

# Friends of Squibnocket Pond

## Meeting with Chilmark Selectmen

### April 4th, 2014

*Squibnocket Pond*

*Squibnocket Bight*

# Why Are We Here?

Tony Orphanos, Summer Resident  
Charlie Parker, Summer Resident  
Stan Humphries, Coastal Geologist, LEC

# Two Urgent Problems

- Loss of Chilmark Public Beach
- Access to Squibnocket Farms

# Design Principles

- *'Managed retreat' (VCS)*
- Removal of all coastal structures
- Restoration of coastal dunes
- Retention of natural barrier beach

# Squibnocket Beach



- Beach is suffering effects of scouring
- 'Historic swimming area' has *potential* to heal
- Area west of Money Hill is not generally useful
  - Cobble structure below mean sea level (MSL)
  - Beach and dune area undergoing transformation
  - Area has been flattening-out for over 50 years

# Squibnocket Beach: Mussel Shoals Showing Cobble Structure Below Mean Sea Level



## Squibnocket Beach To The West of Money Hill



# Squibnocket Beach: With Coastal Structures

Boulders placed on top of Money Hill in 1990's  
have rolled onto Beach as bank eroded

New Shoreline and Coastal Bank:  
Post Sandy

'Rubble revetment'

Legacy revetment

Scouring base of beach

2013 Top Edge of Bank

New Line of Coastal  
Bank (Photo 6/24/15)

# Squibnocket Beach With *Managed Retreat* of Shoreline

Top of Scarp

100 Years

50 Years

2 Years

Erosion rates (1.4'/year) plotted using Long Term  
rates for transects on either side of structure  
(Conservative - does not reflect 1' sea level rise to 2050)

Google

## Squibnocket Beach: After Coastal Structures Removed

- Clean shoreline will re-establish itself from east to west
- Historic swimming will heal after structures are removed
- Opens the door to restoring the coastal dune

# Current Access to Squibnocket Farms

5' - 6' above sea level

Area of Vulnerability

Squibnocket Rd

Causeway revetment  
in water at high tide

'Legacy' revetment

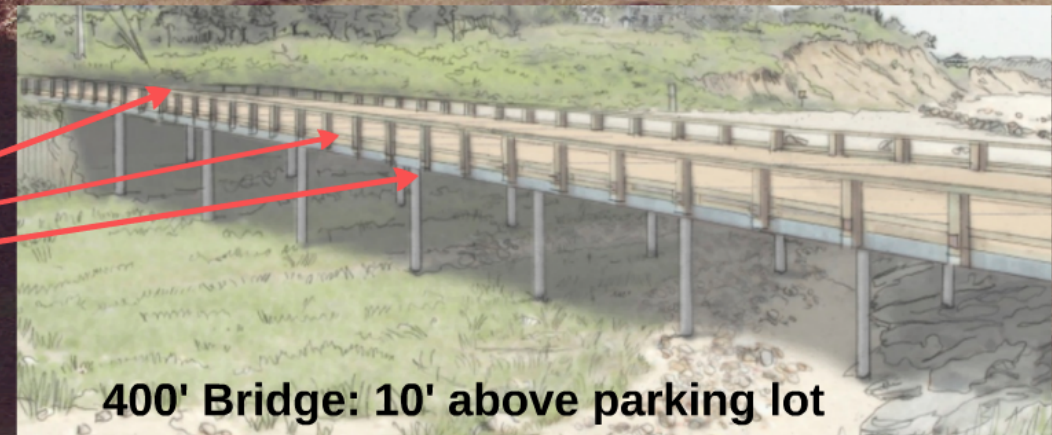
Bridge End-Point:  
50' from high water mark

Money Hill Revetment



# Squibnocket Beach Showing Proposed Bridge with New Structures after 50 Years

Feet above Sea Level:  
-- Top of railing: 19'  
-- Top of deck: 15'  
-- Top of piling: 13'



