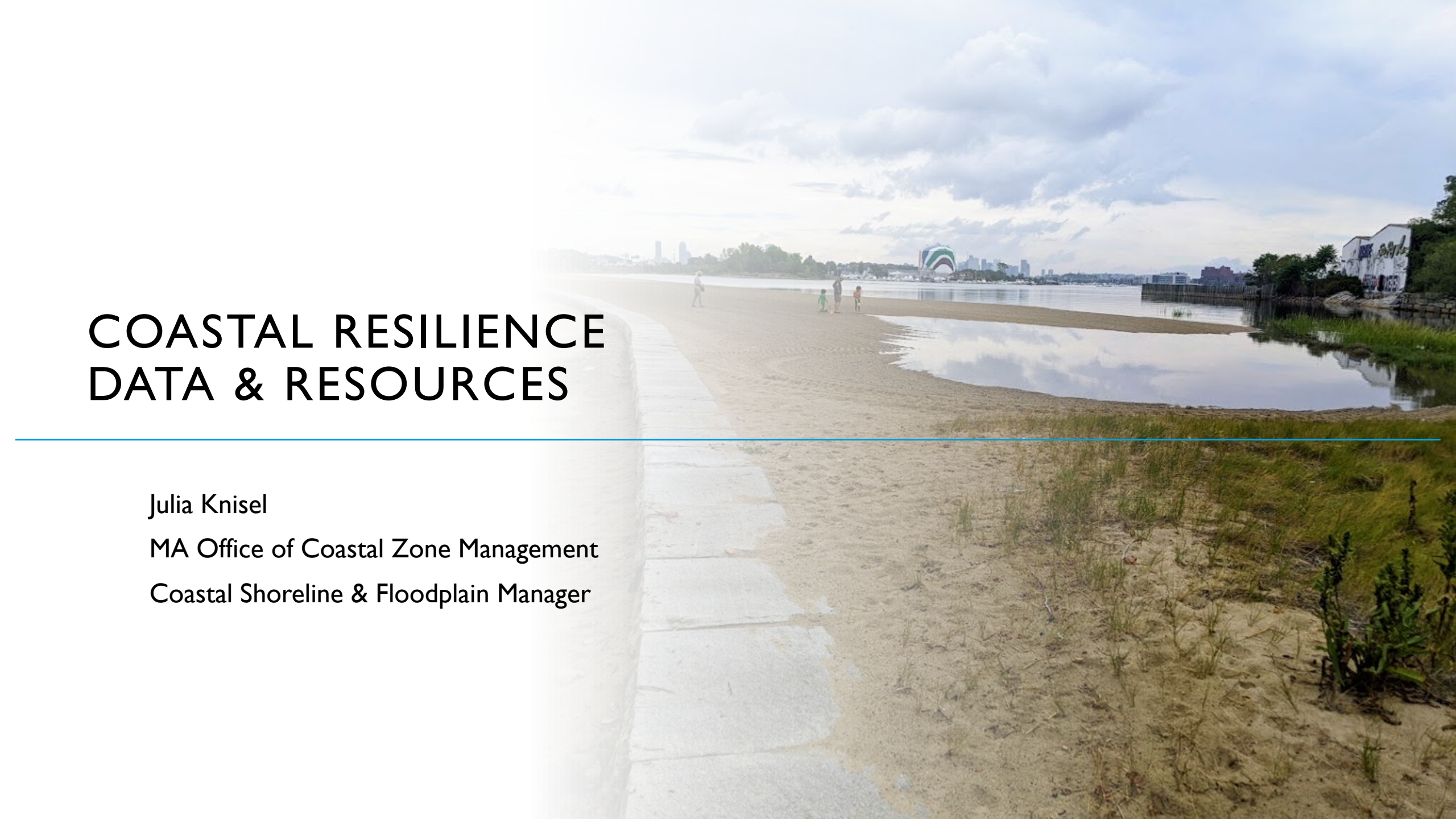
COASTAL RESILIENCE DATA & RESOURCES



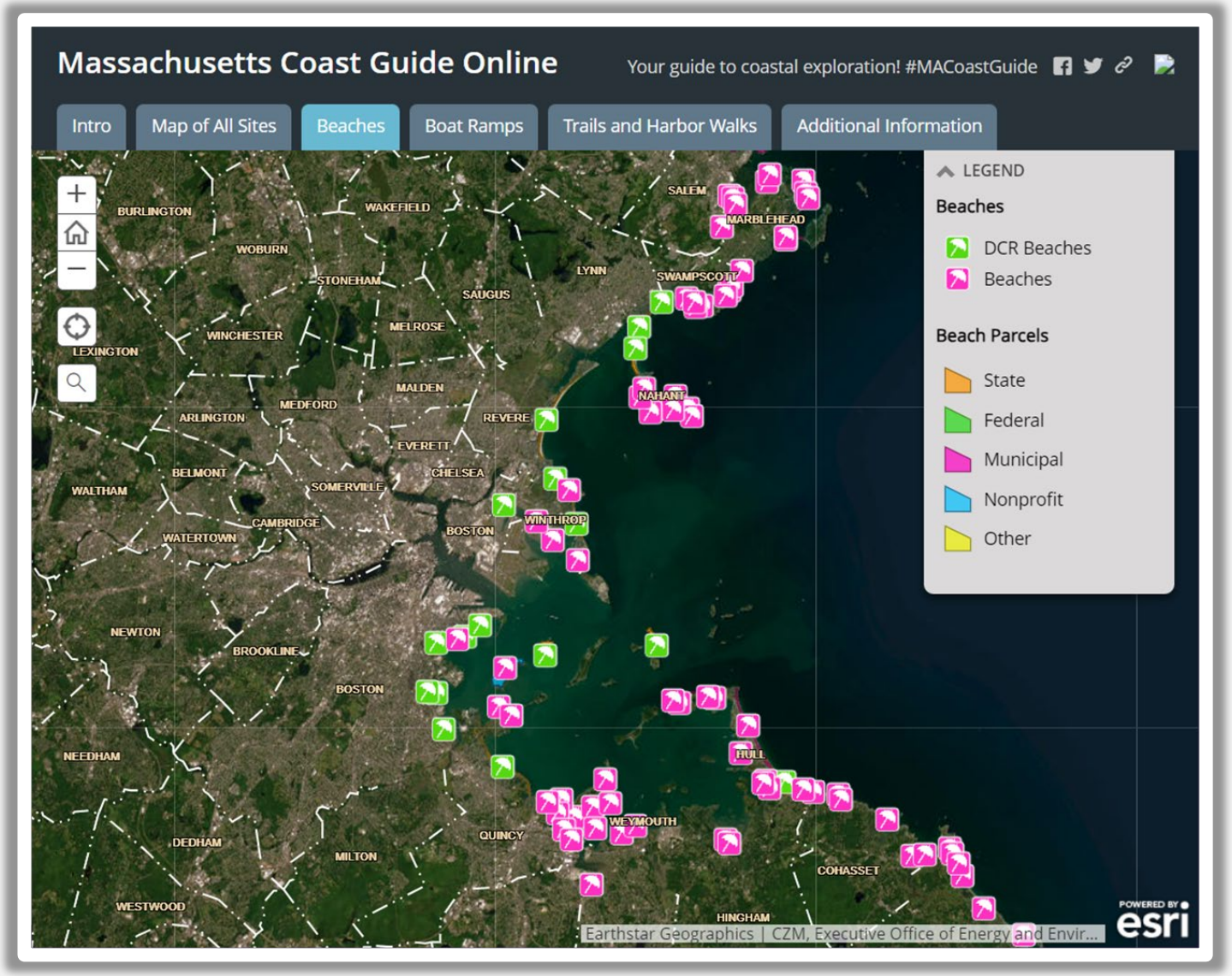
Julia Knisel

MA Office of Coastal Zone Management

Coastal Shoreline & Floodplain Manager

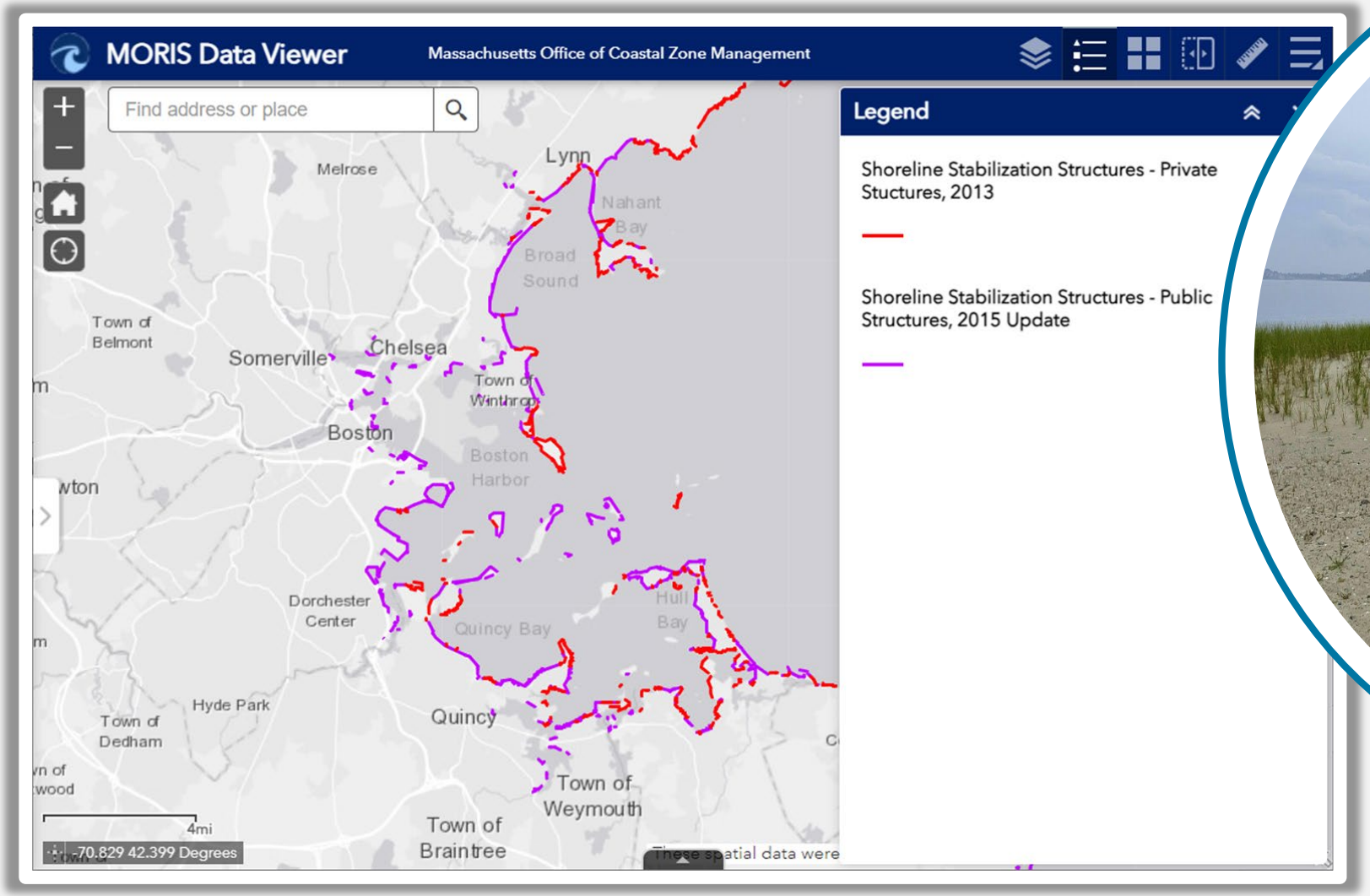
Public Beaches

