

Preparing for Sea Level Rise in Hull

Anne Herbst
October 27, 2011

Gun Rock Patriots Day 2007

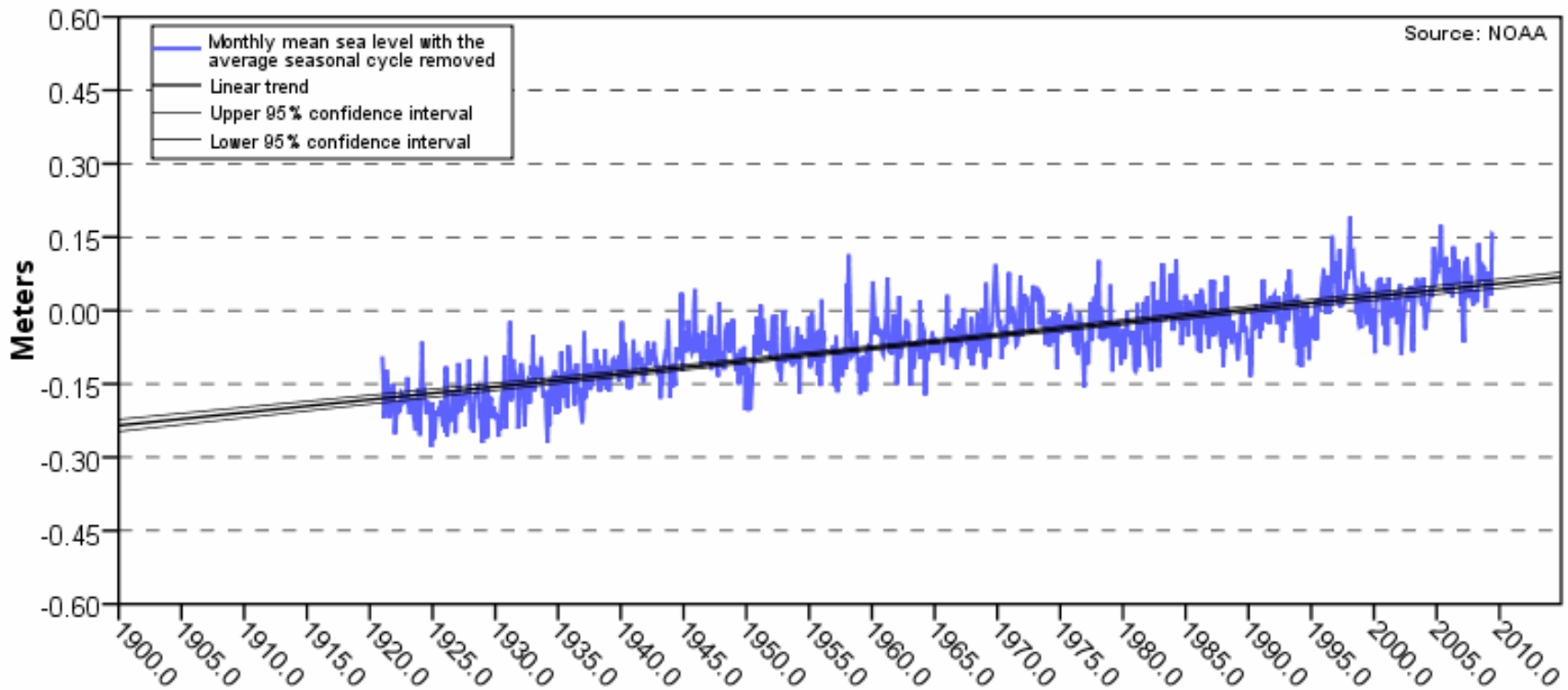


Boston Tide Station

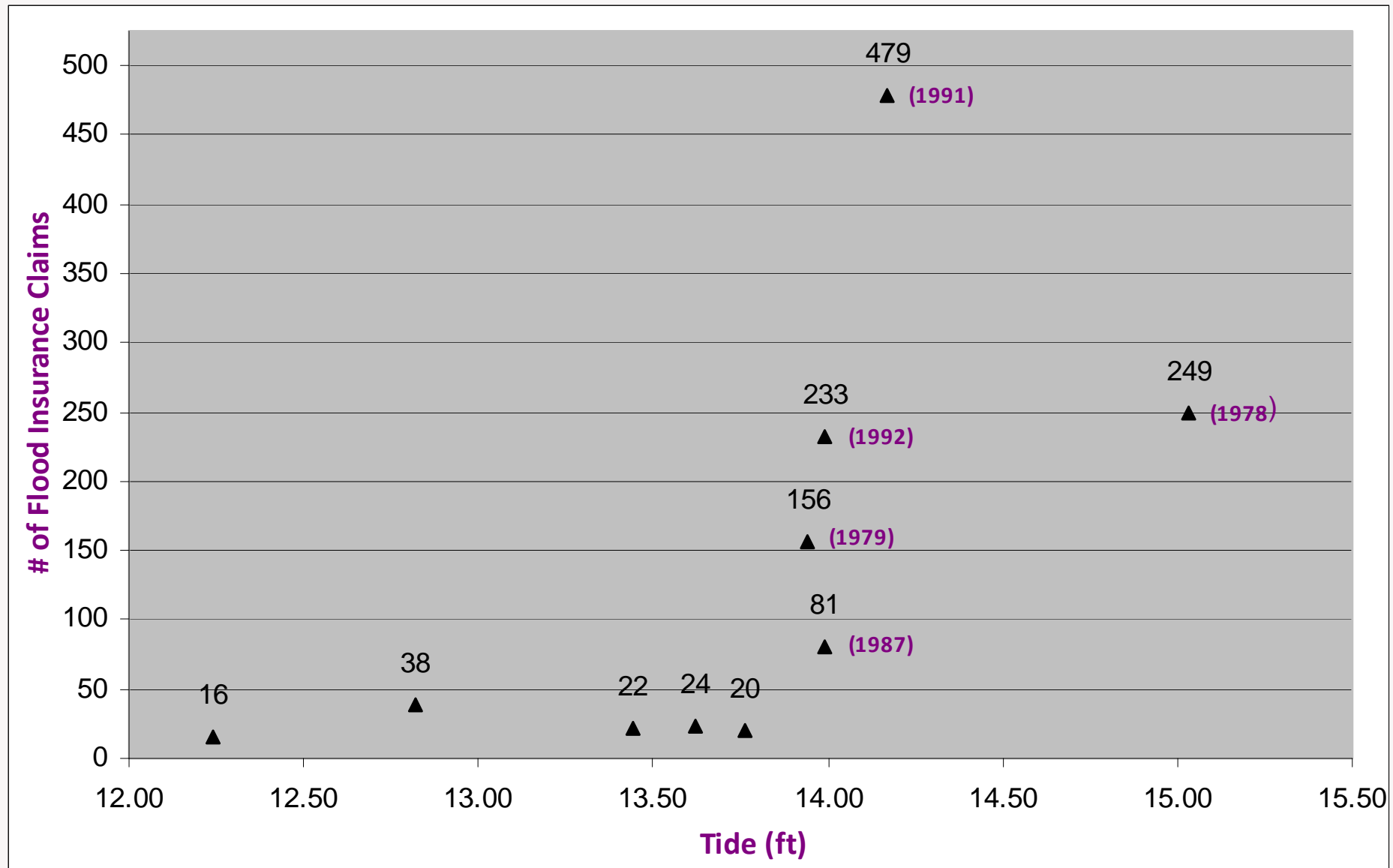
- Record from 1921-2006
- Sea level increase of 1/10 inch per year
- Equivalent to **10.3 inches in 100 years**



Boston, MA 2.63 +/- 0.18 mm/yr



Northeast Storms in Hull Top Ten Flood Insurance Claims (1978-2007)



