

# A TOOLKIT FOR PLANNING FORWARD-LOOKING PORT AREAS IN MASSACHUSETTS

*Site Planning Practicum: East Boston Spring 2022*  
MIT Department of Urban Studies and Planning





# TABLE OF CONTENTS

## INTRODUCTION

Focus on Designated Port Areas (DPA)	4
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## WHAT IS A DPA?

History	7
Enforcement	8
Specifications	9

## BENEFITS OF A DPA

Preserving Maritime Heritage	11
Economic Development	12
Accessible Waterfront Land	12
Protecting Healthy Ecosystems	13

## CONSTRAINTS OF A DPA

Environmental Injustice	15
Conflict With Public Waterfront Access	16
Flooding Risk	16
Economic Development + Abandoned Land	17

## FORWARD-LOOKING PORT AREA STRATEGIES

Clean Maritime Industries	20
Punctual Waterfront Access	22
Community Serving Uses	23
Temporal Separation	24
Gradual Resilience Strategy	25

## CONCLUSION

The Potential for Forward-Looking Port Areas	27
Example Site Plan: Condor Street	28
Resources	29
Acknowledgments	30
References	31

Cover image source: [marinas.com](http://marinas.com)





# INTRODUCTION



# FOCUS ON DESIGNATED PORT AREAS (DPA)

East Boston's coastal land is included within two separate Designated Port Areas, a state designation that impacts what can and can't be built. This designation is meant to preserve areas that are suitable for waterfront industrial uses. As East Boston's history of activism and community organizing has made clear, **industry has been in direct opposition to environmental justice goals in the neighborhood.** Industrial uses—without accountability mechanisms and public oversight—have contaminated land and water, limited public access to the waterfront, and created other conditions that currently exist as challenges in East Boston. In addition, industry's proclaimed economic development potential on a regional scale has not been realized locally in East Boston, where 45% of renters face an elevated risk of displacement.<sup>1</sup> Despite carrying the environmental and public health burden of industry, East Boston residents, the majority of whom identify as Hispanic or Latinx, do not gain access to wealth-building opportunities and long-term stability.

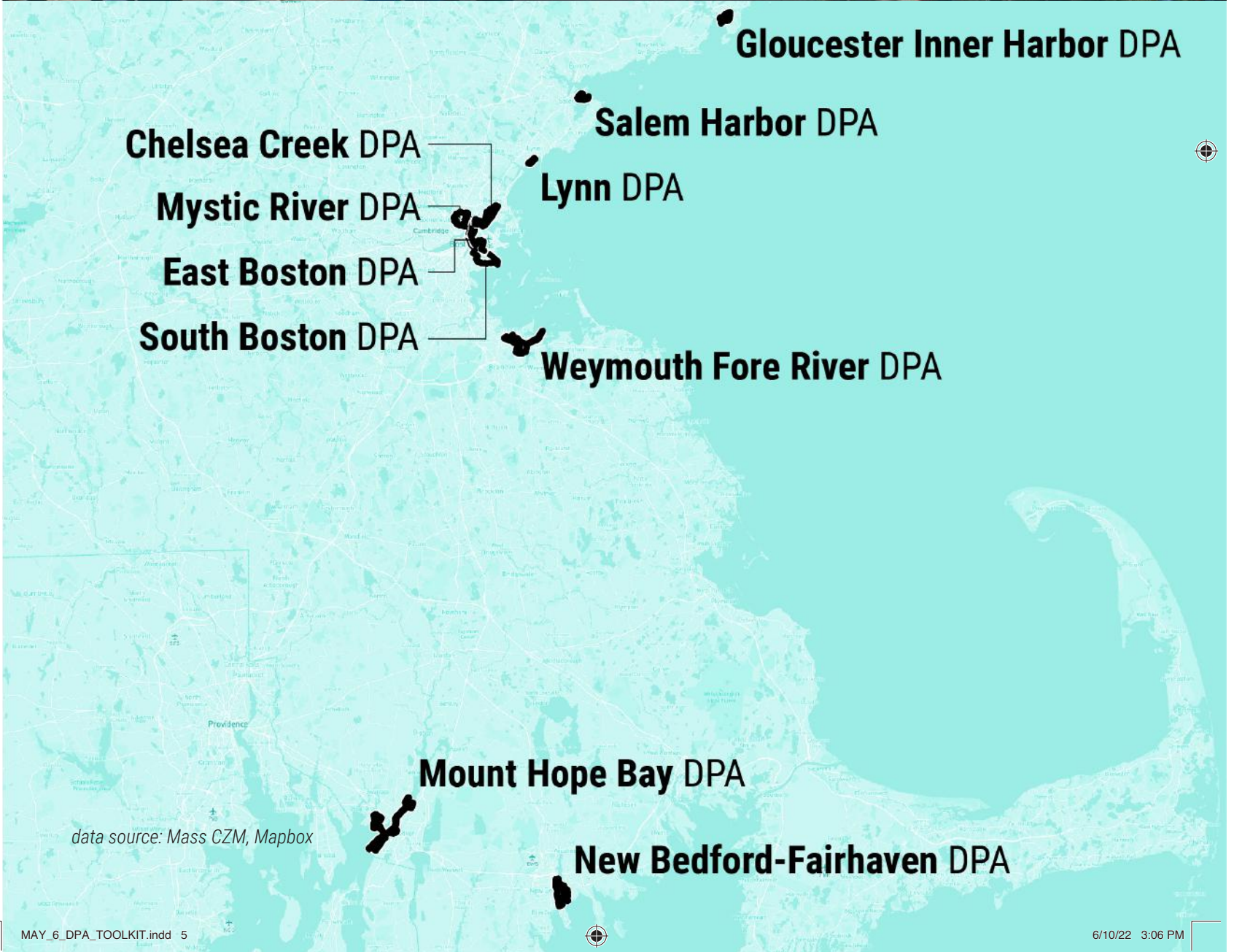
However, **DPA policy takes a regional perspective and is inflexible to proposals that run counter to its intent of preserving waterfront industrial land.** Over time, DPA boundaries can be reviewed and changed, but the regulation does not proactively shift its boundaries to accommodate non-compliant projects. This toolkit suggests that, within the seemingly rigid and undesirable bounds of the DPA, there is room for creative, forward-looking, and community-led planning solutions. Of course, policy priorities shift and regulations can be lifted, and local activism and advocacy can precipitate more fundamental changes to DPA policy. In the meantime, collaboration between local residents, the municipality, mission-driven developers, and industry, can **transform DPAs from disinvested, contaminated, and partially abandoned sites into clean, adaptable sites for blue jobs and environmental justice.** The following toolkit contains strategies to inform that collaboration, and a possible Municipal Harbor Plan, with the hope that DPAs can become future community assets.

