



# Developing a Consensus-Based Coastal Resiliency Strategy in Brewster, MA

NEWEA Spring Meeting, June 6, 2017

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# Let's talk about

- Background on Brewster
- Goal of the Strategy
- Strategy Development and Funding Team
- Scenarios and Impacts
- Consensus Strategies
- Lessons Learned
- Questions?



# Brewster's Public Shoreline



# Storm Surge – Mants Landing





# Storm Surge – Paines Creek

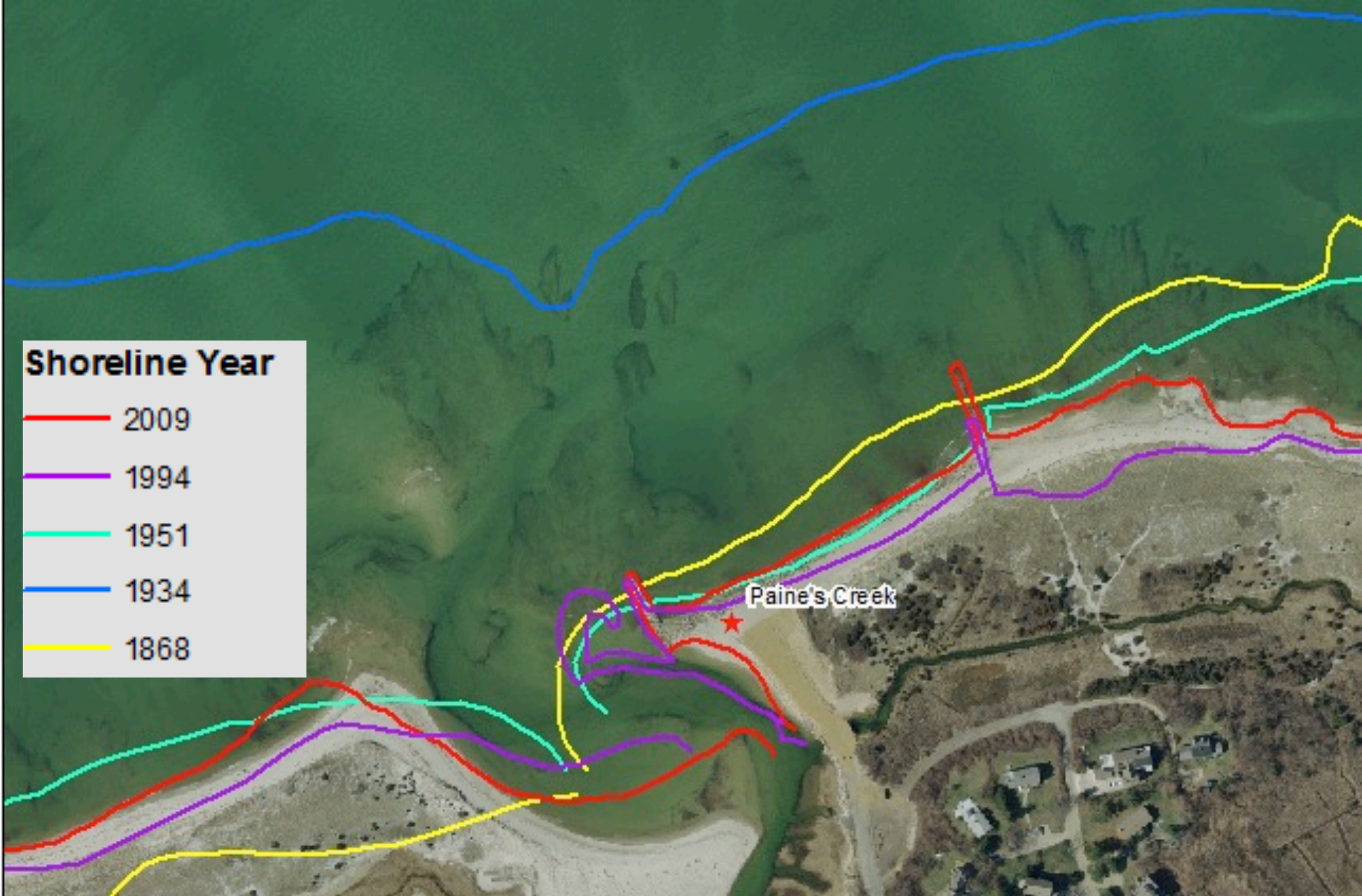




# The Aftermath







**Paine's Creek**  
**2014 Color Aerial and MA CZM Historic Shorelines**



# Paine's Creek – Recent Adaptation



Before (May 2010)



After (May 2015)

Image source: Google Earth



# Breakwater – Recent Adaptation



Image source: Greg Berman



# Goal

Develop and publicly present a set of strategies and mechanisms to address key community vulnerabilities, issues, and priorities and to identify the community's preferred adaptation strategies.



