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Coastal Resilience

Zach Ferdaña, Sr. marine conservation planner

March 5, 2009

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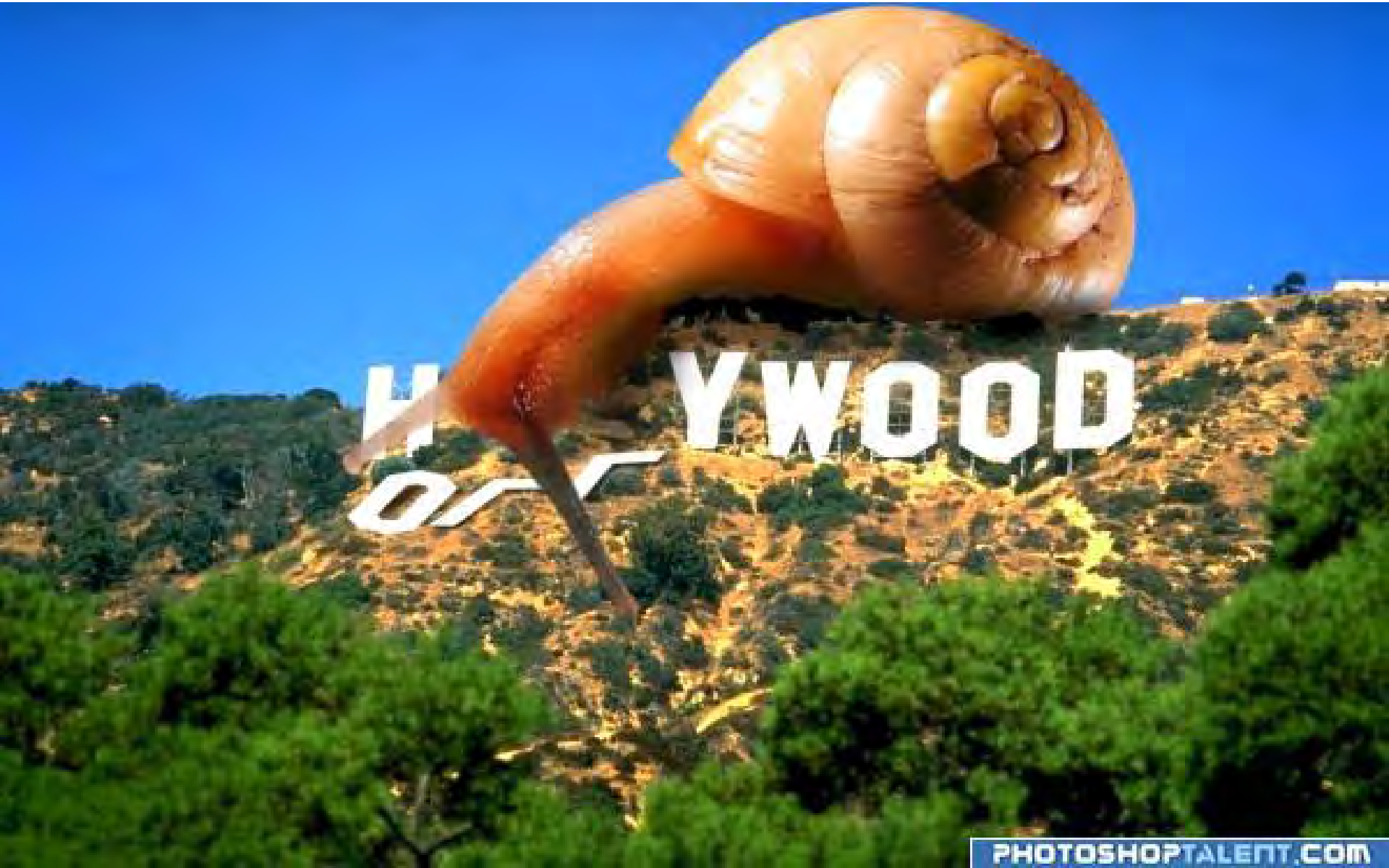
Sea Level Rise – threat or condition?



