HARVARD UNIVERSITY GRADUATE SCHOOL OF DESIGN

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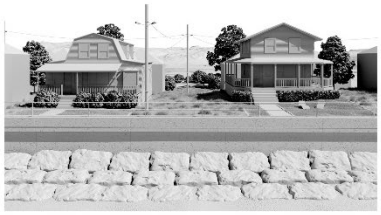
**VIS 2466**
**Place-Based Scenario Planning for the Climate Emergency**
**2024-2025 Spring**
**Department of Landscape Architecture**

*Renew*

Scenario
**0: Renew and Do Nothing**

Scenario
**1: Renew and Repair**



*Sell*

Scenario
**2: Sell as Single Parcel**

*Retreat*

Scenario
**3: Renew Landward Leases**

Scenario
**4: Relocate the Cottages**

Scenario
**5: Restore the Ecosystem**

Kira Clingen/Office for Urbanization, "Six Scenarios for Long Beach," *Long Beach Is…? Long Beach Could Be…?* (Cambridge, MA: Harvard University Graduate School of Design, 2024).

"A scenario is essentially an image of a possible future and a plausible account of a development path towards this future starting from the status quo. That said, the use of scenarios is an eclectic method. Scenarios combine very different types of science and poetry, representational forms and ways of reasoning."- Christian Salewski, *Dutch New Worlds: Scenarios in Physical Planning and Design in the Netherlands*, *1970-2000*

**MEETING TIMES AND LOCATION**
Monday, 15:00-17:45, Gund 521

**CONTACT INFORMATION**
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**WHAT IS PLACE-BASED SCENARIO PLANNING, AND WHY ARE WE INTERESTED IN IT?**
Welcome, climate co-conspirators!

The climate crisis is, in part, a communication crisis. How can we communicate the choices that communities will need to make to proactively adapt to climate change with limited resources? How can we build awareness of how the climate is already changing while designing just adaptation strategies for the near future? How can we visualize climate impacts at a scale and resolution that is accessible to designers, policy makers, and the general public? How might we remake the design disciplines to meet these challenges? This design research seminar will explore these questions through the methodology of place-based scenario planning.

Place-based scenario planning is a form of long-term strategic planning specific to the design disciplines. This method is used to create representations of plausible climate impacts to inform decision-makers in the present. Place-based scenario planning uses local communities as a starting point to understand climate adaptation through infrastructures, buildings, landscapes, and cultural institutions that are easily identified and familiar to people living in a place. Scenario planning is especially useful in regards to climate change, which has many different stakeholders and a high degree of uncertainty.

By exploring the driving forces, certainties, and uncertainties of multiple futures, participants in scenario planning processes can prepare for any and all of them. Instead of relying on a single version of the future, scenario planning develops distinct potential futures and strategies to adapt to each. These strategies can be useful for stakeholders in the climate emergency, including municipal governments, non-profit organizations, institutions, and individuals. These futures are described using compelling narrative and storytelling strategies

This course pushes back on the idea that landscape architects, and designers more generally, must inherit defined sites and issues that respond to briefs pre-written by clients, and instead suggests that designers may develop a more holistic understanding of the places where they are working, in order to adapt to climate change in a way that is just and honors the histories of the places and lived experiences of the peoples where they are working. The climate emergency is a set of compounding crises that require designers to expand their agency, and their understanding, of the places in which we work.

The course is divided into three phases: an (Un)Environmental History Research Dossier, Climate Futures, and an Adaptation Roadmap.

Students will work on specific places in Massachusetts. The scale of these places is intentionally granular. We are interested in digging deep into climate projections and data (and questioning where this information comes from, who it benefits, and how it is disseminated), and understanding how climate change will impact specific communities, neighborhoods, and municipalities. While students will be working on individual places, they will work on four broader thematic areas to facilitate cross-class discussion: Students have the option of working individually or in pairs. Non-design background students are encouraged to partner with design students.

