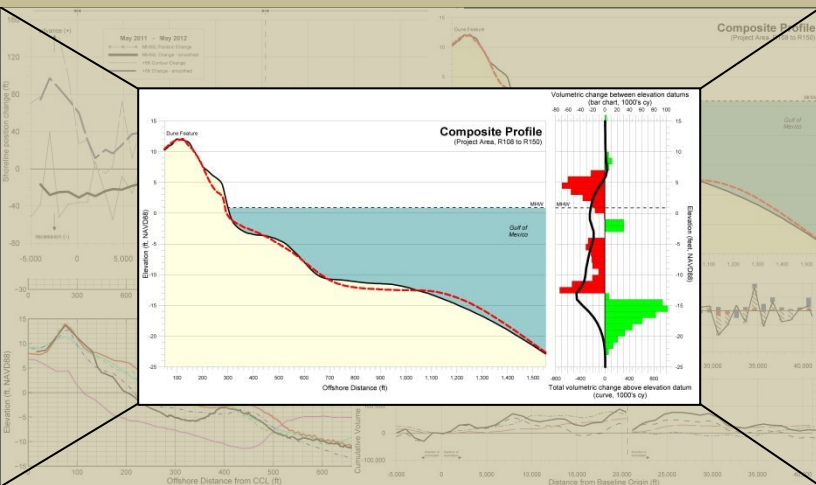


# Detailed Visualization of Project Volume Changes

**Patrick Snyder, P.E.**  
**Albert Browder, Ph.D., P.E.**



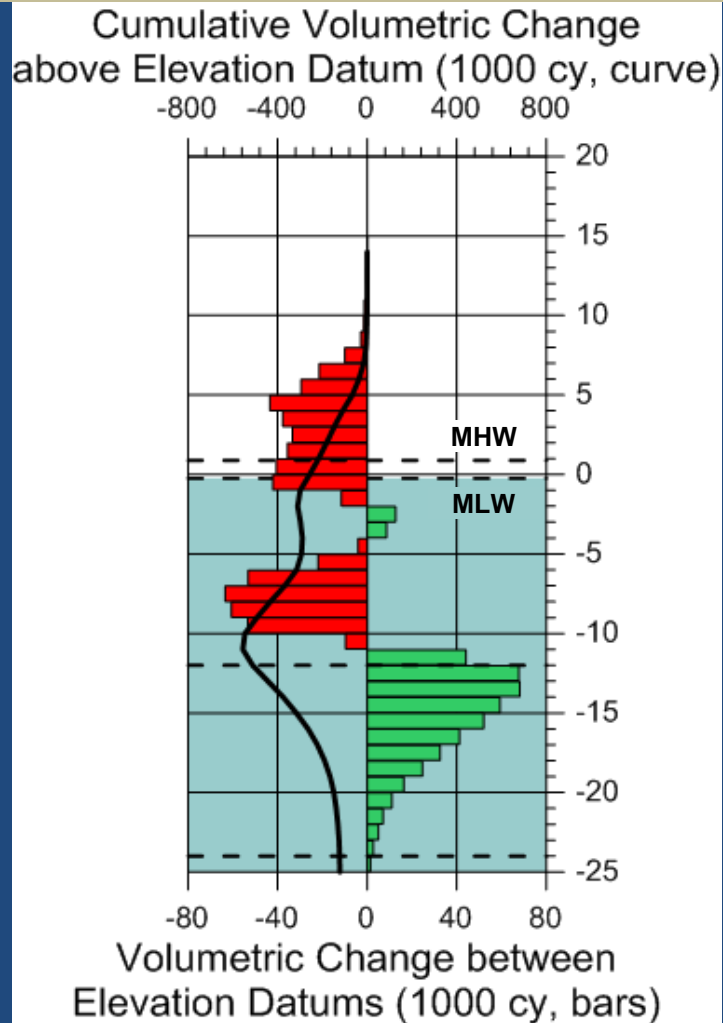
**National Conference on Beach  
Preservation Technology**

**FSBPA**

**February 5, 2015**

**Thursday Morning Session B**

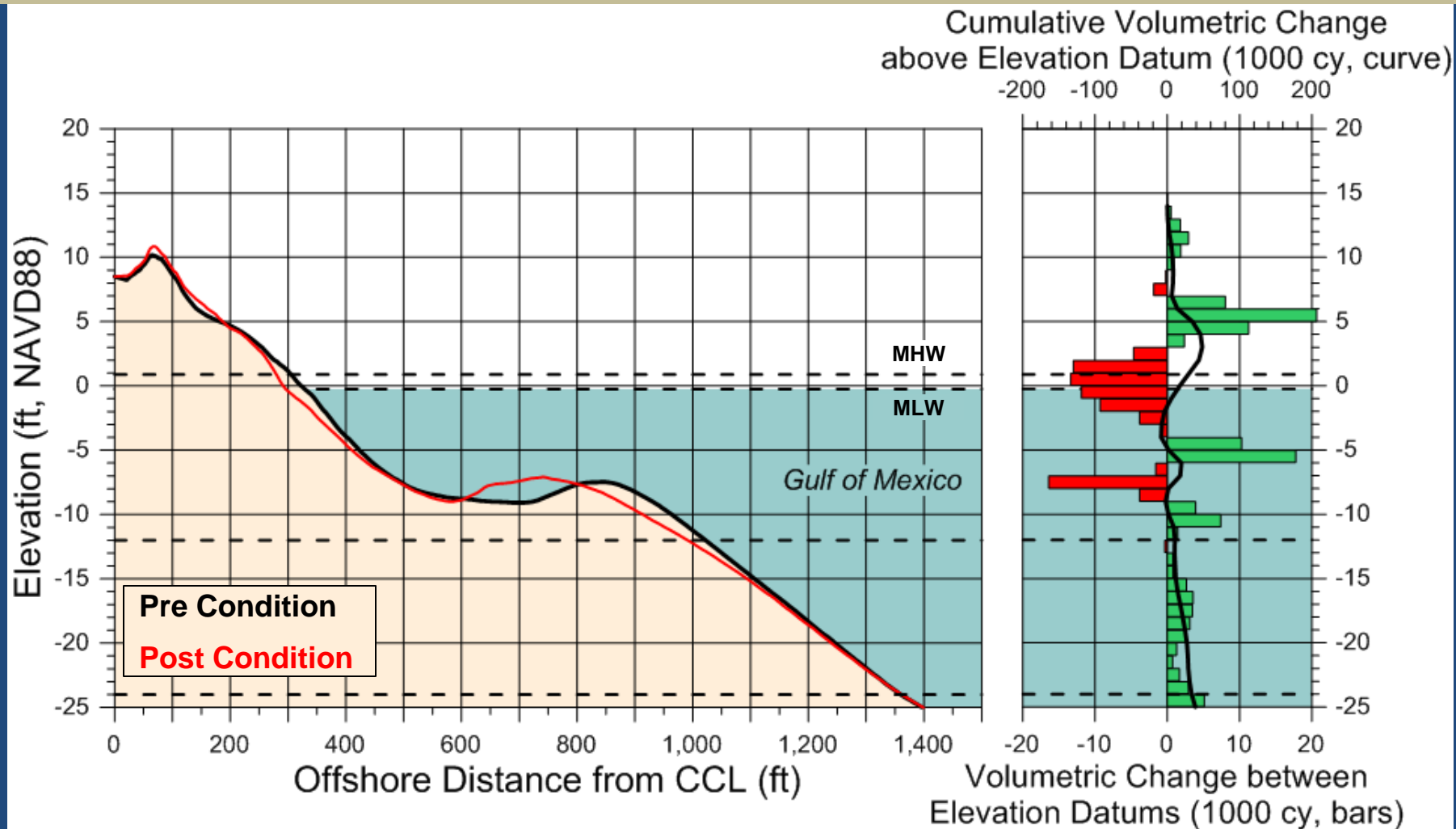
# Detailed Visualization...



## ○ Vertical Distribution of Volume Change

- Incremental Volume  
(between datums)
- Cumulative Volume  
(above datum)
- Depicts general  
shoreline changes
  - island-wide
  - project-wide
  - segment-wide

# Advantages



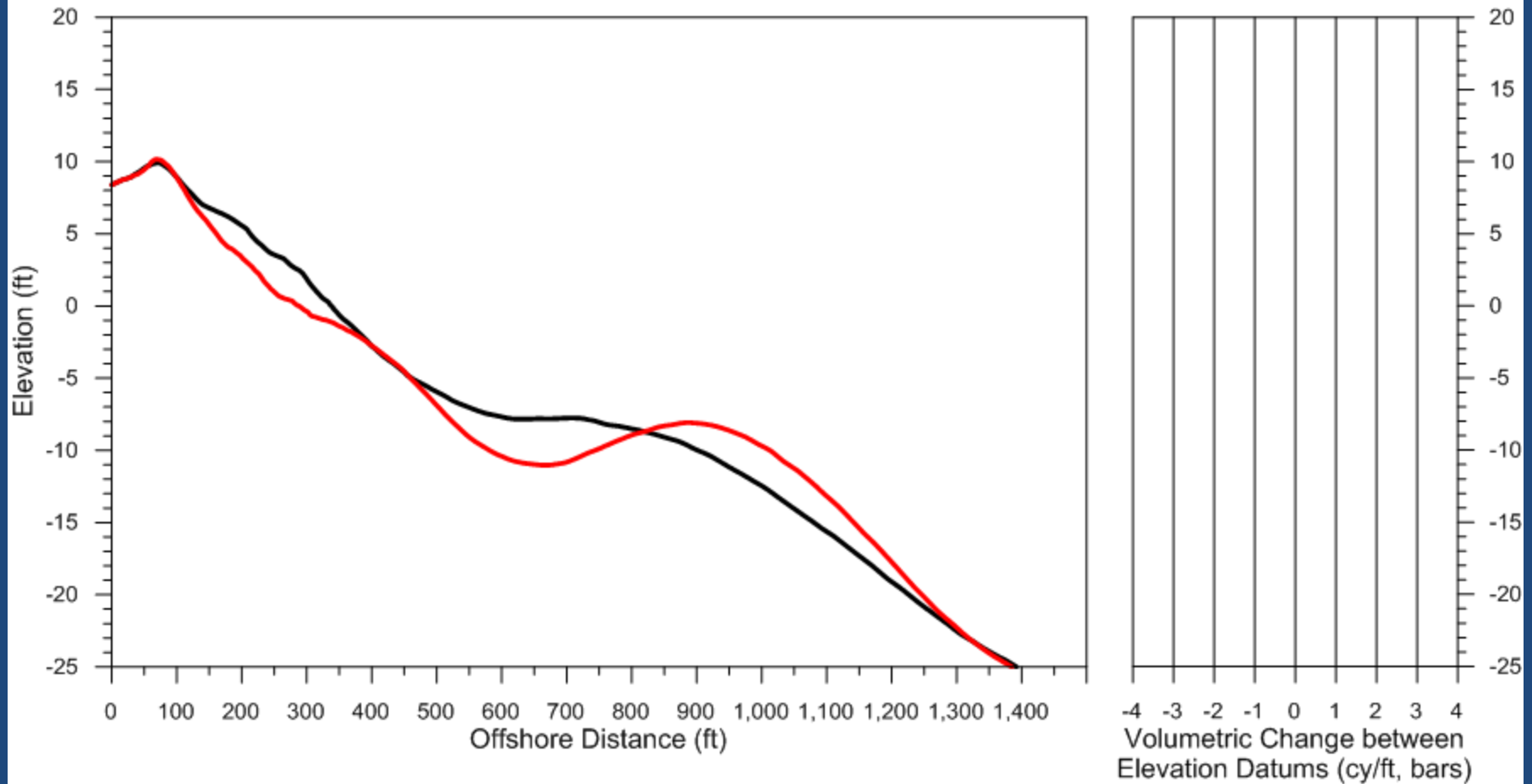
# Uses

- Segment volume change as a function of elevation
- Cross-shore sand transport
- Gross sand transport
- Segment-wide loss/gain
- “Closure” depth
- Indications of survey errors

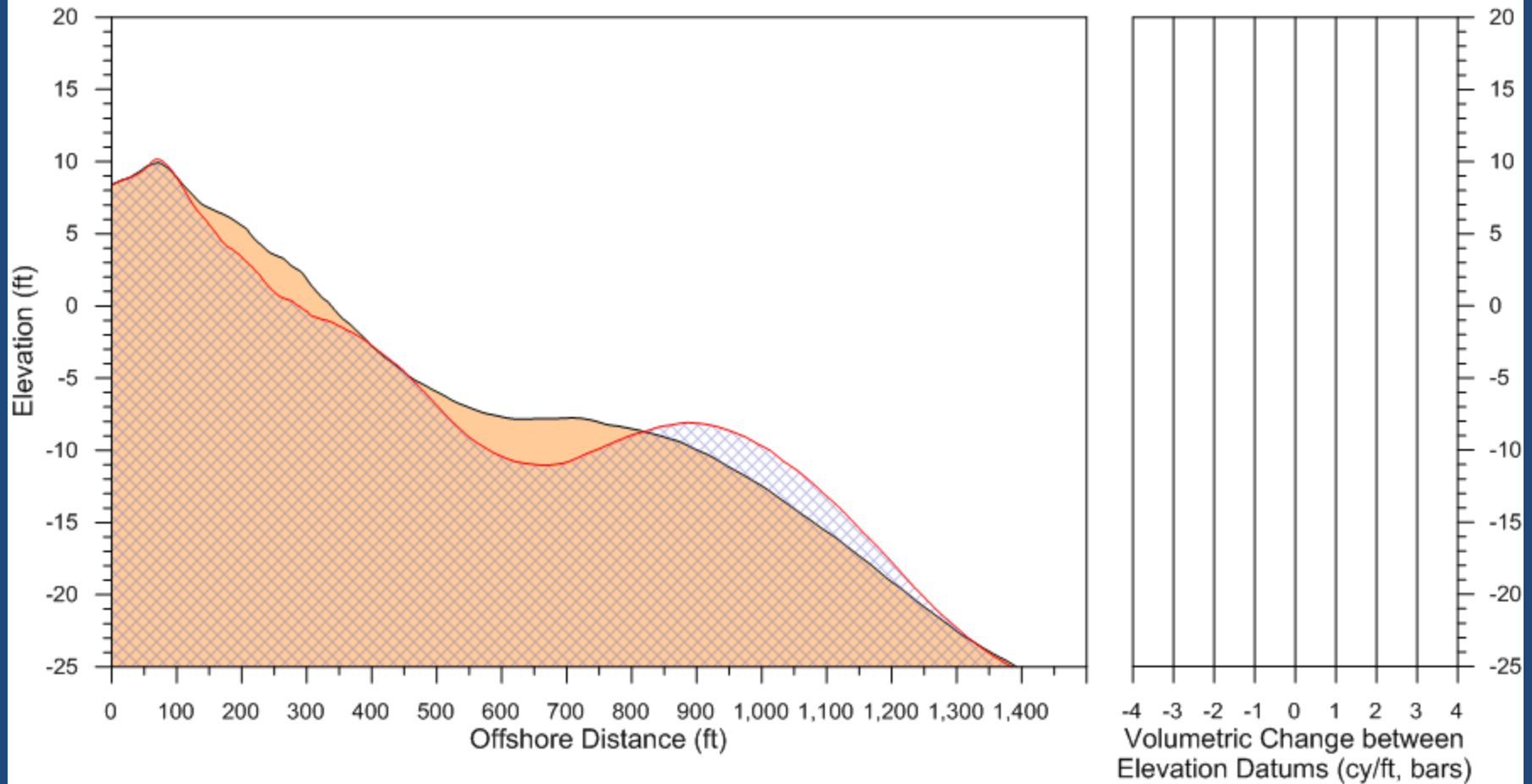
# Methodology

1. Compare two surveys at an individual beach profile transect
2. Incrementally compute volume changes vertically from dune to survey closure
  - High resolution (one-ft increments, typ.)
3. Compute segment-wide or project-wide incremental change
  - Average end-area

