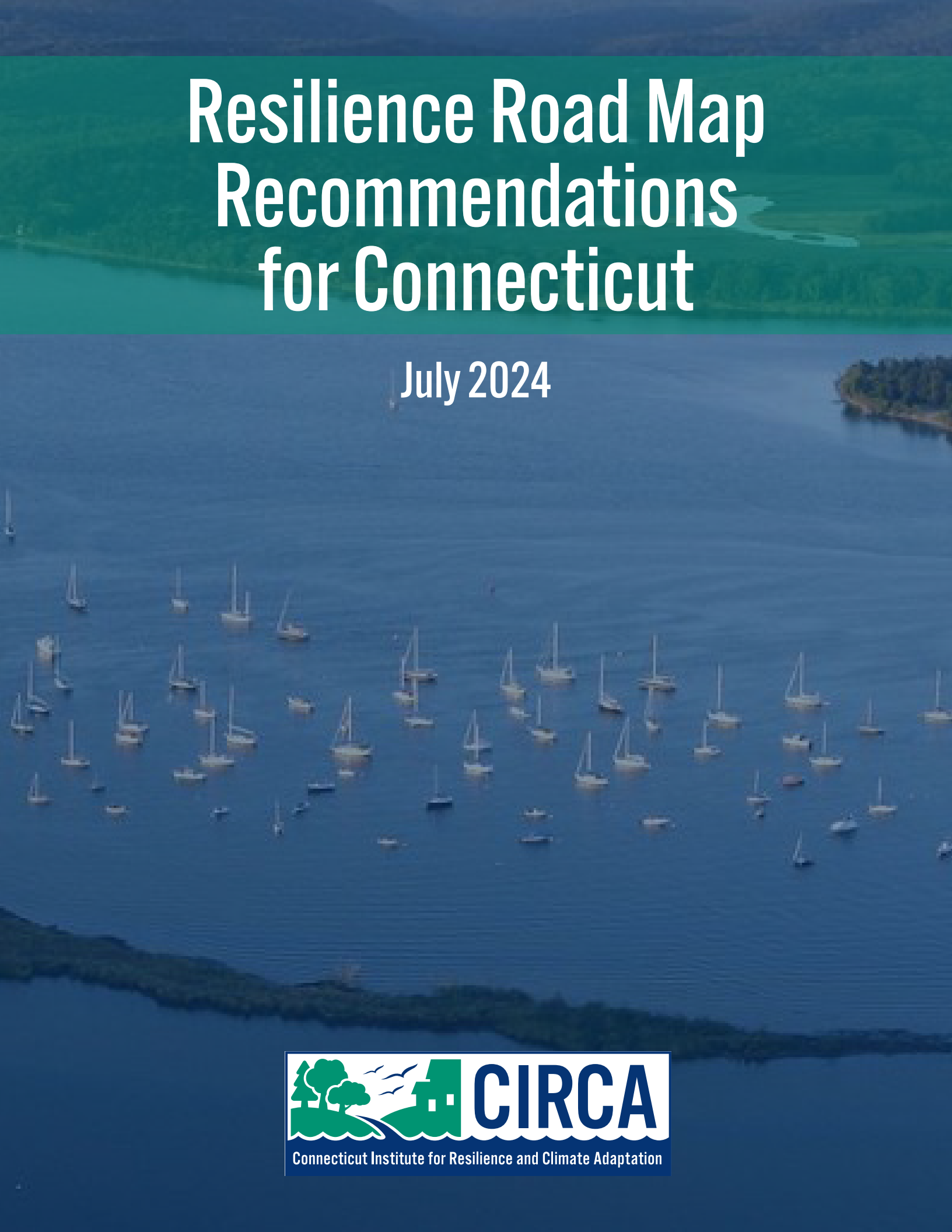
Resilience Road Map Recommendations for Connecticut

July 2024



CIRCA

Connecticut Institute for Resilience and Climate Adaptation

5.0 Lessons Learned and Road Map Recommendations for Connecticut:

The Resilient Connecticut project was developed through a partnership between CIRCA and the State Agencies Fostering Resilience (SAFR) council with support from CT Department of Housing, following the impacts of major coastal flood events in 2011-2012, including Superstorm Sandy and Tropical Storm Irene. The goal of the program was to develop and support climate adaptation planning by increasing coordination across jurisdictions (local, municipal, regional, and statewide) through a climate science informed approach to addressing vulnerabilities at scales that implied shared risks as well as shared solutions. The project also sought to establish a framework for investment and project implementation that integrated risk reduction strategies with economic development framed around transit-oriented development, "resilient corridors", and critical infrastructure improvements.

