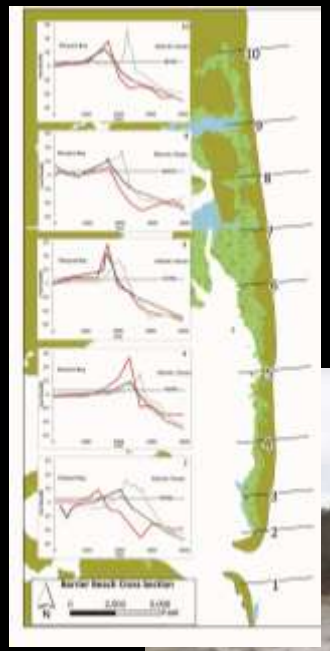
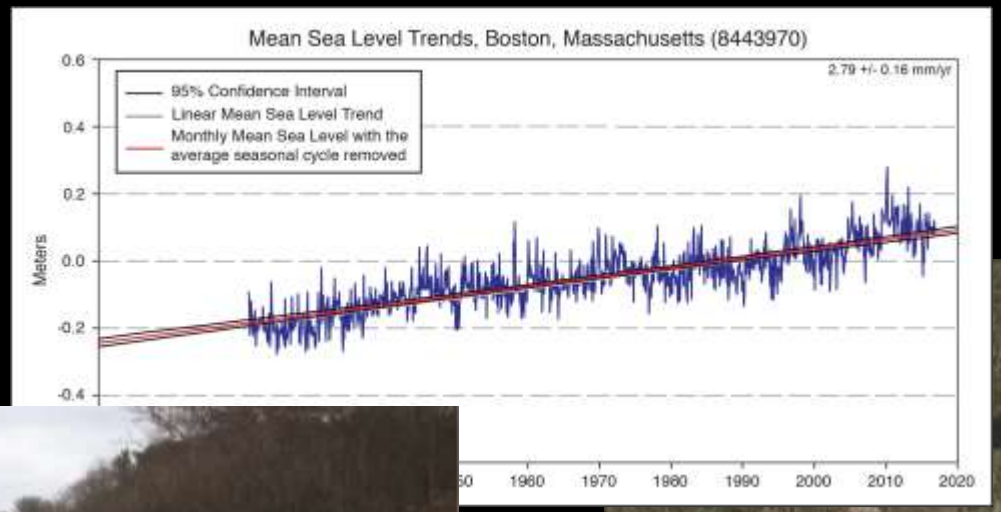
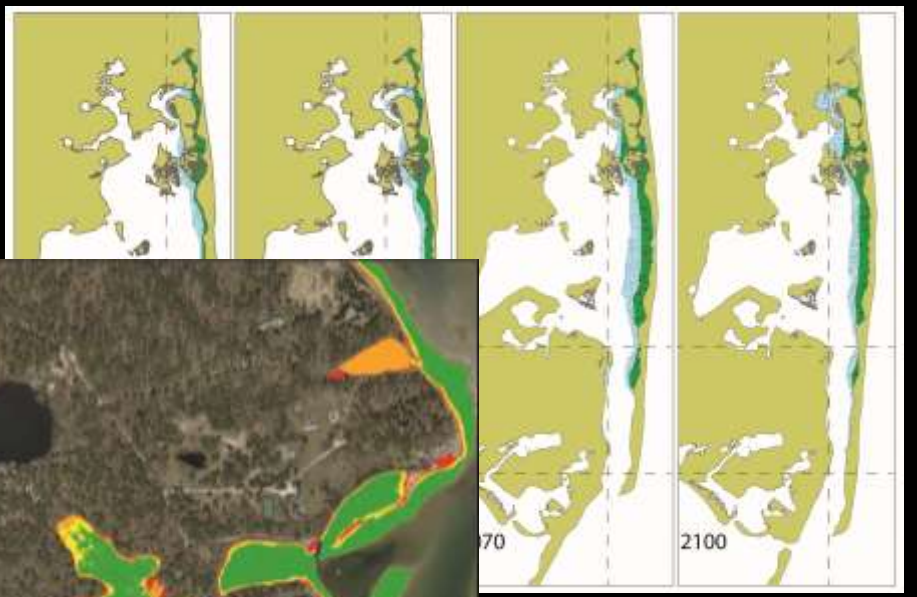
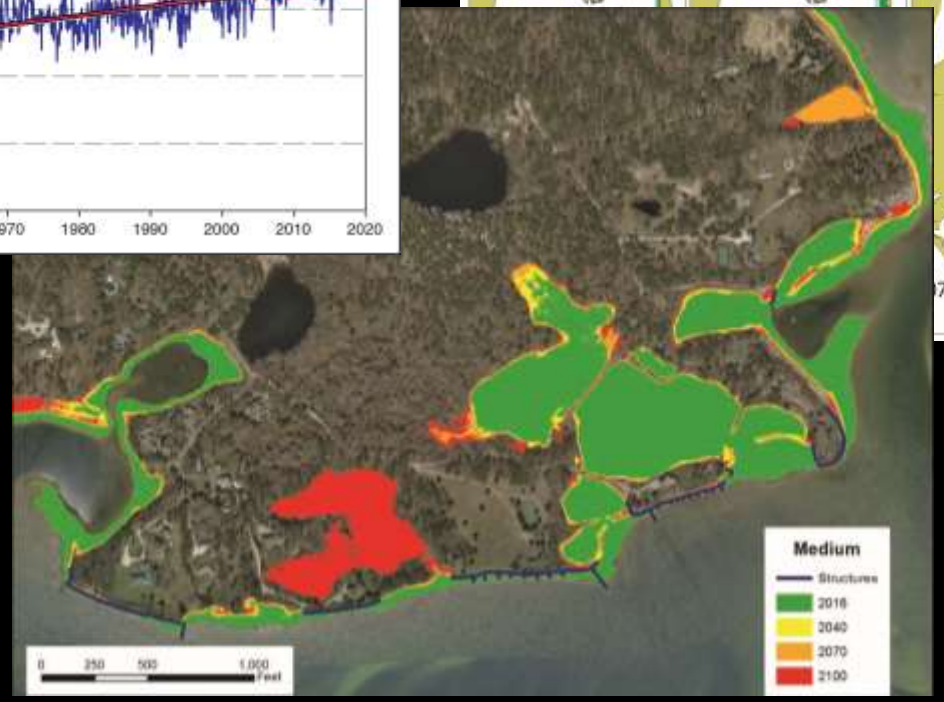
Assessment of Sea Level Rise Impacts on Nauset Barrier Beach and Pleasant Bay, Cape Cod, Massachusetts









Graham Giese, Mark Borrelli, Steve Mague, John Ramsey, Sean Kelley, Bryan Legare, Theresa Smith

Center for Coastal Studies
Marine Geology

CAPE Lab
The Coastal Processes and Ecosystems Laboratory

The University of Massachusetts, Boston
School for the Environment

Outline

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

2. Geomorphological Changes in the Barrier Beach System and Inlet Systems

3. Future Geomorphological Changes on the inner shoreline

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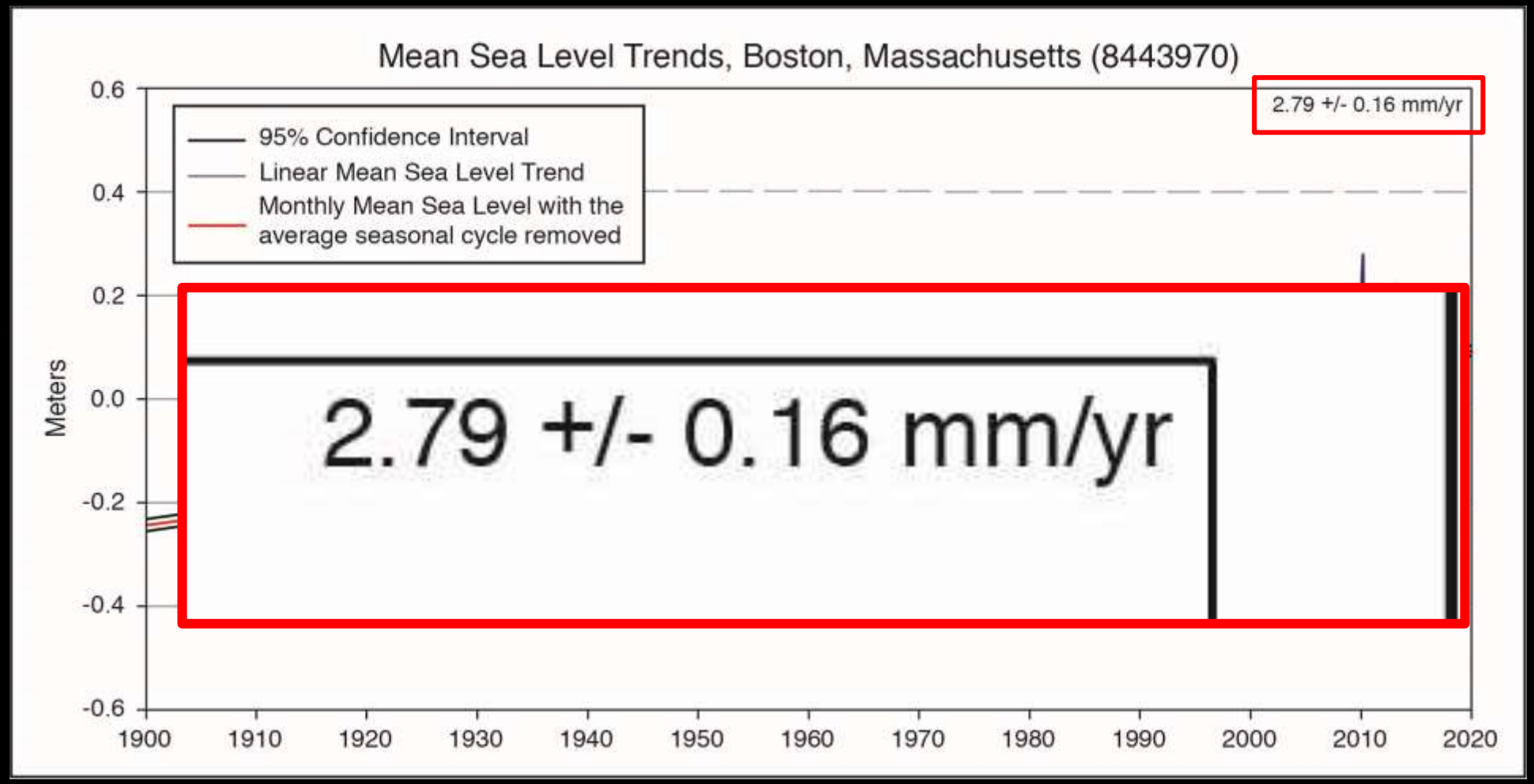

~3 mm/yr = ~1ft/century

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

What does ‘sea level’ really mean?

A. Tides
B. Storm Surge
C. Wave Setup (or setdown)
D. Seasonal Variations
E. All of the Above
F. None if the Above

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

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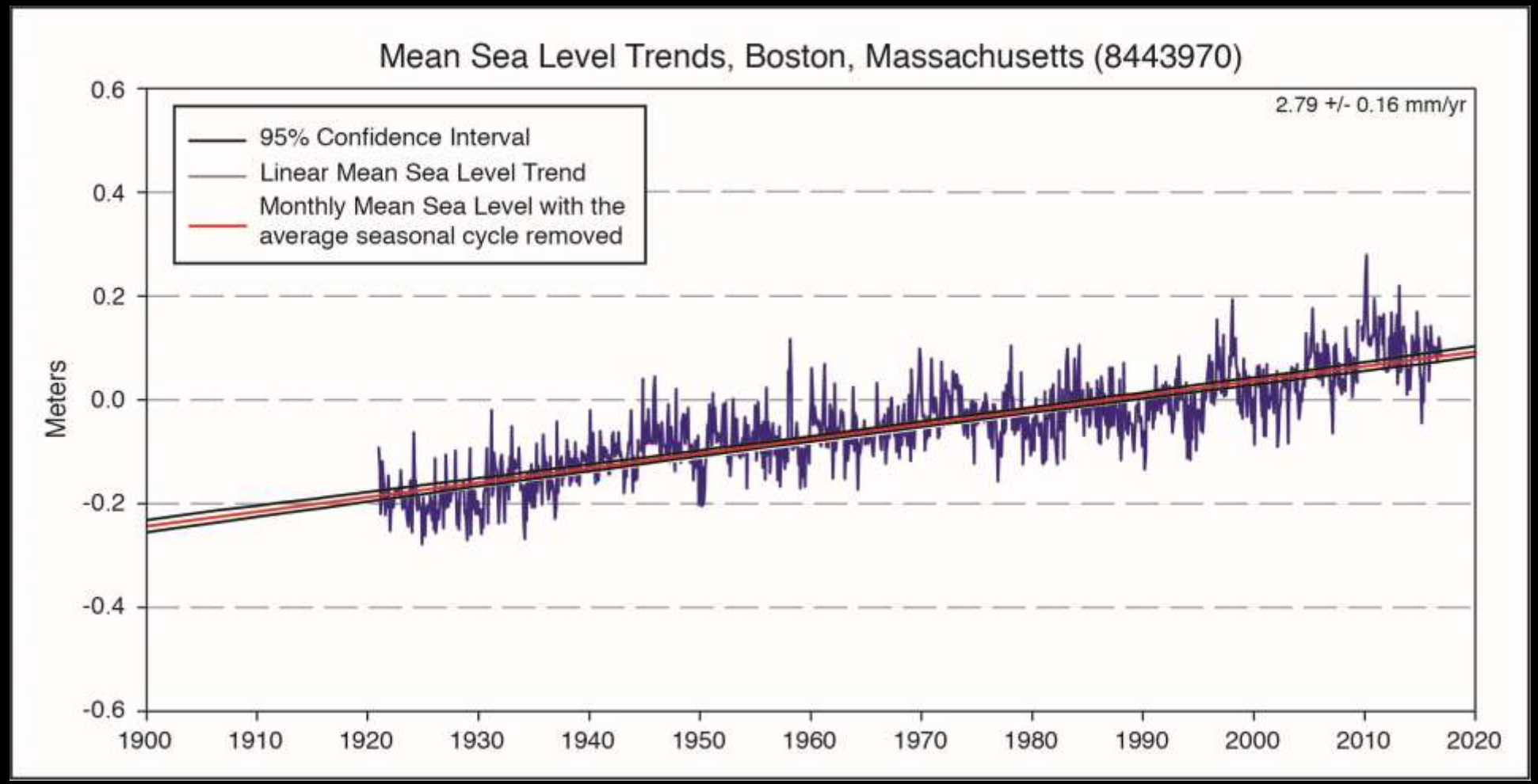