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Long Island, New York
bringing partners and people together

Coastal Resilience

adapting natural and human communities to sea level rise and coastal hazards

Partners

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NOAA

ASFPM

NASA Goddard Institute for Space Studies
New York, N.Y.

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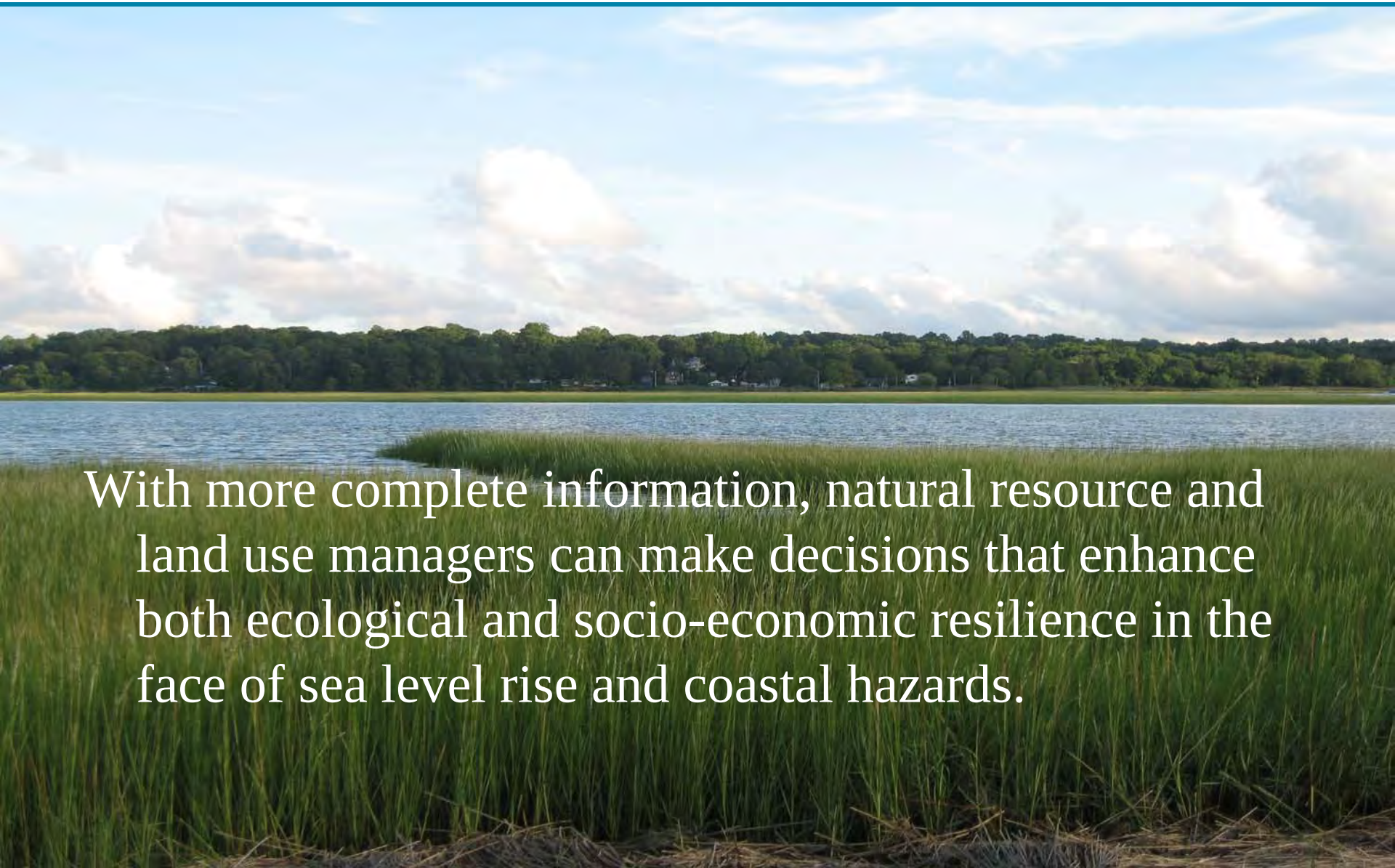
Working hypothesis:



With more complete information, natural resource and land use managers can make decisions that enhance both ecological and socio-economic resilience in the face of sea level rise and coastal hazards.