**This toolkit suggests that, within the seemingly rigid and undesirable bounds of the DPA, there is room for creative, forward-looking, and community-led planning solutions.**





image source: GreenRoots



data source: Mass CZM, Mapbox



# WHAT IS A DPA?





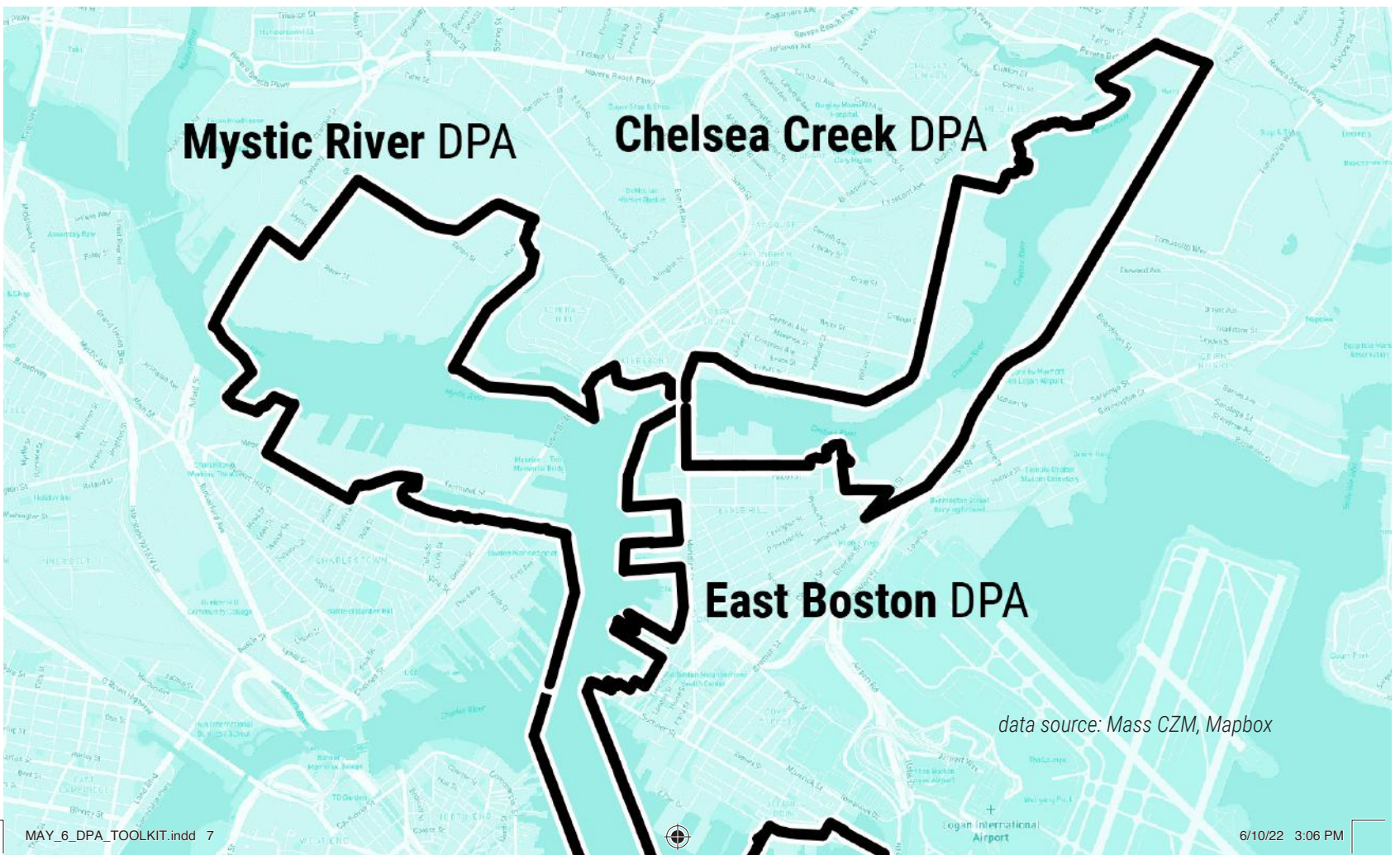
# HISTORY

In 1972, the United States Congress passed the Coastal Zone Management Act, a national policy, to help protect the nation’s coastal environment from the development pressures associated with residential, recreational, commercial, and industrial uses.<sup>2</sup> In 1978, the Commonwealth of Massachusetts established the Office of Coastal Zone Management (CZM) to help articulate priorities for the protection and management of coastal habitats, ocean resources, ports, water access and quality.<sup>3</sup> CZM established the Designated Port Area (DPA) policy as means to help achieve **coastal-zone priorities at both a state and national level.**

There are two central principles that drive the DPA policy: **(1) to promote water-dependent industries as critical to the state’s economy;** and **(2) to prevent the further degradation and loss of healthy coastal ecosystems** by preserving areas that have certain key characteristics that make them well suited to water-dependent industrial

uses.<sup>4</sup> This strategy rests on the idea that dredged coastal areas with ports, wharves, and bulkheads are a rare and finite resource, and therefore, developers should not be able to convert them into areas with incompatible residential, commercial, and recreational uses.

There are **10 DPAs across the Commonwealth.** Each area varies in size and intensity of use and in the balance of public and private ownership, however, all of the areas share a need for similar infrastructure that has three essential components: **(1) a waterway connected to a waterfront** that has been developed for commercial vessel navigation or direct utilization of the water; **(2) adjacent backland space** that is conducive to the siting of industrial facilities and operations; and **(3) access to land-based transportation and utility services** for industrial purposes.<sup>5</sup>





# ENFORCEMENT



## WHEN

Chapter 91 Waterways licenses or permits from the Massachusetts Department of Environmental Protection are the primary mechanism through which the DPA is enforced. These licenses are needed when a project is located in tidelands, Great Ponds, and certain non-tidal rivers and streams. The construction of waterfront buildings requires a Chapter 91 license if it is on filled lands or over the water. Projects in DPAs on filled tidelands require a Chapter 91 license.

Outside of Chapter 91 jurisdiction, municipal zoning is the enforcement mechanism. Municipalities can make changes to the zoning code in order to produce better outcomes for DPAs in alignment with the stated goals of DPAs. Municipalities can also implement policy and allocate funding to influence the success of a DPA.

## WHO

Waterfront property owners need to apply for a new license when there is a change in structure or in use. The application must include municipal zoning certification and municipal planning board notification.

## WHY

Owners of unlicensed structures are subject to MassDEP enforcement leading to removal of structures and/or fines. Many owners are unaware of licensing requirements or believe their property to be licensed properly, leading to non-compliant uses existing within DPA boundaries.

**Chapter 91 licenses are the primary mechanism through which the DPA is enforced.**



# SPECIFICATIONS



image source: BPDA

## KEY PROVISIONS

Structures that are built or altered must be easily removed or converted to be suitable for water-dependent-industrial use.

Non-water-dependent uses cannot be located in facilities with attributes necessary for prospective water-dependent-industrial use.

## SUPPORTING USE

To qualify as a supporting use, any non-water-dependent industrial use needs to be either industrial or commercial and provide direct economic operational support to a water-dependent industrial use. A commercial use cannot interfere with port operations and thus cannot include hotels, nursing homes, and hospitals; recreational boating facilities; amusement parks and major sports or entertainment complexes; and new office buildings. **Supporting uses may occupy no more than 25% of the area of the project site** (excluding tidelands past the shoreline).