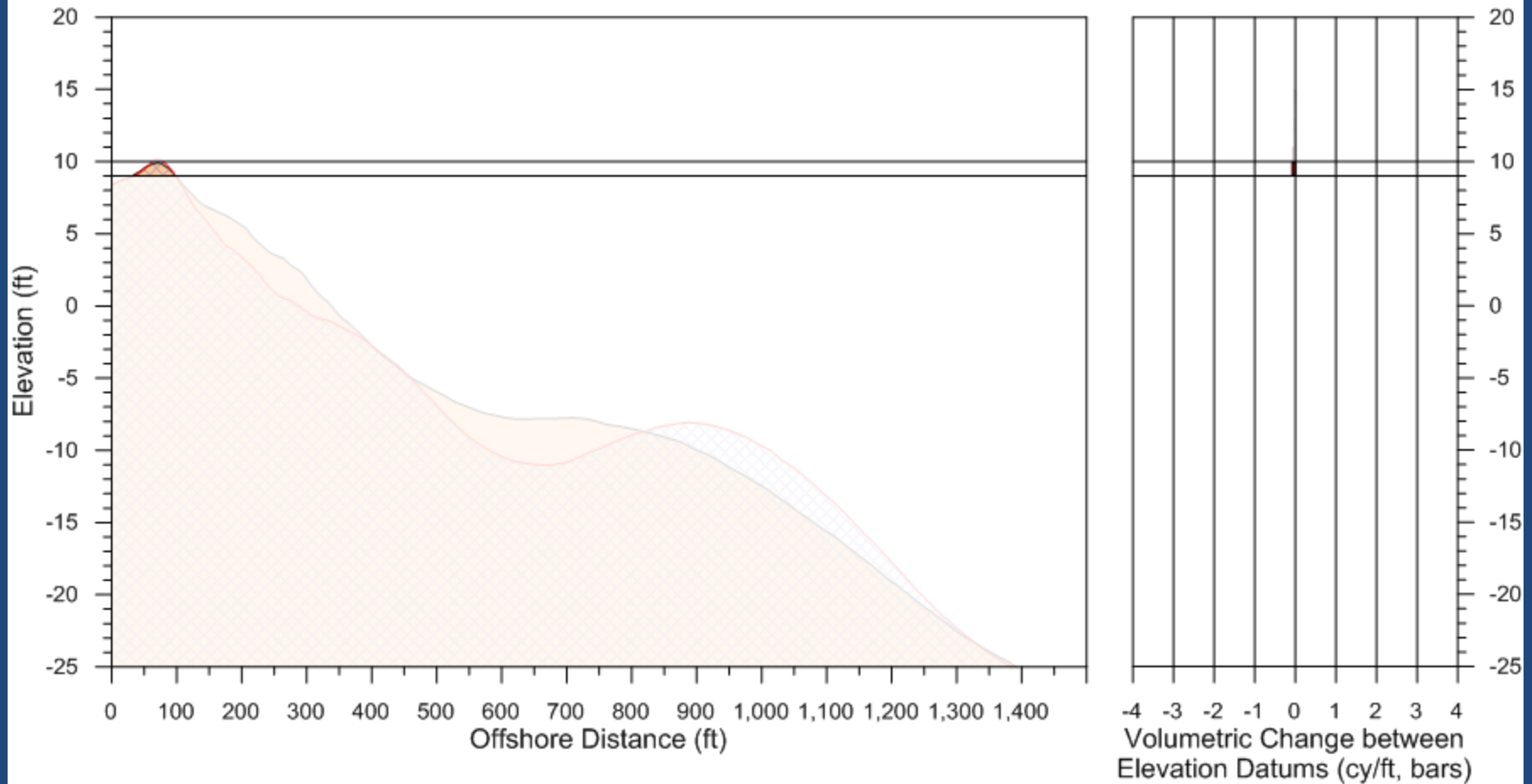
# Methodology



# Methodology

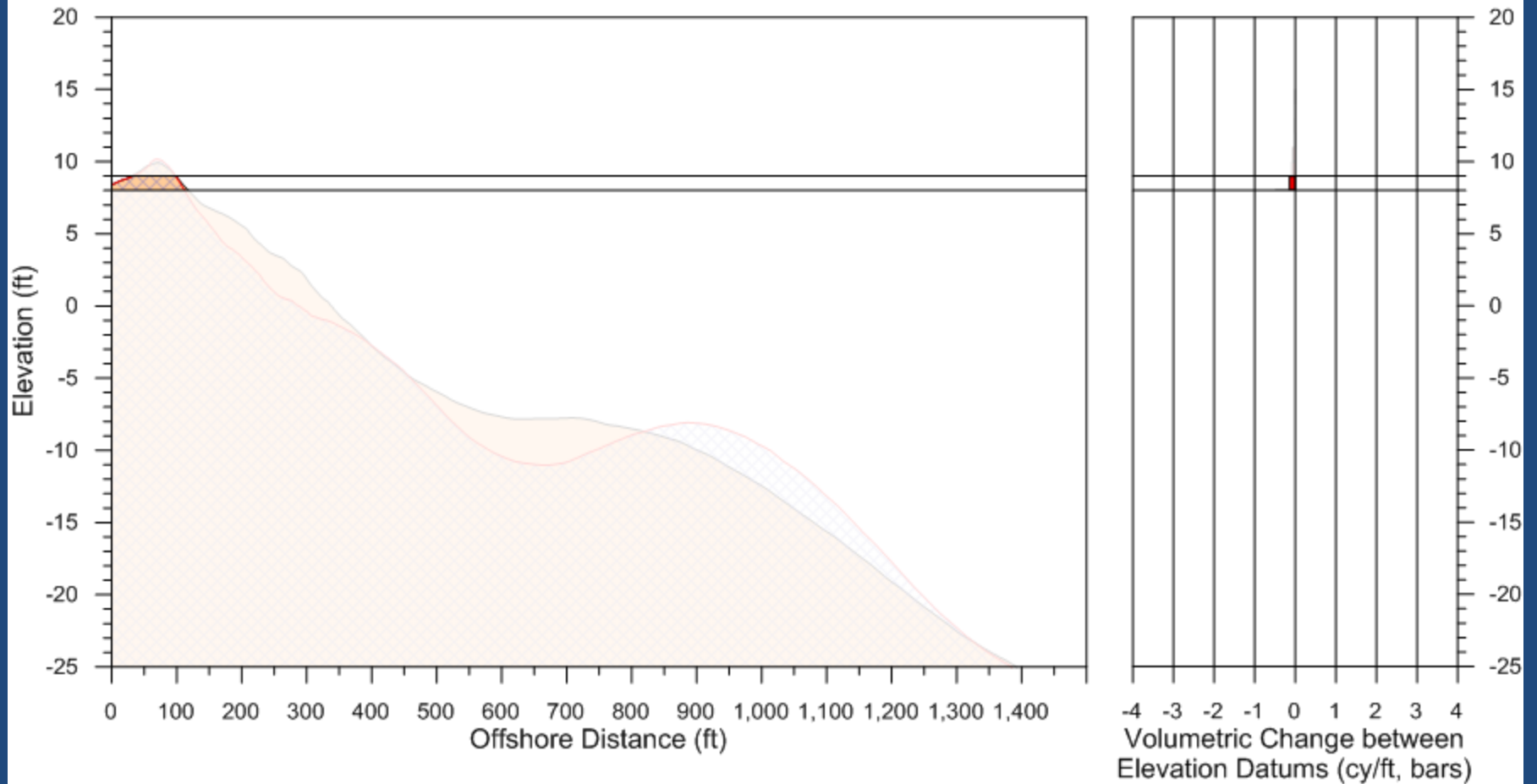


# Methodology

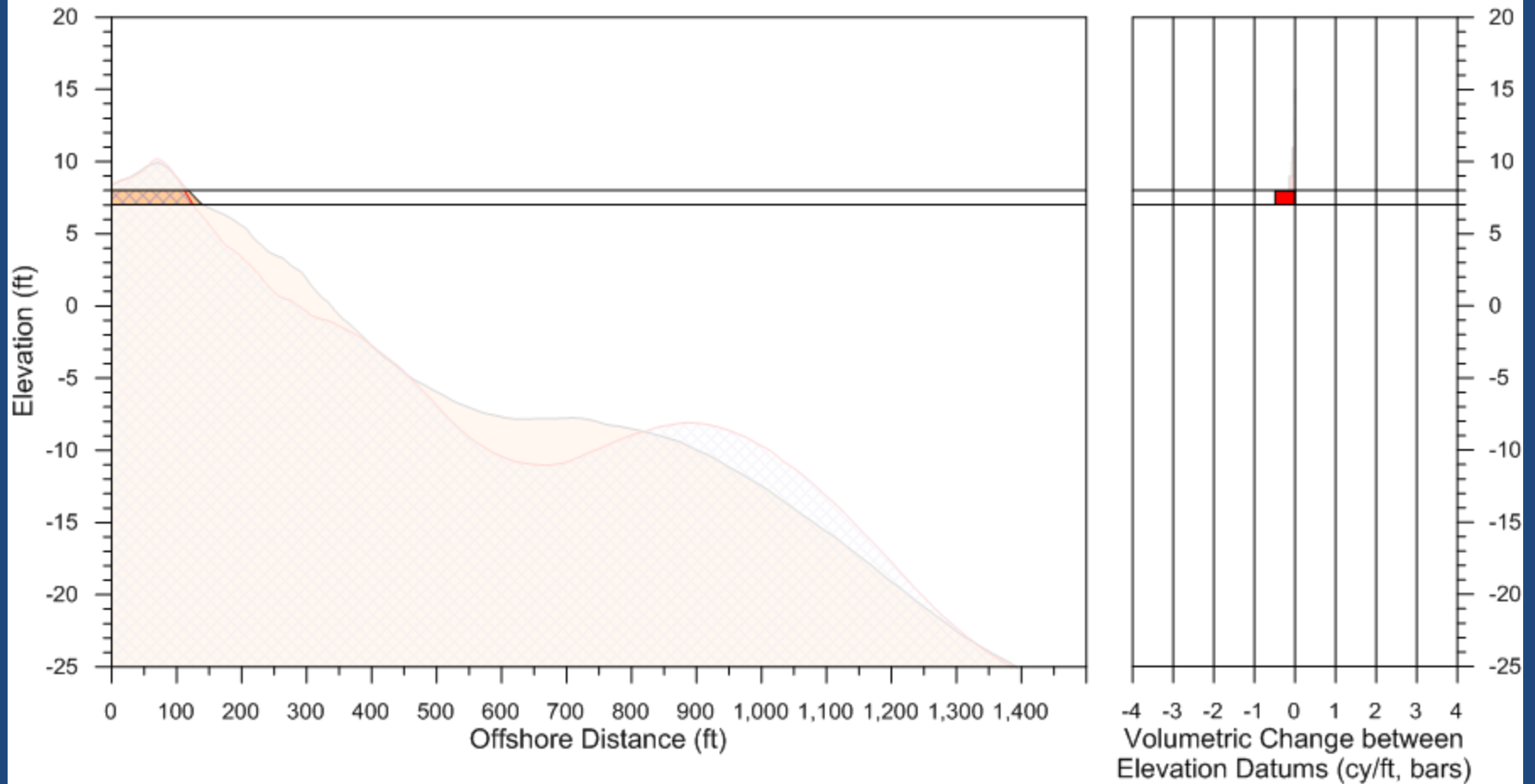




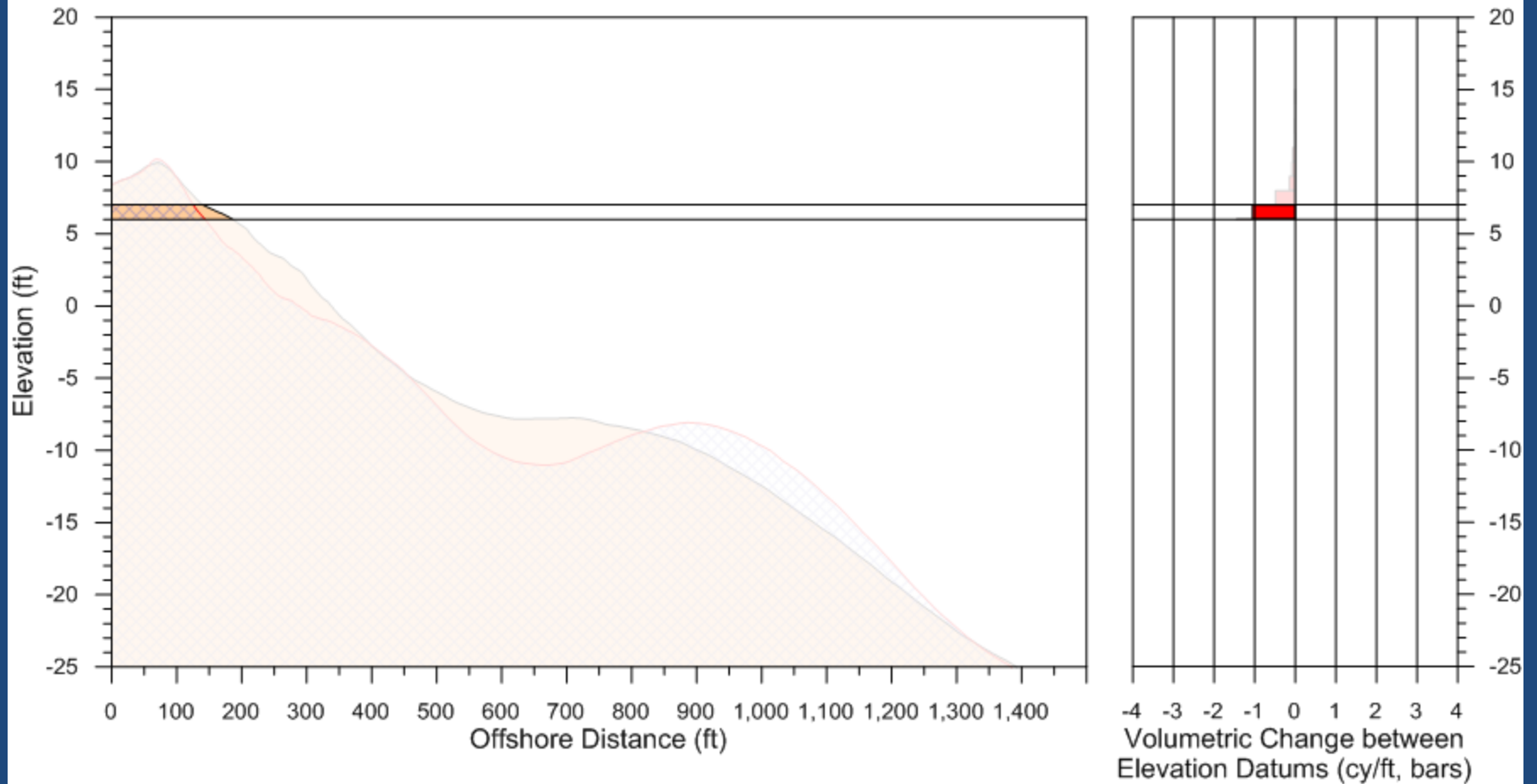
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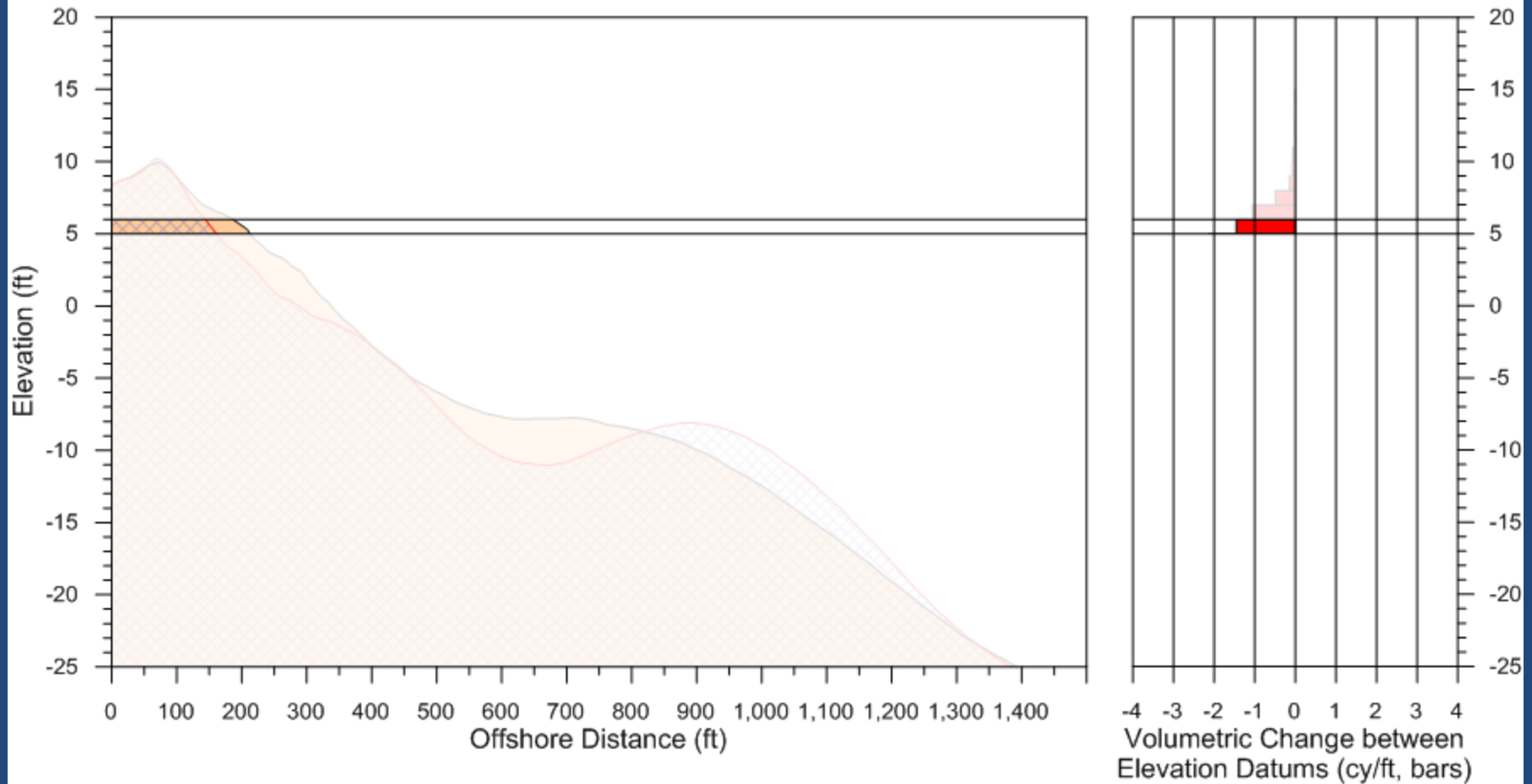
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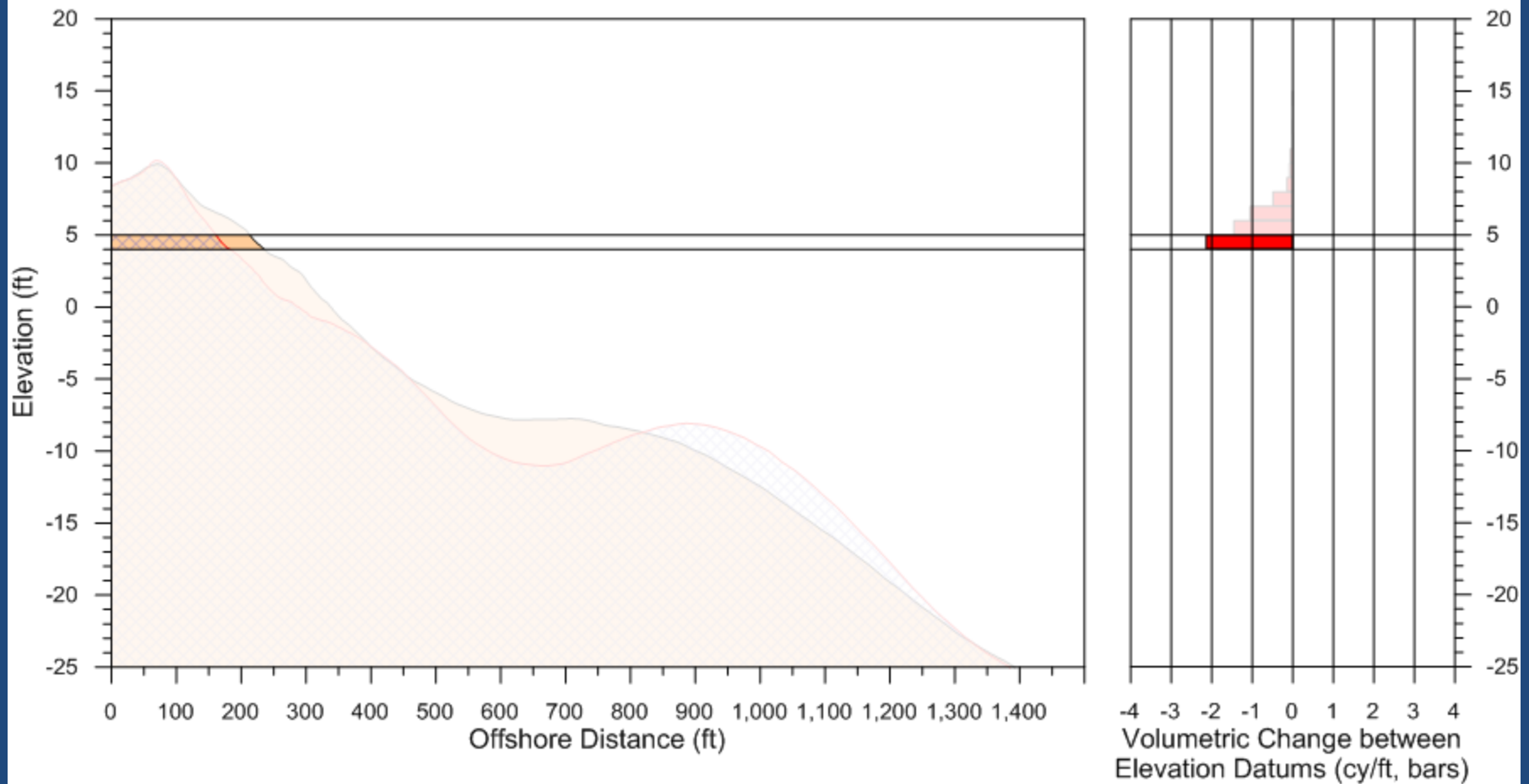
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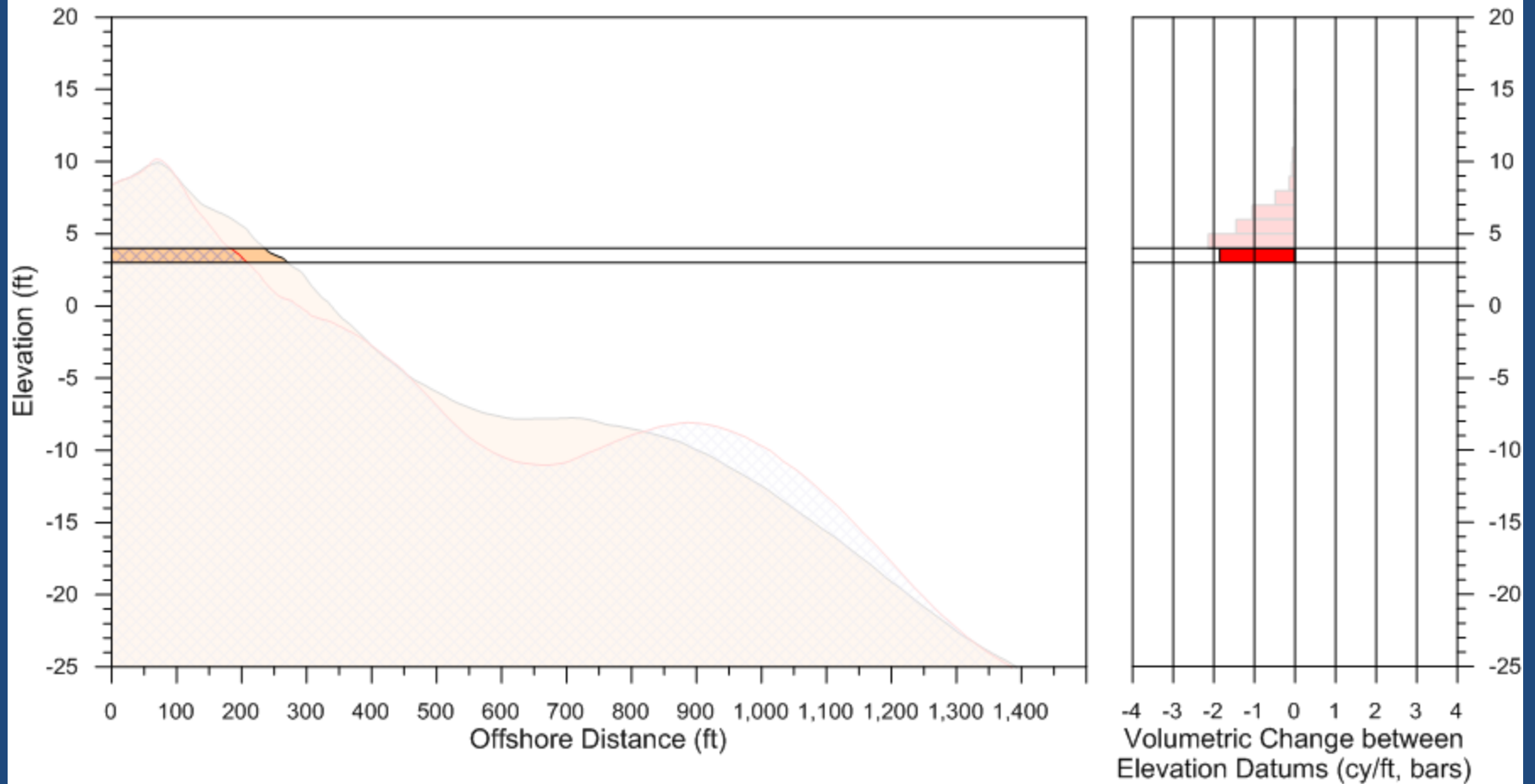
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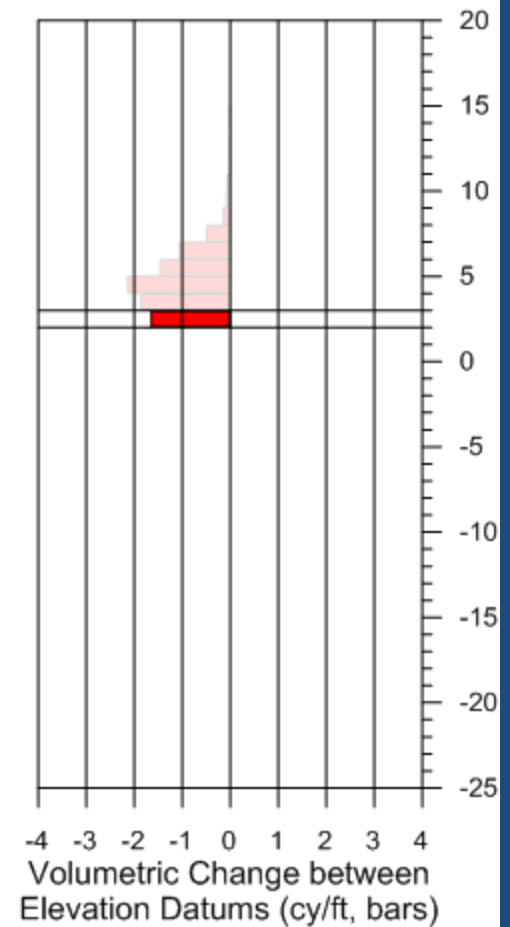
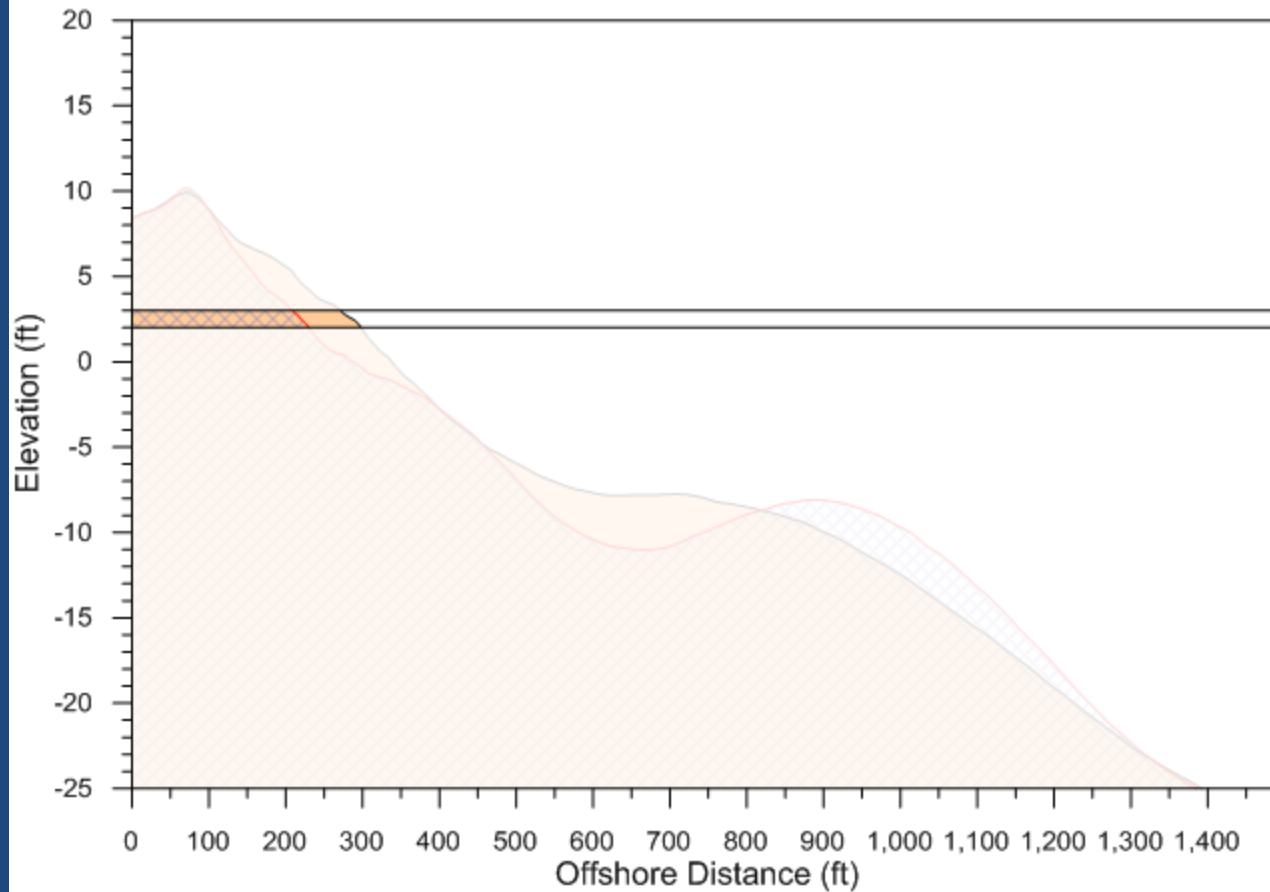
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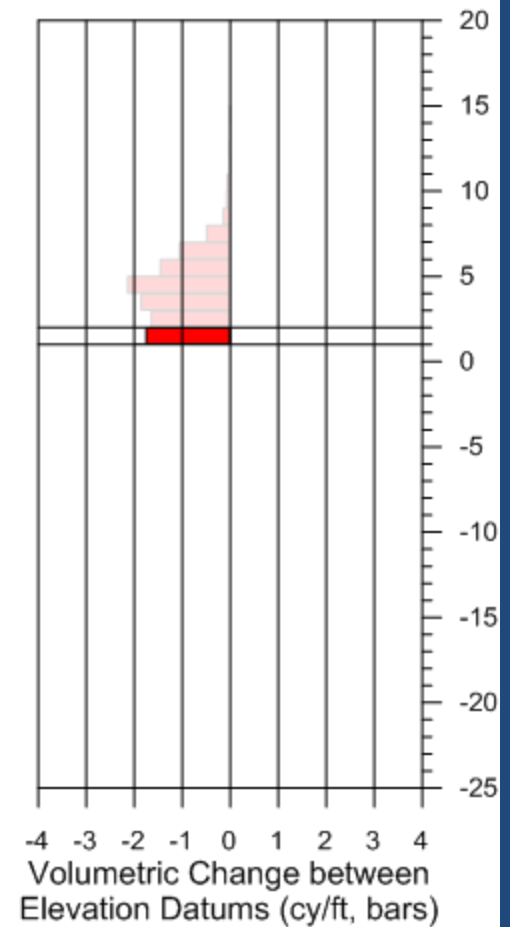
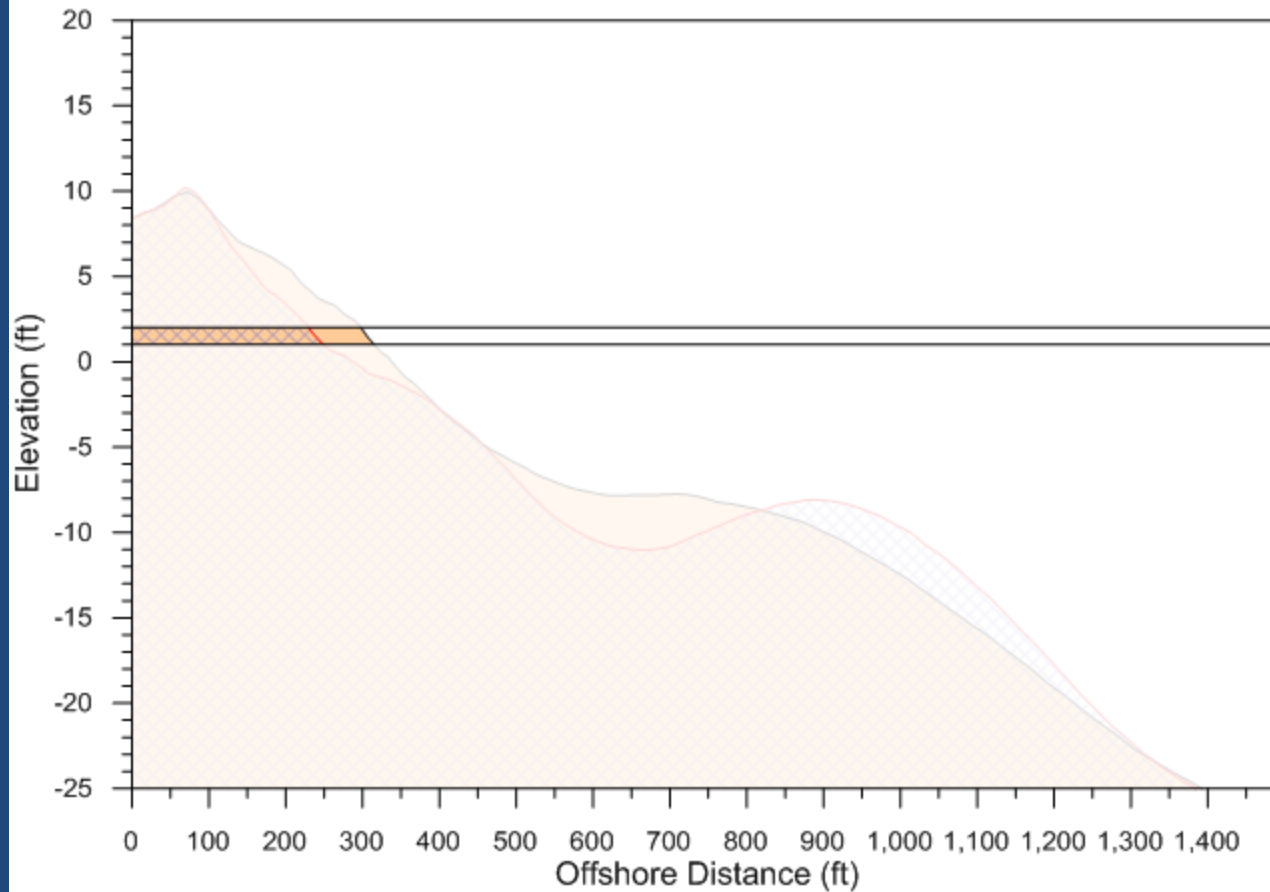
# Methodology



# Methodology

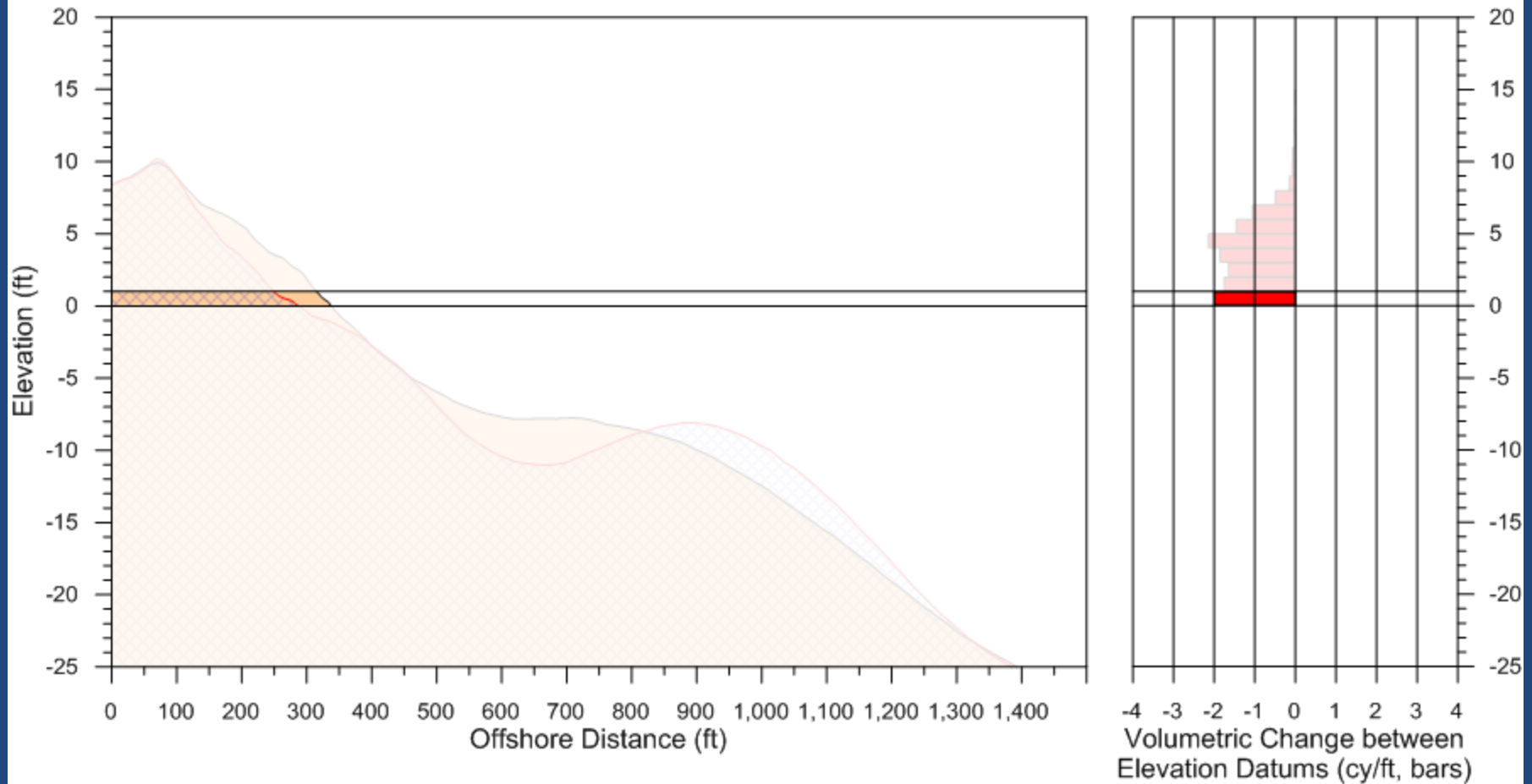


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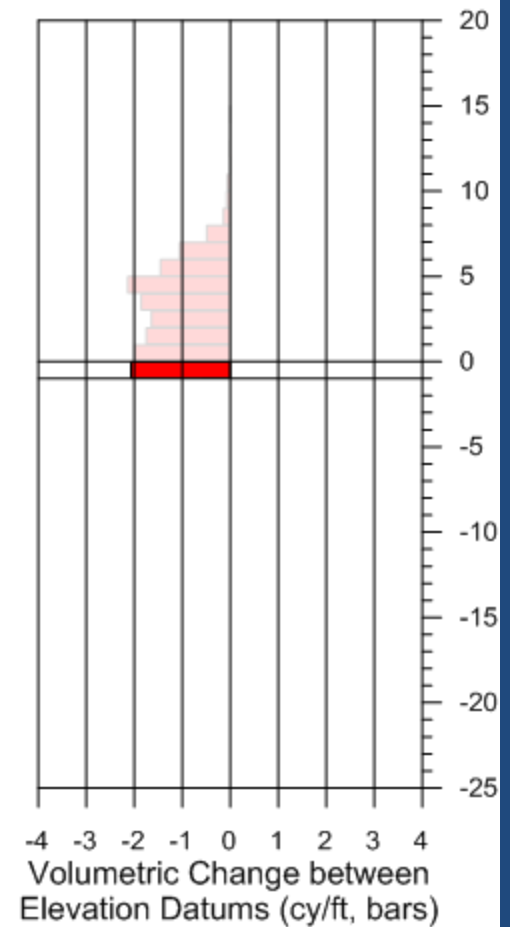
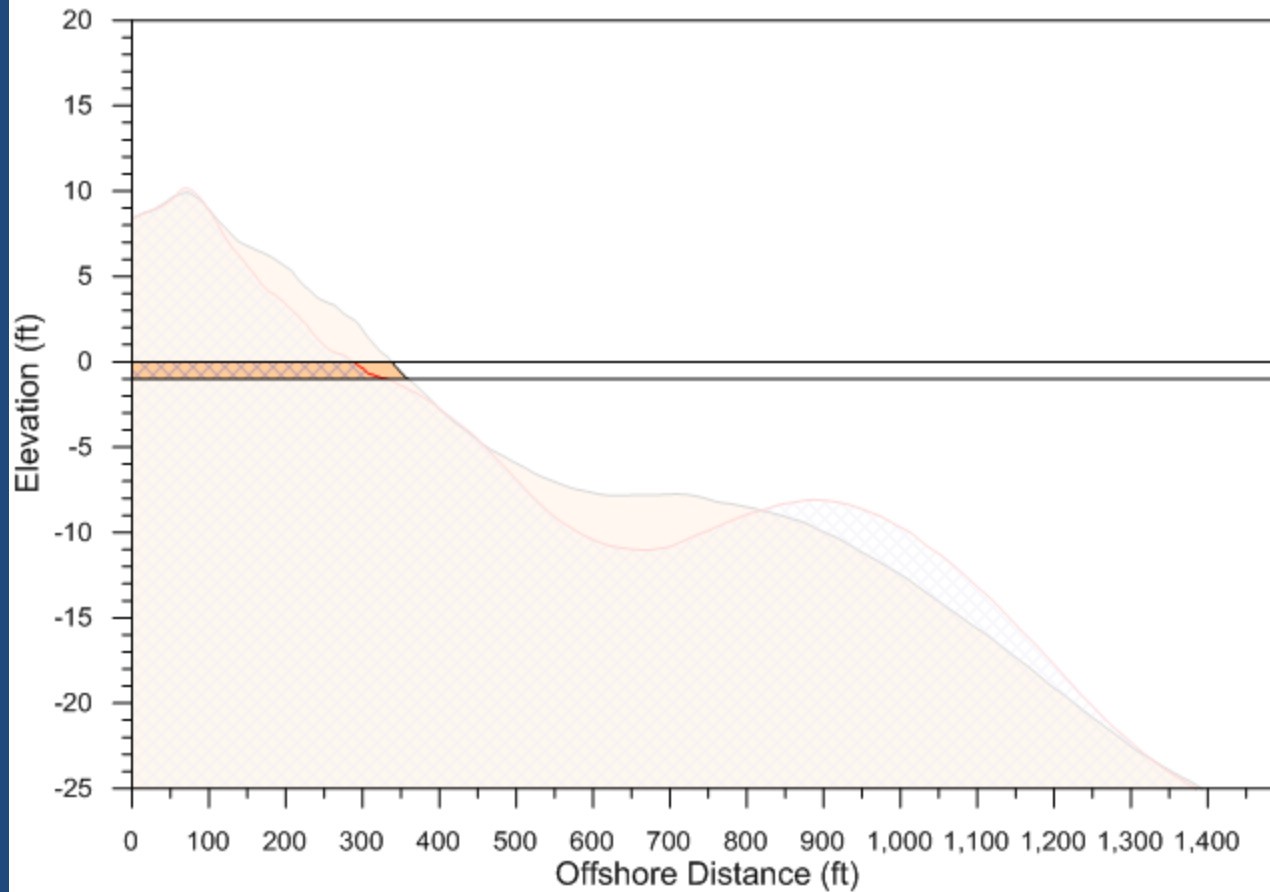