What is Coastal Resilience?

Coastal resilience refers to the ability of linked social, ecological, and economic systems within the coastal zone to adapt to and recover from disturbances such as hurricanes, tsunamis, floods, sea level rise, and harmful algal blooms. (Gunderson and Holling 2002; Berkes and Folke 2002).

Key Elements:

- Linked social, ecological, and economic systems
- Ability to adapt to and recover from disturbances

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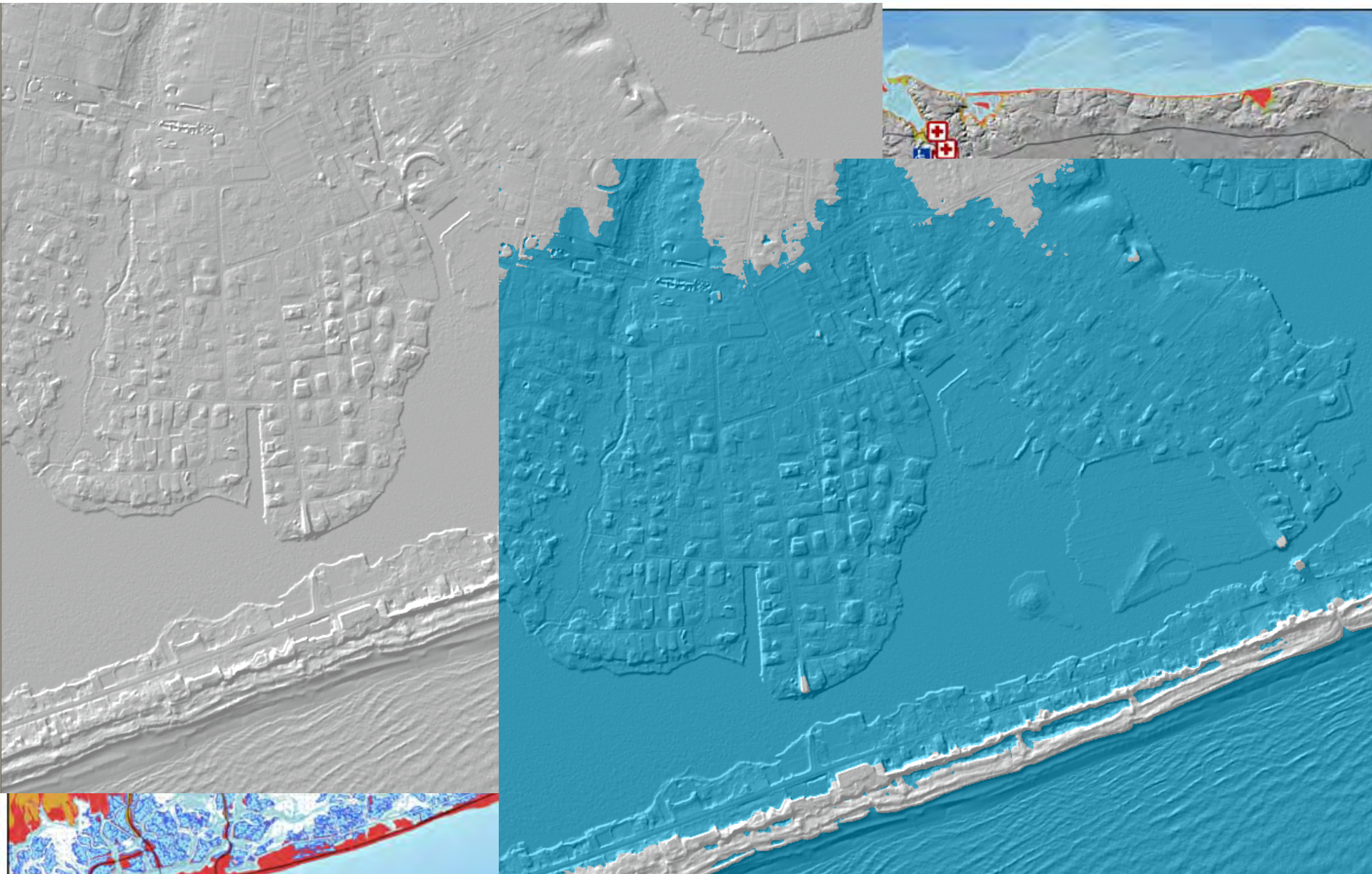
Defining relationships between ecological, socio-economic and management features



