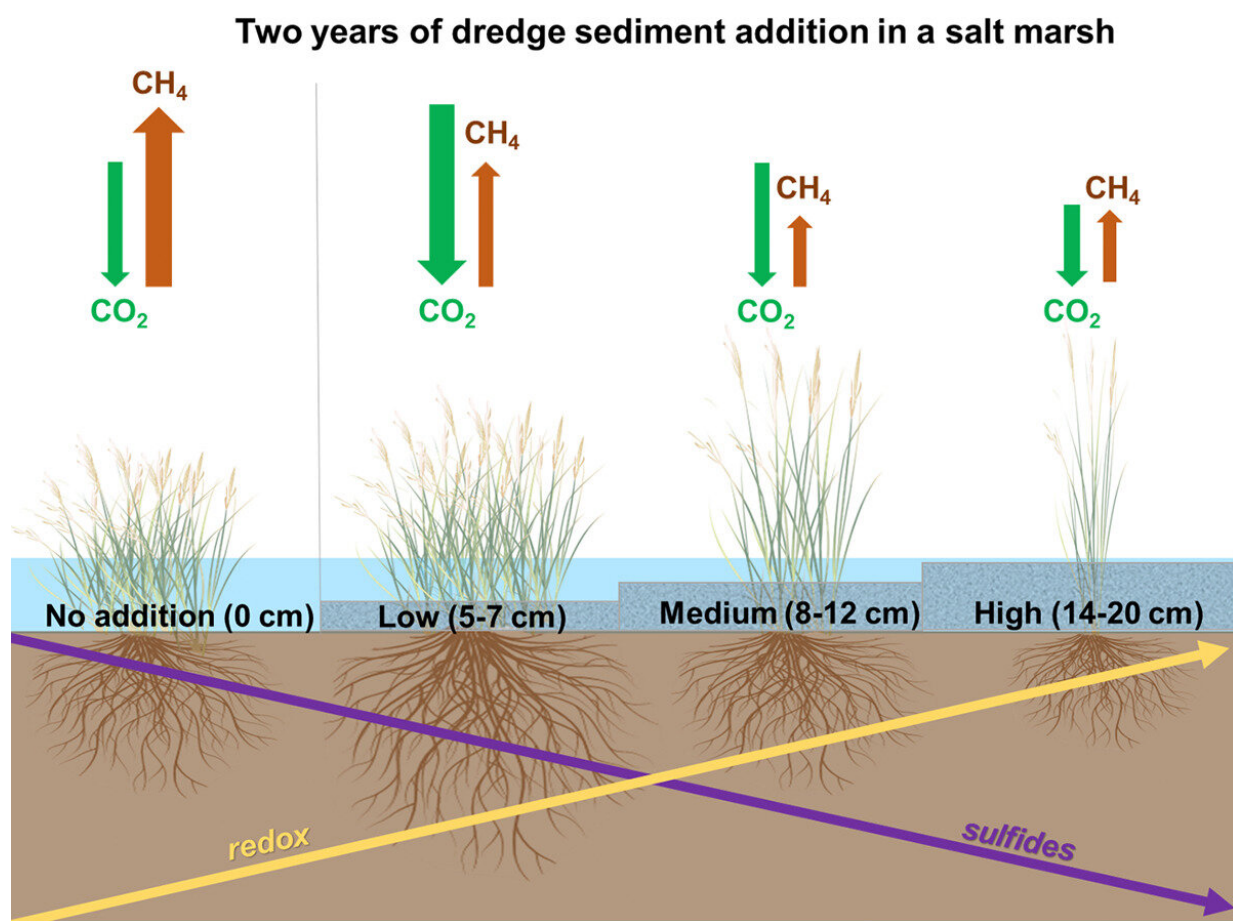


The Goldilocks effect: Adding the right amount of sediment to salt marshes keeps coastlines afloat

January 5 2022, by Madeleine Meadows-McDonnell



Graphical abstract. Credit: DOI: 10.1016/j.ecoleng.2021.106495

Adding just the right amount of sediment to the surface of a Connecticut salt marsh protects coastlines by promoting rapid plant growth, scientists from the University of Connecticut report in a new study published recently in *Environmental Engineering*.

Adding [sediment](#) on top of salt marshes helps them stay above [sea level](#) as it continues to rise. Anna Puchkoff and Beth Lawrence from UConn's College of Agriculture, Health and Natural Resources conducted a study on how the addition of sediment could restore [salt marshes](#) in Connecticut. For her research, Puchkoff used sediment that was dredged from the Long Island Sound by the nearby Guilford Yacht Club.

"My goal was to also reduce project costs and replicate a real-life restoration scenario where in many cases, you have to work with what you've got or what the available resources at hand are," says Puchkoff, who recently earned a master's degree from the Department of Natural Resources and the Environment at UConn. "This was a core principle in my research, since using dredged material from marinas is common and disposal is costly."

Instead of transporting the sediment to a dumping site, Puchkoff teamed up with the yacht club to use their sediment to help restore a salt [marsh](#) on their property and reduce sediment transportation costs.

Puchkoff and Lawrence added different amounts of sediment to the marsh—5, 10, and 15 centimeters—to find out how much sediment is just right. Too little sediment wouldn't have a large enough effect to outweigh the cost of restoration, and too much could kill the plants and the marsh. Ultimately, they found just the right amount. According to their results, five to seven centimeters of sediment was the optimal amount to increase plant growth, which keeps the marsh afloat.

"The goal is to find the intersection of where costs are low, sediment re-

application frequency is low, and recovery is high. Our results indicated that in two years, this amount had the greatest benefit to meet these goals. Ten centimeters may be a good alternative for a longer time frame," adds Puchkoff. The extra sediment has the added benefits of reducing the presence of plant toxins such as sulfides, and helps the marsh take up carbon from the atmosphere, she explains.

This study could help coastlines in the Northeast stay ahead of rising sea levels using techniques that are already in place in other regions.

"Salt marshes are drowning due to rising sea levels, and the Northeastern coastlines are experiencing higher rates of sea level rise than the global average," explains Lawrence, an assistant professor in the Department of Natural Resources and the Environment and Puchkoff's advisor.

The management technique of adding sediment to coastal marshes is commonly used along the Gulf Coast of the U.S. but has only recently been used in the Northeast.

"I hope this information helps propel coastal wetland restoration projects from an idea to execution and will provide land managers with guidance on how to realistically and effectively implement this approach for the Connecticut coast," says Puchkoff.

More information: Anna L. Puchkoff et al, Experimental sediment addition in salt-marsh management: Plant-soil carbon dynamics in southern New England, *Ecological Engineering* (2021). [DOI: 10.1016/j.ecoleng.2021.106495](https://doi.org/10.1016/j.ecoleng.2021.106495)

Provided by University of Connecticut

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