

## **Moving With the Marsh: Encouraging Property Owner Adaptation to Marsh Migration**

### **Abstract**

Climate change adaptation efforts at the local level can help build support among Extension clients as well as improve resilience of natural systems. Marsh migration models of tidal wetlands in Connecticut show inland movement where conditions are suitable. Property owners, however, are frequently opposed to allowing marsh migration of cultivated lawns and gardens. We provide an example of development of a marsh migration buffer on a recently acquired land trust parcel adjacent to tidal wetlands as a local climate adaptation technique. Monitoring and education efforts are ongoing, with emphasis on local outreach. Similar strategies can be applied elsewhere.

**Keywords:** [climate adaptation](#), [marsh migration](#), [sea level rise](#), [buffer](#)

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### **Introduction**

Many tidal wetlands around the world currently are and are projected to continue to be negatively affected by sea level rise due to climate change (Bindoff et al., 2019). With projections along Long Island Sound's Connecticut coastline of 20 in. of sea level rise by 2050 (An Act Concerning Climate Change Planning and Resiliency, 2018), many marshes are getting wetter. This wetness is likely due, in large part, to the inability of natural marsh elevation accretion to keep up with sea level rise (Basso et al., 2015). Where possible, marshes are migrating landward (Anisfeld et al., 2016; Borchert et al., 2018). While movement of marsh is a natural process, sea level rise is accelerating this landward migration. Land slope and elevation and upslope land use are key components of the ability of marshes to migrate. If elevations are too great, absence of tidal fluctuations does not allow for tidal marsh development, and certain land uses, such as roadways or sea walls, impede marsh development. Owners of coastal property that borders marshes often are finding that their lawns are wetter and cannot be mown as tidal wetlands creep landward. Field et al. (2017) found that common conservation strategies may not be of great enough interest to landowners to allow marsh migration to occur on their properties on a scale that would mitigate marsh losses. Such strategies include conservation easements and an understanding of ecosystem services of marshes (Field et al., 2017).

As a climate change adaptation strategy to encourage marsh migration, particularly when it affects lawns and other cultivated landscapes, we propose encouragement of marsh migration buffers achieved through native, salt-tolerant plantings. Society has a long-held love affair with lawns. This has been well documented and

dates back hundreds of years (Beard & Green, 1994). If we in Extension can encourage homeowners to create alternative landscapes that are visually pleasing to them while at the same time allow for marsh migration and concomitant ecosystem services, homeowners may be more amenable to facilitating marsh migration so that tidal wetlands might continue to thrive. This approach builds on Extension outreach strategies proposed by Morris et al. (2014) for agriculture and natural resources Extension clients, including building local support for adaptation solutions to local climate change issues.

## Case Study

As a case study, we worked with the Avalonia Land Conservancy to develop a marsh migration buffer with native, mainly salt-tolerant plants. Avalonia Land Conservancy received a land parcel donation adjacent to its waterfront Dodge Paddock Beal Preserve in Stonington Borough, Connecticut, in 2018. The parcel (0.2 ac) included a large, cultivated garden and lawn bordering a marsh. With funding from the Long Island Sound Study Futures Fund (National Fish and Wildlife Foundation), we worked with an Avalonia Land Conservancy stewardship coordinator to naturalize the area, with a goal of creating a marsh migration buffer. This site presents the opportunity to provide an educational experience wherein visitors can learn about sea level rise and its impacts. Use of labeled native, salt-tolerant species promotes the use of native plants that are attractive and have pollinator and wildlife value.

Garden plants were removed from the cultivated garden by garden clubs and other groups. The area was then covered in black plastic during the summer of 2018 to kill any remaining roots and seeds. This was a hot, dry summer, so little maintenance was needed other than ensuring that the plastic was anchored by rocks and that any ponded rainwater was drained to prevent mosquito-related problems. In the fall, the plastic was removed, and the area was raked, seeded with native grasses, and covered with a thin layer of straw as winter cover. In May 2019, volunteers gathered to plant over 100 native trees, shrubs, and perennials from local nurseries—many of which are salt-tolerant species. Plants were chosen from the Connecticut Coastal Planting Guide (Barrett, 2015). Professionally engraved plant labels were placed throughout the area so that the many visitors who walk through the preserve can learn the names of these native plants and see how they look in a seminatural setting. Blogs, news articles, and public talks by Juliana Barrett and Avalonia Land Conservancy volunteers expand the reach of the project to additional audiences. Specifically, blogs and news articles have reached several hundred viewers, and over 100 participants have joined online presentations. Interest in the project has come from multiple levels, including federal agencies (National Oceanic and Atmospheric Administration), state agencies in Connecticut and Rhode Island, and coastal property owners.

Monitoring of the site will continue to include annual photo documentation of plant cover, assessment of the plantings, and soils testing by the University of Connecticut Soil Nutrient Analysis Lab and soil scientists from the U.S. Department of Agriculture Natural Resources Conservation Service–Connecticut. Nursery plants are doing well to date, and natural recruitment of wetland plants from the bordering marsh is occurring, with seedlings, including crimson-eyed rosemallow (*Hibiscus moscheutos*) and eastern baccharis (*Baccharis halimifolia*), coming up throughout the buffer area.

Although the buffer will eventually become tidal wetland, this transitional landscape provides both ecological and educational opportunities. Ecologically, the buffer provides ecosystem services including native pollinator and wildlife values with few maintenance requirements. Educationally, the buffer provides a natural "stage" as an opening to talk with people about sea level rise and local impacts, showcases the beauty of native coastal

plants, and provides a proactive opportunity to deal with the impacts of climate change on a local level.

## Implications for Extension

Extension educators in coastal states can easily adopt this climate adaptation solution for sea level–related issues with marsh migration at a state, municipal, or land trust site and at varying scales depending on the property and availability of funds. Outreach is a critical component of such marsh migration buffer projects so that stakeholders can become familiar with the values and services provided by tidal wetlands, the concept of marsh migration, and the benefit of working with sea level rise instead of fighting a difficult battle to maintain cultivated landscapes.

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