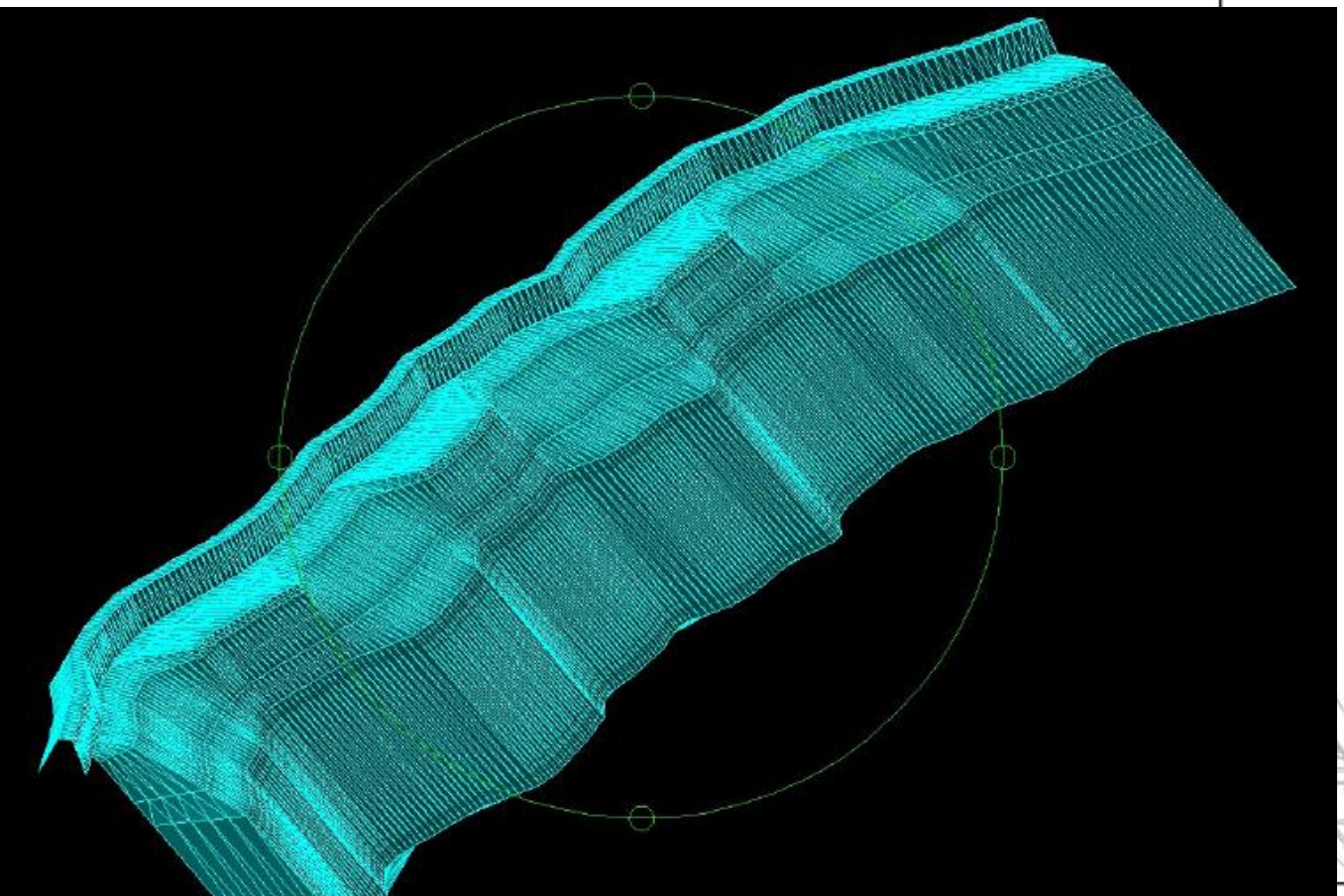
R-14 - Traditional

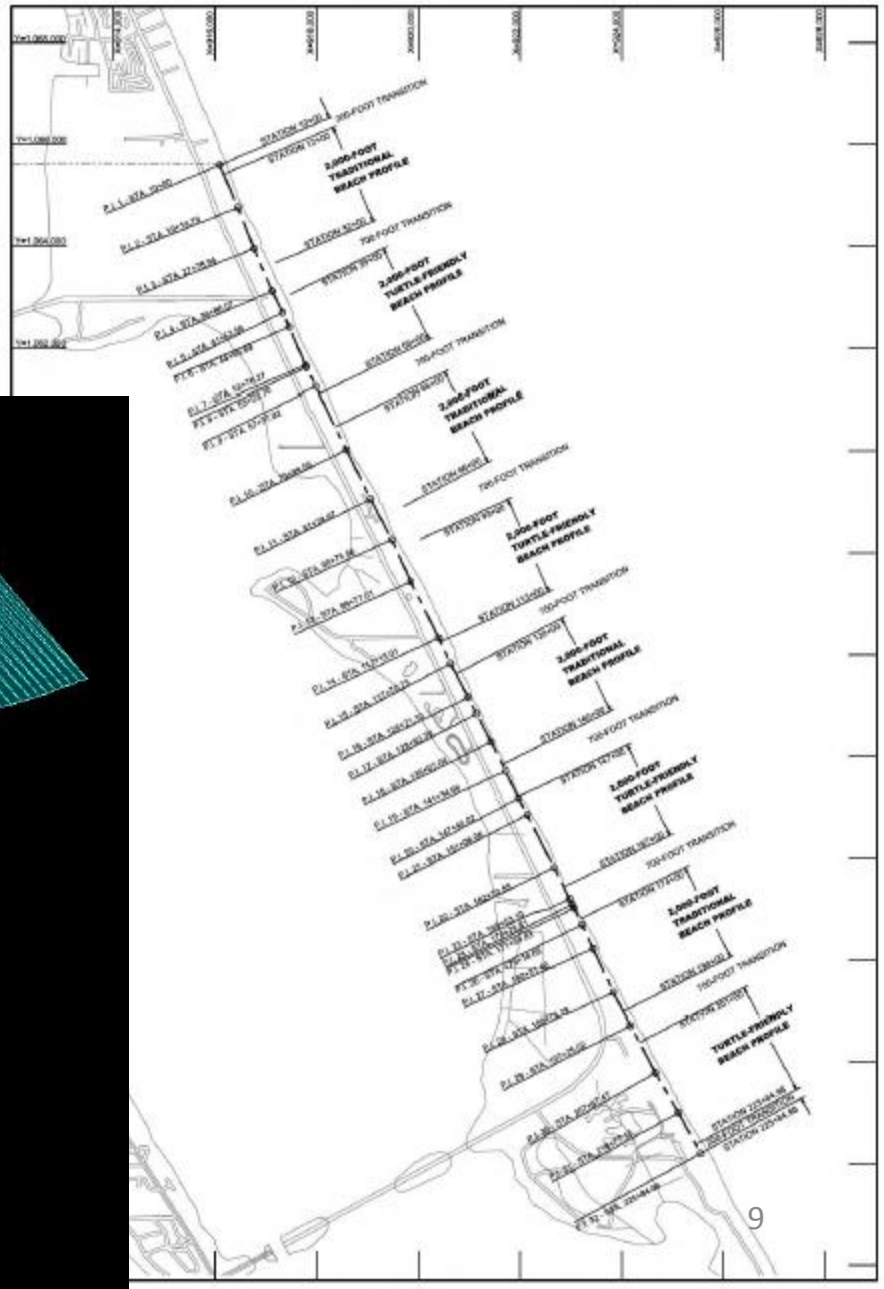



R-18 - Turtle-friendly
Construction Template
MHW
2005 Baseline
Nov 2012 (pre-fill)
2013 Pay Survey (pre-fill)
Elevation (ft-NAVD88)
15
10
5
0
-5
-10
-15
-50
50
150
250
350
450
550
Distance from Monument (ft)

