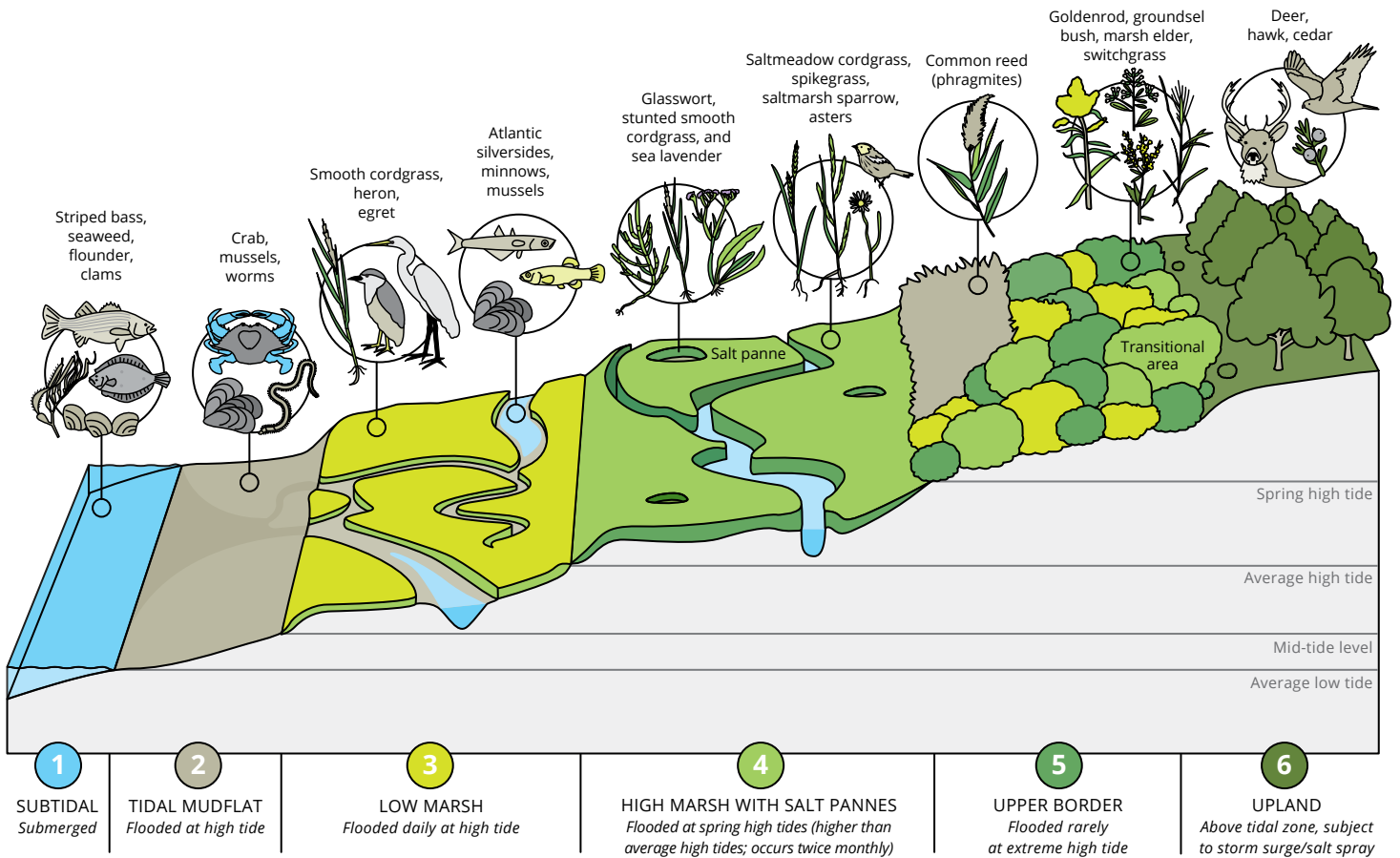


Long Island Sound Sea Level Affecting Marshes Model



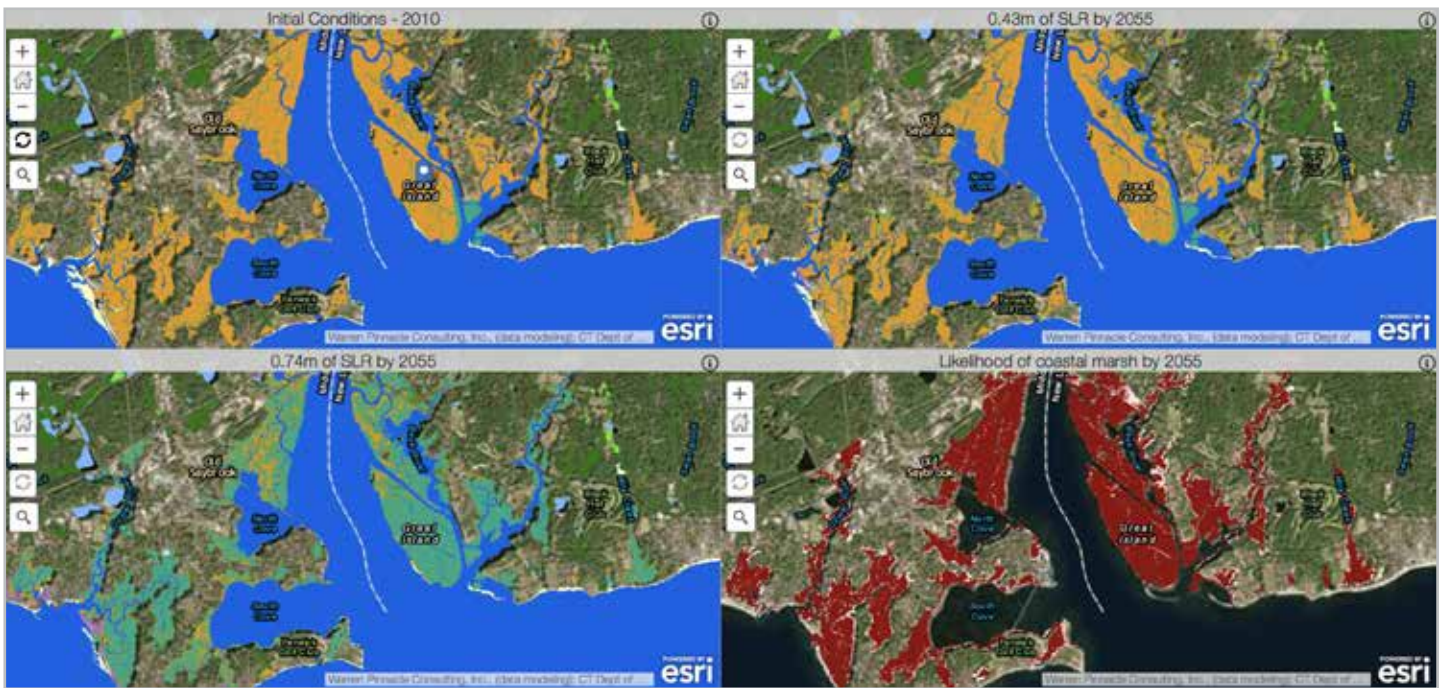
What is a salt marsh?

