

OFFICE FOR URBANIZATION

Future of the American City

THE CASE OF CAPE ANN:
Recommendations and
Bibliography

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Recommendations

The following sixty recommendations are structured around five strategies: communication, resistance, accommodation, avoidance, and capacity building. Within each strategic category, recommendations are sorted into three timescales: immediate (within 2 years), near-term (3–8 years), and medium-term (8+ years).

These recommendations are addressed to five stakeholder groups with interests and agency across the Cape Ann region. These audiences include individuals and institutions who live, work, or provide services on Cape Ann; municipal governments, agencies, and their departments; relevant state and federal government agencies; local businesses, industries, and their associations; and non-governmental or nonprofit organizations working in civil society.

While most recommendations are synthesized from scenario planning research, these recommendations are further informed by consultation with academic, professional, and local experts. While some recommendations stand alone, others require additional study. Collectively, these recommendations draw upon the history of Cape Ann's natural and cultural histories to inform its adaptation to a changing climate.

Recommendations: **Communication**

Communication

The Cape Ann region should incentivize, guide, and coordinate future adaptation efforts to reflect regional and local policy initiatives. These include bolstering climate education, design guidelines, emergency notification programs, public health measures, land use practices, and zoning regulations.

Recommendations: **Communication**

The Cape Ann region should incentivize, guide, and coordinate future adaptation efforts, including revisions to its zoning regulations and land use practices, to reflect regional and local policy initiatives. The region should work to include younger people, seasonal workers, minority groups, and all classes in its decision-making while communicating clear and streamlined processes at critical points.¹

Immediate (2024)

- > Research and develop a synthetic landscape conservation and management planning scenario for the landscape biomes shared across Cape Ann using mixed-methods research, fieldwork, and scenario planning exercises. This year-long study should be coordinated by the Cape Ann Climate Coalition in partnership with the Harvard University Graduate School of Design and include input from Harvard faculty and external experts.
- > Authorize as-of-right accessory dwelling unit (ADU) construction for units under 900 square feet without residency restrictions in all residential zoning areas and provide technical assistance and financial subsidies for net zero ADU construction. The Manchester-by-the-Sea Planning Board, and Essex Planning Board should adopt less restrictive municipal ADU bylaws. Each municipality should then focus on the more difficult challenge of zoning Transit Oriented Development (TOD) districts in each community, and zone for multi-family housing for millennials, seniors, and artists.²
- > Standardize a regional wayfinding and signage system to communicate evacuation networks, evacuation assembly points (EAPs), and emergency shelters to residents and visitors. Wayfinding signs should be made visible on major streets. Information on shelters and routes should be publicly distributed as pamphlets to individual residents and posted in town halls, on websites, and through social media. In addition to emergency alert systems maintained by each municipality's Fire Department, all Cape Ann residents should be enrolled in a Reverse 911 Code Red system by the North Shore Cape Ann Emergency Preparedness Coalition.³
- > Create and maintain a database of vulnerable citizens, including elderly residents, residents with chronic health problems, and residents without transportation who will need assistance in the event of an emergency. This database should be shared with

Addison Gilbert Hospital and other care facilities in the event of an emergency and coordinated by each municipality's Board of Health in conjunction with the North Shore Cape Ann Emergency Preparedness Coalition.⁴

- > Explore the feasibility of establishing live video feeds of: East Main Street; Route 127A at Goose Cove; "The Cut" Bridge at Blynman Canal; Route 128 at Causeway Street; Grant Circle in Gloucester; Route 133 over the Essex Causeway; and Route 133 over Chubb's Creek in Manchester-by-the-Sea. This will allow residents to see flood conditions at these critical thoroughways in real-time via the internet. These feeds should be introduced and maintained by each municipality's Department of Public Works.⁵

Near-Term (2025–2030)

- > Educate residents and businesses in each municipality about the extent of historic wetlands and waterways. Residents and commercial operations should be made aware that these areas are likely to flood regularly in the future. In addition, they should understand relevant aspects of National Flood Insurance Program (NFIP) compliance through flood insurance and building code requirements. This information should be distributed in pamphlets and through each municipality's website and shared by each municipal government, aided by civic organizations.⁶
- > Incentivize residents to move out of flood zones. Civic organizations, Conservation Commissions, and municipal Planning Boards, including the Cape Ann Climate Coalition, should convene working groups to share information on acquisition and buyouts, sea level adaptation land trusts, transfers of development rights, and density bonuses for building out of coastal areas.⁷
- > Install an early flood warning system with water level gauges and radar to monitor rainfall in the Inner Harbors in Gloucester, Rockport, and Manchester-by-the-Sea; at the Great Marsh in Essex; and along the length of the Annisquam River in Gloucester. This system will complement the video cameras installed at critical evacuation routes. This early warning system should be monitored by a regional coalition of each municipality's Department of Public Works and Fire Department.⁸
- > Conduct a waste audit in each municipality facilitated by the Department of Public Works (DPW). This audit should establish a baseline to understand the potential