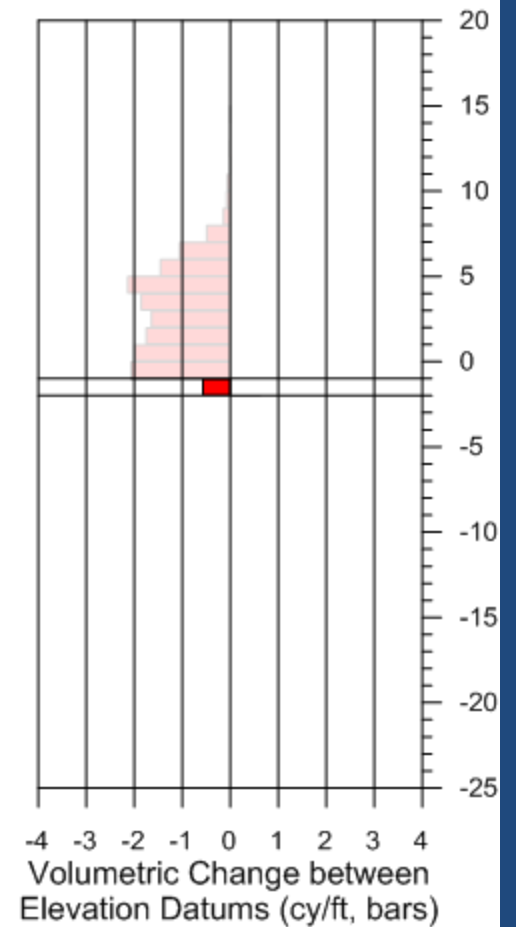
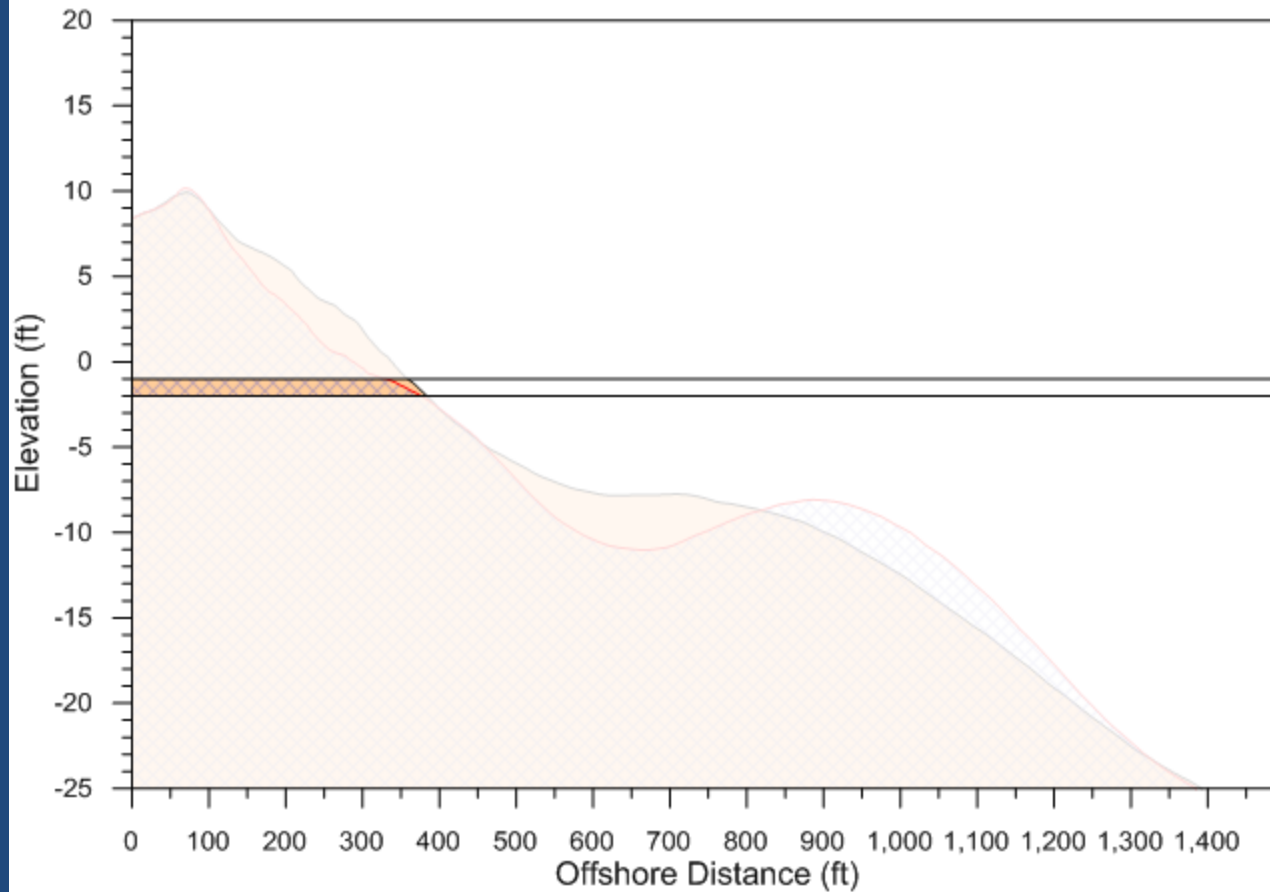
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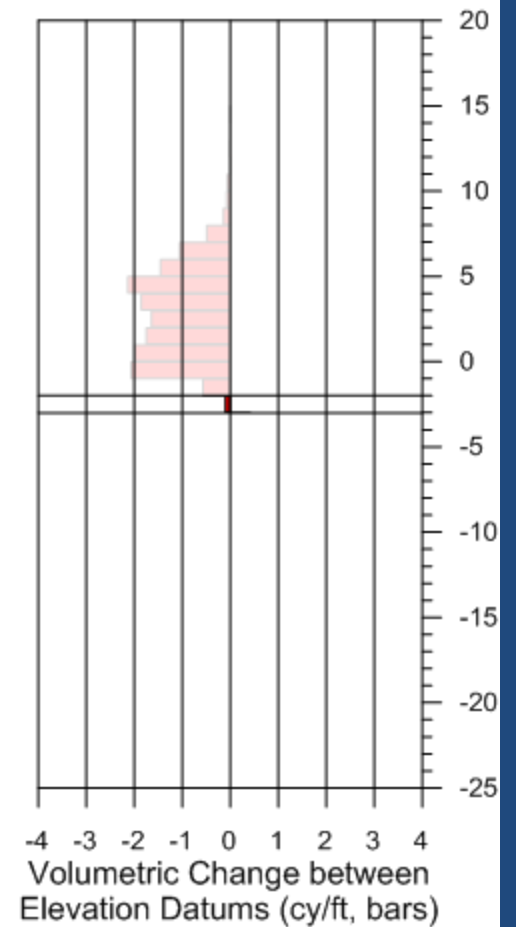
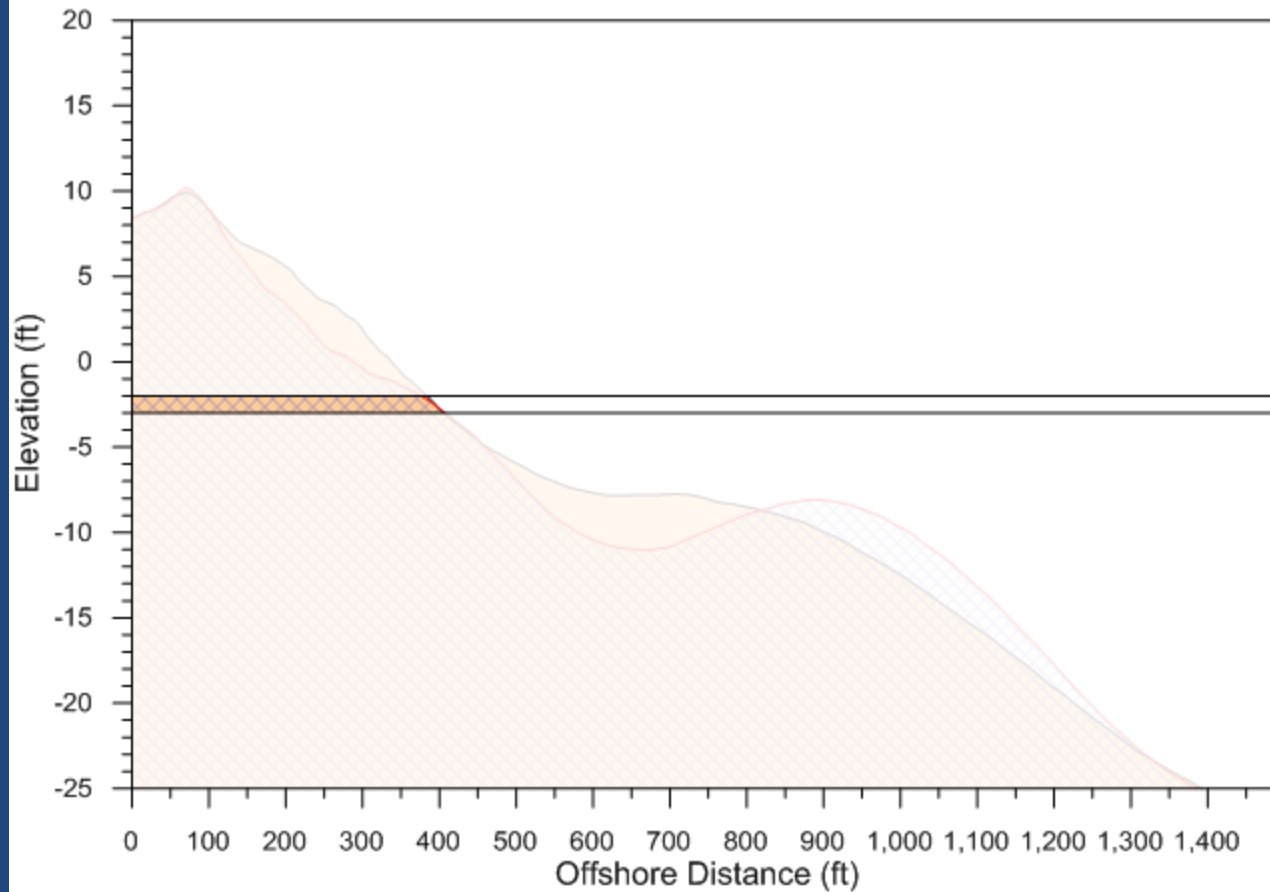
# Methodology



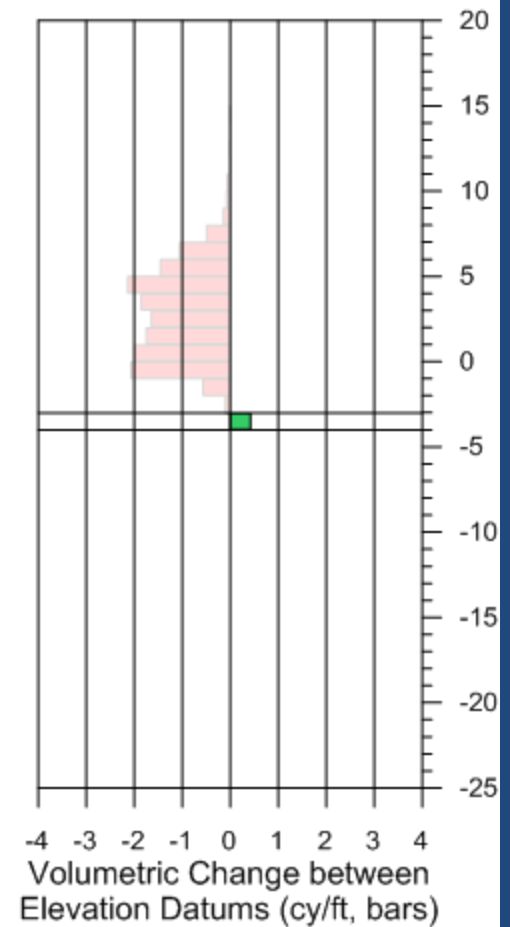
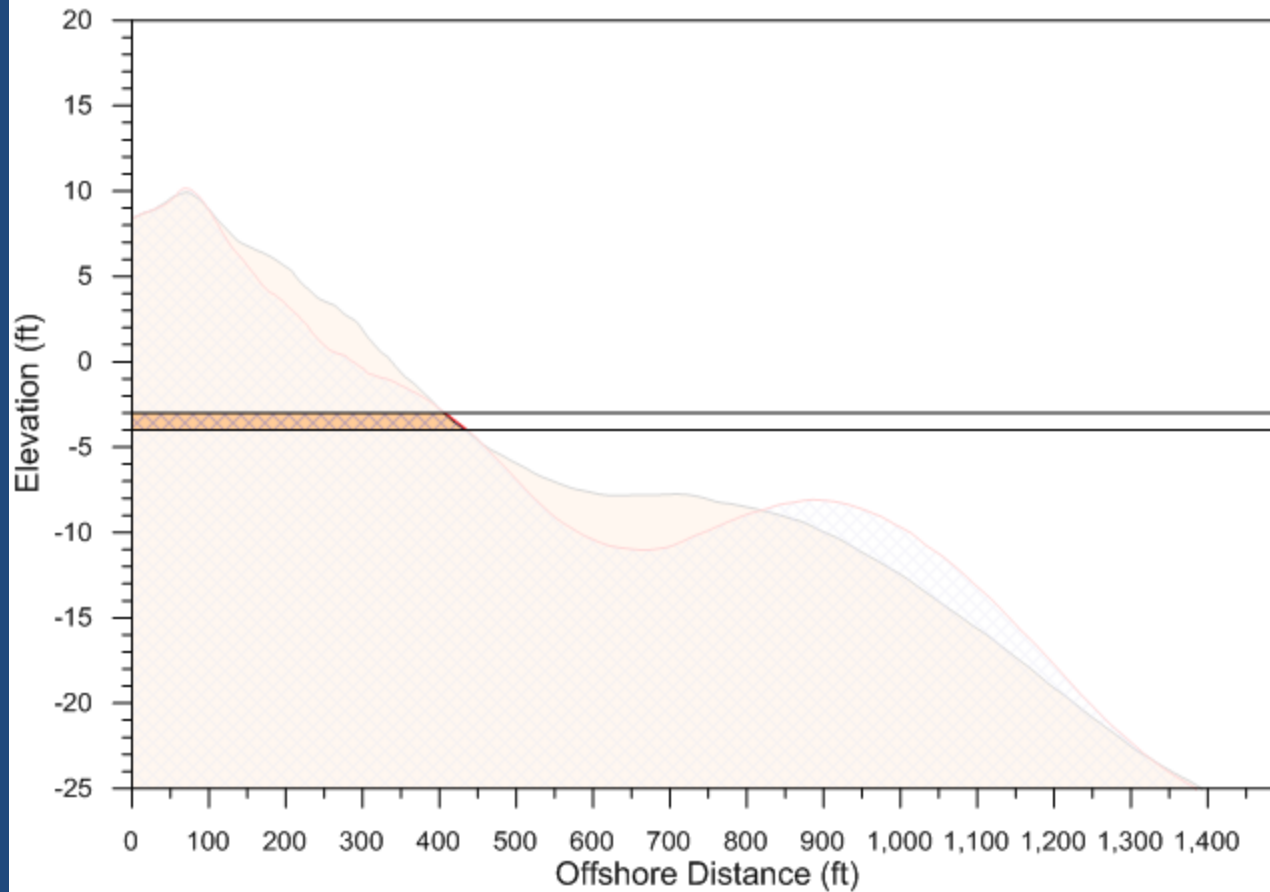
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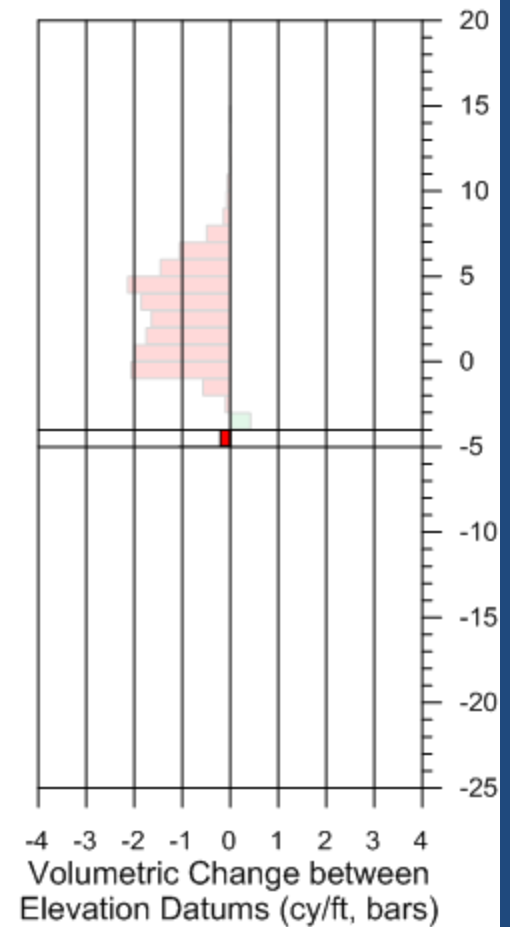
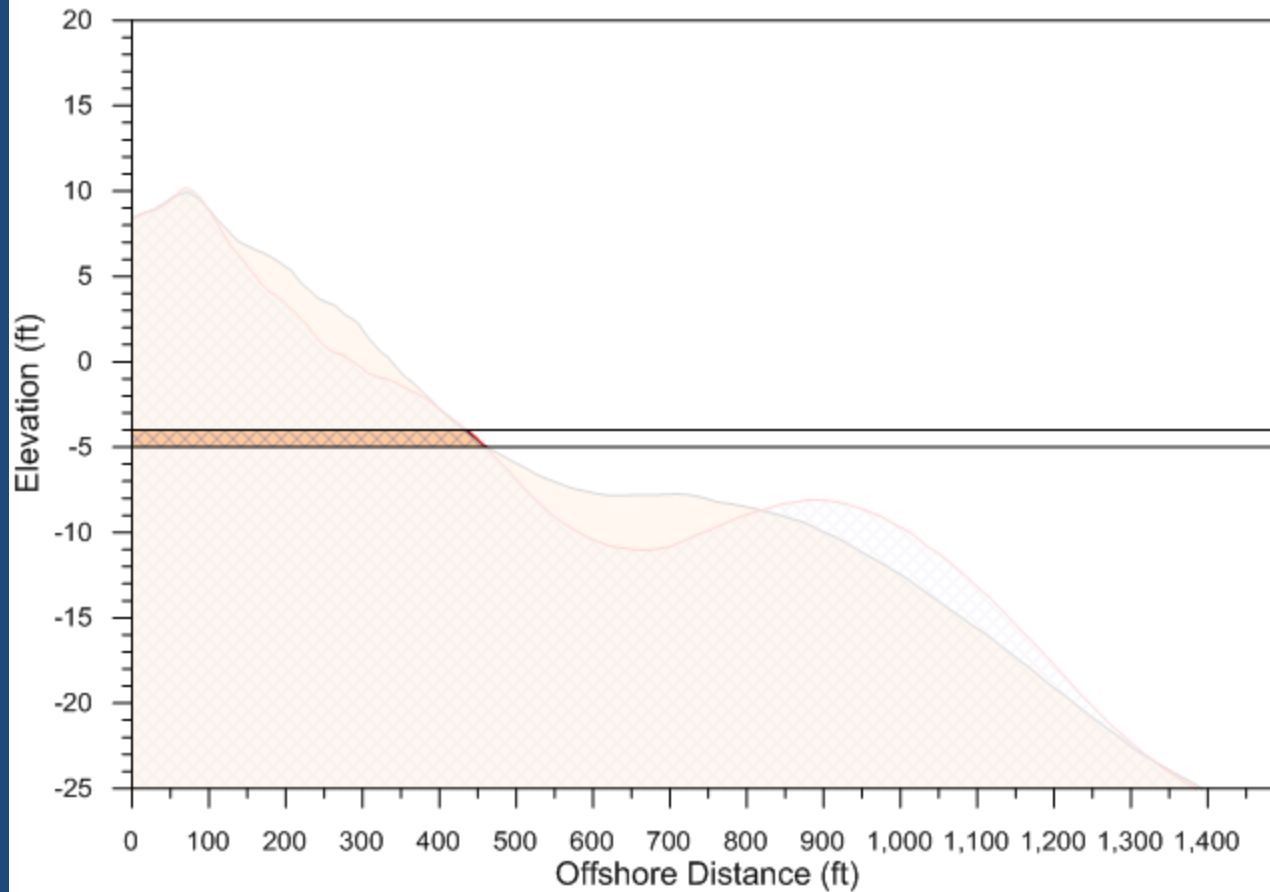
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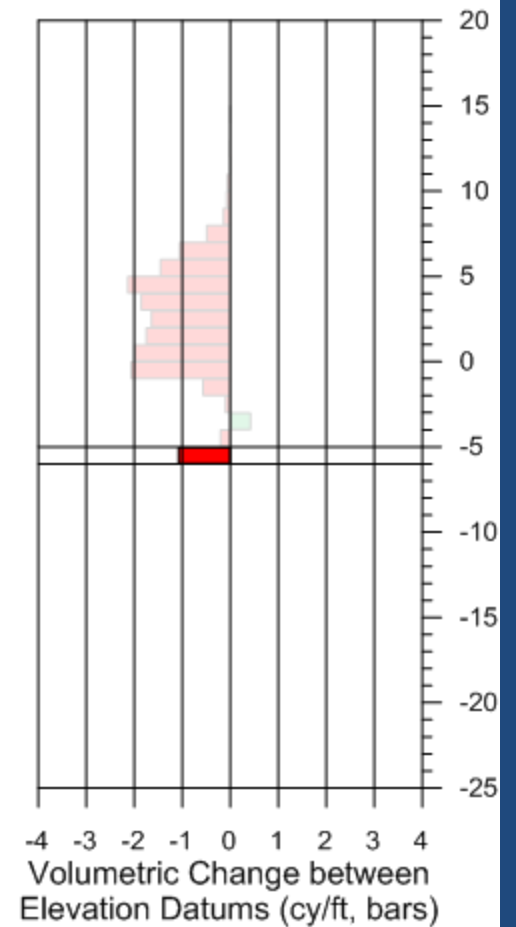
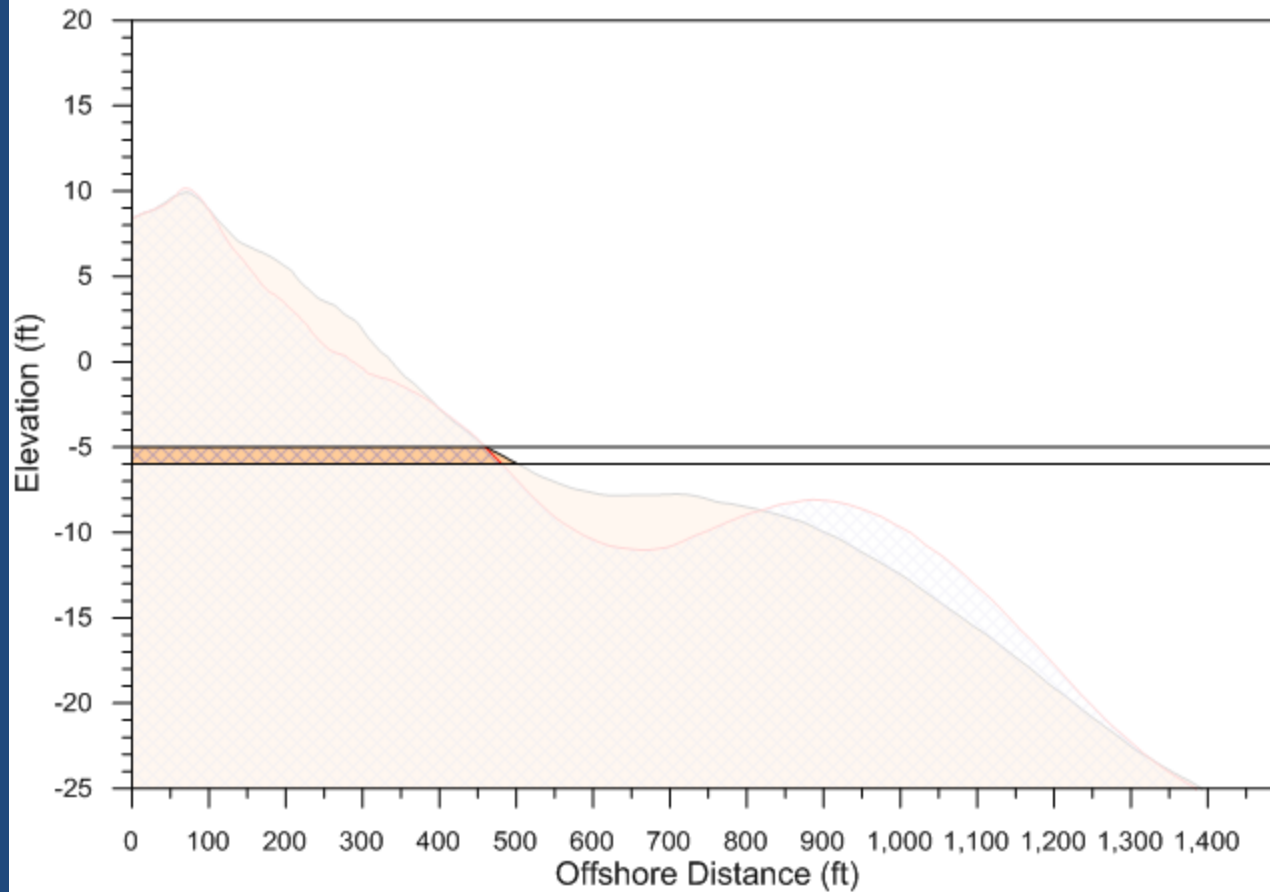
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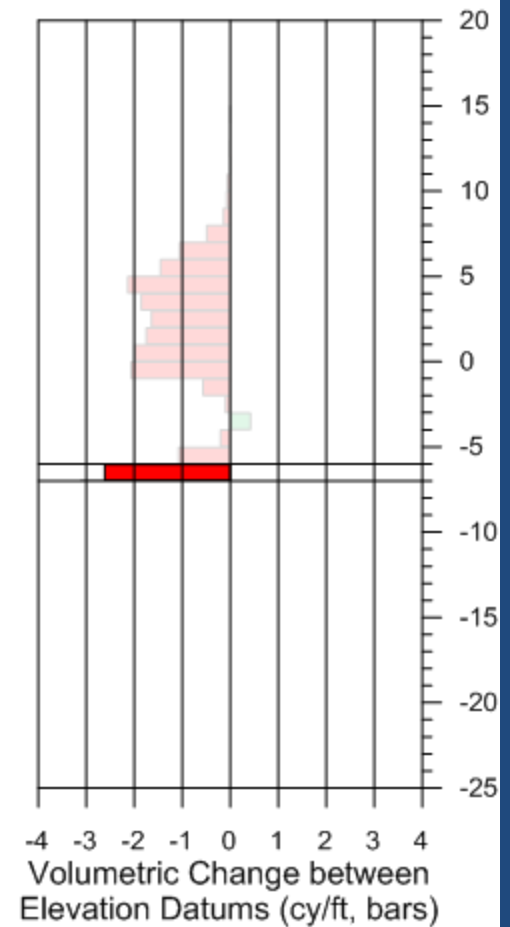
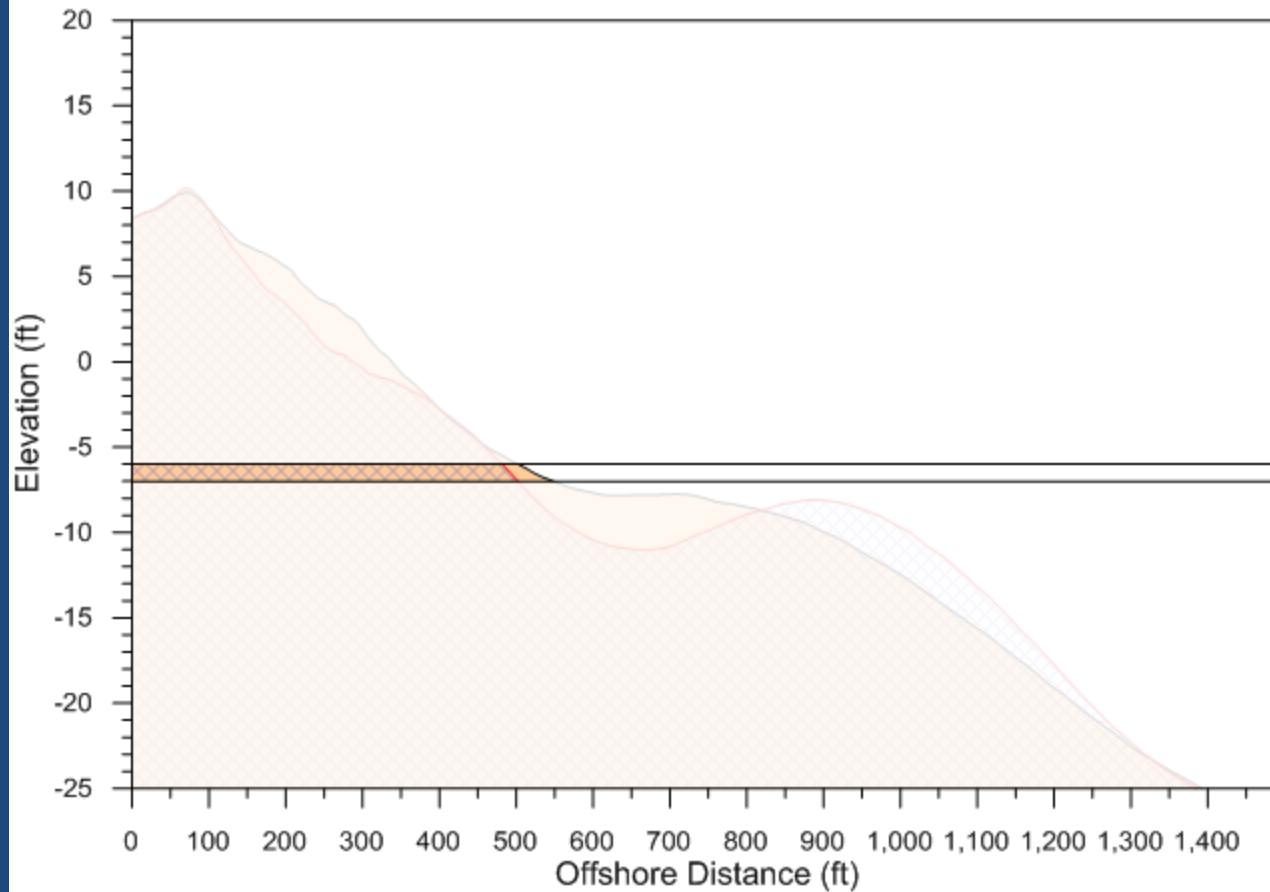
# Methodology



# Methodology

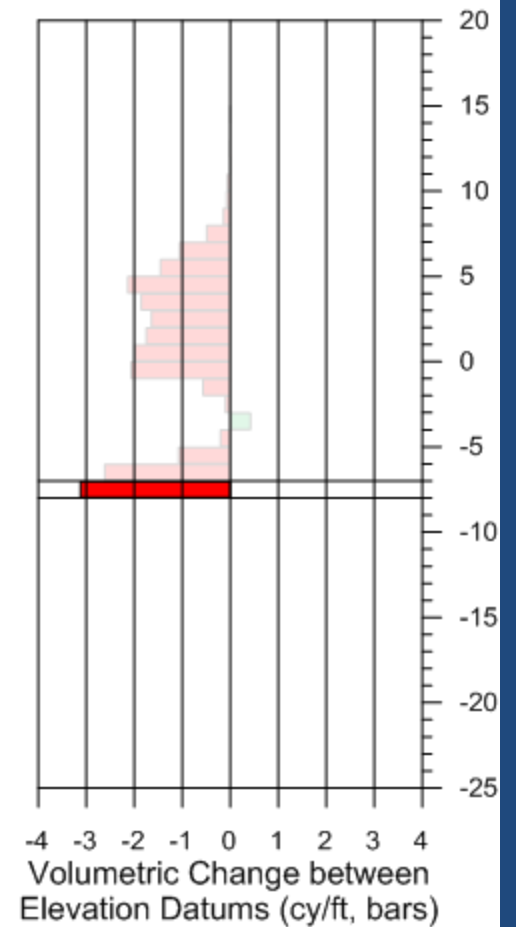
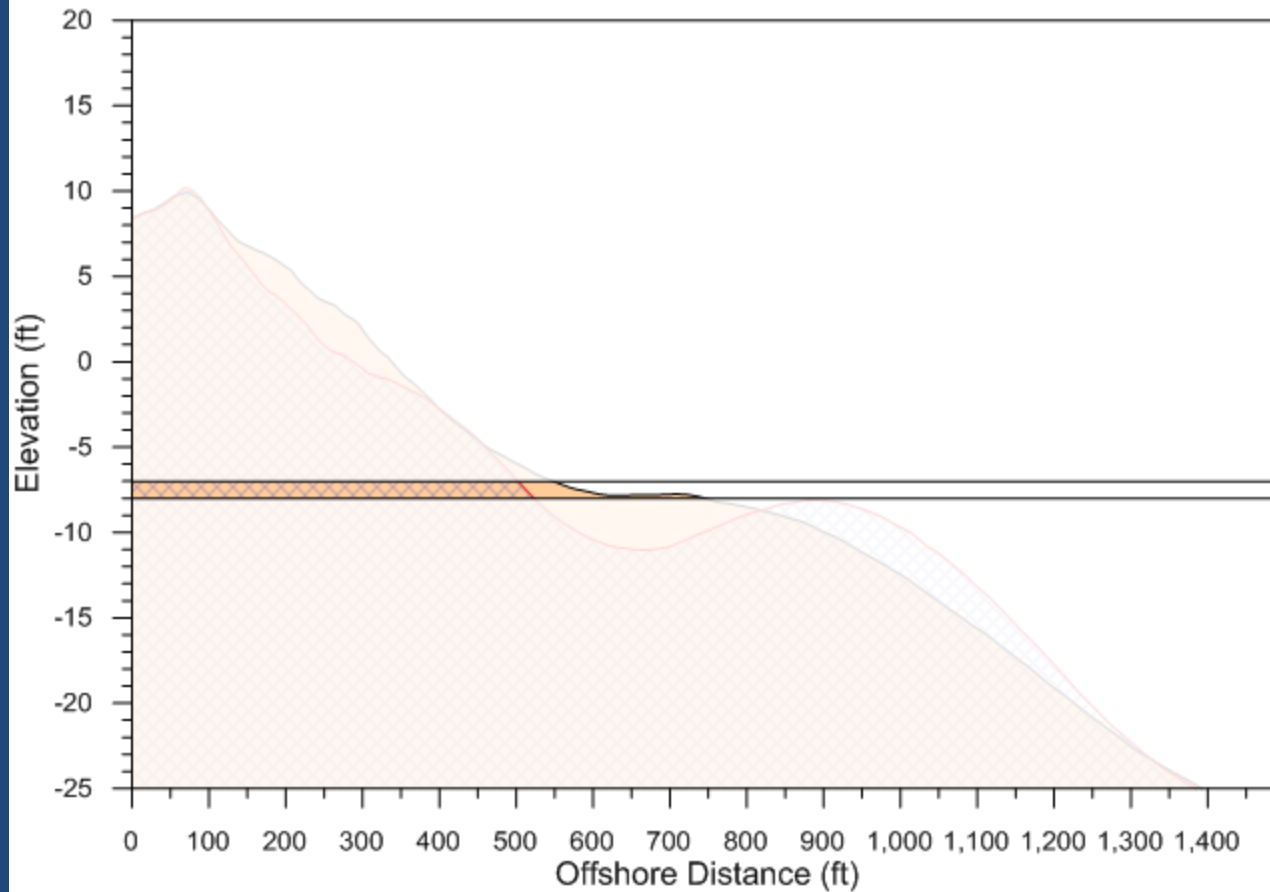