**LEARNING OUTCOMES**

After completing this course, students will be able to:

- Produce measured, scalar climate visualizations
- Understand the linkages between the climate emergency and the design of the built environment
- Understand how policy choices affect climate adaptation
- Synthesize ecological, geological, and projective climate data through diagramming and drawing

**WEEKLY SCHEDULE AND TOPICS**

| Week | Assignment | Class Content | Readings (*Optional) |
|---|---|---|---|
| 1: What is scenario planning and why are we interested in it? | (Un)Environmental History Dossier | Syllabus Overview<br>Lecture: Place-Based Scenario Planning<br><br>Place Assignment<br><br>(Un)Environmental History Dossier Assignment Introduction | *Xiye Bastida, "Calling In," in *All We Can Save: Truth, Courage, and Solutions for the Climate Crisis* eds. Ayana Elizabeth Johnson and Katharine K. Wilkinson (New York: One World, 2020).<br><br>Office for Urbanization, "Cultural Landscapes Dossier," *Compound Vulnerabilities: The Case of Cape Ann* (Cambridge, MA: Harvard University Graduate School of Design, 2022). |
| 2: How are plausible scenarios different than probabilistic projections? | (Un)Environmental History Dossier | Guest Lecture: Heather Hannon and Madeleine Hiller, Lincoln Institute for Scenario Planning<br><br>Reading Discussion | Amitav Ghosh, "A Fog of Numbers," *The Nutmeg's Curse: Parables for a Planet in Crisis* (New York: Bloomsbury, 2019).<br><br>Jeremy Stapleton and the Sonora Institute, "XSP in Practice: Case Studies from Colorado," *Exploratory Scenario Planning* (Cambridge, MA: Lincoln Institute of Land Use Policy, 2020).<br><br>Ekim Tam, "Play the City Game Manual," *Play the City Manual* (Rotterdam: Jap Sam Books, 2017). |
| 3: What are different ways of knowing and understanding the places that we work? | (Un)Environmental History Dossier | Guest Lecture: Ekim Tan, PLAY THE CITY<br><br>Reading Discussion<br><br>In-Class Work Time | Robert Beauregard, "From Place to Site," in *Site Matters*, eds. Andrea Kahn and Carol J. Burns (New York: Routledge, 2021).<br><br>Jane Wolff, "Introduction," *BAY Lexicon* (Montreal: McGill-Queen's University Press, 2021).<br><br>*Dolores Hayden, *A Field Guide to Sprawl* (New York: W.W. Norton and Company, 2004).<br><br>Caitlin DeSilvey, Simon Naylor, and Colin Sackett, eds., "Introduction," *Anticipatory History* (Devon, UK: Uniformbooks, 2011). |
| 4: How have designers used | (Un)Environmental History Dossier | (Un)Environmental History Dossier | Note: These readings are organized by scale. |

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| scenario planning in the past? | | Presentations<br><br>Assignment II: Climate Futures Introduction | Brett Milligan, “Franks Tract Futures, Sacramento: San Joaquin Delta, California,” *Landscape Architecture for Sea Level Rise* edited by Galen D. Newman and Zixu Qiao (New York: Routledge, 2022).<br><br>Richard Weller, “Planning by Design Landscape Architectural Scenarios for a Rapidly Growing City,” *Journal of Landscape Architecture* 3, no. 2 (2008): 18-29.<br><br>Alan M. Berger, Jonah Susskind and Richard J. Zeckhauser, “Theorizing the resilience district: Design-based decision making for coastal climate change adaptation,” *Journal of Landscape Architecture* 15, no. 1 (2020): 6-17.<br><br>*Coastal Protection and Restoration Authority, *Louisiana’s Comprehensive Master Plan for a Sustainable Coast*, (Baton Rouge: Louisiana Coastal Protection and Restoration Authority, 2023).<br><br>*Christian Salewski, “The Image of the Future in Dutch Physical Planning and Design,” *Dutch New Worlds* (Rotterdam: 010 Publishers, 2012): 56-75. |
| 5: What are the design strategies or techniques that we might use to design for coastal climate change adaptation? | Climate Futures<br><br>Preferred Option Studio Trips Week | Guest Lecture: Johanna Hoffman, Design for Adaptation<br><br>In-Class Adaptation Design Workshop | Office for Urbanization, “Resilience and Adaptation Strategies,” *Compound Vulnerabilities: The Case of Cape Ann* (Cambridge, MA: Harvard University Graduate School of Design, 2022).<br><br>*Galen D. Newman and Zixu Qiao, “Innovative Solutions for Sea Level Rise,” in *Landscape Architecture for Sea Level Rise* edited by Galen D. Newman and Zixu Qiao (New York: Routledge, 2022).<br><br>*Willard Bascom and Kim McCoy, “Genesis of Land, Water, and Waves,” *Waves and Beaches: The Powerful Dynamics of Sea and Coast* (Ventura, CA: Patagonia Books, 2020), 20-49. |
| 6: What does a place-based scenario planning exercise look like in | Climate Futures | Long Beach Is…? Long Beach Could Be…? Place-Based Scenario Planning Workshop | Kira Clingen/Office for Urbanization, Long Beach Is…? Long Beach Could Be…? Place-Based Scenarios for a Cultural Landscape in a Changing Climate (Cambridge, MA: Harvard University Graduate School of Design, 2024). |