## TEMPORARY USE

Temporary uses, which require a special 10-year license but are unlimited in terms of project area, include warehousing, trucking, parking, and other industrial and transportation uses which occupy vacant space or facilities. These uses cannot require significant structural alteration of the space they occupy.

## HEIGHT REQUIREMENTS

Buildings for non-water-dependent uses cannot exceed 55 feet in height if located over the water or within 100 feet landward of the high water mark. As buildings get further away from this mark, they can get incrementally taller.

## MUNICIPAL HARBOR PLAN

A municipality can submit a Municipal Harbor Plan that sets forth their objectives, standards, and policies within a harbor and the implementation program they will take to achieve those goals set forth. Municipal Harbor Plans, and the DPA Master Plans therein, can set forth substitutions in use and numerical requirements that maintain the overall intent to conserve the capacity for water-dependent industrial uses. If approved by the Executive Office of Environmental Affairs, all future projects must conform to its provisions.



# BENEFITS OF A DPA





# PRESERVING MARITIME HERITAGE

The working waterfront is a core part of the history and identity of Boston and Eastern Massachusetts. Rocky and nutrient-depleted soils prevented early colonizers from developing a large-scale agricultural economy. Thus, they relied on the ocean and its tributaries and shifted toward maritime-based endeavors like fishing, shipping, and trading. By 1660, shipbuilding was a leading industry in the towns of Newburyport, Ipswich, Gloucester, Salem and Boston. In addition to those activities, a whaling industry flourished from the late 17th century to the mid-19th century. Although the whaling industry dwindled with the advent of petroleum, commercial trading, fishing, and shipping continue to characterize the working waterfronts of Boston today. A forward-looking approach that considers 21st century needs will help **ensure that the urban waterfront can maintain this rich maritime heritage while continuing to thrive.**

**“Massachusetts went to sea... not of choice, but of necessity”**

**- historian Samuel Eliot Morison in *The Maritime History of Massachusetts* (1921)**

*image source: The Trustees*



# ECONOMIC DEVELOPMENT



DPAs preserve potential for economic development by maintaining industrial uses. Port industries are as important now as they have been in the past. According to a study conducted by the University of Massachusetts at Dartmouth, the maritime economy supported \$3.4 billion in wages and nearly 90,000 workers through the latest recession.<sup>6</sup> The industrial and manufacturing sector more broadly employs a high share of workers without a college degree and pays them significantly more than other sectors.<sup>7</sup> Industries are constantly evolving and new ones are forming. Maintaining sites for industrial uses means that a region can **adapt to the needs of those new industries as they arise, leading to job growth and economic development.**

# AVAILABLE WATERFRONT LAND



DPAs maintain available waterfront land that would otherwise face intense development pressure and speculation. The DPA designation makes sure that waterfront land remains accessible for current and future industrial uses. Without DPA designation, waterfront property might be susceptible to residential or commercial development pressure, driving rents higher and closing off the possibility for industrial developers to acquire adequate property without additional cost constraints.

**DPAs maintain available waterfront land that would otherwise face intense development pressure and speculation.**



# PROTECTING HEALTHY ECOSYSTEMS

DPA's protect healthy ecosystems in other places from being destroyed to create new port areas. There are 10 DPAs in Massachusetts. The preservation of 10 sites, which have already been developed for industrial use, benefits the region by preventing other coastal areas from needing to be dredged or turned into ports to support a necessary industrial use. Turning these sites into residential or commercial uses or returning them to their former ecosystems might mean more dredging and industrial development in the future. Thus, Massachusetts' wetlands and marsh ecosystems overall benefit from DPA policy.

**DPA's protect healthy ecosystems in other places from being destroyed to create new port areas.**

*image source: Christopher Seufert*



# CONSTRAINTS OF A DPA



# ENVIRONMENTAL INJUSTICE

Site selection for various maritime and industrial uses occurs on a regional level and responds to competitive advantages and natural features (such as waterfronts). As a result, local community input as to the adjacency of industrial centers is limited. Due to the racist history of urban development, people of color, particularly those who are Black and/or Latinx, are more likely to live in or near industrial areas.<sup>8</sup> In Massachusetts, most DPAs

are adjacent to environmental justice communities (communities that meet 1-3 criteria based on high minority populations, language isolation, and low incomes, as defined by the state), meaning **further marginalization from the planning process**. The environmental harms of industries also pose a costly burden to residents, who may experience poor health due to air and noise pollution.

## Most DPAs are adjacent to environmental justice communities.



# CONFLICT WITH PUBLIC WATERFRONT ACCESS



Water-dependent industrial uses often **block public access to the water**. Industrial users do not necessarily benefit from public activation or access, creating a tension between residents who seek to benefit from their coastal adjacency, and tenants who need to capitalize on square footage for production. For example, adding a ten foot boardwalk can reduce the space that a delivery vehicle needs for a turning radius. Similarly, maritime industries often use both the land and water, meaning they may want to secure their facilities and reduce access points.