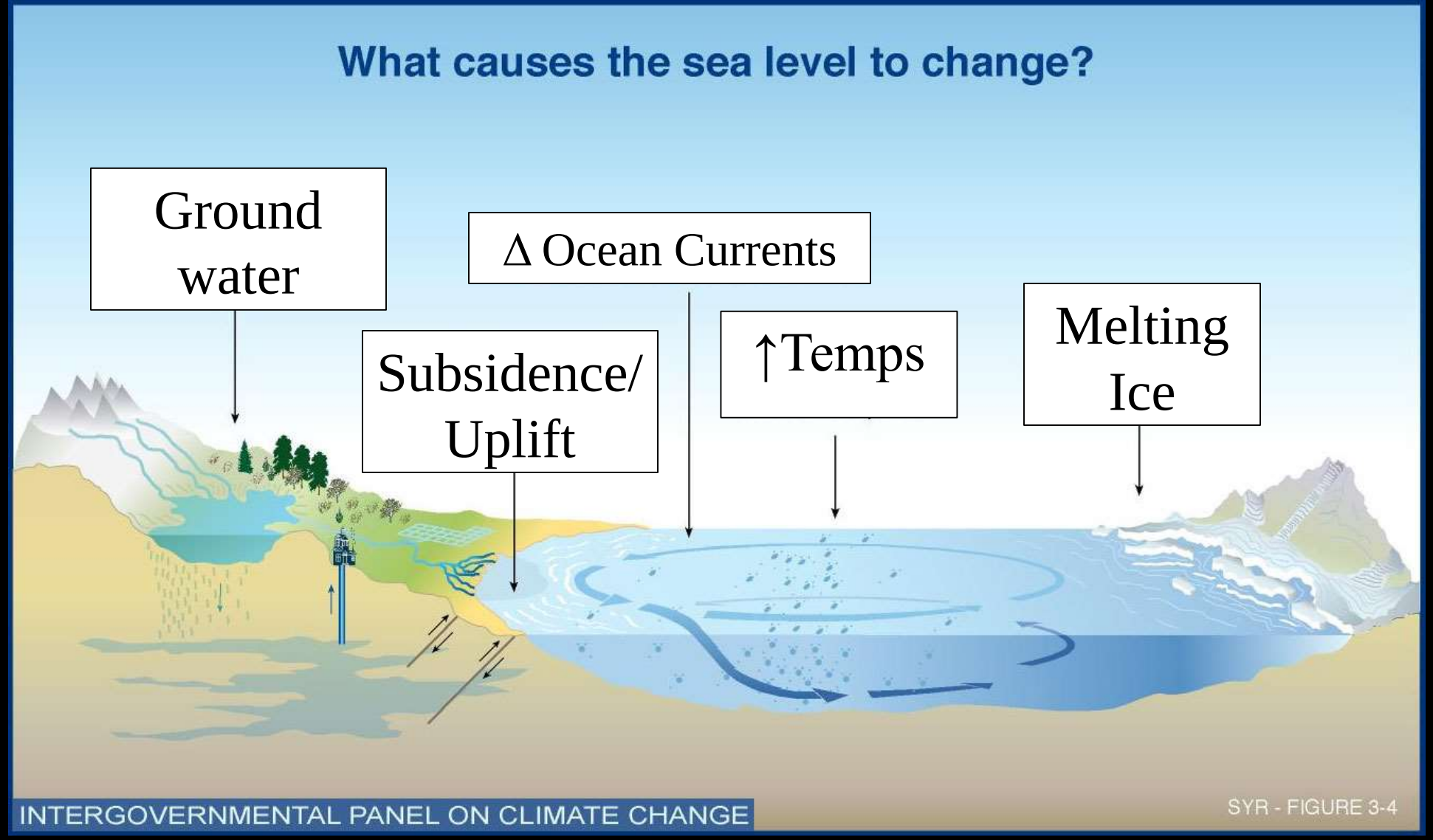
1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

Eustatic (or global) Sea Level Rise

Vs

Relative (or regional) Sea Level Rise

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay



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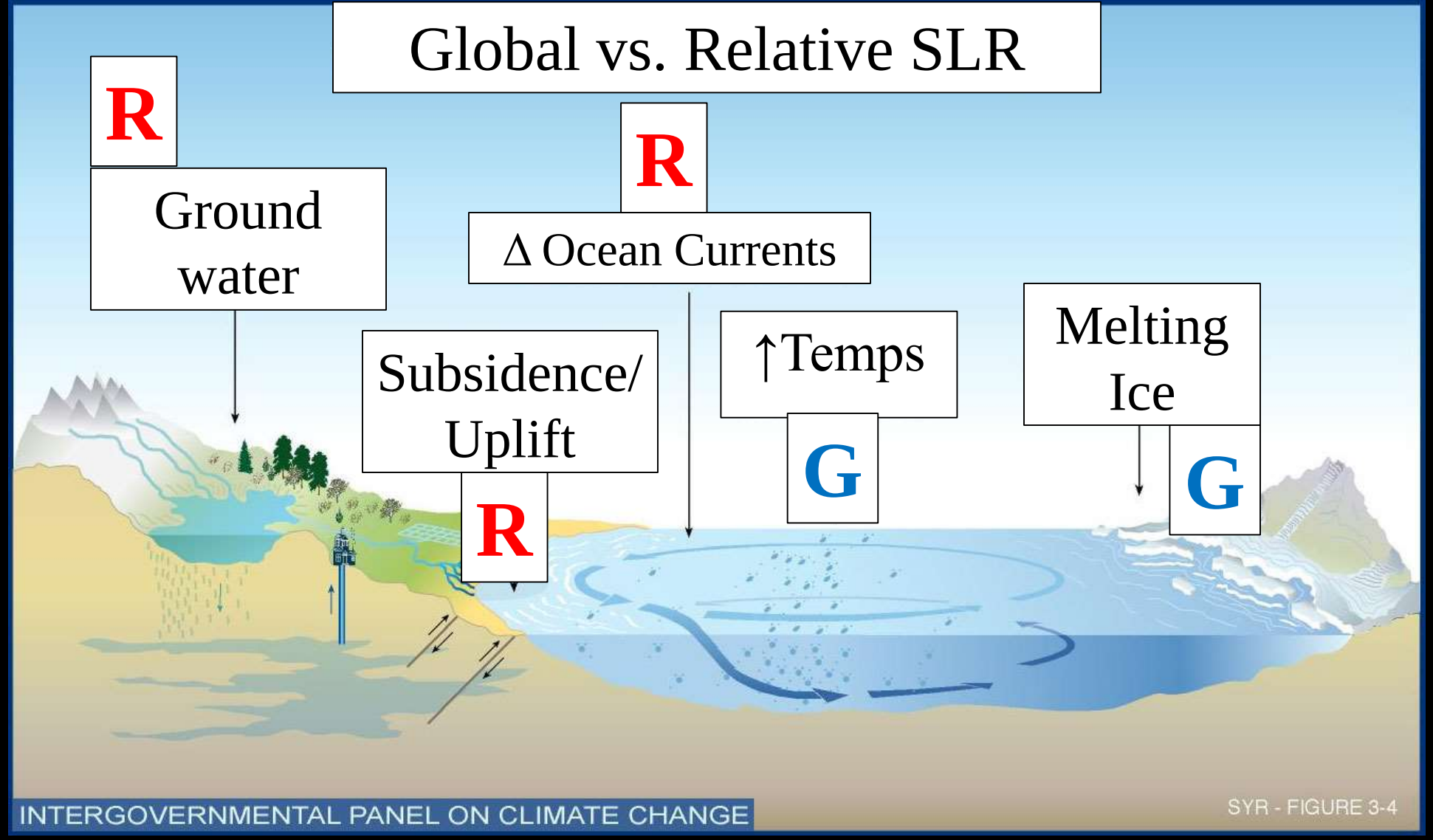
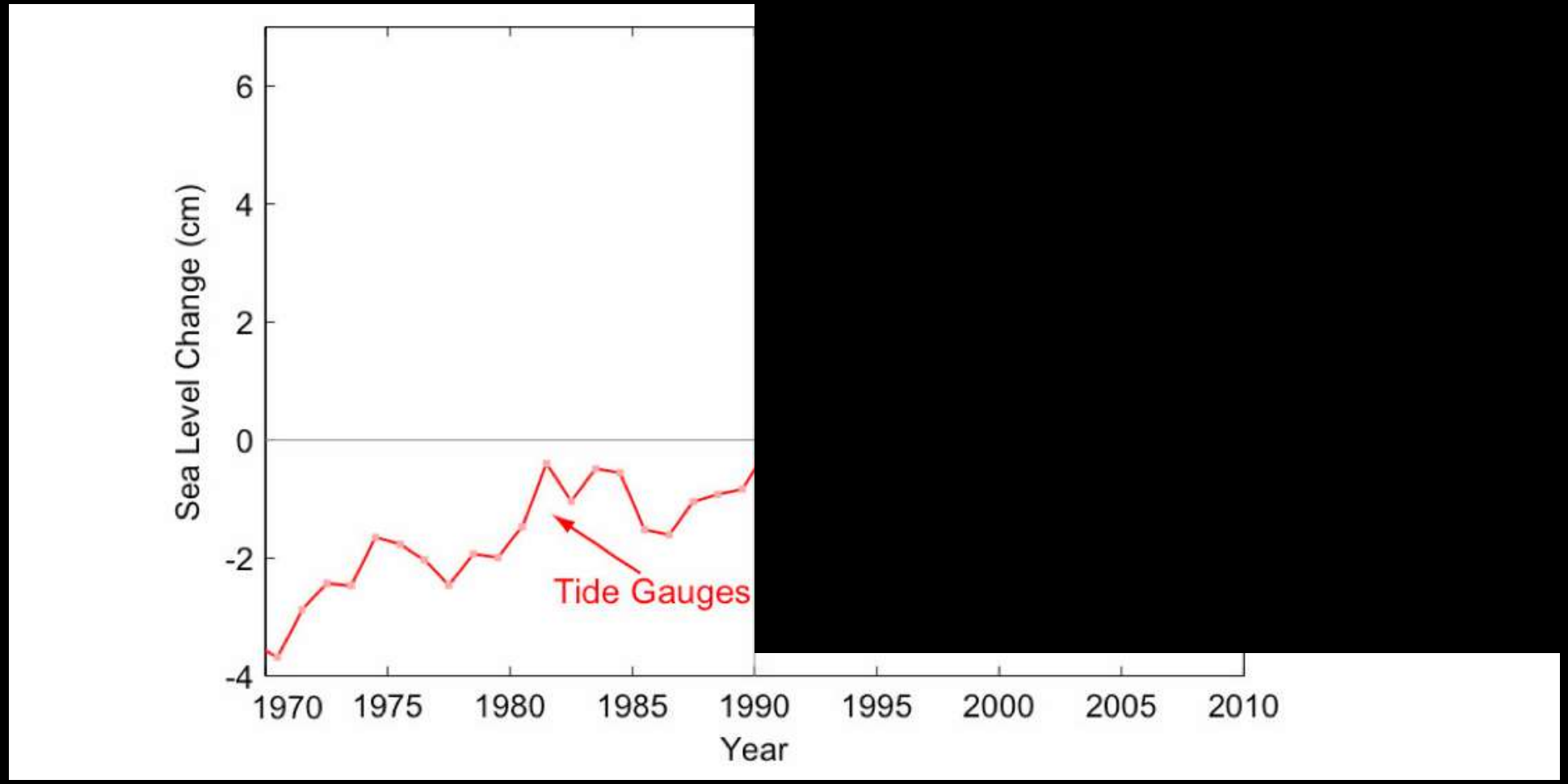