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| practice? | | | *Kathleen F. Lambert, Marissa F. McBridge, Marissa Weiss, Jonathan R. Thompson, Kathleen A. Theoharides, and Patrick Field, *Voices from the Land: Listening to New Englanders' Views of the Future* (Petersham, MA: Harvard Forest, 2018). |
| 7: What representation styles can we use to describe place? | Climate Futures | Guest Lecture: Lizzie Stark on LARPING<br><br>Lecture: Climate Futures<br><br>Desk Crits | Stephanie Carlise and Nicholas Pevzner, "The Performative Ground: Rediscovering the Deep Section," *Scenario Journal* 2 (2012).<br><br>Adam Fenech, Alex Chen, Andrew Clark, and Nick Hedley, "Building an Adaptation Tool for Visualizing the Coastal Impacts of Climate Change on Prince Edward Island, Canada," in *Climate Change Adaptation in North America*, edited by Walter Leal Filho and Jesse M. Keenan (New York: Routledge, 2017): 225-240.<br><br>Nadia Amoroso, Nans Voron, and Gena Wirth, "Visualizing Climate Action: A Conversation with SCAPE Studio," in *Representing Landscapes: Visualizing Climate Action* (New York: Routledge, 2024), 5–11.<br><br>Alison Shaw et al., "Making Local Futures Tangible—Synthesizing, Downscaling, and Visualizing Climate Change Scenarios for Participatory Capacity Building," *Global Environmental Change* 19 (2009): 447–63. |
| 8 | | SPRING BREAK | |
| 9: How do designers represent the places that people are attached to? | Climate Futures | Guest Lecture: Ryan Christopher Jones, Photojournalist<br><br>Lecture: Representing Climate<br><br>Desk Crits | Lindsey Naylor, Virginia Fall, and Andrew Fox, "The power of place in disaster recovery: Heritage-based practice in the post-Matthew landscape of Princeville, North Carolina," *Parks Stewardship Forum* 36, iss. 1 (2020).<br><br>Isabella Frontado and Unicia Young, *All Through My City* (Boston, MA: Boston Planning and Development Agency, 2024). |
| 10: What does it mean to stick with the trouble in the climate emergency? | Climate Futures | Climate Futures Scenarios Round Robin Review<br><br>Guest Critics: Alison Maurer (City of | *Mary Anne Hitt, "Beyond Coal," in *All We Can Save: Truth, Courage, and Solutions for the Climate Crisis* eds. Ayana Elizabeth Johnson and Katharine K. Wilkinson (New York: One World, 2020).<br><br>Ayana Elizabeth Johnson and Paola |

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| | | Somerville), Joseph Kennedy (GSD), Sarah Page (GSD), Christopher Ryan Jones (Harvard) | Antonelli, “Design for a Changing World,” in *What if We Get It Right?: Visions of Climate Futures* (New York: One World, 2024), 104-118. |
| 11: How might we connect changes in specific places to municipal, regional, watershed, or national-scale changes?<br><br>Adaptation Roadmap | | Guest Lecture: Mike T. Wilson, RAND<br><br>Lecture: Adaptation Roadmap<br><br>Assignment III Introduction | Anna L. Tsing, Jennifer Deger, Alder Keleman Saxena and Feifei Zhou, Feral Atlas: The More Than Human Anthropocene (Palo Alto, CA: Stanford University, 2021), www.feralatlas.org/<br><br>FEMA*, Strategic Foresight Initiative 2050* (Washington, D.C.: FEMA, 2024).<br><br>Pierre Belanger, “Redefining Infrastructure,” *Landscape as Infrastructure* (New York: Routledge, 2017), 116-156.<br><br>Regional Plan Association, “The Fourth Regional Plan,” *Four Corridors: Design Initiatives for RPA’s Fourth Regional Plan* (Berlin: Hatje Cantz, 2019). |
| 12: What different perspectives, disciplines, and people are needed to make equitable climate adaptation choices? | Adaptation Roadmap | Guest Lecture: Cat McCandless, City of Boston | Rosetta Elkin, "Nijinomatsubara Forest," in *Landscapes of Retreat* (Berlin: Keler Verlag, 2023). landscapesofretreat.com/Nijinomatsubara-Forest<br><br>A.R. Siders and Jesse Keenan, “Variables Shaping Coastal Adaptation Decisions to Armor, Nourish, and Retreat in North Carolina,” *Ocean and Coastal Management* 183 (2020): 105023. |
| 13: How might we change the design disciplines to reflect the changes we’d like to see in the world? | | Adaptation Roadmap Review | Billy Fleming, “Design and the Green New Deal,” *Places Journal* (2018).<br><br>Liz Camuti, “Another Gulf if Possible,” *Journal of Architectural Education* 78, no. 2 (2024). |