Each community in Connecticut is unique with its own social relationships, land uses, socio-economic, ecological, and environmental factors that present different vulnerabilities and frame potential climate adaptation pathways going forward.

Resilient Connecticut engaged many different communities in Fairfield and New Haven Counties in a planning process to understand vulnerabilities, develop adaptation options, and identify actions to reduce climate risks that are unique to each community (see sections 3 and 4 of this report). However, several common themes and challenges emerged in the planning process that were shared across the region. In this section we document those common challenges, share lessons learned, and propose recommendations that can serve as a resilience "road map" for the region and Connecticut going forward.

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5.1 Common Themes, Challenges, and Lessons Learned:

1. ***Enhanced Planning through Local, Regional, and State Collaboration:*** The Resilient Connecticut Framework was successful at focusing attention on locations with regional assets and infrastructure and urban centers (Downtown Danbury, Fair Haven, Ansonia, South Norwalk) that had been previously neglected in other resilience planning efforts. These areas represented unmet needs in previous planning which face combinations of flooding and heat risks compounded by social vulnerabilities. The Framework concepts (Zones of Shared Risk, Resilient Nodes, Resilient Corridors) were useful spatial planning tools for revealing locations of importance across local, regional, and state domains, and delineating project areas that can be the focus for coordinated action in the coming decade. This represented a change from previous coastal resilience planning in CT which, it could be argued, largely focused on clusters of high value at-risk residential properties in low lying coastal flood plains through more traditional risk identification and cost/benefit approaches; or which prioritized specific adaptation techniques. The partnerships established between municipal, regional (COGs), and state entities can be helpful in developing consistent vulnerability assessment approaches and resiliency strategies to ensure issues receive attention that may not otherwise due to lack of capacity. Favoring one or the other (regional vs. local planning) limits potential outcomes, as the different scales of planning must work together and are needed to support each other.

2. ***Economic Development and Floodplain Management Conflicts:*** Current Federal policies for floodplain management along with local fiscal and economic development incentives remain potent barriers to coherently managing climate risks. In Connecticut's existing "home-rule" approach to land use planning and taxation, municipalities are incentivized to pursue local revenue generating opportunities through economic development and redevelopment. Despite major flooding events such as Superstorm Sandy, coastal areas remain a high value target for commercial and residential development in Fairfield and New Haven Counties, particularly when these areas are close to regional transit such as Metro North. In many cases these areas overlap with FEMA delineated areas of risk commonly known as "floodplains," which can result in intensification of development in areas with high current and future flood risks. In many cases, developers and entities that propose projects in risky areas, sell off these assets once they've been approved and built, transferring the long-term risk to the new property owners, residents, and ultimately, municipalities and the public. At the same time, FEMA floodplains, as delineated on current Flood Insurance Rate Maps (FIRMS), are coarse in their characterization of the actual physical risks. Although FEMA has begun the process of reforming its flood insurance rating methodology with the recent risk rating 2.0 update, the FEMA FIRM remains the most broadly applied and relied upon delineation of flood risks across federal, state, and local regulatory and funding programs. In areas with complex geomorphology such as CT, the mostly static, and coarse delineation of flood risks represented on FEMA FIRMs does not differentiate between areas of future and/or chronic flood risk, which should be avoided for development, and areas where existing and predicted risks should be effectively managed.

This is particularly critical in the assessment of brownfields and underutilized post-industrial sites in coastal areas of Connecticut. No consistent or broadly applicable decision model currently exists for managing tradeoffs between future flood risk, brownfield remediation, and resilient economic development and redevelopment, particularly in EJ communities. In the absence of wholesale retreat from coastal floodplains or relocation of major regional transportation corridors such as the Northeast Rail Corridor and Interstate 95, local planning and zoning decisions are likely to be biased towards short-term economic incentives without an alternative model for creating value.

3. ***Agency Engagement and Coordination:*** The collaboration between state agencies, as envisioned in the original NDRC proposal, did not reach its full potential. The State Agencies Fostering Resilience (SAFR) Council was instrumental in developing the proposal that became Resilient Connecticut. The role of SAFR was to provide a mechanism for interagency collaboration, coordination, and decision-making regarding resilience policies and projects. Early in the project there was a new governor elected, a change in administration, and a new scope created for the Governor's Council on Climate Change (GC3) focusing on climate adaptation. Governor Lamont's Executive Order 3 re-established SAFR as a subcommittee of the GC3 and charged the GC3 with establishing a more comprehensive resilience plan for the state. The committees supporting the GC3 covered a range of sectors and necessitated agency participation in one or more working groups. As a result, the SAFR group's previously anticipated role as a major coordinator for Resilient Connecticut largely took a backseat to other higher profile efforts. The SAFR working group has continued to be a regular forum for informal coordination and discussion of topical issues between agencies. However, the process for more substantive engagement by agencies in planning for projects where jurisdictions overlap and/or time horizons differ (e.g., projects that address state roads and local facilities together) remains unclear, opportunistic and largely ad-hoc. Disruptions in participation are likely to recur across administrations or agency leadership. More formal commitments to interagency participation in planning are needed to create momentum over longer time scales and ensure the most cost-effective solutions can be implemented for large infrastructure investments.