Thirty Years of Coastal Storms in Hull





Storms Tides and Flood Insurance Claims

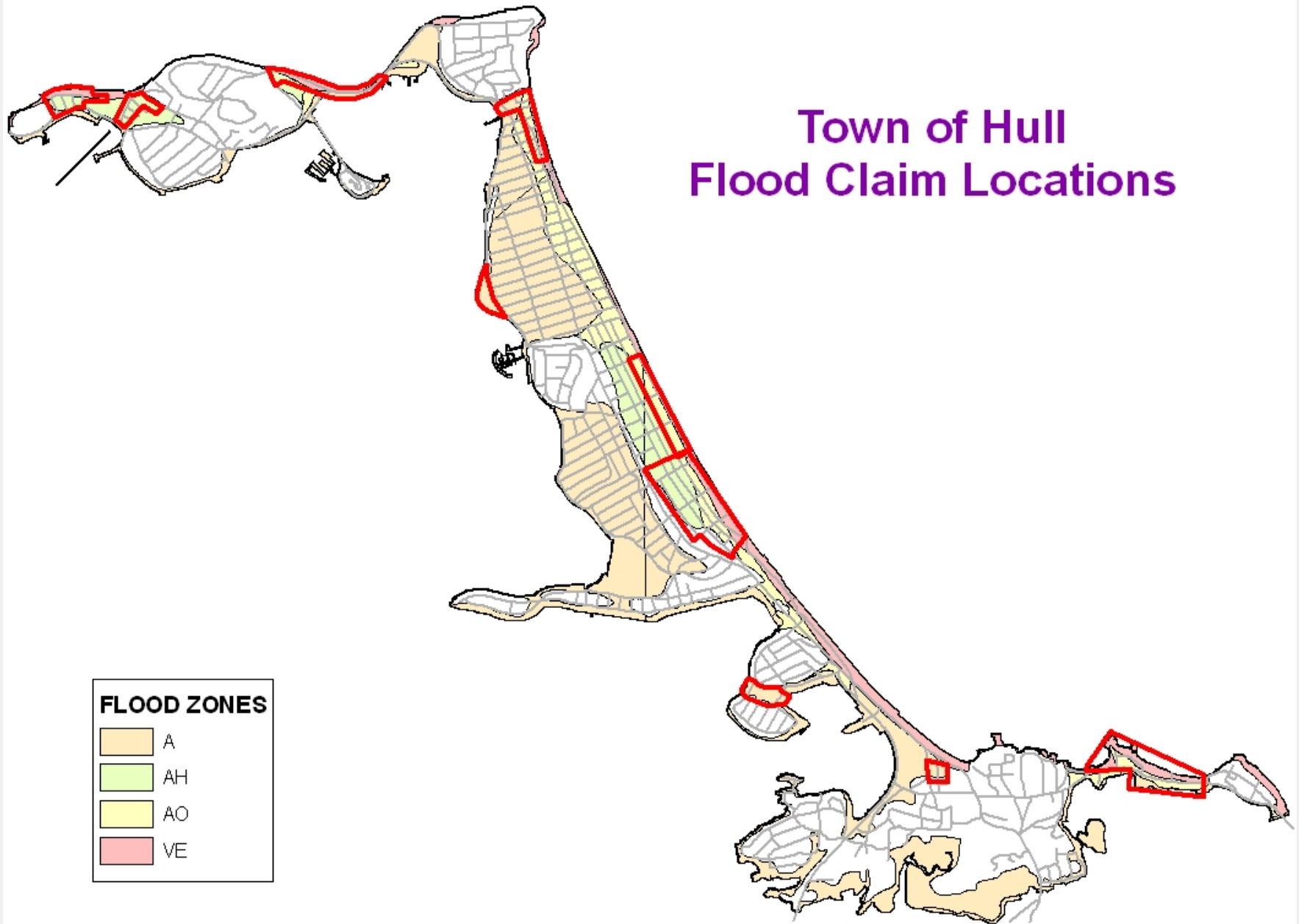
<u>Storm Tide</u>	<u>Storms</u>	<u>Claims per Storm</u>	<u>Average # of Claims</u>
11-12 feet	5	3-6	4
12-13 feet	7	3-38	13
13-14 feet	9	3-233	61
14-15 feet (1991, 14.17)	1	479	479
15 feet + (1978, 15.03)	1	249	249