**ASSESSMENTS**

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| (Un)Environmental History Research Dossier | 25% |
| Climate Futures Scenarios | 40% |
| Adaptation Roadmap | 25% |
| Participation | 10% |

Participation can become subjective when it is not clearly defined. In this course, credit for participation will be awarded based on attendance. Coursework is focused on three cumulative assignments, in addition to a series of assigned readings.

All assignments will be submitted at 80%. Students are expected to refine each assignment based on the verbal and written feedback provided upon initial submission, and turn in their final work at the end of the semester in a compiled Atlas. Iteration, reflection, and incremental improvements are our focus in this seminar.

## Assignment I: (Un)Environmental Histories Dossier

"All sites exist first as places. The design disciplines then distill a new 'professional narrative' involving zoning, solar orientation, and material specifications that replace 'shared histories, collective remembrances, and personal experiences.'" - Robert Beauregard, "From Place to Site: Negotiating Narrative Complexity," in *Site Matters: Strategies for Uncertainty through Planning and Design*, eds. Andrea Kahn and Carol J. Burns (New York: Routledge, 2021).

The (Un)Environmental Histories Dossier is a visual compendium of archival maps, photos, timelines, and any other materials that may frame your understanding of: how the place has changed, how it is changing, and how it will continue to change. This assignment will frame climate change within a longer trajectory of change, and express how climate change will exacerbate existing inequalities in the built environment.

This research document is open-ended, and should be a depository for additional visual research throughout the semester. You may structure the dossier in time periods, forms of media (maps, photographs, etc), or any other organizational format that you find helpful.

Start messy. Collect materials that you find interesting to describe the place. Then, curate and organize them. What narrative threads emerge? What narrative threads are missing? How do your own personal biases inform the materials you are drawn to?

*Forms of Inquiry*

- Timeline - what are the key events or time periods that have shaped this place?
- Maps - archival maps or your own creations using GIS data, think about land ownership, watershed boundaries, and transportation networks
- Stakeholder list or diagram - who has an interest in this place?
    - Civil Society
    - Government (federal, state, regional, municipal)

*Guiding Questions*

- Archival Material and Data - What maps are available? Who made the maps? What photos are available? Who took the photos? What is documented frequently? What is not documented? Which views are privileged? What data is available? Why?
- Archival Documentation - Are there news stories about the place? Books?
- Geology - How deep is the bedrock? What are the subsurface soils? Has the site been filled? Cut?
- Indigenous Knowledge - Who are the traditional owners of this place? What forms of indigenous stewardship were or are used here?
- Economy - What industries exist here? What industries have existed here?
- Civil Society - What nonprofit organizations work here? How many schools are there? What businesses operate here?
- Government - What is the governance structure here? Who or what institutions are in power?
- Environmental History - How has the land here been used? What marks are left on the land?
- Ecology - Which plant and animal species live here? What are the dominant species? What is the base of the food chain? Which ecological relationships are intact? Which are damaged or disturbed? Are there places that used to be marshland? Places that used to be forested? Why has the land cover changed?
- Citizen Science - Are there any observations or reports on iNaturalist, eBird, or any other similar sites?
- Built Environment - What is the canopy cover? What is the ratio of impervious to pervious surfaces? How many structures are in this place? What materials are used to construct buildings? Roads?
- Infrastructure - How many schools are here? Are there septic or sewer systems? Where does electricity come from? How is power generated? What is the condition of the roads? Are the roads low-lying?
- Demographics - Who lives here? What is the median income? What is the average age? Is there an environmental justice population in this place? How is it defined?

- Sense of Place - How do people living here describe this place? How do they identify the boundaries of this place?
- Region - What watershed is this place part of? What school district? What governing bodies?
- Climate Projections - Which species may live here in the future? Is there sea level rise data available? Is there data on hurricane surge? Future temperatures? Is there a Municipal Vulnerability Plan or Hazard Mitigation Plan that describes future climate impacts here?