State, municipal & nonprofit collaboration opportunities in the metro region



Coast Guide Online at https://arcg.is/1CKium

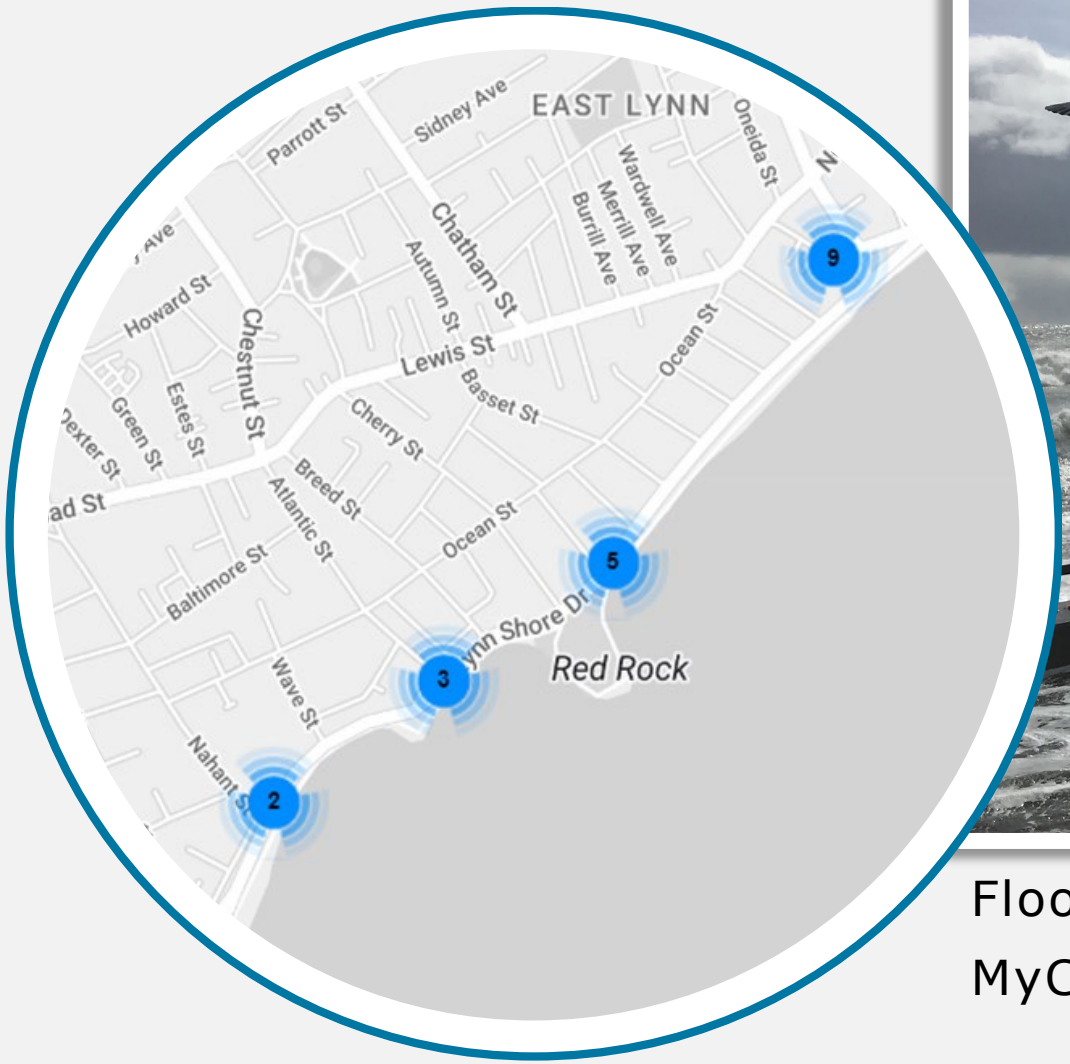
Seawalls & Revetments



Low seawall at Revere Beach

MORIS at https://czm-moris-mass-eoeea.hub.arcgis.com

Coastal Storm Impacts



Flooding at King's Beach, Lynn (March 2018)

MyCoast Reports at https://mycoast.org/ma

Shoreline Change

Sand & gravel overwash (March 2013)

Low rates of long-term erosion at Nantasket Beach, Hull

MA Coastal Erosion Viewer at https://arcg.is/1b91au0

Sea Level Rise

Scenario	2030	2040	2050	2060	2070	2080	2090	2100
INTERMEDIATE	0.7	1.0	1.4	1.8	2.3	2.8	3.4	4.0
INTERMEDIATE HIGH	0.8	1.2	1.7	2.3	2.9	3.6	4.3	5.0
HIGH	1.2	1.7	2.4	3.2	4.2	5.2	6.4	7.6
EXTREME	1.4	2.2	3.1	4.2	5.4	6.8	8.4	10.2

Table shows projected decadal average values for relative mean sea level (feet NAVD88).

