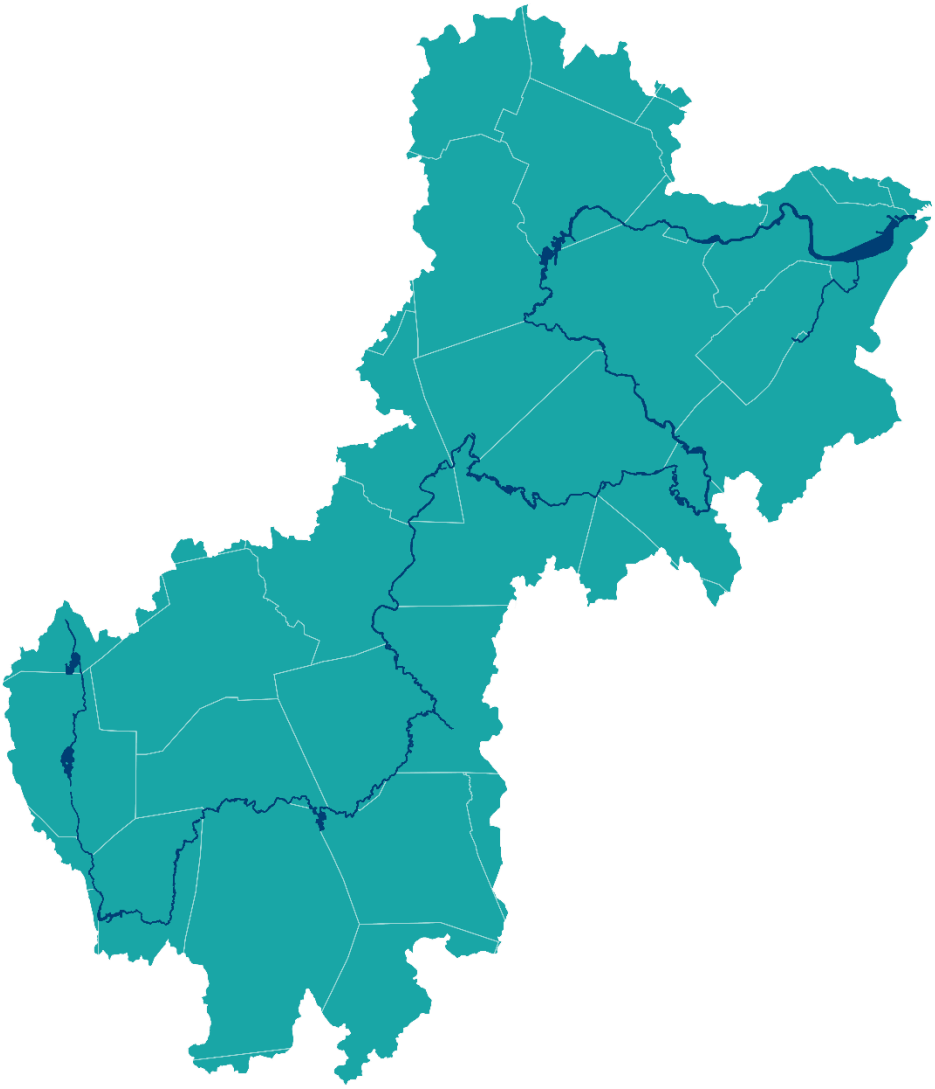
Charles River Climate Compact

Climate Resilience Strategic Plan

Produced by the Metropolitan Area Planning Council (MAPC)
for the Charles River Climate Compact

March 2023



Charles River Climate Compact

Charles River Watershed Association

Town of Medway

Metropolitan Area Planning Council

Acknowledgements

Funding

This project was funded by the Metropolitan Area Planning Council's (MAPC) Technical Assistance Program (TAP) and District Local Technical Assistance (DLTA) Program.

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Climate Compact Members

Arlington
Bellingham
Boston
Brookline
Cambridge
Dedham
Dover
Franklin
Holliston
Hopkinton
Lincoln
Medfield
Medway
Milford
Millis
Natick
Needham
Newton
Norfolk
Sherborn
Somerville
Walpole
Waltham
Watertown
Wellesley
Weston
Westwood
Wrentham

The Charles River Watershed includes an additional eight municipalities that were not Climate Compact members at the time of report writing.

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1. Introduction

The Charles River

The Charles River, also known as the Quinobequin, springs from its source in Hopkinton and flows through twenty-three cities and towns along its eighty-mile journey to meet the sea at Boston Harbor. With over eighty brooks and streams, several major aquifers, and thirty-three lakes and ponds, the Charles River watershed encompasses 308 square miles of Massachusetts and is home to approximately a million people. Charles River Watershed Association (CRWA) humbly recognizes the Massachusett, Wampanoag, and Nipmuc Nations, as the organization's work is carried out across their traditional territory, and acknowledge them as the past, present, and future caretakers of this land. The watershed includes the present-day communities of Arlington, Ashland, Bellingham, Belmont, Boston, Brookline, Cambridge, Dedham, Dover, Foxborough, Franklin, Holliston, Hopedale, Hopkinton, Lexington, Lincoln, Medfield, Medway, Mendon, Milford, Millis, Natick, Needham, Newton, Norfolk, Sherborn, Somerville, Walpole, Waltham, Watertown, Wayland, Wellesley, Weston, Westwood, and Wrentham.[1]

Figure 1: Map of the Charles River and the Charles River Watershed

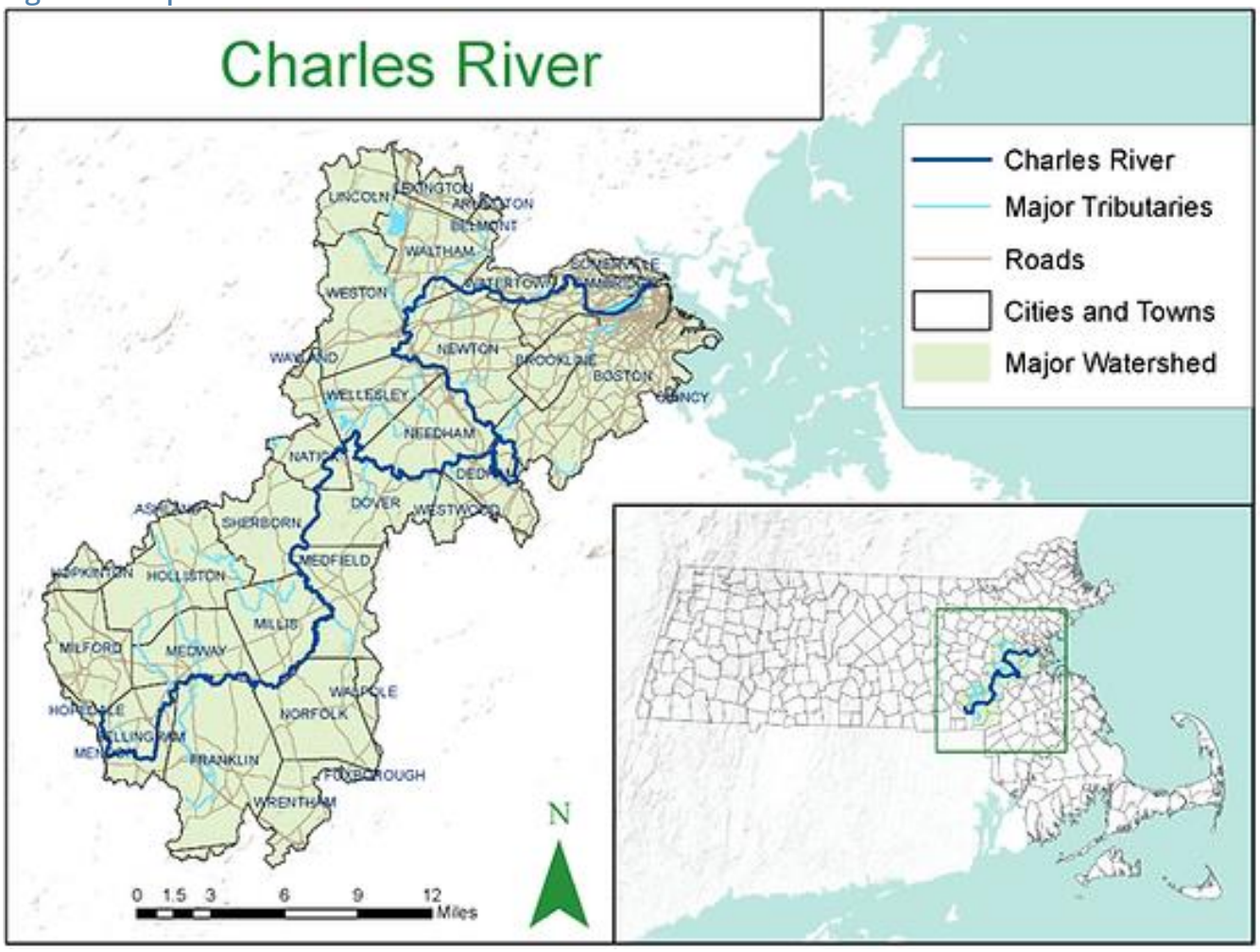


Image from the CRWA website

1 Information from the CRWA website: https://www.crwa.org/

Charles River Watershed Association

Formed in 1965 by a group of concerned citizens who raised alarm about the declining health of the Charles River, Charles River Watershed Association (CRWA) is one of the oldest watershed organizations in the country. In the fifty years since the founding, CRWA has guided the transformation of the river from the "Dirty Water" of the past - rife with industrial pollution, sewage, trash, and even cars - to the Charles River we know and love today, one of the cleanest, most celebrated urban rivers in the country. CRWA's mission is to protect, restore, and enhance the Charles River and its watershed through science, advocacy, and the law. With the dedication of about sixteen full-time staff, the organization develops science-based strategies to increase resilience, protect public health, and promote environmental equity as we confront a changing climate.[2] The Charles River Watershed Association and the Town of Medway worked together as lead applicants for the Technical Assistance Program (TAP) grants that funded this Strategic Plan.

Charles River Climate Compact

The Charles River Climate Compact (CRCC) is a voluntary partnership established in 2019 between 28 watershed communities in the Charles River watershed and led by the Charles River Watershed Association. The Compact aims to take a watershed approach to climate adaptation, which allows for a clearer, more cost-effective picture of ongoing ecosystem impacts and allows the Climate Compact to respond accordingly.

At the time of report writing, participating communities include Arlington, Bellingham, Belmont, Boston, Brookline, Cambridge, Dedham, Dover, Franklin, Holliston, Hopkinton, Lincoln, Medfield, Medway, Millis, Natick, Needham, Newton, Norfolk, Sherborn, Somerville, Walpole, Waltham, Watertown, Wellesley, Weston, Westwood, and Wrentham.

The Charles River Climate Compact's mission is to work collaboratively to increase climate resilience for people, and the natural ecosystems in the Charles River watershed by taking a regional approach to implementing climate adaptation and mitigation solutions.

Adams Street. Photo from the Town of Medway

2 Information from the CRWA website: https://www.crwa.org/

Why a Regional Approach?

Communities along the Charles River enjoy access to a major waterway and recreational connections to nature. As one of New England's most prominent rivers, the scenic Charles is home to annual regattas and extensive recreation, but it is also plagued by many issues common to urban waterways such as aquatic species and nutrient pollution. Unfortunately, climate change models indicate flooding and rising temperatures will grow more severe over time for Massachusetts. Impacts won't end at municipal borders, and the actions of one community could affect their neighbors. Therefore, the Climate Compact is working together to take a proactive approach to adapt to climate change. This process of adaptation will require collaborative partnerships, a consistent regional approach to climate resilience, and securing grant funding.

What is the Charles River Climate Compact Strategic Plan?

The CRCC Resilience Plan is a five-year strategic plan to address some of the most pressing issues facing the Charles River watershed. This Strategic Plan offers a roadmap to help guide the Climate Compact's resources and decisions for the next 5 years, supporting their work in proactively preparing for a future where we all thrive. The planning process provided an opportunity for Climate Compact members to identify where to focus joint resources to be most effective, while also developing clarity and boundaries on how to work together.

This Strategic Plan was informed by:

- Working with a Core Team, a Municipal Advisory Group, and the full Climate Compact.
- Conducting interviews, workshops, and an equity focus group with additional stakeholders.
- Developing a vision, values, goals, and implementation strategies.

What's Included?

This report includes the following sections, which can be used to navigate the contents of the document:

- **Chapter 2: Stakeholder Engagement**, which describes the engagement process and themes from the feedback received.
- **Chapter 3: Vision, Values & Goal Setting**, which describes the final vision, values, and goals that framed this Strategic Plan and can help guide the Climate Compact's future work.
- **Chapter 4: Implementation Strategy Identification & Evaluation**, which summarizes the final high-, medium-, low-, and other priority strategies identified by stakeholders; as well as information on next steps and recommendations for plan maintenance.
- **Chapter 5: Additional Information**, which includes a glossary, acronym list, and reference list.