*Sources*
- Harvard Pusey Map Library
- Municipal websites (search for "Town Name" Hazard Mitigation Plan and "Town Name" Municipal Vulnerability Plan)
- Commonwealth of Massachusetts, "Mass Mapper," maps.massgis.digital.mass.gov/MassMapper/MassMapper.html
- FEMA, "National Flood Hazard Layer," www.fema.gov/flood-maps/national-flood-hazard-layer
- Library of Congress, www.loc.gov/
- United States Census Bureau, "Census Data," data.census.gov/

Each reference should include a caption that places the document or found material into a broader narrative about the place. All materials should be cited using Chicago Manual of Style 17th edition.

*Format*
Please use the inDesign template posted online.

*References*
Office for Urbanization, *Compound Vulnerabilities: Cultural Landscapes Dossier* (Cambridge, MA: Harvard University Graduate School of Design, 2020), capeann.officeforurbanization.org/media/cape-ann-dossier.pdf

Anna Tsing, Jennifer Deger, Alder Keleman Saxena, and Feifei Zhou, *Feral Atlas* (Palo Alto: Stanford University, 2021), feralatlas.org

Jane Wolff, *BAY Lexicon* (Montreal: Queen's University Press, 2021).

Anthony Acciavatti, *Ganges Water Machine: Designing New India's Ancient River* (New York: Applied Design and Research, 2015).

William Least-Heat Moon, *PrairyErth* (New York: Harper Collins, 1991).

## Assignment II: Climate Futures Scenarios

"Open-ended, flexible, multiple and comprehensive, Wolff's *Delta Primer* invites us, in effect, to a charrette. She does not, however, determine the outcome, nor does she lock anyone into rigid categories or lines of action. By avoiding the one hundred percent solution, moreover, she **invites as many different types of people, values, and outlooks as possible into the game**. From this perspective, Delta Primer is scrupulously non-partisan within its environmentalists' orientation. Politics, Artistotle tells us - even environmental politics - is the art of the possible, and Jane Wolff knows that **while no solution is perfect, more than one solution can be possible**."
-Kevin Starr, Introduction to Jane Wolff's *Delta Primer: A Field Guide to the California Delta* (San Francisco: William Stout Publishers, 2003).

Place-Based scenario planning is a methodology to prepare for uncertain climate futures. By exploring the driving forces, certainties, and uncertainties of multiple futures, participants in scenario planning processes can prepare for any and all of them. Instead of relying on a single version of the future, scenario planning develops distinct potential futures and strategies to adapt to each. Visualization further communicates the complexity and design strategies that may be used to realize the scenario, or alternative future.

The method that we will follow to establish these scenarios is adapted from Exploratory Scenario Planning to explore specific places and their unique quirks and oddities. The broad focal question that we are looking to answer is: *How will climate change plausibly affect [this place], what should we do, and when?* We know that the future is uncertain, and climate impacts are exacerbating that uncertainty (for example, hundred year storms are now expected to strike on much more regular intervals, but we do not know exactly when those storms will arrive). To answer this question, we are interested in thinking about what events might disrupt the status quo in the future, and how we might prepare to address those uncertain events. We are *not* looking to establish a normative vision of the future and create a roadmap to arrive at a perfect solution (these problems are too interconnected and complex to truly solve!)

This assignment follows a series of steps outlined below. We'll begin by making a list of driving factors that distill the information collected in the *(Un)Environmental Histories Dossier*. Then, we'll start thinking about what we know about each of those drivers, to establish what we are certain will happen and in the future, and what remains uncertain. We will choose two of those uncertainties to explore in greater depth through a series of four climate futures scenarios, which we will represent with a rendering, animation, physical model, or other representational tool. One future is strongly recommended to be a disaster scenario, such as a hurricane, typhoon, nor'easter, wildfire, or drought. This "do nothing" scenario can be used to describe the status quo. The other three scenarios will offer designed responses to the scenario, such as building resilience and adaptation measures that are calibrated to the place and its stakeholders.

*Methodology*
Step 1. Identify and Rank Driving Forces.
Make a simple, bullet-pointed list of the key driving forces of change, uncertainty, and disruption that already affect or may affect your place. Driving forces are external to your place (for example, even if your place emits emissions, it will still have no control over climate change). When you have identified these driving forces, re-order the bullet points to rank them based on the level of uncertainty and level of importance to the question: *How will climate change plausibly affect [this place], what should we do, and when?*

Continue to build on the drivers you identified through the guiding questions in the (Un)Environmental Histories Dossier, and explore any drivers you might not have looked into, including:

- Social Drivers
    - Demographics
    - Lifestyles
    - Activity preferences
    - Religion
    - Education