400' Bridge: 10' above parking lot

Top of Scarp in 50 Years

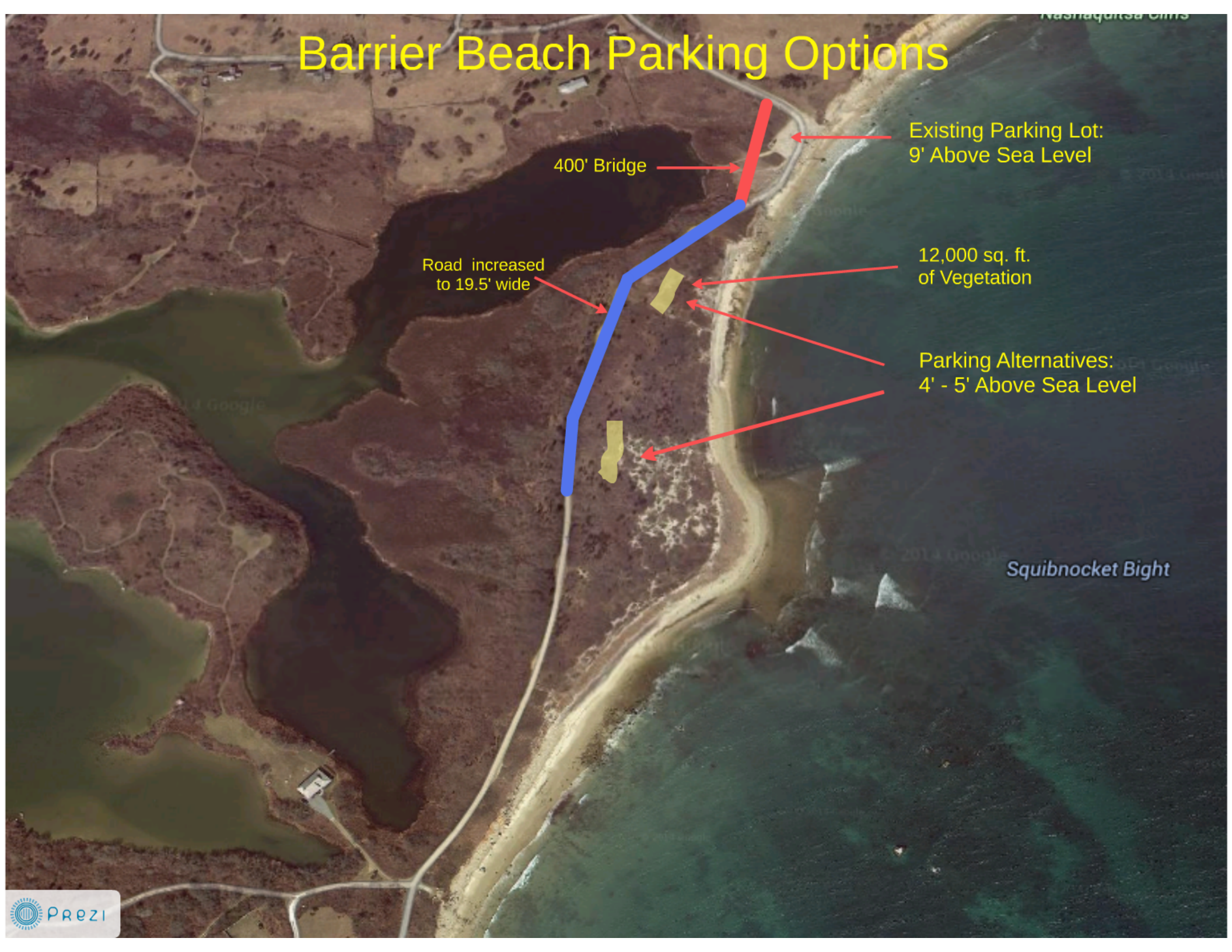
Scarp in 2 years after  
revetment is removed

New Coastal Structures at Bridge End-Points

# Squibnocket Farms' Bridge Proposal

- Best beach resources are marginalized
- Bridge is outsized presence on top of beach
- Coastal structures create irregular shoreline
- Pushes public beach to the west of Money Hill
- End-points of bridge become vulnerable near-term
- Requires siting of parking on barrier beach