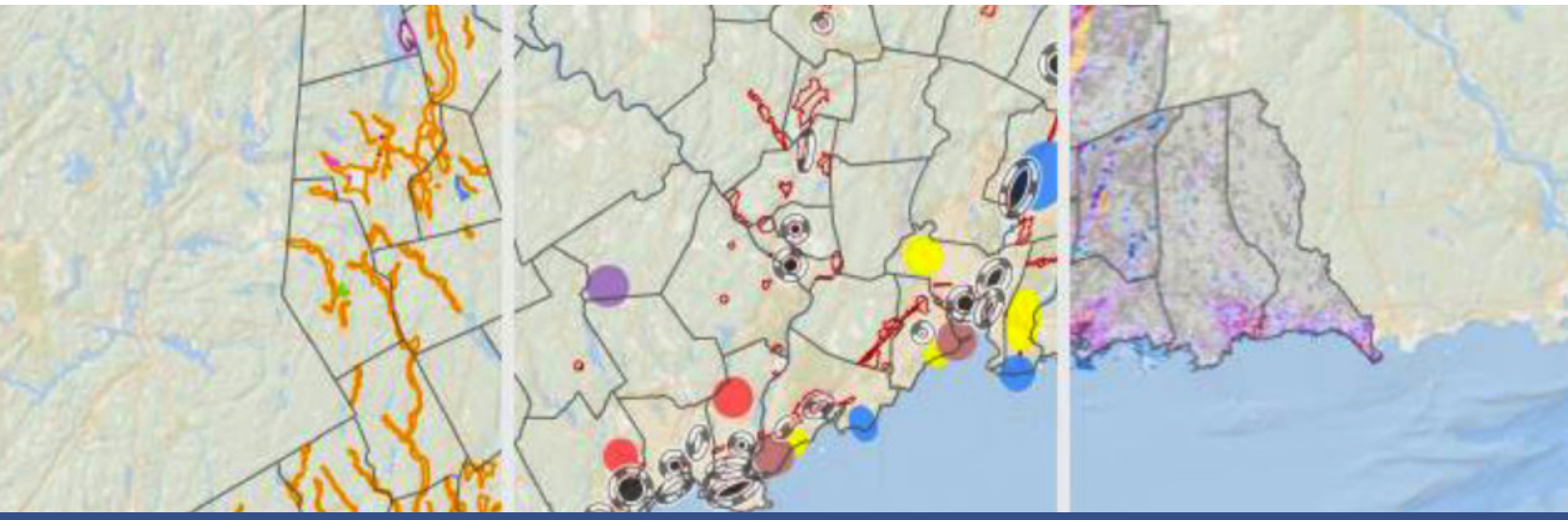
4. ***Challenges Associated with Resources, Staffing, and Sustained Education (aka Capacity):*** Climate change adaptation planning requires technical resources that are difficult for many local governments and resident groups to access. Significant capacity gaps exist between communities. In some cases, towns have chosen not to address climate issues or have lacked a pathway toward consensus on complex problems. In other cases, disparities in property taxes, competing service demands on municipal budgets, and differences among local staff availability and expertise have limited action. Some towns simply won't be able to create or maintain the capacity to implement long-term, complex adaptation projects. The State of Connecticut should sustain the capacity of CIRCA to provide Municipalities, COGs, and citizens associations with training on

planning processes, consensus development, interpretation of risks and maps, project scoping, project budgeting, available grants and funding sources, and support and advice on the effectiveness of technical approaches.

5. ***Integrating Technical Information into Planning:*** In recent years, steps have been taken to ensure climate change is incorporated into local and regional Plans of Conservation and Development and Natural Hazard Mitigation Plans. There has also been the development of resilience tools, future risk maps, and viewers by CIRCA and other groups. Broadening these to include the capacity to assess the potential effectiveness of adaptation strategies should be developed by CIRCA and others with appropriate technical resources. In addition, evidence-based assessments of the effectiveness of innovative solutions (like living shorelines and green infrastructure) are currently limited. Data from demonstration projects and post-construction monitoring of innovative projects are essential to the development of standards that can be used in permit decisions and to provide guidance to municipalities in the development of proposals. Data should be made publicly available, and knowledge dissemination should occur as suggested above in #4.