    - Age distribution of the population
    - Migration
    - Societal understanding of and debate about climate change
- Technological drivers
    - Renewable energy and energy efficient technologies
    - Water-efficient technologies
    - Autonomous vehicles
    - Artificial intelligence
- Economic drivers
    - Environmental and green jobs programs
    - Housing availability and affordability
    - Types of businesses
    - Climate-related competition
    - Public-private partnerships
    - Availability and cost of disaster insurance
- Ecological drivers
    - Biodiversity
    - Sea level rise
    - Rising temperatures
    - Changes in precipitation (including drought)
    - Extreme weather
- Political and Legal drivers
    - International climate change policy
    - Federal climate change policy
    - State climate change policy
    - Municipal climate change policy
    - Water policy

Note: as designers, we are inheriting scientific and probabilistic information about the future. Sea level rise and storm surge projections should be used with a citation. It is not our responsibility to produce this information, only to cite it.

Step 2. Define Critical Certainties.
Critical certainties are the drivers that are inevitable and known in your place. These are the drivers that you ranked with a low level of uncertainty and high level of importance to the focal question. Make a simple list of statements from your bullet points to describe these critical certainties. These certainties will be used in each scenario narrative. There is no set number of critical certainties that apply to your place. As a starting point, try to find ten certainties, and add or subtract depending on the place.

Step 3. Define Critical Dialectics.
Critical dialectics are unknowns that might lead to divergent futures. These might be events or actions that the community has no control over (a major storm, a global financial crisis), or situations that stakeholders in place could affect through local action like advocacy, policy making, design, or funding changes. These uncertainties can be arranged in an axis that represents the extremes of these certainties. There is no set number of critical uncertainties that apply to your place. As a starting point, try to find five uncertainties, and add or subtract depending on the place.

Step 4. Develop Scenarios.
Cross axes of the most important Uncertainties based on the narrative thread you uncovered in your drivers, as informed by your *(Un)Environmental Histories Dossier*. Crossing two axes will create a scenario matrix of four alternative futures to test in place. Develop four descriptive, memorable, and distinct visions for the future, known as scenario narratives. Give each scenario a memorable title and short description. These narratives are text-based, and will be used to develop robust design strategies.

It is recommended that one scenario is a “do nothing” scenario that explores the effects of a natural disaster, such as a hurricane, drought, or wildfire. This scenario will help to elucidate the current status quo.

Step 5. Visualize Scenarios.
Design an alternative future. Scenario descriptions are short, allowing different stakeholders to discuss them. Visualization is a powerful tool to show the physical implications of these scenarios on the ground in place. Using a single viewpoint, render each scenario. Using the same viewpoint and graphic style allows the design strategy and outcome for each scenario to be compared easily. These scenarios are meant to be exploratory, meaning that all scenarios are explored with the same amount of time and commitment to craft, even unlikely or extreme futures.

Think about the design strategies that might bring you to each scenario. Examples from the Office for Urbanization’s *Adaptation Strategies and Precedents* dossier include:

- Communication
    - American Community Survey
    - Coastal Management Plans
    - Business Engagement
    - Design Guidelines
    - Early Warning Systems
    - Education/Training
    - Flood and Hazard Disclosure Information
    - Flood Risk Information
    - Hazard Mitigation Plans
    - Local Flood Survivor Organizations
    - Local Plans
    - Long-term/Visioning Plans
    - Long-Range Transportation Plans
    - Managed Retreat/ Relocation Specific Plans
    - Post-Disaster Recovery and Redevelopment Plans
    - Public Demonstrations and Protests
    - Public Service Announcements
    - Regional Policy Plans
    - Task Force on Climate-Related Financial Disclosures (TCFD)
    - Wetlands Migration/Ecosystem-Specific Plans
- Resistance
    - Artificial Reefs
    - Beach Nourishment
    - Breakwaters
    - Bulkheads
    - Coastal Bank
    - Constructed Dunes
    - Dams
    - Dikes
    - Floodgates/Barriers
    - Groins/Jetties
    - Levees
    - Living Breakwaters
    - Replumbing
    - Revetments
    - Seawalls
    - Site layout and grading
    - Temporary Flood Barriers
    - Terps
- Accommodation
    - Blue Streets
    - Breakaway Walls

    - Constructed Wetlands
    - Desalinization
    - Detention Areas
    - Drainage Maintenance
    - Flood/Garage Vents
    - Negative Planning
    - Retention Areas
    - Underground Cisterns
    - Wetland Enhancement
- Avoidance
    - Abandon Lowest Floor
    - Acquisition/Buyout
    - Asset Realignment
    - Basement Infill
    - Buffers/Setbacks
    - Building Elevation
    - Clustering
    - Demolition
    - Density Bonuses
    - Elevate Building Utilities
    - Floodproof Building Utilities
    - Flotation
    - Freeboard
    - Infill
    - Land Swap
    - Low Impact Development
    - Overlay Districts
    - Parcel Fill
    - Protected Areas/Open Space
    - Relocation
    - Rolling Easements
    - Targeted Public Infrastructure
    - Transfer of Development Rights (TDR)s