1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

All models are (not) created equal



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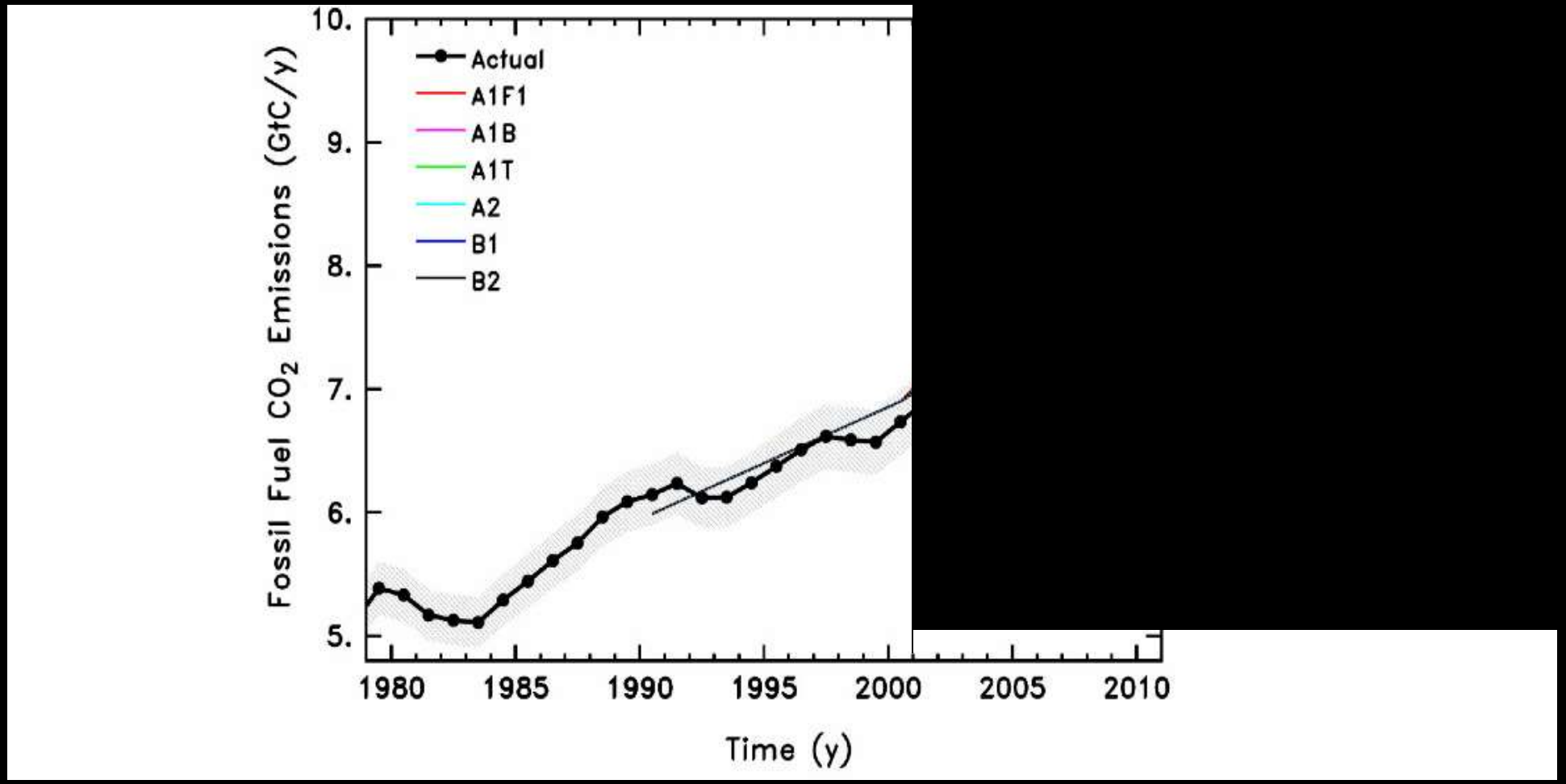

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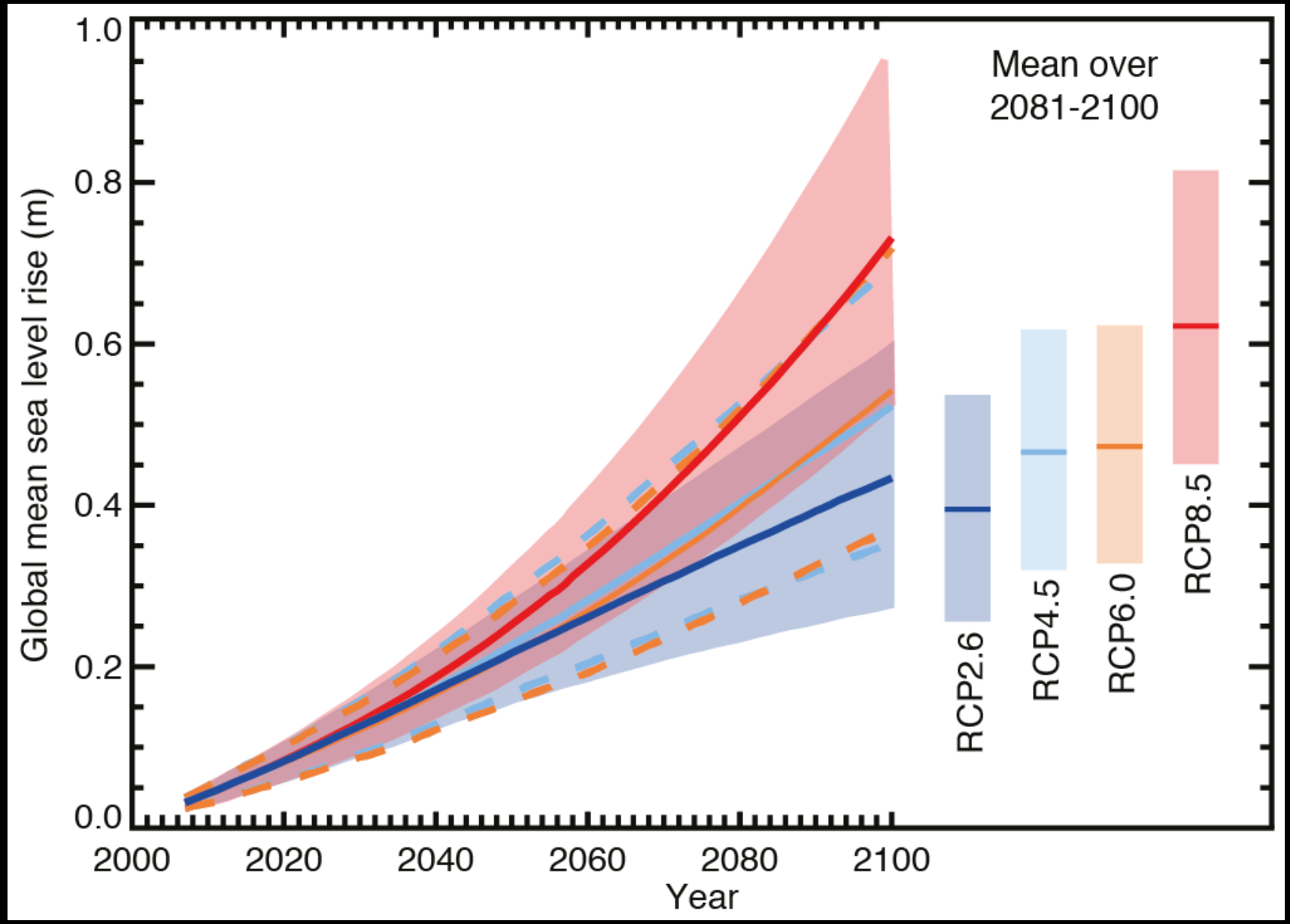

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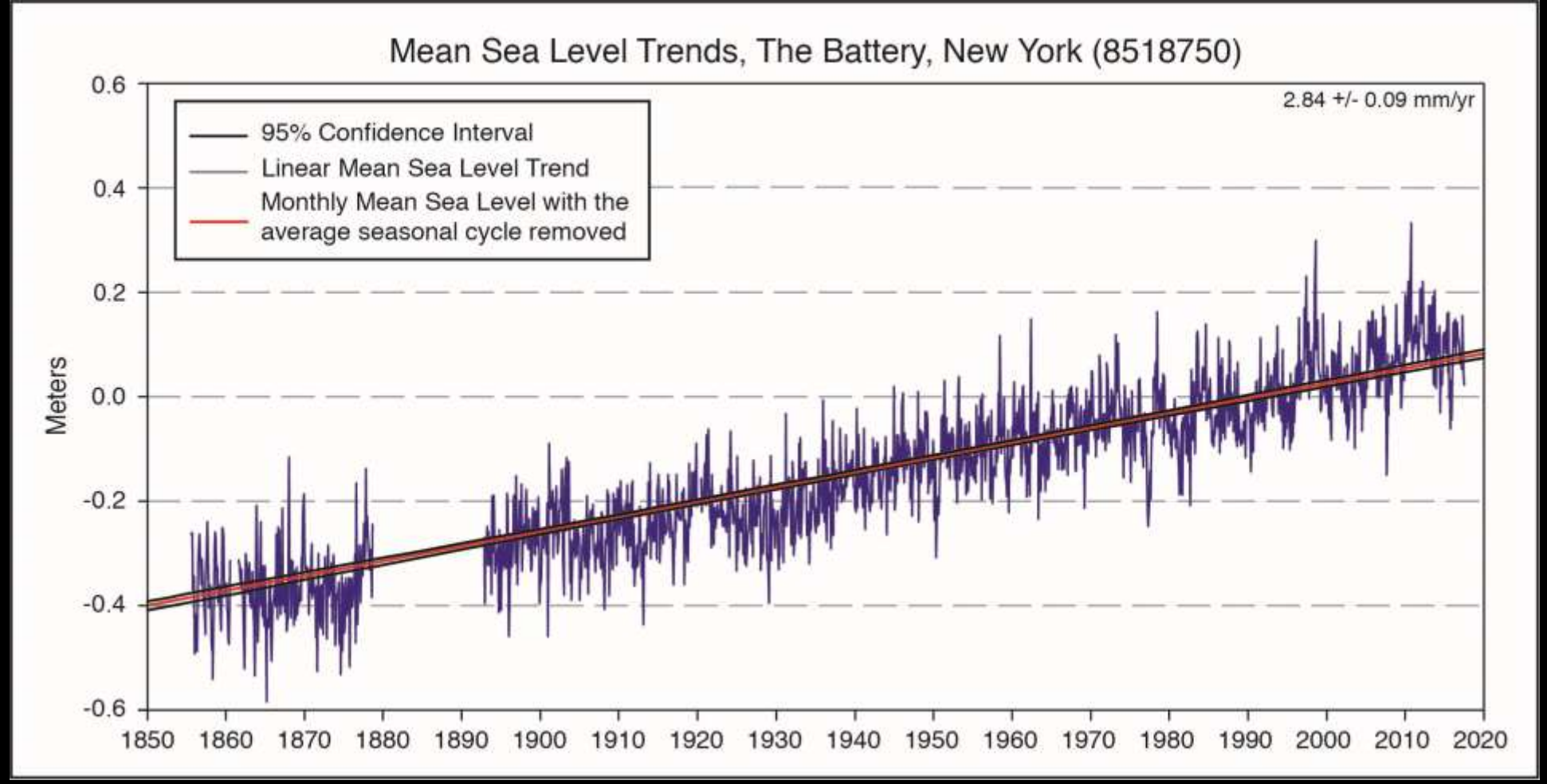

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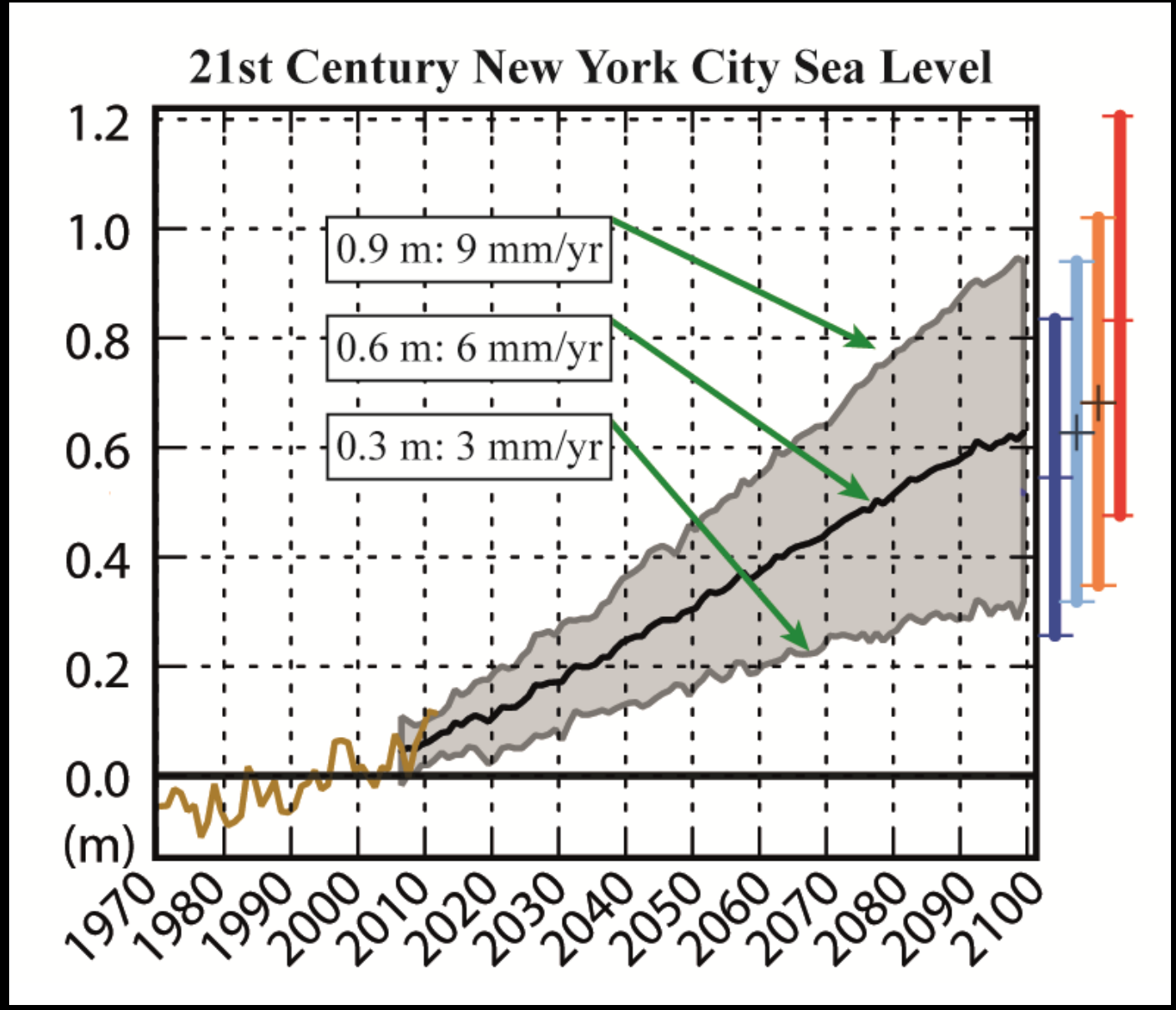