# Key Players

## Development

### Technical Team:

- Horsley Witten Group, Inc.
- Center for Coastal Studies
- LEC Environmental Consultants

### Facilitation:

- Consensus Building Institute

### Community representation:

- Brewster Coastal Advisory Group (BCAG)

## Funding

- Town of Brewster, MA
- MA Office of Coastal Zone Management (CZM)

# Public Involvement Process (1/2)

- Interview of town residents and stakeholders to design the BCAG, and encourage applications for BCAG “seats”
- After selection of BCAG members, the team held:
  - 8 three-hour public meetings, and
  - A two-hour public visioning session.
- During those meetings, the team:
  - Examined coastal conditions, threats and community needs.
  - Identified, refined, and reached consensus on guiding principles



# Public Involvement Process (2/2)

- Following the guiding principles, the team explored potential town-wide and site-specific strategies.
- The Team then reached consensus on:
  - Many town-wide approaches for coastal adaptation and
  - A set of recommendations to guide next steps and implementation
- In addition to consensus approaches, the team collected additional suggestions – including ideas for landing-specific approaches – developed in assigned smaller working groups or as individuals.

# Tides in Brewster – Some context

- Tidal range (consecutive Low/High Tides):
  - Average: 10.3 feet
  - Ranging from 6.8 to 15.2 feet
- Relative to the shoreline (Mean High Water or MHW)
  - Most (58%) high tides are above MHW
  - **~ 1 in 17 high tides (5.8%) are  $\geq 2$  ft above MHW: that's 41 high tides**
  - 3 greatest high tides are 2.8 feet above MHW