Analysis includes 23 coastal storms with at least 3 claims from 1978 to 2007

Town of Hull Flood Claim Locations

FLOOD ZONES

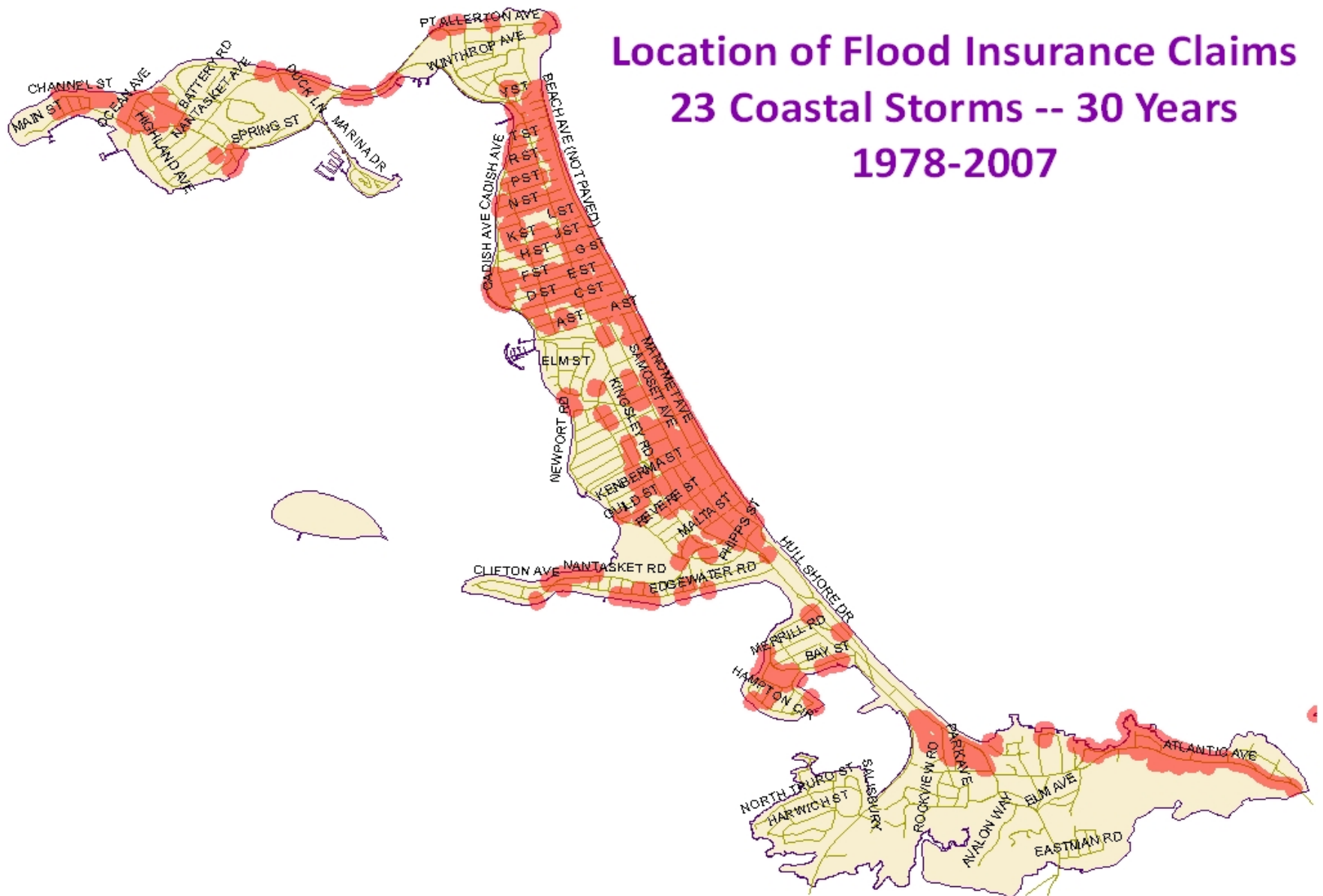
-  A
-  AH
-  AO
-  VE



Location of Flood Insurance Claims

23 Coastal Storms -- 30 Years

1978-2007



The Cost of Flood Damage 1978 through August 2011

- 1,829 paid claims
- \$13.7 million in damages

1991 'No Name Storm': \$5 million in damages



The Cost of Flood Damage

<u>Town</u>	<u>Paid Claims</u>	<u>Paid Damages</u>
Duxbury	277	\$3.9 million
Marshfield	1097	\$14.3 million
Hull	1829	\$13.7 million
Scituate	2939	\$53.8 million



Patriot's Day storm 2007





Blizzard of '78



Property damage after the Blizzard



3D Models of Seven Critical Facilities

- Base Flood Elevation (BFE) -- the 1% storm
- Two sea level rise scenarios:
 1. BFE + 1.0 foot
 2. BFE + 3.3 feet
- Vertical accuracy is +/- 1.0 foot





Base flood is the flood having a one percent chance of being equaled or exceeded in any given year. Base Flood Elevations were taken from the Federal Emergency Management Agency Preliminary Digital Flood Insurance Rate Map for Plymouth County dated November 7, 2008. Labels represent flood water depths measured from the foundation at ground level. Vertical accuracy is +/- 1.0 ft. Completed October 2009.