6. ***Issues of Timing and Readiness:*** Connecticut municipalities differ markedly in their readiness and capacity to take action on climate adaptation and resilience. New programs like the DEEP Climate Resilience Fund can "even the playing field" with funding. Resilient Connecticut identified initiatives that started with political leaders, community groups, and town staff and then advanced to consensus at different rates. Consequently, to be broadly accessible,programs need to be sustained so that communities at different stages of readiness can participate.

5.2 Recommendations for a Resilience Road Map for Connecticut:



1. Take action on existing vulnerabilities, zones of shared risk, and resilience opportunities.

The Resilient Connecticut planning process resulted in the identification of 64 Resilience Opportunity Areas (ROARs) in Fairfield and New Haven Counties. These represent the region's un-met needs for local and regional planning, project development and implementation support. The database of Zones of Shared Risk, Risk Narratives, and ROARs can be found in the Phase II vulnerability assessment report as well as the Resilient Connecticut website.

1.1. Move forward with design and implementation of projects that were advanced during Phase III site planning in Downtown Danbury, Downtown Ansonia, South Norwalk, Downtown Fairfield, South End Stratford, Fair Haven, and Branford. Each of these Phase III locations resulted in specific near and long terms actions, concept design, and project development which can be prioritized for additional state and Federal funding for implementation. See Section 4 for more information on next steps for each of these areas.

1.2. Prioritize engagement and planning support for additional Resilience Opportunity Areas, that were identified in Phase II in other vulnerable locations in Fairfield and New Haven Counties. Local governments and regional planning organizations should work with technical assistance partners such as state agencies, CIRCA, NGOs, and others to move additional ROARs through the site planning process and create specific near-term actions that can be implemented in the next 5-10 years (see recommendation 2.1 below).

1.3. Assign responsibility to a lead agency or office to maintain a statewide inventory of climate resilience plans, actions, and projects as references for previous, existing, and ongoing resilience planning work. This should be integrated with the Statewide Resilience Project Pipeline in recommendation 7. This inventory can become a central resource and reference point for the emerging community of practice of climate service providers and help to prevent duplication of previous work.

1.4. Strengthen the role of regional Councils of Governments (COGs) to conduct monitoring and progress updates on Natural Hazard Mitigation Plans (NHMPs), Coastal Resilience Plans (CRPs), Climate Adaptation Plans (CAPs), and Plans of Conservation and Development (POCD), to evaluate whether towns are acting on plans and identify barriers and ongoing challenges to implementing actions and projects. This can help to position plans as iterative, living documents that continuously inform projects and investments rather than mandatory reports that only receive attention every 5-10 years.

2. Improve agency coordination and take advantage of existing programs and capacity.

Climate adaptation and resilience planning in Connecticut has evolved over the past decade. Today there are many different programs and partners that have built a solid foundation of knowledge, plans, data, and tools to support communities in planor and adapting to climate change impacts. Going forward, existing programs and partners will need to better coordinate and work together to leverage this foundation for the benefit of communities across the state. This includes leveraging staff capacity and expertise across different state agencies to incentivize more collaboration.

2.1. Expand the Resilient Connecticut Program statewide and designate roles and responsibilities for state planning and technical assistance partners with a lead coordination entity (CIRCA). Provide technical resources to towns to move plans and projects down the resilience project pipeline through a state program that integrates the informal relationships between climate service providers and agency initiatives that are currently engaging communities in an ad-hoc or opportunistic way. That includes integrating data sources, mapping, and stakeholder engagement support for municipalities to conduct vulnerability assessments, conditions analysis, concept development, design, permitting, benefit/cost analysis, implementation, monitoring, and adaptive management of the full range of climate resilience actions. This would be an opportunity to integrate the work of multiple partners including CIRCA's Resilient Connecticut program with the DEEP Climate Resilience Fund, DPH,

DOT, CT Insurance Department, and the CT Green Bank's new authorities to invest in environmental infrastructure, among others.

2.2. Refresh the State Agencies Fostering Resilience (SAFR) Council. A more formal structure for SAFR is required and a coordinating entity is necessary. CIRCA has been serving this function in recent years. We recommend the development of a mission statement (To ensure effective cooperation and coordination among agencies to accelerate adaptation to the effects of climate change), designated representatives, quarterly meetings and monthly meetings of work groups. We recommend the consideration of a chief resilience officer in the state to chair the group and report to OPM.

