



Acadia's Salt Marshes: Keeping Pace or Falling Behind?

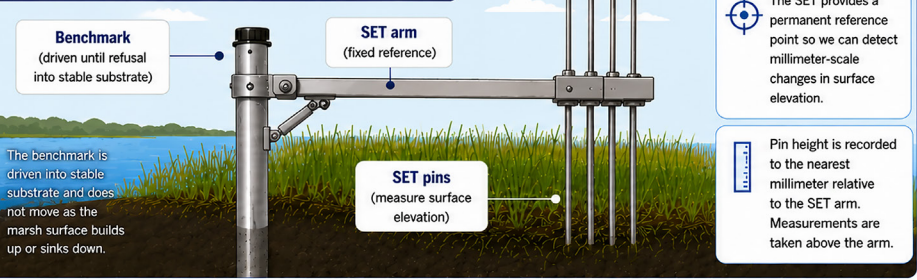
Salt marshes can keep up with rising seas—but only if they build elevation fast enough. Monitoring since 2011 shows Acadia's marshes are building elevation more slowly than sea levels are rising.



How We Track Elevation Change in Salt Marshes

Sediment Elevation Stations (SETs) let us measure tiny changes in marsh surface height over time.

THE TOOL: A SEDIMENT ELEVATION STATION (SET)



WHY THIS WORKS:



Stable benchmarks don't move.



Millimeter-level measurements detect tiny changes.



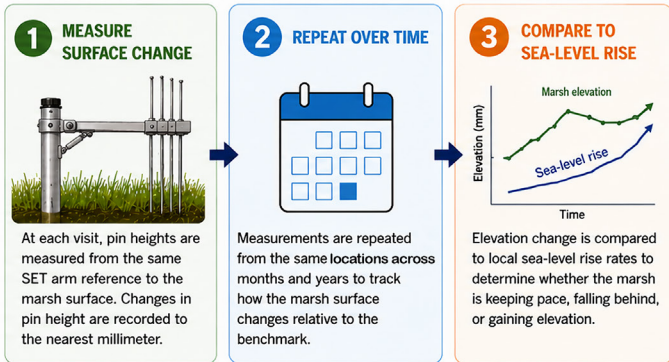
Long-term data reveal trends, not just snapshots.

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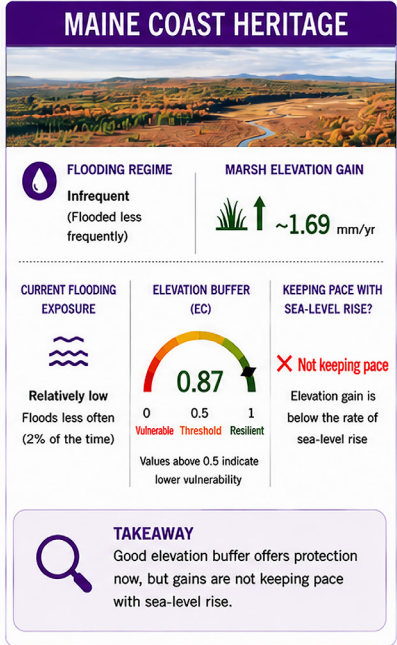
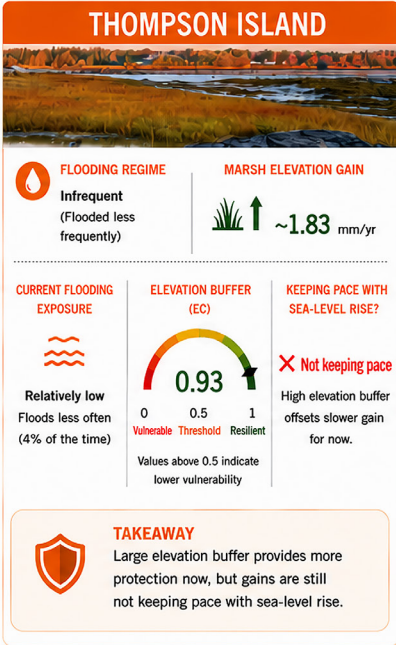
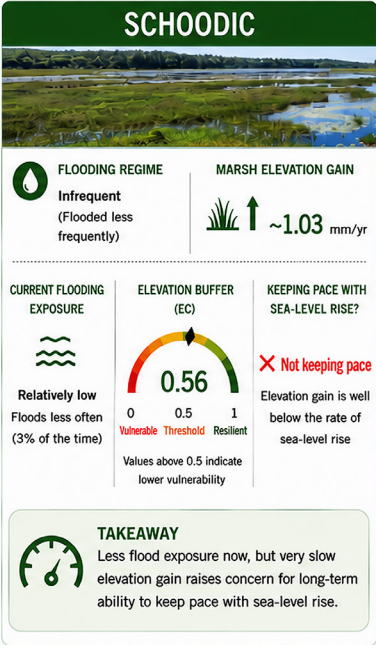
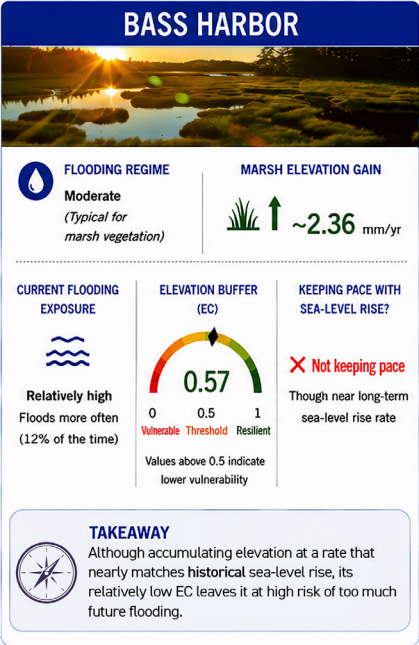