# FLOODING RISK

Water-dependent uses require certain **shoreline typologies** to support marine activities. Where planners and landscape architects are concerned, the “toolkit” of coastal adaptation strategies to mitigate flooding from sea level rise involves making changes to shoreline

typologies. As a result, in areas with severe **risk of flooding** from sea level rise and with highly variable topography, coastal communities may be at additional risk.





# ECONOMIC DEVELOPMENT + ABANDONED LAND

Highly valuable industrial land is preserved in favor of a long-term, regional strategy. In the short term, real estate development and economic opportunities go through traditional real estate and industry cycles. As a result, existing tenants may go out of business, or land may transfer owners while remaining vacant or underutilized due to the restrictions of land use.

For residents, this potentially means one of two things. The first is that a lack of local industrial opportunities in a zone restricted to industrial uses means **living near abandoned land**. A community may have demand for housing and other community-centric amenities that may outpace demand for active industrial waterfronts, where vacant land is a highly sought-after asset. The second concern is that coastal demand for vacant land may **increase speculation**, and in turn, increase the cost of development and decrease the likelihood of it happening.

**Who benefits from economic development of waterfronts?** Neighbors to industrial areas may not benefit from economic development of a waterfront. While industry provides jobs and economic development regionally, those benefits do not always reach the people living directly adjacent to industrial areas. For environmental justice communities, this compounds concerns about the costs of living near industrial users.



**While industry provides jobs and economic development regionally, those benefits do not always reach the people living directly adjacent to industrial areas.**