Recommendations: **Communication**

reduction and revenue impacts of waste management programs. The audit should be performed in concert with public outreach by civic organizations and DPWs on the locations of existing textile donation bins, municipal gardens with compost sites, and public recycling bins.¹¹

> Establish stringent building codes and design guidelines to incentivize new development and reconstruction ready for climate adaptation. Require new construction to meet Design Flood Elevations (DFEs) for a 1,000-year flood and incentivize developers to hold water on site with drainage maintenance and site design guidelines using density bonuses and a Transfer of Development Right (TDR) program. These design guidelines should be developed and implemented by each municipality's Planning Board in consultation with architecture, landscape architecture, and engineering firms.¹²

Medium-Term (2030+)

> Pass flood disclosure laws for realtors and property sellers. Lobby the Commonwealth's legislature to pass stringent disclosure laws that require real estate sellers to disclose whether (a) there has been previous water damage to structures due to natural flood events; (b) there has been previous flooding due to a natural failure or breach of a reservoir or controlled emergency release of water from a reservoir; (c) the property is located wholly or partly in a 100-year, 500-year, 1000-year, or reservoir floodplain; (d) the seller has ever filed a claim for flood damage to property with any insurance provider; (e) flood insurance covers the property; or (f) the seller has ever received assistance from FEMA or the US Small Business Administration (SBA) for flood damage to the property. Housing advocates, real estate groups and landlords should support passing this measure.¹³

> Deliver youth and adult education programs through public school curricula and civic organizations that promote environmental education, habitat restoration, and stewardship. These programs should include actionable information for residents about localized solar production, the benefits of planting native species, water collection on rooftop cisterns, and residential composting as well as general information about Cape Ann's historic ecosystems and natural history.

Recommendations: **Resistance**

Resistance

The Cape Ann region should move beyond single-purpose gray infrastructure repairs and upgrades toward synthetic gray and green strategies, beginning with the restoration of degraded marshland and decommissioning of damaged seawalls and revetments.

Recommendations: **Resistance**

The Cape Ann region should move beyond single-purpose gray infrastructure repairs and upgrades toward multi-purpose synthetic gray and green infrastructure strategies. Installing costly water pumps and floodproofing sewer pump stations without integrating and augmenting existing natural systems depletes limited resources.

Immediate (2024)

- > Restore marshland by filling in agricultural ditches along municipally owned marshes surrounding Route 128 by Causeway Street and Good Harbor Beach in Gloucester, Saratoga Marsh in Rockport, and Conomo Point in Essex through a partnership between municipal governments and conservation organizations, with technical assistance from the Trustees of Reservations and funding from the North American Wetlands Conservation Act. Private landowners must be incentivized to fill in agricultural ditches immediately and each municipality should work to provide ecological education, funding, and technical resources for landowners. These restoration efforts should integrate appropriate coastal planting communities using native species that reduce tidal forces, soil erosion, and runoff pollutants.¹⁴
- > Implement dam rehabilitation measures for Babson Reservoir Dam and safety improvements to all Fernwood Lake Dams, Haskell Pond Dam, and Wallace Pond Dam (coordinated by the Gloucester Department of Public Works) as well as the Mill Pond Dam and Carlson Quarry Dam (coordinated by the Rockport Department of Public Works). The rehabilitation measures on Babson Reservoir should include a pilot project that introduces floating solar capacity on the Reservoir before expanding to other man-made waterbodies across Cape Ann. The pilot can be subsidized by the Massachusetts Department of Energy Resources Solar MA Renewable Target tariff program.¹⁵
- > Commission a masterplan to deconstruct the Long Beach seawall and construct an artificial dune system along the barrier beach. This plan should be commissioned by the Town of Rockport.¹⁶
- > Commission a feasibility and impact study for a tidal barrier along the Annisquam River at Route 128 at the site of the Andrew A. Piatt Bridge.¹⁷
- > Commission a study on the effects of future sea level rise on Good Harbor Beach and Marsh, including sediment transport, current, wave action and erosion rates, and

the structures and roadways that impact marsh hydrology. This initial study should be immediately followed by a design proposal for the acquisition of buildings around Good Harbor Marsh and an artificial dune and living breakwater system at Good Harbor Beach.¹⁸

