

**Environmental Law Institute
WEBINAR READ AHEAD PAPER**

***Sustaining Coastal Wetlands in a Time of
Severe Storms and Rising Seas***
Webinar Date: 1.19.2023

This Read Ahead paper provides background information for the Environmental Law Institute webinar: Sustaining Coastal Wetlands in a Time of Severe Storms and Rising Seas on January 19 at 2:00 ET.

Extent of Tidal Wetlands

The [most recent estimate](#) of the extent of saltwater wetlands along the U.S. coast, published in 2009, found some 6.4 million acres, with about half occurring along the Gulf of Mexico. This is only a portion of the historic extent of the resource. The Federal Interagency Coastal Working Group [reported](#) an annual loss of coastal wetlands:

“Between 1998 and 2004, an estimated 59,000 acres of coastal freshwater and saltwater wetlands in watersheds of the Atlantic and Gulf of Mexico were lost on average each year. From 2004 to 2009, this rate increased to an estimated average of 80,000 acres of wetlands lost in coastal watersheds each year.”

The remaining saltwater wetlands still provide an [impressive array](#) of ecological services and benefits to society. Often termed “[the most productive ecosystems on Earth,](#)” they are nursery grounds for fisheries and provide habitat for birds, mammals and other wildlife. Wetlands also protect communities from storm surges and flooding. Along the Atlantic and Gulf coasts the protective value of wetlands is [estimated to be](#) about \$1.8 million per square kilometer annually. On top of all that, saltwater wetlands help fight global warming by storing carbon at a rate that is about [two to four times greater](#) than that observed in mature tropical forests.

Threat to Tidal Wetlands from More Severe Storms and Rising Seas

Erosion from increasingly severe coastal storms, rising sea levels, and steady coastal urbanization pose an existential threat to saltwater wetlands. Of these threats to saltwater wetlands, sea level rise is the most critical.

The National Oceanic and Atmospheric Administration [predicts](#) sea level rise along the U.S. coast of 1.3 feet by 2050, 4 feet by 2100, and 7.2 feet by 2150 under the “intermediate” scenario. The change coastwide could be over 7 feet by 2100 in the “high” scenario. Some regions, such as the western Gulf coast, can expect sea level rise of over five feet by 2100 in an “intermediate” scenario.

The rising seas will eventually drown all the saltwater wetlands that now exist, converting them to open water. Some wetlands will survive in place for a time if seas rise slowly enough for sediment and plants to [build up naturally, effectively raising the wetland](#). But the rate of sea level rise is [accelerating rapidly](#), and other factors, such as [land subsidence](#), will shift the balance in favor of rising seas in the years ahead.

For most saltwater wetlands, survival will require landward migration. This is possible where geography does not present obstacles, such as steep slopes, and where human development has not already staked a claim.

A 2022 study evaluated 166 U.S. estuaries and found that “landward migration of coastal wetlands will transform coastlines but not counter seaward losses.” On the Pacific coast, some 83% of wetlands are projected to become open water by 2110, and “migration of most wetlands was constrained by coastal development or steep topography,” according to a 2018 [study](#). Along the Gulf of Mexico, where sea levels are rising the fastest, [estimated](#) conversion of wetlands to open water varies for each state, with rates from 24% to 37% by 2060.

The outlook for saltwater wetland survival darkens further when one considers that new coastal development is likely to occupy some dry land that might otherwise become a new wetland. Population in the 100-year coastal floodplain is [expected to almost double](#) by 2060, significantly expanding the coastal development footprint.

And the rising sea levels that drive wetlands inland will also prompt people to defend the land they are on, often with seawalls, bulkheads, or levees, which would prevent wetlands from migrating. Some [14% of the coast is already armored](#) by this infrastructure, and if the current rate of armoring continues, that percentage is expected to double by 2100.

Finally, wetlands that are able to migrate will need years to provide the same degree of ecosystem services they did originally. A [study](#) of over 600 restored wetlands worldwide found that biological structure and biogeochemical functioning “remained on average 26% and 23% lower, respectively, than in reference sites” even a century after restoration, which means that even the wetlands that do survive won’t provide the same benefits.

Measures to Sustain Tidal Wetlands

The webinar will address what can be done to both protect existing tidal wetlands and facilitate their landward migration. In general, the panel will describe three key strategies to help sustain tidal wetlands and support shifting these ecosystems to higher ground.

- 1. Education and Planning:** Broader understanding of the climate change risks to coastal ecosystems among decision-makers and the public is an important foundation for efforts to sustain these ecosystems. Better recognition of risks can provide a foundation to support development of plans to identify migration corridors, and to apply diverse measures to protect these assets in timeframes that are appropriate to the risk.
- 2. Land Acquisition and Investments:** Acquisition of title or easement is a key tool to protect both existing coastal ecosystems and the uplands that will become pathways for landward migration of the ecosystems in response to more severe storms and rising seas. Acquisition might be by local, state, or federal governments or nonprofit organizations.
- 3. Permits and Regulations:** Local, state and federal governments have a range of regulatory tools for managing existing ecosystems and protecting landward migration pathways. Permitting for coastal structures, such as seawalls, is a tool to reduce their impacts on tidal wetlands. State and local governments can use regulations to discourage development in ecosystems and migration pathways. And the federal government can require that federally funded projects be directed away from flood risk areas and toward higher ground.

Ideas and innovations in these three areas are coming along well, but sea level rise is accelerating. So, the country is in a race to sustain existing tidal wetlands and facilitate landward migration ahead of rising sea levels.