Project background

- 2,000-ft alternating cells
- 700 ft transition zones

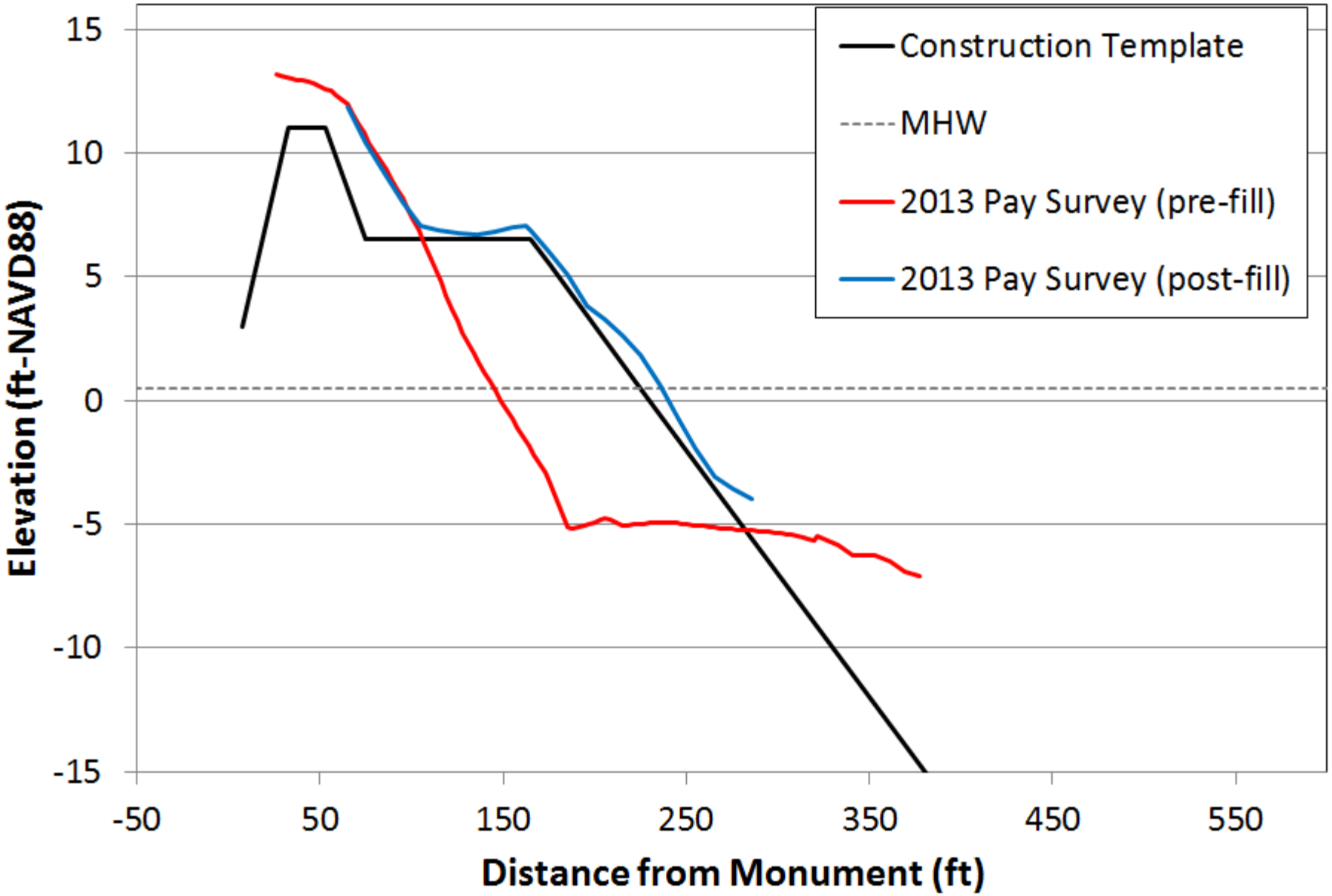




Construction details

- March 26 – April 24, 2013
- Fill requirements varied alongshore
- Concurrent project in St. Lucie County
- Daily post-construction monitoring
  - Escarpments
  - Nesting