Photo from the Town of Medway

2. Stakeholder Engagement

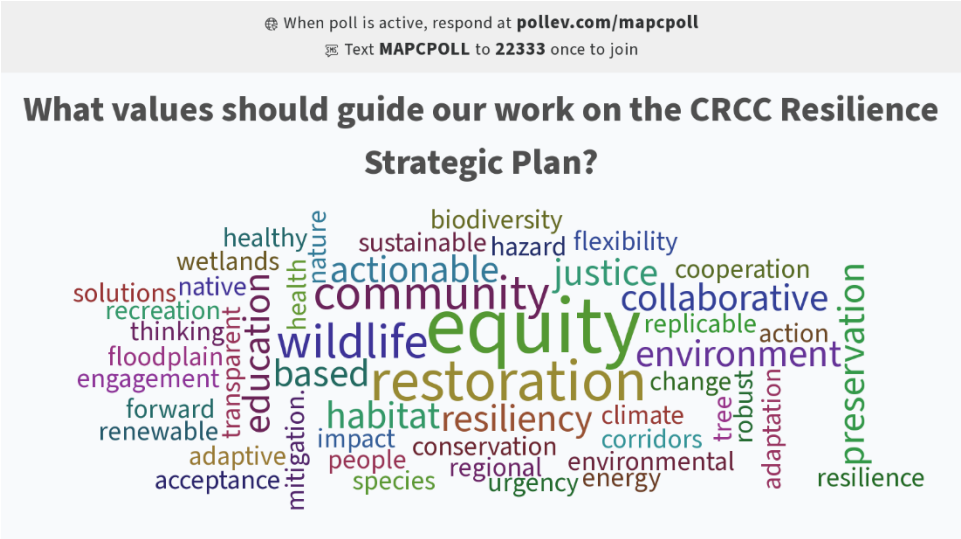
Summary of Stakeholder Engagement Process

The CRCC Resilience Strategic Plan was developed based on input gathered through a multi-part stakeholder engagement process. This process included a Visioning Workshop and other meetings with the full Climate Compact, regular check-ins with a Municipal Advisory Group, targeted engagement with priority stakeholder groups, and a public survey targeted toward watershed residents. Each component of the engagement methodology is summarized below, and more details can be found in the Additional Information section.

Climate Compact Checkpoints

The Stakeholder Engagement process for the Resilience Strategic Plan kicked off with a **Visioning and Goal-Setting Workshop** with the full Climate Compact group. The Workshop took place during the Climate Compact's regular bi-monthly virtual meeting on September 14, 2022. In addition to providing an overview of the project and timeline, the MAPC team led the Climate Compact members through two exercises: (1) writing Postcards from the Future to articulate members' visions for the future of the Charles River watershed and (2) a PollEverywhere to crowdsource values the group thought should guide their work as the Climate Compact.

Figure 2: Results of PollEverywhere values activity



The MAPC team also joined Climate Compact bi-monthly meetings to present on the following topics:

- July 2022: Introduction to the Resilience Strategic Plan project
- November 2022: Review of draft vision, values, and goals; and discussion of strategies and Climate Compact logo
- January 2023: Review and initial prioritization actions and strategies, with follow-up strategy prioritization survey
- March 2023: Presentation of final prioritized strategies and implementation roadmap

Figure 3: Jamboard created with the Climate Compact

A collaborative Jamboard used to brainstorm strategy ideas with members of the Climate Compact.

Municipal Advisory Group

A Municipal Advisory Group (MAG) was formed, comprising of members of the Climate Compact who volunteered additional time to act as a sounding board for the Core project team and weigh in at key decision points. The group met four times over the course of the strategic planning process, providing valuable feedback each time on the following topics:

- **MAG Meeting #1** (September 2022): In the first meeting, the group reviewed the upcoming strategic planning process, including the Stakeholder Assessment, and the Vision and Goals drafted based on the first Workshop at the September Climate Compact Meeting.
- **MAG Meeting #2** (October 2022): The MAG discussed internal and external communication logistics and guidelines. Additionally, the Core Team provided an update on the stakeholder engagement process and the data collected to-date on goals and priorities.
- **MAG Meeting #3** (December 2023): In this meeting, the MAG provided feedback on a complete draft of the vision, values, and goal statements, as well as the initial compilation of strategies developed through the stakeholder assessment process. The Core Team also provided an update on the Public Survey.
- **MAG Meeting #4** (February 2023): For the final MAG meeting, the group reviewed the final summary and analysis of public survey responses, worked on finalizing a list of priority strategies, and provided feedback on the format of the public dashboard.

Stakeholder Assessment

Beyond the members of the Climate Compact, the Core Team identified various high-priority stakeholder groups to reach out to in a targeted manner. The team conducted interviews with each of these stakeholder groups to understand how their work might intersect with the Climate Compact's areas of focus, ideas for strategies and actions the Climate Compact should take, and how these stakeholders might want to work with the Climate Compact in the future, among other topics.

- **River Advocates**: Volunteers who work regularly with CRWA on advocacy participated in a group interview, providing their perspective as residents and advocates of the watershed
- **State Agencies**: Agencies in the Executive Office of Energy and Environmental Affairs including Department of Environmental Protection, Department of Conservation and Recreation, and the Department of Fish & Game Division of Ecological Restoration took part in a group interview that reviewed synergies in their work with the Climate Compact's and how the group could partner with the agencies more closely going forward
- **Environmental and/or Conservation Planners**: The deep technical knowledge of Environmental and Conservation planners was sought in a group interview
- **Nonprofits**: Local nonprofits focused on climate issues, like land conservation and environmental restoration, were invited to a group interview
- **South West Advisory Planning Committee (SWAP)**: Project staff joined an existing SWAP monthly meeting to inform members of the Climate Compact's Resilience Strategic Planning process, as the memberships between the groups overlapped

An informational fact sheet was also shared digitally and at meetings and events in the watershed.

Figure 4: Informational Fact Sheet

Equity Focus Group

In addition to the stakeholder interviews, the team prioritized hearing from groups who historically have been left out of planning and environmental planning processes. The team hosted an equity focus group on November 7, 2022, inviting representatives of local organizations and associations like Communities Responding to Extreme Weather (C.R.E.W.) and a Mashpee Tribe member.

Public Survey

In addition to feedback from the specific groups described above, a survey was distributed to members of the public to gather input from a broader perspective. The input from the public survey was compared with the priorities of other stakeholders and found to be generally in alignment.

The CRCC Resilience Strategic Plan public survey was distributed to members of the public throughout the Charles River Watershed from November 2022 through January 2023. The survey received a total of 294 responses from community members in nearly all 35 cities and towns in the Watershed. While nearly all of the respondents who responded to the demographic questions identified as White, 10 respondents filled out the survey in non-English languages (Spanish, Portuguese, and Simplified Chinese were available and all were used). Only 12 percent of respondents who answered the demographic questions were age 34 or younger, with the rest split between the 35-64 age group or 65 and older. Nearly 80% of respondents who reported their household income levels earned $75,000 or more, with 38% reporting income of more than $150,000.

The public survey asked respondents to provide input on the categories of Current Conditions, Vision, Values, and Strategies.

Summary of Public Survey Results

Current Conditions: The current climate change impact that respondents reported personally experiencing most frequently was high temperatures or a heat wave. Additionally, participants were

invited to share their stories about dealing with extreme weather in an open comment format. A range of stories and experiences were shared, with many expressing dismay about plants and gardens being affected by drought (in particular in the summer of 2022), experiences with flooding in their homes, and many who experienced multiple or all of the extreme weather conditions listed.

Vision: In their vision for their community in 2030 and beyond, respondents were most eager to see more trees, parks, gardens, plants/greenery and public green spaces. Second and third to this were the desire for "a community that is able to safely manage flooding and extreme heat events" and "more biodiversity of plants and wildlife."

Some respondents expanded beyond the options offered in the open response section, adding considerations and ideas that had not arisen in other engagement formats. Respondents suggested preservation of trees, mitigation of carbon emissions, better access to public transportation, and more public open and green space—all ideas that either had not come up or were not emphasized in other engagement formats. Additionally, the open responses further emphasized ideas like prioritizing equity and environmental justice, improving biodiversity, and stormwater management. While these open responses came in response to the visioning question, some responses better reflected potential strategies.

Values: Respondents were asked to rank values that would guide the Climate Compact's work. The value that rose to the top was "Stewardship and ecological resilience." Following that, in order of most number of #1 and #2 rankings combined were:

- "Cities and towns working together with their neighboring cities & towns on climate change"
- "Investing in infrastructure changes that protect the largest number of people at the lower cost"
- "Equity, Environmental Justice, and Climate Justice (for example, working with climate vulnerable communities who are at the front lines of climate impacts)"

Strategies: The survey provided summarized, high-level options for strategies that the Climate Compact might pursue. The top three most-frequently prioritized strategies by the public were:

1. Nature-based solutions and green infrastructure (for example, wetland restoration)
2. Advocacy (for example, supporting requirements at the state level to better protect our forests and waterbodies)
3. Climate resilient regulations (for example, developing sample local bylaws)

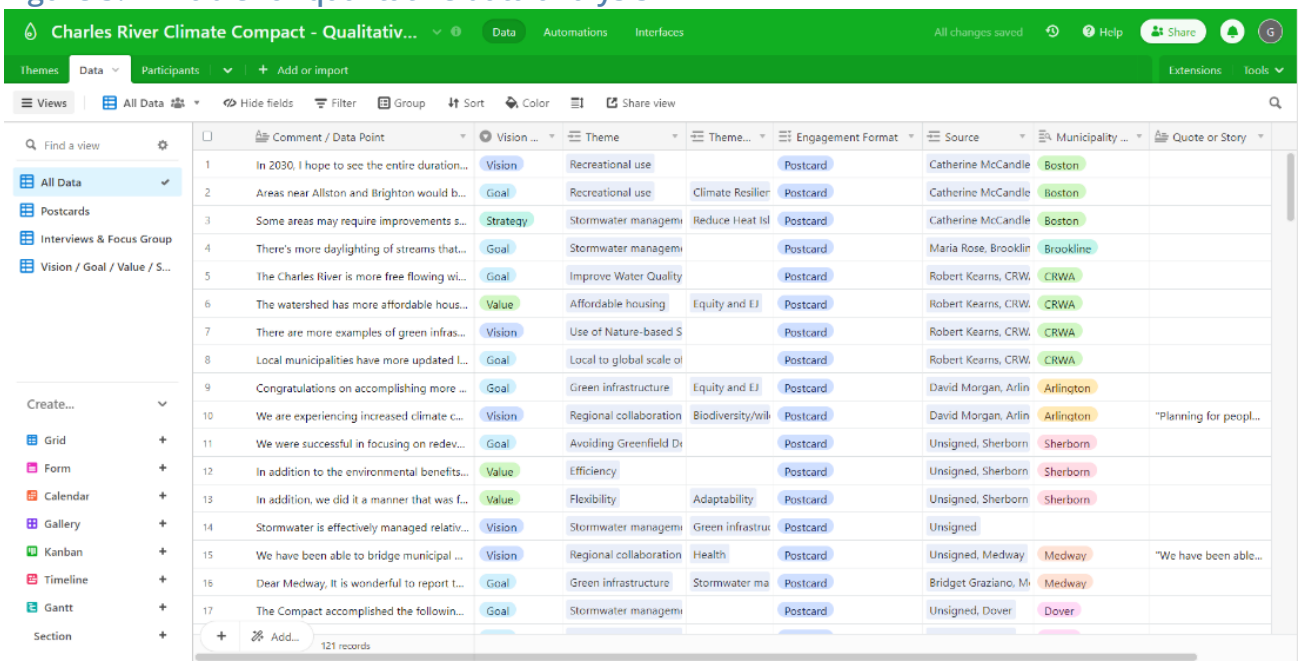
Additional Open-Ended Comments: The open-ended comments section included a range of support, concerns, and ideas related to climate adaptation and mitigation efforts. Most of the responses reflected support and alignment with what was captured in other modes of engagement, such as the Stakeholder Interviews and Equity Focus Group.

Please see Section 3 for more information on the final Vision and Value statements, and Section 4 for the final list of strategies.

Engagement Process Results

The team used AirTable to analyze the input participants provided throughout the engagement process. The team coded each piece of input from the Postcards from the Future, interviews, and equity focus group with primary and secondary themes. The themes were used to inform the initial draft of the Resilience Strategic Plan's Vision, Goals, and Values and are summarized below.