# Barrier Beach Parking Options



400' Bridge

Road increased  
to 19.5' wide

Existing Parking Lot:  
9' Above Sea Level

12,000 sq. ft.  
of Vegetation

Parking Alternatives:  
4' - 5' Above Sea Level

Squibnocket Bight

# Current Proposal for Parking

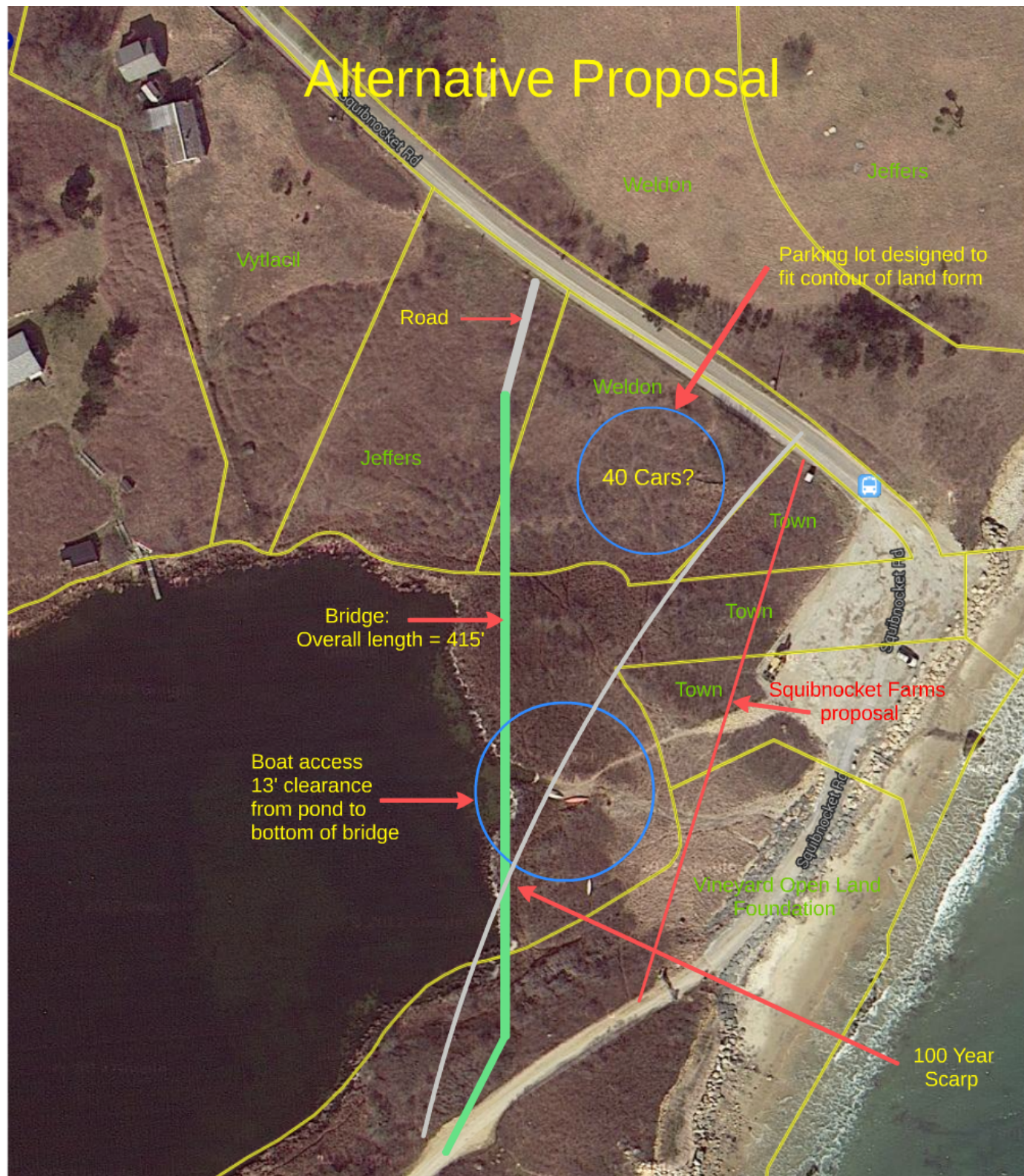
- Bridge proposal requires siting of parking on barrier beach
- Requires 2 lanes for bridge and barrier beach road
- Removes 12,000 sq ft of vegetation effects storm prevention capacity
- Longevity of parking on barrier beach
  - Related to sea level rise/storms, not historical erosion rates
  - Areas are 4' above sea level = 2' - 2.5' above high tide
  - Sea level rise of 1' by 2050 increases vulnerability [1]
  - Additional sea level rise of 2' - 6.5' forecast later in century [1]
- Parking lot on barrier beach requires wider bridge & road (19.5')

[1] "Sea Level Rise", Climate Change Resources, VCS, Jeremy Houser, 2013, pages 1 & 11. See VCS on Web.