# Methodology

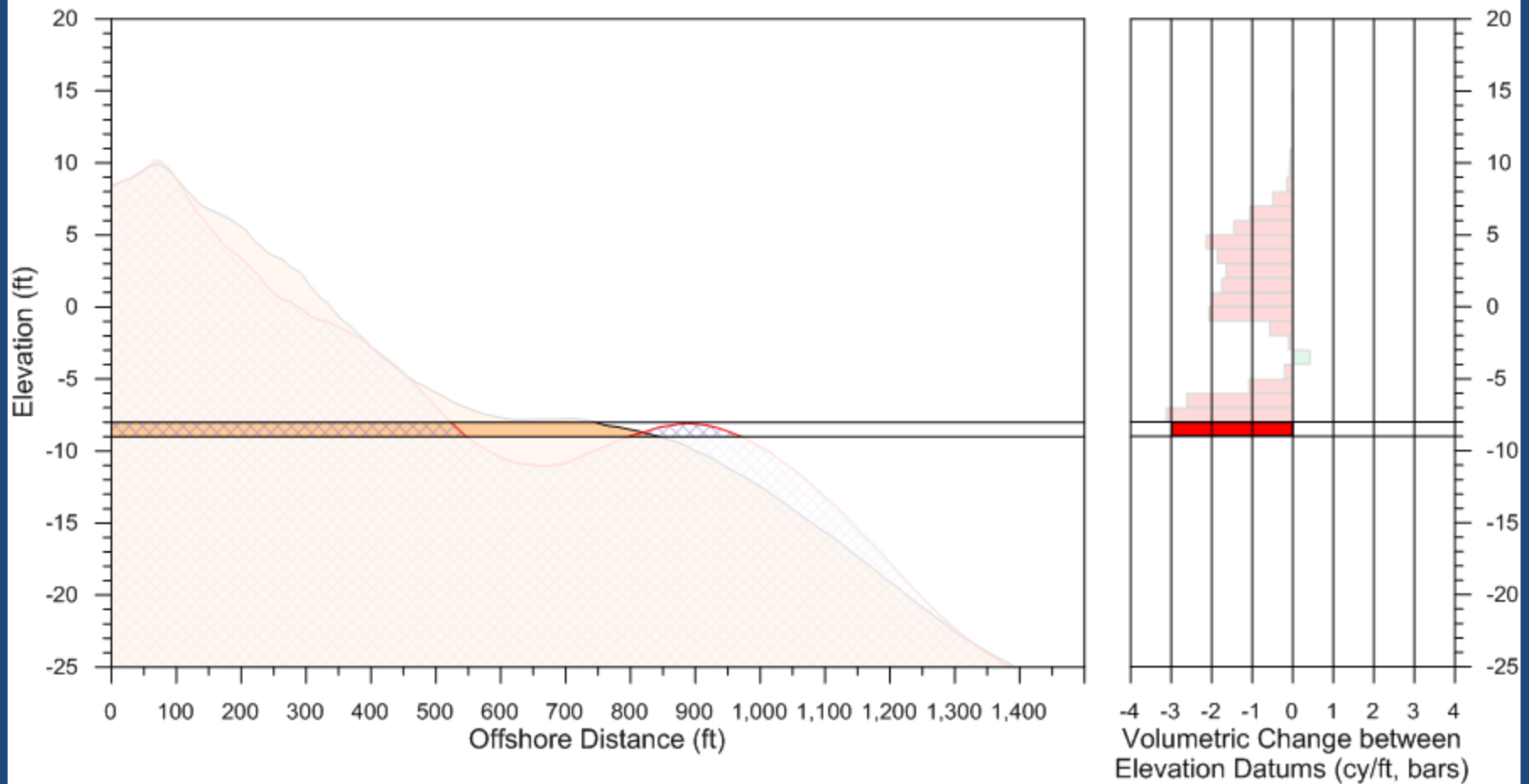




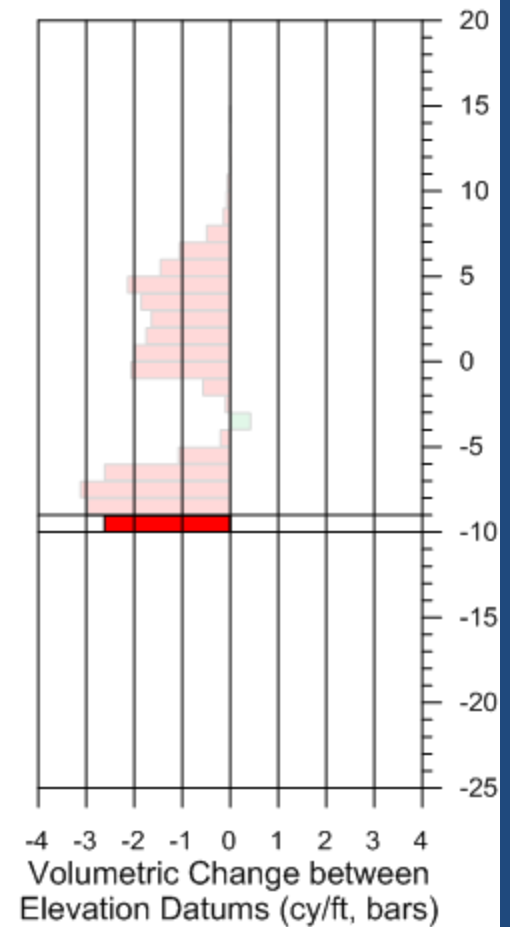
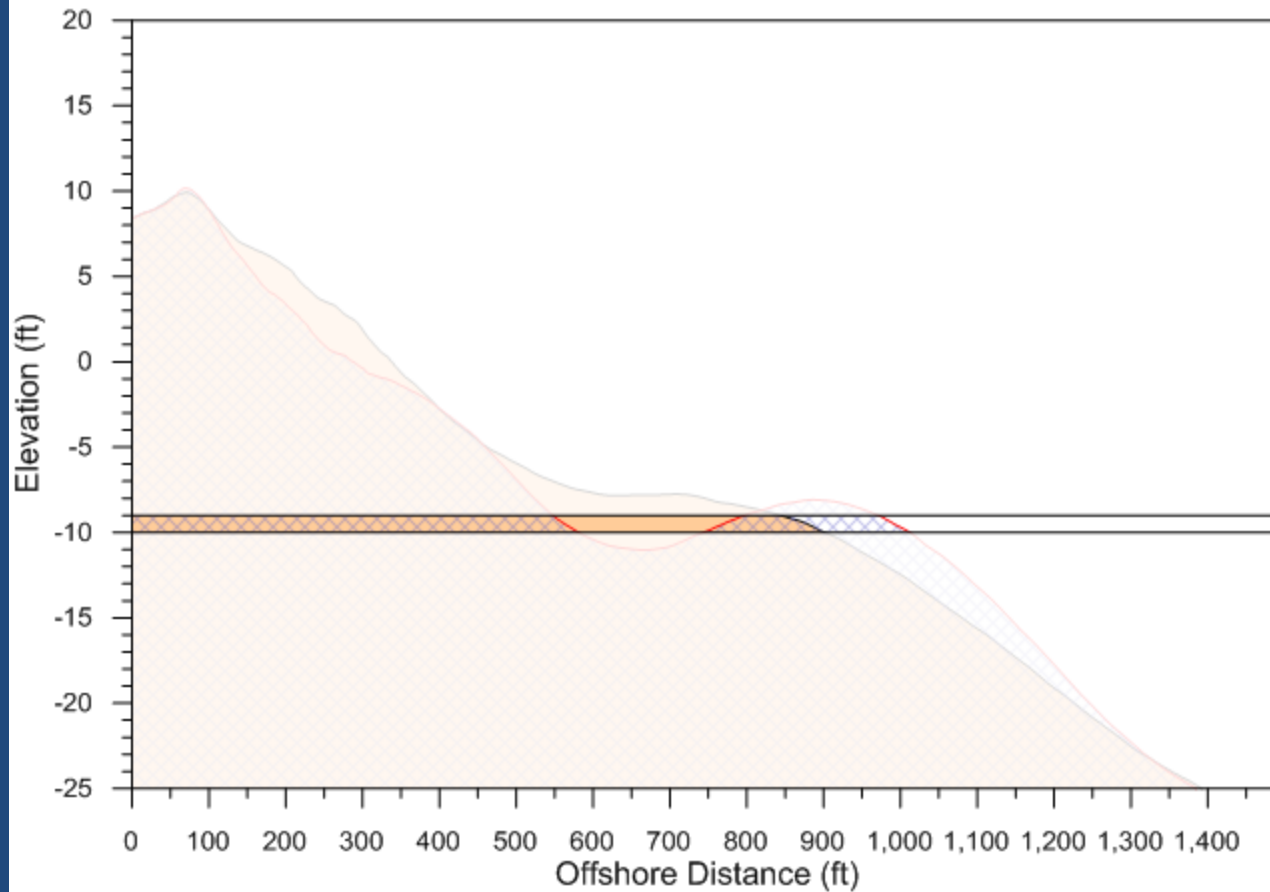
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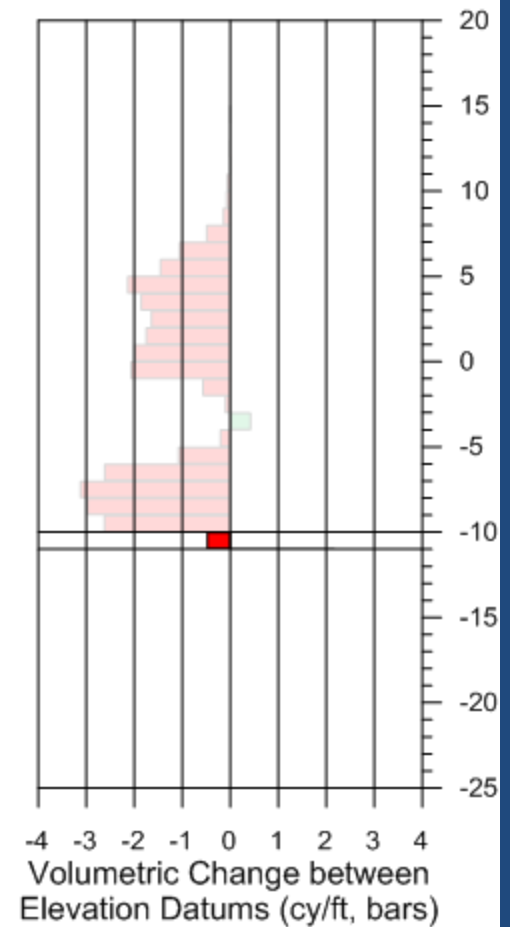
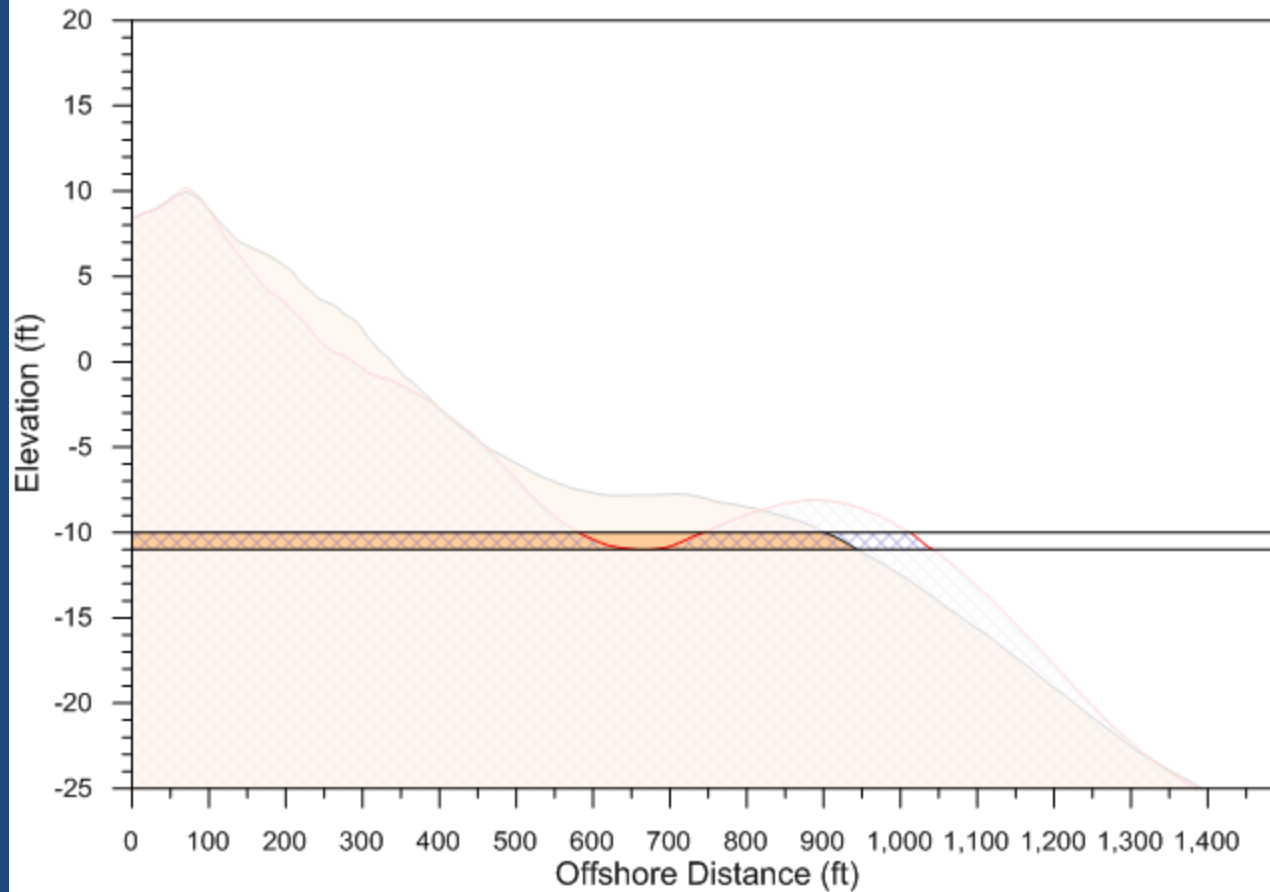
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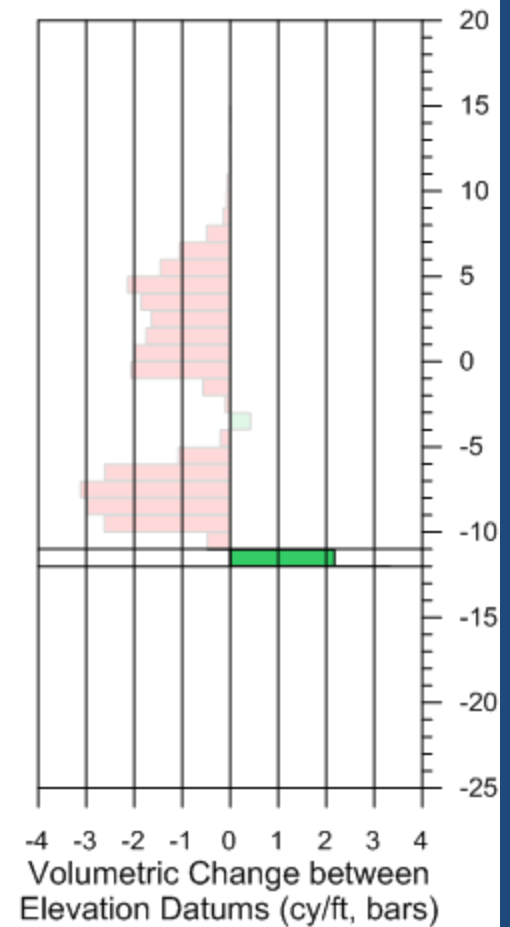
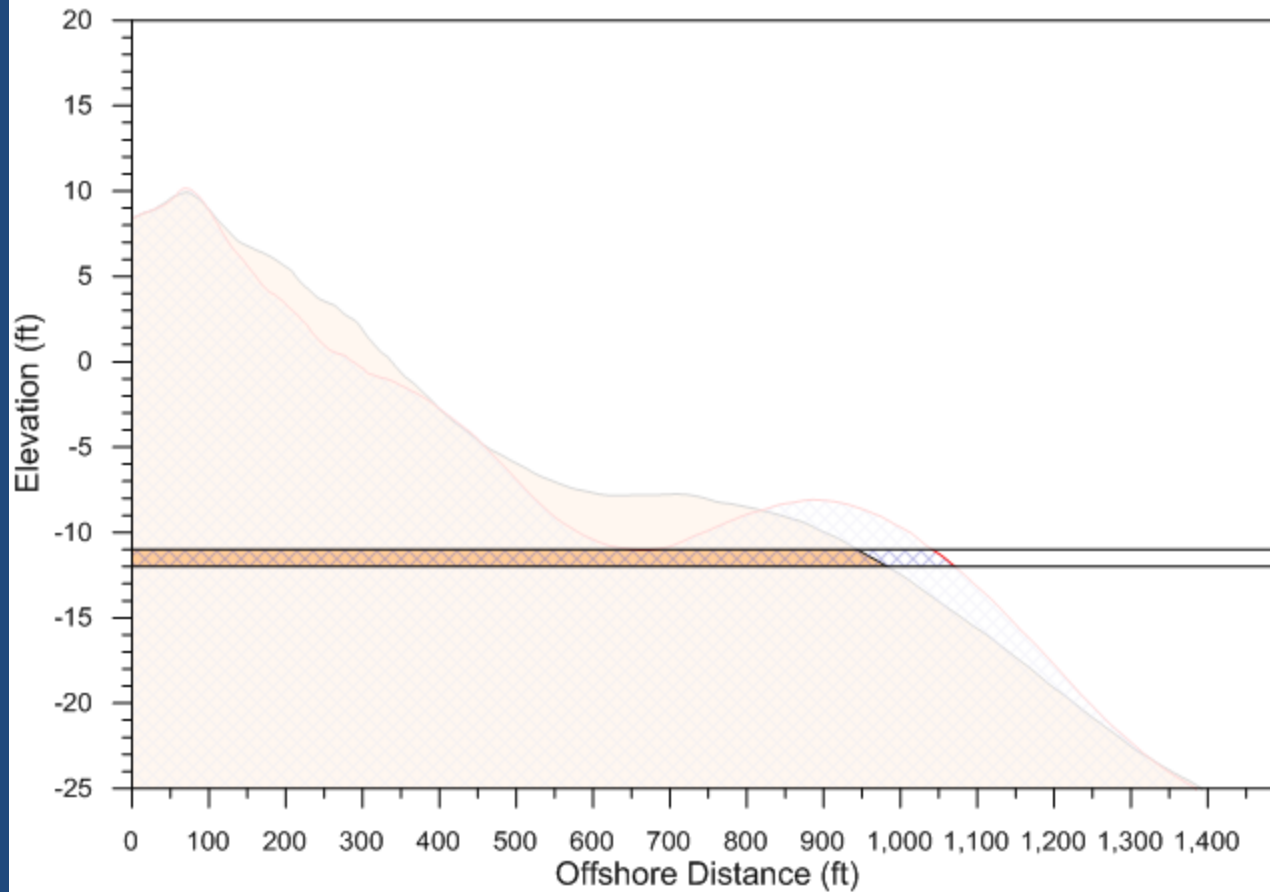
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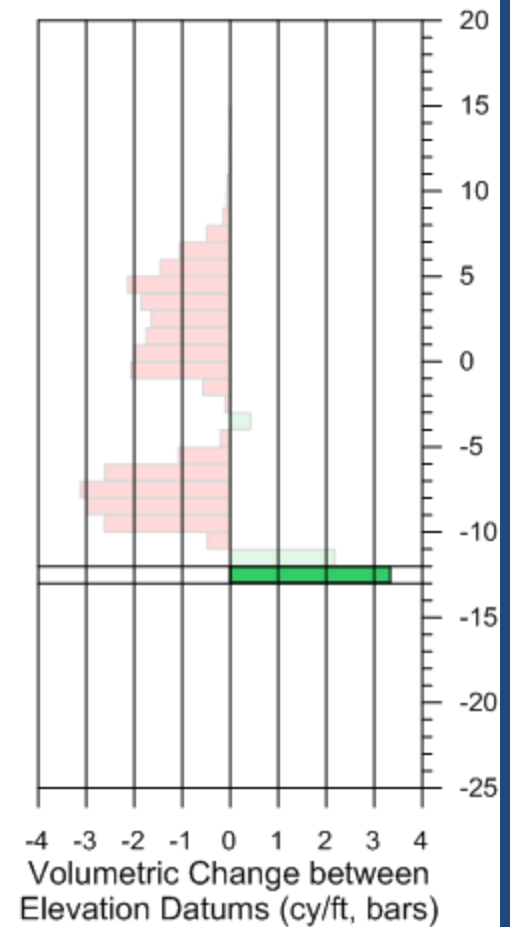
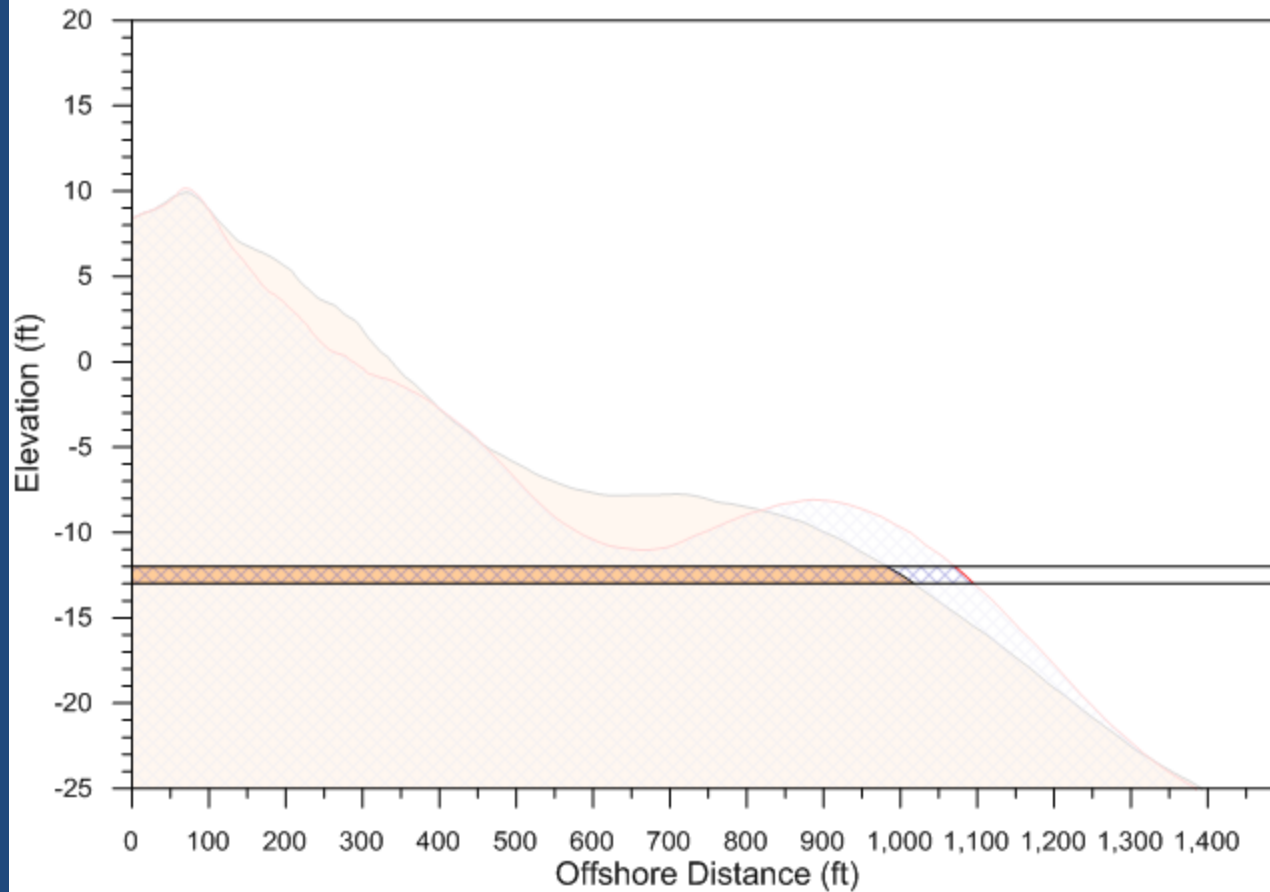
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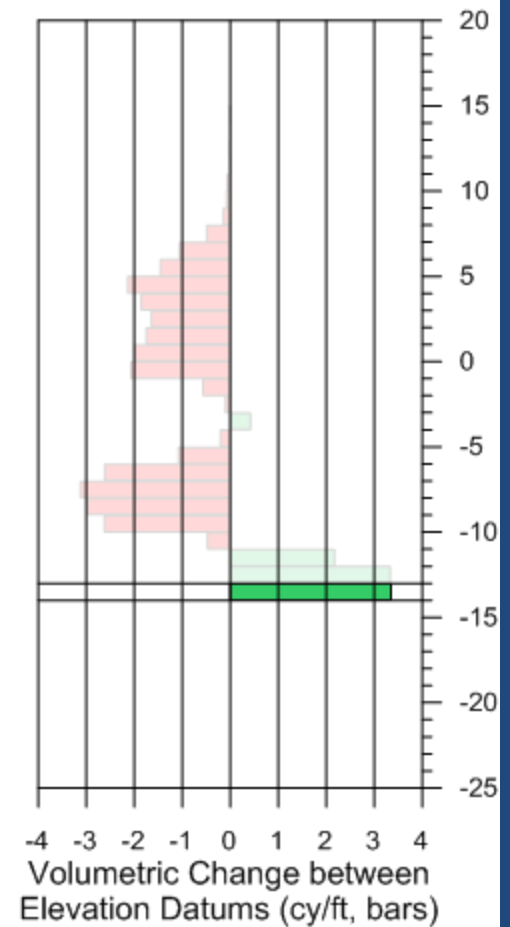
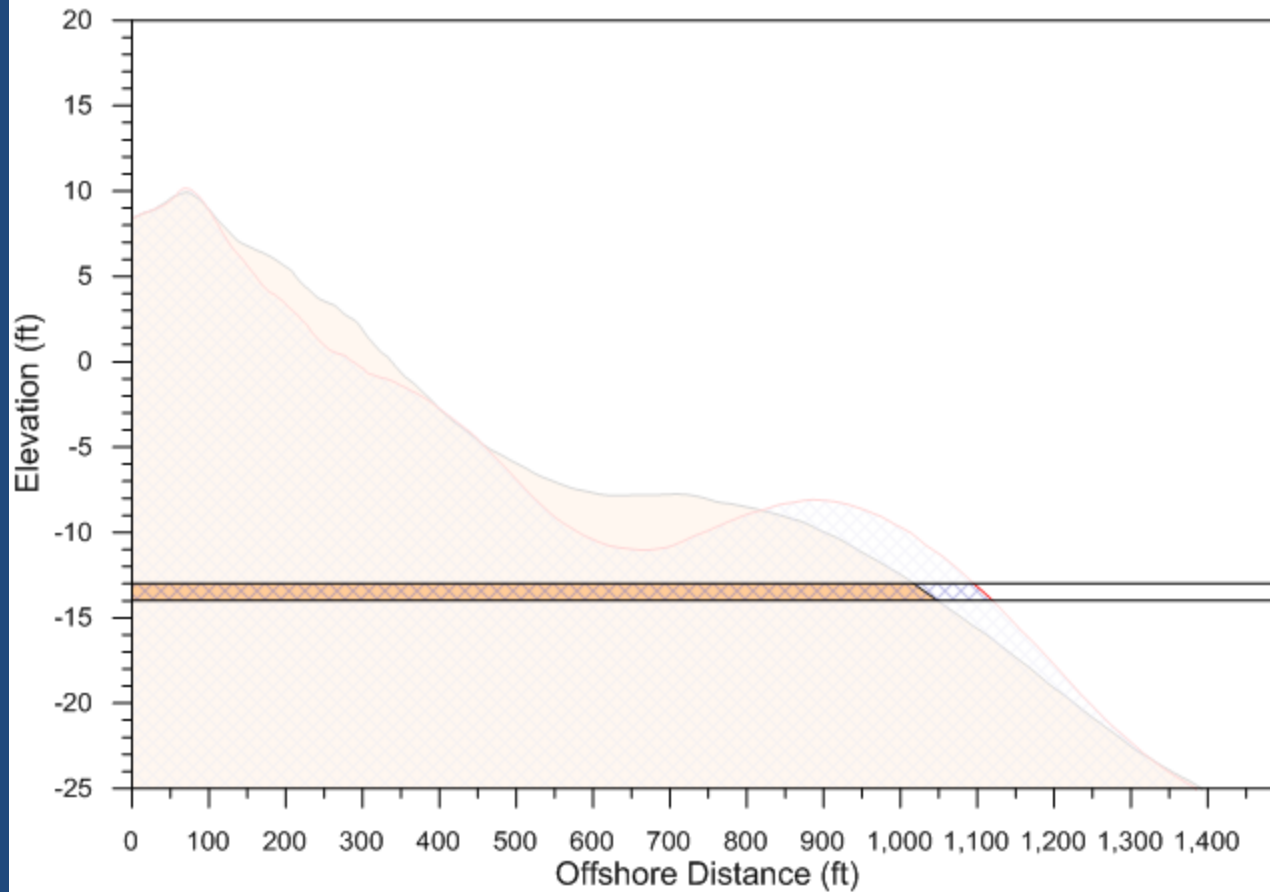
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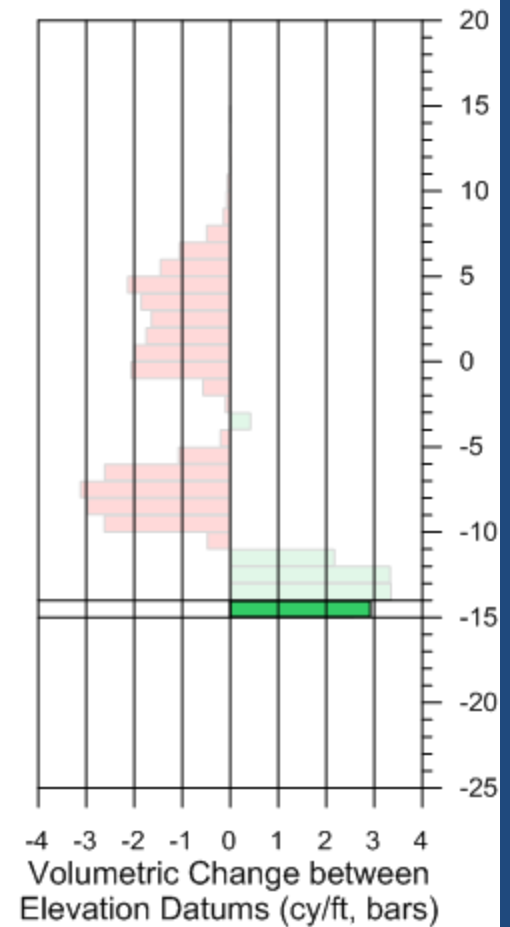
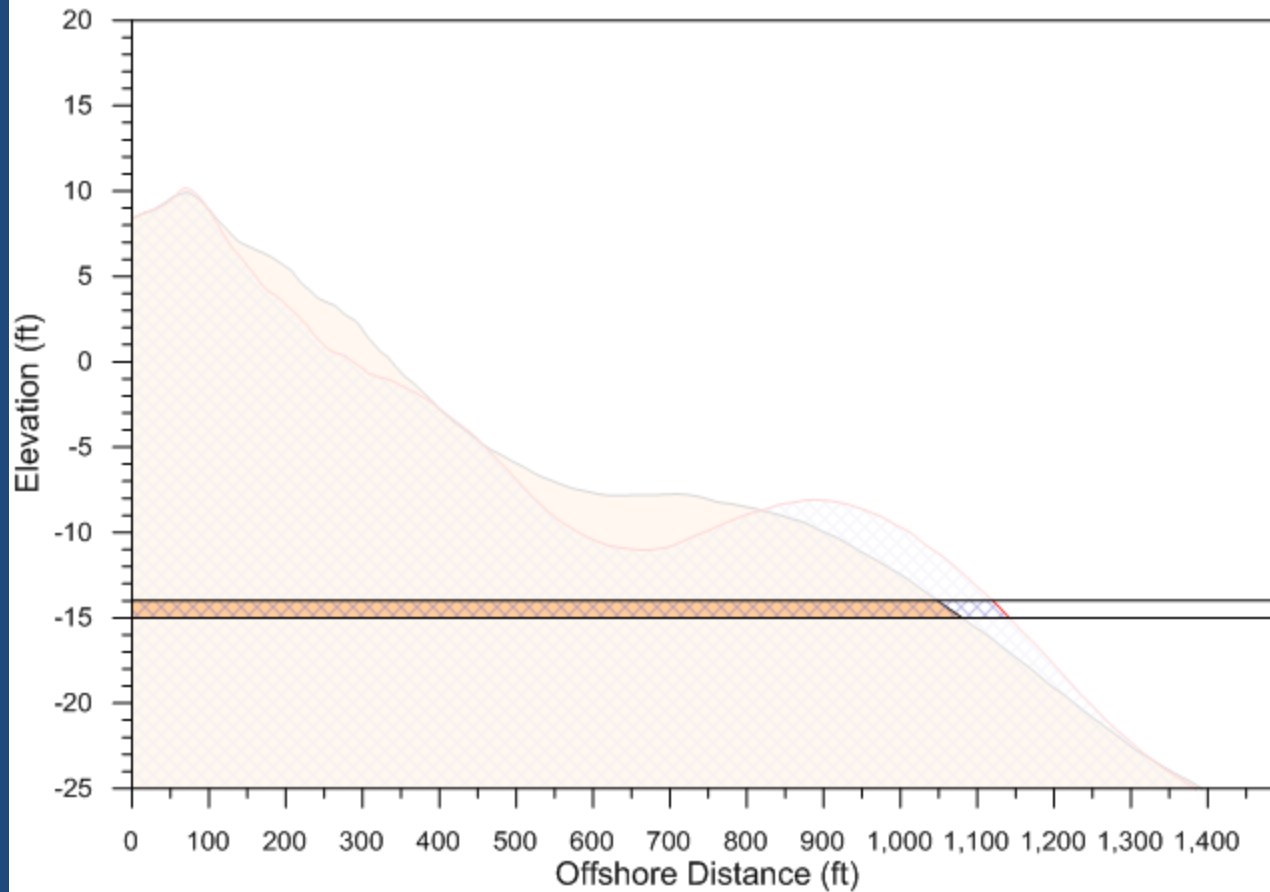
# Methodology