- > Adopt a Pay-As-You-Throw waste management plan in Essex.¹⁹

Near-Term (2025–2030)

- > Pass a Shoreline Zoning Bylaw that limits the number and location of coastal shoreline erosion structures and prohibits their repair or construction in sensitive coastal and estuarine environments.²⁰
- > Commission a design proposal to heighten the seawall and revetment along Front Street in Rockport above the 2100 Design Flood Elevation and reinforce the Granite Pier revetment.²¹
- > Enlarge the culvert at the intersection of Summit Avenue and Lowest Lane in Rockport.²²
- > Rank the stormwater and drainage maintenance proposals in the 2021 Horsley Witten Crosswalk by their long-term effectiveness. This action should be completed by each municipality's Department of Public Works.²³
- > Create multi-layered infrastructural redundancies as an added form of defense and resilience, starting with an additional Level III electrical Trunk Cable inland through Hamilton/Wenham implemented by National Grid. Two additional electrical, water, and cable lines should be dug under the Annisquam River, coordinated across state and local governments.²⁴
- > Formalize a public-private partnership with the marina businesses along Gloucester's working waterfront to use their commercial freezers for post-disaster relief during summer storms and flooding events. This action should be undertaken in concert with broader business continuity planning for all waterfront businesses across Cape Ann.²⁵

Recommendations: **Resistance**

- > Introduce a living seawall system at Gloucester High School that can host living organisms and accommodate a quick elevational change. Gloucester should prioritize bids from engineering and design firms that build the shellfishing capacity of the region and minimally affect coastal erosion in other areas.²⁶
- > Commission a design plan for a waterfront park along an elevated and reinforced seawall at Stacey Boulevard around “The Cut” bridge. The park should include a harbor walk for coastal access, emergency flood warning system, and elevational changes that register flood levels.²⁷
- > Commission a tree inventory for Gloucester, Rockport, and Essex led by each municipality’s Open Space Department (in collaboration with civic organizations) to inform future roadway elevation, redesign, and drainage maintenance projects.²⁸
- > Retrofit all gas and fuel stations along emergency evacuation routes to be dry-floodproofed in the event of an extreme storm system, including the remediation of soils from underground chemical storage.²⁹

Medium-Term (2030+)

- > Commission a study on a hurricane barrier and eel grass planting at the mouth of Manchester-by-the-Sea Harbor, including nutrient loads, water quality and sediment transport as well as the effects of erosion at other places along the coast.³⁰
- > Retrofit solar panels on municipal public rooftops and create an online visualization panel showing the energy produced over time on each municipality’s Department of Public Works website. This action should include increasing grid-scale storage technologies to support renewable energy and increase the resilience of the Cape Ann electrical system.
- > Estimate the feasibility of purchasing Johnson’s Quarry in Rockport to enhance the resilience of the drinking water supply.³¹

Recommendations: **Avoidance**

Accommodation

The Cape Ann region must reevaluate its relationship to incoming waters. The region should explore roadways and retention ponds as places that can mitigate flooding.

Recommendations: **Accommodation**

Cape Ann faces threats of water from all sides and must reevaluate its relationship to incoming waters. The region should differentiate between different types of water and consider how seawater, freshwater, and gray water may be retained, reused, and/or repelled.

Immediate (2024)

> Pass Road Overlay Districts along streets that have repeatedly flooded and sustained \$10,000 in damages over the past fifty years. Planning Boards should look to Gloucester's Atlantic Road Overlay District as an example and refrain from issuing building permits in these areas, including Penzance Road, Marmion Way, and Old Penzance Road in Rockport, Ocean Street and Raymond Street in Manchester-by-the-Sea, and Robbins Island Road and Conomo Point Road in Essex.