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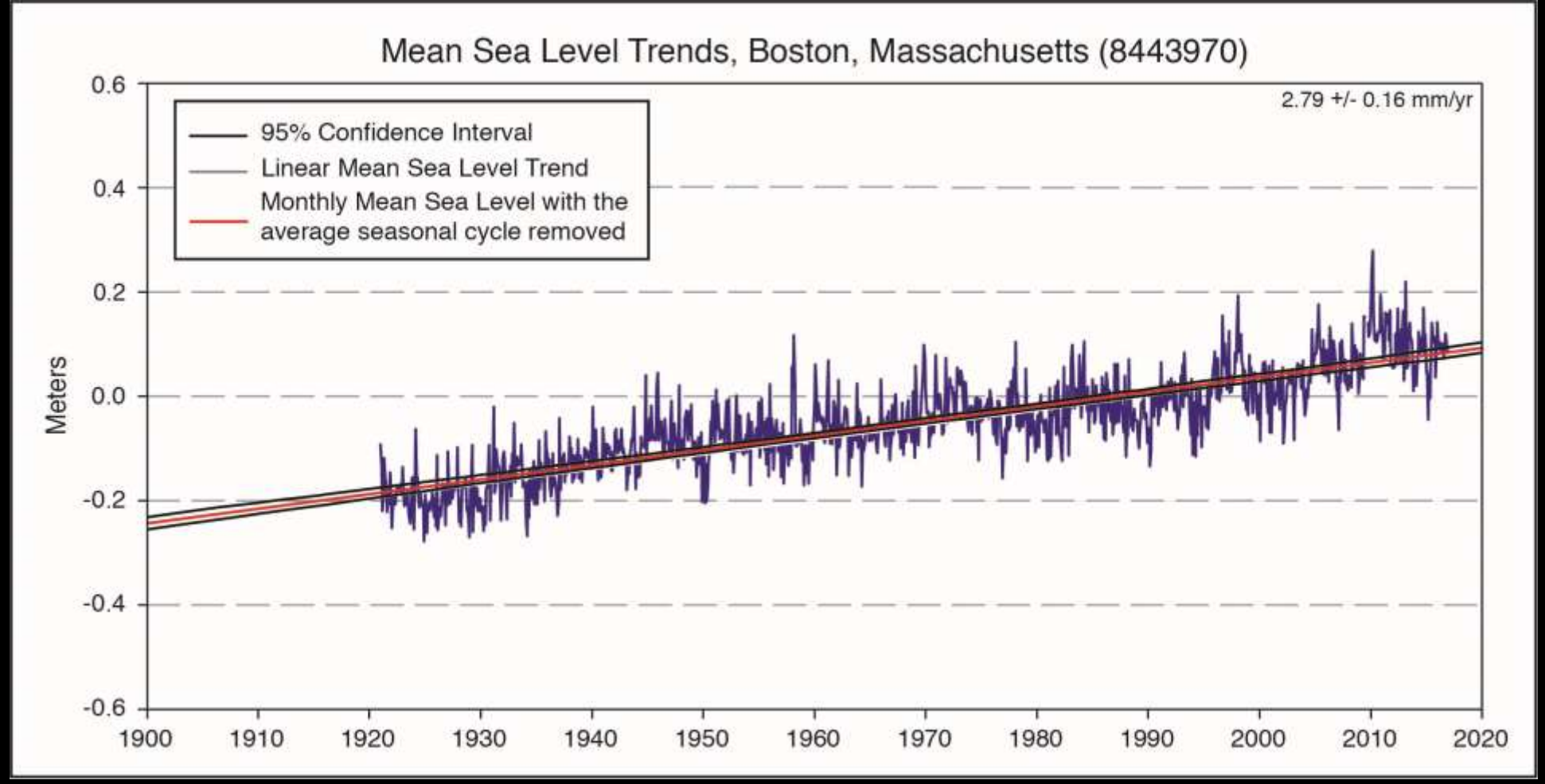

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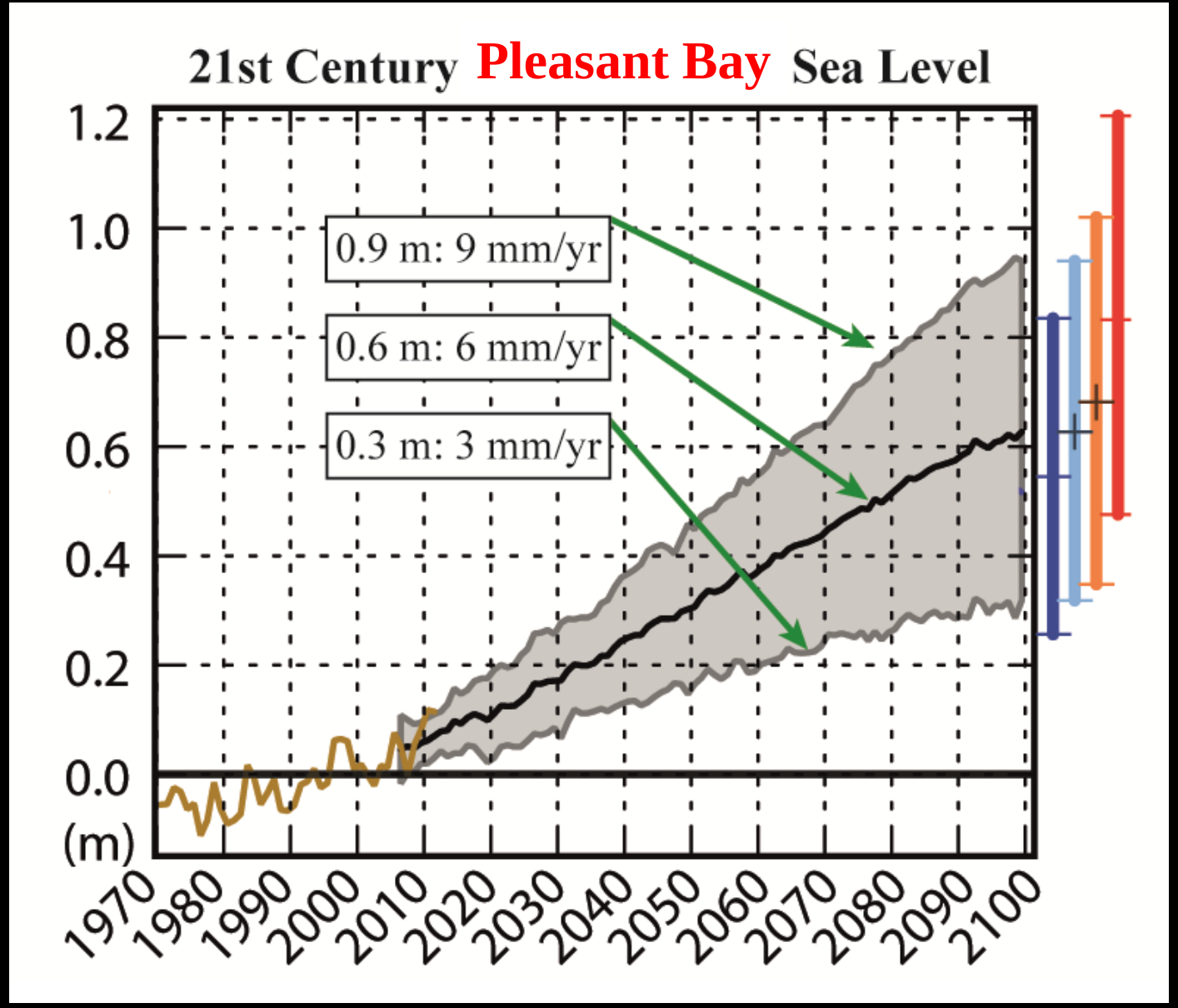


1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

YEAR	LOW	MID	HIGH
2040	0.5 ft	0.7 ft	1.1 ft
2070	1.0 ft	1.5 ft	2.0 ft
2100	**1.2 ft**	**2.1 ft**	**2.9 ft**

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

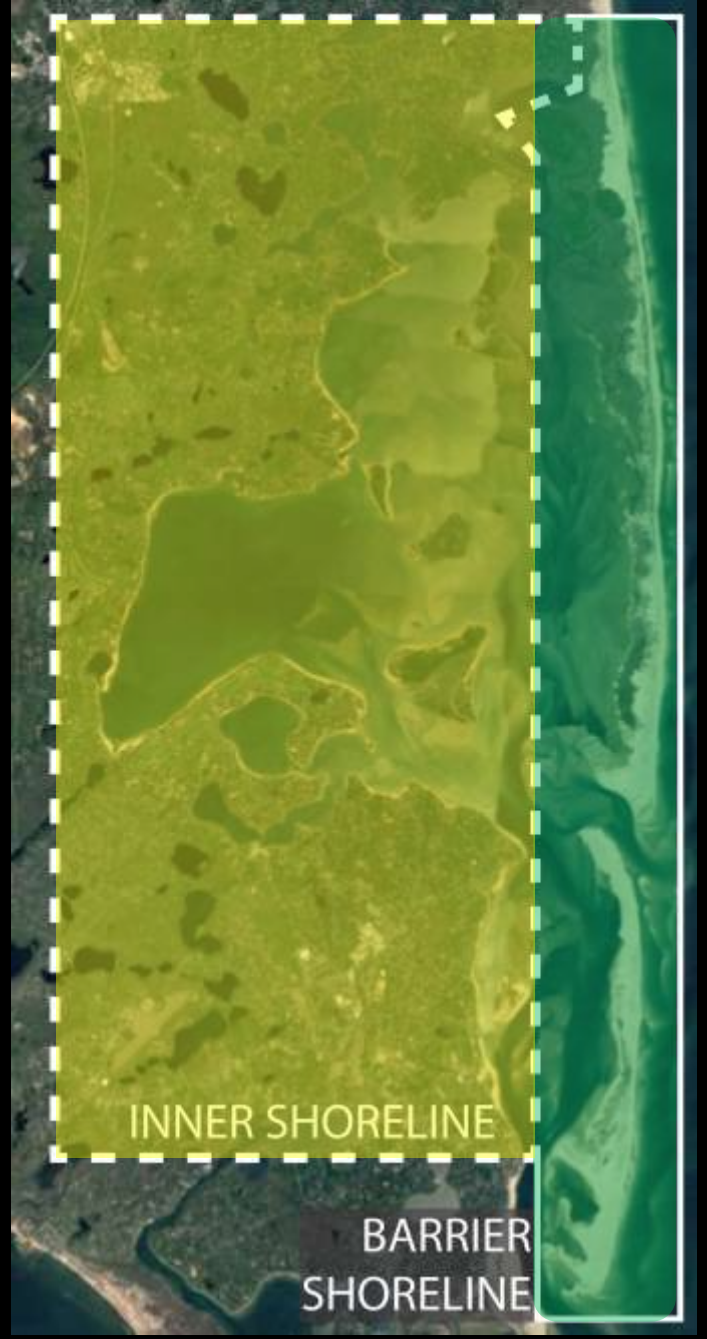
Outline

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

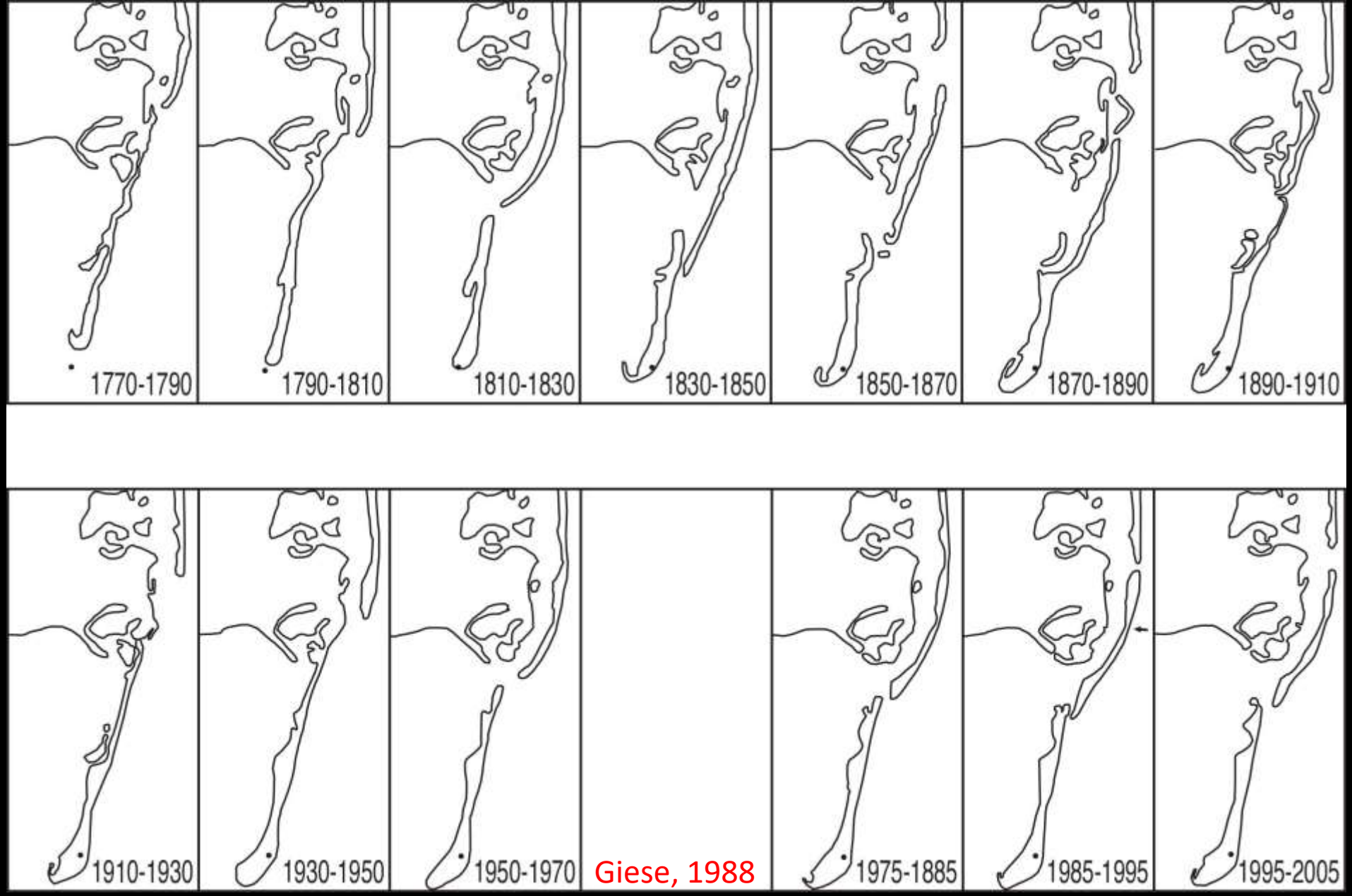
2. **Geomorphological Changes in the Barrier Beach System and Inlet Systems**