Source: 2016 NOAA tidal predictions. Sesuit Harbor, East Dennis, MA



# Measured Historic Storm Surges

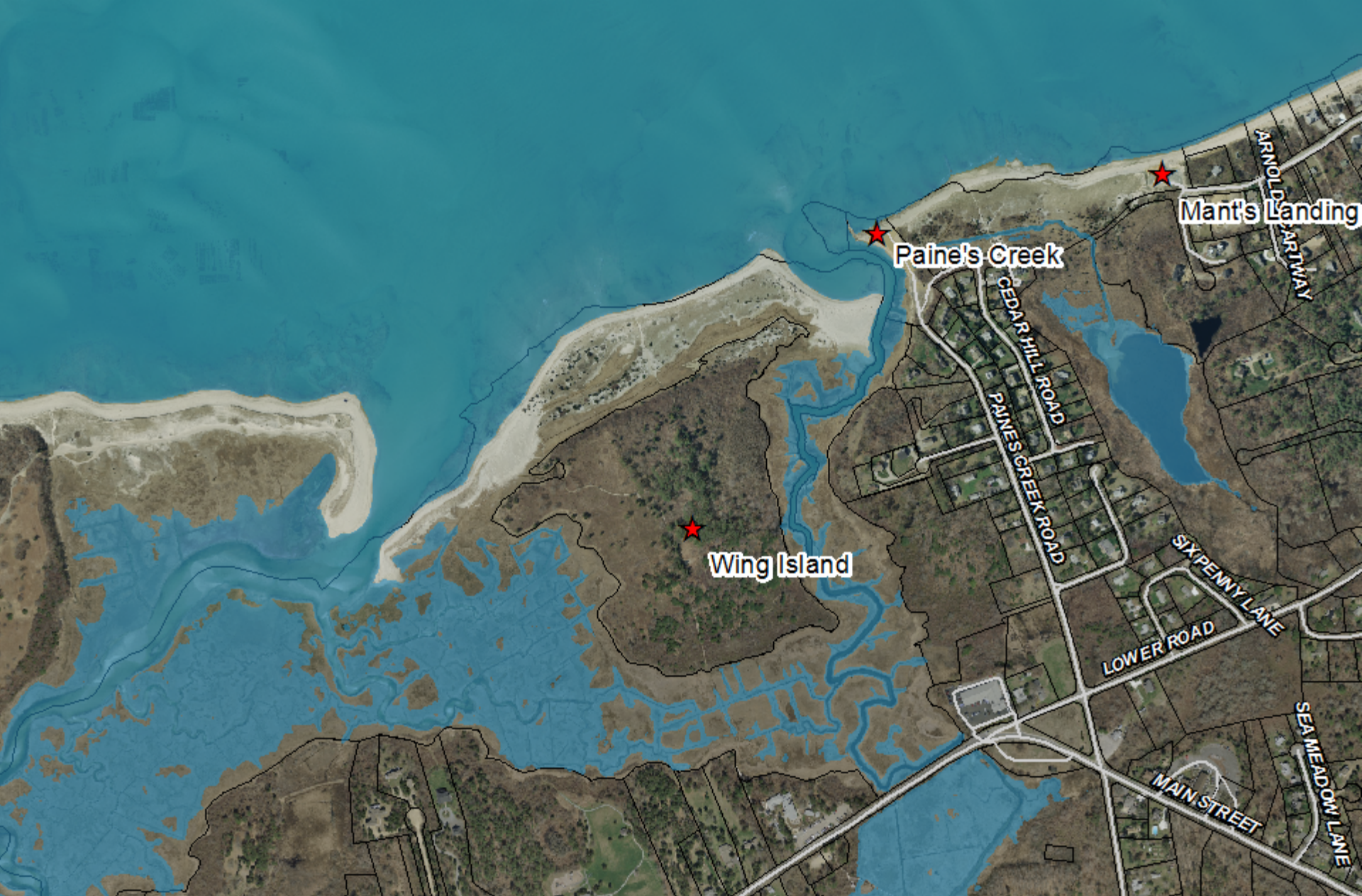
## NOAA Boston Gauge

Surge (feet)	Storm Date	Storm Name
4.21'	February 9, 2013	Winter Storm Nemo
4.57'	October 29, 2012	Hurricane Sandy
4.88'	October 30, 1991	"Perfect Storm" Halloween Nor'easter
4.34'	February 6, 1978	Blizzard of 1978
3.69'	February 14, 1940	Valentine's Day Nor'easter