Near-Term (2025–2030)

> Commission a study to triage the roadways across Cape Ann that have never flooded and are not likely to flood; those that have previously flooded; and roads that are likely to flood in the future. Pass an ordinance to demolish asphalt roads along repetitive loss routes and transfer maintenance responsibilities for homeowners along these roadways.³²

> Commission a feasibility study on elevating the structures on Bearskin Neck and the businesses along Front Street in Rockport on open foundations above the 2100 Design Flood Elevation. The study should include structural repairs to the existing bulkheads and seawalls.³³

> Build public-private partnerships with the Essex County Club and Cape Ann Golf Club to temporarily store tree debris and branches in the event of extreme storms and expand the retention capacity of Essex County Club along Sawmill Brook.³⁴

Medium-Term (2030+)

> Conduct a feasibility study on the creation of two ferry systems to provide transportation across and from Cape Ann. The first study should look at an all-season ferry route across the Annisquam River between the Route 128 Andrew A. Piatt Bridge and "The Cut" Bridge at Blynman Canal. The second study should look at a seasonal commuter and tourist ferry between Boston and Gloucester's Inner Harbor, both implemented by private businesses on land leased from the City of Gloucester.

Recommendations: **Avoidance**

Avoidance

The Cape Ann region must balance its historic districts and waterfront economies with adaptation efforts and design principles that create a new cultural imaginary around a new relationship to the ocean.

Recommendations: **Avoidance**

Cape Ann's cultural imaginary revolves around its relationship to the ocean. The region should strive to balance its historic districts and waterfront economies with adaptation efforts and adopt design principles and guidelines to pursue a distinctive visual character for the built and natural environment.

Immediate (2024)

- > Conduct a feasibility study on realigning or building a bridge along Route 128 between Lobsta Land at the intersection of Causeway Street and Grant Circle in downtown Gloucester.³⁵
- > Relocate all moveable assets out of the working waterfront, including the Gloucester Designated Port Area, while elevating mechanical utilities and relocating critical assets. All critical assets that cannot be relocated should be dry floodproofed.³⁶
- > Conduct a feasibility study on elevating the Essex Causeway to restore the flow of the Great Marsh through downtown Essex while expanding the transit experience for pedestrians and bikers by widening the road and including a dedicated bikeway and sidewalk to connect the two sides of Essex's downtown core.³⁷ During construction, Apple Street, which is being elevated, should be clearly designated as an alternative evacuation route through Essex.
- > Commission a design study on demolishing Thatcher Road through sensitive Good Harbor Marsh and constructing an alternative route through Dogtown Common along municipally owned land. This road should be designed and planned as the primary site for future net-zero development out of downtown Gloucester.³⁸
- > Include a clause in the 2023 Long Beach leases in Rockport that stipulates that Long Beach owners who elect to renew their leases in 2023 will be liable for any damages due to extreme storm systems and coastal flooding, and that these leases will be renewed on a year-to-year basis with an option for the Town of Rockport to suspend all leases after half of Long Beach property owners agree to sell or relocate their homes. The Town of Rockport should commission a masterplan for a municipal parcel to relocate the Long Beach cottages at a subsidized rate.³⁹

- > Include a clause in future Conomo Point leases in Essex that stipulates that those owners who elect to renew their leases will be liable for any damages due to extreme storm systems and coastal flooding. Offer the owners of cottages on Conomo Point who elect to renew their leases the opportunity to purchase subsidized municipal land. Fund improvements on Conomo Point for a publicly accessible boat launch to provide access to the Point during periods of intense flooding.

Near-Term (2025–2030)

- > Commission two studies on elevating public areas in Cape Ann. The first study should evaluate raising Gloucester's waterfront from the intersection of Rogers Street and Western Avenue to East Main Street on Rocky Neck on fill, including raising individual seawalls and bulkheads above the 2100 Design Flood Elevation and raising roads to access structures built at the DFE. The second study should look at elevating the Manchester-by-the-Sea Village Core along Route 127 from the intersection of Bennett Street to the intersection of Brook Street around Central Pond, after the Pond's restoration is complete.⁴⁰
- > Dry floodproof all sewer pump stations in the floodplain and install camlocks, transfer switches, and electrical panels to facilitate access to power emergency generators.⁴¹
- > Conduct a feasibility study on the relocation of Essex Downtown, including parcels that would need to be acquired to infill a walkable, transit-oriented town core. This feasibility study should include engagement with business owners to understand the number and cost of flooding events they are willing to endure before they are required to relocate.⁴²
- > Relocate the Gloucester and Manchester-by-the-Sea Department of Public Works out of the 1,000-year floodplain.⁴³
- > Purchase repetitive loss structures across Cape Ann through public-private partnerships between each municipality's government, conservation organizations, and the state and federal government.⁴⁴

Recommendations: **Avoidance**

> Pass stringent Ground and Surface Water Overlay District Bylaws that expand natural buffer zone regulations to 500 feet around the reservoirs and wellheads on Cape Ann. This action is concurrent with introducing landscape and natural systems design guidelines.⁴⁵

Medium-Term (2030+)

> Conduct a feasibility study on the site planning and construction of a regional wastewater-to-biogas treatment plant with the capacity to treat waste from Gloucester, Rockport, Manchester-by-the-Sea, and Essex in a highly visible site that integrates its functions into the broader community with a public education coordinator position.