Figure 5: AirTable for qualitative data analysis



Accessible communication: Participants shared a vision of more members of the public being engaged and knowledgeable about the River. Some identified a concern that those who do not regularly use the Charles for recreational purposes—and many who do—may not understand the vulnerabilities of the River, their impact on the watershed, and how they could contribute to improvements. One participant suggested a communication strategy of integrating learning about the River and watershed into public school curriculums. Another suggestion was to support access to the watershed and River itself, such as by providing transportation access, alongside education. Importantly, participants noted that communication and engagement should be accessible to all, regardless of people's age and abilities.

Local to global scale of strategies: Many respondents who held roles in municipal government suggested updating local zoning code and policies to address climate change and resilience needs. Some participants provided specific examples of targeted, local strategies that either worked or failed to affect the needed behavior change. Those in other positions, such as residents and volunteers, suggested that the state should update laws to protect natural resources like forests, coasts, and biodiversity. This theme intersects with the value of stewardship and upkeep, as many respondents suggested that these policy strategies should incorporate maintenance costs and concerns.

Green infrastructure: Participants imagine a future for the Charles River watershed in which green infrastructure has been developed to mitigate the impacts of climate change. Examples of green infrastructure that could be implemented range from rain gardens to passing green zoning bylaws.

Stormwater management: The participants identified the importance of stormwater management to prevent projected flooding increases and various strategies to address this focus. Some of the suggested strategies include elevating areas to prevent riverine flooding, daylighting streams, removing dams, increasing tree cover, building pollinator and community gardens, and more. Some of these strategies may also help address other issues like heat islands. Additionally, participants encouraged CRWA to continue its existing work on flood modeling for the watershed.

Improve Water Quality: Many respondents raised water quality as a concern, from high CSO levels to noticing algae blooms in the River. Participants mentioned specific points along the River where they experienced or identified water quality issues, which should be revisited in the implementation (see

comments tagged to this theme in the project AirTable). Water quality is associated with both recreational use and wildlife biodiversity. Participants suggested that the swimmability of the river could be a metric for the water quality level. Another suggested indicator of water quality was the degree that native species could thrive—such as how far fish could swim down the River—and fewer invasive species.

Recreational use: In vision statements and goals, many participants referenced the recreational opportunities afforded by the River. Responses show a vision of many, diverse people having access to and using the Charles for activities from walking along the river to paddleboarding to bicycling. One participant proposed the vision of indigenous tribes being able to use the river for cultural practices, like mishoon burning and river journeys. Multiple participants noted that swimmability would be a good metric for assessing whether we reach goals for water quality maintenance and improvement. Additionally, the goal of increasing the number of people who access the River for recreation was proposed as something that would also increase public awareness and investment in preserving the river.

Biodiversity/wildlife: A common concern had to do with the increase in invasive species seen on the River. Participants who recreate on the water have noted specific trends—for the better and for the worse. Strategies to address these invasive species have been piecemeal and within individual municipalities, not coordinated. Participants shared a vision of not only people, but also animals, enjoying the clean water and well-kept watershed.

Equity and Environmental Justice: Stakeholders identified racial equity and Environmental Justice as key values to guide the Climate Compact's work. Many of these comments connected to regional collaboration and the distribution of resources across the region to support Environmental Justice communities. Specific equity issues and opportunities respondents named ranged from addressing heat islands and the lack of green space in urban areas, to better public access to green spaces. Some also made connections to other sectors, such as workforce development in the clean energy and environmental protection fields and housing that is affordable and located in areas with access to green space.

Stewardship and Upkeep: Participants emphasized the importance of CRWA's role as a steward of the natural environment. This might look like advocating for state regulations that protect natural resources, working on infrastructure projects, or even setting a goal to make the Charles River swimmable.

Regional Collaboration: There was enthusiasm and support among participants for the regional collaboration represented by the Climate Compact. Participants articulated visions for continued municipal collaboration across political boundaries to amplify and align work toward improving the Charles River and the watershed overall. In particular, State Agencies expressed strong interest in remaining connected with the Climate Compact and its potential to bridge between the municipal and state levels of action in climate work.

Gaps in Participation

Equitable community engagement requires continuous improvement. Despite the efforts of the team in designing and implementing the stakeholder analysis process for this Resilience Strategic Plan, there were still areas for improvement. The gaps that remained in the participation included challenges with reaching demographic groups that historically have not been involved in climate planning and limitations with engaging groups that are already overly engaged or have low capacity to provide input.

First, challenges with reaching conventionally under-engaged populations can be seen in the Public Survey results as well as in the low participation in the Equity Focus Group. While the Public Survey received responses in each of the languages it was available in (English, Spanish, Portuguese, and

Simplified Chinese), the non-English languages only received a few responses each. More work can be done to ensure language accessibility is paired with relationship building among those language-speakers' communities. Additionally, the respondents who answered the demographic questions were overwhelmingly White and wealthy. The strategies suggested in the Resilience Strategic Plan include engagement and outreach to groups that do not conventionally take part in climate planning, highlighting a step to addressing the disparities seen in the survey responses as one of the Climate Compact's high priority strategies.

The Equity Focus Group was another venue in the engagement strategy in which the project team hoped to hear perspectives from historically under-engaged populations or groups that represent them. Representatives and leaders of these organizations were invited to a focus group, with the hope that they would be able to provide a high-level view of what their communities and constituencies experienced or desired for the future of the watershed. Only a small number were able to attend the Focus Group, likely because many of them are over-engaged and involved in a wide variety of projects and initiatives. Those who attended have strong working relationships with CRWA, demonstrating the importance of establishing and investing in these relationships over time.

Additionally, some groups the team tried to reach had little capacity for in-depth involvement. While the project team used engagement tools to summarize detailed information related to the Resilience Strategic Plan for Climate Compact members to review, many were busy with their own municipal responsibilities. In the final prioritization of strategies, about 75% of Climate Compact members responded to the prioritization survey. Having more targeted input from the Municipal Advisory Group was one way we addressed this challenge, as well as using various tools in the stakeholder engagement process, like Jamboard and PollEverywhere.

Future community and stakeholder engagement processes can build upon the successes of this project, while aiming to further close gaps in engagement. The Compact might consider how to develop more and deeper relationships with communities and community organizations that historically have not been a part of climate planning. Such efforts would align with strategies prioritized within the Resilience Strategic Plan related to outreach and engagement efforts.

3. Vision, Values & Goal Setting

As described in Section 2, the project team worked with key stakeholders to draft and refine a Vision, value statements, and goals that could frame this Strategic Plan, and guide the Climate Compact's future work. The final statements are included in the subsections below.

Vision

Vision was defined as, "a hope for the future of the watershed." The Climate Compact collaboratively developed the following vision of a resilient and sustainable Charles River watershed:

> The Charles River is healthy and resilient to our changing climate. Watershed communities work together across municipal boundaries to prepare for, and be resilient to, the effects of climate change. Members of the public are aware of how climate change impacts the watershed and are important partners in our work. These coordinated efforts promote healthy, sustainable, and equitable environments for people and wildlife, both today and for generations to come.

Photo from the Town of Medway

Values & Value Statements

Value was defined as, "a principle or standard to guide decision-making and prioritization." The Climate Compact collaboratively developed the following values and value statements.

Regional Collaboration and Action at Multiple Scales

We acknowledge the importance of working collaboratively at both the local and watershed scale. The impacts of climate change transcend municipal boundaries and so too will the solutions.

Equity, Environmental Justice and Climate Justice

Investing in resilience provides an opportunity to build a more equitable society, including opportunities to address historic wrongs.

Stewardship and Ecological Resilience

Maintaining and improving the ecological health of the river and watershed is paramount and a critical component of adapting to a changing climate. Residents and visitors are part of the overall ecosystem; we aspire to ensure the river and natural open spaces are accessible and welcoming to all members of the public.

Accessibility and Transparency

We strive for the information produced, actions taken, and means of communication to be accessible to all watershed residents.

Goals

A goal is like a lighthouse - it illuminates a path, and helps arrive to a destination. Goals were defined as, "an objective the Climate Compact will aim to achieve." The following six goals were identified collaboratively:

1. Build resilience in watershed communities to extreme events caused by climate change, with a focus on flooding and heat, primarily through regional collaboration and identification of effective local solutions.
2. Identify and implement nature-based solutions that mitigate flooding and drought, and improve water quality and ecological health across the region.
3. Maintain and improve biodiversity of the river and watershed.
4. Work together to advocate for smart and effective climate laws, policies, and programs at all levels of government.
5. Collaborate on climate adaptation, mitigation and sustainability efforts.
6. Establish a strong regional partnership through effective Climate Compact logistics, capacity building, and sharing resources.

Photo from the Town of Medway

4. Implementation Strategy Identification & Evaluation

Existing Climate Resilience Planning & Projects

To inform the strategy identification and evaluation process, the project team first researched examples of regional strategies in other watersheds, and conducted a review of existing climate resilience planning and projects in the Charles River Watershed. More information is included in the following subsections.

Examples of Regional Strategies

The project team developed an inventory of regional climate planning efforts and projects, with an emphasis on those organized around watersheds. Table 1 on the following page includes more detailed information on the projects identified and their relevance to the Climate Compact.

Existing Strategies in the Watershed

The project team also reviewed climate resilience planning and projects implemented to date by municipalities in the Compact. "Table 2: Existing Strategies in the Watershed" includes more detailed information. This review identified several trends across municipalities demonstrating that most municipalities are taking climate action seriously, including:

- All watershed communities have completed the Municipal Vulnerability Preparedness (MVP) 1.0 Planning process.
- 30 Charles River Watershed communities have received at least 1 MVP Action Grant.
- 4 watershed municipalities have a stormwater utility (Bellingham, Franklin, Millis, and Newton).
- 25 watershed municipalities have adopted the Community Preservation Act (CPA).
- 24 watershed municipalities have an up-to-date Open Space Plan.
- 30 watershed municipalities have an up-to-date Hazard Mitigation Plan (HMP).

Photo from the Town of Medway

Table 1: Research on Regional Resiliency Strategies

Project Description	Relevance to Climate Compact	Status	Timeframe	Project Leads	Project Partners	Funding
"Wicked Hot Mystic" created a watershed-wide map of day- and night-time "real feel", so that municipalities can prioritize nature-based solutions in the hottest urban heat islands and measure the cost effectiveness of strategies. Volunteer scientists helped measure ground level temperatures, humidity, and air quality during heat waves. The project included recruitment and training of volunteer scientists; data collection; and mapping, art projects, and data visualization.	CRWA has an existing volunteer network.	Complete	2020-2022	Town of Arlington and Resilient Mystic Collaborative (RMC)	Museum of Science	$186,200, MVP Action Grant
Lower Mystic Regional Climate Assessment: Centering Social Equity in Preparing Critical Infrastructure for Extreme Storms. Tasks included a Regional Infrastructure Functional Exercise simulating impacts from a Nor-easter, a Social Vulnerability Assessment informed by interviews with low-income residents and workers discussing impacts if critical infrastructure were damaged by an extreme event, and a synthesis that prioritized strategies with the biggest benefits for vulnerable populations.	Centering social equity in planning for extreme events.	Complete	2021	Resilient Mystic Collaborative (RMC), particularly Boston, Chelsea, Everett, Revere, Somerville, and Winthrop	MWRA, Arup, All Aces, Inc., BSC Group, Starluna Consulting, Consensus Building Institute, CH Consulting, Community Action Agency of Somerville, GreenRoots, Harborkeepers, La Comunidad, Somerville Community Corporation, TCGT Entertainment, DHS, MEMA, NYC Mayor's Office of Recovery and Resiliency, US Coast Guard	$390,000, MVP Action Grant

Project Description	Relevance to Climate Compact	Status	Timeframe	Project Leads	Project Partners	Funding
Managing Flooding in the Upper Mystic Watershed. In the process of designing and permitting their first three large stormwater wetlands to help manage current and future flooding in the Mystic Watershed. Tasks included tabletop assessments of parcels and community-engaged design and permitting.	We've heard an emphasis on green infrastructure and nature-based solutions from stakeholders.	In-progress		Resilient Mystic Collaborative (RMC)	Kleinfelder and Stantec	- $108,000 MVP Action Grant - $670,000 MVP Action Grant in 2020 - $350,000 MVP Action Grant
Deerfield Creating Resilient Communities is an unofficial, volunteer group of representatives from MA and VT municipalities, academia, nonprofits, state, and federal agencies. They created a Steering Committee to meet, share resources, and apply for funding; identify problem areas in the watershed and compile a list of ongoing and planned projects; and participated in the 2017 "A Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed (FRCOG)."	The wide-ranging membership of this group is reminiscent of the 2019 CRCC survey results suggesting interest in expanding membership of the Compact.	This group may no longer be active	2011-2017	Creating Resilient Communities	N/A	Unsuccessful $500,000 application from the State Supplemental Budget
Ipswich River Watershed Association - Tidal Crossing Protocol. Incorporated data into MassBays Healthy Estuaries Grant, created comprehensive plan to mitigate barriers in an area of environmental concern (Great Marsh Area). Newbury received a two-year MVP grant for the Orchard Street culvert.	Natural resources have been a recurring theme in the stakeholder engagement process for this Strategic Plan.	Complete	2015-2019	Ipswich River Watershed Association, UMass Amherst	Information not available.	Information not available.
Housatonic Valley Association - Green River Assessment. Addressing non-point source pollution within 15 different segments of the river. Outlines concerns for each river section and recommended action items, such as	Property owners should be considered in outreach materials as there were concerns related to erosion, water quality, invasive knotweed and debris in different parts of the river.	Complete	2017	Housatonic River Association	Housatonic River Association, Massachusetts Division of Ecological Restoration	Berkshire Taconic Community Foundation, Berkshire Environmental Fund