Sea level rise projections for Boston tide gauge at https://eeaonline.eea.state.ma.us/ResilientMAMapViewer

Sea level rise projections for MA include Antarctic ice sheet loss projections (as of 2017)

Sea Level Rise

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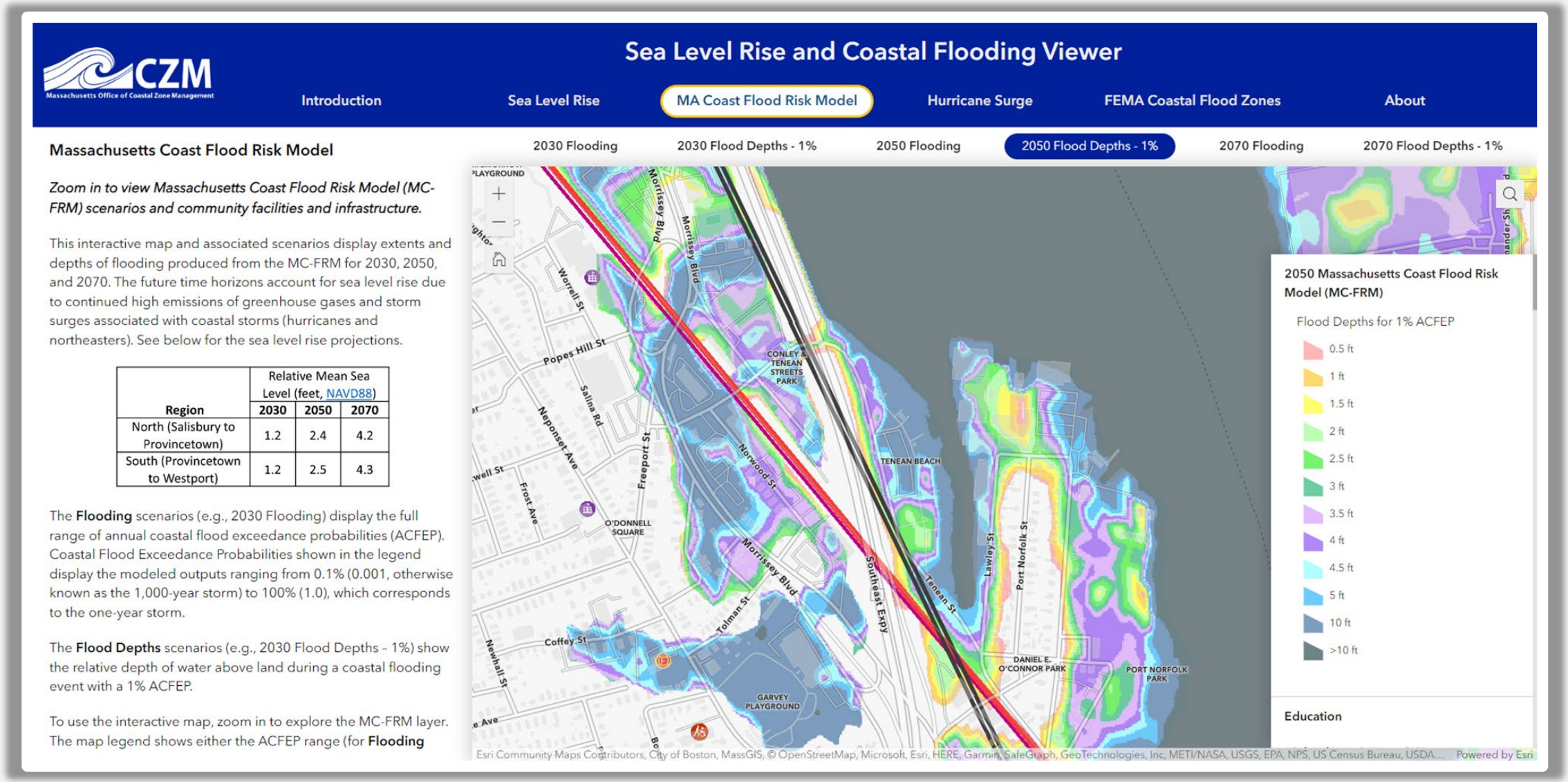
MA Coast Flood Risk Model



https://experience.arcgis.com/experience/23d861b79aed450eb8972013dd28579b/page/MA-Coast-Flood-Risk-Model