Tidal wetlands, specifically salt marshes, are the waving green fields of grasses seen throughout Long Island Sound, but mostly within low-energy environments such as embayments where, protected from waves and currents, sediment accumulates, providing the conditions needed for salt-marsh plants to grow. Salt marshes provide a critically important transition area between aquatic and terrestrial environments. They generally contain three zones: **low marsh**, composed of smooth cordgrass (*Spartina alterniflora*) that is flooded daily by saltwater; **high marsh**, dominated by saltmeadow cordgrass (*Spartina patens*) that is flooded less frequently; and **upper border**, which marks a transition to less salt-tolerant vegetation.

Profile of a Long Island Sound Salt Marsh Ecosystem
(Illustration by Lucy Reading-Ikkanda/LISS)

Why do we need to study salt marshes?

Marshes provide a variety of “ecosystem benefits,” including buffering developed upland areas from potentially damaging storm surges; filtering pollutants to improve water quality; trapping sediments; and providing spawning, nursery, and feeding grounds for fish, invertebrates, waterfowl, and wading birds. The ecosystem benefits of salt marshes were not fully understood or appreciated until the mid-twentieth century, and until this time suffered from years of dredging and filling related to land and port development. By the 1970s, New York and Connecticut adopted laws to protect tidal wetlands from such destruction. Despite such initiatives, marsh loss around Long Island Sound has continued. One reason may be the inability of marshes to accumulate sediment and organic matter at a pace equal to sea level rise (SLR), resulting in marshes that become wetter, erode, and ultimately “drown” or transition to unvegetated tidal mudflats or open water. There is an urgency to understanding how salt marshes are responding to SLR—and the implications of such change—to better inform marsh management.



Screenshots from SLAMM Viewer depicting a location under initial conditions, marsh change under 0.43m SLR by 2055, 0.74m SLR by 2055, and likelihood of coastal marsh by 2055.

Sea Level Affecting Marshes Model (SLAMM)

In order to learn more about how the Sound's salt marshes will be affected by SLR, the Long Island Sound Study and its partners completed a Sea Level Affecting Marshes Model (SLAMM) analysis for the entire Long Island Sound coastal area. SLAMM is a two-dimensional model in which long-term shoreline and habitat class changes are predicted as a function of land elevation, tide range, and sea level rise. Using four potential SLR scenarios, the model predicts areas that marshes are likely to move or migrate to, changes in total marsh area, and change in habitat type (e.g., high marsh to low marsh) over several time steps from 2025 to 2100. This type of land cover change, expressed in terms of likeliness to occur, can help coastal communities prepare for changes in their coastlines and identify properties for conservation and restoration. To see how your local marshes are expected to change over time under different predicted SLR scenarios, check out our new SLAMM Viewer tools in Basic and All Data versions: www.longislandsoundstudy.net/slamm

HOW WILL OUR COASTS CHANGE OVER TIME?

- Under moderate SLR predictions, the Sound's marshes will change from a system dominated by high marsh to a low-marsh system by 2100. This will change the type of ecosystem services these marshes will provide (example: saltmarsh sparrow breeding habitat eliminated).
- Under more extreme SLR predictions, SLAMM predicts a reduction in the total area of tidal marsh, which will substantially alter the Sound's ecosystem and reduce ecosystem benefits.
- Under extreme SLR predictions, developed land will be increasingly subject to flood hazards.

HOW CAN COMMUNITIES USE SLAMM DATA?

SLAMM data can be used by communities in several ways:

- To identify marshes most vulnerable to SLR
- To develop tidal marsh conservation and restoration priorities
- To identify developed areas subject to tidal flooding
- To begin to develop SLR threat response strategies



For more information, visit www.longislandsoundstudy.net/slamm.

For questions on the SLAMM project, the SLAMM Viewer tools, or on how SLAMM can help your community plan for the future, contact David Kozak (david.kozak@ct.gov; 860.424.3608) or Victoria O'Neill (victoria.oneill@dec.ny.gov; 631.444.0441).