**For visualizations purposes, assume 4 ft surge**

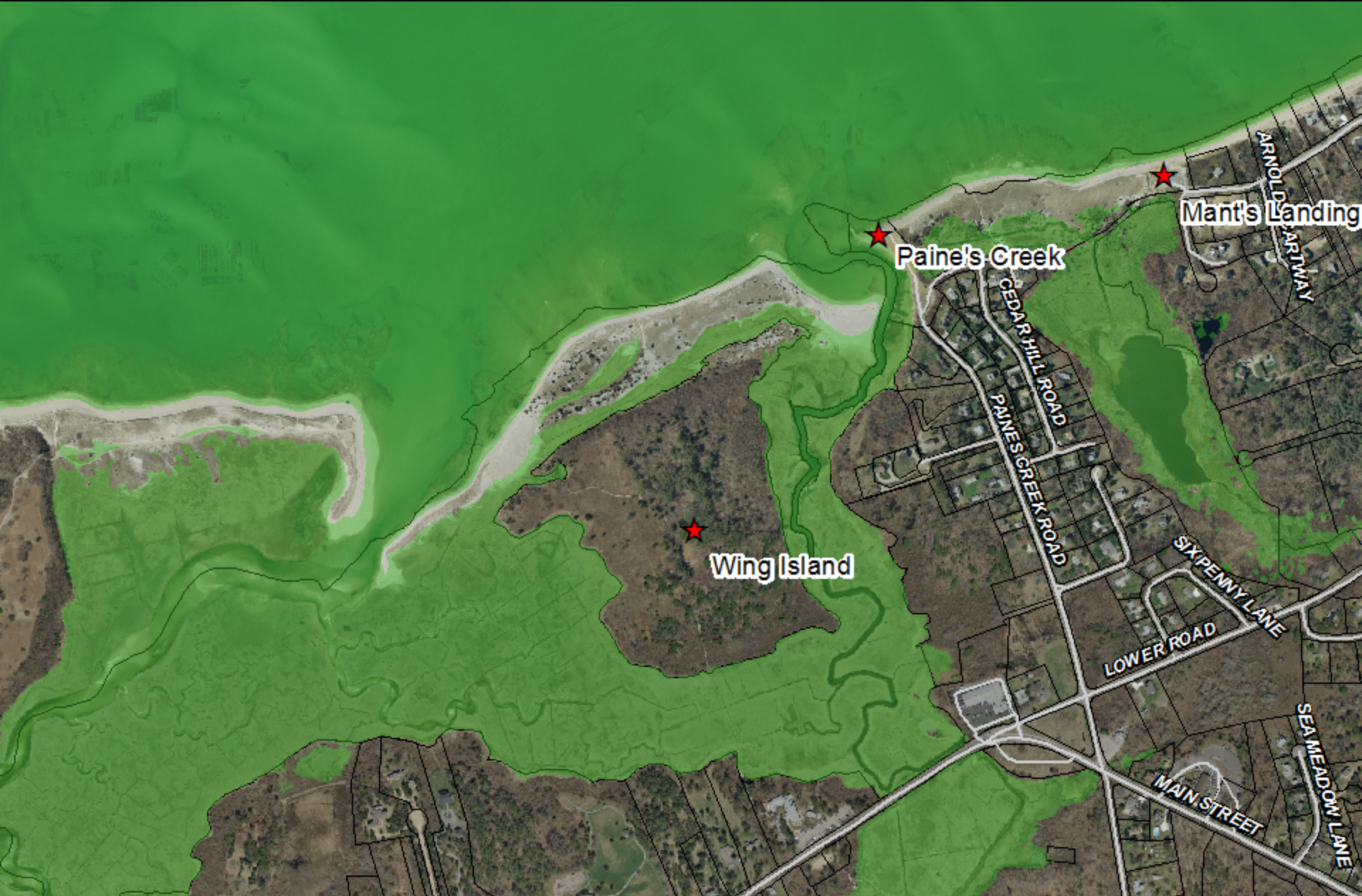
# Coastal Flooding Scenarios

- MHW: today's benchmark for coastal flooding
- MHW + 2 ft: a particularly high tide in 2016, or a more average tide with a storm surge or some SLR
- MHW + 4 ft: an average tide with 4 ft of SLR, or 2 ft of SLR with a 2-ft storm surge
- MHW + 8 ft: an average tide with a combination of 4 ft of SLR, and 4 ft of storm surge