3. Future Geomorphological Changes on the inner shoreline

PHASE 3:
Future
Geomorphological
Changes on the inner
shoreline



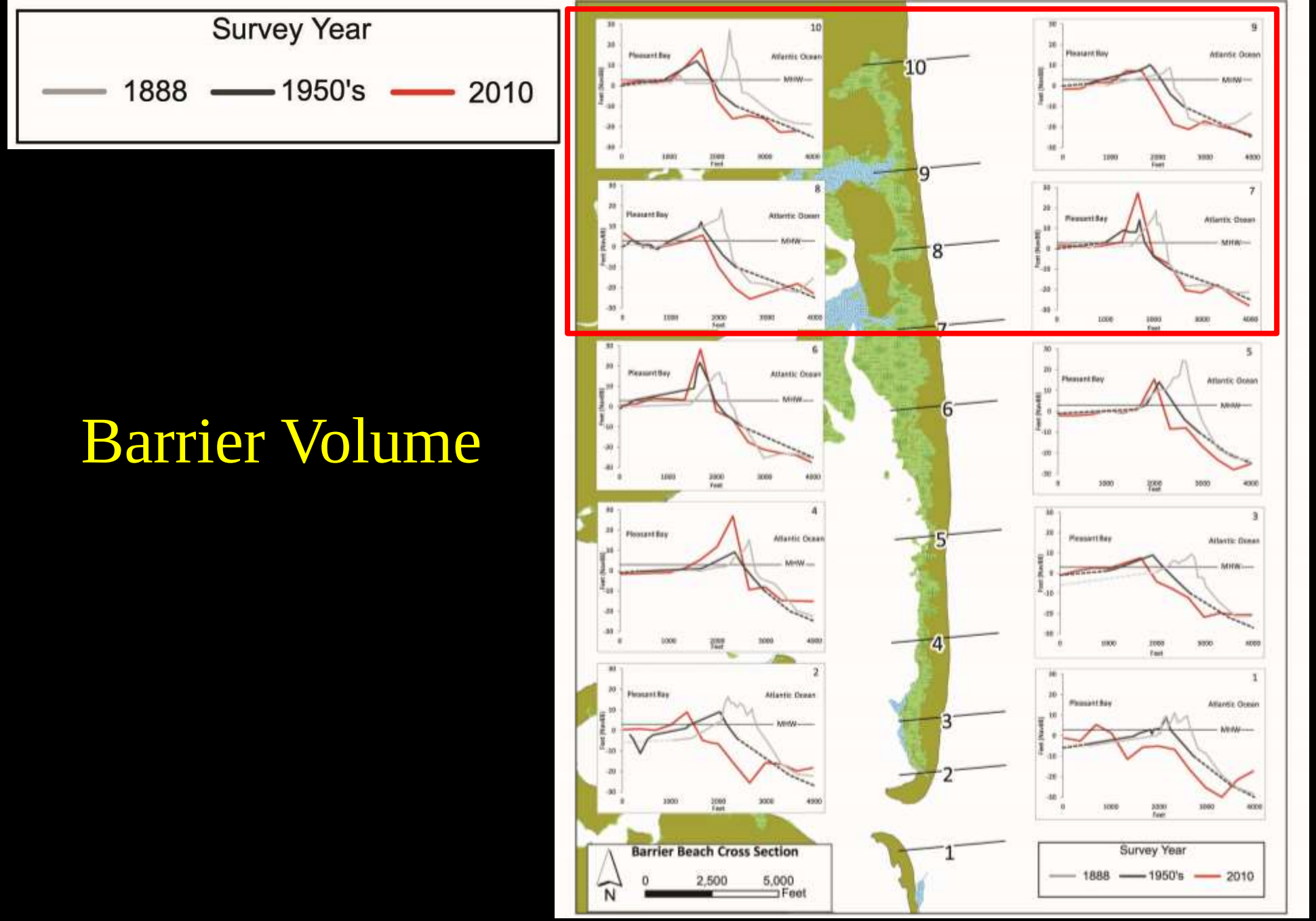
PHASE 2
Geomorphological
Changes in the Barrier
Beach System and
Inlet Systems



2. Geomorphological Changes in the Barrier Beach System and Inlet Systems


Strong Island
Minister's Point
Chatham Light
2057

Barrier Volume



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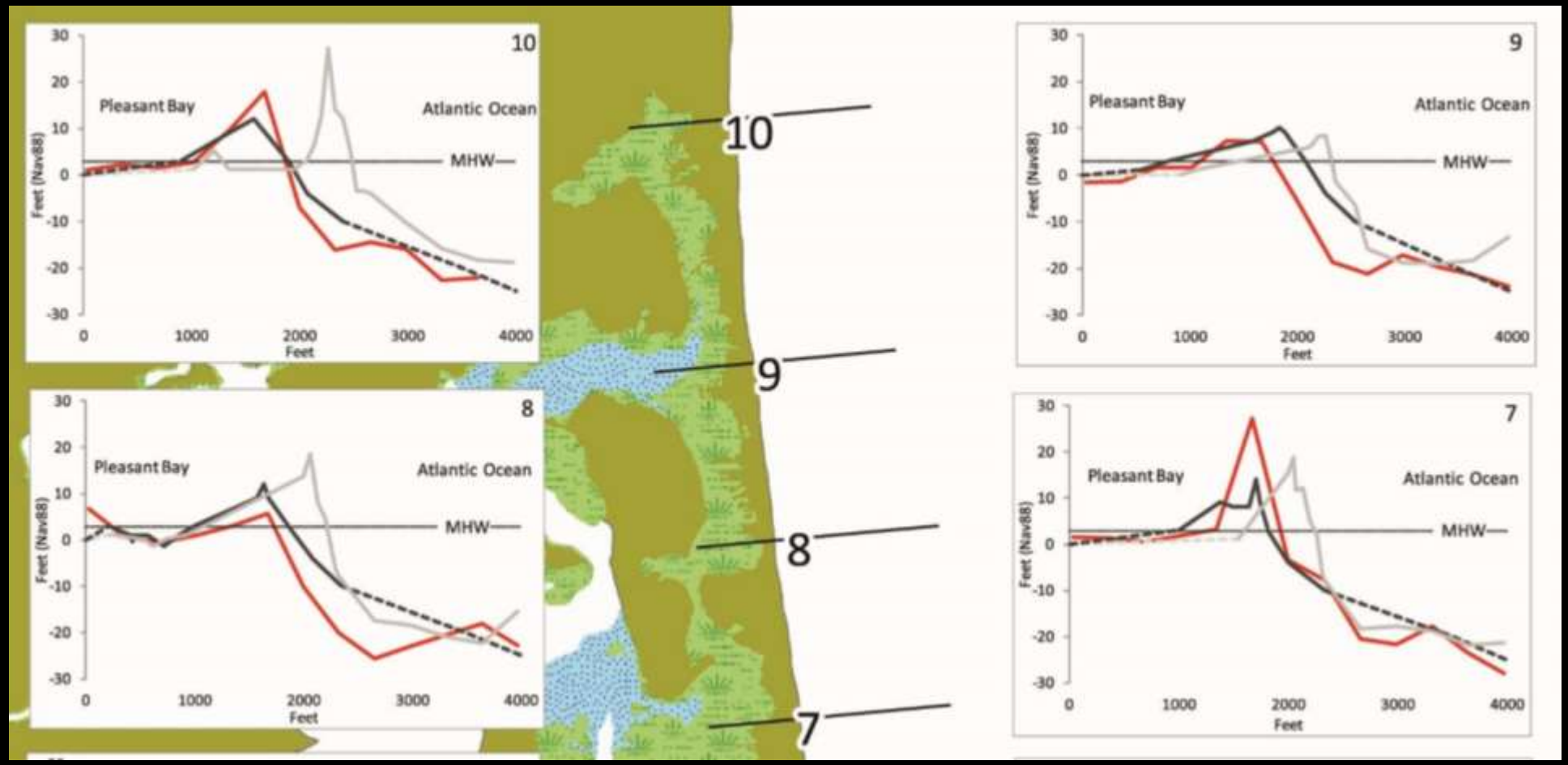


2. Geomorphological Changes in the Barrier Beach System and Inlet Systems

Washover Processes And Inlet Formation At Pochet Island

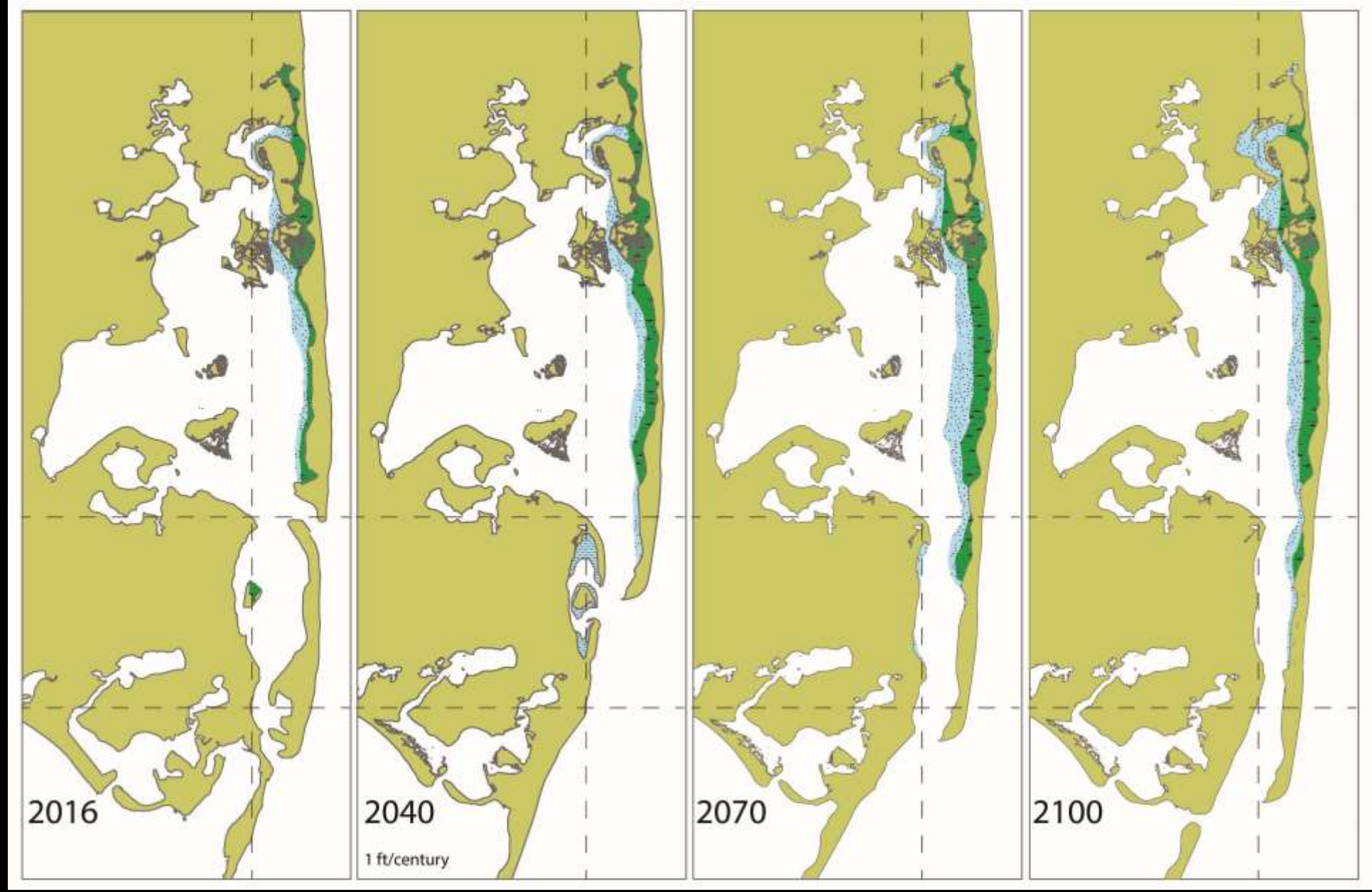
2004
2005
2006
2007
2008
2012
2013
2014
2015
2016
2017
2018