Base flood is the flood having a one percent chance of being equaled or exceeded in any given year. Base Flood Elevations were taken from the Federal Emergency Management Agency Preliminary Digital Flood Insurance Rate Map for Plymouth County dated November 7, 2008. Labels represent flood water depths measured from the foundation at ground level. Vertical accuracy is +/- 1.0 ft. Completed October 2009.



Base flood is the flood having a one percent chance of being equaled or exceeded in any given year. Base Flood Elevations were taken from the Federal Emergency Management Agency Preliminary Digital Flood Insurance Rate Map for Plymouth County dated November 7, 2008. Labels represent flood water depths measured from the foundation at ground level. Vertical accuracy is +/- 1.0 ft. Completed October 2009.

Adaptive responses to sea level rise

- Protection
- Accommodation
- Retreat



Protection

- Repair the dune and plant beach grass
- Protect open space as a buffer against storms
- Repairs to seawalls
- Bylaw prohibits dumping in waterways and on coastal banks
- Maintenance of drainage systems



Accommodation

- Flood proofing sewer plant and fire station
- Elevating homes and utilities



Accommodation: recent initiatives

- **Freeboard Incentive program:** \$500 rebate on building permit fees for projects that elevate 2 feet higher than regulations require
- **Elevation of existing buildings:** new special permit process to request relief from zoning height limit for the purpose of flood map compliance and/or freeboard
- **New language in the Planning Board's Site Plan Review process:** requires applicants to address potential for damage from sea level rise