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Sea Level Rise projections

Decade	GCM-based Central Range	High-End
2020s	2 to 5 in	7 in
2050s	7 to 12 in	22 in
2080s	12 to 23 in	45 in

What if ice sheets collapse?

- Greenland ice sheet: 7 m
- West Antarctic ice sheet: 5 m
- How fast?

Goddard Institute for Space Studies
New York, N.Y.

Storm Inundation projections

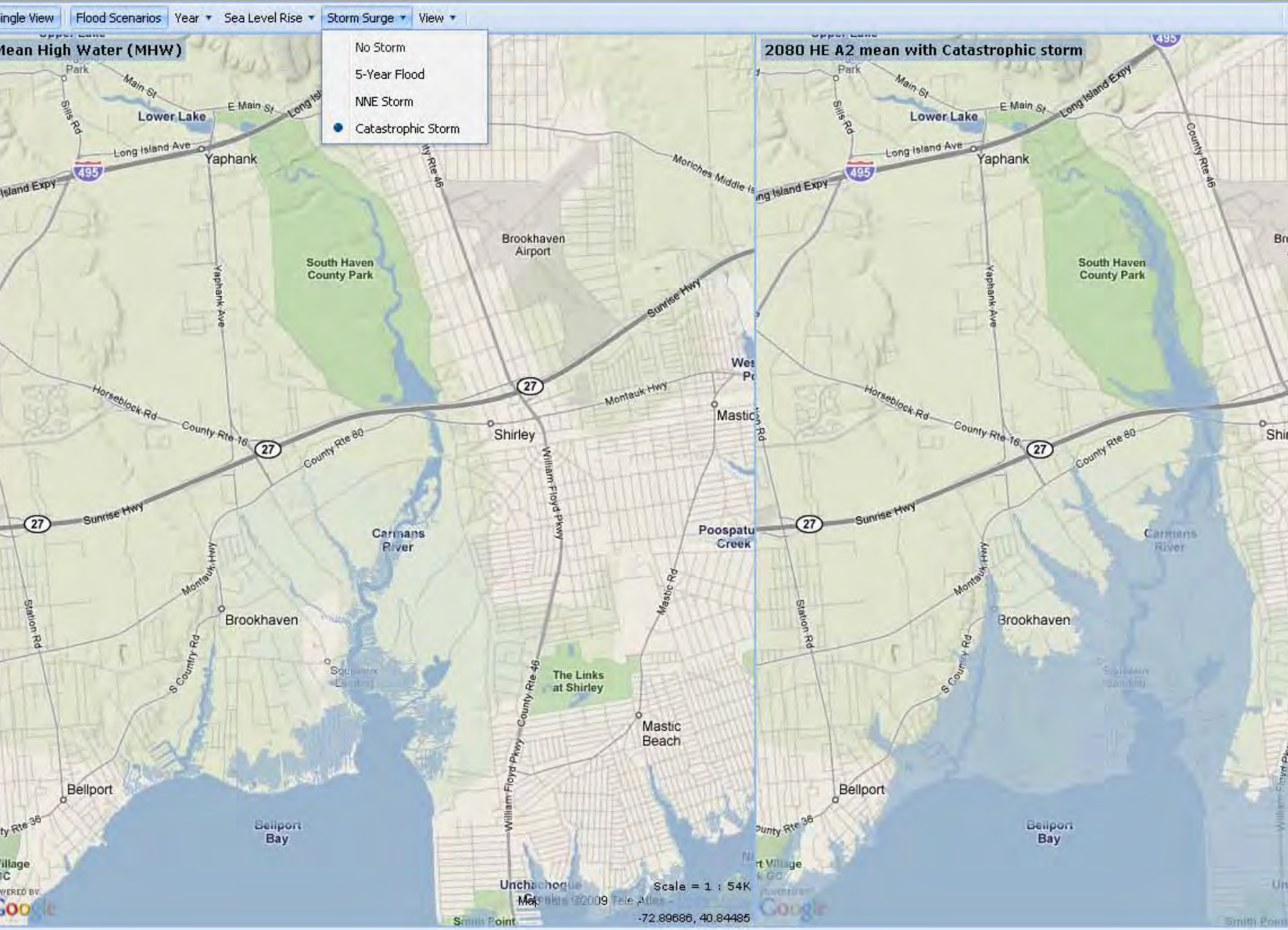
Sept. 21, 1938:

- 682 people killed
- $4.7 billion in property losses
- Identical hurricane today would cost $24 billion

Modeling storms:

- 20% annual chance storm (5-yr flood)
- Category 2 Hurricane
- 1938-style catastrophic storm

Courant file photo



ingle View
Flood Scenarios
Year
Sea Level Rise
Storm Surge
View
No Storm
5-Year Flood
NNE Storm
Catastrophic Storm
Mean High Water (MHW)
2080 HE A2 mean with Catastrophic storm
Lower Lake
Yaphank
South Haven County Park
Brookhaven Airport
Shirley
Mastic
Carmans River
Poospatu Creek
Brookhaven
The Links at Shirley
Mastic Beach
Bellport
Bellport Bay
Sunrise Hwy
Montauk Hwy
Horseblock Rd
County Rte 16
County Rte 80
Long Island Expy
Main St
E Main St
Sills Rd
Yaphank Ave
Station Rd
S Country Rd
William Floyd Pkwy
Mastic Rd
Moriches Middle Is
Scale = 1 : 54K
-72.89686, 40.84485

Community Vulnerability and Risk Analyses

Protecting human communities

- Critical infrastructure
- Social characteristics

What is at risk?

- Infrastructure damage and loss
- Income and people

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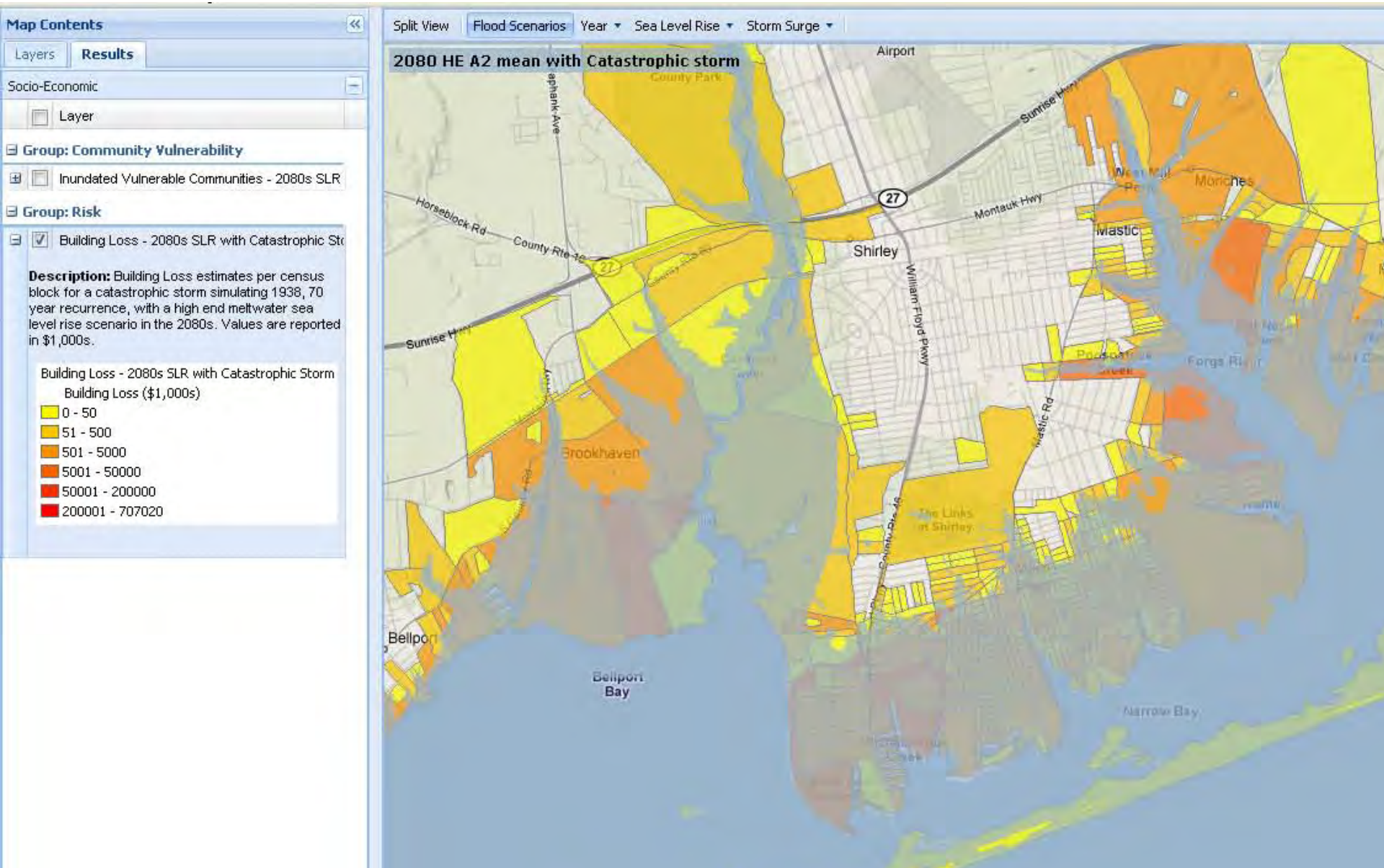
Vulnerability and Risk



Which wetlands will remain?

Ecological value

Storm mitigation

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Coastal wetlands – now and its potential future