# FORWARD-LOOKING PORT AREA STRATEGIES



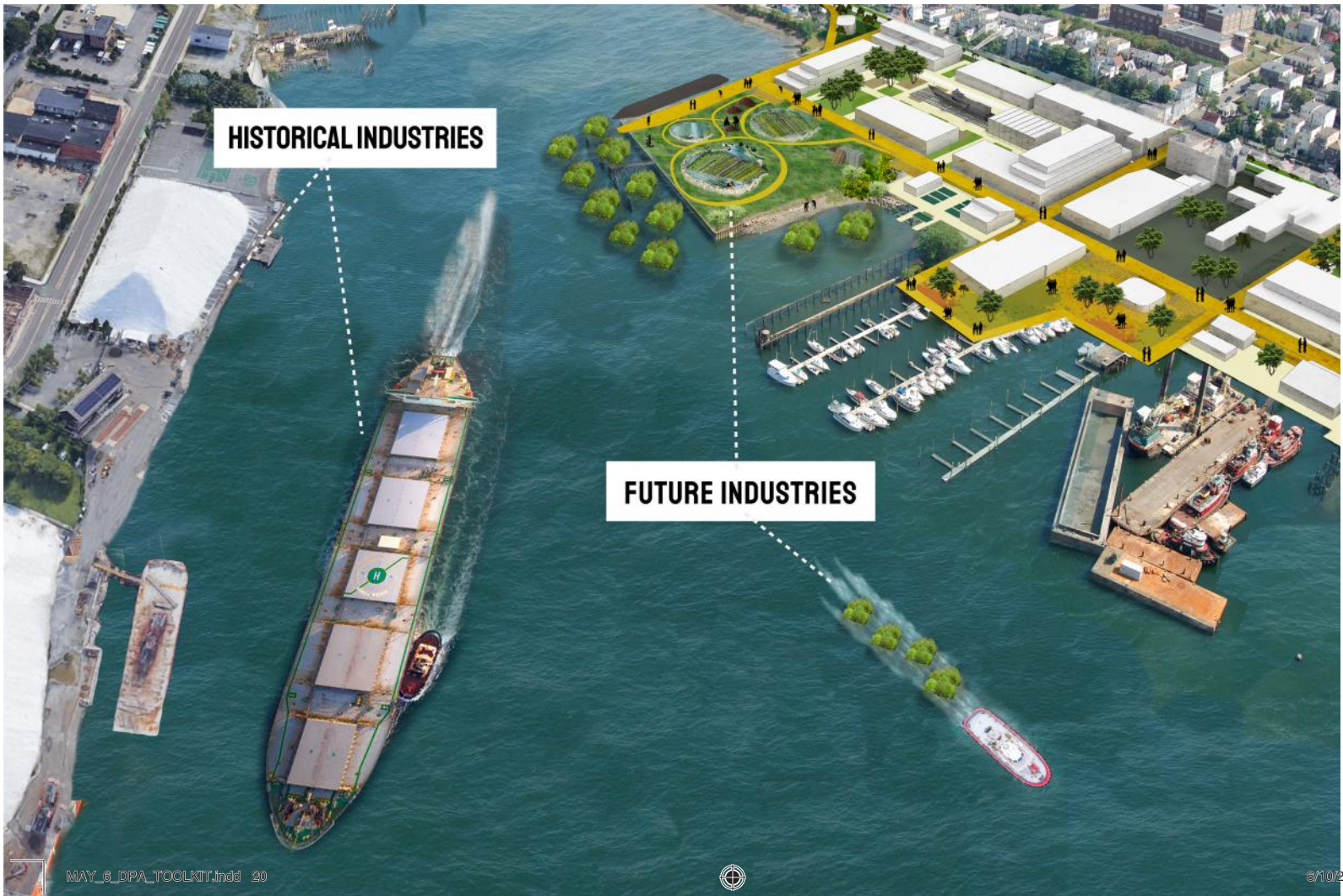


# CLEAN MARITIME INDUSTRIES



image source: Vineyard Wind

While industrial sites have historically been hazardous to adjacent communities, the future of industry can look different. Clean maritime industries, such as aquaculture, offshore wind, coastal ecosystem restoration, and constructed wetlands manufacturing, are starting to populate coastlines, and a forward-looking port area can recruit and incorporate such uses. These non-polluting industries present less of an environmental and public health concern for local residents but still rely on the waterfront infrastructure and inland connectivity that exists in port areas.





## THE OPPORTUNITY FOR CONSTRUCTED FLOATING WETLANDS

Constructed floating wetlands (CFW) are designed to mimic natural wetland ecosystems. They consist of semi-terrestrial vegetation established on a buoyant engineered substrate that floats on the surface of the water. The upper parts of the vegetation grow above the water level, while the roots grow into the water column and develop an extensive root system. The vegetation grows hydroponically, meaning it uptakes nutrients directly from the water column.

### Constructed Floating Wetlands in Boston

In Boston, The Charles River Conservancy launched the Charles Floating Wetland project to test how CFWs can help control harmful algal blooms, enhance valuable ecological habitat, manage stormwater, enliven parkland, and engage and educate the public on the connection between river ecology, pollution, and water quality.<sup>9</sup> In 2018, a multi-disciplinary team won the 2018 MIT Climate Changed competition for an innovative coastal resiliency strategy called Emerald Tutu. The project, which was funded by the U.S. National Science Foundation in 2020, proposes a network of interconnected floating vegetated mats that the City of Boston could launch in the harbor to attenuate wave energy and slow down storm surges, soak up excess stormwater, improve water quality, and extend the green waterfront.<sup>10</sup> Beyond local municipalities who may need hundreds and thousands of CFWs to reach their urban water quality goals, private utility companies, developers, and commercial port facilities may look to nature-based strategies to comply with new environmental regulations and reduce various