Project Description	Relevance to Climate Compact	Status	Timeframe	Project Leads	Project Partners	Funding
remediating stormwater runoff and implementing vegetation buffers.	This stakeholder group would also be the first to experience potential degradation of the watershed.					
Connecticut River Conservancy - Dam removals on Broad Brook, Turkey Hollow Brook, and Sutton River in 2021. Reopened 27 miles of riparian habitat. Removal of Magic Mountain Dam and Henne Dam in Vermont in 2021. Projects focus on smaller headwater streams with native fish populations that are impacted by dams, culverts, and other artificial structures.	Dam removal can clear waterways and significantly improve fish passage as well as flood resiliency.	In-progress	2017 - present	Connecticut River Conservancy	USDA Natural Resources Conservation Service, US Fish & Wildlife Service, and Vermont Fish & Wildlife Department	deCoizart Foundation, New Hampshire Charitable Foundation
Taunton River Watershed Alliance - Stream Continuity Assessment. A Critical Linkages project was designed to analyze the continuity of over 1,300 streams and waterways in the region, with rankings from 1-5 (1 being the highest) for ecological restoration. Clearing previously obstructed waterways from culverts or fords can maintain healthy ecosystems and protect river networks.	Southeastern MA is also experiencing more severe climate impacts from storms and rising sea levels. Restoring the continuity of streams can help alleviate flood conditions and maintains watershed resilience.	Complete	2017	Taunton River Watershed Alliance, Mass Audubon	Massachusetts Environmental Trust, Eaglemere Foundation	Information not available.
Merrimack River Watershed Council - Tewksbury Hazard Mitigation and Climate Resilience Planning. Town-wide land assessment for flood management and stormwater storage. Analysis on flooding, green infrastructure, and affordable housing parcels. Residents of the town were surveyed on the topic and its impacts.	Many town residents experienced regular flooding either on their properties or on roads leading to and from after heavy rainfall. Implementing green infrastructure has been identified as a priority because it would alleviate flood issues and improve water quality.	Complete	2022	Merrimack River Watershed Council, Weston and Sampson	Town of Tewksbury, Tewksbury Conservation Commission	MVP Action Grant

Project Description	Relevance to Climate Compact	Status	Timeframe	Project Leads	Project Partners	Funding
Mass Audubon - Narragansett Bay Watershed Economy. This was a study on how low impact development and green infrastructure can improve the economy and ecosystem vitality of the Narragansett Watershed in Rhode Island by using natural systems for flood control, water purification, and habitat restoration.	A healthy watershed is important for the economic well-being of a region. Areas that rely on tourism should consider incorporating ecosystem services into development planning and land valuation.	Complete	2020	Mass Audubon, Stanford University, University of Rhode Island	Information not available.	Information not available.
Association to Preserve Cape Cod - Salt Marsh Migration Potential. While coastal wetlands instead of a watershed, salt marshes are highly productive ecosystems that support biodiversity. This project looked at salt marsh restoration as a way to combat sea level rise, coastal erosion and storm surges.	Useful study on salt / brackish water transition zones, considering the Charles River flows into Boston Harbor and the Atlantic.	Complete	2015	Association to Preserve Cape Cod, USGS	Information not available.	Jean B. Edgerly Memorial Fund, Dolphin Fund for Cape Cod, Environmental Trust Fund of Cape Cod, and Permanent Freshwater Fund, the Horizon Foundation, and the Massachusetts Bays National Estuary Program
Sudbury, Assabet and Concord Wild and Scenic Rivers Conservation Plan	Natural resources have been a recurring theme in the stakeholder engagement process for this Strategic Plan.	Complete	2019	SuAsCo Council, National Park Service	Information not available.	Information not available.

Table 2: Existing Strategies in the Watershed

Project Type	Project Description	Status	Timeframe	Project Leads	Project Partners	Funding
Coordination & Collaboration	Charles River Climate Compact: this coalition of watershed communities meets monthly share information and resources, and collaborate on regional climate adaptation and mitigation.	Ongoing	2019-ongoing	CRWA	Participating watershed communities	N/A
Planning	Developing a regional Climate Resilience Strategic Plan for the Charles River Climate Compact, which will describe the vision, goals, priorities, context of work, and roadmap for implementing identified action items. The plan is informed by a robust outreach and engagement process that includes interviews, workshops, surveys, and an Equity Focus Group.	Ongoing	July 2022 - March 2023	CRWA, Town of Medway	Climate Compact, Municipal Advisory Group, MAPC	$37,000, MAPC TAP

Modeling	Building Resilience Across the Charles River Watershed: created a watershed flood model and tested the impact of regional nature-based solutions under various precipitation scenarios. As part of Phase II in 2022, an updated model was used to identify over 50 opportunities for flood mitigation projects and select three priority interventions for flood storage in Waltham, Newton, and Medway. Phase III includes extensive outreach and engagement to watershed residents and climate vulnerable residents.	Ongoing	2020-ongoing	CRWA, CRCC	Communities Responding to Extreme Weather (C.R.E.W)	$830,155, MVP Action Grant
Planning	In 2021 the CRWA received a grant from the Foundation for Metrowest to support funding for developing a regional tree protection and planting plan.	Ongoing	2021-ongoing	CRWA		Foundation for Metrowest
Coordination	CRWA is participating in statewide initiative with the Barr foundation to coordinate groups working on climate adaptation					
Training	CRWA conducts municipal trainings for elected officials and municipal staff, including - Climate Resilience 101 Toolkit - Helping Communities Prepare for Climate Change Training - MS4 Workshop series in 2022, and MS4 Permit Training in 2021 -Engaging climate vulnerable communities trainings	Ongoing		CRWA	MS4 Workshop series: EPA, Brown & Caldwell	MS4 Workshop Series: MassDEP
Advocacy	Advocacy: - Protecting public access to the river, including through the Public Lands Preservation Act & Public Waterfront Act - Building support to remove the Watertown Dam, Charles River Dam in South Natick, Wrentham Eagle Dam, and restore the river - Support for the Drought Management Bill - Water Management Act: advocating for stronger regulations for water withdrawals to protect vital water resources - Preserving restoration progress at Medfield State Hospital - Support for implementation of the MS4 permit program and necessary reductions in stormwater pollution - 2022 CRWA/CLF lawsuit against EPA, and 2019 CRWA/CLF Petition to EPA to exercise its RDA authority to regulate large properties polluting the Charles River with stormwater runoff under the Clean Water Act. Instituting a new permit program to address 50% of the total stormwater pollution is sound, science-based watershed management.	Ongoing	Ongoing	CRWA	EPA/RDA Authority: CLF is a partner	N/A
Restoration	USACE Muddy River Restoration Project included riverbank restoration, landscaping, and dredging to reduce local flooding. CRWA played a leading role in the Maintenance & Management Oversight Committee (MMOC).	Complete		USACE		

Restoration	Canterbury Brook Restoration effort to reimagine and restore Canterbury Brook. Project includes seeking to understand community needs, assess stream health, and identify areas for restoration to improve stormwater management, connect the stream to surrounding wetlands, and improve water quality and habitat.			CRWA	Mass Audubon's Boston Nature Center	
Conceptual Design	Cheesecake Brook Restoration Vision Plan: conceptual designs for the restoration of a portion of the brook. Designs proposed nature-based solutions to help improve water quality, reduce stormwater flooding, and provide habitat.	Complete	2020	CRWA	Horsley Witten Group	Gerstner Family Foundation
Assessment	Health Assessment of the Charles River Natural Valley Storage Area (NVSA). This research focused on a vulnerable priority area in Franklin, MA, and confirmed action is needed to rehabilitate cold-water fish populations, mitigate stormwater pollution, improve water quality, and restore biodiversity. The report recommends priority restoration efforts including removal of the perched culvert at Dix Brook, upgrades to stormwater management systems, invasive plant removal, continued advocacy for land conservation, and low-impact development across the watershed.	Complete	2021	CRWA	USACE, MA Division of Fisheries & Wildlife, X-Cel Conservation Corps	MA Environmental Trust
Outreach & Engagement	CRWA education and outreach activities; including Green Infrastructure Ambassadors, school visits, "Watershed-in-a-Box" demonstrations, River Ambassadors attendance at community events across the watershed, and River Advocates volunteer program and training.	Ongoing	Ongoing	CRWA	N/A	N/A
Data collection	CRWA River Science: collecting water quality data through volunteer monthly monitors, a flagging program, biological monitoring, and water quality reports and data	Ongoing	Ongoing	CRWA	N/A	N/A
Restoration	CRWA River Restoration Work: including advocating for the removal of defunct dams, creation of a watershed restoration plan, working with volunteers to remove invasive species, daylighting streams, assess culverts and prioritize stream-road crossing replacement projects, monitor migratory fish runs, prioritize fish passage improvements.	Ongoing	Ongoing	CRWA	N/A	N/A
Dam Removal	The Charles River Dam in South Natick is in "poor condition" according to DCR Office of Dam Safety. Through a significant information gathering and community engagement process, the Town of Natick Charles River Dam Advisory Committee recommended to the Select Board to remove the Charles River Dam in South Natick. The Natick Select Board upheld this decision with a favorable vote and the Town is moving forward with design and permitting of the river restoration project.	Ongoing	Ongoing	Town of Natick	N/A	Massachusetts EEA & Federal Sources

Planning/Assessment, Modeling	New Charles River Dam in Boston is undergoing a study to assess the adequacy of the New Charles River Dam (from a hydrology and operational point of view) to meet changing climate conditions (sea level change, coastal storms, and watershed rainfall/runoff) through 2085.	Ongoing	Ongoing	USACE	N/A	MA DCR
Assessment	Metro Boston Coastal Flood Management Study: US Army Corps study on regional resilience in the metro Boston area, which includes Charles River watershed communities.	Ongoing	2021-ongoing	USACE	EEA, MAPC	
Climate resilient land use strategies	**Strengthening Floodplain overlay district requirements:** Millis Special Flood Hazard District language includes a strong purpose section. Holliston, Wellesley, and Wrentham do not allow new construction in the floodplain district. Wellesley also applies its Flood Plain District restrictions to a "Watershed Protection District," defined as areas that border a brook, stream, or other water body. Sherborn does not allow new construction in the floodplain district, although a special permit may allow construction with evidence that the locations are not subject to flooding. Wayland has a "Floodplain District" in addition to a Federal Flood Plain Protection District (the FEMA SFHA). Newton's Floodplain/Watershed Protection District includes land adjacent to local streams that is not included in the FEMA SFHA. Weston's Wetland and Flood Plain Protection District includes lands within 25 feet of mean high water of water bodies and brooks and streams, and wetland areas as mapped, where no new structure are permitted, except by Special Permit and after review by the Conservation Commission. Arlington, Brookline, Hopkinton, Milford, Millis, Needham, Walpole, Watertown requires special permits in floodplain overlay districts. Dedham, Ashland, Belmont, Medfield, Medway, Natick requires a Special Permit and establish standards for review for activities in the Floodplain Overlay District. Needham, Wellesley, Natick, Medway, Norfolk, Arlington, Holliston, Hopkinton have adopted language designed to prohibit or limit the expansion of pre-existing structures in their floodplain districts. Dedham, Newton, Brookline, and Cambridge adopted additional requirements for compensatory storage, for bordering land subject to flooding. Wayland requires access in their "Flood Plain District" (distinct from the SFHA) to be above a specified elevation. Sherborn, Watertown, and Medway limit the amount of floodplain district land that can contribute to lot area requirements.	Complete	Various	Various	N/A	N/A