R-14 - Traditional



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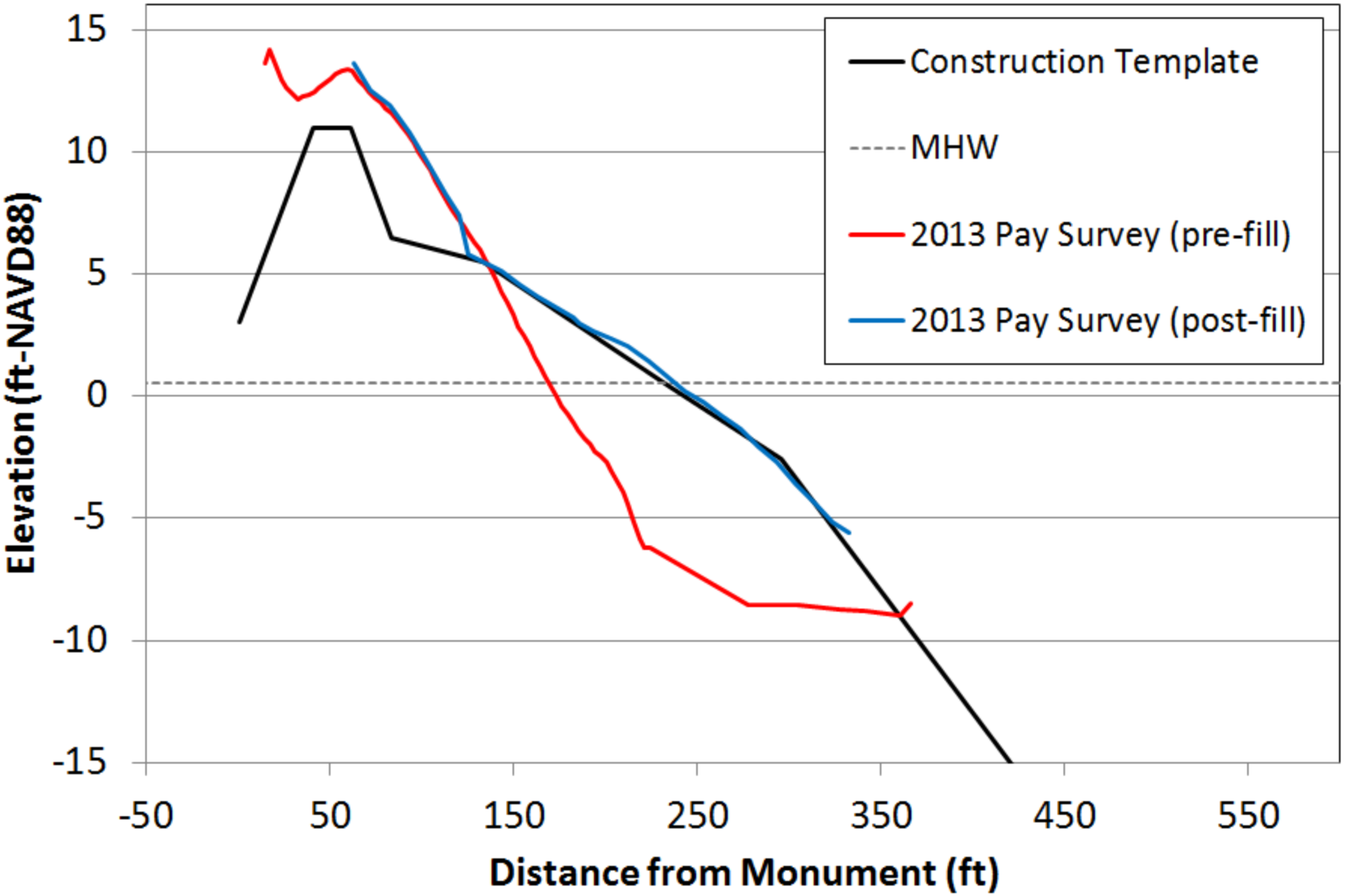


