

Recreational Overfishing Triggers Salt Marsh Die-off: Recommendations to Preserve Rhode Island Salt Marsh Health

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Abstract: Salt marsh die-off has recently progressed into Narragansett Bay due to recreational fishing pressure. Salt marshes provide many benefits to humans and are among the most valuable ecosystems per capita worldwide. There is a real and present need for direct action reducing recreational fishing pressure in Narragansett Bay in order to ensure the continued provisioning of important ecosystem services by salt marshes to all Rhode Islanders.

Why do marshes matter?

Coastal wetlands protect coastal populations by buffering storms and sea level rise:

- Coastal wetlands prevent erosion, reduce coastal flooding, stabilize shorelines, and attenuate waves
- In the US, coastal wetlands are estimated to provide \$23.2 billion per year in storm protection services
- Loss of just 1ha of coastal wetlands results in an average increase of \$33,000 USD in storm damage

Salt marshes provide additional ecosystem services:

- **Lessen storm impacts:** Decrease surges, minimize property damage, and reduce human death tolls
- **Reduce eutrophication:** Filter runoff water and reduce excess nutrient input to estuaries and oceans
- **Provide nurseries for fish:** Provision coastal fisheries that account for 90% of the world's fish catch
- **Sequester carbon:** Reduce greenhouse gas emissions contributing to climate change

Salt marsh die-off is spreading in Rhode Island:

The ability of coastal ecosystems to provide services to Rhode Islanders has been compromised by salt marsh die-off in Narragansett Bay. Recreational overfishing of predatory populations such as blue crabs, striped bass, and smooth dogfish has released the marsh crab *Sesarma* from predation pressure and allowed their populations to explode. This has led to runaway herbivory of cordgrass by the *Sesarma* crab at marsh creek banks. Cordgrass holds the sediment in place, and without it the edges of the marsh erode into the water. Cordgrass also helps the marsh grow and develop, so cordgrass die-off may compromise the ability of salt marshes to offset the effects of sea-level rise.

The rate of die-off expansion has more than doubled over the past decade and currently die-off areas are expanding by >8% per year, including 14 sites in Narragansett Bay which together have lost over 150,000 m² of marsh area to between 1997 and 2012.

Recreational fishing is not ecologically benign: recreational overfishing by anglers is indirectly responsible for extensive marsh die-off throughout southern New England and recently, the occurrence of die-off in Rhode Island. If recreational overfishing continues these localized die-offs could coalesce into complete, region-wide marsh die-off.

Over the next century, coastal ecosystems will be impacted by climate change, sea-level rise, ocean acidification, and overexploitation, making preservation of coastal ecosystems an important and challenging conservation goal. The predicted increase in the frequency and severity of storms associated with climate change and sea-level rise will increase the vulnerability of low-lying coastal populations, making Rhode Islanders particularly susceptible to the negative effects of climate change.

It is crucial that actions are taken now to protect salt marshes and ensure their continued provisioning of ecosystem services to Rhode Islanders. Salt marsh die-off triggered by recreational overfishing is a recent and ongoing serious issue in Rhode Island. Efforts must be made to assess salt marsh health across Rhode Island, research this type of die-off and the potential for recovery, and strategize how best to restore salt marshes to their historic health.

Recommended Actions:

1. **Monitor salt marsh health:** Assess and monitor the spread of recreational overfishing-triggered salt marsh die-off in Rhode Island waters.
2. **Allocate funding to research:** Support further research on recreational overfishing-triggered salt marsh die-off and potential for recovery.
3. **Communicate to the public:** Collaborate with scientists and journalists to raise awareness of recreational overfishing-triggered salt marsh die-off.

Recommended References:

1. Costanza R., O. Perez-Maqueo, M.L. Martinez, P. Sutton, S.J. Anderson, and K. Mulder. 2008. The value of coastal wetlands for hurricane protection. *Ambio* 37: 241–248.
2. UNEP. 2006. Marine and coastal ecosystems and human well-being: a synthesis report based on the findings of the Millennium Ecosystem Assessment. UNEP.
3. Bertness, M.D., et al. 2014. Herbivory drives salt marsh die-off. *PLoS One*, *in press*