Climate resilient land use strategies	**Strengthening stormwater regulations:** Dedham, Boston, and Cambridge increased infiltration requirements. Dedham, Needham, Arlington, Natick, Westwood, Wayland, Holliston, and Ashland apply stormwater regulations to less than one acre. Arlington, Bellingham, Hopkinton, Walpole require the use of Cornell rainfall records for sizing stormwater infrastructure. Medway and Wellesley require use of NOAA Atlas 14 rainfall rates.	Complete	Various	Various	N/A	N/A
Climate resilient land use strategies	**Strengthening wetlands regulations:** Boston, Arlington, and Wrentham incorporated climate resilience considerations into wetland regulations. Medway, Wellesley, Brookline, Dover, Watertown, Bellingham, Dedham, Lincoln, Medfield, Milford, Millis, Norfolk, Sherborn, Wrentham expanded buffer zone jurisdictions. Dedham, Wellesley extended the Wetlands Protection Act stormwater regulations beyond the state WPA applicability. Wellesley requires that the post-development peak discharge rate be at least 5% less than the pre-development rate for the 2-year and the 10-year 24-hour storms. Bellingham, Dover, Sherborn, Wrentham, Franklin, Needham, Brookline, Wellesley, Ashland expanded Isolated Land Subject to Flooding by reducing the area and/or flood volume required to meet the definition for ILSF. Arlington, Bellingham, Dedham require a 2:1 ratio for compensatory storage. Medway reserves the right to limit the size of lawns and impose irrigation restrictions to protect groundwater supplies. Dedham and Dover include replacement requirements if trees are removed, and guidelines/limitations for tree removal.	Complete	Various	Various	N/A	N/A
Climate resilient land use strategies	**Incorporate climate resilience in site plan review:** Lexington's Site Plan Review Standards include addressing "sustainable, climate-sensitive, and environmentally conscious site design practices". Watertown requires that "proposed developments shall seek to diminish the heat island effect; employ passive solar techniques and design to maximize southern exposures, building materials, and shading; utilize energy-efficient technology and renewable energy resources; and minimize water use."	Complete	Various	Various	N/A	N/A

Climate resilient land use strategies	**Regulate water conservation:** Natick requires water users estimate the "cost of installing, financing, maintaining and replacing a water use system including the cost savings in consumption of water by use of mitigating measures and alternative solutions including but not limited to ultra-low flow devices, composting toilets, recycling and reuse systems, and use of non-potable water." Ashland Water Use Restrictions bylaw establishes a year-round restriction on unattended watering (handheld watering not restricted) of two proscribed watering days (7 p.m. to 7 a.m.) per week. Wayland Lawn Irrigation Systems bylaw prohibits underground irrigation systems that cover an area of 15,000 square feet or more.	Complete	Various	Various	N/A	N/A
Climate resilient land use strategies	**Strengthen tree protections:** The Town of Arlington has a Tree Protection and Preservation bylaw. The City of Somerville parking lot requirements include requirements for landscaped islands every five parking spaces and at the end of every row.	Complete	Various	Various	N/A	N/A
Climate resilient land use strategies	**Climate resilient design standards and guidelines:** Watertown updated design standards in its zoning ordinance. Boston has Coastal Flood Resilience Design Guidelines. Somerville established landscaping requirements called "Green Score."	Complete	Various	Various	N/A	N/A
Climate resilient land use strategies	**Increase Climate Resilience Through Zoning Districts:** Cambridge has requirements for projects in Planned Unit Developments to address expected vulnerability to climate change. Bellingham, Foxborough, Walpole, Wayland, Wellesley, Weston, Ashland adopted Water Resource Protection overlay districts to protect drinking water supply, with language designed to prevent hazardous materials from contaminating municipal water supply.	Complete	Various	Various	N/A	N/A
Transportation	I-90 Multimodal Project to reconstruct I-90 through the Allston neighborhood of Boston	Ongoing	Unclear. MassDOT intends to formally submit the SDEIR to MEPA in 2023	MassDOT	N/A	N/A
Advocacy	The Trustees of Reservations is working on land conservation, community gardens, agro-ecological management at farms, and youth involvement in the watershed.	Ongoing	Ongoing	Trustees of Reservations	N/A	N/A
Advocacy	The Upper Charles Climate Action (UCCA) Node of 350 Massachusetts is promoting legislation, increasing the use of clean energy, and educating the public.	Ongoing	Ongoing	Upper Charles Climate Action	N/A	N/A

				(UCCA) Node of 350 Massachusetts		
Advocacy	Green Newton is advocating for energy efficiency and recycling.	Ongoing	Ongoing	Green Newton	N/A	N/A
Advocacy	Mass Rivers Alliance advocates to protect and restore the Commonwealth's rivers and streams	Ongoing	Ongoing	Mass Rivers Alliance	N/A	N/A
Analysis	Charles & Mystic River Regional Coastal Flood Interventions Project. Participating communities include Arlington, Belmont, Boston, Cambridge (and communities outside of the Charles River watershed, including Chelsea, Everett, Malden, Medford and Revere)	In-progress	2025	Arlington	Resilient Mystic Collaborative (RMC)	$750,000, Community Project Grant
Planning/Assessment, Modeling	Neponset Watershed Regional Adaptation Strategy and Flood Model.	In-progress	FY23	Dedham	The project includes Boston and additional municipalities outside of the Charles River watershed.	$389,457, MVP Action Grant
Convening	Building Resilience to Climate Driven Heat in Metro Boston.	Complete	FY21	Cambridge	Metro Mayors Coalition Climate Preparedness Taskforce communities	$268,820, MVP Action Grant
Construction	Maillet, Sommes, Morgan Constructed Stormwater Wetland.	In-progress	FY23	Reading	Project includes Somerville, Arlington, Cambridge, and additional municipalities outside of the watershed	$2,116,578, MVP Action Grant
Design, permitting	Hurld Park - Heat Resilient Park.	In-progress	FY23	Woburn	Project includes Arlington, Cambridge, Somerville, and additional municipalities outside of the watershed	$271,425, MVP Action Grant
Convening	Amelia Earhart Dam Working Group: elevate by 4 feet for regional flood resilience.	In-progress	Ongoing	Cambridge	Working with RMC, MA DCR, and AECOM	N/A

Planning/Assessment	Equitable Coastal Resilience and Redevelopment in Lower Mystic. Chelsea, Somerville, Everett, Malden, Revere, Winthrop	In-progress	FY23	Chelsea	Somerville, and additional municipalities outside of the watershed	$556,000, MVP Action Grant

Strategy Development

A strategy was defined as, "a tactic used to achieve a goal." As described in Section 2, the project team worked with key stakeholders to brainstorm and refine a menu of strategies for the Climate Compact to pursue over the next 5 years. The intent was to develop a set of strategies with collective support from the Climate Compact that would provide a clear roadmap for determining activities, guiding funding requests and establishing metrics.

The initial set of draft strategies, collected through the Stakeholder Analysis, were grouped by goal. Subsequently, the detailed strategies were translated into higher-level statements in order to make the review, refinement, and prioritization process with stakeholders easier. Finally, the project team created a final set of strategies which were prioritized by the Climate Compact in an online survey, and results were compared to the public survey responses. More details on this process and a breakdown of these themes by respondent group can be found in Table 5 in the Additional Resources section.

The overall themes represented in the set of strategies identified by stakeholders include:

- Stormwater management, nature-based solutions, green infrastructure
- Advocacy
- Biodiversity/Ecological restoration
- Regional collaboration
- Zoning and regulations
- Outreach, engagement, education, communication

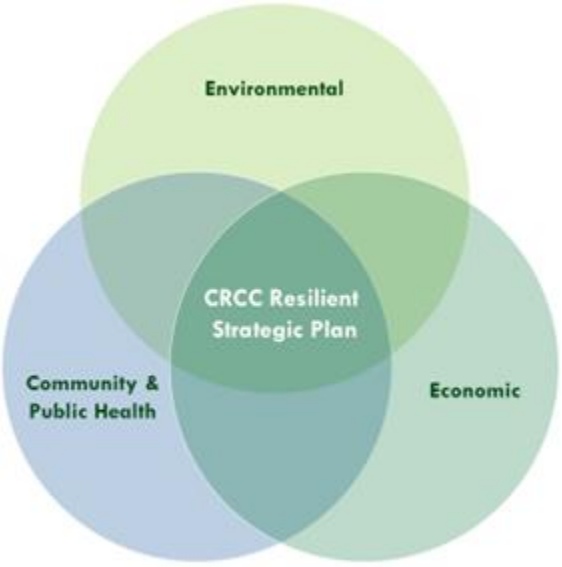
Strategy Roadmap

The table on the following page includes implementation recommendations for high-priority strategies. Medium-, low-, and other priority strategies are also listed. The rankings that determined prioritization were based on Climate Compact votes as follows:

- 7 or more votes = high priority
- 5 and 6 votes = medium priority
- 4 to 1 votes = low priority
- 0 votes = "other"

The implementation roadmap information in the table on the following page also includes the categories listed below. The goal corresponding to each strategy is noted in the table.

- **Timeframe:** some actions could be completed within the next 5 years, while other strategies may take longer or may be an ongoing effort.
- **Lead:** the organization with primary implementation responsibility
- **Co-benefits:** such as community and public health co-benefits (i.e., reducing watershed and community vulnerabilities), environmental co-benefits (i.e., increasing the resilience of natural resources and long-term water quality/quantity), or economic co-benefits (i.e., increasing proactive funding for adaptation, and saving on reactive disaster recovery)
- **Equity Considerations**: what are the equity considerations for the strategy
- **Estimated Cost:** which could include CRWA's staff time, or a ballpark cost estimate
- **Potential Funding:** including possible state and federal grant sources



A diagram of co-benefits

As this Strategic Plan is implemented, many efforts will be led by CRWA as the Climate Compact convener. While not specifically listed as a strategy in this report, we recognize that there is a need to build up resources in general. This could include increasing staffing up at CRWA and potentially hiring a fulltime staff person for the Climate Compact.

Table 3: High Priority Strategies

Strategy	Topics Included	Timeframe	Lead	Co-benefits	Equity Considerations	Est. Cost	Potential Funding
Advocate for climate-related programs, legislation, state-level requirements and restrictions through joint comments letters, meetings or other means. (Goals 3 & 4)	Ecosystem and biodiversity protections, better drought management, flood management, flood protection, state funding	Ongoing	CRWA	Environmental, community, economic	Prioritize projects in and with environmental justice communities	Staff time	N/A
Support municipalities in applying for grants or obtaining other funding that would invest in green stormwater infrastructure implementation and maintenance (Goal 2)	Obtaining implementation funding for identified sites, GSI planning	Ongoing	CRWA	Environmental, economic	Prioritize projects in and with environmental justice communities	Staff time	EPA Healthy Communities Grant, MVP Action Grant, DEP 604b Grants
Develop and support incentives and/or regulatory framework for better stormwater management, including GSI implementation on private property (Goal 2)	Improve/incentivize GSI & better stormwater management - esp. on private property, public education about phosphorus reduction	1-5 years	Municipalities	Community, environmental	Prioritize projects in and with environmental justice communities	Review of regulatory options: $25,000	MVP Action Grant, MS4 Municipal Assistance Grant, EPA Healthy Communities Grant, MAPC ACR Grant
Pursue resiliency strategies with a focus on nature-based solutions, strategies	Identifying opportunities, modeling NBS projects/strategies	1-5 years	Municipalities	Environmental, community, health	Prioritize projects in and with environmental justice communities	$50,000-$500,000 for GI and NBS.	**NBS:** MVP Action Grant, PARC Grant, MAPC ACR Grant.