Washover Processes And Inlet Formation At Pochet Island

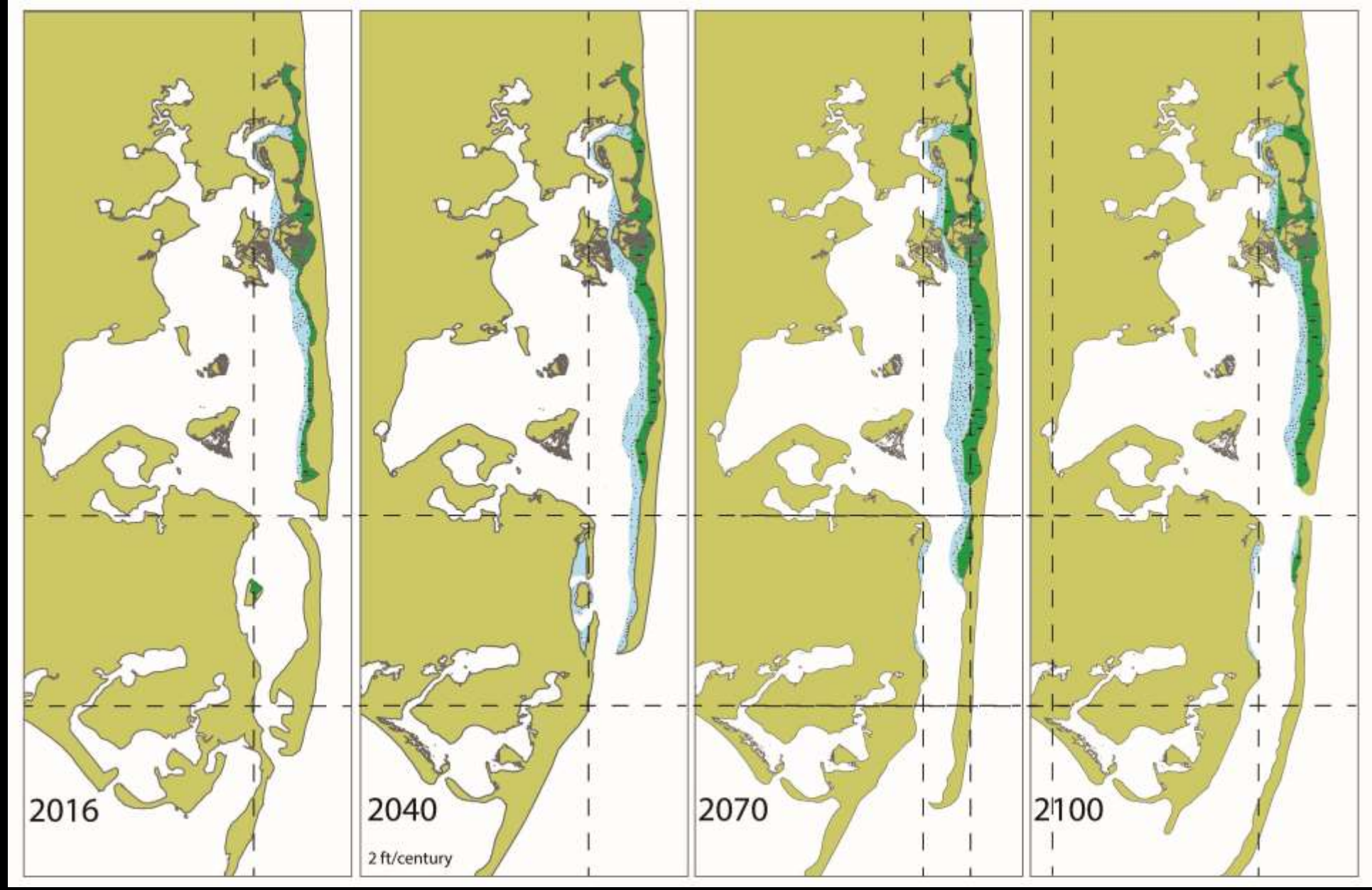
2004

2018

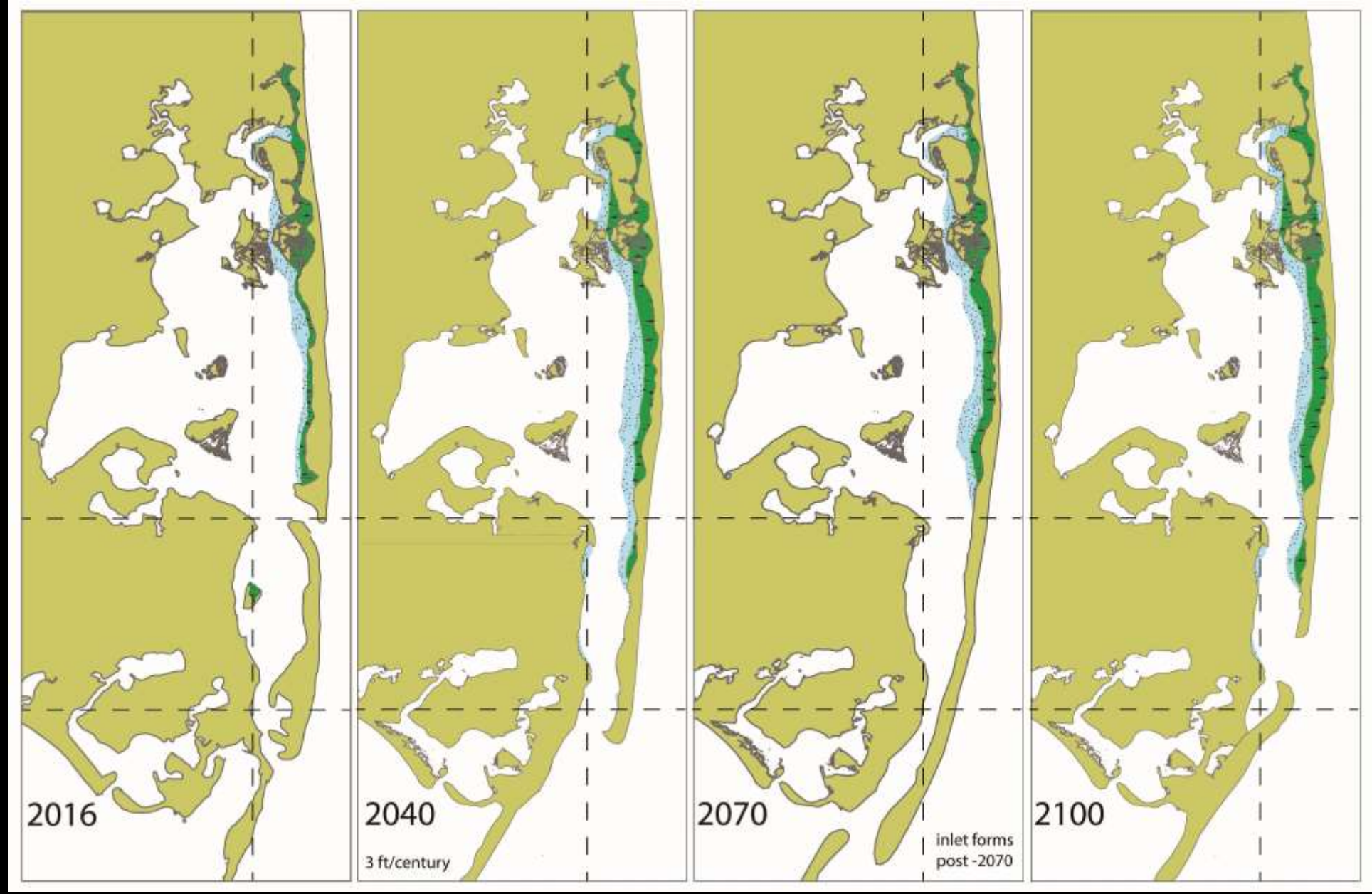
Low SLR Scenario



Mid SLR Scenario



High SLR Scenario



2. Geomorphological Changes in the Barrier Beach System and Inlet Systems

Outline

1. Sea Level Rise: Nauset Barrier Beach and Pleasant Bay

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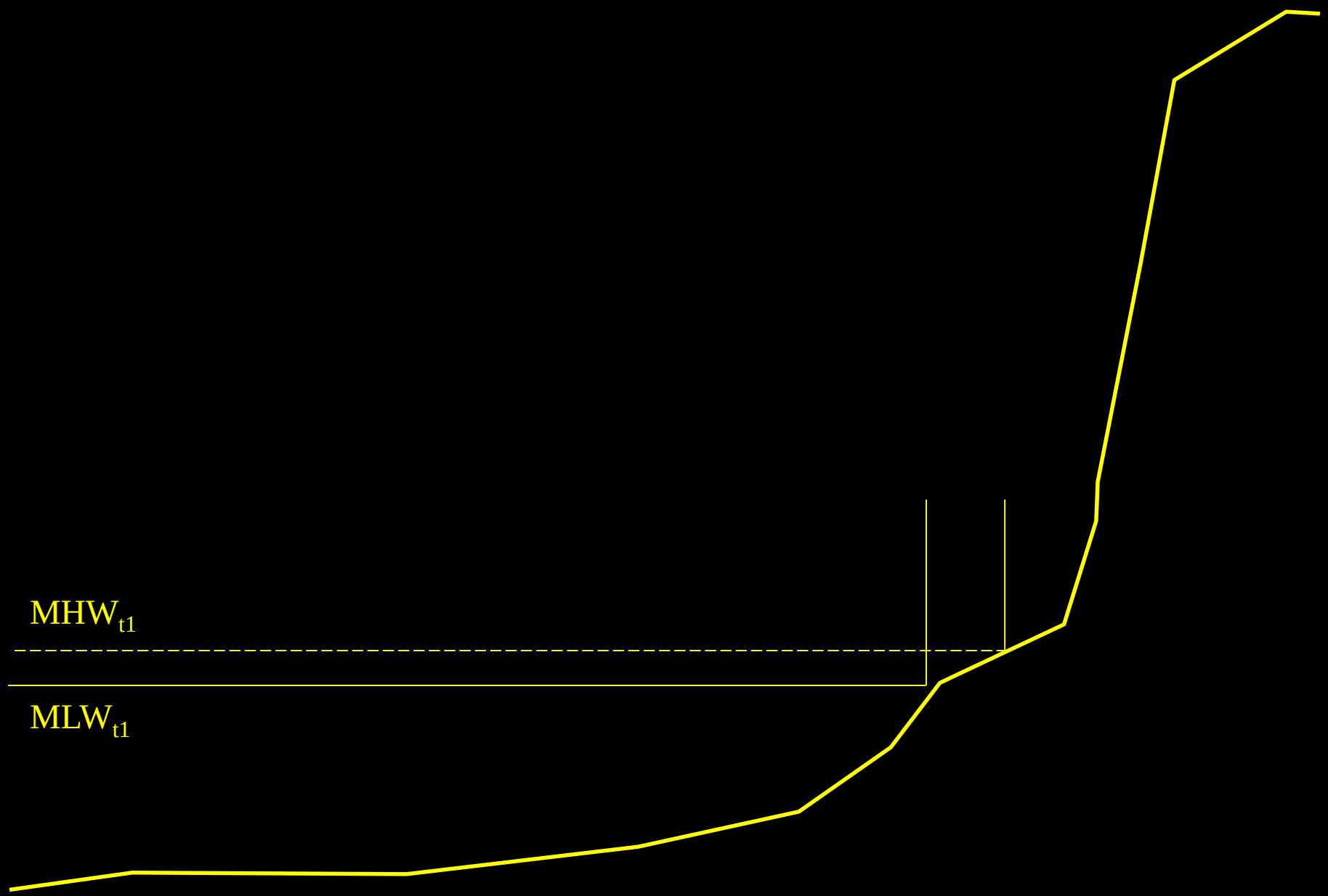
3. Future Geomorphological Changes on the inner shoreline



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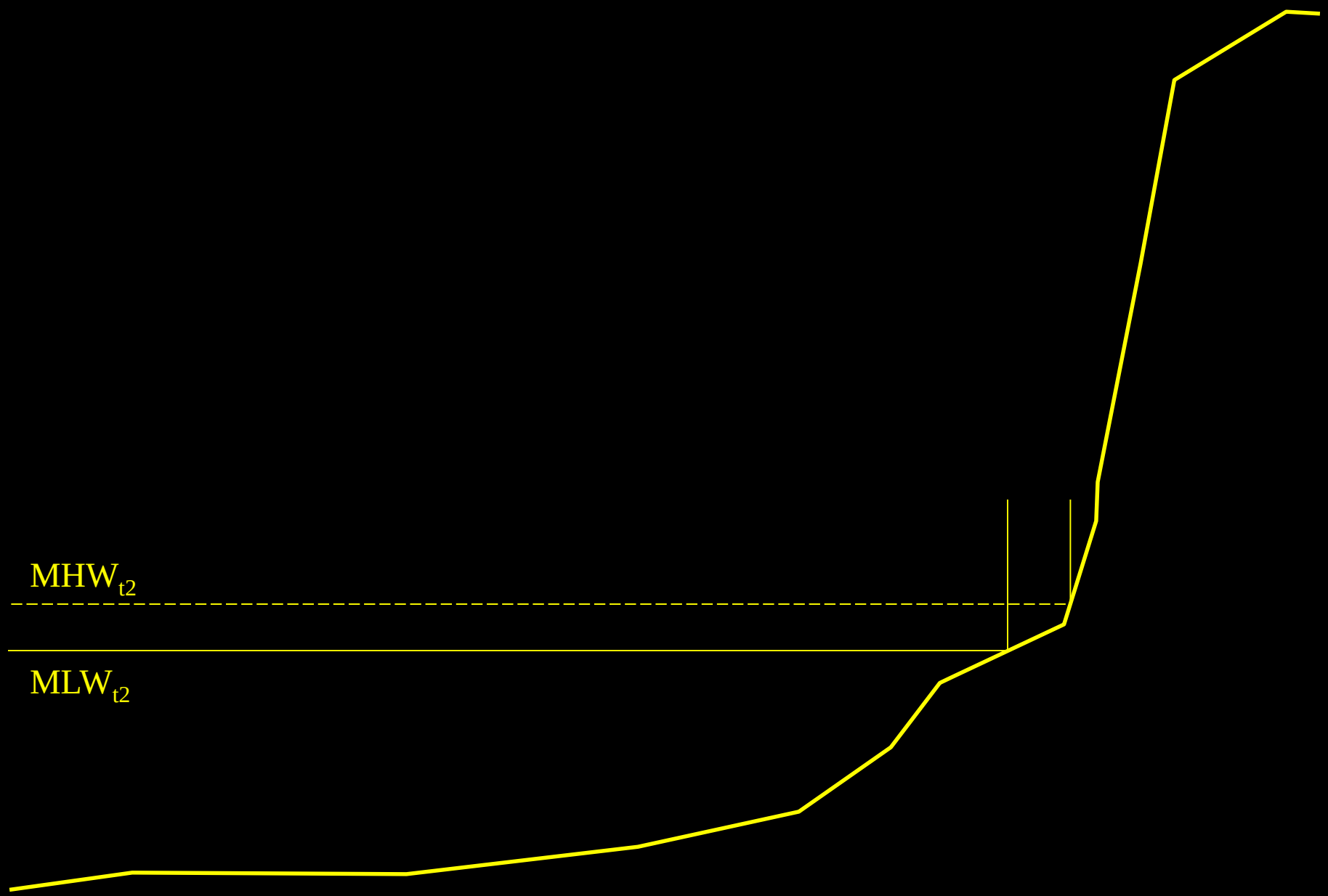