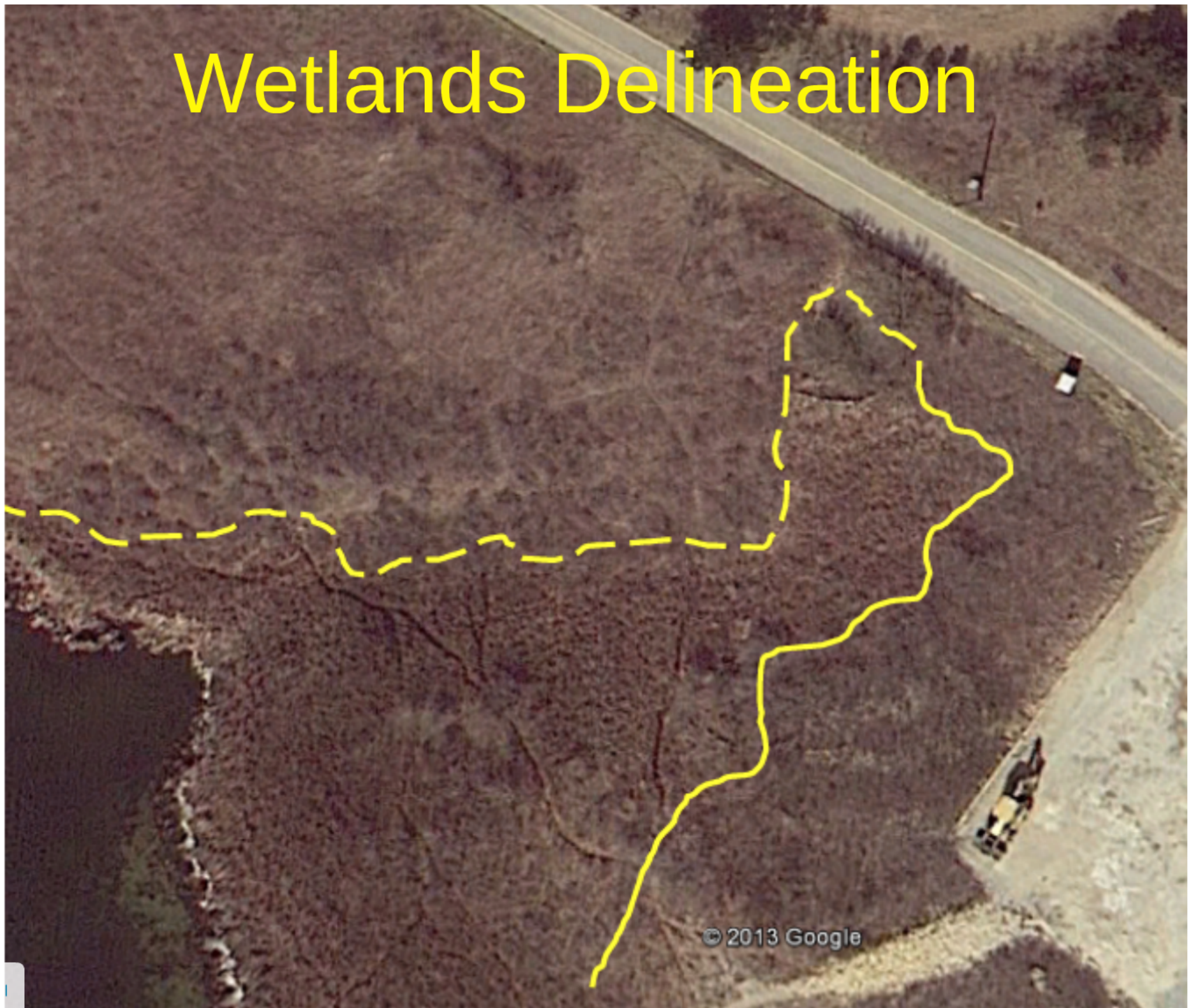
# Permitting Challenges to Proposed Project