2.3. Create a planning partners collaborative or council to better organize existing programs and avoid duplication between climate resilience planning service providers. The collaborative should be chaired and facilitated by a neutral entity such as OPM or DEEP. This should be distinct from the GC3 process or could be a specific workgroup under the GC3. Look at the FEMA Coordinating Technical Partners as a model that should include and formally recognize established climate services technical and supporting partners that have already been doing the work and have capacity to continue engaging communities going forward.

2.4. Provide training and application of tools and resources for resilience planning. This should include an easily accessible process for communities to get assistance with training and the use of tools with partners through an expanded Resilient Connecticut program (see recommendation 2.1). Over the past decade many different climate-related "toolkits" have been developed for decision-making and planning purposes. What's needed going forward is application, refinement, and training on the use of existing tools and resources.

2.5. Create a regional working group (New England, or Northeast) to continually exchange ideas and progress updates between technical and planning partner programs. Create a technical exchange between state programs. Recent efforts to regionalize technical support programs between states have lacked coordination and can result in overlapping or duplicative programs.

3. Utilize equitable and inclusive planning approaches.

The entire community must be engaged in the assessment of adaptation needs, priorities, and projects. Broad participation is essential to ensure public support and to identify the needs of the most vulnerable. Communities that have been traditionally marginalized or disengaged from planning must be included from the start in setting priorities and developing solutions to climate resilience challenges. This requires resources to support participation and develop local capacity in EJ communities. The state should continue to build on the GC3's efforts to remove barriers and move towards more equitable participation in the resilience planning process.

3.1. Build on the successful pilot rounds of the CIRCA/DEEP Climate and Equity Grants Program to fund capacity building grants for environmental justice-oriented community-based organizations (CBOs) to lead resilience planning and take action in their communities. This should include the identification of a stable source of funding for the grant program over a longer period. This program should be focused on building up the capacity of CBOs with existing relationships and representation from EJ communities and should be broad enough to allow grantees to make decisions on priority activities within a climate resilience framework. More information about the findings from CIRCA's Climate and Equity Grants Pilot Program can be found on the program website here: https://circa.uconn.edu/environmental-justice/climate-and-equity-grant-program/

3.2. Invest in local community-based resource hubs that can provide a venue and staff to facilitate planning for traditionally overburdened and underserved communities. Many community-based organizations are already playing this role around issues of housing, economic justice, food insecurity, health care, and other needs. These organizations can begin to take more active roles in climate resilience planning with additional resources and assistance from state partners. These hubs should also overlap with resilience hubs described in recommendation 4.1 below.

3.3. Integrate the Connecticut Environmental Justice Screening Tool into state grant programs, projects, and investments. CT EJ Screen 2.0 was created through an extensive process that included engagement with EJ community-based organizations. This resource should be leveraged going forward to direct investments and improve the resilience of EJ communities in Connecticut. A staff position at DEEP should be designated for updating the CT EJ Screen going forward to ensure it remains an accurate picture of pollution burden and sensitive populations across Connecticut.

4. Prioritize emergency preparedness and recovery planning.

Prioritize preparedness for disruptive and extreme weather hazards by incorporating climate change into local and regional emergency planning and identify "Community Lifelines" that must function in the aftermath of a disaster. These are essential to human health and safety and sustain the operation of critical community services, government and business functions.

4.1. Create a network of resilience hubs that can serve as points of contact with local communities, provide services, coordinate with local and state government, and pass through resilience-related grants and technical assistance to residents. Resilience hubs can provide spaces for cooling, clean air, backup power generation, provide a venue for engagement and support for longer-term transformational adaptation through building community capacity, relationships, and "social capital."

4.2. Help communities plan for resilience hubs. Create a planning, technical assistance, and funding program to help communities do the work of establishing resilience hubs. Look at a model that includes multiple state partners including CIRCA, the CT Green Bank, DEEP, DPH, and DEMHS, assisting local governments and community-based organizations to assess sites, make resilience improvements, and train local community-members to staff hubs. This will allow multiple communities to learn from one another through a state program that includes sharing technical resources and building a network of mutual support. This can be integrated into the Resilient Connecticut program in recommendation 2.1, as a specific funded activity for towns and community-based organizations.

4.3. Update the State Emergency Response Framework to include the role of resilience hubs for improving local community capacity to support emergency operations and long-term recovery.

4.4. Establish a network of real-time water level and flood level sensors in coastal communities to support local emergency operations, flood alerts, and evacuations. Many communities have been and will continue to live with more frequent flooding of key roadways and underpasses. Real-time information delivered to decision makers could allow for better coordination of road closures and resilient corridors during flooding events. CIRCA pilot projects are underway in Stamford and Branford to develop protocols for data collection and information delivery to decision makers. Learn from these pilots and expand to a statewide coastal flood alert system informed by real-time data at key sites.