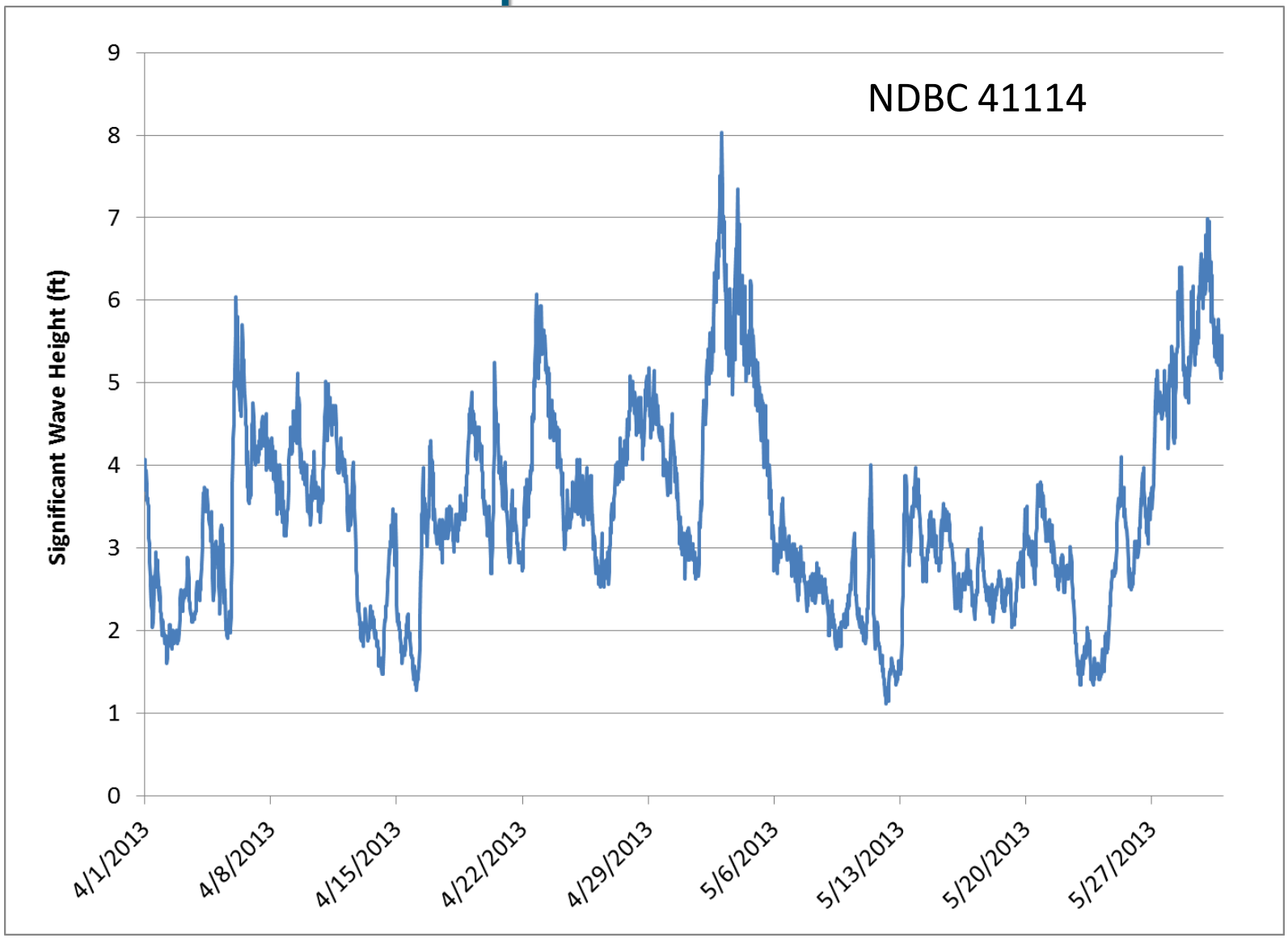
Construction details

- "Constructability" from GLDD
  - Increased losses at template inflection points
    - Longer cells preferred
    - Minimize transition zone length
  - Sloped berms and transition zones require additional survey crew and RTK dozer resources
  - Relatively narrow berm width contributed to challenge
  - But…no major problems