# Methodology

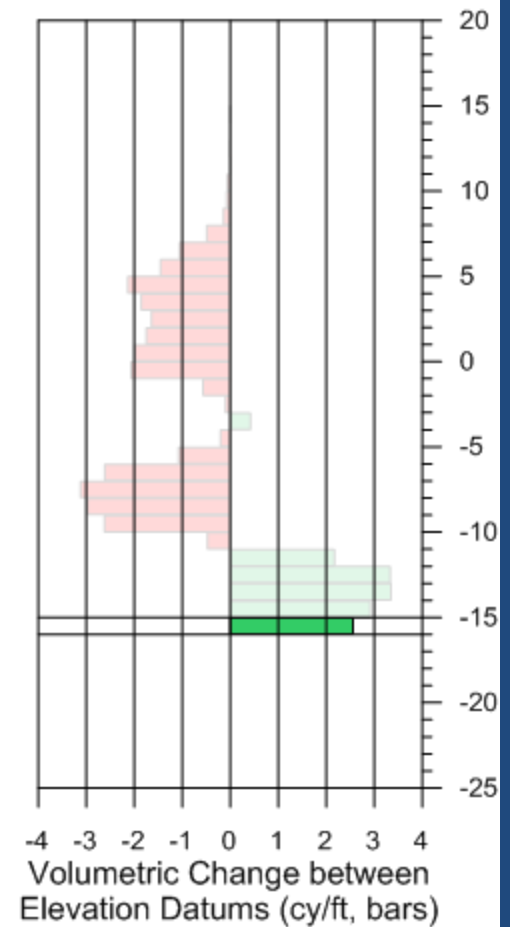
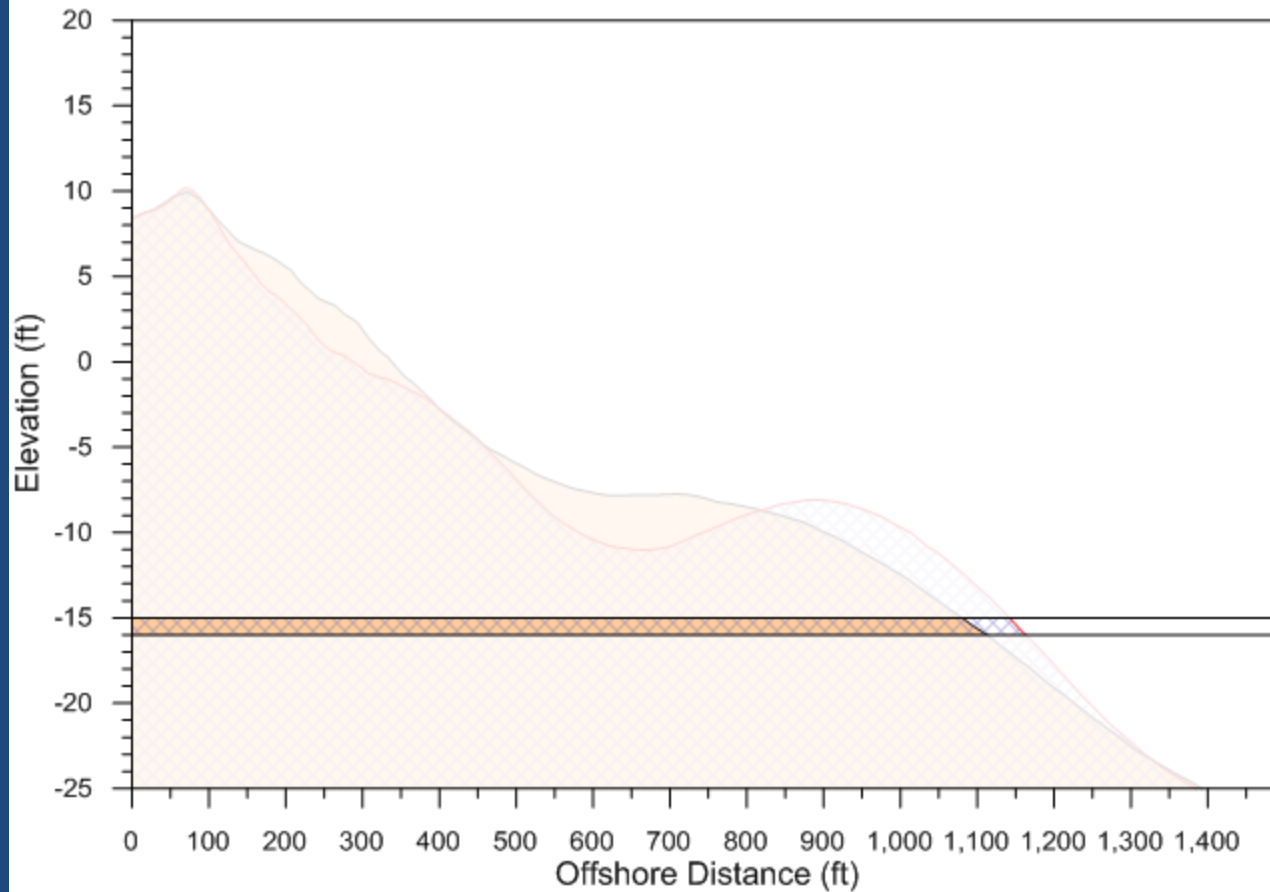


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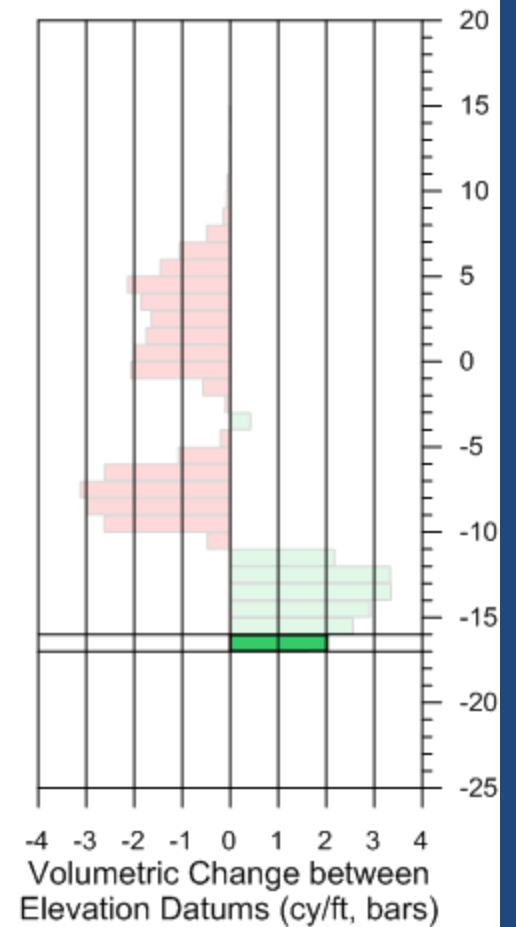
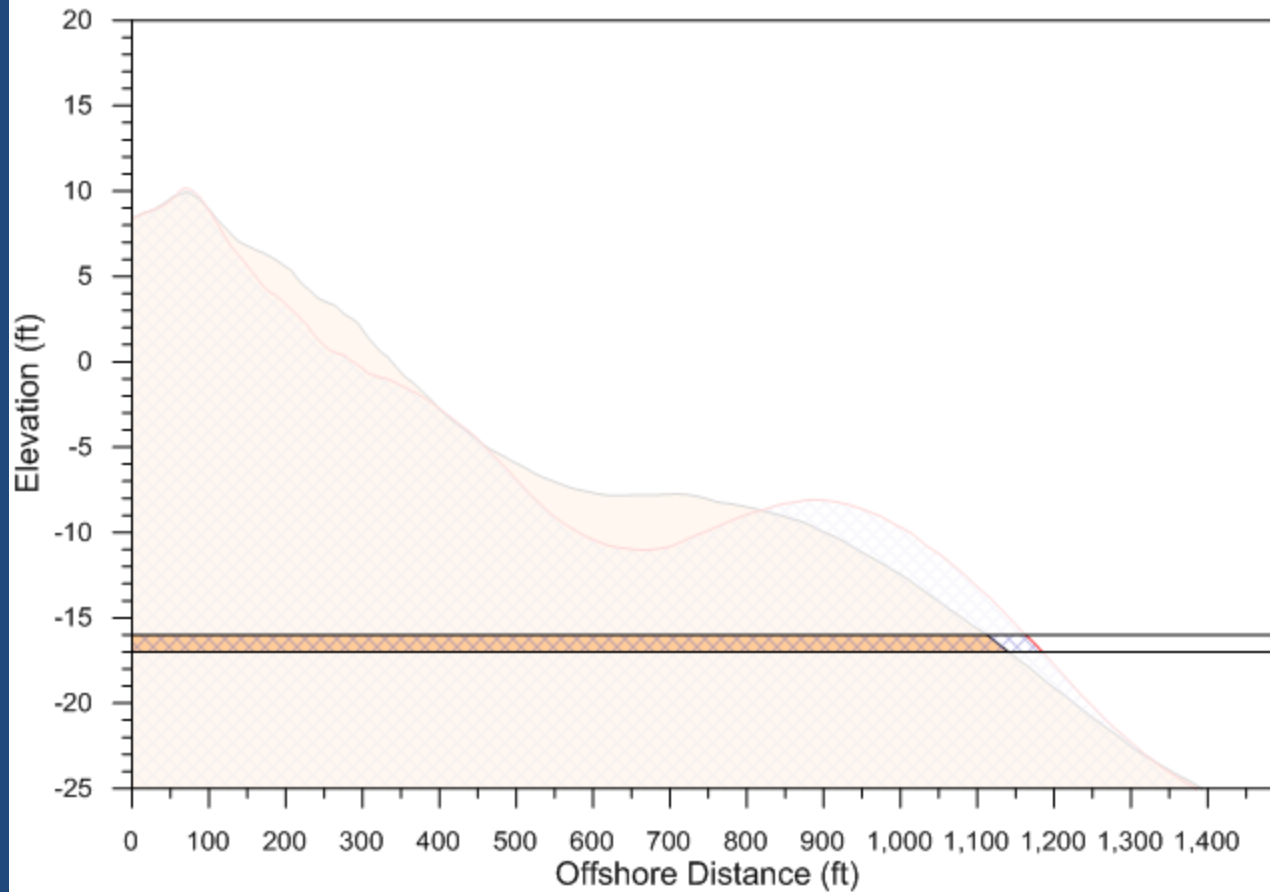




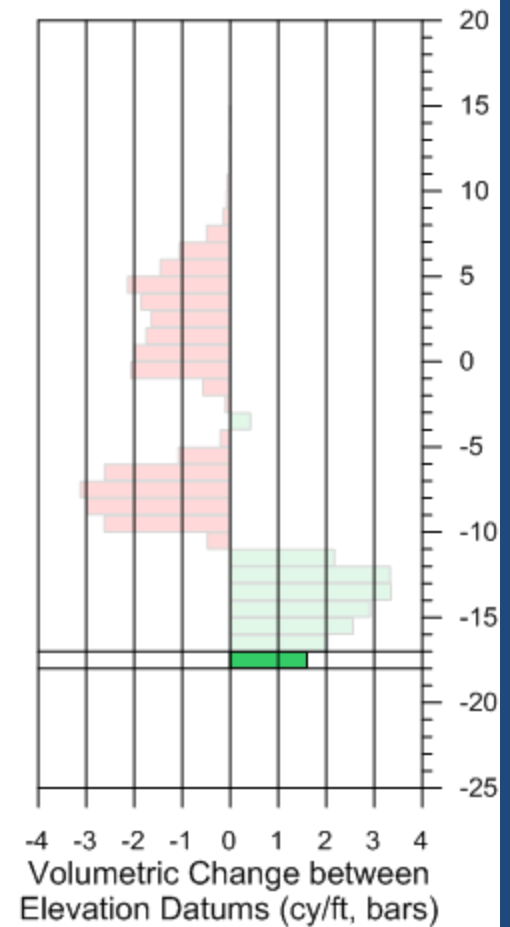
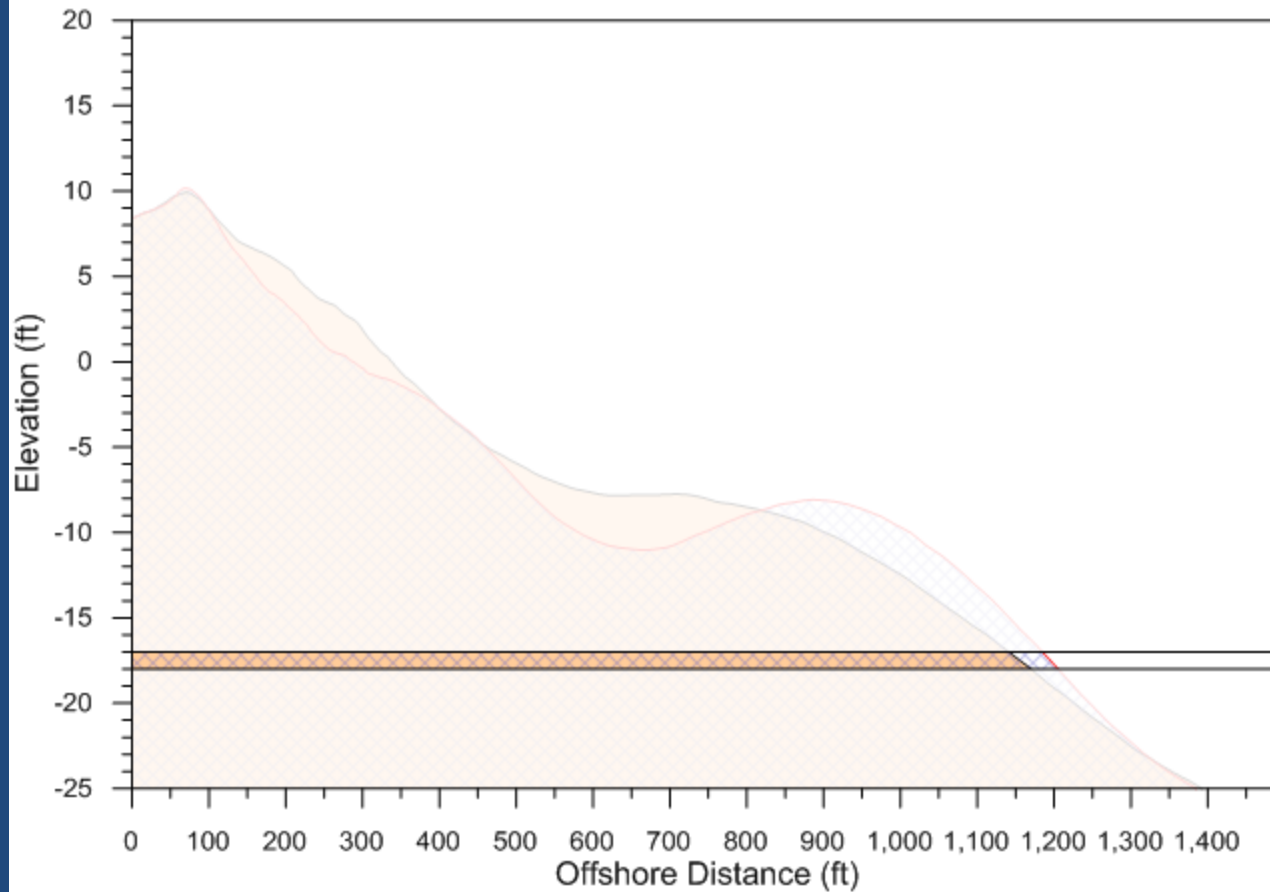
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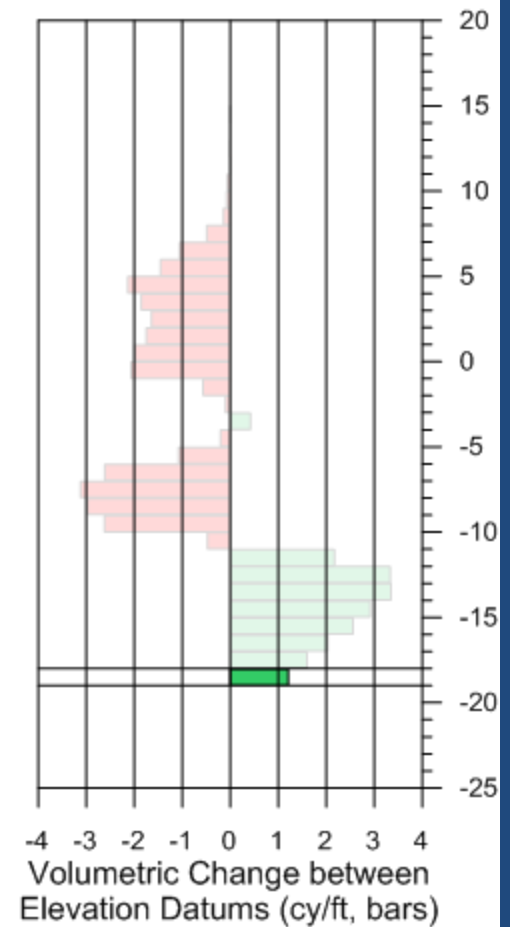
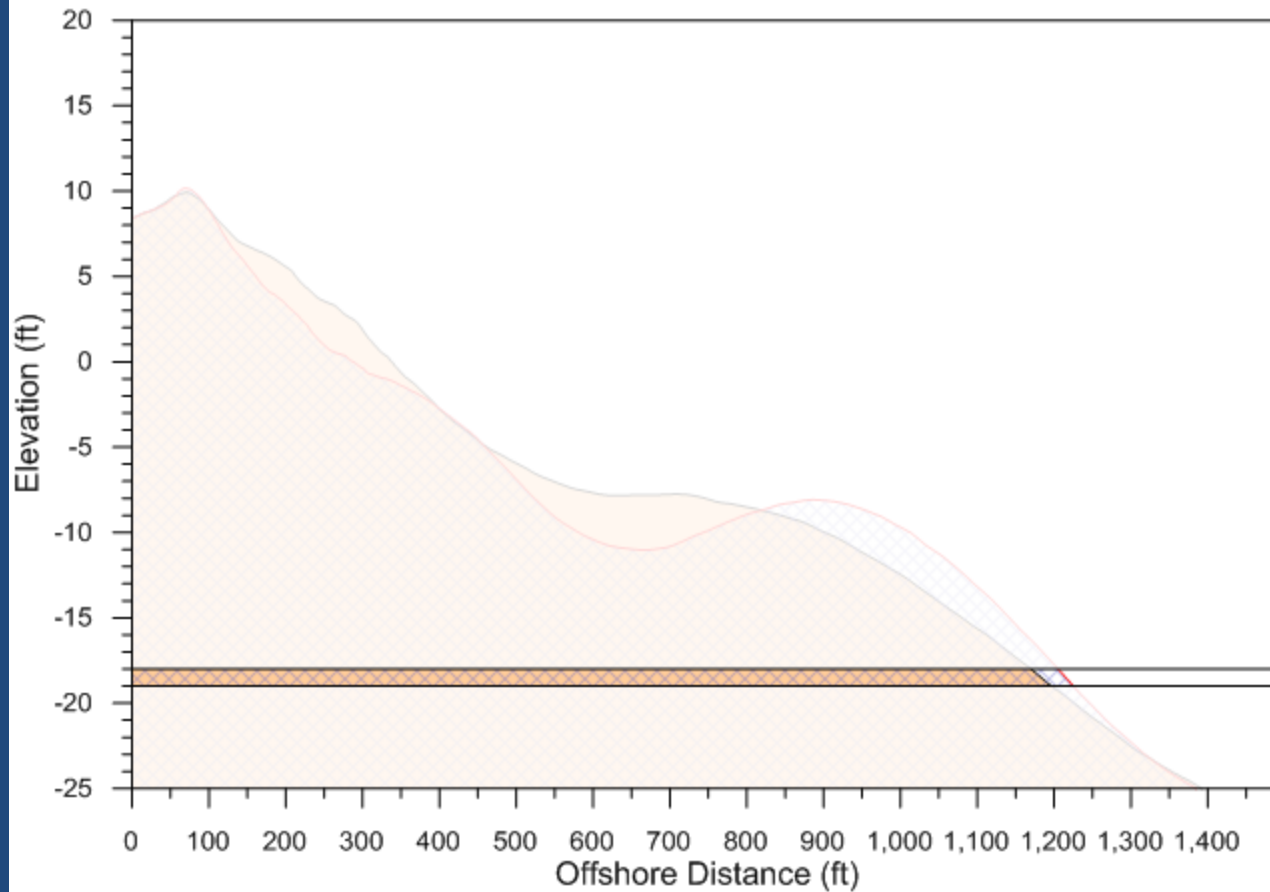
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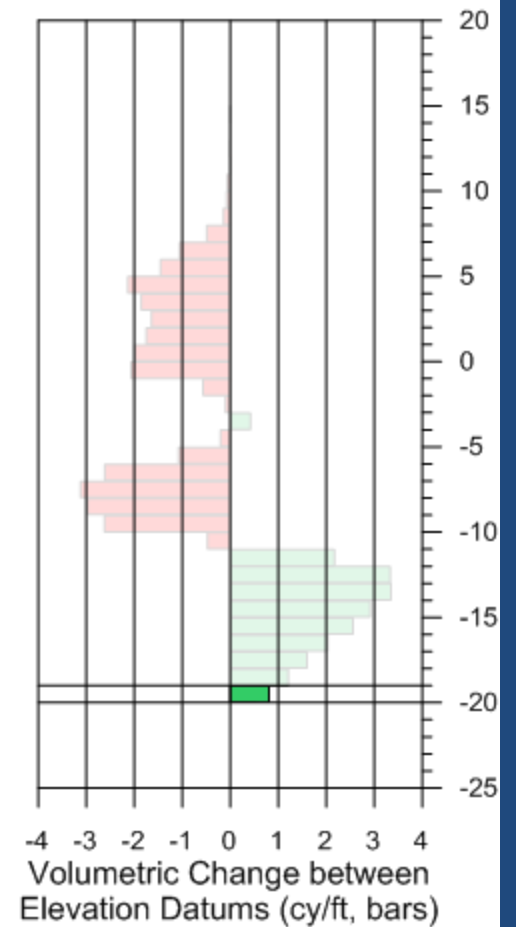
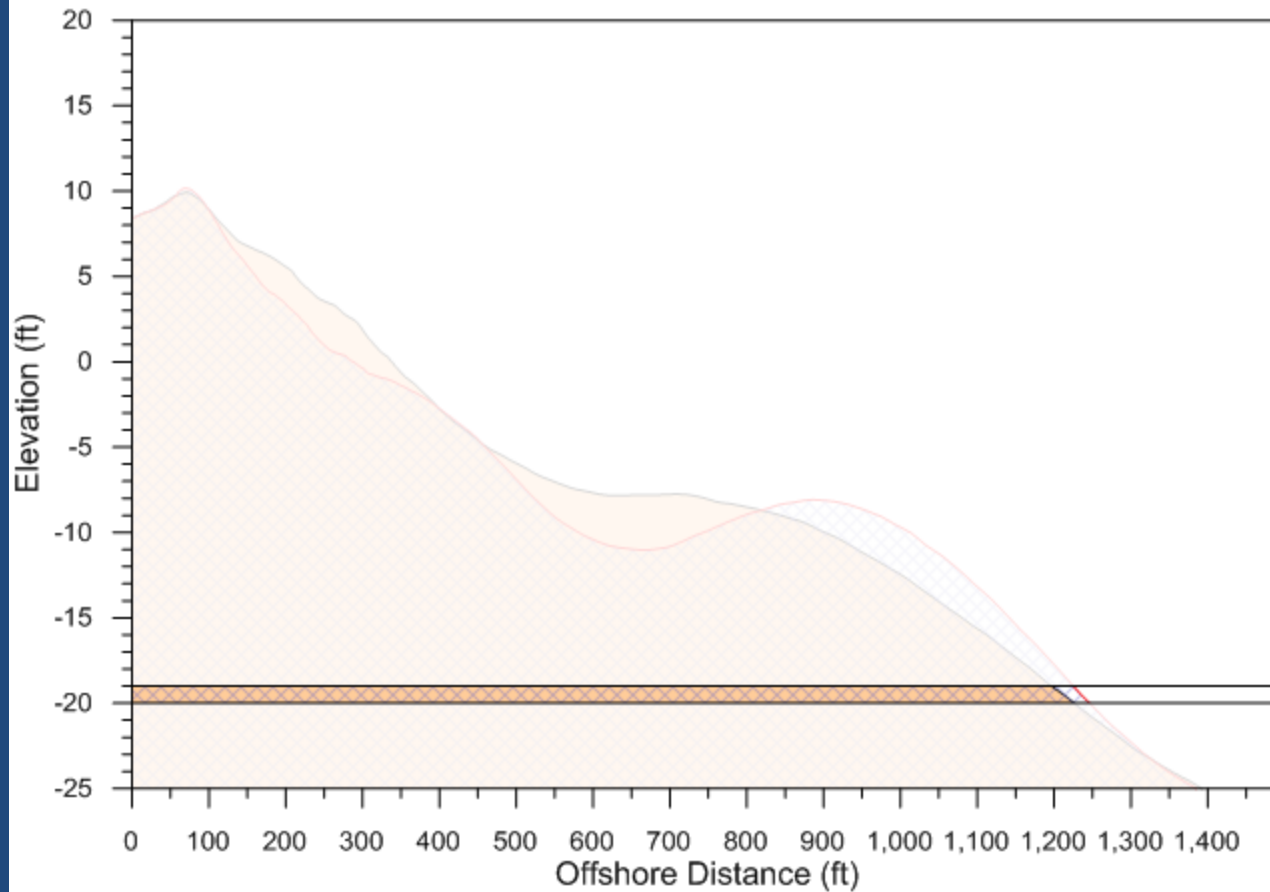
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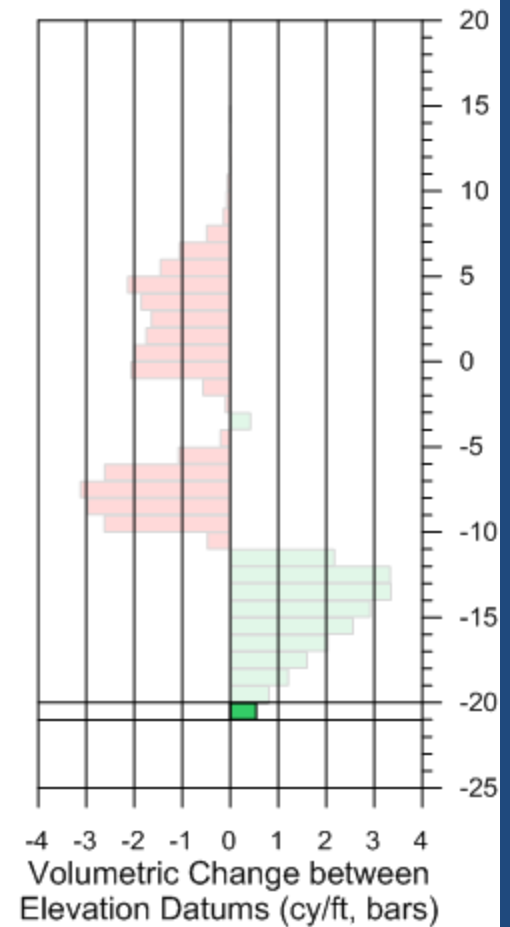
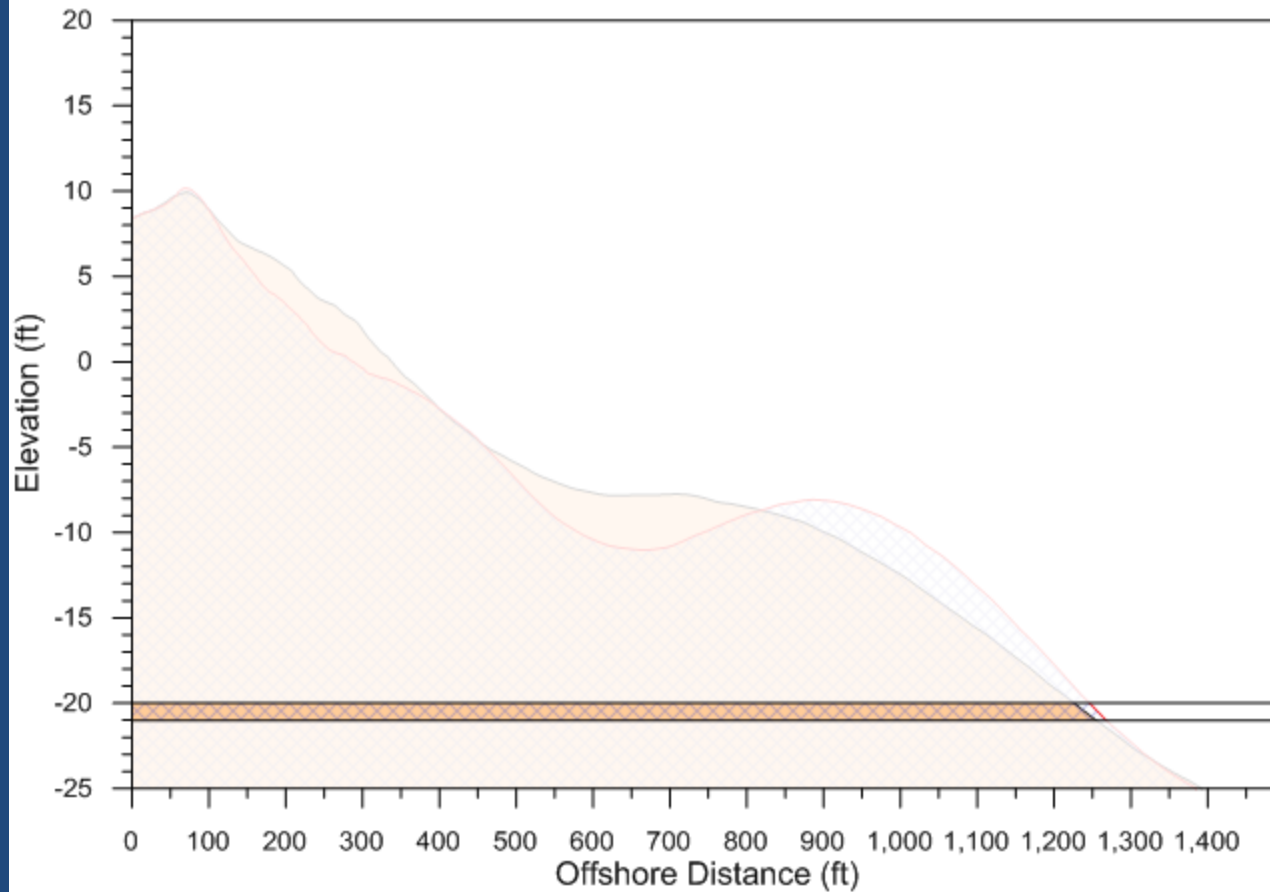
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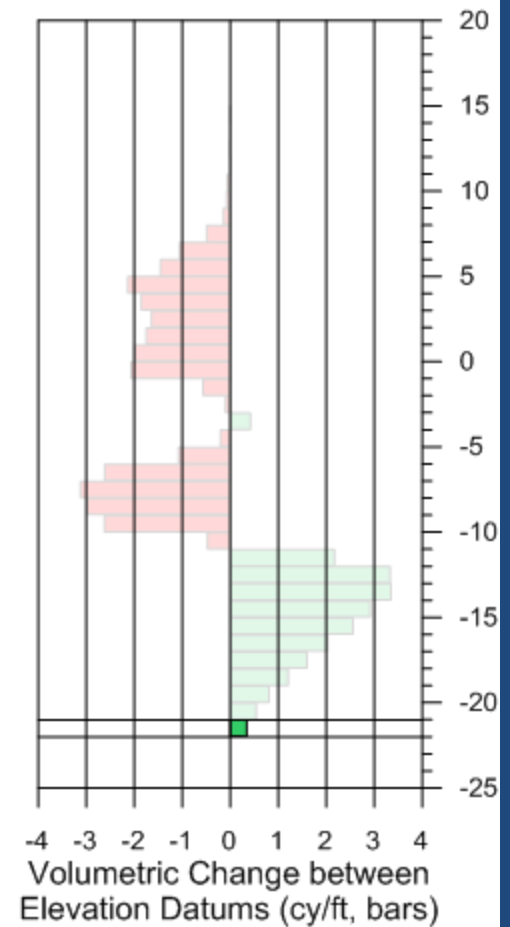
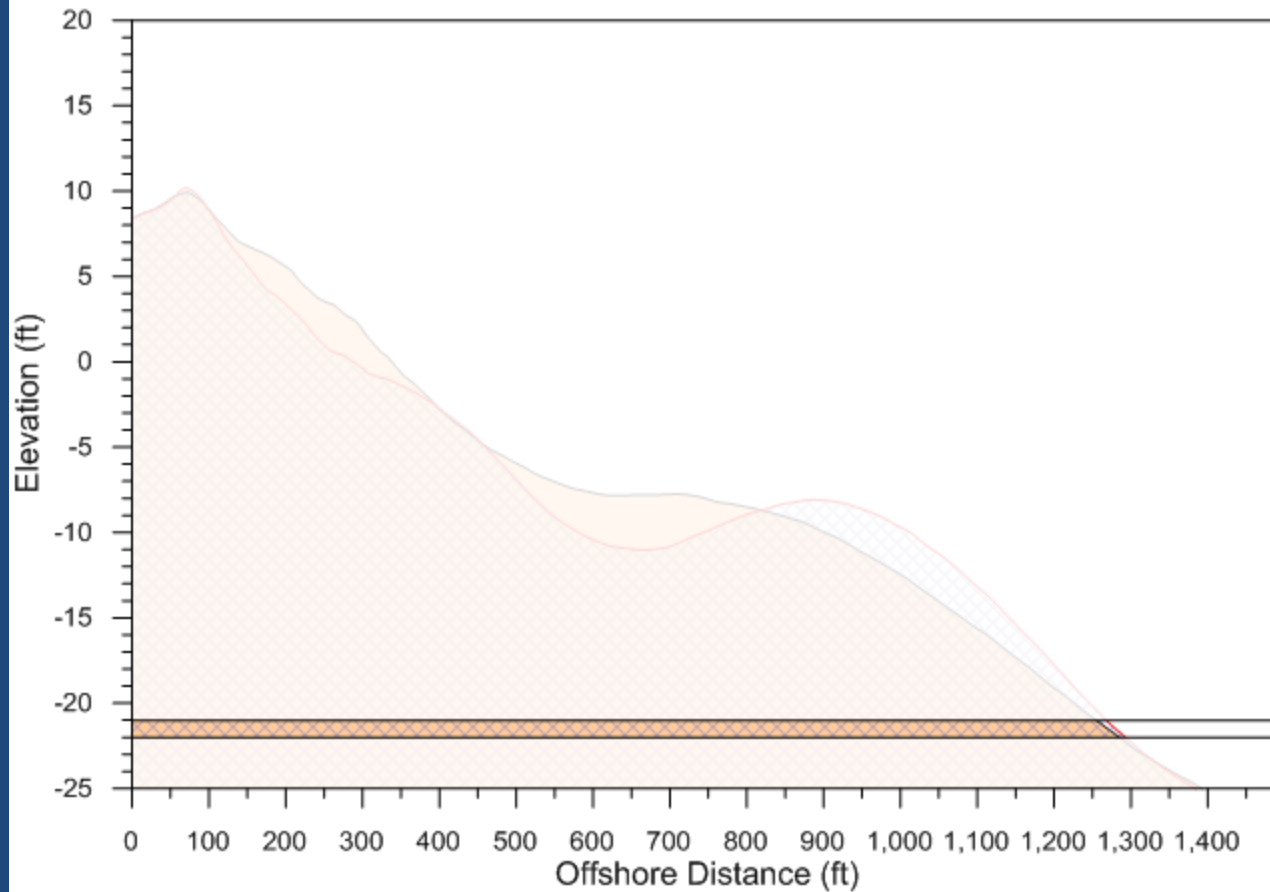
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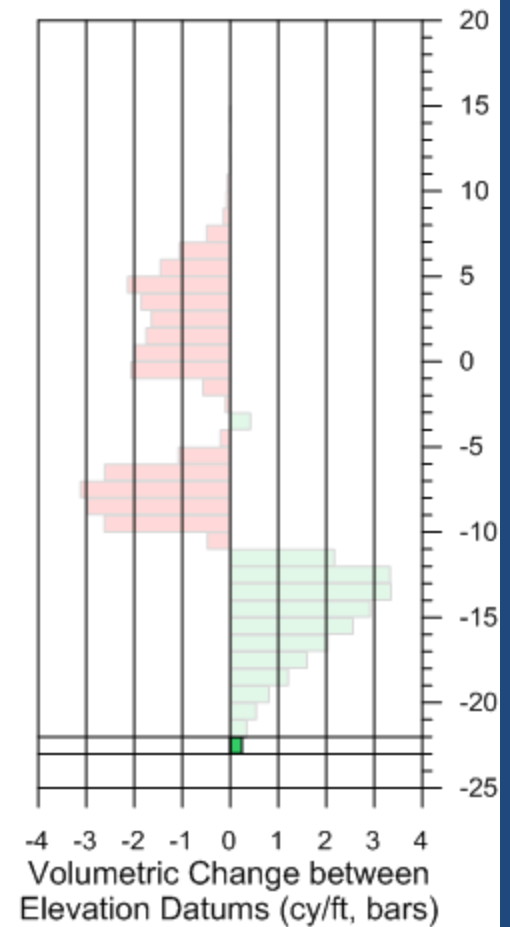
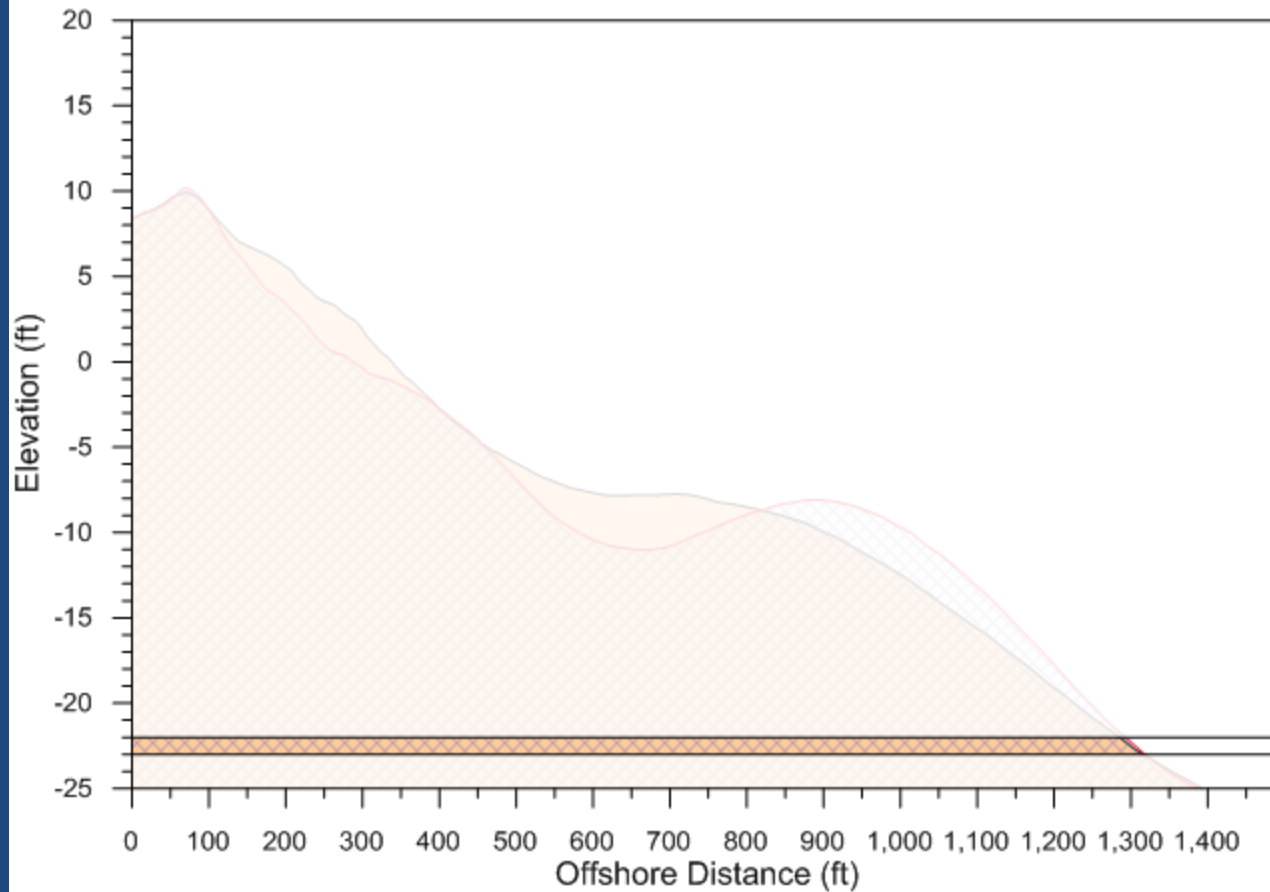
# Methodology



