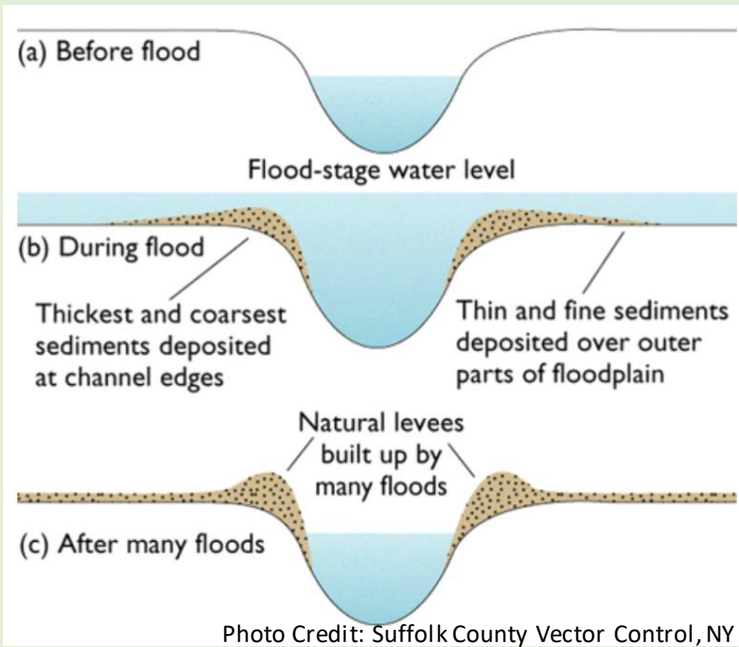


## Mitigating Marsh Ponding: Runnels - A Short-Term Solution

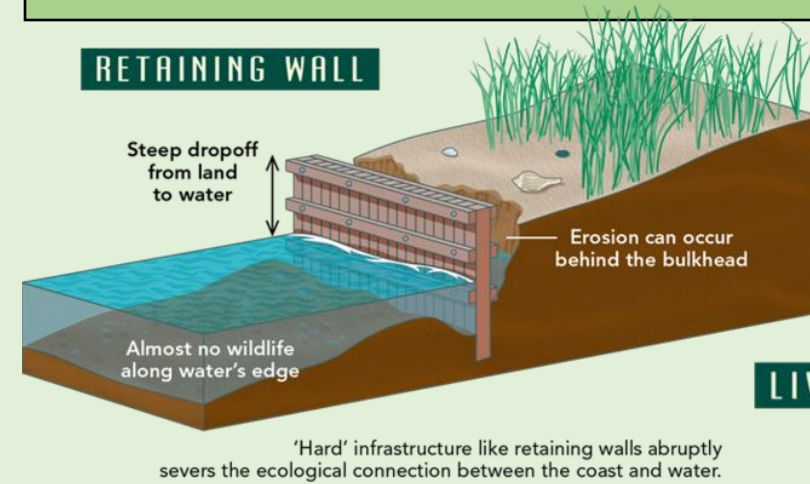
When ditches were dug, spoil was placed along the edges of ditch banks. Over time, additional sediment from tides has combined with construction spoil piles to form small levees. These levees create giant pools which change marshes to shallow open water and reducing their ability to protect against storms.



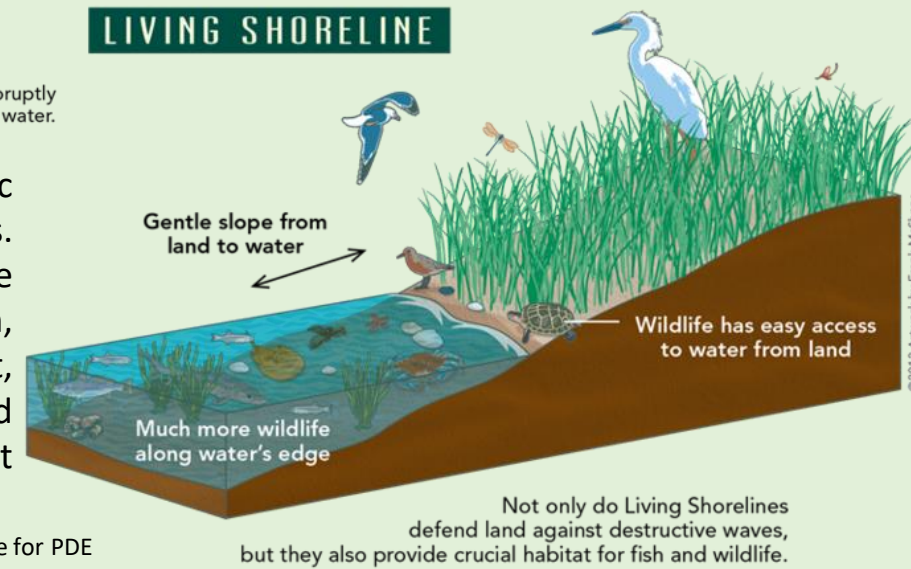
Runnels are a restoration technique that restore marsh by making a shallow channel (less than 10" deep) from the mega-pool to ditches, water can escape, and plants can grow.

