Salt Marshes are Responding to Sea Level Rise, Can We?

Or

Choices for Coastal Management Critical for Salt Marsh Health

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Most of our Tidal Marshes have been Building with Sea Level Rise over the past 3,000 years.
Salt Marshes are Poised Systems

- Reflect a dynamic balance of building processes;
  - Sediment trapping and binding
  - Root production and limited decomposition
  - Sea Level Rise (up to 5 mm /yr)

- . . . and eroding processes
  - Compaction (Floods and Ice)
  - Decomposition of roots and peat (Temperature, Nitrogen)
  - Physical exposure to waves and ice
Global Sea Level Rise Measurements (Church & White 2011) Reflected in Salt Marsh Responses Found in Great Bay

Great Bay Elevation change
1.7 mm/yr 95-97
4.3 mm/yr 00-11

Portsmouth Tide Gauge:
1.76 mm/yr 1927-2001

Global Sea Level Rise Measurements (Church & White 2011) Reflected in Salt Marsh Responses Found in Great Bay

Great Bay Elevation change
0.6-1.2 mm/yr (Ward et al. 2008)
1.7 mm/yr 95-97
4.3 mm/yr 00-11

Adapting to Climate Change Along Coasts

• Increasing SLR threatens tidal wetlands
  – Allow tidal marshes to grow in elevation as Sea Level Rises
  • What is stopping them? Tidal restrictions, dams, dredging, etc.
Adapting to Climate Change Along Coasts

• Increasing SLR threatens tidal wetlands
  – Allow tidal marshes to grow in elevation with SLR
  – Allow marshes to migrate landward (no barriers)
What do marshes need to remain healthy in the 21\textsuperscript{st} century?

a. Tidal flooding  
b. Sediment source  
c. Zone of retreat into upland buffer

How should we manage and restore marshes in the near future?

a. Remove barriers to hydrology  
b. Remove barriers to sediment supply  
c. Remove shoreline barriers  
d. Provide areas for marsh migration
Next Steps: Develop planning tools

• Balance projected marsh losses with gains
  – If sea level doesn’t change very quickly, then neither losses nor gains occur