climate related risks. Thus, the demand for CFWs in Boston and nearby areas is likely to increase in coming years.

### A Clean, Water-Dependent Industrial Use

Scaling-up production of CFWs requires large-scale manufacturing and maintenance. Port areas provide the appropriate context and infrastructure to support the development of this new nature-based industry. The supplies that are required to construct the buoyant mats and other forms of floating apparatuses can be delivered to the port area by way of trucks or marine vessels, depending on shipment size. Once a CFW is built it can be launched directly into the water and temporarily stored along the coastal edge until a tug boat can pick it up and deliver it to its final destination. During the winter, the port area provides a convenient location to warehouse the CFWs because machinery like water agitators and bubblers, powered from the shore, can be placed into the water to help break up ice sheets. Additionally, in East Boston, siting a CFWs manufacturing and maintenance facility on the Hess Site has the added benefit of providing space to develop a complimentary native plant production area. Because the Hess Site is tidally flooded, this area along Condor Street provides an ideal environment to propagate a variety of native semi-terrestrial and aquatic plant species that will need to be well-adapted to nutrient-rich brackish water that is typical of many of Boston's urban waterways.



image source: Charles River Conservancy

# PUNCTUAL WATERFRONT ACCESS



Industrial uses often block public waterfront access. High quality waterfront access often takes the form of a long, continuous recreational path that encourages walking and biking along the water. For example, Boston's Harborwalk connects the Seaport, Downtown, the North End, and Charlestown with an unbroken waterfront path.

While waterfront access can still be provided in DPAs, it is easier to do so in a more punctual way rather than in a continuous, linear way so as to not conflict with water-intensive industrial uses. Recreational **paths can run between two industrial uses, leading to a vista point with views of the water.** In The Harborkeepers' Vision Chelsea Creek report, this strategy is used as a way to maintain a working waterfront in a DPA while enhancing waterfront access and the public realm.