- Provides a low impact solution to mega-pooling by restoring marsh hydrology.
- Revegetates the marsh, restoring its natural function.

## Reducing Shoreline Erosion: Living Shorelines – a Medium/Long-Term Solution

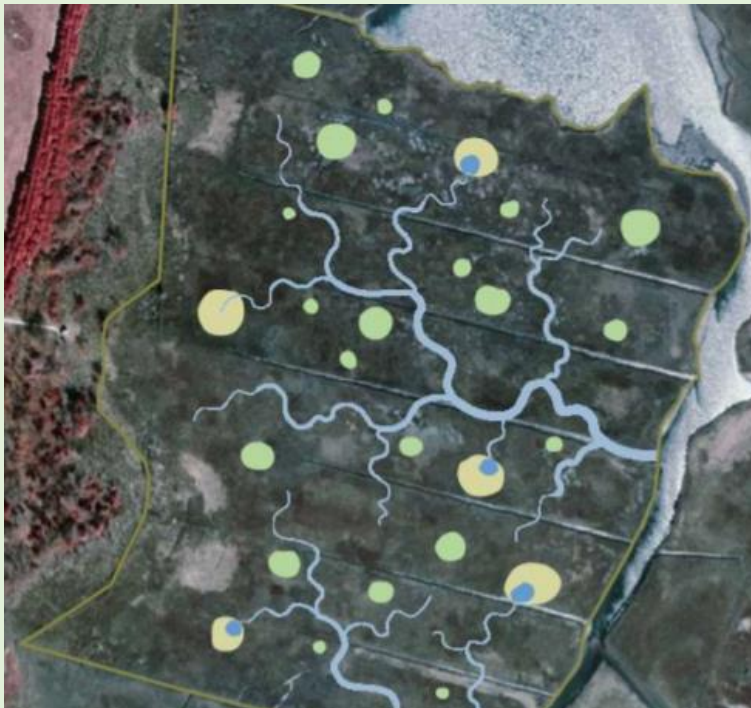


- Reduces wave energy, erosion and property damage during large storms.
- Protects and increases wildlife habitat and economically important fish species.
- Promotes carbon storage
- Traps sediment moving along the shoreline



Living shorelines are an ecologic alternative to rip-rap and bulkheads. Living shoreline may employ offshore sills, oyster reef balls, wave attenuation, marsh plants, beach replenishment, and more to dissipate wave energy and allow a fringing marsh or beach to persist along the shoreline.

## Restoring Natural Marsh Drainage Patterns: Interconnected Creek Network – A Medium Term Solution



Another technique used to rehabilitate ditched marshes is the creation of an interconnected creek network. Using large machinery, linear ditches are rerouted, connected, and sometimes filled to create a "natural" hydrologic flow. Additionally, open water pools are established for foraging birds, fish, and invertebrates.

This technique requires a great deal of funding and several years post-construction to fully establish before benefits are seen.

### Benefits

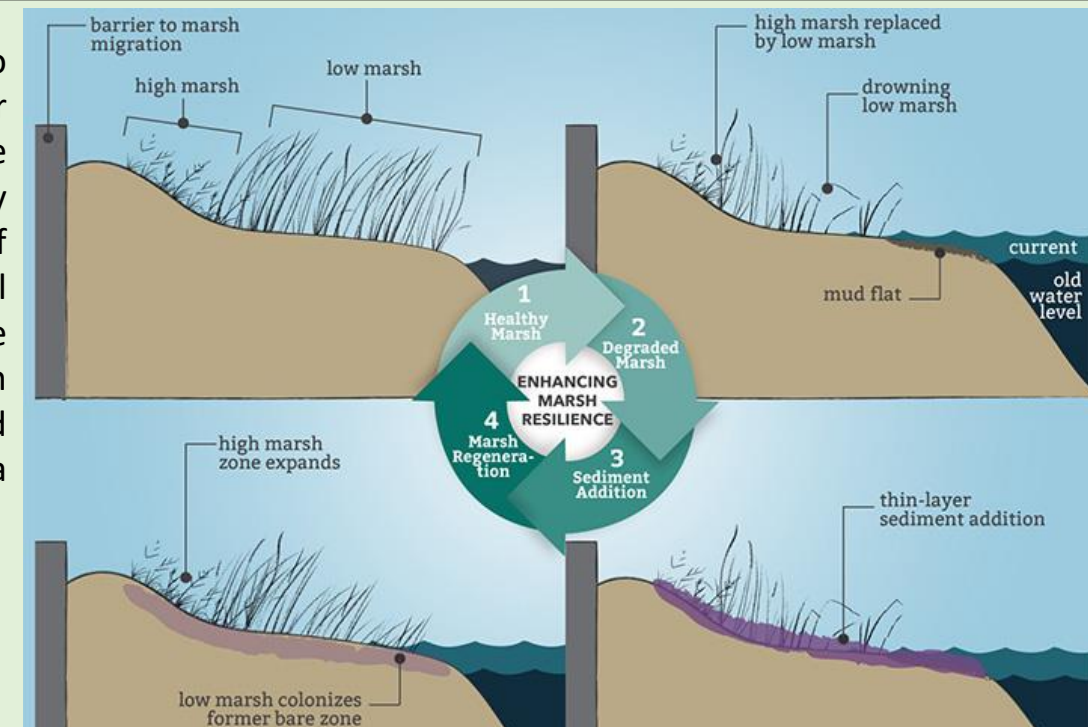
- Restored tidal flow across the marsh.
- Improved marsh vegetative cover.
- Increased and improved wildlife habitat.