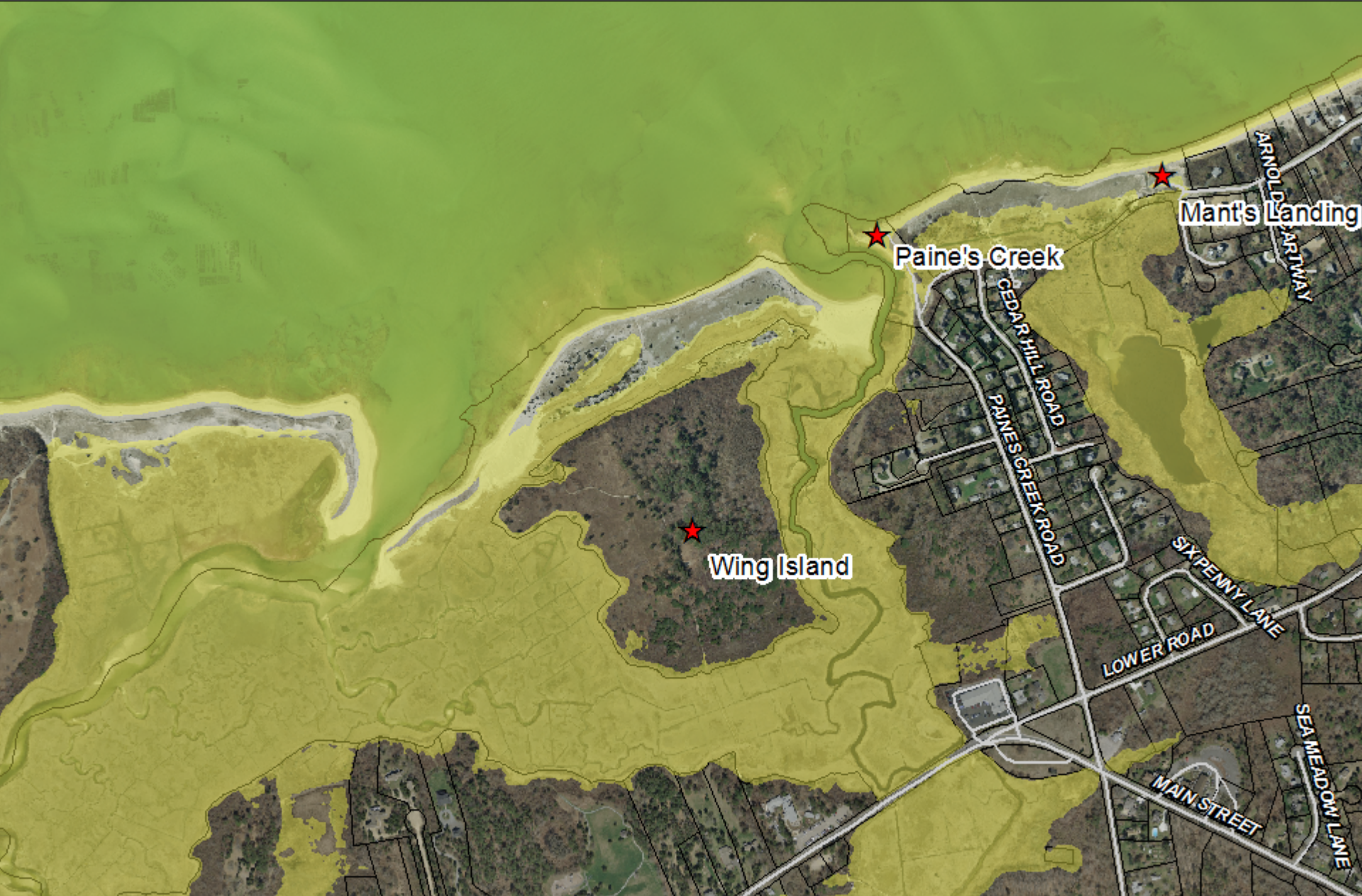
**Paine's Creek, Mant's Landing, and Wing Island  
Mean High Water**