4.5. Work with coastal communities to install traffic gates at railroad underpasses that frequently flood to keep people out of harm's way during hazard events. These gates can be a relatively lower cost near term solution to manage traffic and prevent the need for emergency rescues at underpasses. Underpass zones of shared risk were identified throughout Fairfield and New Haven Counties as part of the vulnerability assessment in Phase II of Resilient Connecticut 1.0.

4.6. Create a central GIS database of evacuation routes and resilient corridors to support longer term emergency planning that integrates sea-level rise and increased flooding into a coordinated evacuation strategies.

5. Build adaptation into infrastructure investments to avoid future costs.

To minimize future costs and social disruption, municipalities and state agencies should integrate climate change adaptation into all planning decisions and investments immediately. Every town's Plan of Conservation and Development and Hazard Mitigation Plan, for example, should enhance long-term resilience by including an assessment of climate change impacts into plans. Routine repairs and improvements that recognize future risk will yield a high return on investment.

5.1. Add detailed climate vulnerability assessment requirements to local and regional Plans of Conservation and Development (POCD). POCDs should be informed by local vulnerability assessments to a variety of climate hazards including sea-level rise, coastal flooding, extreme precipitation, and extreme heat; and identify resilience challenge areas. This will require training opportunities, reporting examples, and technical support to assist towns and COGs with fulfilling these new requirements (see recommendation 2.1). This should include identification of which local resources (social, ecological, and financial) are impacted or informed by resilience initiatives. A phase-in process can allow towns to transition into the new requirements.

5.2. Plans should clearly identify problems that need external support in addition to local municipal resources and include budget reporting for issues that require state support. Formalize the capital improvement plan process for local, regional, and state investments and indicate which projects are informed by resilience and adaptation strategies.

5.3. Municipalities should consider updating zoning codes to move towards resilient development consistent with the Resilient Zoning library and toolkit. Zoning is one tool communities can use to enhance local resilience to climate change impacts like flooding, sea level rise, and increased heat. As redevelopment occurs, it's imperative that new projects don't create additional vulnerabilities such as increased stormwater, heat, or increasing risks in locations that will face chronic hazards in 2050.

5.4. Encourage and incentivize towns to utilize other local boards with newly established authorities for climate resilience activities like Flood Prevention, Climate Resilience, and Erosion Control Boards which now have infrastructure maintenance, construction authority and can bond to fund projects. Local Conservation Commissions can manage nature-based resilience strategies like restored marshes, wetlands and forest areas. Incentives might include a specific track for cost-sharing projects through the DEEP Climate Resilience Fund for example, that utilize local funding or leverage resources through these new boards.

6. Adapt existing and resist new development in coastal and riverine floodplains.

Higher mean sea levels will increase the frequency of flooding in areas that are currently flood prone. Enforcement and strengthening of existing policies will reduce risk to people, property, and municipal tax bases and make new commercial and residential development less vulnerable. Existing homes and businesses that were previously built in areas of flood risk will need to consider the full range of flood mitigation options including elevation, flood proofing, and voluntary acquisition of repetitive and severe repetitive loss properties, among others. New development should be avoided in areas where coastal flood risks are currently known as these areas will continue to flood more frequently by 2050. If municipalities, developers, and property owners choose to site new buildings and development in areas of known coastal and riverine flood risk going forward, future liabilities and costs should be fully assumed by property owners.

6.1. Promote strategies to encourage existing owners to make their properties resilient to flooding. Programs such as FEMA flood mitigation assistance as well as new programs like the CT Green Bank's C-PACE and Smart-e loan program are available to assist with funding and financing property level resiliency improvements. Existing properties that currently face flooding risks, particularly coastal flooding, will need to become more resilient through a variety of strategies including elevation, flood proofing, elevation of critical systems, improved stormwater management, green infrastructure, and in some cases, voluntary acquisition of repetitive and severe repetitive loss properties.

6.2. Create, and make accessible, high resolution, more accurate coastal flood risk maps for the entire coastline that can be used to supplement FEMA risk maps. These maps would be forward looking using actionable science to inform municipal land use and property owners of future risks and guide decision making.

6.3. Municipalities should create resilience overlay zones which designate requirements and design guidelines for existing uses in flood zones. These zones should clarify requirements for meeting state and federal flood risk management standards for freeboard requirements and access. Overlay zones should be conservative and encompass not only areas currently experiencing flooding but also include areas that are anticipated to be vulnerable in 2050 due to sea level rise. This methodology will allow time for property owners to make resilience improvements prior to the onset of problems. Standards and guidelines should be consistent with federal flood risk management standards to avoid ineligibility for federal funding sources.