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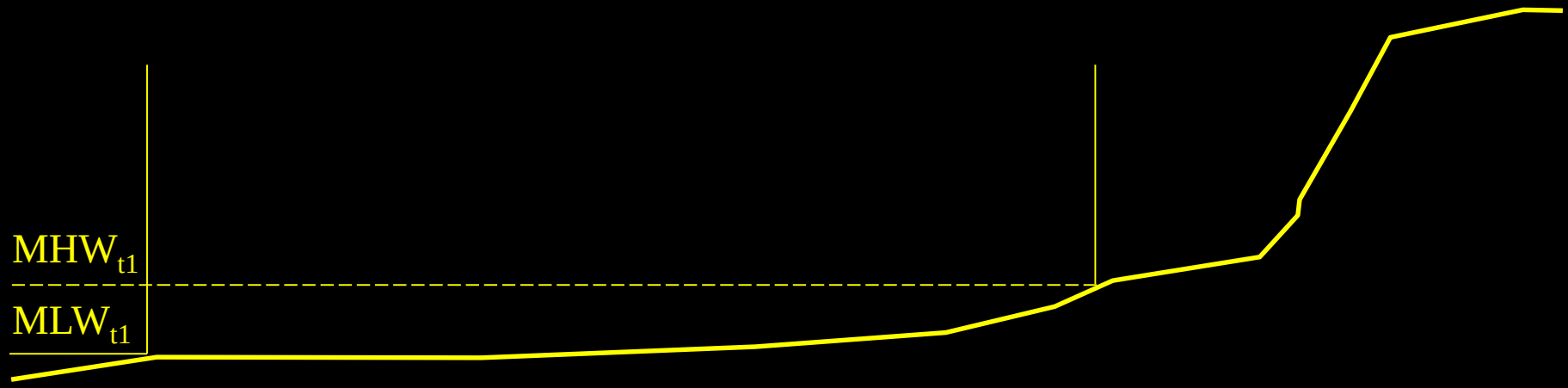

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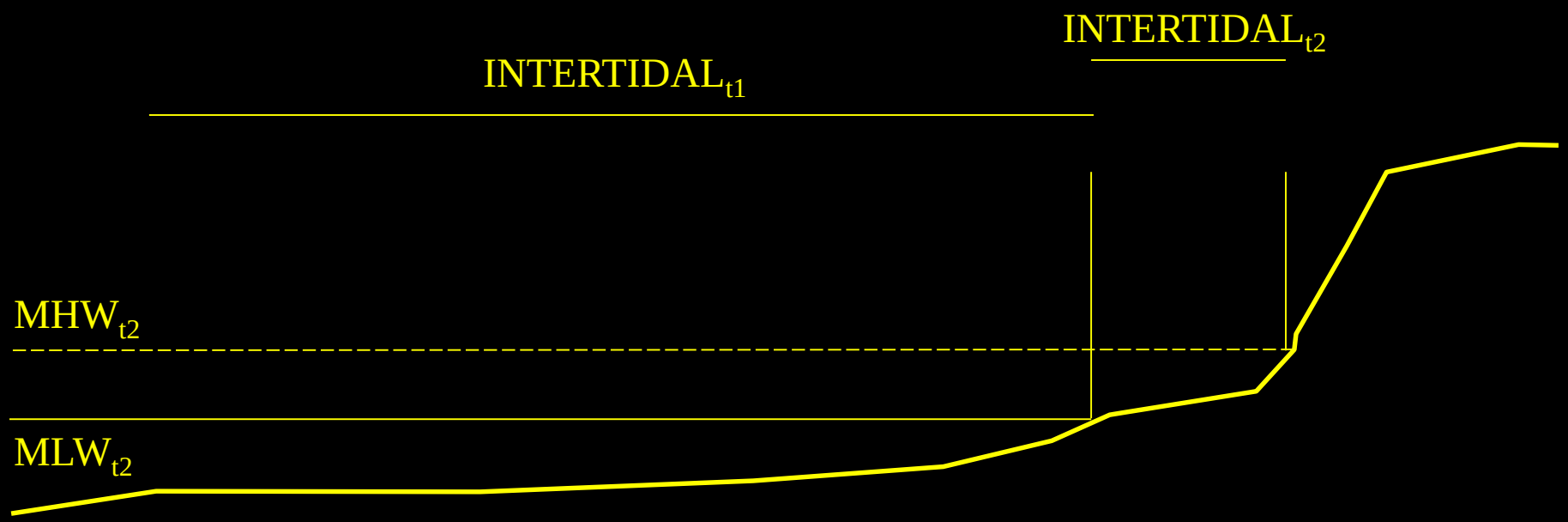
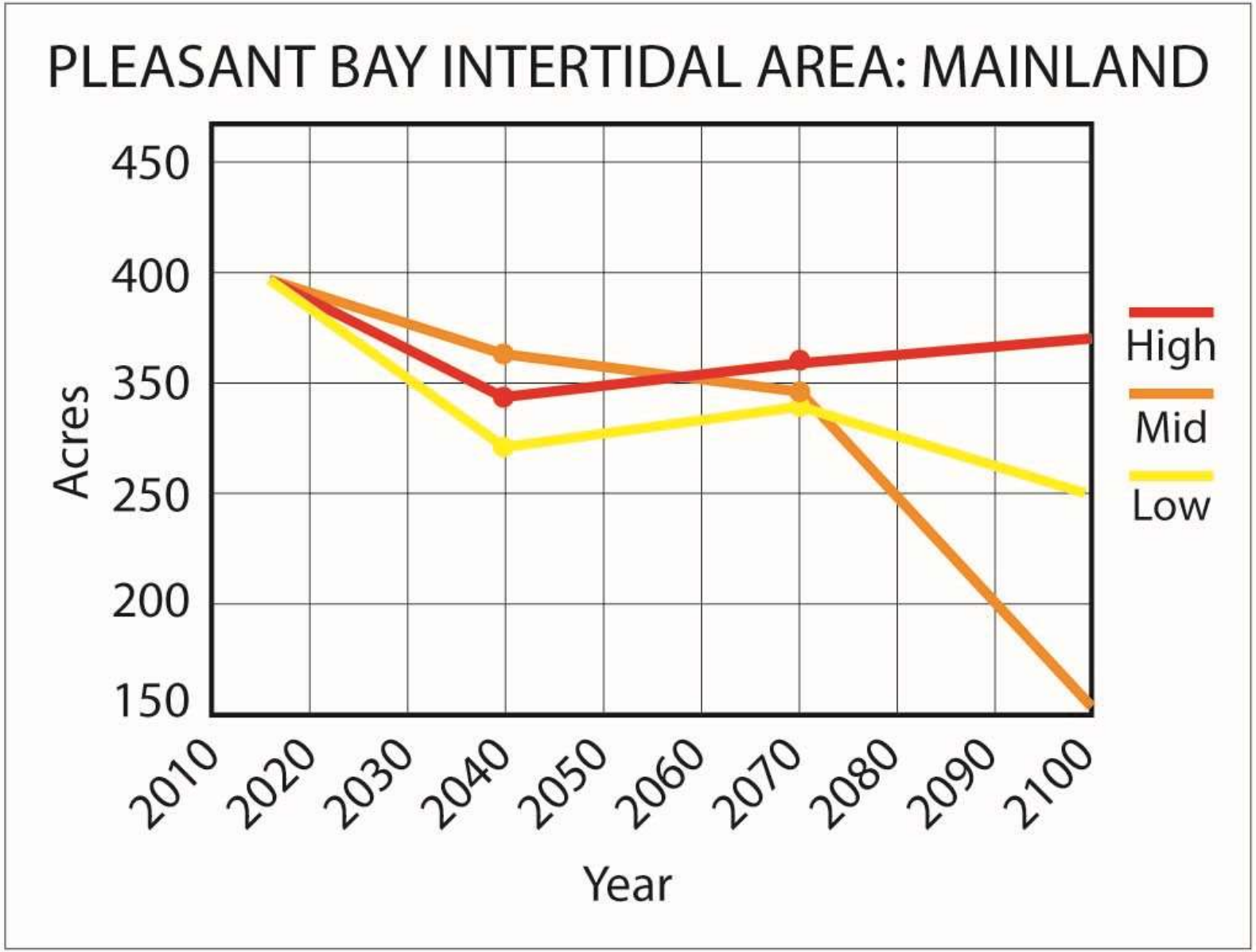