## THE OPPORTUNITY FOR WATERFRONT IMPROVEMENT FUNDS



The City of Chelsea, as part of their Municipal Harbor Plan and DPA Master Plan proposal approved by the CZM, established a Waterfront Improvement Fund that requires **contributions in exchange for more flexibility in supporting uses**, which municipalities have had a difficult time defining and enforcing. When a proposed supporting use is neither categorically excluded nor explicitly allowed by the zoning code and state regulations, the owner can provide direct economic support of water-dependent industries through mandatory contributions to the Waterfront Improvement Fund in order to receive a license or permit. The same condition applies when a proposed project exceeds the 25% area limitation for supporting uses.



# COMMUNITY-SERVING USES

DPA regulations allow for 25% of a project area to be commercial or industrial supporting uses to water-dependent industries, such as office or storage space and retail. While these types of uses are not generally thought of as “community-serving uses”, there are creative ways to approach this use category to **make the waterfront more accessible and appealing to the public**. Massachusetts DPAs have successfully integrated breweries, museums, and restaurants as supporting uses. In addition, water-dependent industrial uses such as the manufacturing of artificial wetlands can provide opportunities to engage local residents, particularly youth, in recreational and educational activities at the water’s edge.

Municipalities can also implement policies to require any new industries to hire locally and allocate public funding for workforce development and training programs to make sure local residents can be skilled up for those jobs. A maritime academy or industrial job training center that requires access to the water could be sited in a DPA, providing those programs locally, on site.

image source:  
Landing Studio





# TEMPORAL SEPARATION

Vacant space can be used for temporary uses related to parking or warehousing with special licenses. With owner participation and careful scheduling, these **spaces can double as sites for local events, markets, fairs, festivals, and more.** Community groups can collaborate with private owners to drive community use of the waterfront and provide co-benefits to local businesses, who might be invited to sell goods at events and gain marketing opportunities.





# GRADUAL RESILIENCE STRATEGY

DPA's are, by nature, susceptible to storm surge flooding and/or high tide flooding, but some are more vulnerable than others based on locations and landscape attributes. With sea level rise, flood risk will get worse over time. For example, in the Chelsea Creek DPA, 31% of buildings are currently exposed to the 1% annual chance flood. This number will increase to 62% by 2050 and 75% by 2070.<sup>11</sup>

A June 2021 study by Arcadis for CZM called "Building Resilience in Massachusetts Designated Port Areas" acknowledges that resilience is key to the long-term preservation of these districts. Further, initial vulnerability studies show that different DPAs have different levels of risk and experience sea level rise impacts over time. These initial studies have shown that the site in question is located in a lower-risk area due to local topography that works in favor of neighboring communities; however,

they identified a **phased, gradual approach to coastal resilience that includes new techniques and guidelines for water dependent users**. These include designing for climate mitigation and nature based solutions; protecting, conserving, and restoring natural resources on and off site; increasing permeable surfaces; dry and wet floodproofing; offering floodable landscapes and flood-resilient waterfront infrastructure; and among higher complexity and cost techniques, elevating flood and shoreline protection to Design Flood Elevation. This incremental approach to resiliency includes engaging stakeholders and tenants for implementation. Further recommendations for gradual resiliency can be found in the state report.