**Paine's Creek, Mant's Landing, and Wing Island  
MHW + 2 feet**





**Paine's Creek, Mant's Landing, and Wing Island  
MHW + 4 feet**





**Paine's Creek, Mant's Landing, and Wing Island  
MHW + 8 feet**





**Paine's Creek, Mant's Landing, and Wing Island  
All Flooding Scenarios**

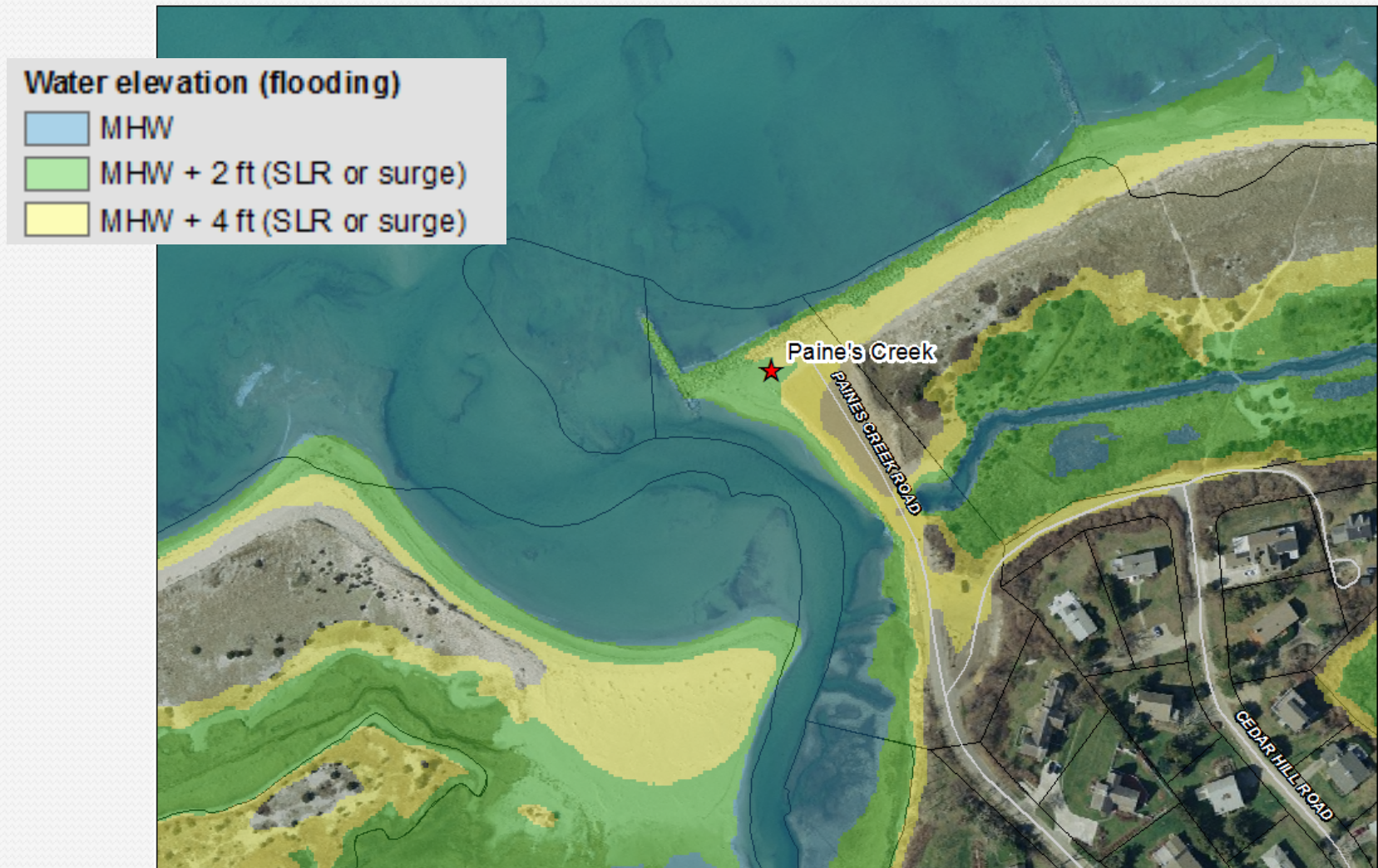




**Spruce Hill, Linnell and Crosby Landings  
All Flooding Scenarios**



# Paine's Creek – Access Impacts





# Preliminary Impacts to Parking and Access

Coastal Landing	Parking Spaces	Scenarios with Impacts	
		Parking	Access to Parking
Paines Creek	19	4 ft	8 ft
Mants	44	4 ft	4 ft
Saints	38	-	-
Breakwater	6	-	4 ft
Breakwater Beach	62	8 ft	8 ft
Point of Rocks	3+8	-	-
Ellis	19	8 ft	-
Linnell	25	8 ft	-
Crosby	60	4 ft	4 ft

Note: 4 ft corresponds to either a 4ft storm surge, or 4 ft of SLR  
8 ft correspond to 4 ft of SLR + 4 ft of storm surge

# Consensus Adaptation Strategy Recommendations (1/2)

1. Evaluate, expand, and explore alternative access to town landings (via public and public-private means)
  - Bicycles and Pedestrians
  - Shuttle
  - Satellite Parking
2. Seek and evaluate new access locations
3. Maintain access for emergency vehicles and shellfishing
4. Broaden and improve access (including visual) for individuals with limited mobility



# Consensus Adaptation Strategy Recommendations (2/2)

5. Continue beach management and restoration efforts, with periodic review
6. Promote and support wetland resource adaptation (Crosby Lane Culvert/Salt Marsh Restoration)
7. Continue analysis of climate impacts
8. Implement ongoing adaptive management
9. Prioritize future projects on underutilized beaches to avoid overcrowding

# Consensus Implementation Recommendations

1. Clarify the Roles and Responsibilities of the Coastal Committee
2. Implement the Management Plan
3. Continue Public Engagement



# Some Lessons Learned

- It takes time for people to:
  - Understand prediction is a planning tool, not an exact science
  - Agree on what constitutes consensus
  - See past their own personal interests
- Graphics matter: people need to see what change means
- Public participation is a valuable process – it provided good information to support a culvert opening project, which:
  - Increases tidal flushing,
  - Improves salt marsh habitat and coastal resiliency, and
  - Will allow Crosby Marsh to better adapt to a changing climate.

# Questions?



**Historical Context**  
Photo Dated: 1990



**Present Day**  
Photo Dated: 2015



**Mean High Water +4 Feet**