Photo Credit: C. Pfeifer, Cardno ENTRIX

## Increasing Marsh Elevation: Thin Layer Placement – a Long-Term Solution

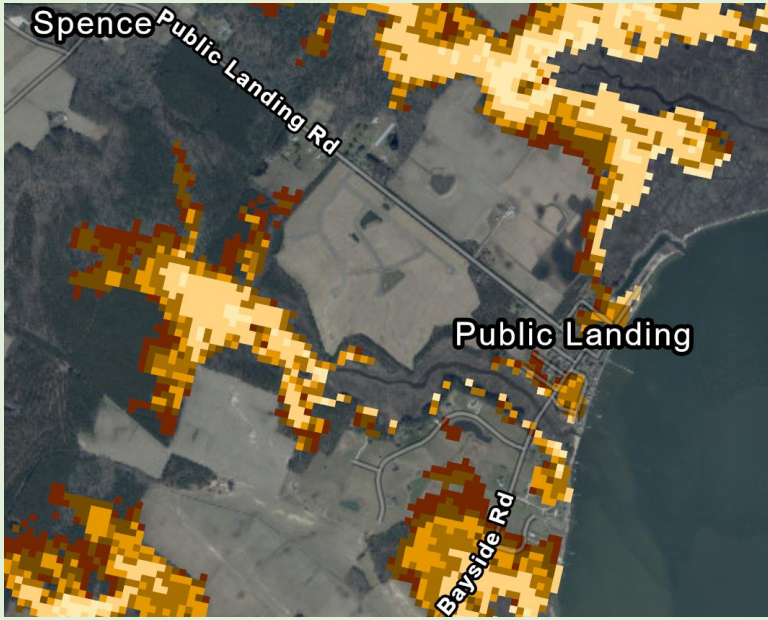
Salt marshes are at risk due to rising tides. Thin layer placement increases the marsh's elevation by distributing a thin layer of sediment (dredged material or sand mined) onto the marsh surface. The elevation of salt marsh is increased lengthening the life of a marsh for decades.

Photo Credit: Design by Caravan



- Increases soil stability consequently increasing plant growth and wildlife habitat.
- Mitigates the risk of marsh drowning.
- Enhances the marsh's ability to protect against flooding and storm surge.





Caption: Potential corridors for marsh migration

Marsh migration occurs when upland areas near salt marshes are inundated with saline waters. Saline water will cause upland plants to die, allowing marsh plants to grow in their place. This, natural process is accelerating in the Coastal Bays. Identifying, planning, and managing undeveloped lands neighboring salt marshes will better prepare landowners for a changing landscape.

- Maintains salt marsh habitat for wildlife.
- Increases coastal resiliency by understanding the risks of flooding.
- Allows homeowners to better prepare for future land uses.

Conservation Easements – Long-Term Planning

Easements are a great way to ensure that land remains conserved in perpetuity. These are legal agreements which limit the uses of land in order to protect conservation attributes. While the property owner retains ownership of the property, certain land uses (e.g., residential, non-agricultural, commercial, and industrial development) are restricted. These agreements conserve the open-space uses of the land in perpetuity and ensure that future generations will benefit from the land as well.

Conservation easements are particularly helpful for lands adjacent to salt marshes, rivers and streams, and swamps as these lands may eventually become inundated as the water bodies and wetlands migrate inland.

- Conserves land indefinitely.
- Increases fish and wildlife habitat.
- Cash and/or tax breaks to the landowner.
- Protects family farm legacies.

Invasive Species Control

Phragmites australis, commonly known as “Phrag”, is an invasive species originally from Australia. This salt-tolerant species occurs along the upland-marsh edge and often is the first to establish in areas where upland trees are dying due to saltwater intrusion.

Controlling the spread of this species is critical as it outcompetes native marsh species and provides little to no wildlife habitat. Herbicides, mechanical and manual removal are common Phrag removal techniques. Controlled burns are also being studied as a possible method for removal.

- Increases habitat for wildlife including the endangered salt marsh sparrow and economically important fish species.
- Allows natives marsh plants to reestablish.

# Maryland Coastal Bays Landowner Workshop

## Restoration Techniques Handout

Throughout the early and mid 1900s, many of the Maryland Coastal Bays marshes were altered with agricultural and mosquito ditching, berm construction, haying, grazing, or filled outright for development. This historic mismanagement has caused a range of disturbances such as restricted tidal flows and altered plant/soil dynamics.

Here, we summarize key restoration techniques used to rehabilitate and restore salt marshes. Restoring our salt marshes is a key focus as they provide numerous benefits to coastal communities as well as wildlife.



Photo Credit: Katherine Stahl USFWS

Contact Us!

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