CZM Coastal Resilience Grant Program

https://www.mass.gov/service-details/coastal-resilience-grant-program

Dune restoration at North Nantasket Beach (2 years after construction in 2021)

Coastal communities & eligible nonprofits & Tribes

Reduce impacts associated with coastal storms, erosion, flooding & sea level rise

CZM StormSmart Properties Fact Sheets

StormSmart Coasts

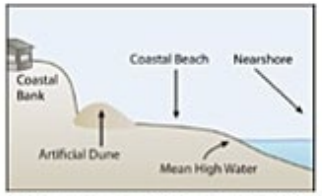
StormSmart Properties Fact Sheet 1: Artificial Dunes and Dune Nourishment

The coast is a very dynamic environment and coastal shorelines—especially beaches, dunes, and banks—change constantly in response to wind, waves, tides, and other factors such as seasonal variation, sea level rise, and human alterations to the shoreline system. Consequently, many coastal properties are at risk from storm damage, erosion, and flooding. Inappropriate shoreline stabilization methods can actually do more harm than good by exacerbating beach erosion, damaging neighboring properties, impacting marine habitats, and diminishing the capacity of beaches, dunes, and other natural landforms to protect inland areas from storm damage and flooding. StormSmart Properties—part of the Massachusetts Office of Coastal Zone Management's (CZM) StormSmart Coasts Program—provides coastal property owners with important information on a range of shoreline stabilization techniques that can effectively reduce erosion and storm damage while minimizing impacts to shoreline systems. This information is intended to help property owners work with consultants and other design professionals to select the best option for their circumstances.

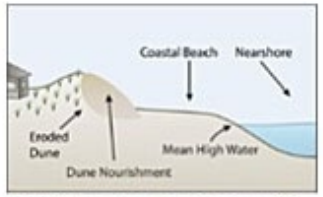
What Are Artificial Dunes and Dune Nourishment?

A dune is a hill, mound, or ridge of sediment that has been deposited by wind or waves landward of a coastal beach. In Massachusetts, the sediments that form beaches and dunes range from sand to gravel- and cobble-sized material. An artificial dune is a shoreline protection option where a new mound of compatible sediment (i.e., sediment of similar size or slightly coarser) is built along the back of the beach, seaward of the area to be protected. (Artificial dunes may be called cobble berms when larger pebble- and cobble-sized materials are used.) Dune nourishment provides shoreline protection by adding compatible sediment to an existing dune. With artificial dunes and dune nourishment, sediment is brought in from an offsite source, such as a sand and gravel pit or coastal dredging project.

No shoreline stabilization option permanently stops all erosion or storm damage. The level of protection provided depends on the option chosen, project design, and site-specific conditions such as the exposure to storms. All options require maintenance, and many also require steps to address adverse impacts to the shoreline system, called mitigation. Some options, such as seawalls and other hard structures, are only allowed in very limited situations because of their impacts to the shoreline system. When evaluating alternatives, property owners must first determine which options are allowable under state, federal, and local regulations and then evaluate their expected level of protection, predicted lifespan, impacts, and costs of project design, installation, mitigation, and long-term maintenance.



This diagram shows an artificial dune built seaward of an eroding coastal bank to protect the bank from further erosion that could endanger the house.



This diagram shows a dune nourishment project that added sediment to the seaward side of an eroded dune to enhance the ability of the dune to protect the house.

StormSmart Coasts

StormSmart Properties Fact Sheet 6: Sand Fencing

The coast is a very dynamic environment and coastal shorelines—especially beaches, dunes, and banks—change constantly in response to wind, waves, tides, and other factors such as seasonal variation, sea level rise, and human alterations to the shoreline system. Consequently, many coastal properties are at risk from storm damage, erosion, and flooding. Inappropriate shoreline stabilization methods can actually do more harm than good by exacerbating beach erosion, damaging neighboring properties, impacting marine habitats, and diminishing the capacity of beaches, dunes, and other natural landforms to protect inland areas from storm damage and flooding. StormSmart Properties—part of the Massachusetts Office of Coastal Zone Management's (CZM) StormSmart Coasts Program—provides coastal property owners with important information on a range of shoreline stabilization techniques that can effectively reduce erosion and storm damage while minimizing impacts to shoreline systems. This information is intended to help property owners work with consultants and other design professionals to select the best option for their circumstances.

