Sea Level Rise, Chronic Flooding and Property Values
The Beaches Conference June 14, 2019

Moderator: Peter Slovinsky, Maine Geological Survey
Note Taker: Ruth Indrick, Kennebec Estuary Land Trust

Jamie Carter: Sea Level Rise and High Ride Flooding: Patterns and Protections in the Northeast

- Sea level rise: range of rise has increased and span of range of rise predictions have also increased

2012 curves from National Coastal Assessment 3rd assessment

- Captured processes that could occur
- Didn't use any probability information to identify one scenario as more likely than another

We are now tracking between intermediate low and intermediate high

- But local level variability is much higher than this global scale change Sources of Uncertainty?
- First - Greenland ice sheet, Arctic melting in general
- NASA started looking more at where the water was coming from for specific locations on the globe, the sources of water from specific places on the globe
- Probabilities associated with emissions packages and the impacts further out

o A lot more uncertainty further out than there is today o Helps to identify areas and scenarios where there is more confidence 2017 report

- Global and regional sea level rise scenarios for the United States
- Includes probabilistic predictions
- Starts to look at the regional level, identify what is happening at the regional level, where there are differences
- Now projects out to year 2200
- Starts in the year 2000
    - o Past started in the mid90s because was mid of last tidal datum epoch
- So to 2100
    - o Range=.3m to 2.5m change by 2100
- Extreme and high scenarios have very low probabilities
    - o But very high impacts, so good to think about
- East coast is hot spot for elevated sea level rise impacts Showing an area in Maine that has impacts

- Graphic from sea level rise viewer (NOAA viewer)
  - Allows thinking about sea level rise with storm surge, king tide NOAA viewer
- allows view of new scenarios
  - goes up to 10 ft High tide flooding
- Where sea level rise has been seen expressing itself
  - o The National Weather Service (NWS) has thresholds
  - o Fit to a linear model
- Example in Portland
  - o Allows predictions of local flood warnings
- Shows high tide flooding events, per year, over time
  - o When water level exceeds threshold of flooding that the NWS has set
- Has been increasing
  - o Because sea level has gone up o So we expect to see more high tide flood events over time
- Number of high tide floods has been linked to sea level rise info
  - o In the Coops report 86 be author Billy Sweet, new report out
- Outlook is getting produced every year – May 2018-April 2019
  - o Prediction of high tide flooding events o We exceeded the prediction from last year

<u>Rachel Stearns: There's a Sand Layer in My Peat, Back Barrier Salt Marshes as a Geological Archive of Storm Activity</u>

Farmers in the Marsh Project

- Salt Marsh history in that region
  - o Farmers made alterations to keep water away, farm it, get water for horses o Are tidal control structure = trunks o Are large structure = embankments, to keep tides out of area farmers wanted to farm
    - Some are smaller – 20cm – harder to see, but do have impacts on the marsh
    - Inhibit draining and impact flooding on marsh, impacts vegetation
- Do the embankments create a specific layering of sediments that make them possible to identify – a sediment signature o Non-embankment core
  - To 20cm is usually light brown heavily rooted peat o Embankment core
    - Decomposed throughout, not a healthy growth of vegetation at the surface
- While coring
  - o Found sand layers scattered throughout the cores
  - o 2 to 7cm size, range from fine to coarse sand, some have more organic material

than others

o South side of embankment, closer to water – had more layers of sand o These were evidence of storm deposits o She has not seen sediment like this, to this degree in other marshes

o Sand info is important

- Because we will get more intense storms with climate change
- We will get more wash over from storms from sea level rise

- Why valuable
  - o Detailed information about past storms
    - Understand frequency, potential for the future
- How to analyze them
  - o Look at grain size – shows how sediments can move o Look at organic content – shows whether the sand was from a storm or something

else o Look at microfossils – details about transport by the water

- But is challenging
  - o How well are the events preserved? o The barrier in front of a marsh can vary, impact deposition but not easy to link to

    impacts
- This type of analysis is relatively rare in New England
- There is the opportunity for someone to take this on as a research project!

<u>Q&A</u>

Question:

- Could this be ice rafted material?

Answer:

o Possible

o Micro paleo could give info

o Tidal creek to landward transect of these cores could give this information

Pete Hanrahan: How Will We Adapt to Sea Level Rise?

- No matter how much sea level is rising, it's going up

- The last time sea levels were as high as they are now, we had very high carbon levels in

the atmosphere

- We have filled up 67 to 72% of marshes

- 2 Books you should read – are essential
- Design with Nature – Ian McHarg
- High Tide on Main Street – John Englander

- Glaciers are melted
- We need to admit it is coming and begin to figure out how to adapt to it
    - In NC, they almost banned a report sharing Sea level rise predictions – governor vetoed bill

- We are dealing with sea level rise in piecemeal fashion
- Approaching it in a state to state fashion
- There is no national approach
- Louisiana senator asked for a national approach, but not there yet
- Also moving impacts from one community to another
    - Example = New York city
- Are big problems in Miami
- We know better, so we need to do something about it
- Messed things up during the industrial revolution

- Examples from other parts of the globe

- Dutch
    - 2000 years of managing the water, using living shorelines
    - Became more mechanized 50 years ago
    - They have been thinking living shorelines since 1985

    - Example
    - New Jersey bulldozed dunes, area of Delaware didn't
        - Hurricane Sandy had much bigger impact in NJ that DE

    - Using flexible structures in Maine
    - Working toward that now

Question: What do you do to help protect a rocky shore?

- Do you plant plants? Retreat?

Answer: see how nature manages, mitigates at other locations, try to mimic that

- Could be planting vegetation
- Installing marine mattresses
- Mimic what was natural there before

Question: Could retreat from shoreline include giving up a structure while still owning coastal space for camping, non-permanent structure?

Answer: probably not the right session, but is important for municipal dialogue

- Suggests connecting with MA attorney (missed name) – take for a property
- Lawyers good for addressing that type of a question

Question/Comment: Shorelines naturally change, erode, accrete in other locations. We have an interest in keeping shoreline in a certain location. Trend is allowing people to do that if we use more natural materials. But keeps shoreline in a non-natural state of erosion. Limits sediment supply to environment. We are handicapping ourselves by not allowing movement, limiting the supply of sediment.

Answer: In NH doing work on living shorelines

- A model looked at a site to see what is appropriate, but includes consideration that there are places where a shoreline can/should erode Most of what we have done is defensive – but could go offensive
    - Wave attenuation devices that decrease wave impact, decrease erosion in a way that doesn't limit onshore sources of sediment

Question: Sand on the marsh was interesting, also troubling that there were more storms that we didn't know about. How much should it disturbs me that data is always worse than we thought? (there were more high tide flood events than were predicted)

- Things are increasing, but it depends – not a continuous up tick, but the long-term trend is up

Question: Are cores archived?

- No, just field notes

Question: Are there any moves to blend flood insurance rate maps with sea level rise info? The

probabilistic impacts of sea level rise? Because this information is not yet in flood insurance rate maps. ● Have made advisory flood maps that include both impacts But no idea if any move to blend, and no indication that there is

Question: Is there any option or move to change flood insurance to support moving as well as rebuilding?

- No idea