Strategy	Topics Included	Timeframe	Lead	Co-benefits	Equity Considerations	Est. Cost	Potential Funding
include elevation, dam removal, culvert improvements, land protection/conservation, wetlands and stream restoration, GSI/other water quality focused projects (Goal 1)						$500,000+ for dam removal.	**Restoration and conservation:** DER Priority Project, DER Wetlands Restoration & Cranberry Bog Program, LAND Grant, MA Land and Water Conservation Fund, Private foundations and private sources. **Culverts and Dams:** DER Culvert Replacement Municipal Assistance Grant, EEA Dam and Seawall Repair or Removal Program Grant, DER Regional Restoration Partnerships Grant, NOAA - Community Based Restoration Grant Program, U.S. Fish and Wildlife Service – National Fish Passage Program, FEMA – National Dam Safety Program – Dam Removal, U.S. Army Corps of Engineers – Section 206 Ecological Restoration Program, US Forest

Strategy	Topics Included	Timeframe	Lead	Co-benefits	Equity Considerations	Est. Cost	Potential Funding
							Service, FEMA – National Dam Safety Program, USACE- Water Infrastructure Finance and Innovation Act, National Culvert Removal, Replacement & Restoration Grants. **Water:** Statewide Water Management Act Grant
Coordinate and collaborate with state agencies, regional groups, municipalities, nonprofits, international partners (Goal 1)	Working with partners to advance projects & overall goals, keeping partners informed about our work	Ongoing	CRWA	Environmental	Build relationships with community-based organizations and marginalized communities	Staff time	Private Foundations
Support communities in updating bylaws/ordinances with climate considerations (Goal 1, 2, 6)	Support Stormwater Management, Floodplain, natural resource/tree protection, green zoning bylaw/ordinances in the development and adoption process, educational materials, templates and support tools	1-5 years	CRWA	Environmental, community	Prioritize projects in and with environmental justice communities	Per bylaw update or zoning review project: $25,000-$50,000 Public education campaign: $25,000	EEA Planning Assistance Grant, MVP Action Grant, MAPC TAP Grant, MAPC ACR Grant

Strategy	Topics Included	Timeframe	Lead	Co-benefits	Equity Considerations	Est. Cost	Potential Funding
Develop public educational materials related to water conservation, water quality, local climate impacts, and more. (Goal 1)	Shared educational materials "authored" by the CRCC	1-5 years	CRWA	Environmental, community, health	Build relationships with community-based organizations and marginalized communities; Invest outreach and engagement resources in historically underheard communities	$25,000	EPA Healthy Communities Grant, MAPC TAP Grant, MAPC ACR Grant
Implement nature-based solutions, actively pursue implementation of a feasible number of nature-based solutions that would provide broad benefits such as reducing the heat island effect and managing stormwater flooding. (Goal 2)	Obtain funding and implement NBS projects with broad benefits/impacts	5+ years	Municipalities	Environmental, community, health	Prioritize projects in and with environmental justice communities	$50,000-$500,000	MVP Action Grant, MAPC ACR Grant, PARC Grant, Federal Community Funded Projects
Share regular member updates and plan field trips and an annual in-person meeting (Goal 6)	Coordination	Ongoing	CRWA	Community	Use as opportunity to invest in or spotlight local equity-focused efforts	Staff time	N/A
Formalize external communication process and package/materials for messaging from the Climate Compact. (Goal 6)	CRCC "promotional materials", press kit	1 year	CRWA	Community	Build relationships with community-based organizations and marginalized communities; Invest outreach and engagement resources in	$25,000	MAPC TAP Grant, MVP Action Grant, MAPC ACR Grant

Strategy	Topics Included	Timeframe	Lead	Co-benefits	Equity Considerations	Est. Cost	Potential Funding
					historically underheard communities; Translate materials into multiple languages and avoid technical language		
Training and capacity building programs related to climate impacts, environmental justice, and equity (Goal 6)	Training and capacity building for CRCC members	1 year	CRWA	Community	Invest outreach and engagement resources in historically underheard communities; Translate materials into multiple languages and avoid technical language; Use as opportunity to invest in or spotlight local equity-focused efforts	$25,000-$50,000	EPA Healthy Communities Grant, MAPC TAP Grant, MAPC ACR Grant, MVP Action Grants
Flag grant funding opportunities for communities, pursue funding as a Compact (Goal 6)	Partner to get the funding needed to advance strategies identified in the Plan	Ongoing	CRWA	Community	Prioritize projects in and with environmental justice communities; Build relationships with community-based organizations and marginalized communities	Staff time	N/A

This final set of high priority strategies are mostly related to Goals 1, 2, and 6. This demonstrates a high level of interest from Climate Compact members and stakeholders related to building resilience to climate impacts, nature-based solutions, and establishing a strong regional partnership. The table below includes more information related to the goals associated with each high priority strategy.

Table 4: Goals Related to High Priority Strategies

Goal	Number of Related High Priority Strategies
Goal 1: Build resilience in watershed communities to extreme events caused by climate change, with a focus on flooding and heat, primarily through regional collaboration and identification of effective local solutions.	4
Goal 2: Identify and implement nature-based solutions that mitigate flooding and drought and improve water quality and ecological health across the region.	4
Goal 3: Maintain and improve biodiversity of the river and watershed.	1
Goal 4: Work together to advocate for smart and effective climate laws, policies, and programs at all levels of government.	1
Goal 5: Collaborate on climate mitigation and sustainability efforts.	0
Goal 6: Establish a strong regional partnership through effective Climate Compact logistics, capacity building, and sharing resources.	4

For reference, more information on the grants included in the table of high priority strategies above is available at the following links.

Grants Related to Natural Resources:

- Mass DER Priority Projects: Become a DER Priority Project | Mass.gov
- EEA Local Acquisitions for Natural Diversity (LAND) Grant Program: Local Acquisitions for Natural Diversity (LAND) Grant Program | Mass.gov
- MA Division of Conservation Services Massachusetts Land and Water Conservation Fund Grant Program: Apply to the Massachusetts Land and Water Conservation Fund Grant Program | Mass.gov
- MassDEP: Statewide Water Management Act Grant: Water Management Act Grant Programs for Public Water Suppliers | Mass.gov
- EEA Parkland Acquisitions and Renovations for Communities (PARC) Grant Program: Parkland Acquisitions and Renovations for Communities (PARC) Grant Program | Mass.gov

Grants Related to Infrastructure:

- Mass DER Culvert Replacement Municipal Assistance Grant Program: Culvert Replacement Municipal Assistance Grant Program | Mass.gov
- EEA Dam and Seawall Repair or Removal Program Grants and Funds: Dam and Seawall Repair or Removal Program Grants and Funds | Mass.gov
- List of additional potential funding for dams: Dams additional funding - dams.pdf (mass.gov)

Additional Grants:

- MS4 Municipal Assistance: Grants & Financial Assistance: Watersheds & Water Quality | Mass.gov
- EPA Healthy Communities Grant Program for New England: Healthy Communities Grant Program for New England | US EPA

- MAPC ACR Grant: Accelerating Climate Resiliency Grant Program – MAPC
- MAPC TAP Grant: Funding Opportunities – MAPC
- EEA Planning Assistance Grants: Planning Assistance Grants | Mass.gov

In addition to the high priority strategies outlined in the implementation roadmap in Table 3, the Climate Compact and key stakeholders also identified additional strategies that were ranked as a medium-, low-, or "other" priority. These are summarized below.

Medium-priority strategies include:

1. Promote specialized opt in energy code (DOER Stretch Code)
2. Education on resiliency strategies for developers and public audience
3. Fund land conservation and acquisition efforts
4. Research clean energy strategies
5. Share information on community choice electric programs within the Climate Compact

Low-priority strategies include:

1. Outreach and engagement with youth
2. Create outreach and educational resources on green infrastructure
3. Share municipal success stories and toolkits to help municipalities implement NBS in their communities
4. Updated data analysis, modeling, and mapping regarding future conditions
5. Connect people to recreational opportunities on the river
6. Street tree management, maintenance, and planting
7. Fringe marsh restoration
8. Protect riparian vegetation in private and public lands
9. Funding for Green Infrastructure Maintenance
10. Develop educational posts and brochures about climate action topics including biodiversity
11. Updated modeling, data analysis, and mapping; including GIS biodiversity databases, and habitat and species range change modeling
12. Invasive species removal and native planting
13. Advocate for the State to take more action to reach renewable energy goals
14. Create a clearinghouse of resources and tested vendors for adaptation strategies
15. Public education on community choice electric programs
16. Create subcommittees in the Climate Compact; including related to mitigation, communications, regulation updates, and stormwater.
17. Formalize internal communication strategy and sharing protocol for the Climate Compact
18. Create volunteer opportunities, and connect volunteers with climate education and job opportunities.
19. Have the Climate Compact present at local meetings as an external technical expert
20. Annual/semi-annual one-on-one check ins with each municipal contact/team and CRWA team

Other strategies include:

1. Host public engagement events along the river, including tabling, handing out flyers, riverfront pop-ups, art-related activities
2. Author and share sample language for municipal regulations and requirements
3. Support municipalities in allowing for administrative approval of invasive species removal in resource areas by approved contractors, to encourage residents without creating a permitting burden
4. Create decision-making tools to help municipalities choose resiliency strategies like vegetative green infrastructure that improves ecological health, offers community co-benefits, and can be sited in Environmental Justice and climate vulnerable areas

5. Create educational design guidelines that establish a hierarchy of recommended nature-based solutions. Identify vegetative green infrastructure as high priority interventions, and acknowledge porous pavement and underground infiltration as lower priority alternative options
6. Connect with the Maura Healey administration and find opportunities to align the Climate Compact's and new administration's goals (i.e., meet more frequently with state agency contacts or include them in our meetings)
7. Share information about existing state-level initiatives that municipalities can take part in, promote, support, or build upon
8. Connect and collaborate with other climate collaborative groups
9. Identify preferred example language from literature reviews completed by policy working groups in the watershed

Next Steps & Plan Maintenance

The Climate Compact is working on implementing the high priority action items identified by stakeholders during the resilience strategic planning process. The Resilience Strategic Plan will be updated over time as needs, priorities, funding opportunities, and Climate Compact membership change. The Strategic Plan could be maintained and updated over time using the following strategies:

- **Meetings:** dedicate one Climate Compact meeting each year to monitor plan implementation. These meetings will provide an opportunity to capture implementation updates and identify new planning or project needs.
- **Survey:** as conveners of the Climate Compact, CRWA could prepare and distribute a survey each year to Climate Compact members. The survey could help capture information related to strategy status, updates on progress, and any necessary changes or revisions to the plan.
- **Continuing stakeholder and public participation:** the public dashboard includes a link to the location where CRWA is collecting all public feedback related to projects and initiatives. Ongoing analysis of this public feedback could help inform future Strategic Plan updates.

By maintaining the plan as described above, the Climate Compact could be prepared to begin drafting a full plan update in time for a 5-year update.

5. Additional Information

Key Resources

Links to related information are included below:

- Public webpage and dashboard summarizing the results of this strategic plan: storymaps.arcgis.com/stories/a014144ae19d4c52b8e94465069d233b
- Charles River Watershed Association webpage: crwa.org/climate-compact

Glossary

Climate Resilience: is defined as "the ability of a community to address the needs of its built, social, and natural environment in order to anticipate, cope with, and rebound stronger from events and trends related to climate change hazards, including temperature changes, extreme weather, sea level rise, coastal and inland flooding, changes in precipitation, and other impacts." (Office of Energy and Environmental Affairs).

Climate Adaptation: "the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities." (IPCC)

Climate Mitigation: Reducing the amount of GHG emissions in order to slow and mitigate the impacts of climate change.

Equity: a commitment to working with marginalized groups and vulnerable communities who may be at the front lines of climate impacts. This could include actively collaborating with stakeholders to bridge the gap and promoting their needs, allowing for a more just society where all voices are heard.

Green Infrastructure (GI): Integration of natural systems and elements to provide a specific service, often water infiltration, filtration, or storage. May include engineered elements in addition to natural elements. May also provide co-benefits such as shade, cooling, wild-life habitat, recreation etc.

Low-Impact Development (LID): Term used to describe site design and stormwater management practices used to manage runoff and pollutant loadings on-site or as close to on-site as possible.

Nature-Based Solution (NBS): A term used to describe projects that use ecosystems to provide services and benefits through the preservation, conservation, restoration, or creation of natural systems such as wetlands. May provide additional co-benefits such as outdoor space and recreation, wild-life habitat, and carbon reduction or sequestration.

Resilience: preparing for extreme events like flooding, heat, and drought. This could include adaptation strategies such as green infrastructure and bioswales to absorb stormwater runoff.

Sustainability: living in a balanced, equitable, co-existence with people, wildlife, and our environment and managing our resources responsibly to ensure the longevity of life on Earth. This could include mitigation strategies such as solar panels.

Sea Level Rise (SLR): Sea level rise is the amount that the ocean elevation will increase due to climate change. The amount of SLR projected is based on different greenhouse gas emissions scenarios, due in

part to the degree that polar ice caps melt. Sea Level Rise rates are also impacted by local topography and land subsidence.

