

Municipal Adaptation to Sea Level Rise in Saco Bay, Ogunquit, and Seabrook

Changing Environments Symposium – Bowdoin College

October 24, 2009

Climate Change Adaptation Panel

1:45 to 3:00 PM

Jonathan T. Lockman, AICP - Planning Director



Coastal Hazard Resiliency Tools Project

- Multi-year effort, with a partnership between Maine Geological Survey and SMRPC, funded by the Maine Coastal Program.
- Getting municipal decision-makers the information they need, and a forum to actually make decisions about adapting to sea level rise and becoming more resilient to storms & hazards.



Coastal Hazard Resiliency Tools Project

- Not just another restatement of the problem – but seeking concrete actions.
- Biddeford, Saco, OOB, and Scarborough have been participating.
- This year Kennebunk and York will be added to the roster.



Examples of Municipal Adaptation Actions

SPO Regional Challenge Grant: Sea Level Adaptation Working Group (SLAWG) of Saco Bay Municipalities. Duties would include:

- Commenting on federal or state beach nourishment/erosion control efforts that affect more than one community.
- Identifying infrastructure vulnerable to storms and sea level rise such as culverts, storm drains, bridges or tide gates. Using regional approaches to plan for improvements and obtaining monies for adaptation construction projects.

Duties of “SLAWG”

- Recommending the standardizing of floodplain management standards and building code interpretations resiliency of individual private structures.
- Recommending standardizing of standards affecting the shorelands adjacent to Saco Bay, as well as standardizing review and controls for water activities or structures affected by sea level rise or coastal storms.



Duties of “SLAWG”

- Such water activities may or may not include land-based development, and could include aquaculture, marina, or green energy production projects.
- The group may provide non-binding comments on various applications for development review affecting Saco Bay that may be vulnerable to sea level rise or coastal storms, to those individual review authorities having jurisdiction.