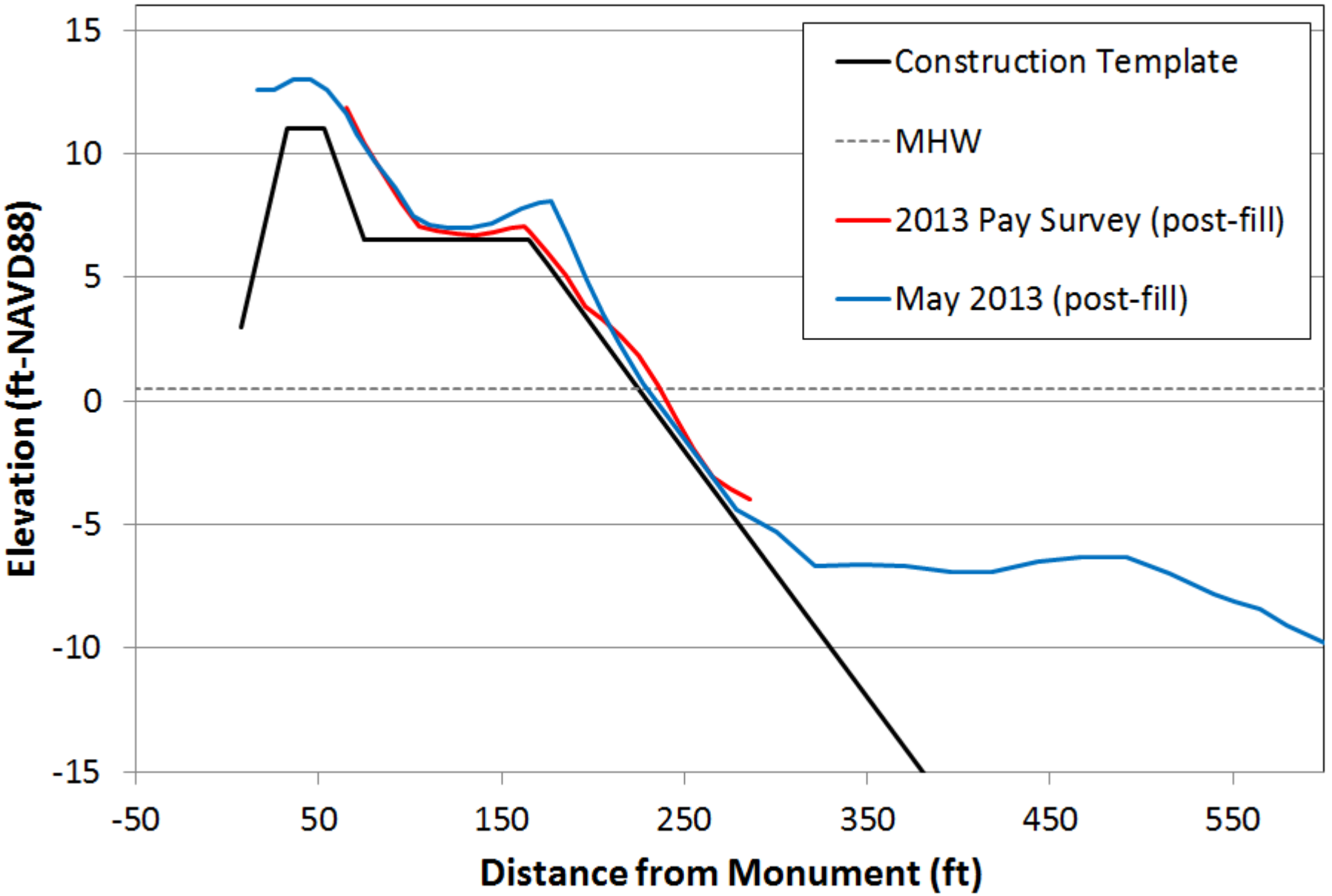
Equilibration

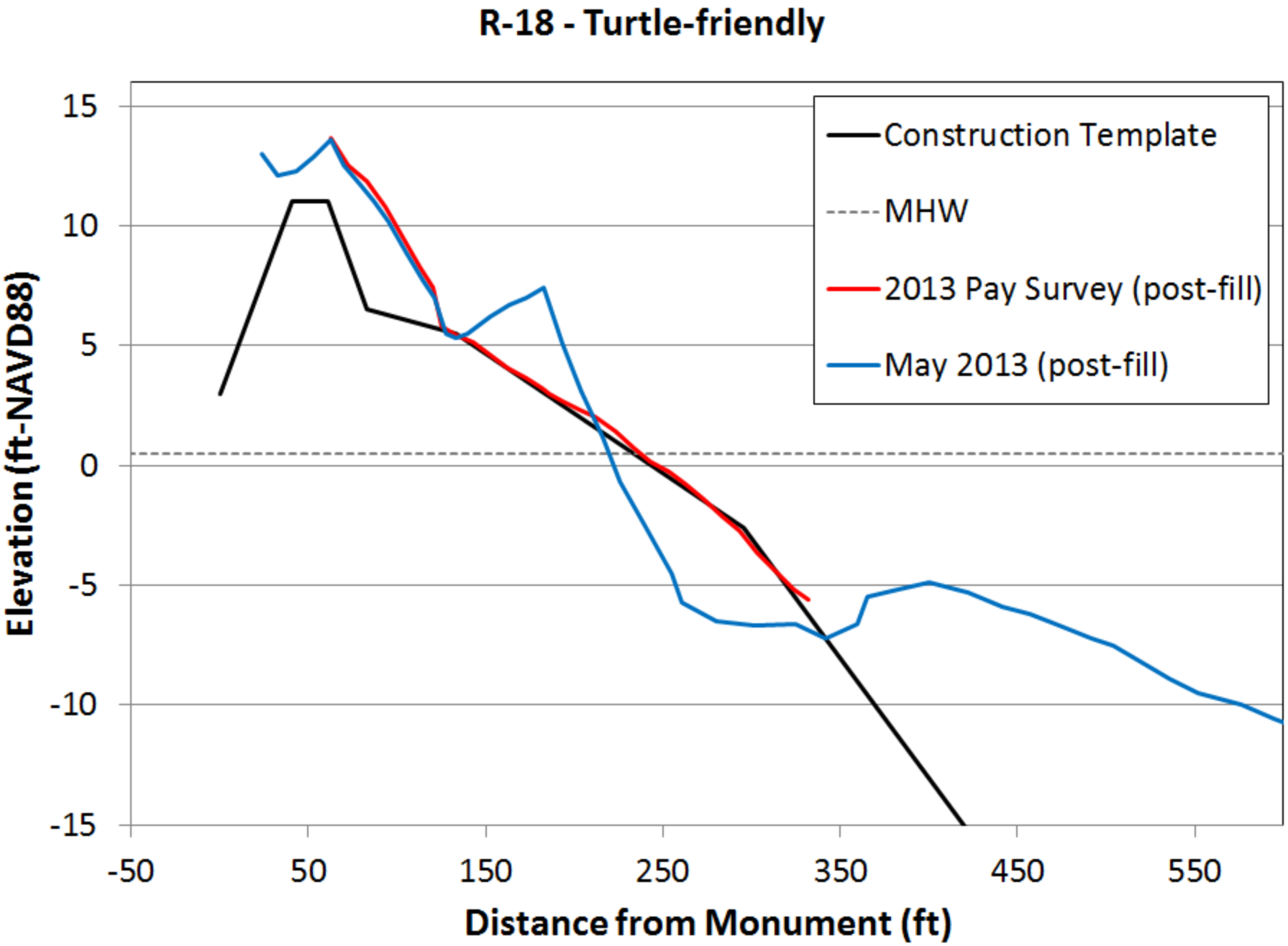
- Comparison between immediate post-construction and May 2013 surveys
- Relationship to historical profiles
- Subaerial beach only