Map Contents

Layers | Results

Ecological

Layer

Group: Marsh

Marsh Loss - 2080s SLR

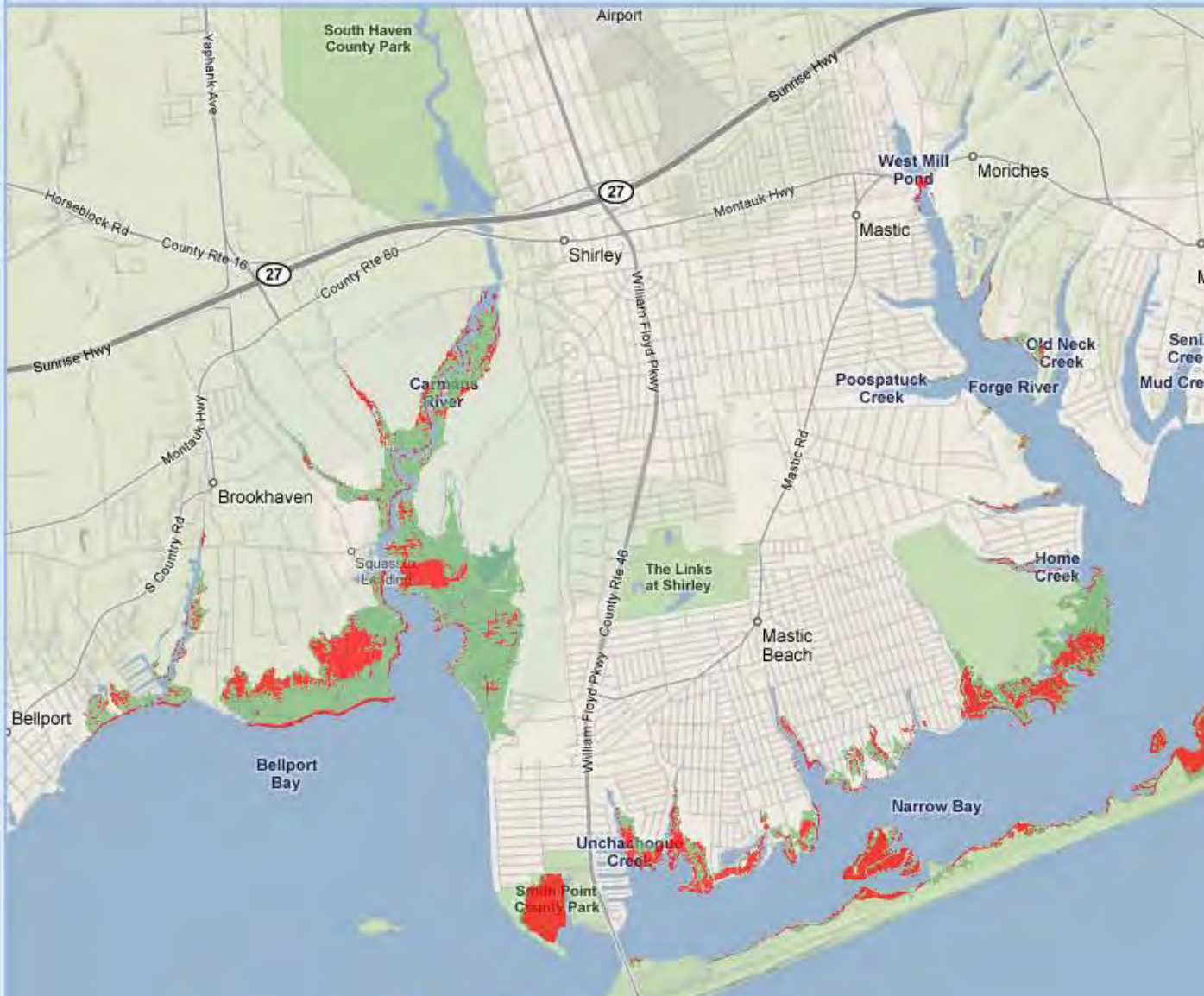
Description: "Loss" is defined as 'present-day' marshes below mean low water in 2080 under a A1B sea level rise calculation. Due to limitations in the LiDAR data, we were unable to calculate mean low water for earlier SLR calculations (i.e. 2020, 2050, etc.). Source: NY DEC salt marsh data. The marsh dataset is primarily from 1974, with a 1995 update for the Shinnecock Bay region.

2080 Estimate
- Lost
- Potentially present (not inundated)

Total Marsh Loss per Town - 2080s SLR

Total Marsh Loss per Village - 2080s SLR

Split View | Flood Scenarios



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Regulatory approaches

- Standard buffers/setbacks
- Rolling easements/setbacks
- Priority areas for protection based on current conditions:
  - Priority areas for acquisition
  - Bulkhead-free zones
- Priority areas for protection based on future conditions
  - Upland buffer areas