6.4. Strengthen flooding disclosure requirements for real-estate transactions. Other coastal states have recently made efforts to improve flood related disclosure, such as adding requirements to disclose whether a property is mandated to carry federal flood insurance as well as information about previous flood damage and flood insurance claims. More examples of how Connecticut compares to other states can be found here: https://www.fema.gov/sites/default/files/documents/fema_state-flood-risk-disclosure-best-practices_07142022.pdf.

6.5. Enable the effective use of transferable development rights (TDR's) through legalizing the creation of TDR banks. Property owners in designated vulnerable areas where further development is disincentivized (thereby increasing resilience) then have a mechanism for preserving property value, selling unusable development rights while retaining ownership. TDR banks would eliminate the difficulty of direct transfer between seller and buyer as statute currently requires.

6.6. Consider designating a high frequency or chronic floodplain (e.g. 1–10-year annual exceedance probabilities in 2050) to prioritize help for property owners to equitably access FEMA funding for flood mitigation assistance, including options for property elevations and/or voluntary acquisitions of repetitively flooded properties. Currently, the process for property owners to receive FEMA support for acquisitions is long and administratively burdensome. Local governments must apply for funds on behalf of property owners through a reimbursement model which may be difficult for lower income households to access. State support for acquisition should include requirements for community benefit such as improving public access in coastal areas, preserving open space for community flood management, and the creation of parks and other features that create community-wide benefits.

7. Develop a resilience project pipeline.

In many towns, there are several areas at-risk, and all need attention. Having a series of resilience projects underway will increase the likelihood of winning state and federal adaptation grants and increase support for the local share of matching costs. In addition, state agency resilience projects may need coordination with local projects. The creation of a central project pipeline database will allow for project planning and implementation between and across jurisdictions.

7.1. Conduct and complete the vulnerability assessment of state assets and operations as required by Governor Lamont's Executive Order 3. The vulnerability assessment of state assets and operations should result in coordination and action to ensure state investments are resilient to climate change impacts. Specific projects resulting from the assessment should populate the state resilience project pipeline.

7.2. Update the state resilience strategy based on the assessment of state assets and operations. Develop strategies to inform state and local policies and processes to allow for coordinated action among agencies, regional planning (COGs), and local municipalities. The strategy was reviewed as part of the GC3 process in 2020-21. Given the new information that will be generated by the vulnerability assessments in 7.1, the overall resilience strategy should be renewed through the GC3 or a working group of the GC3.

7.3. Make sure state agency project pipelines are disclosed to COGs and towns. Document challenges and vulnerabilities that require coordination between local and state entities. (e.g. local drainage systems that connect to state drainage infrastructure, or local flooding concerns related to state roads). Clarify the process for towns who wish to initiate engagement with state entities to address these joint challenges. This will allow for opportunities to more effectively and efficiently address problems between overlapping state and local jurisdictions when projects are in the planning stages of development.

7.4. Create a project pipeline database, map, and CIS data portal to track progress on implementing the state resilience project pipeline. This should be coordinated with a state planning inventory and other state data through a centralized data office (see recommendation 1.3). Making the resources for planning more streamlined and less confusing for towns will help with adding new requirements for vulnerability assessments and data creation.

8. Establish and invest in new local funding sources.

Municipalities must begin to develop sustainable funding sources for longer term investments in resilience. A resilience project pipeline receiving federal and/or state support will require local cost-sharing, so a strategy for raising local funds is essential. In addition, many local projects may not qualify or receive significant federal funding. New policy tools in Connecticut have recently been created for this purpose. For example, Public Act 19-77 allows a municipality to create a resiliency reserve fund and PA 21-115, "An Act Concerning Climate Change Adaptation," also provides municipalities with a suite of voluntary tools to fund climate resilience, including enabling of stormwater authorities and a new Environmental Infrastructure Fund within

8.1. Create municipal resiliency reserve funds. Towns should be incentivized to set aside funding for climate resilience and adaptation in budget plans utilizing a climate resilience reserve fund. This acknowledges that every community will be affected by climate change, impacting infrastructure, public health and safety, and that cost sharing will be a necessary component to funding solutions. Examples of actions that could be funded with the resulting revenues should be described for towns to reference, such as upsizing culverts and bridges, providing back-up power to critical facilities, upgrading stormwater infrastructure, and conducting necessary planning studies.