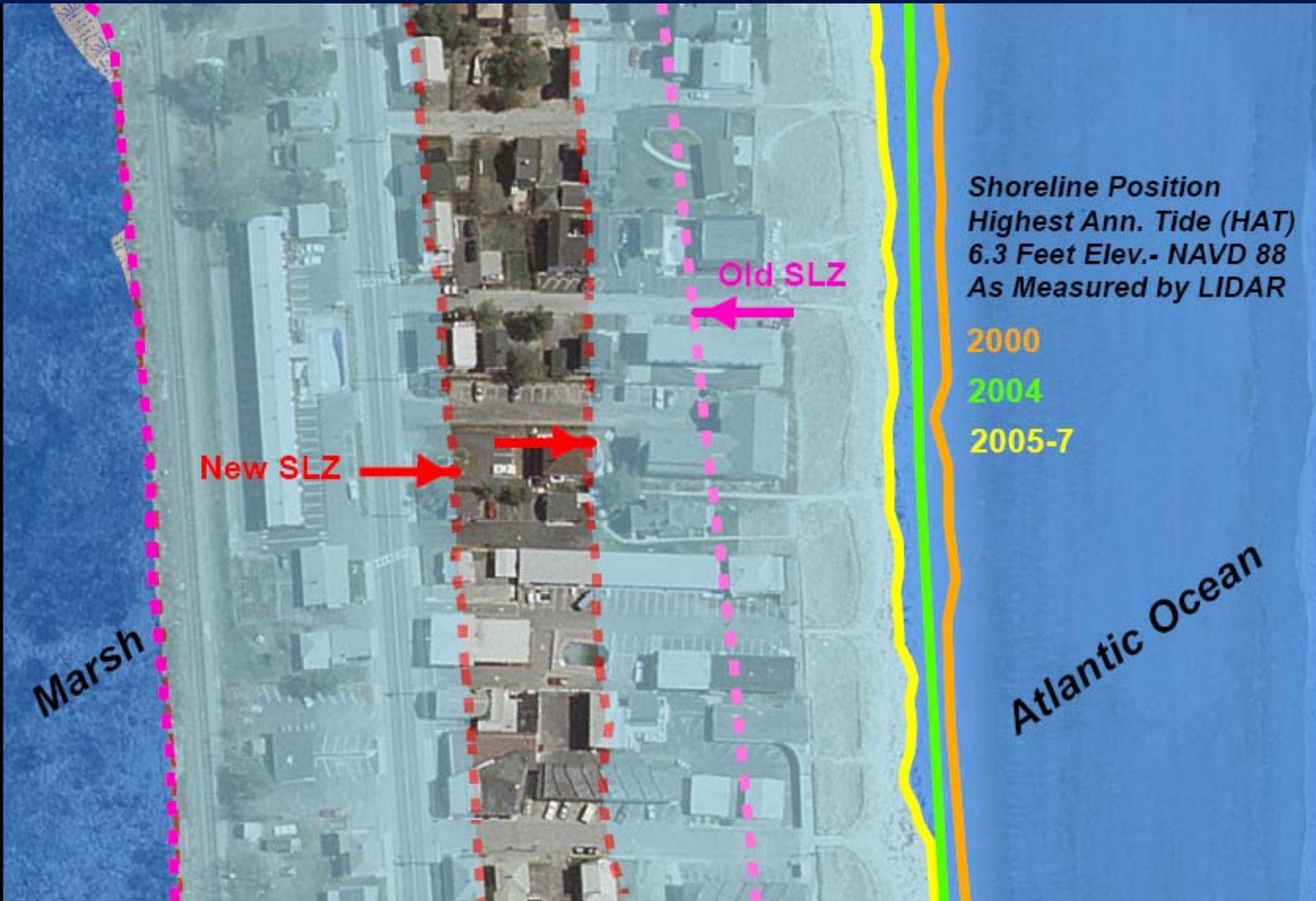


Improving Shoreland Zoning

- Using LiDAR to set an accurate shoreline position
- You can't begin to deal with adaptation unless you know where your shoreline is!
- Highest Annual Tide Level – HAT
- For Old Orchard Beach, it's 6.3 feet.



Old Orchard Beach – East Grand Avenue Area



Shoreline Position
Highest Ann. Tide (HAT)
6.3 Feet Elev.- NAVD 88
As Measured by LIDAR