# Methodology

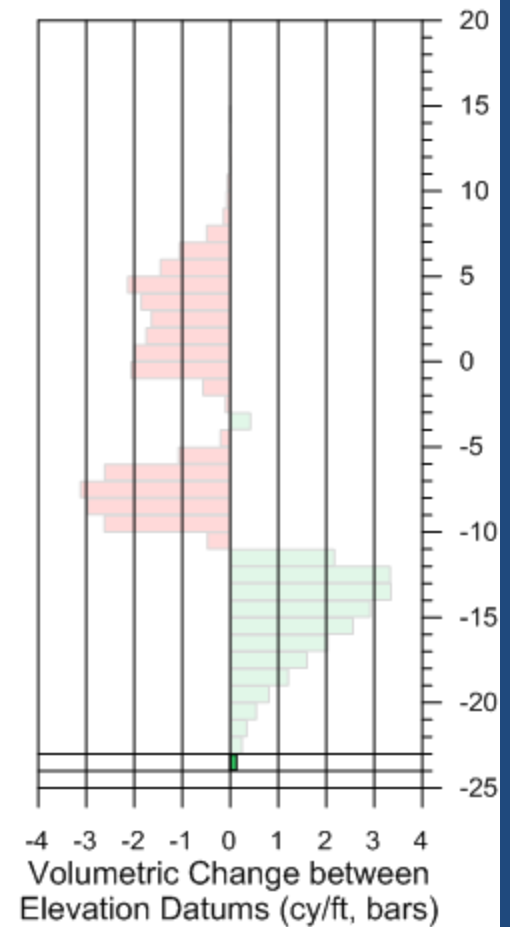
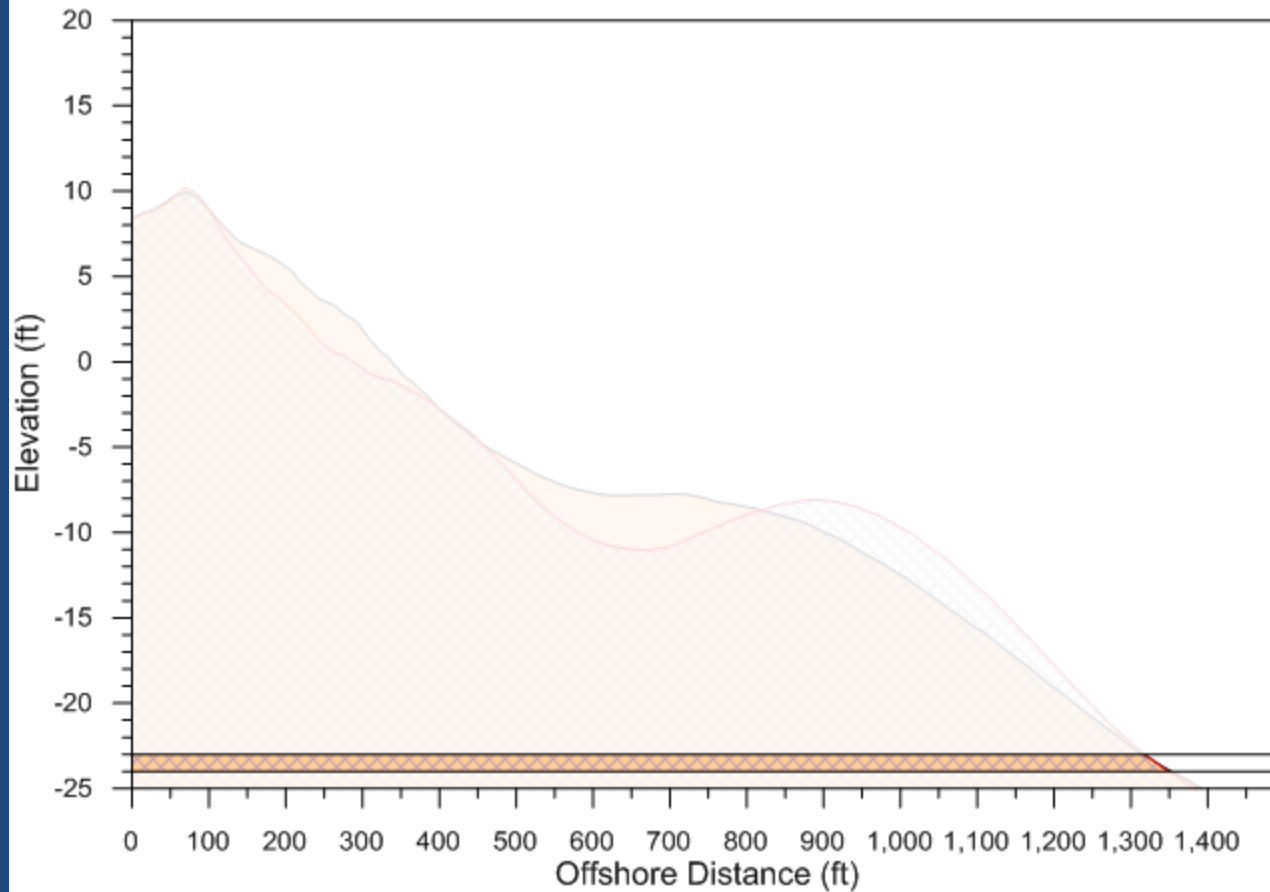


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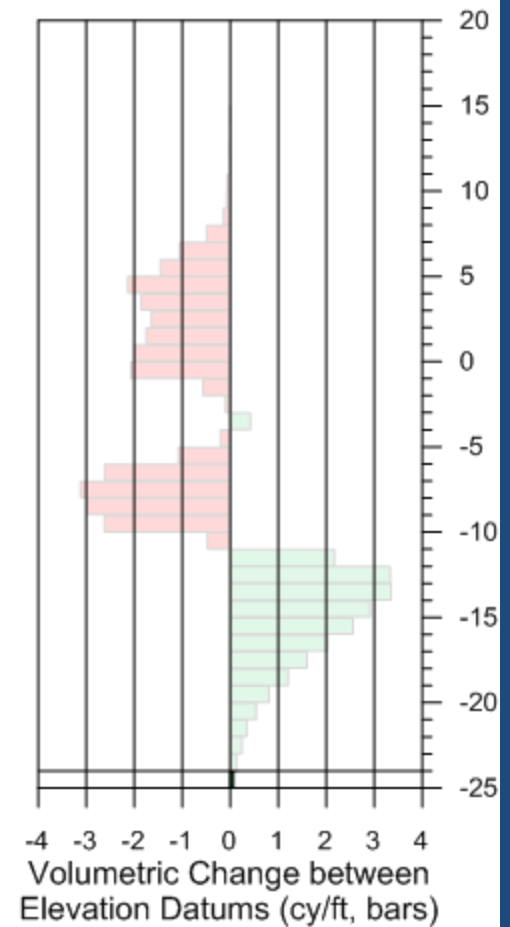
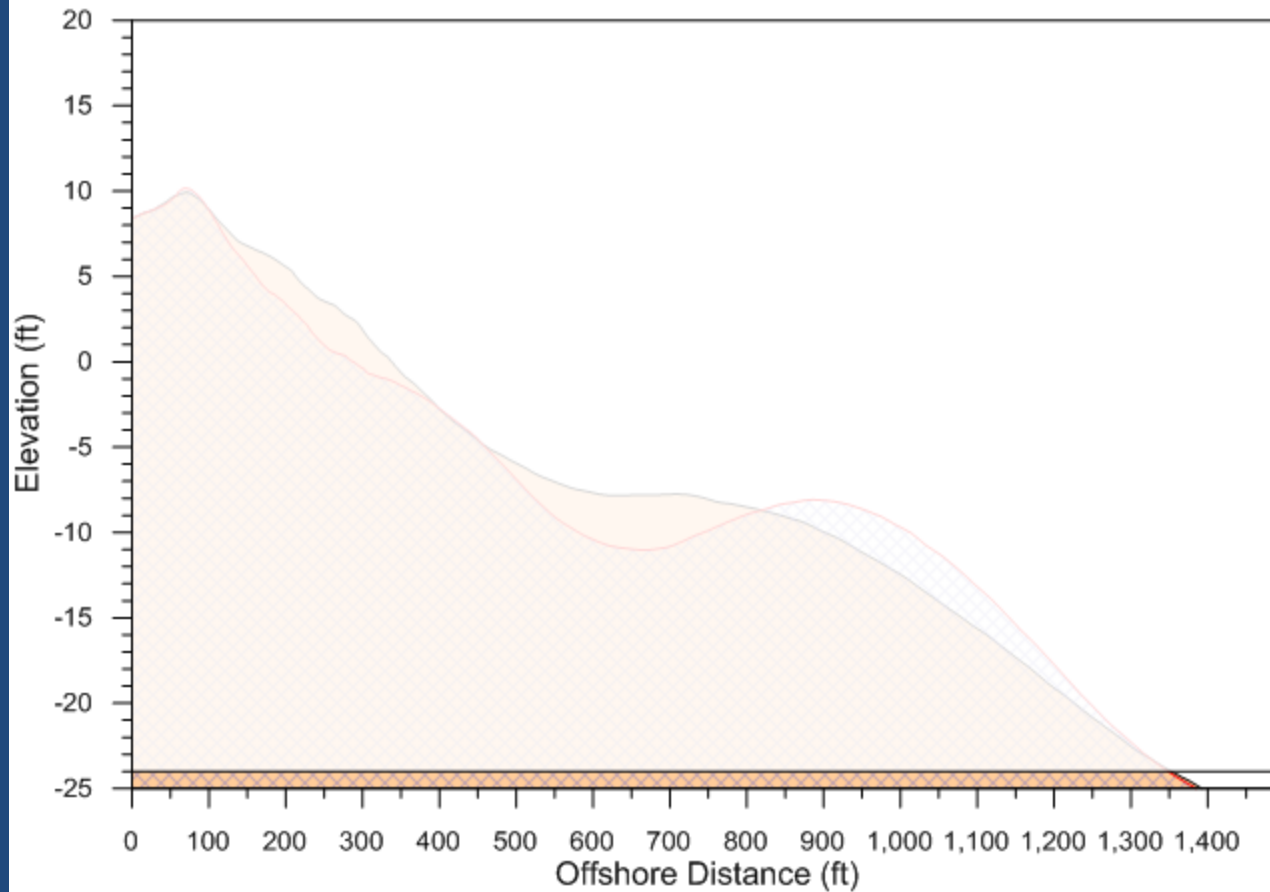