# CONCLUSION



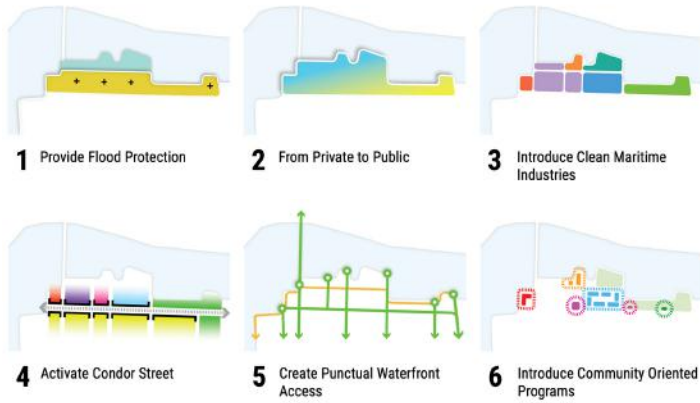


# THE POTENTIAL FOR FORWARD-LOOKING PORT AREAS

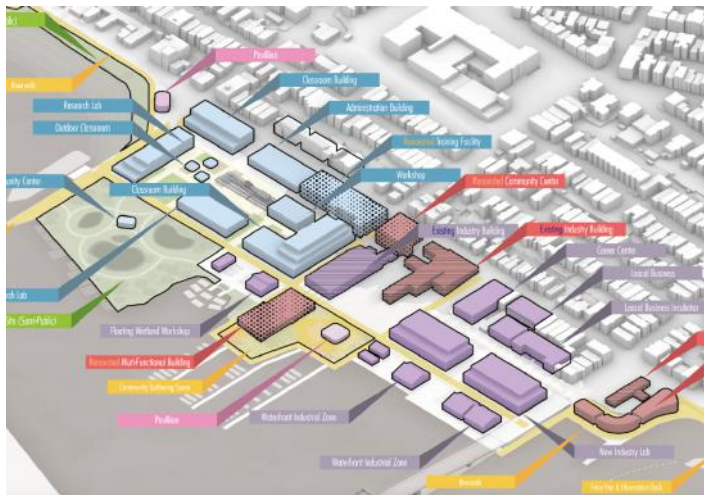
It is possible to break with the history of environmental injustice that comes with industry. Waterfront industry, in particular, presents an opportunity to provide local economic development alongside coastal resilience and community-serving uses. Through comprehensive design strategies, strategic planning, and deep engagement with local residents, a port area can serve not just its region, but its neighborhood.

When it comes to DPAs, municipalities don't have to choose between regional and local interests. A new or amended Municipal Harbor Plan can bring these seemingly disparate interests closer together, codifying **a community vision for clean maritime industry that includes economic and environmental benefits for the people living closest to industrial sites**. Municipal Harbor Plans, upon state approval, can strengthen the municipality's enforcement ability and improve public accountability mechanisms. In East Boston, the City of Boston has committed to undertaking a municipal harbor planning process, which will be shaped by a current planning initiative called PLAN: East Boston.<sup>12</sup> Through these forward-looking plans, the DPA regulations themselves can start to accommodate a broader vision for Massachusetts ports areas.

# EXAMPLE SITE PLAN: CONDOR STREET



Some of the strategies presented as part of this toolkit have been applied to the Chelsea Creek DPA along Condor Street in East Boston in a site plan. This site was identified as an area where there is a need for improvements to facilitate public access to the waterfront and where current private uses are neither DPA-compliant nor serving the community.



See the site plan here:



[eastbostonpracticum.mit.edu/site-plan](http://eastbostonpracticum.mit.edu/site-plan)





# RESOURCES

**Climate Ready East Boston** <https://www.boston.gov/departments/environment/climate-ready-east-boston>

**Plan East Boston Phase 1** <http://www.bostonplans.org/planning/planning-initiatives/plan-east-boston>

**Coastal Resilience Design Guidelines** <http://www.bostonplans.org/getattachment/438a5874-46b5-48e2-b0b0-db4933bb7808>

**East Boston Municipal Harbor Plan** <http://www.bostonplans.org/getattachment/438a5874-46b5-48e2-b0b0-db4933bb7808>

**Chapter 91, The Massachusetts Public Waterfront Act** <https://www.mass.gov/guides/chapter-91-the-massachusetts-public-waterfront-act>

**Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan** <https://www.mass.gov/service-details/massachusetts-integrated-state-hazard-mitigation-and-climate-adaptation-plan>

**SCAPE/Harborkeepers Chelsea Creek Vision Plan** [https://www.scapestudio.com/wp-content/uploads/2021/01/210122\\_VisionChelseaCreek\\_Pamphlet\\_spreads.pdf](https://www.scapestudio.com/wp-content/uploads/2021/01/210122_VisionChelseaCreek_Pamphlet_spreads.pdf)

**Building Resilience in Massachusetts Designated Port Areas Resilience for Water Dependent Industrial Users in the Chelsea Creek and Gloucester Inner Harbor Designated Port Areas** <https://www.mass.gov/files/documents/2022/03/29/building-resilience-in-massachusetts-designated-port-areas.pdf>

**Provincetown Community Development, Chapter 91 Instructions**  
<http://www.provincetown-ma.gov/DocumentCenter/View/241/Chapter-91-License-Instructions?bidId=>

**Salem Municipal Harbor Plan, Harbor Tour**  
[https://harborplan.salem.com/wp-content/uploads/2021/03/2.11.2021\\_Harbor-Tour\\_final.pdf](https://harborplan.salem.com/wp-content/uploads/2021/03/2.11.2021_Harbor-Tour_final.pdf)

**City of Chelsea, Chelsea Creek Municipal Harbor Plan**  
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**Emerald Tutu**  
<https://phyconomy.net/articles/emerald-tutu-nature-based-solution-protect-urbanized-coastlines/>

**Biomatrix Floating Ecosystems**  
<https://www.blurb.co.uk/bookshare/app/index.html?bookId=9615219>

**Building a Floating Wetland Model**  
[https://seagrant.mit.edu/wp-content/uploads/2021/06/MITSeaGrant\\_FloatingWetland\\_Booklet\\_6\\_9\\_2021\\_smallfile.pdf](https://seagrant.mit.edu/wp-content/uploads/2021/06/MITSeaGrant_FloatingWetland_Booklet_6_9_2021_smallfile.pdf)

**Biomatrix Water**  
<https://www.biomatrixwater.com/>

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