> Conduct a study ranking the municipal parcels outside of the 1,000-year floodplain across Cape Ann to identify parcels that could be incorporated into a masterplan for inland development with connecting infrastructure out of the floodplain, coordinated between each municipality's Planning Board and a regional Commission.

Recommendations: **Capacity**

Capacity

The Cape Ann region should continue to initiate experimental research, reports, and projects, and engage relevant stakeholders and agencies to coordinate ongoing and future efforts. By prototyping and piloting public projects and policies, Cape Ann can develop new climate innovations and emerge as a national adaptation leader.

Recommendations: **Capacity**

The Cape Ann region should continue to initiate experimental research, reports, and projects as well as engage with relevant stakeholders and agencies to coordinate ongoing and future adaptation efforts. Additionally, Cape Ann should continue to engage with local civic and research institutions and professionals to solicit adaptation strategies. Through the prototyping and piloting of public projects and policies, Cape Ann can develop new climate innovations and emerge as a national leader in adaptation.

Immediate (2024)

- > Propose a Cape Ann Climate Commission Act to establish a regional climate adaptation coalition, funded by state and local governments, that serves as an adaptation planning and regulatory agency. The Commission should be led by a Chief Adaptation Officer. The Coalition will coordinate between residents, local businesses, students, civic organizations, NGOs, and state and local governments on strategic planning initiatives and strategize between stakeholders to help secure federal and state funding assistance and grants. The Commission will align budgets, timelines, and masterplans with green infrastructure and capital improvement efforts across the region.⁴⁸
- > Inform the Federal Emergency Management Agency (FEMA) Regional Office of each municipality's interest in applying to the National Flood Insurance Program (NFIP) Community Rating System (CRS) and submit CRS applications. The system encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Programs. Membership provides direct benefits to citizens, including a 5%-40% discount on flood insurance purchased through NFIP.⁴⁹
- > Conduct a day-long scenario planning exercise bringing civic, institutional, and government stakeholders, including the North Shore Cape Ann Emergency Management Response Team to explore the effects of a Category 3 hurricane on Cape Ann. Prioritize a discussion around mutual aid agreements to extend each municipality's emergency capacity by sharing equipment and staff.
- > Install emergency generators at Manchester-by-the-Sea Town Hall and Fire Department, Manchester-by-the-Sea Memorial School, the Gloucester Department of Public Works, and the Rose Barker Senior Center in Gloucester.⁵⁰

Near-Term (2025–2030)

- > Adopt adaptive management strategies in the scope of work for architecture, landscape architecture, and engineering firms hired by each municipality for implementing, closely monitoring, and adapting future actions based on the observed results.
- > Establish swap shops at the transfer stations in Gloucester, Manchester-by-the-Sea, and Essex, including fix-it clinics throughout the year to encourage reducing waste and help build a recycling culture in Cape Ann.⁵¹
- > Establish a regional climate adaptation fund that collects funds from developers, a tax on short-term rental properties including Airbnbs, a foreign investment tax, municipal services fees, and revenues from leased municipal lands.⁵²
- > Pilot a SALT (Sea Level Adaptation Land Trust) program for residential properties within the floodplain along Ocean and Raymond Streets in collaboration with the Manchester-Essex Conservation Trust, Essex County Greenbelt, and Manchester-by-the-Sea Planning Board.⁵³

Medium-Term (2030+)

- > Develop a research project to calculate the carbon sequestration value of salt marshes and wetlands, in collaboration with academic and research institutions, to use as a metric for the mitigation potential of these ecosystems and attract state and federal funding for projects across Cape Ann.⁵⁴
- > Expand the Cape Ann Transit Authority with increased service, additional stops at recreation areas and trailheads, and reduced or free fares for Cape Ann residents.
- > Apply for state and federal grant programs to introduce a hydrothermal processing unit to regional waste treatment capacities on Cape Ann by 2035 that converts waste to energy, supplementing the existing electrical grid.⁵⁵

Notes

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