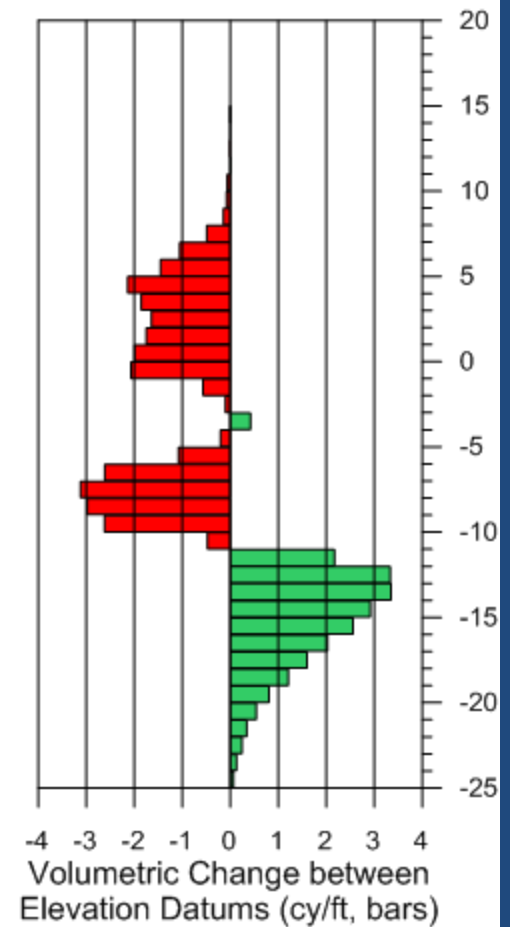
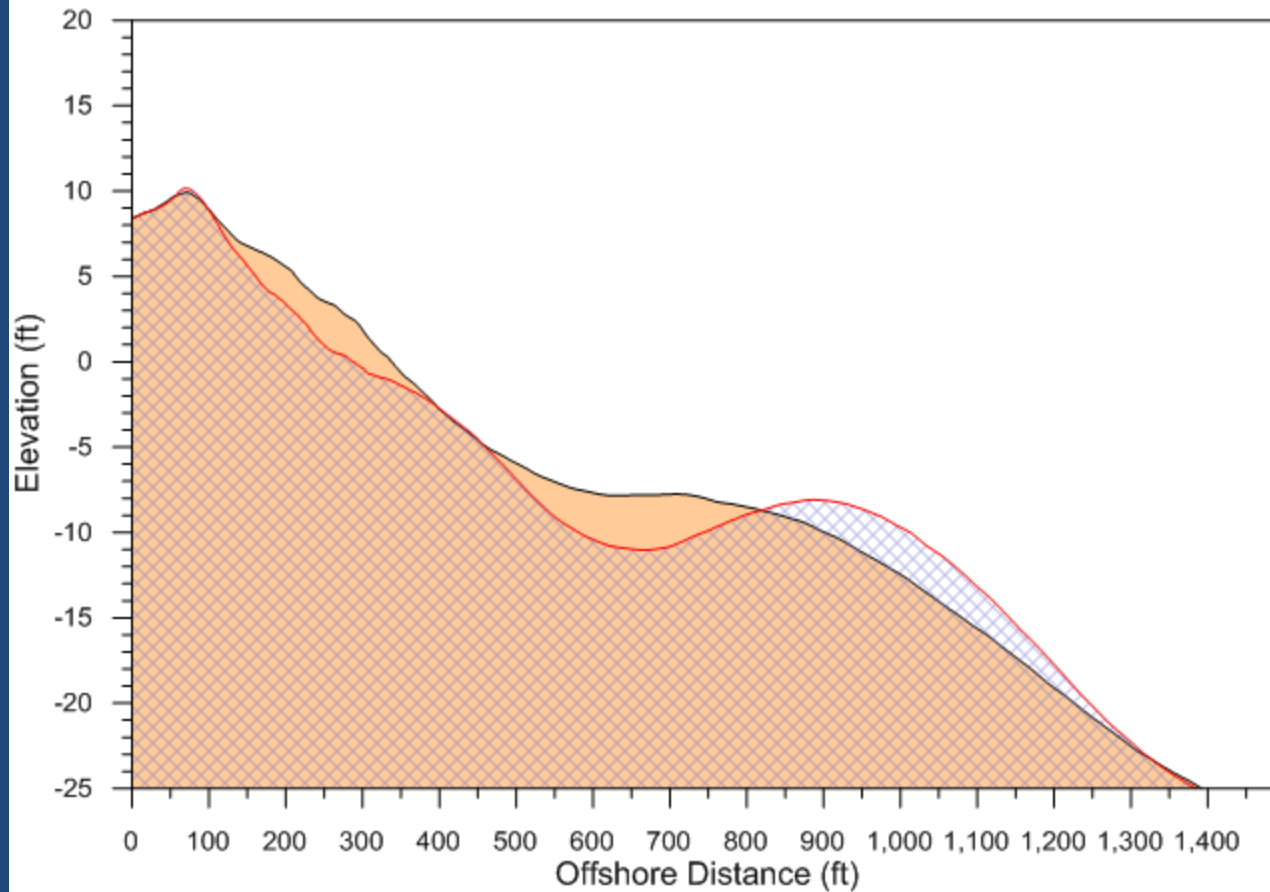
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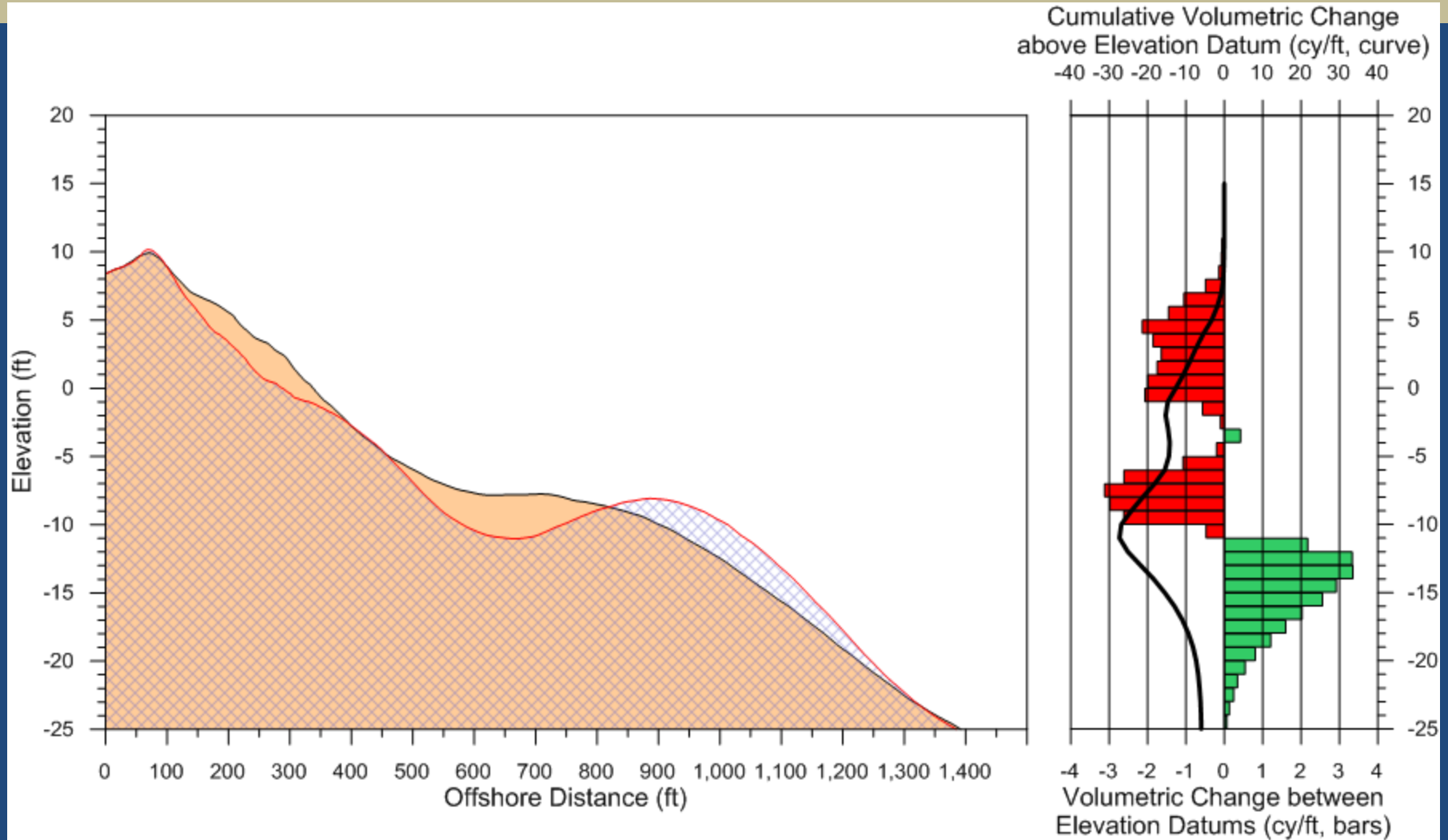
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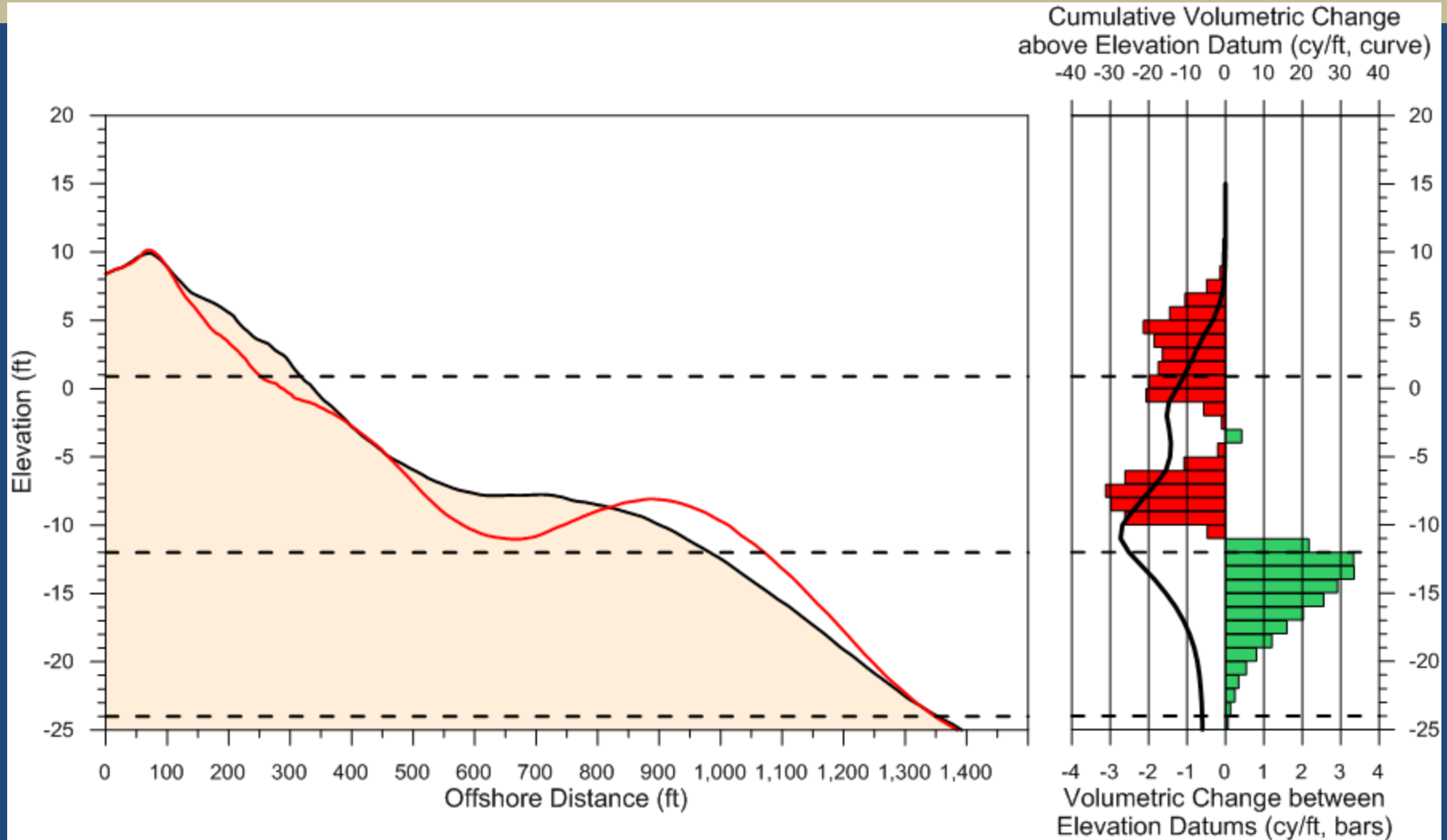
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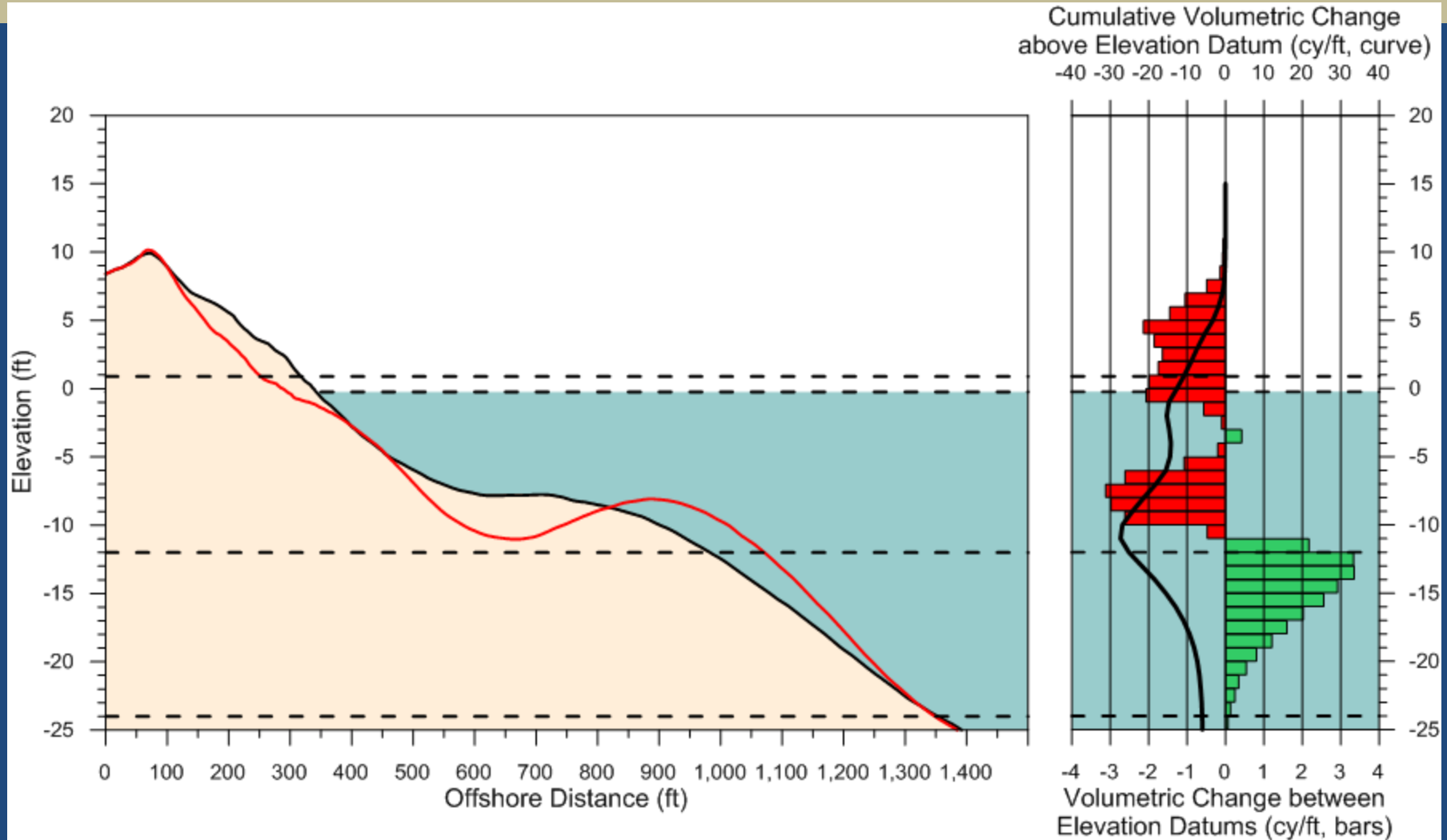
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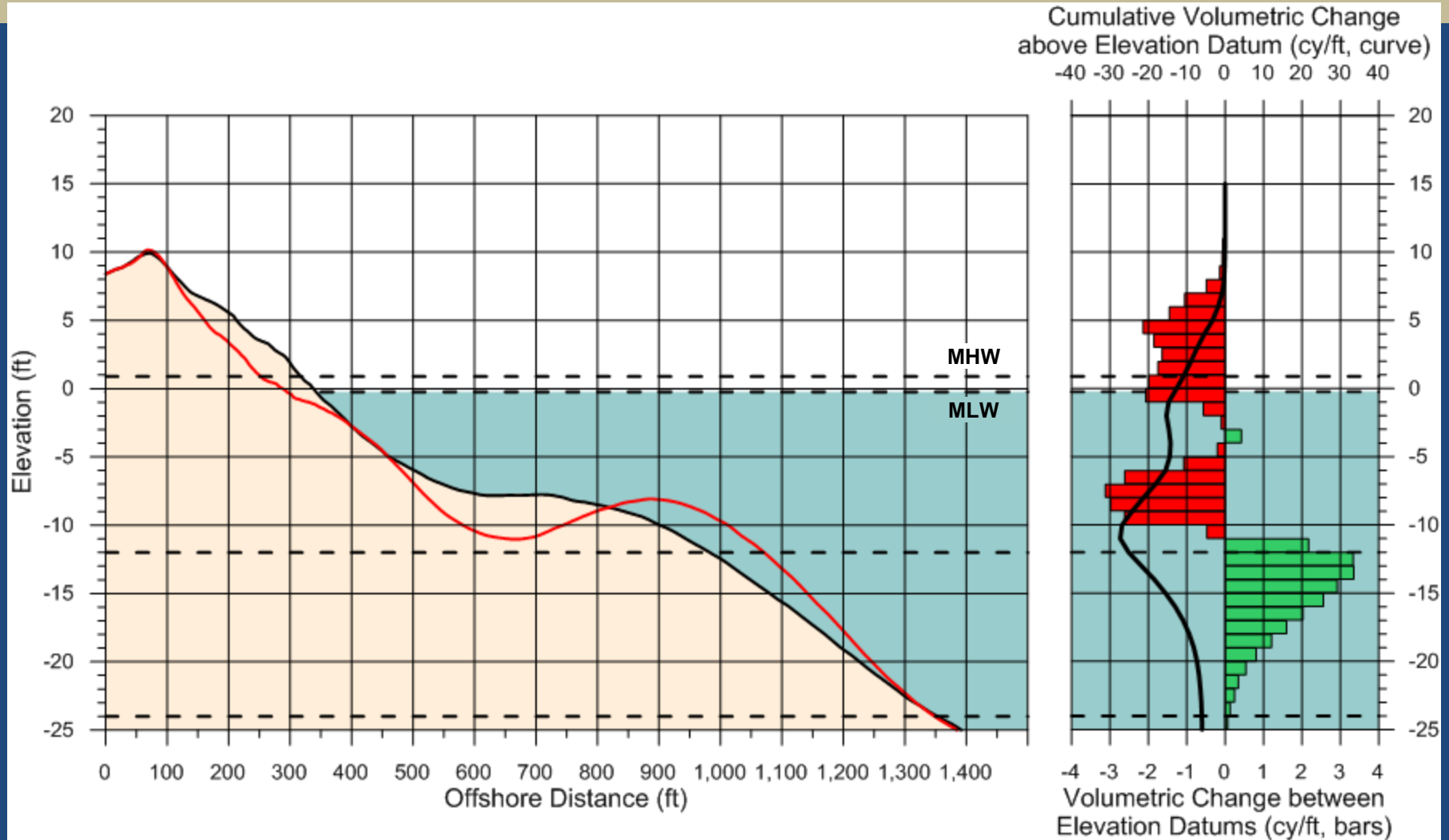
# Methodology



# Methodology



# Methodology



# Case Study – East Beach

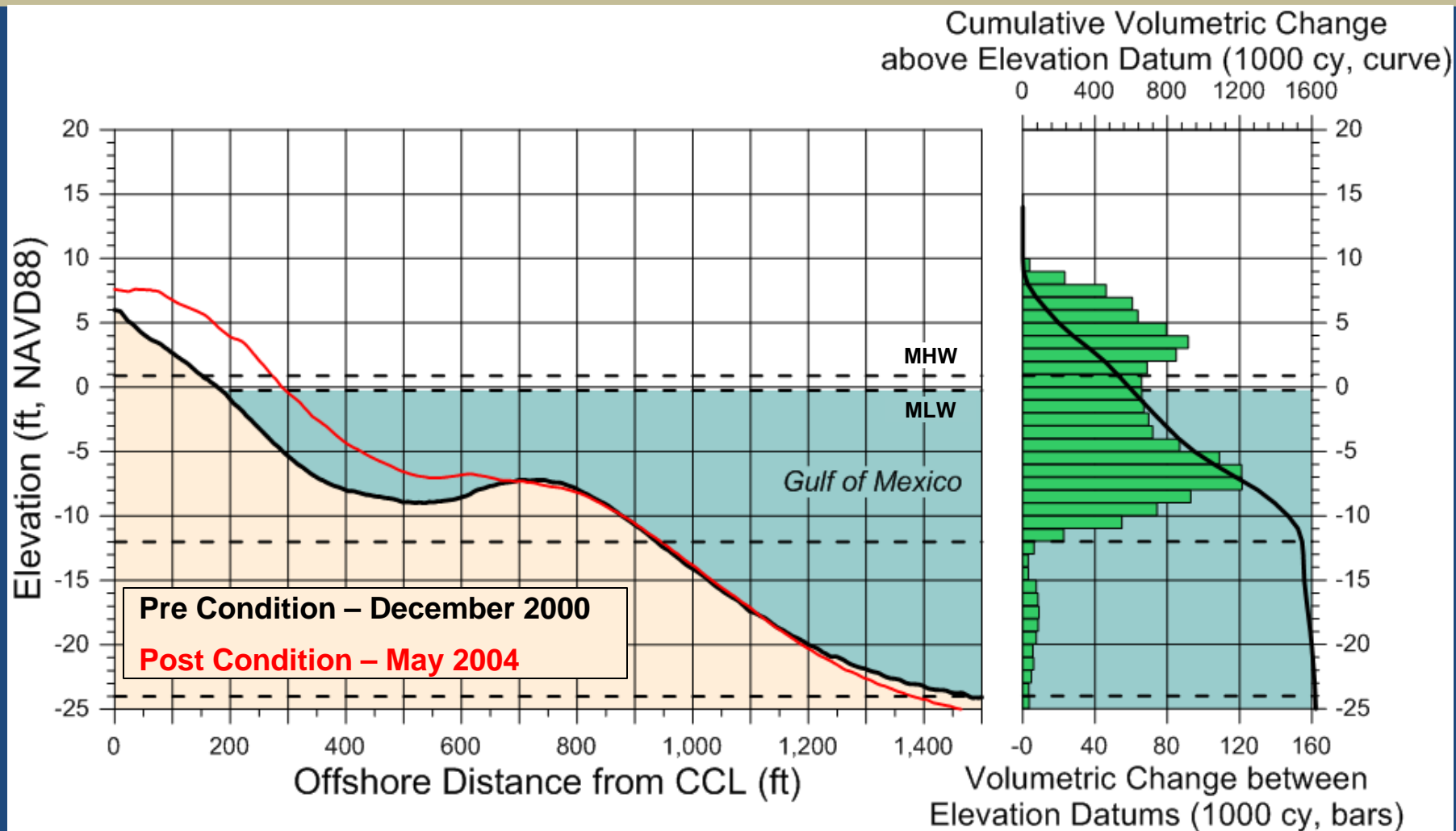




# December 2000 – May 2004

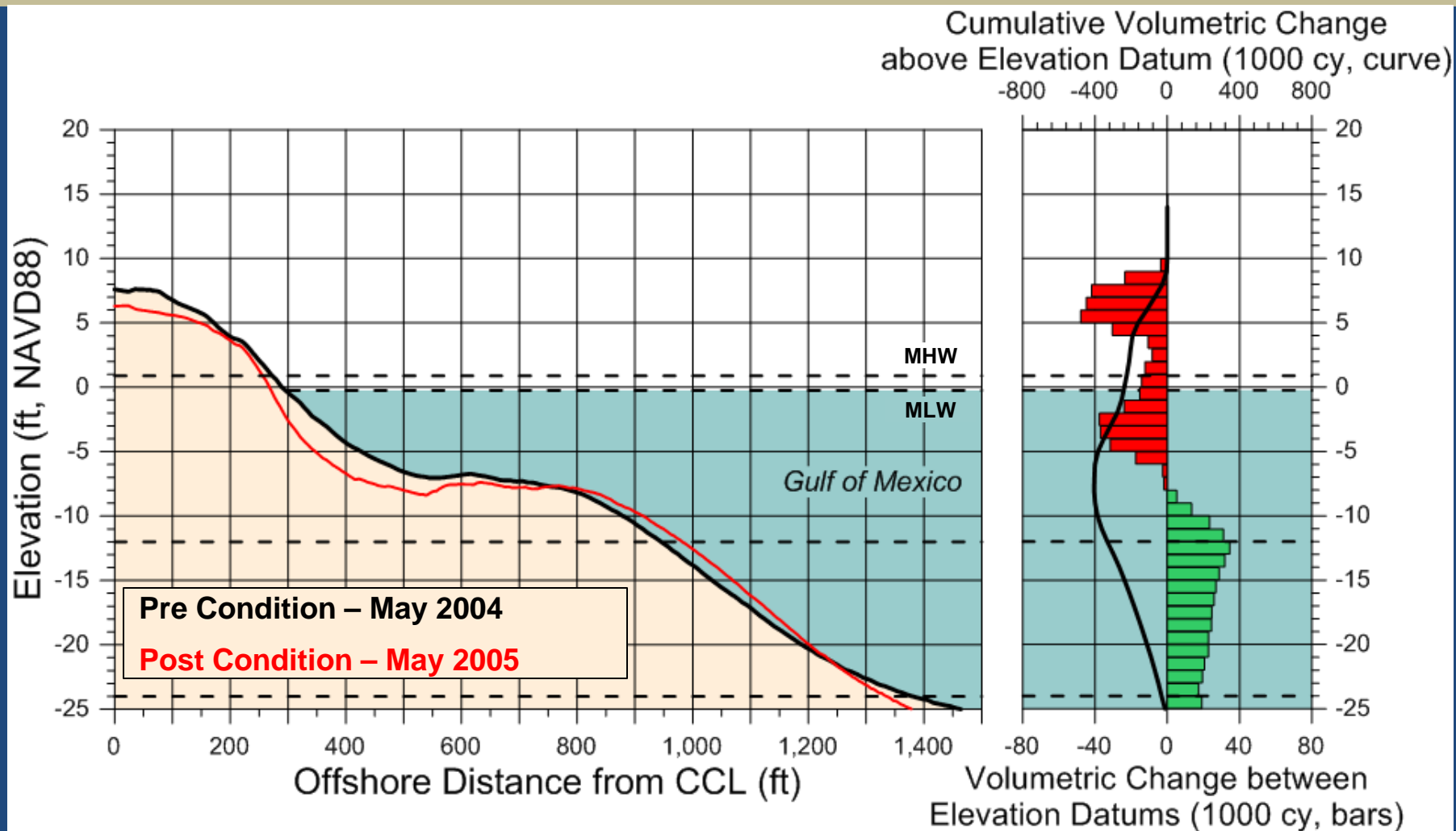
Beach Restoration (2001)

No major storm events



# May 2004 – May 2005

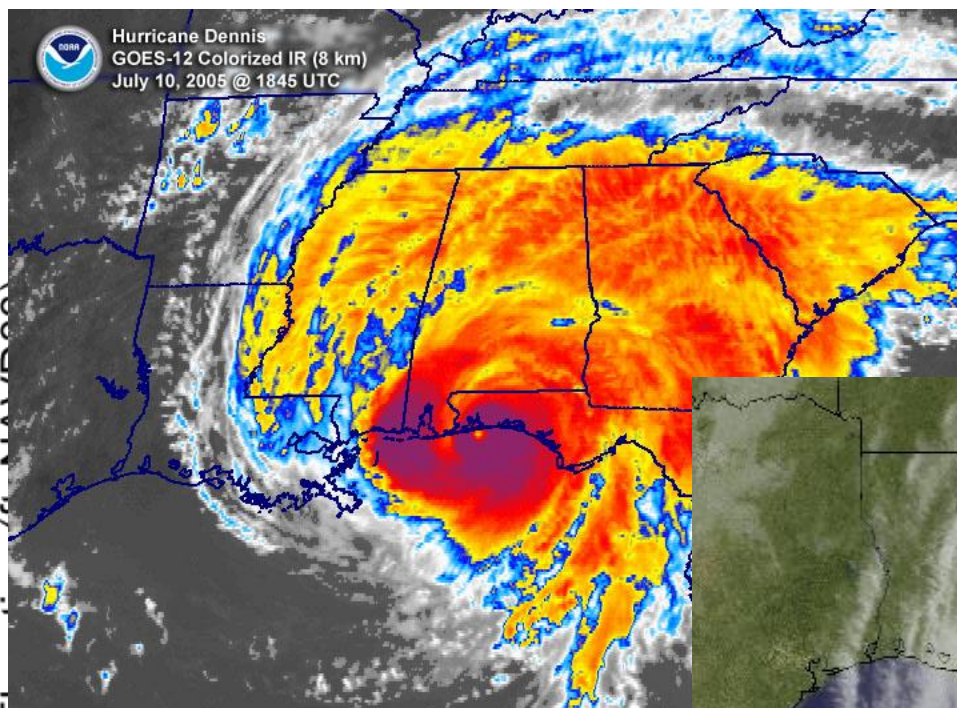
Hurricane Ivan (September 2004)



# May 2005 – May 2006

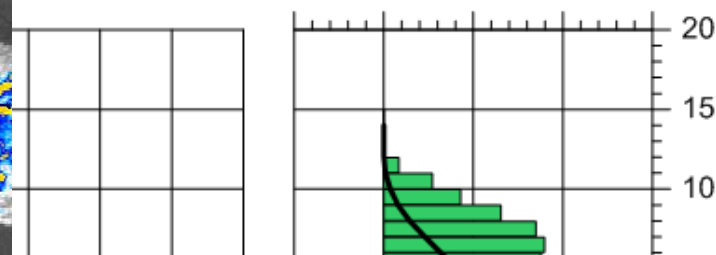
## Beach Renourishment

### Hurricanes Dennis and Katrina (during construction)



Cumulative Volumetric Change  
above Elevation Datum (1000 cy, curve)

-400 0 400 800 1200



Pre Condition – May 2005

Post Condition – May 2006

-20  
-25

0 200 400 600 800

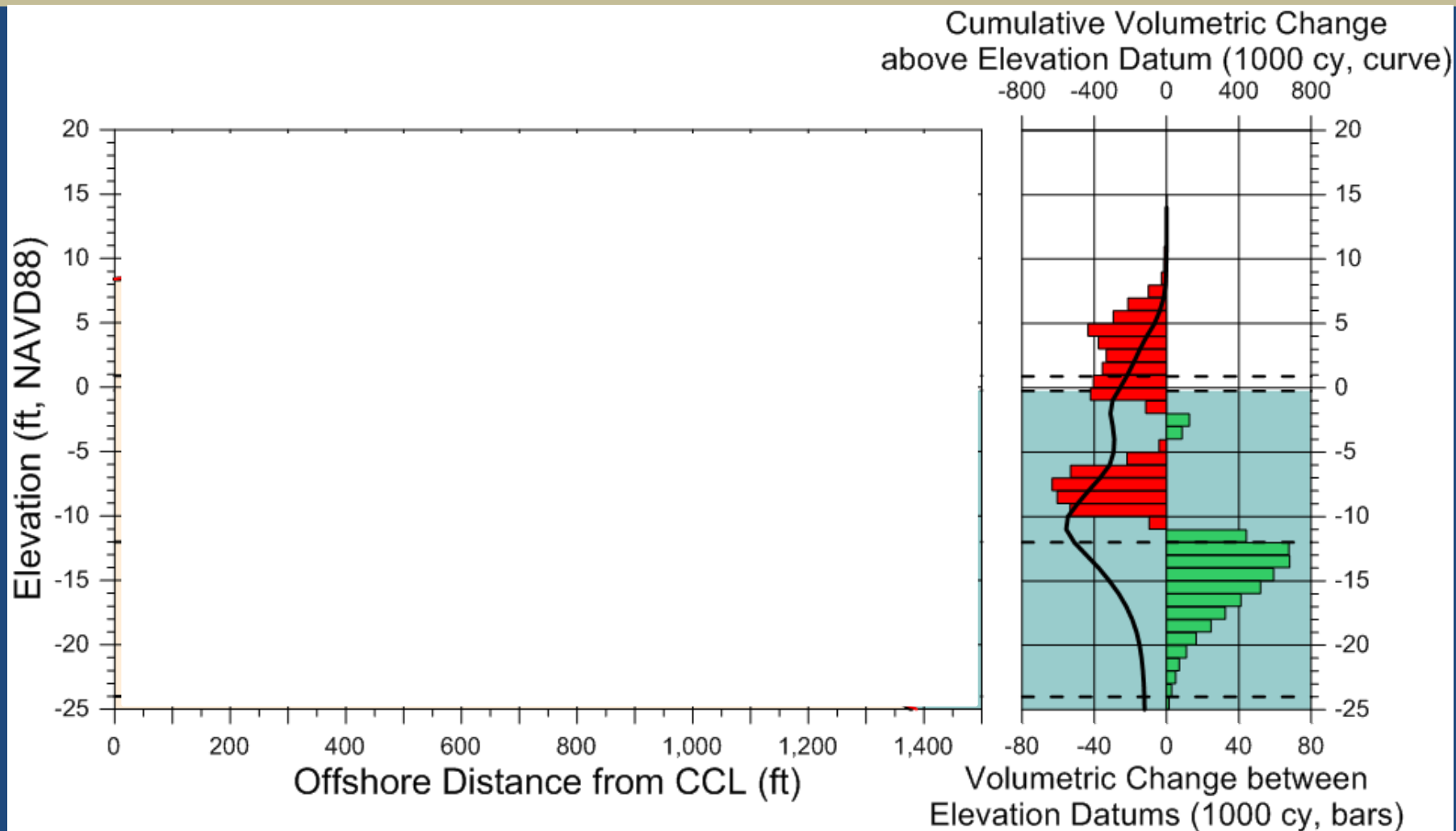
Offshore Distance



Elevation Datums (1000 cy, bars)