Retreat

- FEMA buy-out of homes after the Blizzard of '78

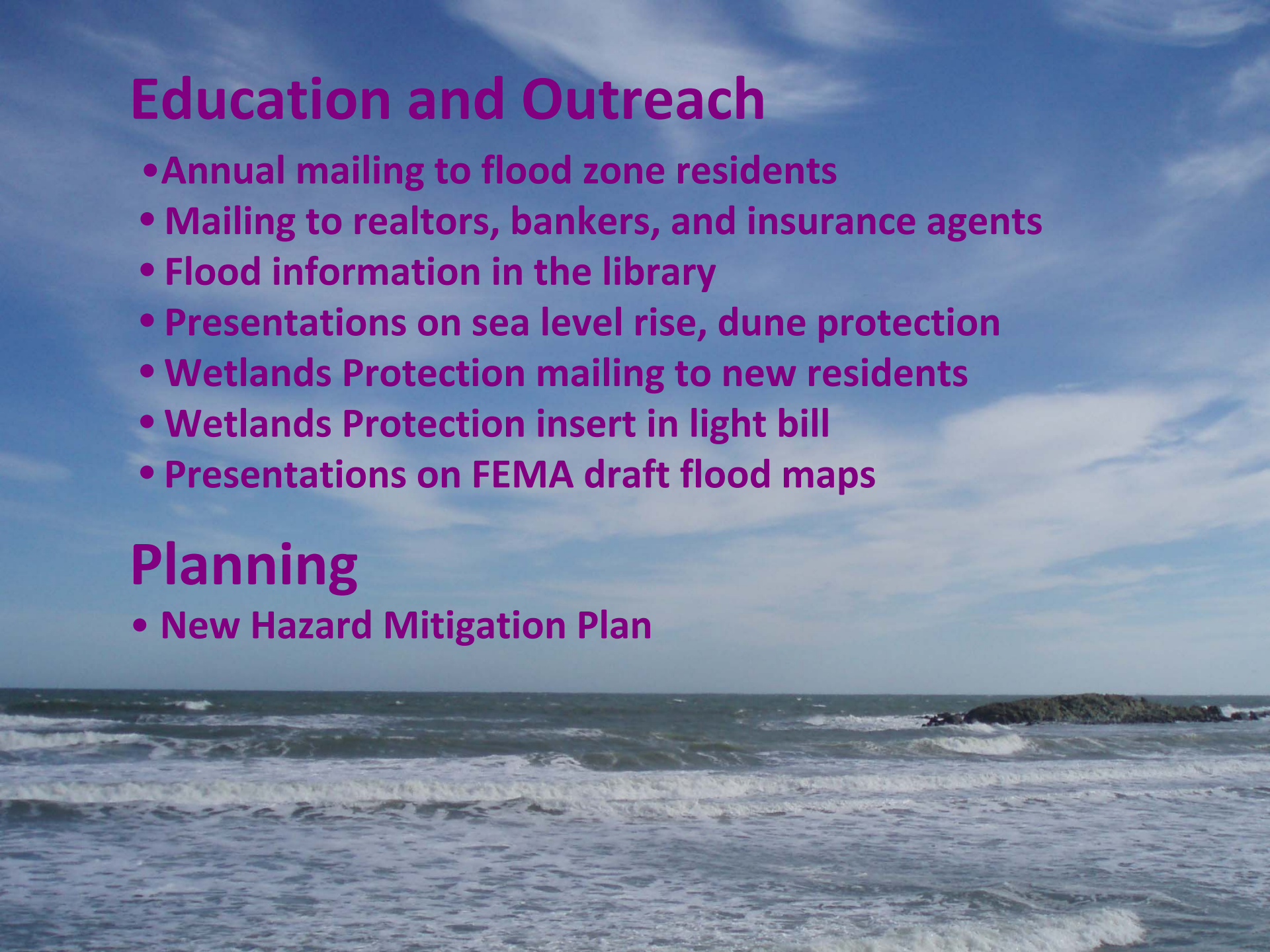


Education and Outreach

- Annual mailing to flood zone residents
- Mailing to realtors, bankers, and insurance agents
- Flood information in the library
- Presentations on sea level rise, dune protection
- Wetlands Protection mailing to new residents
- Wetlands Protection insert in light bill
- Presentations on FEMA draft flood maps

Planning

- New Hazard Mitigation Plan



Thank You