What Is Sand Fencing?

Sand fencing, also called snow fencing, is designed to help capture sand to build dunes. It is typically made of thin, wooden slats that are connected with twisted wire to wooden or metal stakes. While other fence materials such as plastic, polyethylene, and metal are sometimes used to trap sand, they are not recommended for coastal use because of the impacts they can cause. See Design Considerations below for details on impacts of other materials.

No shoreline stabilization option permanently stops all erosion or storm damage. The level of protection provided depends on the option chosen, project design, and site-specific conditions such as the exposure to storms. All options require maintenance, and many also require steps to address adverse impacts to the shoreline system, called mitigation. Some options, such as seawalls and other hard structures, are only allowed in very limited situations because of their impacts to the shoreline system. When evaluating alternatives, property owners must first determine which options are allowable under state, federal, and local regulations and then evaluate their expected level of protection, predicted lifespan, impacts, and costs of project design, installation, mitigation, and long-term maintenance.

Sand fencing was installed along the base of and perpendicular to this eroded dune to trap windblown sand and help rebuild the dune. (Photo: CZM)

StormSmart Coasts

StormSmart Properties Fact Sheet 7: Repair and Reconstruction of Seawalls and Revetments

The coast is a very dynamic environment and coastal shorelines—especially beaches, dunes, and banks—change constantly in response to wind, waves, tides, and other factors such as seasonal variation, sea level rise, and human alterations to the shoreline system. Consequently, many coastal properties are at risk from storm damage, erosion, and flooding. Inappropriate shoreline stabilization methods can actually do more harm than good by exacerbating beach erosion, damaging neighboring properties, impacting marine habitats, and diminishing the capacity of beaches, dunes, and other natural landforms to protect inland areas from storm damage and flooding. StormSmart Properties—part of the Massachusetts Office of Coastal Zone Management's (CZM) Stormsmart Coasts Program—provides coastal property owners with important information on a range of shoreline stabilization techniques that can effectively reduce erosion and storm damage while minimizing impacts to shoreline systems. This information is intended to help property owners work with consultants and other design professionals to select the best option for their circumstances.

What Are Seawalls and Revetments?

Seawalls and revetments are types of coastal engineering structures that run parallel to the shoreline. Also known as "armoring" or "hard structures," coastal engineering structures provide a physical barrier that directly protects inland areas. Seawalls are vertical walls that are typically constructed of concrete or stone, while revetments are sloping structures typically composed of rock (also called "rip rap"). Seawalls and revetments provide storm damage protection and erosion control from waves, tides, currents, and storm surge (water build up above the average tide level). They can be used in both exposed areas with high wave energy, as well as in areas with more sheltered conditions (e.g., relatively low wave energy). As discussed below, seawalls and revetments can significantly alter the coastal system and may have adverse impacts on the project site and neighboring properties. Because these effects are now well understood, new construction of these hard structures is only allowed in very limited circumstances. This fact sheet addresses the more common practice of repair and reconstruction of existing seawalls and revetments. Given the technical and permitting issues involved with seawall and revetment repair and reconstruction projects, a coastal engineer should be consulted for site-specific advice.

No shoreline stabilization option permanently stops all erosion or storm damage. The level of protection provided depends on the option chosen, project design, and site-specific conditions such as the exposure to storms. All options require maintenance, and many also require steps to address adverse impacts to the shoreline system, called mitigation. Some options, such as seawalls and other hard structures, are only allowed in very limited situations because of their impacts to the shoreline system. When evaluating alternatives, property owners must first determine which options are allowable under state, federal, and local regulations and then evaluate their expected level of protection, predicted lifespan, impacts, and costs of project design, installation, mitigation, and long-term maintenance.

Fact sheets at https://www.mass.gov/service-details/stormsmart-properties