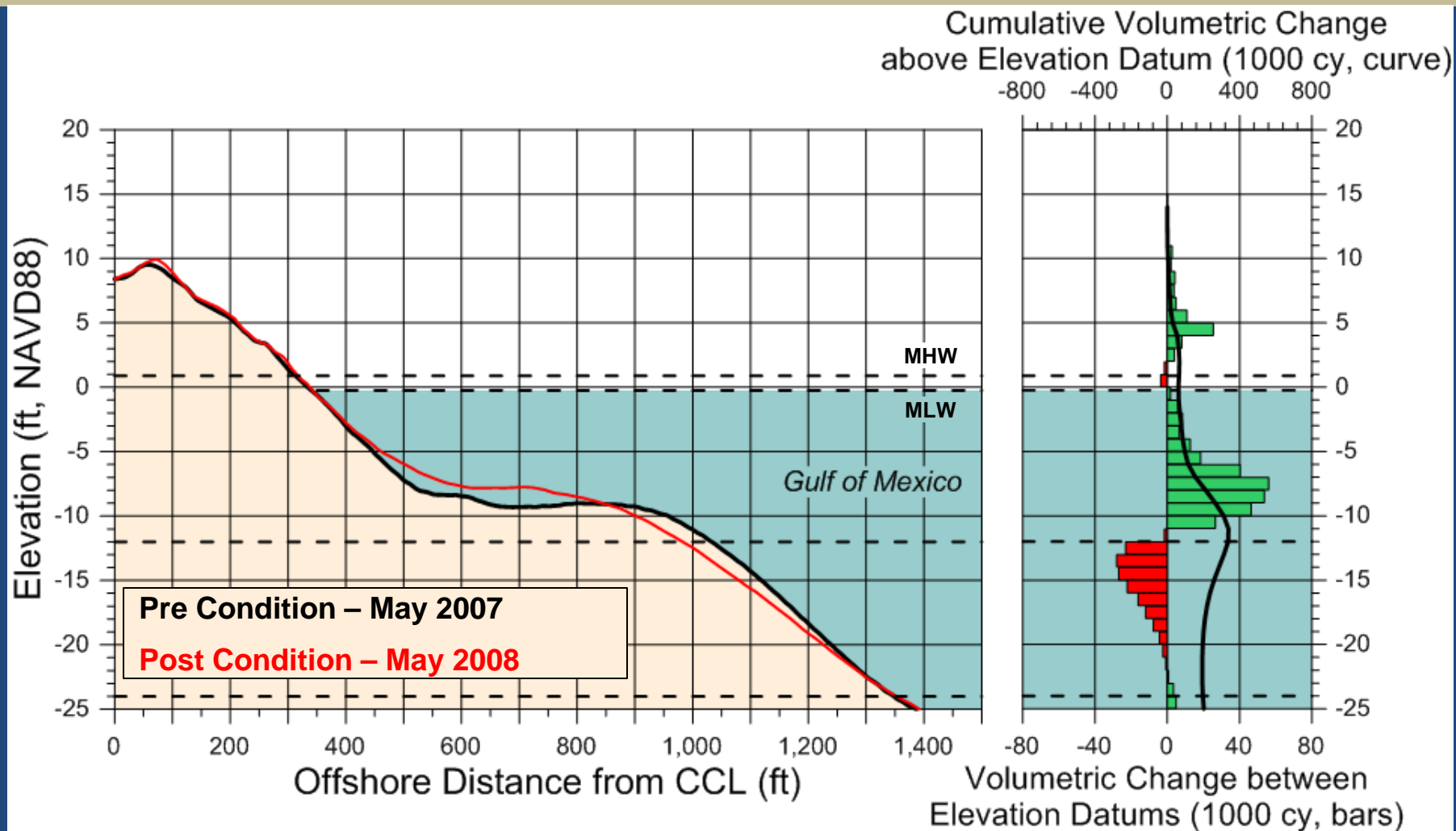
# May 2006 – May 2007

Post- to one-year post-construction  
Equilibration and calm-weather recovery



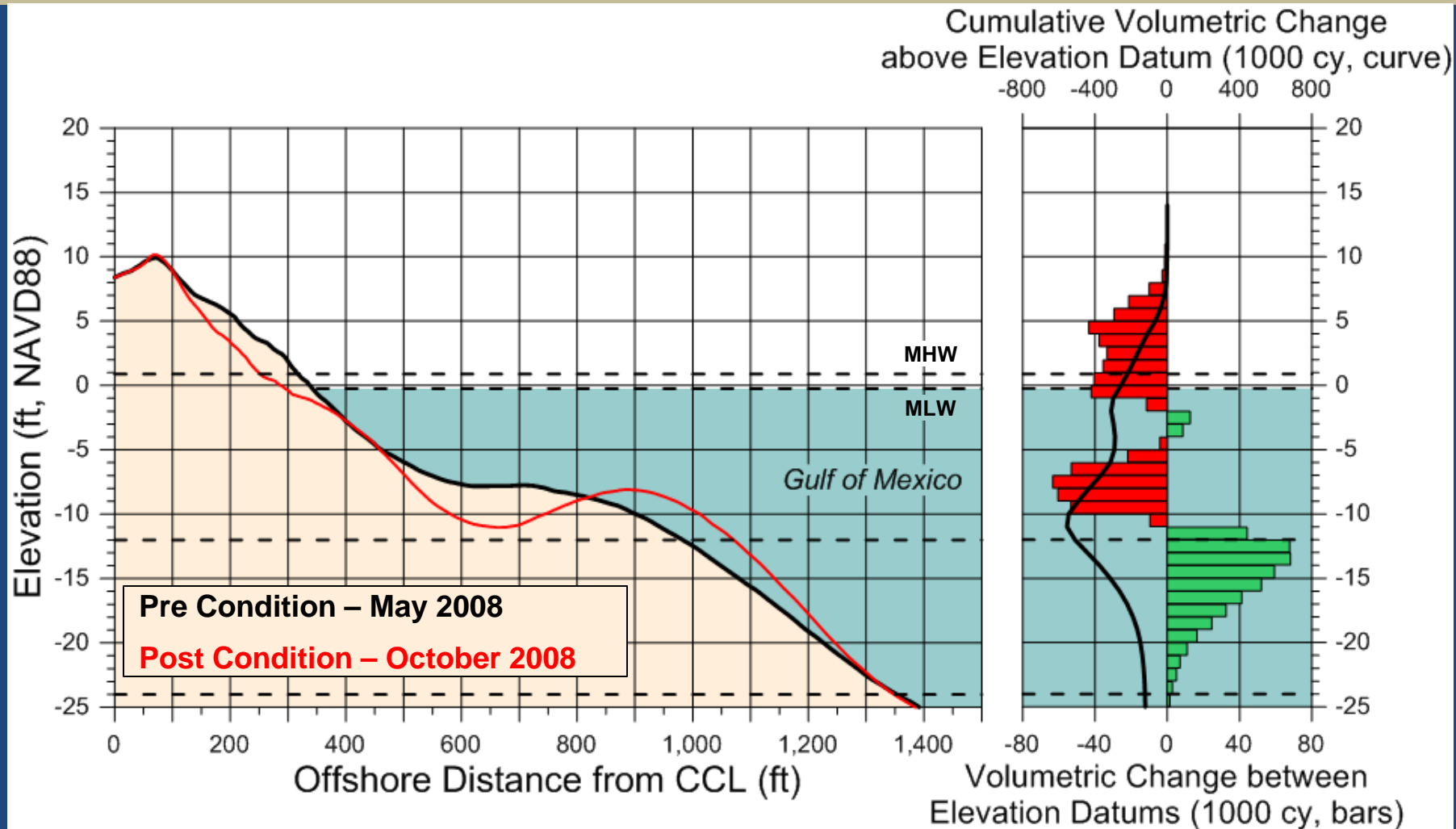
# May 2007 – May 2008

One-year to two-year post-construction  
Calm weather recovery



# May 2008 – October 2008

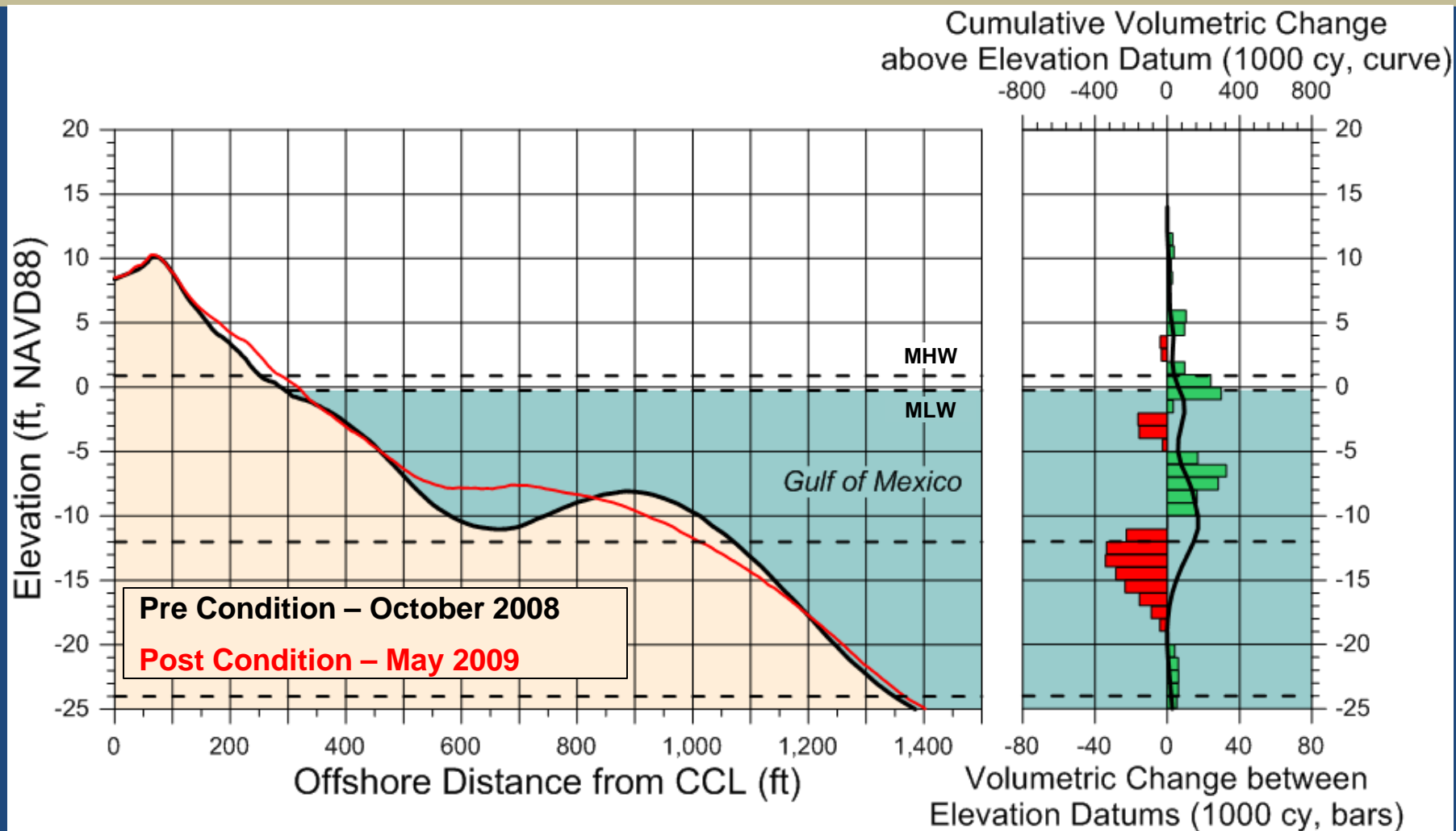
## Hurricanes Gustav and Ike





# October 2008 – May 2009

Calm-weather recovery

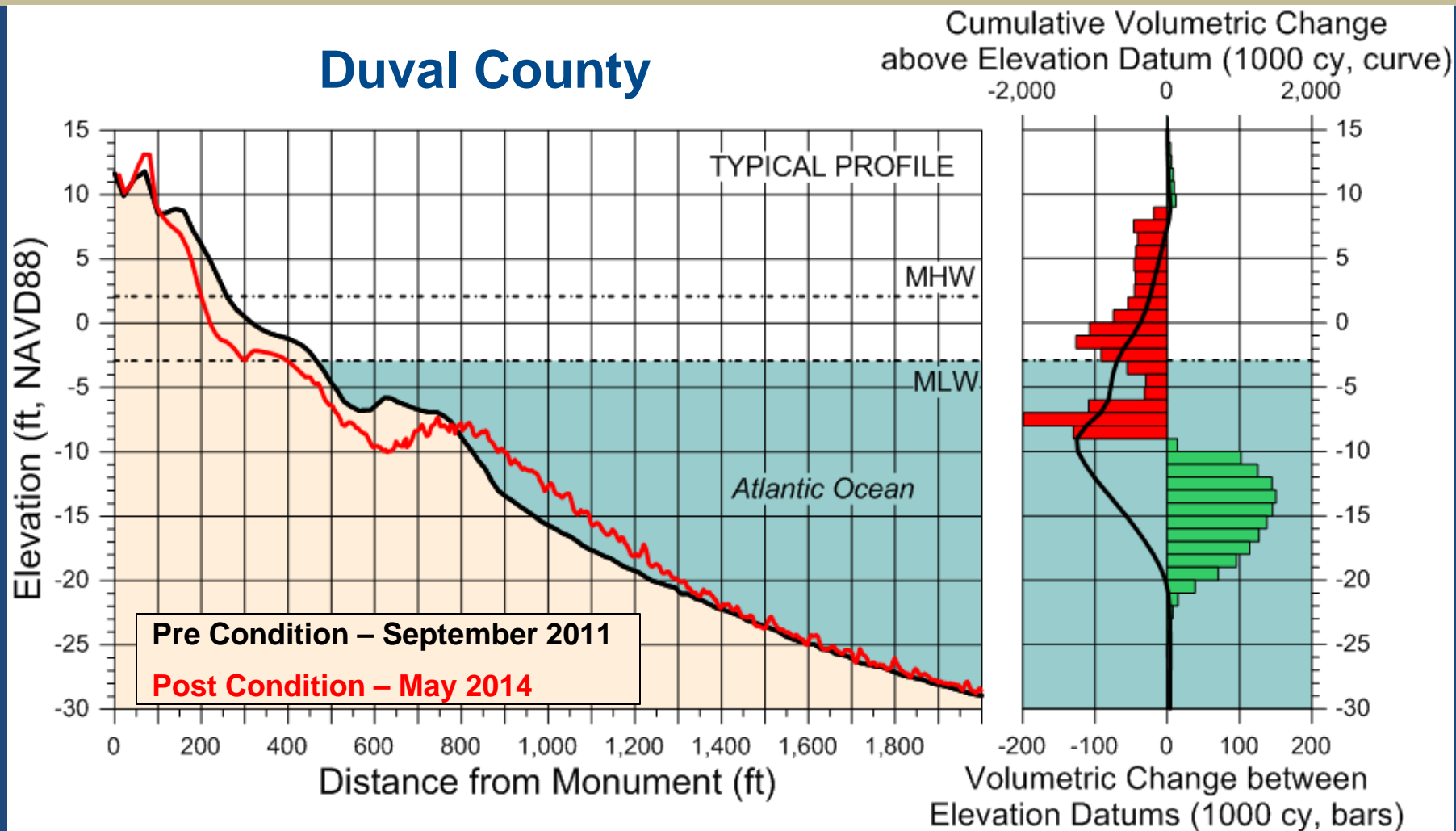


September 2011 (AD) – May 2014

Post-construction equilibrium

# Survey Closure

## Duval County

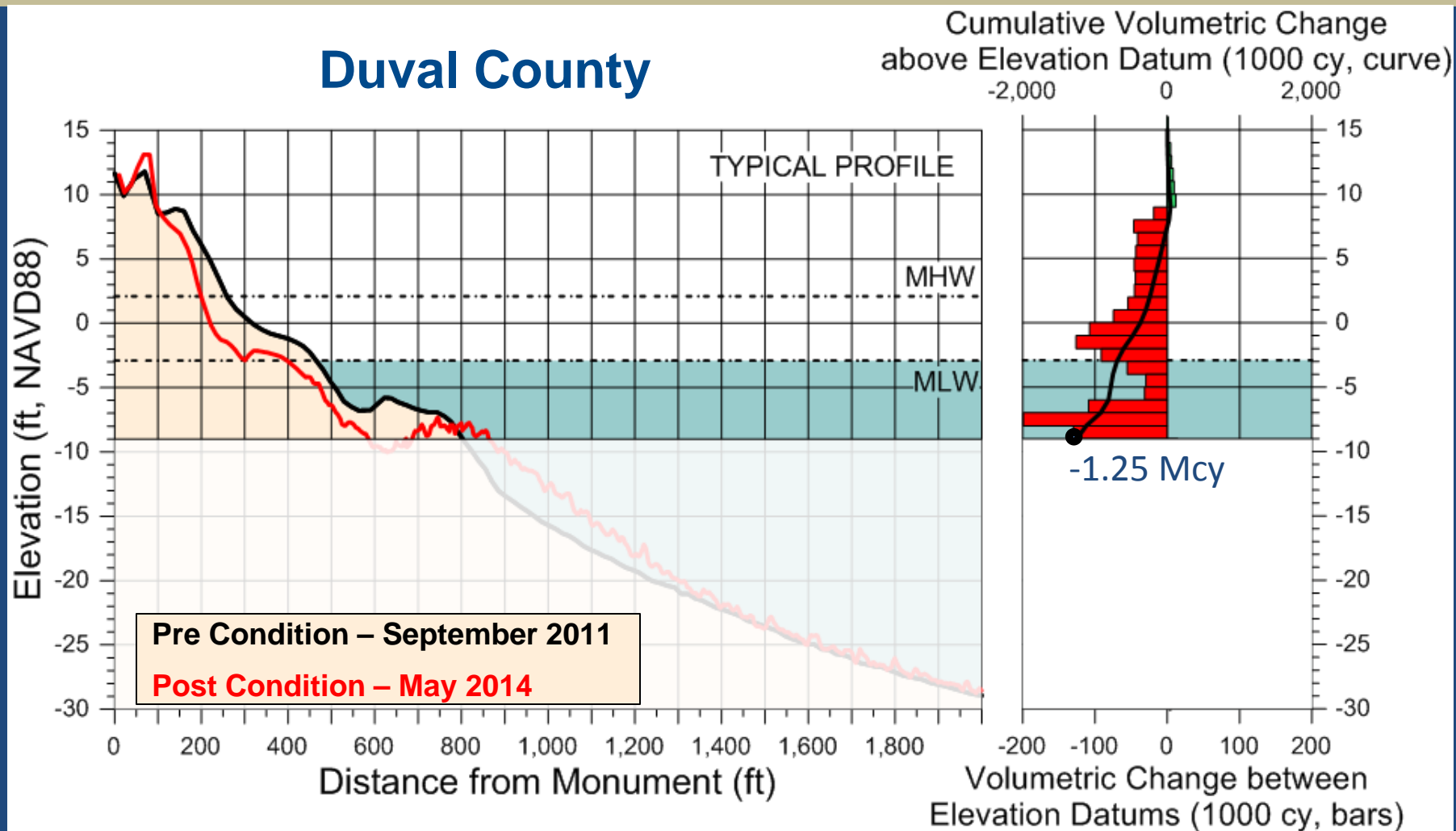




# September 2011 (AD) – May 2014

Post-construction equilibration

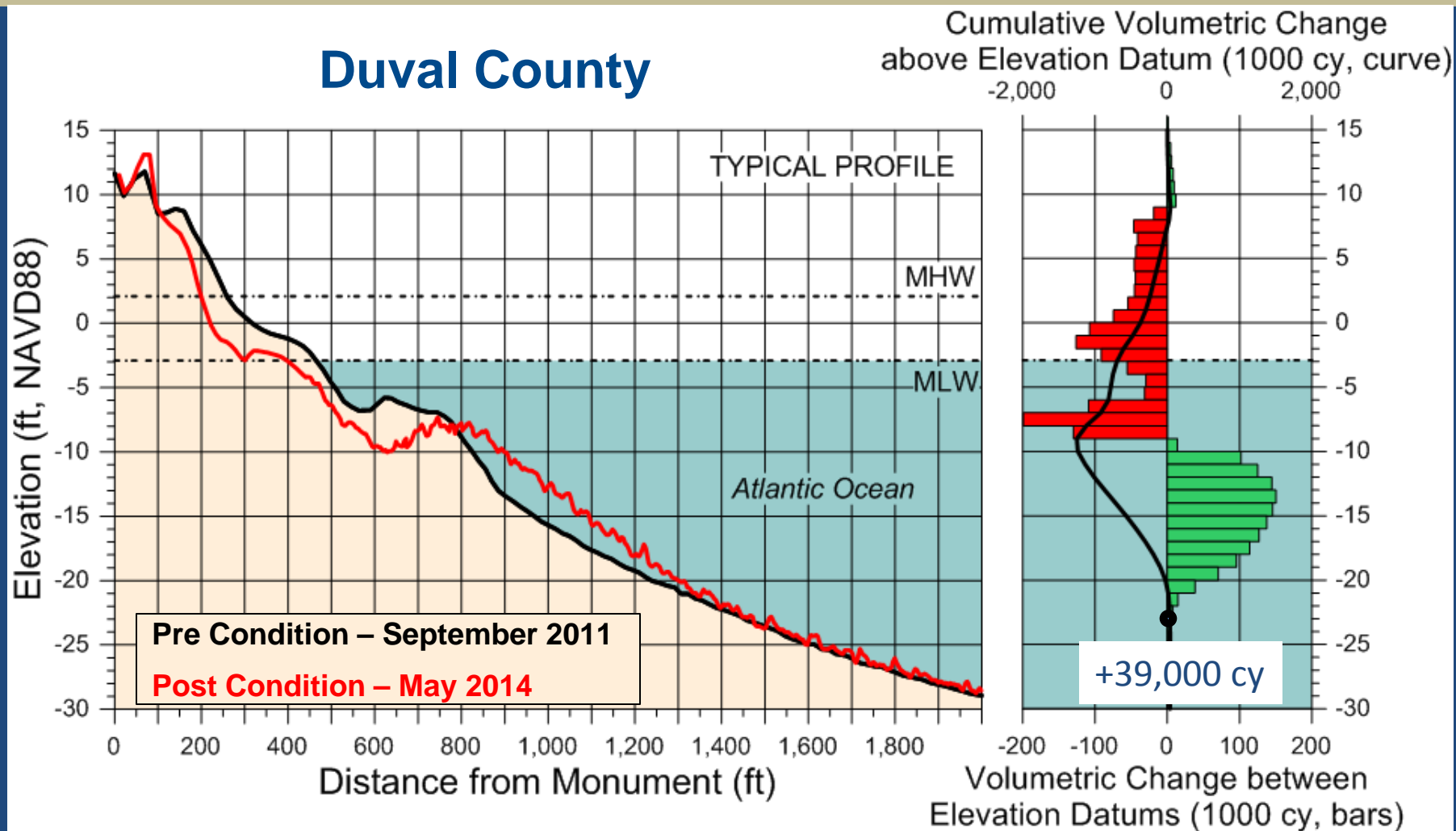
## Duval County



# September 2011 (AD) – May 2014

Post-construction equilibration

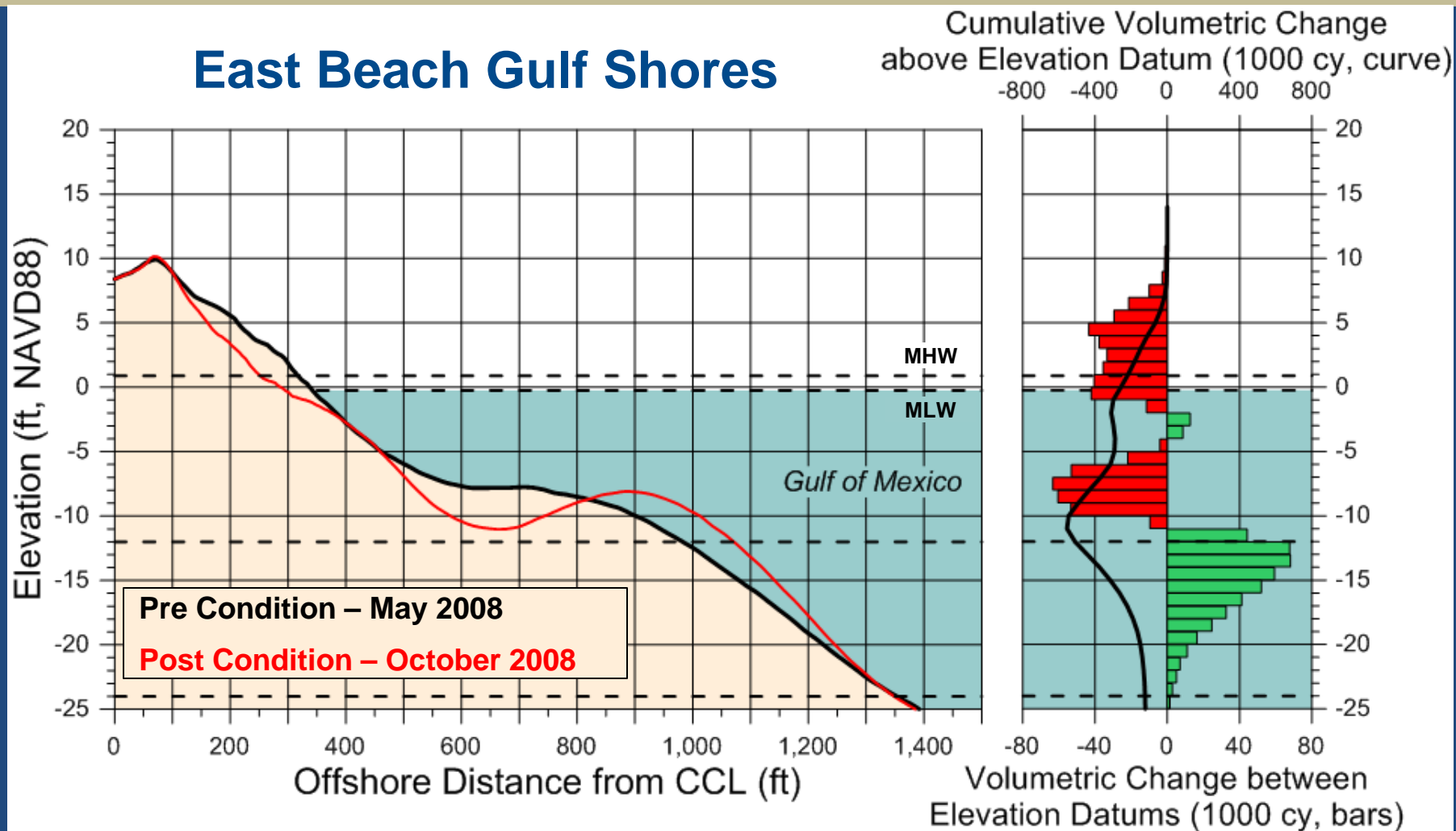
## Duval County



# May 2008 – October 2008

Hurricanes Gustav and Ike

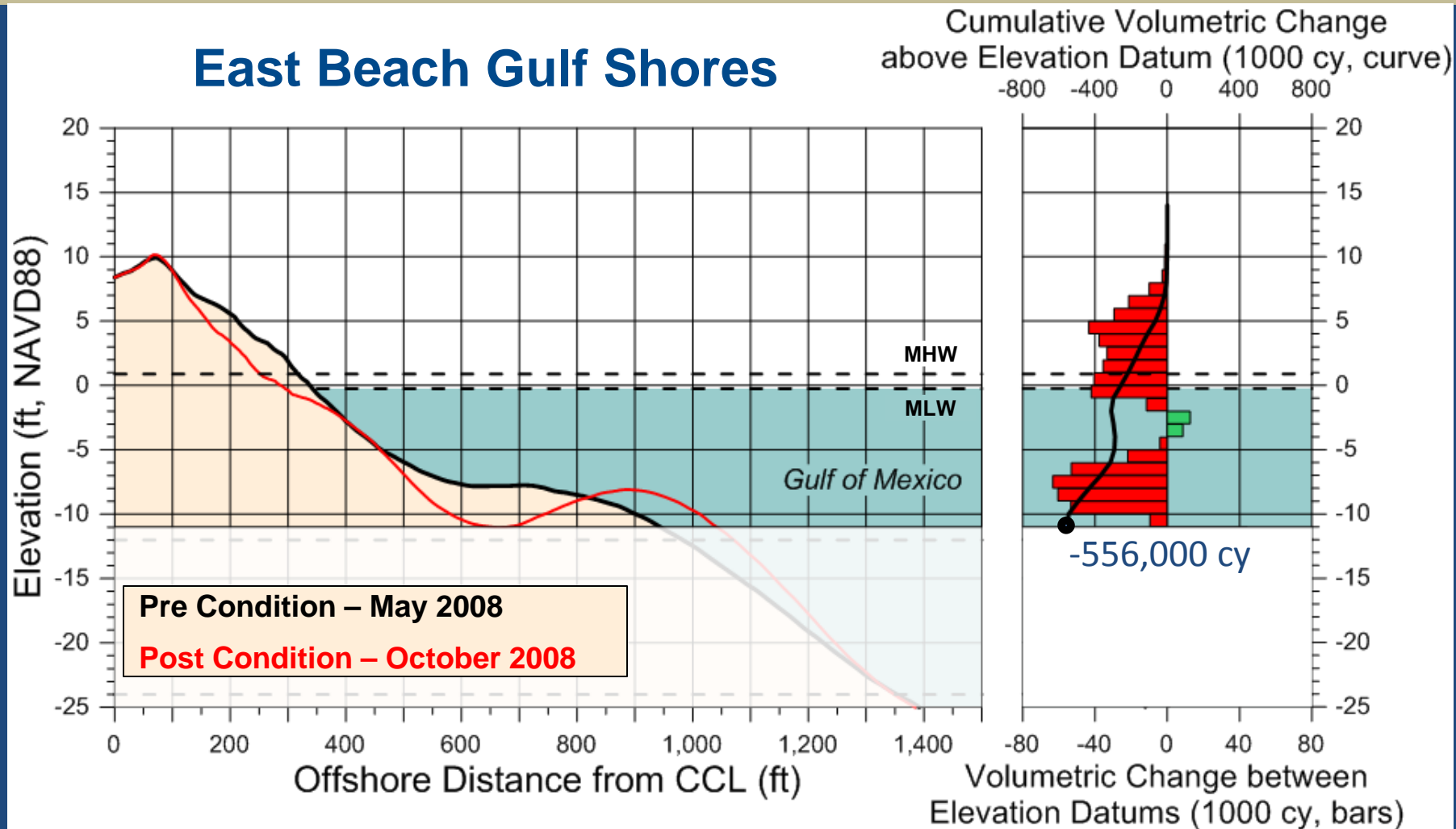
## East Beach Gulf Shores



# May 2008 – October 2008

Hurricanes Gustav and Ike

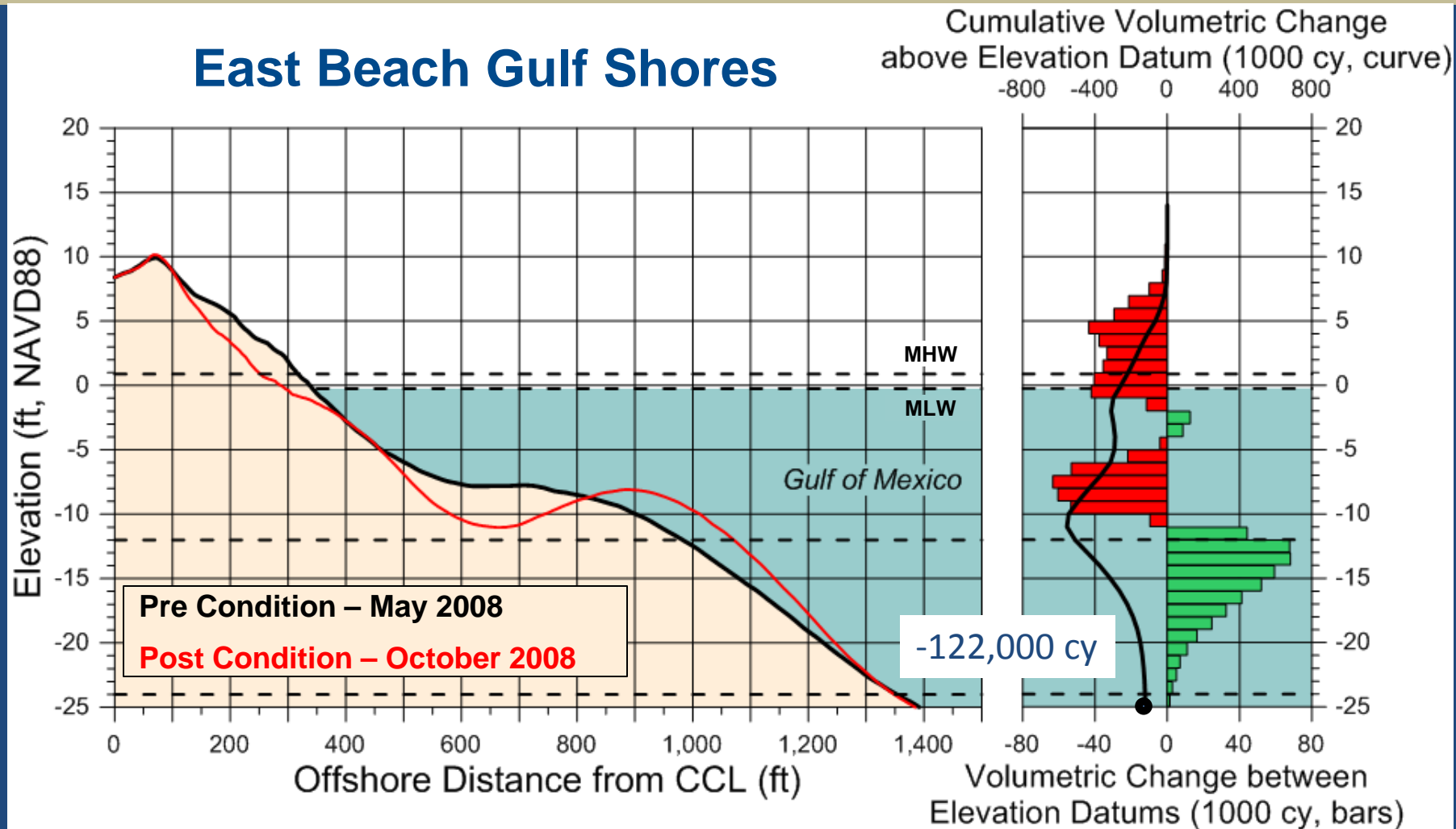
## East Beach Gulf Shores



# May 2008 – October 2008

Hurricanes Gustav and Ike

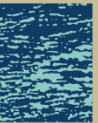
## East Beach Gulf Shores



# Thank you



# Thank you



olsen  
associates, inc.  
Coastal Engineering