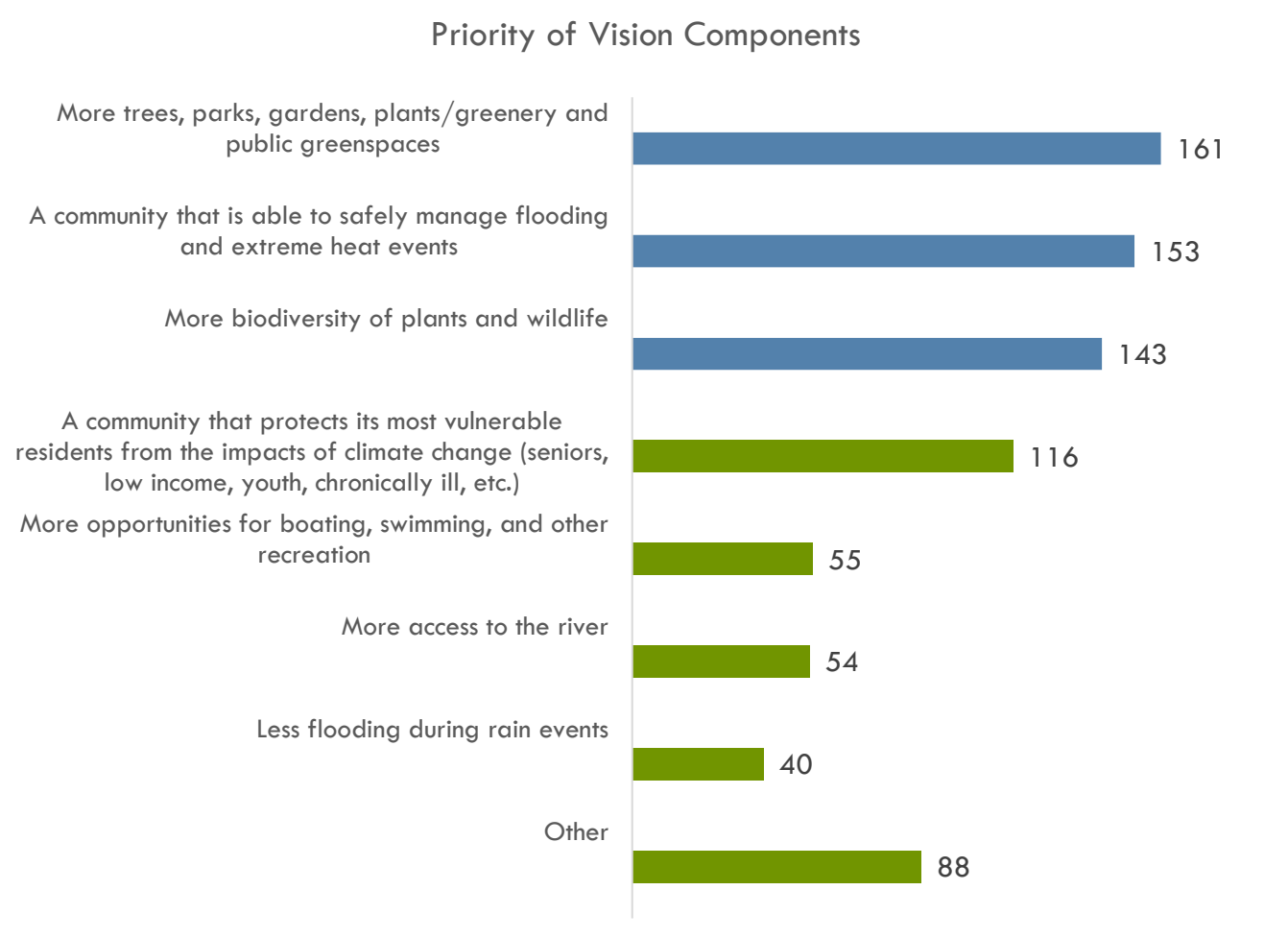
Public Survey Analysis Details

Comparison of Stakeholder and Public Input

Vision Statement

- While the emphasis of the final vision statement was different, it includes all of the components that were most highly prioritized by respondents to the public survey:
    - "A healthy and resilient Charles River" includes (1) more trees, parks, green spaces, etc.
    - Resilience is highlighted throughout the Vision Statement and aligns with the public survey's emphasis on (2) managing flooding and extreme heat events.
    - The mention of (3) more diversity and wildlife is captured in the Vision Statement
- The fourth most-popular response was "A community that protects its most vulnerable residents from the impacts of climate change (seniors, low income, youth, chronically ill, etc.)" which aligns with the mentioned of equity in the Vision Statement.
- The focus of the Vision Statement ended up being more targeted at municipal collaboration, which was not an option in the survey, but makes sense for the role and function of the Climate Compact group.

Figure 6: Public survey prioritization of vision statement components

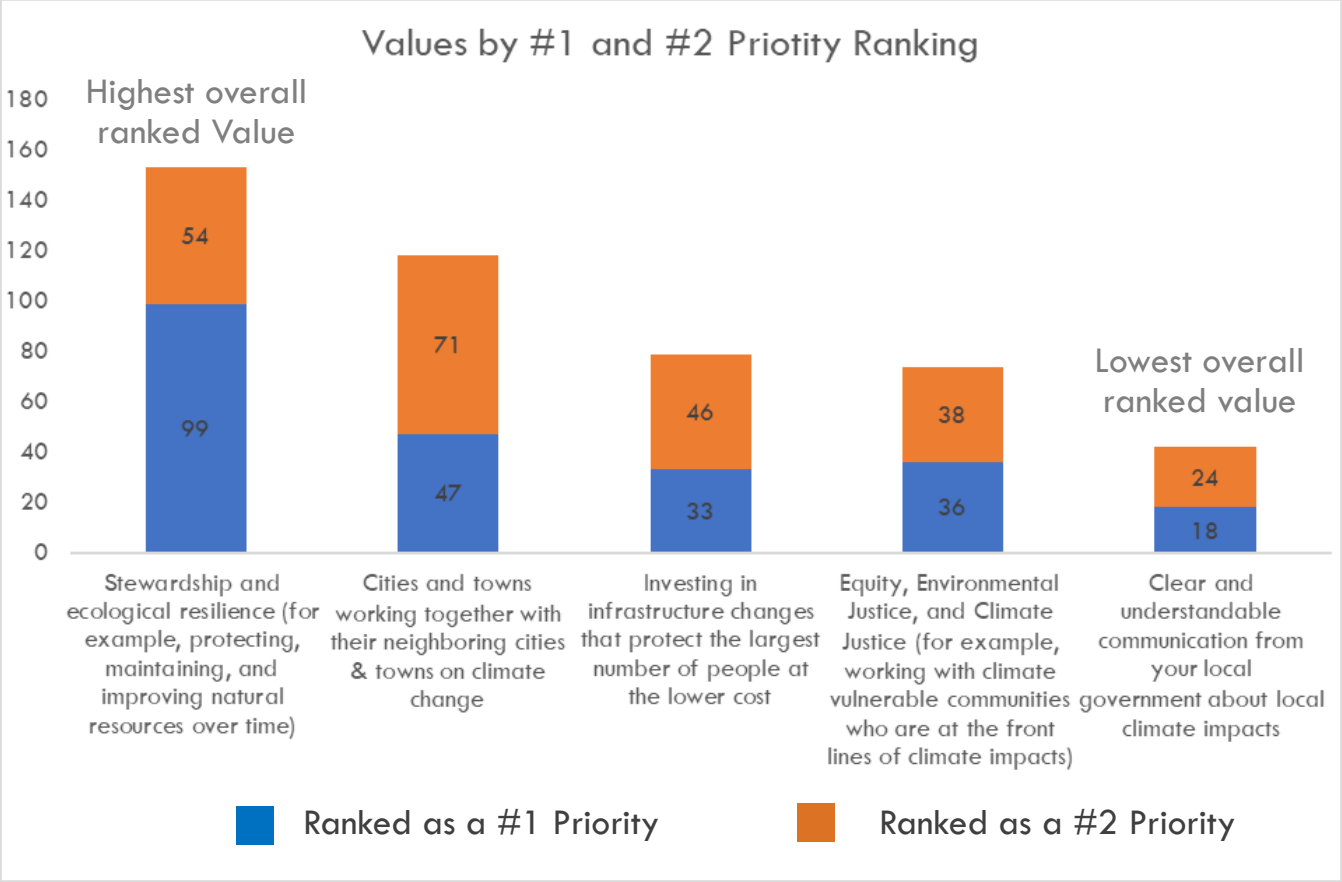


Please see Section 3 for more information on the final Vision statement.

Values

- Overall, the Values identified through the previous engagement processes seem to align with the public survey results.
    - Stewardship and ecological resilience received the most #1 rankings
    - Cities and towns working together received the second most #1 rankings, followed by Equity and Environmental Justice

Figure 7: Public survey ranking of values

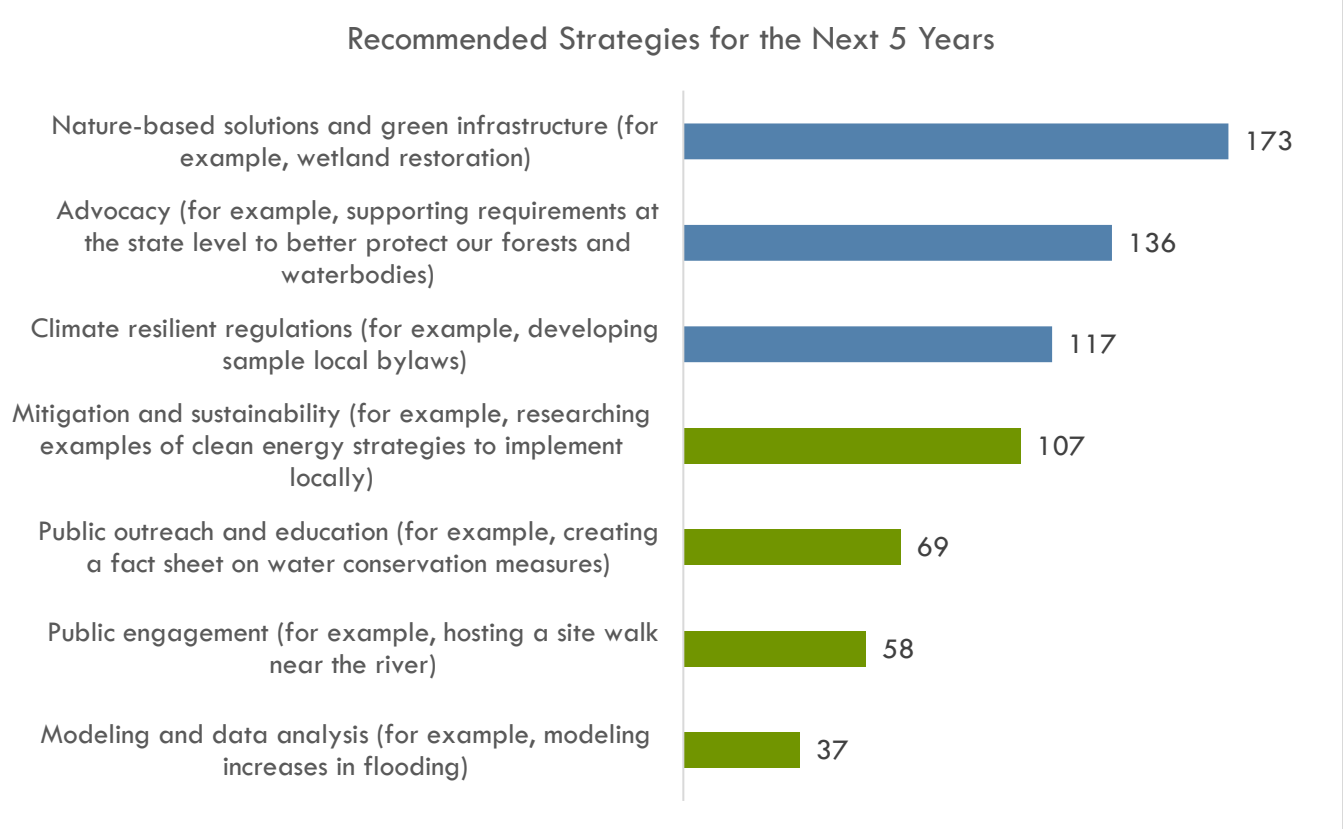


Please see Section 3 for more information on the final Value statements.

Goals and Strategies

- The top results of the public survey are reflected in the goals and priority strategies identified through other means of engagement
- There is an understandable difference in the emphasis of the public survey responses on high-level solutions (nature-based solutions, advocacy, regulation), not knowing the details of the Climate Compact's composition and jurisdiction.
- The benefit of things like data analysis, modeling, grant applications, etc. may not be as clear to members of the public.
- It is interesting to note that public outreach and public engagement were in the bottom three (out of seven) strategy options in the public survey responses.

Figure 8: Public survey prioritization of strategies



Public Survey Results by Urban or Suburban

When broken down by classification of the cities and towns as urban or suburban, most of the prioritizations remain consistent. The designation of urban or suburban was created based on MAPC's Housing Submarkets typology. The order of priority for the vision statement components were nearly the same for urban and suburban communities. Urban communities prioritized the vision for "A community that is able to safely manage flooding and extreme heat events" slightly more than they valued "More trees, parks, gardens, plants/greenery and public greenspaces."

Values ranked a bit differently between urban and suburban communities. The highest-ranked value for both was "Stewardship and ecological resilience," however, the second-most highly ranked value for suburbs was "Cities and towns working together with their neighboring cities & towns on climate change" while the second-highest for urban areas was "Equity, Environmental Justice, and Climate Justice (for example, working with climate vulnerable communities who are at the front lines of climate impacts)."

Finally, there were minor discrepancies between the ordering of importance of strategies between urban and suburban cities and towns, though they were not significant.