- Capacity Building
    - Academic Partnerships
    - Chief Resilience Officer
    - Community Buy-In
    - Corporate Engagement
    - Green Bonds/Climate Bonds
    - Green New Deal
    - Hazard Mitigation Grant Program
    - Infrastructure Investment and Jobs Act
    - Land and Water Conservation Fund
    - Limit Spending
    - Municipal Services Fee
    - Municipal Vulnerability Preparedness Act Grant
    - National Coastal Resilience Fund
    - National Flood Insurance Program
    - National Sea Grant Program
    - Philanthropy/Foundations
    - Political Leadership
    - Professional Associations
    - Public-Private Leasing Arrangements
    - Risk Inundation Tax
    - Sea Level Purchasing Option (SLPOs)

- Service Tax Funds
- Shoreline Adaptation Land Trusts (SALTs)
- Special Taxing Districts
- State Grant Programs
- Technical Assistance
- Town Meeting

*Guiding Questions*

- Timeline - When are your scenarios applicable? Scenario planning is generally effective at a medium-scale time horizon (10-25 years in the future). If you are choosing to work in the short-term or long-term, or staying within the confines of the medium-term how are you justifying the horizon you are interested in? Think about cultural references you've stumbled upon, significant dates or anniversaries in the place that you are working, and other known events in the future as you decide when to situate your scenarios.
- Just Transition - How do these scenarios build economic and political power to shift from an extractive economy to a regenerative economy?
- What Keeps People Up at Night - What questions around climate keep the people living in this place up at night? Sunny day flooding? Droughts? Jobs?
- Places to Systems - What issues emerge in your place? How are they interconnected to larger systems? Do these systems respond to the unique challenges, histories, and people in your place?
- Representation - Is there a specific view or vantage point that has been painted, photographed, or portrayed in place? Does representation in section to convey what's happening underground add a critical dimension to your scenarios? Is there a specific style of representation that evokes the place?
- Annotation - What is the critical information to annotate on your visualizations? Amount of sea level rise? Storm surge? Number of people in buildings?
- Design Strategies - What adaptation and resilience design solutions are appropriate or might be included in your scenarios?

*Format*

Please use the inDesign template posted on Canvas.

*References*

Brett Milligan, Franks Tract Futures (Davis, CA: University of California Davis, 2020), www.franks-tract-futures-ucdavis.hub.arcgis.com/

Jane Wolff, *Delta Primer: A Field Guide to the California Delta* (San Francisco: William Stout Publishers, 2003).

Climate Justice Alliance, "Just Transition: A Framework for Change," *Climate Justice Alliance*, climatejusticealliance.org/just-transition.

Jeremy Stapleton and the Sonoran Institute, *Exploratory Scenario Planning (XSP): Navigating an Uncertain Future* (Cambridge, MA: Lincoln Institute of Land Use Policy).

Office for Urbanization, *Compound Vulnerabilities: Adaptation Strategies Dossier* (Cambridge, MA: Harvard University Graduate School of Design, 2022), capeann.officeforurbanization.org/media/adaptation-strategies-dossier.pdf

Nardia Haigh, *Scenario Planning for Climate Change* (New York: Routledge, 2019).

## Assignment III: Adaptation Roadmap

"From a social investment standpoint, significant sums of money have been, and continue to be, spent on reinforcing unstable places not meant for development. Returning after wildfire. Rebuilding in flood zones. The urge to outmatch nature is age-old. We scoff at the fabled frog that boiled to death in a pot of slowly warming water, yet we refuse to confront the reality of the sea as it pushes deeper into our cities." - Rosanna Xia, *California Against the Sea: Visions for a Vanishing Coastline* (Berkeley: Heyday Books, 2023).

An Adaptation Roadmap describes the design and policy requirements to achieve a preferred scenario, or vision of the future. This Roadmap is not a comprehensive plan. Instead, the roadmap addresses the most critical design strategies and how they may be implemented on site. Physical changes to the built environment require capacity building, community engagement, and often policy change to enact. Climate resilience and adaptation measures are especially difficult to implement because they are often novel design strategies that have not been tested in other places. This creates challenges for communities that are early adopters of design strategies, and design firms, who must navigate novel permitting processes.