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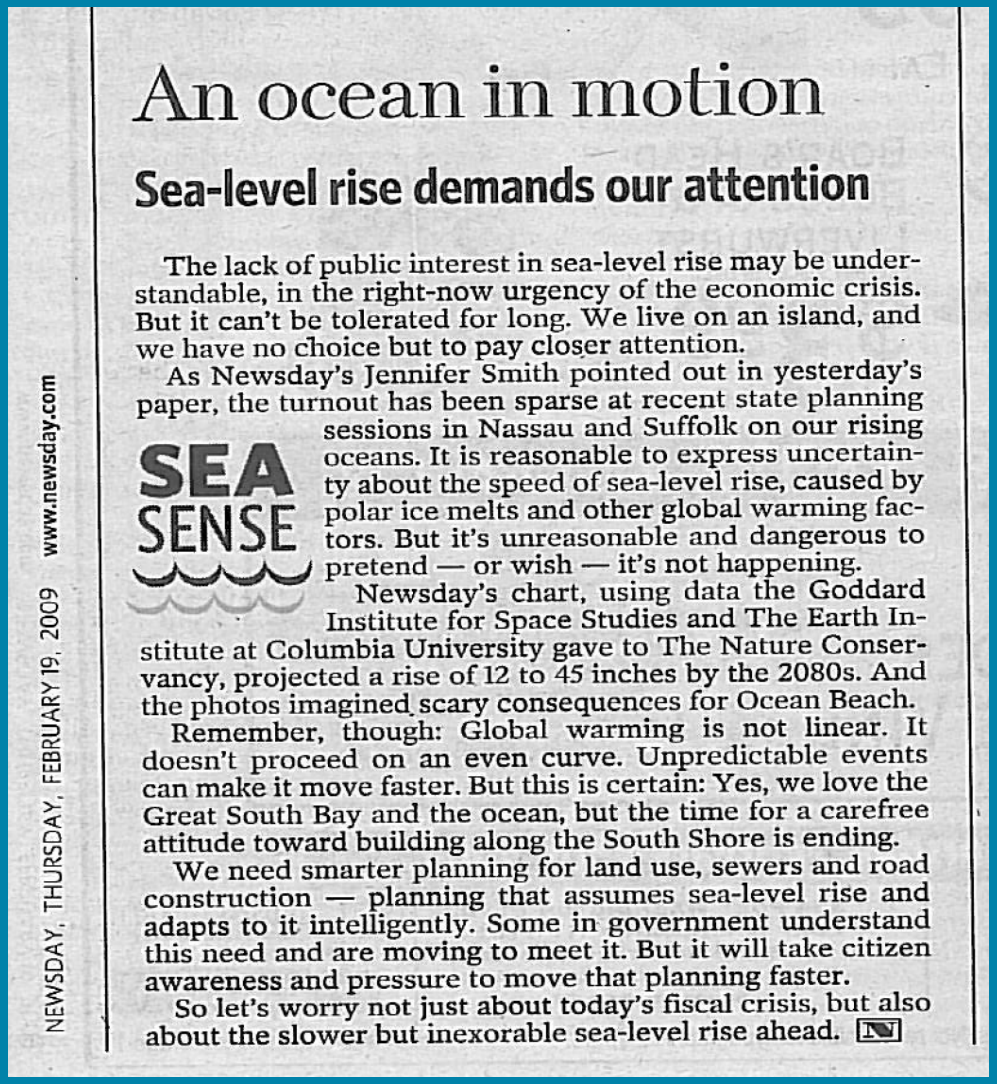
ecosystem-based adaptation

- Climate change is an ongoing condition that demands our attention

- Online decision support is a great vehicle for demonstrating conditions, relationships and options

- Coastal wetlands may be the best ecosystem to test our assumptions



NEWSDAY, THURSDAY, FEBRUARY 19, 2009 www.newsday.com

An ocean in motion

Sea-level rise demands our attention

The lack of public interest in sea-level rise may be understandable, in the right-now urgency of the economic crisis. But it can't be tolerated for long. We live on an island, and we have no choice but to pay closer attention.

As Newsday's Jennifer Smith pointed out in yesterday's paper, the turnout has been sparse at recent state planning sessions in Nassau and Suffolk on our rising oceans. It is reasonable to express uncertainty about the speed of sea-level rise, caused by polar ice melts and other global warming factors. But it's unreasonable and dangerous to pretend — or wish — it's not happening.

SEA SENSE

Newsday's chart, using data the Goddard Institute for Space Studies and The Earth Institute at Columbia University gave to The Nature Conservancy, projected a rise of 12 to 45 inches by the 2080s. And the photos imagined scary consequences for Ocean Beach.

Remember, though: Global warming is not linear. It doesn't proceed on an even curve. Unpredictable events can make it move faster. But this is certain: Yes, we love the Great South Bay and the ocean, but the time for a carefree attitude toward building along the South Shore is ending.

We need smarter planning for land use, sewers and road construction — planning that assumes sea-level rise and adapts to it intelligently. Some in government understand this need and are moving to meet it. But it will take citizen awareness and pressure to move that planning faster.

So let's worry not just about today's fiscal crisis, but also about the slower but inexorable sea-level rise ahead.

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