Figure 9: Public survey prioritization of vision statement components by urban vs suburban

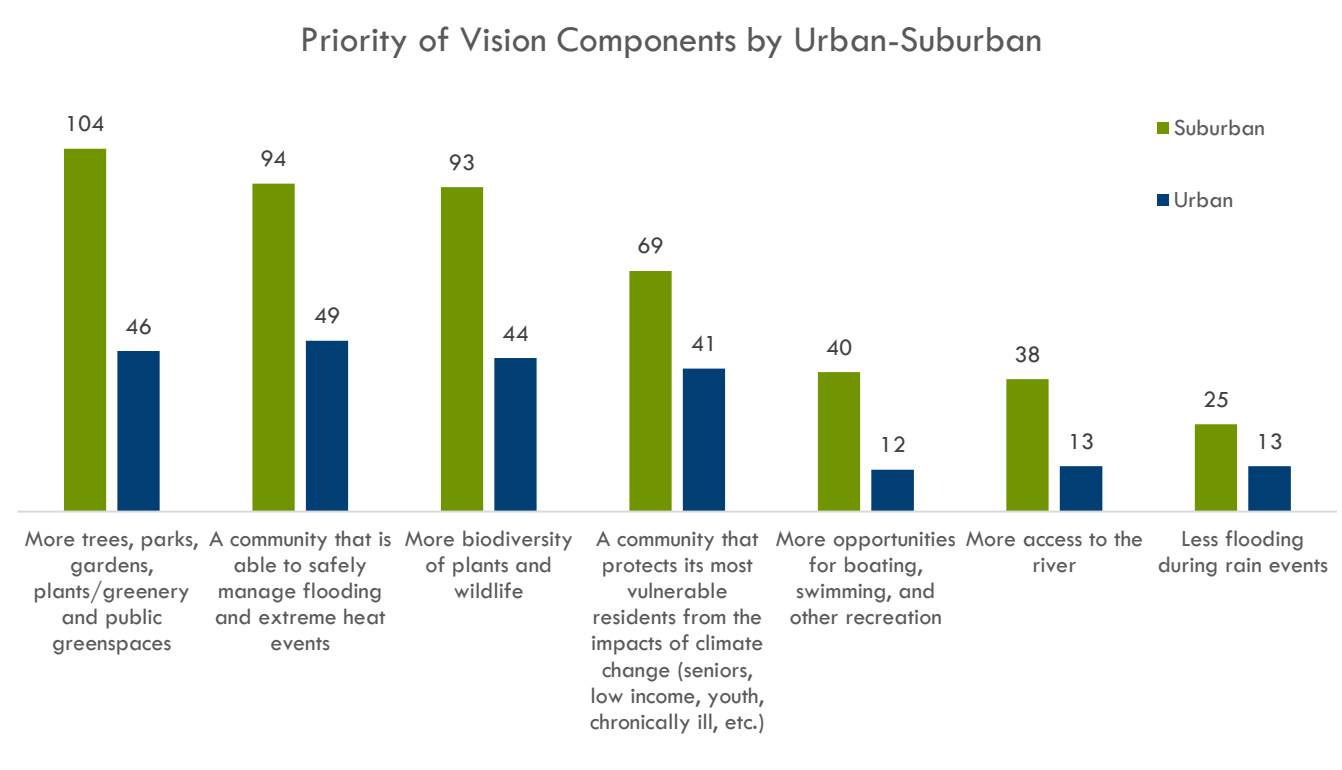


Figure 10: Public survey ranking of values by urban vs suburban

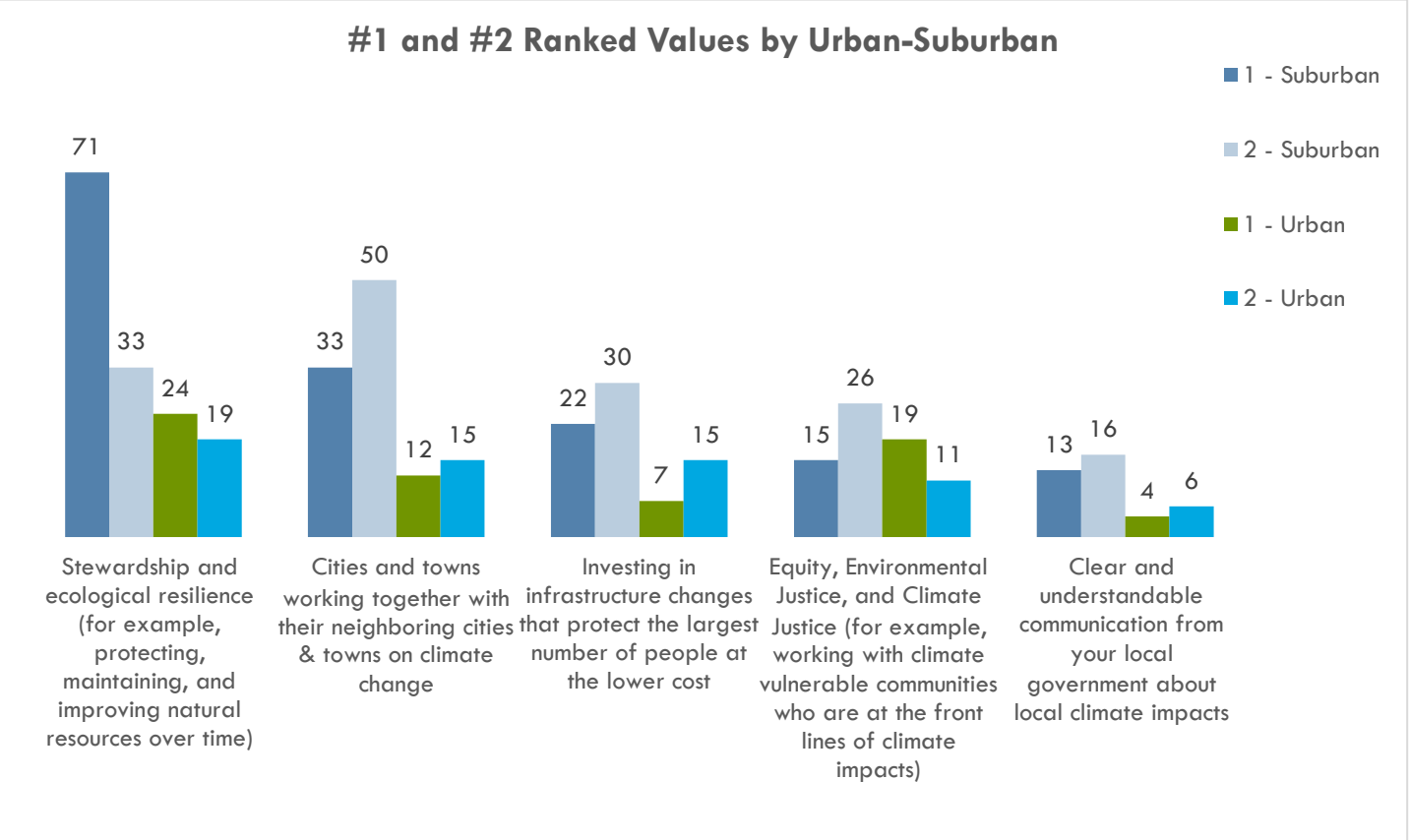
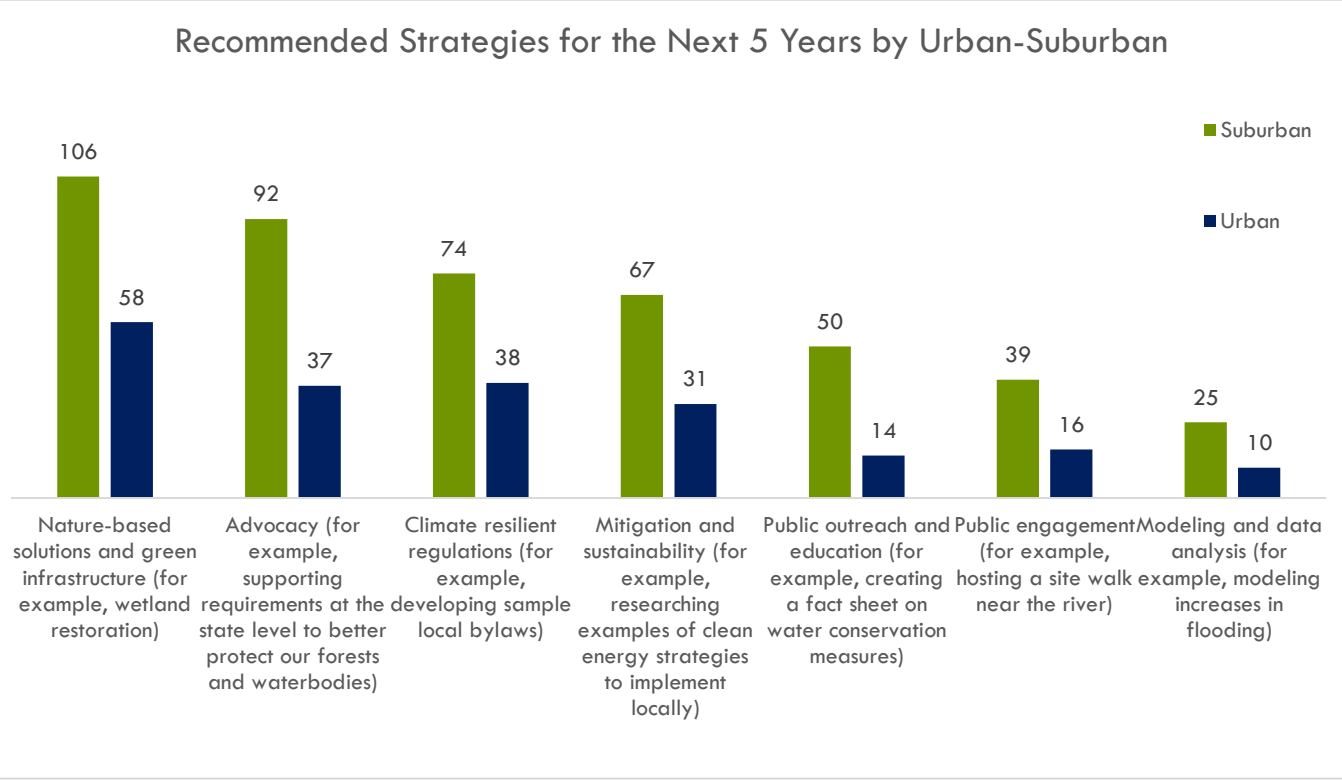


Figure 11: Public survey prioritization of strategies by urban vs suburban



Synthesis of Various Stakeholder Engagement Input Sources

This table compares the top strategies identified through the three main engagement formats related to strategy development: focus groups and interviews with key stakeholders, Climate Compact meetings, and the public survey.

Table 5: Aggregated Strategy Prioritization

Focus Groups & Interviews	Climate Compact	Public Survey
6 meetings *(Numbers indicate discrete strategy ideas related to each topic that were suggested in these meetings)*	***27 responses to prioritization survey*** *(Numbers indicate "votes" from Climate Compact for each strategy)*	***294 responses from residents in the Watershed*** *(Numbers of respondents who selected this as a recommended strategy)*
• Stormwater management (17) • Regional collaboration (16) • Accessible communication: outre ach, education, engagement (13) • Biodiversity/wildlife, address invasives (13) • Green infrastructure (12) • Local to global scale: updating zoning, policies, and legislation; advocacy (12)	• Advocate for climate related programs, legislation, state-requirements (16) • Support municipalities in applying for grants (14) • Build on existing stormwater management efforts (13) • Pursue resiliency strategies including elevation, dam removal,	• Nature-based solutions and green infrastructure (173) • Advocacy (136) • Climate resilient regulations (117) • Mitigation and sustainability (i.e., clean energy) (107) • Public outreach and education (69)

Focus Groups & Interviews	Climate Compact	Public Survey
6 meetings *(Numbers indicate discrete strategy ideas related to each topic that were suggested in these meetings)*	***27 responses to prioritization survey*** *(Numbers indicate "votes" from Climate Compact for each strategy)*	***294 responses from residents in the Watershed*** *(Numbers of respondents who selected this as a recommended strategy)*
• Recreational access (11)	culvert improvements, restoration, etc. (12) • Coordinate and collaborate with state agencies, regional groups, and other partners (11) • Advocate for updated requirements at state level to protect biodiversity (10)	

Please see Section 3 for more information on the final Goals, and Section 4 for the final list of strategies.

Acronym List

ACR – Accelerating Climate Resilience Grant Program
CPA – Community Preservation Act
CRCC – Charles River Climate Compact
CRWA – Charles River Watershed Association
DEP – Department of Environmental Protection
EEA – Executive Office of Energy & Environmental Affairs
EPA – Environmental Protection Agency
GI – Green Infrastructure
GIS – Geographic Information System
HMP – Hazard Mitigation Plan
LID – Low Impact Development
MAPC – Metropolitan Area Planning Council
MS4 – Municipal Separate Storm Sewer Systems
MVP – Municipal Vulnerability Preparedness
NBS – Nature-Based Solutions
SLR – Sea Level Rise
TAP – Technical Assistance Program

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