Equilibration



R-14 - Traditional




R-18 - Turtle-friendly
Construction Template
MHW
2013 Pay Survey (post-fill)
May 2013 (post-fill)
Elevation (ft-NAVD88)
15
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150
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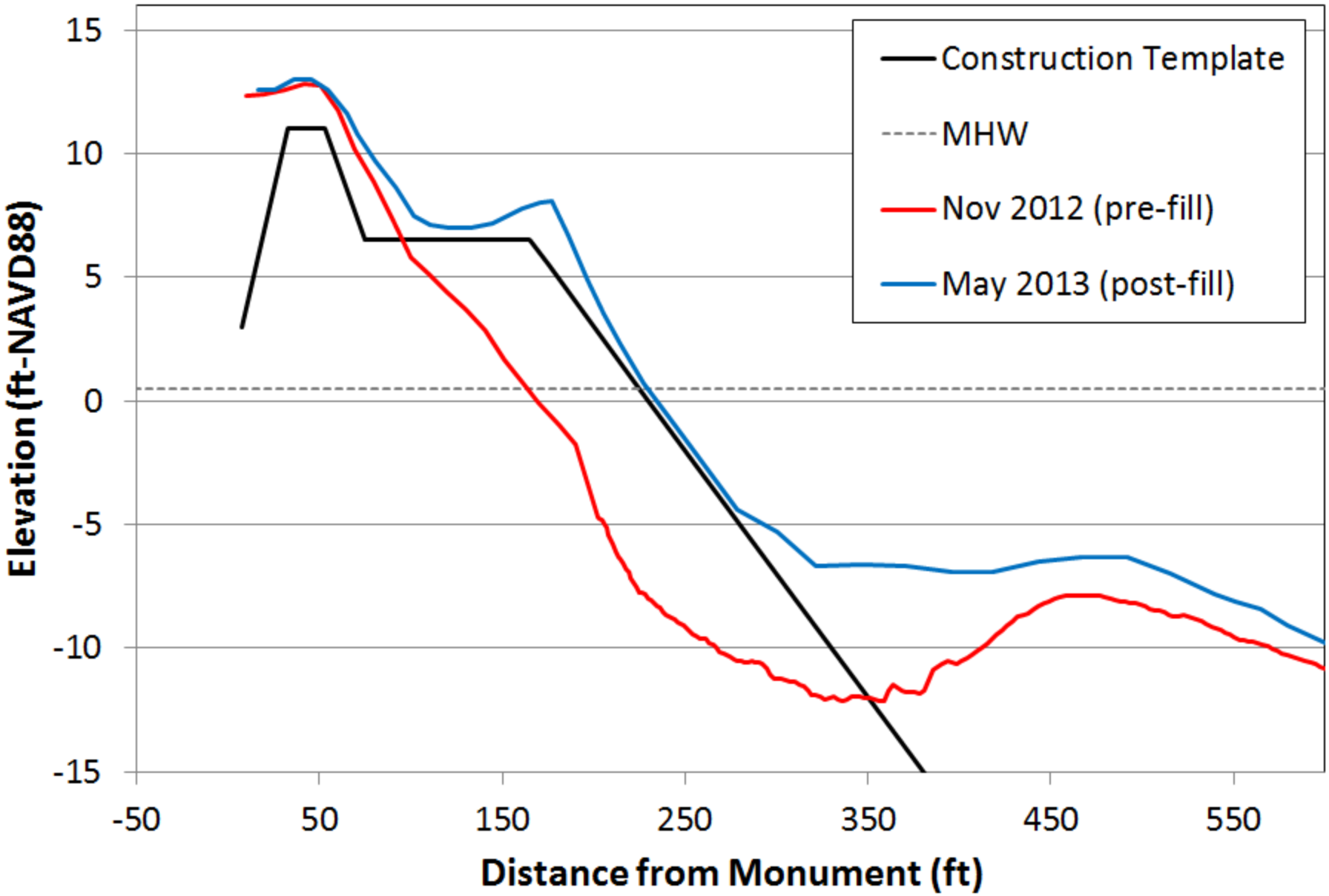
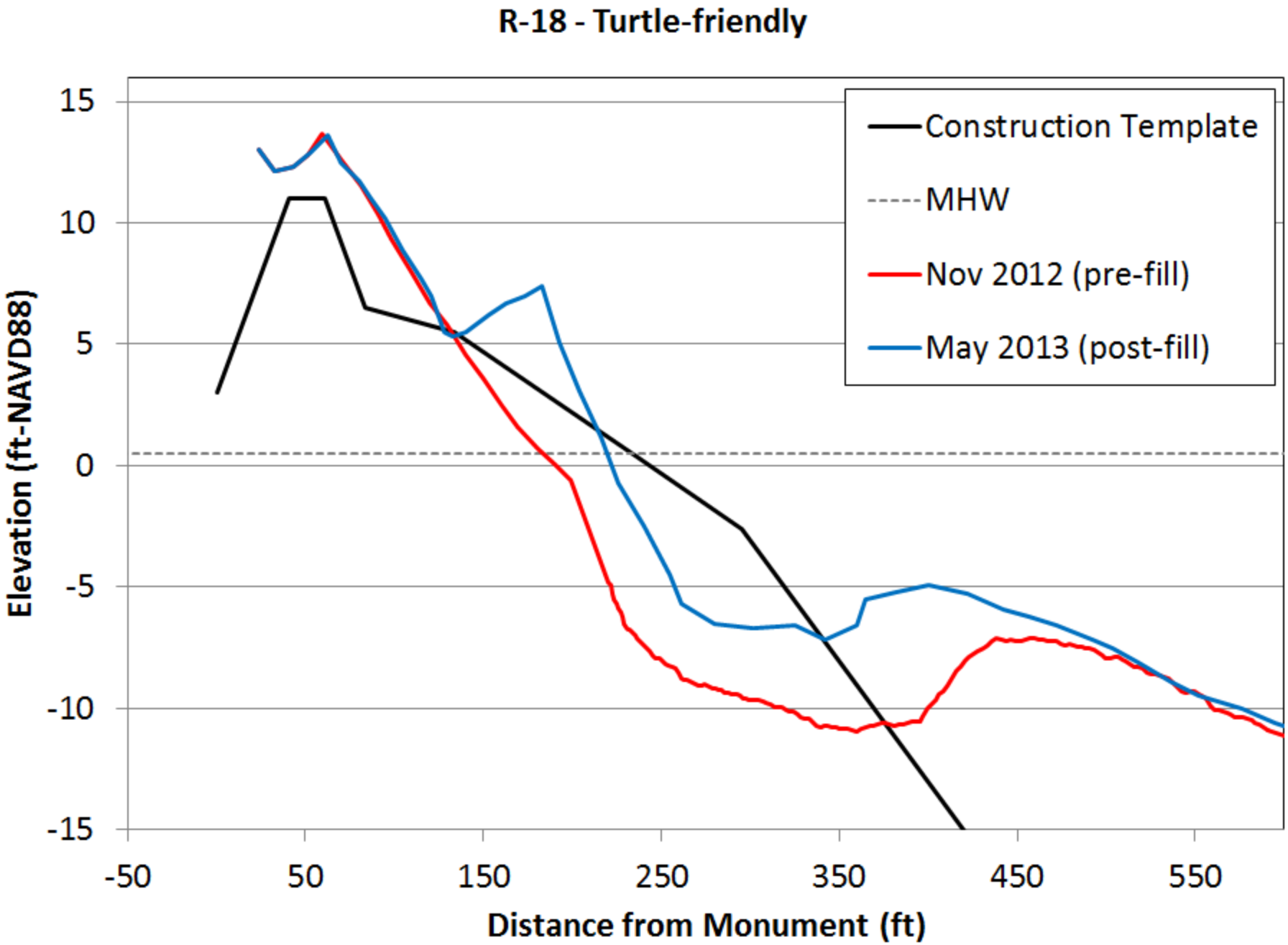
Distance from Monument (ft)

R-14 - Traditional

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Equilibration

Jensen Beach Park
Turtle-friendly cell

Equilibration

- Wave action quickly modified the construction profiles in both templates
- Cross-shore transport resulted in similar equilibrated
  - Widths
  - Slopes
  - Berm elevations