This assignment will address the second part of the focal question: How will climate change plausibly affect [this place], what should we do, **and when?**

*Methodology*

Step 1. Choose a Scenario
Which of the four scenarios that you explored in Climate Futures is most interesting to carry forward? Does this scenario represent the most radical future? Sweeping change?

Step 2. Identify Strategies
Which physical strategies did you visualize in your Climate Future? Are there other strategies that are required that are beyond the perspective that you looked at? Which physical design strategies make sense for this place? Revetment, seawall, fire barrier? Does this place already have climate resilient or adaptive infrastructure? Which strategies apply to all scenarios? Could some strategies leading to preferred futures also lead to do-nothing, or worst-case scenarios?

Step 3. Curate Precedents
Include five design projects that are relevant to your place. Three projects must be built, two can be speculative or proposed projects. For each project, describe the:

- Cost of the project
- Timeline - how long did the project take to build from concept to implementation?
- Secondary achievements - did the project speed up permitting timelines for similar projects? Establish a Resiliency Department?
- Team - what disciplines are represented in the project process? How many team members worked on the project?

Step 4. Identify Stakeholders
Build on your initial list of stakeholders in the (Un)Environmental Histories Dossier. Beyond the design team, who would be required to implement the strategies you are proposing in your scenario? Local government? Federal agencies? State agencies?

Step 5. Assign a Timeline
Create a timeline or roadmap diagram that clearly identifies and lays out when each physical design strategy might be implemented. Working backwards from implementation, think about the time to permit the project, build community support, and the time to monitor and assess its performance.

Step 6. Identify Critical Decision Making Points
What are the critical decision making moments? These are moments to shift from Plan A to Plan B. If one potential strategy is to build a 12" seawall, and there will be 41" of sea level rise by 2050, the critical decision making moment likely passed in 2000.

*Deliverables*

- Five precedent projects with an image of the project, the design firm, date completed, short description, costs, and location
- One timeline drawing or diagram that sequences the Adaptation Roadmap and identifies critical points
- List of stakeholders

*Format*

Please use the inDesign template posted online.

*References*

Coastal Protection and Restoration Authority, *Louisiana's Comprehensive Master Plan for a Sustainable Coast* (Baton Rouge: Louisiana Protection and Restoration Authority, 2023).

City of Boston, *Climate Ready Boston* (Boston, MA: City of Boston, 2016).

Rebuild by Design, *Policy by Design: Promoting Resilience in Policy and Practice* (New York: Rebuild by Design, 2014).

Town of Hull and Weston & Sampson, *Hull Climate Adaptation Roadmap*, https://storymaps.arcgis.com/stories/1f3f4a3ed4674e808310e00a9f20008f accessed January 24, 2025.

Each reference should include a caption that places the document or found material into a broader narrative about the place. All materials should be cited using Chicago Manual of Style 17th edition.

All assignments should be considered in-progress and iterative throughout the semester, and students are expected to revisit and rework each assignment based on feedback from the instructor and external critics. The class will prioritize in-class work time to collaborate with classmates. Critique will be open and constructive, with participation from the entire class.

All assignments will be completed using pre-formatted inDesign templates, and will be submitted as PDF and packaged inDesign folders.

**REQUIRED SKILLS AND PREREQUISITES**
This course is available to all disciplines at the Graduate School of Design and beyond. Design students are expected to be proficient in ArcGIS, Rhino, and the Adobe Suite. Non design background students will be paired with design students who may not have the prerequisite digital skills.

**GUEST LECTURES**
This seminar will include presentations from guest lecturers throughout the semester. Students are expected to engage with each lecture, and complete required readings before the class session.

- Heather Hannon, Associate Director of Planning Practice and Scenario Planning, Lincoln Institute of Land Policy, Cambridge, USA
- Johanna Hoffman, Founder, Adaptive Urban Futures, San Francisco, USA
- Ekim Tam, Director, Play the City, Rotterdam, Netherlands
- Ryan Christopher Jones, Photojournalist, Cambridge, USA
- Michael T. Wilson, Policy Researcher, RAND Corporation, Boston, USA
- Catherine McCandless, City of Boston, Boston, USA

**REQUIRED MATERIALS AND EXPENSES**
Students will use:

- Laptop, charger and mouse
- ArcGIS Pro, Rhino, AutoCAD, Adobe Creative Cloud, Adobe Illustrator, Adobe Photoshop, and Adobe inDesign

The estimated cost of materials and plotting is $100. To minimize plotting costs, all work will be completed on tabloid papers, and students may present digitally during reviews.