- Barrier beach/coastal dune are 'Resources' that are protected under WPA Regulations[
  - 'Any alteration of a coastal dune shall not have an adverse effect on the coastal dune by disturbing the vegetative cover so as to destabilize the dune [10.28(3)b] or cause any modification of the dune form that would increase the potential for storm damage or flood control [10.28(3)c].'
  - The short and long-term effects would be especially destructive in a velocity flood zone.
- Given that this activity could result in a harmful net effect, it is highly unlikely that the Commissioner would issue a variance
  - The presence of other alternatives that are less harmful to the environment makes variance even less likely
  - There are clear precedents
- Location of a bridge on top of a beach resource is considered undesirable

# Alternative Proposal



# Wetlands Delineation



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**Parking**

Dirt road access to bridge

100' from lot to lot going up the road (Purple Line)

Cut into bank will require retaining wall

Finished grade: 11' MSL

130' deep from road toward pond (Purple Line)

Topographical line (contour) is 9' MSL; requires 2' retaining wall

Possible line for bridge

Parking Lot Target Area

Bridge

Road to Bridge

Google

Squibnocket Rd

Measurements: 24.5', 22.3', 20.5', 18.5', 16.2', 15.4', 15', 17', 19', 14.8', 11.6', 10.8', 9', 5.8', 4.7', 3.7', 1.8'

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to bridge

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11' MSL**

130' deep from road toward pond  
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Possible line  
for bridge

## Parking Lot Target Area

## Bridge

## Road to Bridge

# Alternative Proposal

- Mix of road and bridge
  - Further from shoreline & closer to the pond
  - 415' of bridge (vs. 400')
  - Connects to existing road beyond Money Hill
- Parking lot: 40 cars?
  - Behind existing parking lot
  - Designed to minimize frontal exposure
- Existing boat ramp is accessible
  - 13' of clearance

# Dune Restoration

Gradual tapering  
on backside

Dune area could  
be raised to 11' MSL

4' Dune  
New elevation = 9'

Overwash Area

7'

9'

4'

5'

5'

9'

9'

Squibnocket Rd

Squibnocket Beach

Squibnocket Rd

Google

# Dune Restoration

- Target: overwash area from Money Hill to the east
  - Overwash area is max of 6' above sea level
  - Possible high maintenance area
  - After area stabilizes, 'dune restoration' is possible
- Benefits:
  - Reduce frequency of overwash into the Pond
  - Lower maintenance costs
  - Additional source of nourishment for beach
  - Provides wildlife habitat
- Dune could be 11' high across entire parking lot area to edge of Money Hill
  - 2' on top of parking lot; 6' on overwash area
  - Gradual taper to the Pond

## Alternative Proposal Benefits

- Allows implementation of *Managed Retreat* strategy
  - Removal of all coastal structures - no new structures
- Provides depth and width for growth of historic beach area
  - Cove effect as shoreline retreats into 'softer' area
  - Opens the door to dune/coastal bank restoration
- Preserves barrier beach
  - Retains 12,000 sq. ft. of vegetation for flood control
- Provides safer, more secure, and more convenient parking
  - 11' above sea level; beyond 100 year line
- Bridge location is superior for Squibnocket Farms
  - Smaller footprint (one lane vs. two)
  - Private road
  - Eliminates Money Hill vulnerability
- Retains existing boat ramp



# Open Issues

- Wetlands Delineation
- Dune replenishment strategy
- Parking layout
- Landscaping plan, including contours
- Access to beach
- Maintenance plan
- Bridge end-point at Money Hill

# Summary of Plan

- Pursues best overall environmental solution
  - Trade-off analysis
- Focuses on preservation of historic beach area
  - Priceless asset
- Short-term *and* long-term perspective on this beach
  - Remove structures preventing healing process
  - Move bridge from path of beach migration
- Area could develop into pristine beach system
- Avoid betting on unproven beach resources

## The Enduring Shore

*Questions?*

Cape & Islands:

- 20,000 years since glaciers receded
- 400' of sea level rise since that time

Hurricane Irene

# Appendix

Bridge with railing = 19' above sea level  
Bridge with pick-up = 21' above sea level