3. Future Geomorphological Changes on the inner shoreline

Loss of Mainland intertidal areas by 2100



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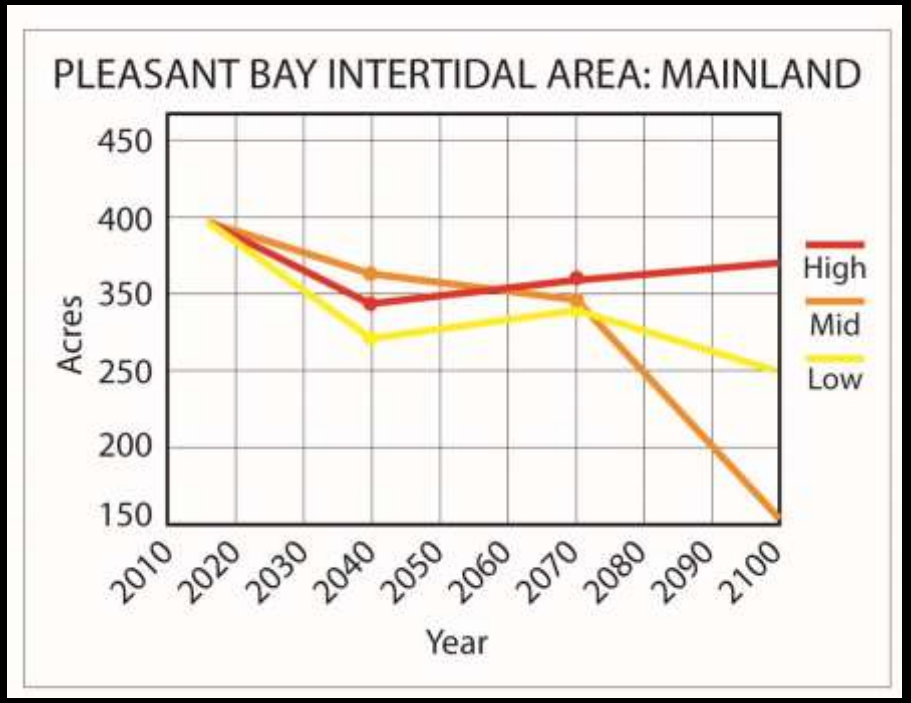
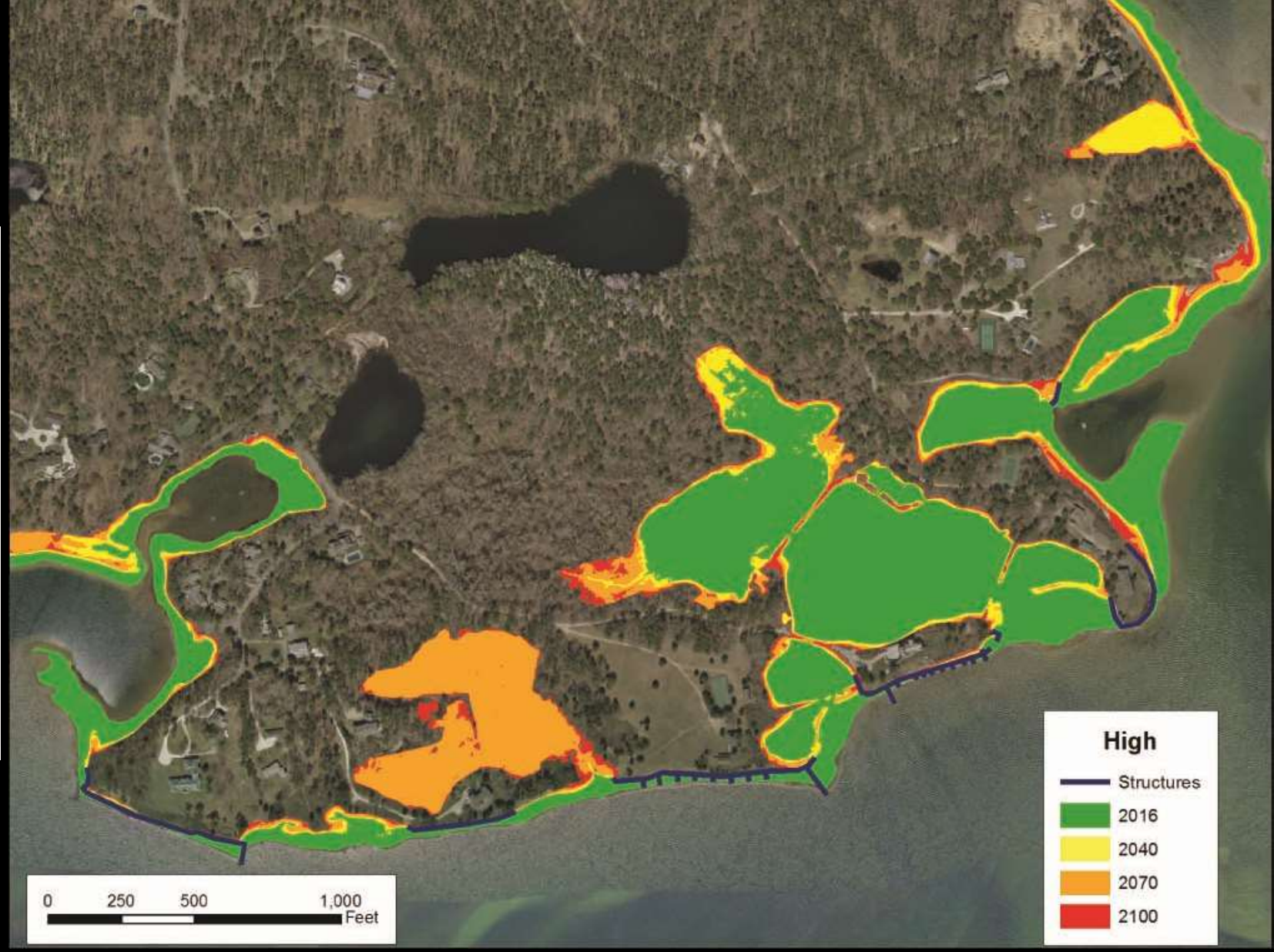
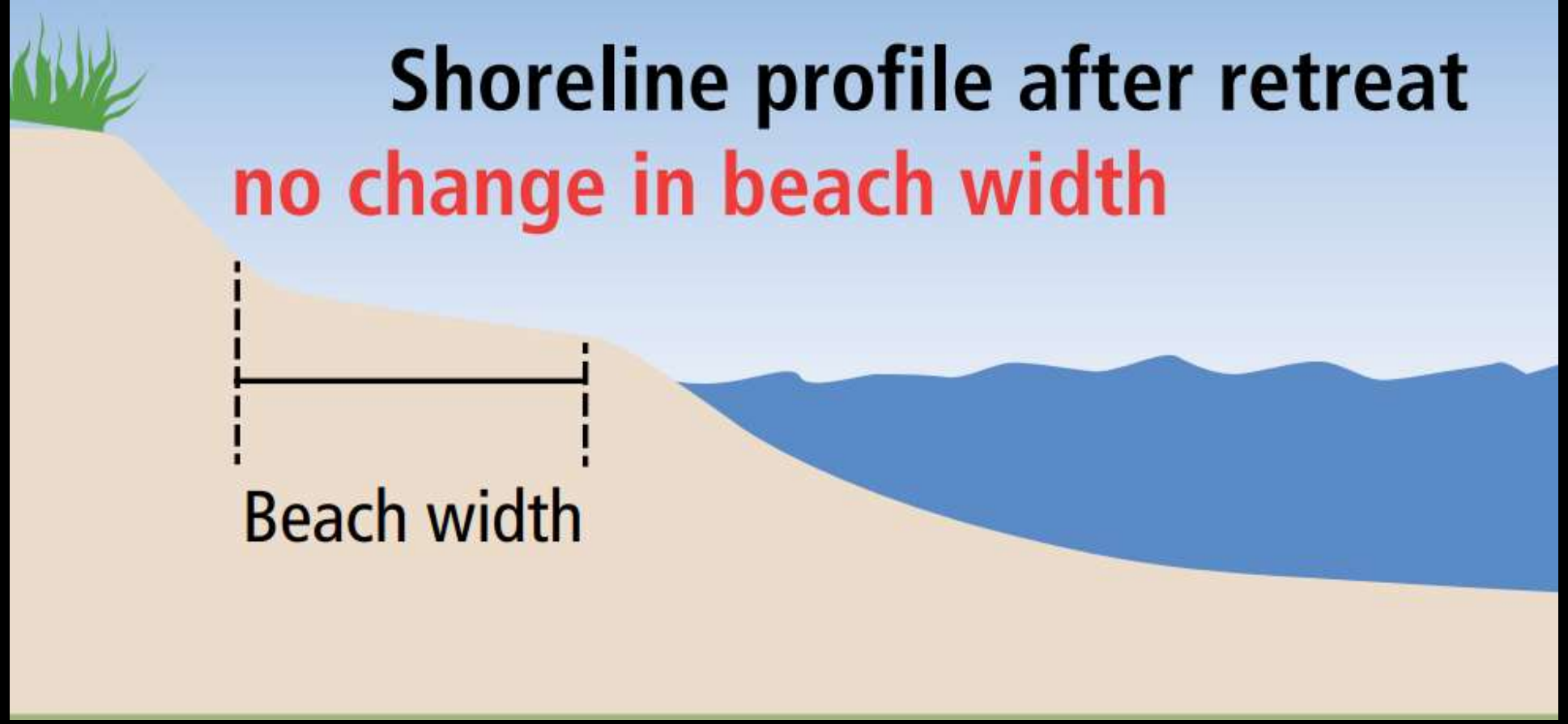




3. Future Geomorphological Changes on the inner shoreline

Coastal Engineering Structures

3. Future Geomorphological Changes on the inner shoreline



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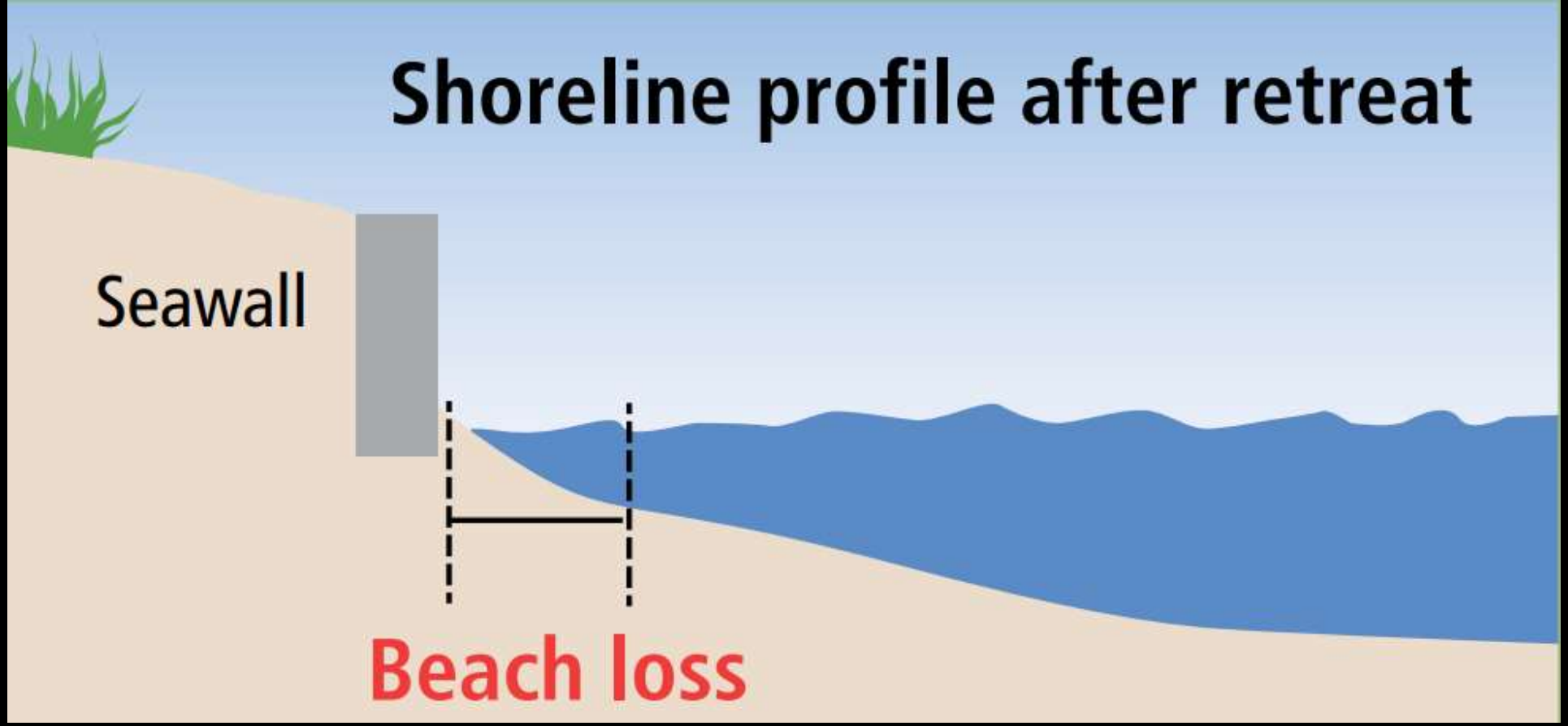

3. Future Geomorphological Changes on the inner shoreline

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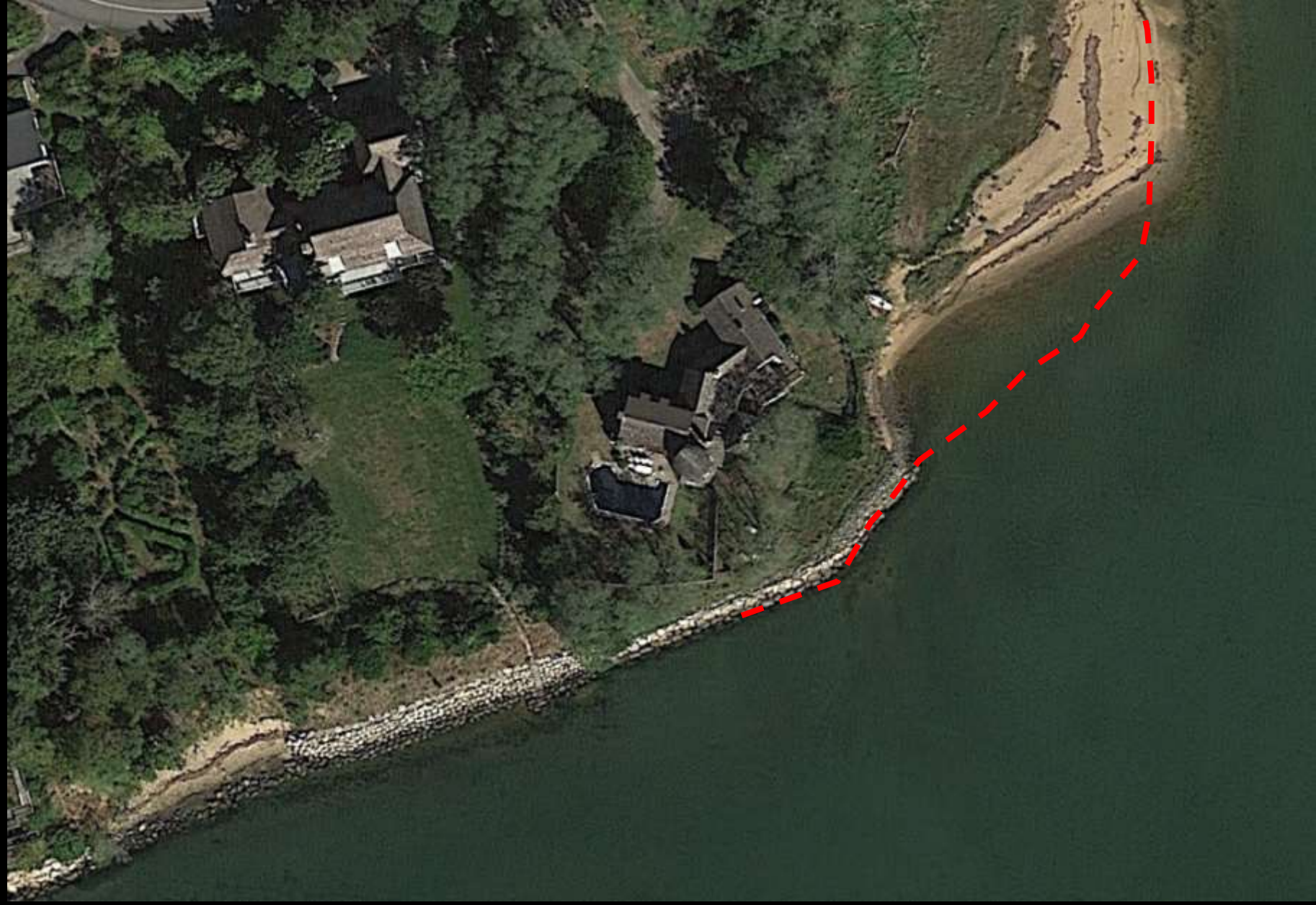
‘End Effects’
or
‘Edge Effects’



3. Future Geomorphological Changes on the inner shoreline

Conclusion

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Questions

Thanks to:
The Pleasant Bay Alliance
Liann Dunn Design and Illustration