If elevation gain cannot keep pace with sea-level rise over time, marsh vulnerability increases.

THE PROCESS



Recent, regional sea-level rise (2001–2019 average): ~4.6 mm/yr | Long term SLR: ~2.5 mm/yr (1947–2025) | Marsh elevation gain rates derived from 2011–2024 monitoring data.



WHAT IS ELEVATION CAPITAL (EC)?
A measure of where the marsh sits within the biologically usable flooding range needed to support healthy salt marsh vegetation.

Sits low in the tidal frame and is at risk of flooding too often and drowning. **LOW EC**

Has high elevation buffer, but still floods enough to function as a stable marsh. **HIGH EC**

Too little elevation increases flooding stress. Too much elevation can reduce tidal flooding and sediment delivery altering vegetation.

WHY IT MATTERS

Acadia's salt marshes are dynamic ecosystems. Their ability to keep pace with rising seas depends on both elevation and how fast they can build elevation.

- Flooding helps marshes build elevation.**
Tidal flooding delivers sediment that marsh plants trap and build into the soil.
- Marsh vulnerability depends on both elevation and pace.**
Marshes can respond quickly to changing flooding and sediment conditions—but not always fast enough to match accelerating sea-level rise.
- Even high marshes can become vulnerable.**
Sites with more elevation buffer may still face risk if sea-level rise accelerates.
- Long-term monitoring reveals early warning signs.**
Tracking elevation change helps identify vulnerable marshes before major habitat loss occurs.

THE TAKE-HOME MESSAGE

MARSH ELEVATION GAIN
Marshes are building elevation...
~1–2 mm/yr

SEA-LEVEL RISE
...but sea levels are rising faster.
3–33 mm/yr by 2100



NOT KEEPING PACE



MORE FLOODING



ELEVATION FALLS BEHIND



HABITAT LOSS RISK



Across Acadia, marshes are not keeping pace with rising seas. Sites with low elevation capital and slow elevation gain are most at risk of increased flooding and habitat loss.

ACADIA SALT MARSHES

Turning data into action for resilient marshes



WHAT THIS MEANS FOR MANAGEMENT

MARSH RESILIENCE PROTECTS ECOSYSTEM SERVICES.



1 FOCUS MONITORING WHERE RISK IS HIGHEST.
Prioritize sites with low elevation capital and declining trends (e.g. Bass Harbor).



2 DETECT DECLINE EARLY.
Track elevation trends to act before vegetation loss and habitat degradation begin.



3 IMPROVE SEDIMENT DELIVERY & PROTECT SPACE.
Promote good flooding to deliver sediment and protect adjacent uplands so marshes can migrate inland.



4 STRONG MARSHES = STRONG COMMUNITIES.
Resilient marshes support habitat and coastal protection.



EARLY WARNING SIGNS



1. DECREASING ELEVATION GAIN OVER TIME
Marsh surface elevation is not keeping up and falling behind sea-level rise.



2. INCREASING FREQUENCY OF FLOODING
Flooding is happening more often, increasing stress on plants and soil.



3. LOSS OF VEGETATION OR CONVERSION TO MUDFLAT
Vegetation loss or transition to mudflat indicate declining marsh health.



4. SITES APPROACHING LOW ELEVATION CAPITAL
Low elevation means less ability to keep up with sea-level rise—higher risk of habitat loss.