2000

2004

2005-7

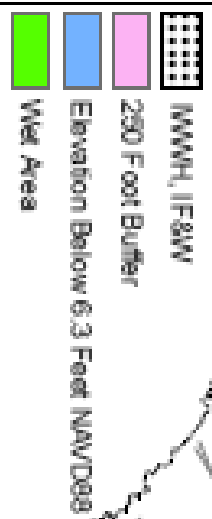
New SLZ

Old SLZ

Marsh

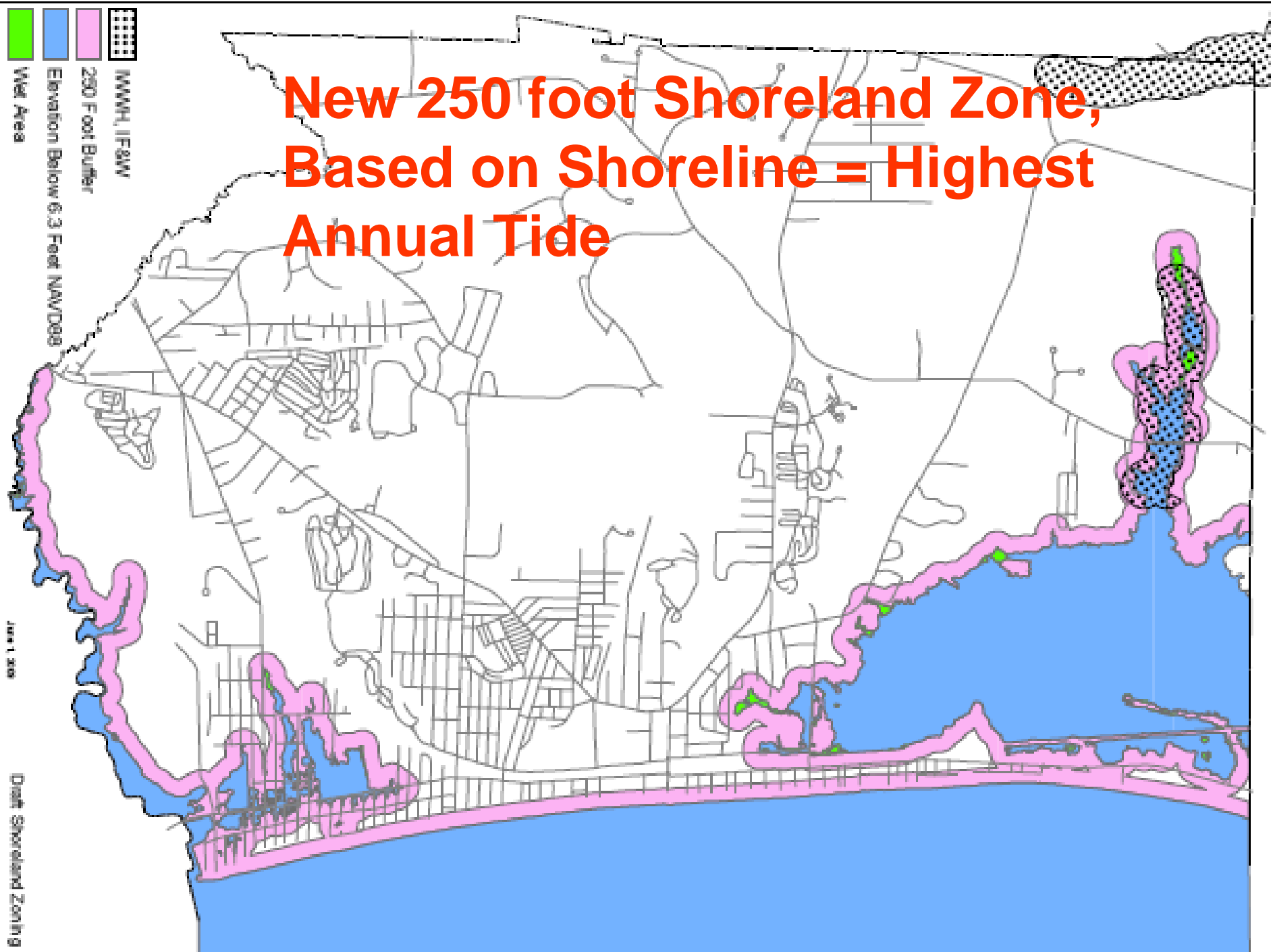
Atlantic Ocean

New 250 foot Shoreland Zone, Based on Shoreline = Highest Annual Tide



June 1, 2009

Draft Shoreland Zoning



Looking at the Future: Higher than today's "HAT" or today's 100-year Floodplain

- Ogunquit, Maine – New Definition of “Normal High Water”
- Seabrook, New Hampshire – Preliminary Discussions of “Extended Coastal Flood Hazard Overlay”



Ogunquit Zoning Ordinance – Adopted Language


“In the case of land adjacent to tidal waters, the normal high water line shall be considered to be the contour line at an elevation 11.0 feet above mean sea level as determined by a land surveyor based on the nearest USGS benchmark.”



Ogunquit Zoning Ordinance – Adopted Language

DEP Highest Annual Tide – 2008 Predictions.

Location	Highest Annual Tide Height (elevation in feet, NGVD29)
Kennebunkport	7.0
Wells, Webhannet River	6.9
Cape Neddick	6.8

- This means that Ogunquit is using a position four feet higher than the highest annual tide as the start of its setback.
 - In the area of marsh between Route 1 and the barrier beach, the FEMA 100-year flood is predicted to rise to an elevation of 9 feet.
 - The contour line set for measuring the setback is two feet higher than the height of the 100-year flood (in the salt marsh area).
- 

Seabrook, NH – A Proposal at the New Frontier of Floodplain Management

- Uses Rhode Island Coastal Policy (2007) of 3-5 foot sea level rise by 2100. (Maine uses 2 feet.)
- Adds 6 feet to current 100-year tidal flood height of 9 feet (NGVD 29) to create an “Extended Coastal Flood Hazard Overlay,” with the upper edge of the zone set at 16 feet.
- Within this zone, the proposal envisions setting “freeboard” heights, way beyond current FEMA Floodplain Management Ordinance requirements.



Seabrook, NH – A Proposal at the New Frontier of Floodplain Management

Table 2
DESIGN FLOOD ELEVATION STANDARDS
EXTENDED COASTAL FLOOD OVERLAY DISTRICT

STRUCTURE TYPE	DESIGN FLOOD ELEVATION	RECONSTRUCTION THRESHOLD
Accessory Structures	10 ft. (9 ft. BFE + 1 ft.)	NA
Single Fam. Residential & Multi- family <5 Units	11 ft. (9 ft. BFE +2ft.)	50%
Multifamily 5+ units	12 ft. (9 ft. BFE + 3ft.)	40%
Commercial Development	12 ft. (9 ft.BFE + 3ft.)	40%
Essential Facilities (schools, hospitals, public safety buildings, etc.)	13 ft. (9ft. BFE + 4ft.)	33%
Public Infrastructure	14 ft. (9ft. BFE+ 5ft.)	25%

COAST Project – New England Environmental Finance Center/Muskie School

Cost Scenarios for Beach Nourishment Versus No Action

Scenario Summaries (costs in millions)

SLR Scenario	Adaptation Action	Expected Damages	Expected Adaptation Cost	Total Damages and Costs
No SLR	1) No Action	\$680.0	\$0	\$680.0
	2) Nourishment to 50 Year Floodplain plus 1'	\$3.4	\$52.4	\$55.8
	3) Nourishment to 100 Year Floodplain plus 1'	\$0	\$60.0	\$60.0
Low SLR	1) No Action	\$899.3	\$0	\$899.3
	2) Nourishment to 50 Year Floodplain plus 1'	\$28.3	\$52.4	\$80.7
	3) Nourishment to 100 Year Floodplain plus 1'	\$0	\$60.0	\$60.0
High SLR	1) No Action	\$1016.6	\$0	\$1016.6
	2) Nourishment to 50 Year Floodplain plus 1'	\$67.8	\$52.4	\$120.2
	3) Nourishment to 100 Year Floodplain plus 1'	\$37.6	\$60.0	\$97.6

Summary of Municipal Adaptation to Sea Level Rise

- Citizen Involvement - Generate Best Available Local Predictions for Hazards and Educate Citizens
- Capital Programming/Regional Planning – Identify vulnerable infrastructure, obtain funding, upgrade/elevate, use multi-municipal cooperation and coordination
- Shoreland Zoning – Adjust Regulatory Shoreline Position to Reflect Realities of Climate Change
- Floodplain Management – Extend current FEMA framework to cover higher ground reflecting SLR, change reconstruction thresholds, and require more than 1 foot of freeboard.



**For more information, contact:
Jonathan T. Lockman AICP, Planning Director
SMRPC
21 Bradeen Street, Suite 304
Springvale, ME 04083**

**<http://www.smrpc.org>
jlockman@smrpc.org
207-324-2952**