8.2. Create a grant or revolving loan fund for municipalities that want to establish stormwater authorities and Flood Prevention, Climate Resilience, and Erosion Control boards. Prioritize state support for municipalities that want to do the initial engagement, mapping/assessment, and stand-up stormwater authorities, reserve funds, and other local climate resilience funding mechanisms.

8.3. Encourage and enable municipalities to establish "resiliency improvement districts" that utilize a tax-increment financing model to fund improvements in vulnerable areas. This approach can provide more direct financing of projects by those who directly benefit from resiliency improvements. Clear standards and guidance for design flood elevations, freeboard, egress, and other resilience criteria should be included for communities that want to use this option.

8.4. Create a state matching fund to help municipalities with bigger projects. Establish a 50/50 State/local matching fund or other combination that can help municipalities access federal funding for implementation of larger scale projects. This could be done through a specific track of the DEEP Climate Resilience Fund, or other state program.

9. Integrate emissions reductions and renewable energy deployment with adaptation and resilience planning.

Ultimately, the path forward to more sustainable communities includes large investments in reducing greenhouse gas emissions while also reducing risks and vulnerabilities to climate change impacts. It remains a critical goal to ensure these investments are coordinated to maximize our impact with limited resources. In many cases greenhouse gas reduction strategies can meet multiple objectives such as reducing heat risk to vulnerable residents, improving grid resilience, and improving the connectivity of multi-modal transportation.

9.1. Help vulnerable residents make their homes more energy efficient and cooler. Prioritize outreach and engagement with building owners, residents, municipalities and utilities to access state and federal incentives for renewable energy programs, in locations of high heat vulnerability. The Climate Change Vulnerability Index for heat can be used as a screening tool to identify and prioritize locations of communities that are particularly vulnerable to extreme heat and air quality impacts. Resilience Opportunity Areas (ROARs) that are characterized by heat and social vulnerability may be good locations for additional planning support for site assessments and investments in renewable energy deployment, efficiency improvements, and other greenhouse gas reduction strategies.

9.2. Improve grid resiliency through targeted microgrid deployment. Work with community-based organizations, municipalities, developers, utilities, and state agencies to implement microgrids in areas that are particularly vulnerable to extended power loss. Not only can microgrids, connected to solar, batteries, and fuel cells generate resilient power during grid outages, they can provide cost savings and emissions reductions during everyday operations.

9.3. Develop a climate resilient standards for multifamily housing that can help to reduce costs for residents and improve resilience to extreme heat, flooding, wind, and other hazards. Many residents who live in affordable housing face high energy costs due to inefficient heating and cooling. Retrofits of existing affordable housing and new affordable housing should be designed to maximize both emissions reduction and risk reduction to climate hazards.

9.4. Invest in climate resilient TOD. Transit Oriented Development (TOD) is an important tool for climate mitigation, as well as climate resilience. Require that transit-oriented development (TOD) plans consider sea level rise and flood hazard areas in planning. Many areas near transit options along the coast in Connecticut are also vulnerable to coastal flooding. It's important that future development of TOD avoids areas where chronic flooding will increase risks and costs to property owners and residents over time. For more on Resilient Connecticut's findings related to climate resilient TOD, visit our research page here: https://resilientconnecticut.uconn.edu/tod/

9.5. Municipalities should consider zoning and land use planning for heat and emissions reductions. Incorporate design standards in zoning regulation to mitigate projected heat increases like green roofs, reflective roofs and pavement, and protections for existing tree canopy cover. Vegetation and landscaping standards can help mitigate both heat and flooding issues using nature-based solutions to provide cooling, process stormwater on site, and absorb CO2.

10. Track changes in climate projections and policy options.

Since 2014, CIRCA's research has provided Connecticut specific guidance on local projections of sea-level rise, precipitation, and temperature due to climate change. This research has been instrumental in helping the state establish planning guidance and policies. As climate science evolves, updated guidance based on the latest findings will be needed to continue informing Connecticut's approach to adaptation and resilience. In addition, efforts to make climate science broadly accessible and understandable to the public will help to enable and inform action.

10.1. Move from "Best available science" to "actionable science." Project designs and decision making on priorities requires information grounded in measurement and data. Connecticut should continue to invest in field assessment and data collection to inform planning and policy guidance.

10.2. Develop resilience metrics and track progress of strategies, actions, and projects. Data from demonstration projects and post-construction monitoring of innovative projects are essential to the development of standards that can be used in permit decisions and to provide guidance to municipalities in the development of proposals.

10.3. Develop a sustained broader public education program to inform the public about climate risks and ongoing progress on strategies.

10.4. Continue to track the evolution of climate science and update state guidance such as PA-18-82, the CT Physical Climate Science Assessment Report, and the Science and Technology working group report of the GC3.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