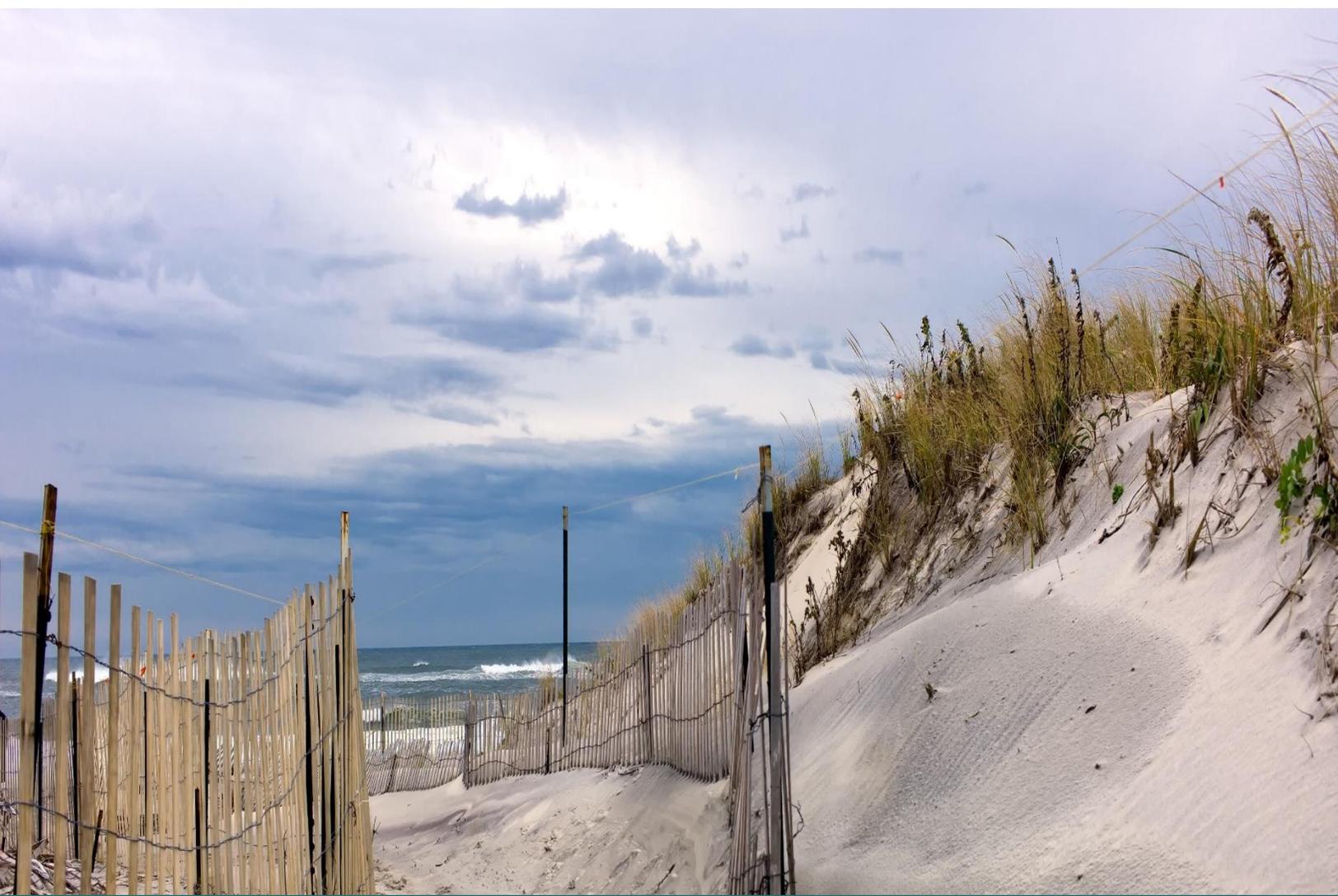


# RESILIENCE IMPLEMENTATION AND STRATEGIC ENHANCEMENTS (RISE)



## LOCAL ASSESSEMENT TOOL



January 2020

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## GLOSSARY OF TERMS

1% Annual Chance of Flood (formerly 100-year flood)	A flood that has a 1 percent chance of being equaled or exceeded in any single year. <sup>1</sup>
.2% Annual Chance of Flood or (formerly 500-year flood)	A flood that has a 0.2 percent (1 in 500) chance of being equaled or exceeded in any single year. <sup>2</sup>
Accessibility	The ability to access products, services, or environments; this context refers to access to transportation and emergency services.
Capacity building	Activities and improved access to knowledge and tools that provide individuals and organizations with the skills necessary to function at the highest possible level.
Critical infrastructure	A community's essential systems and networks; includes transportation, utilities, health care, water, wastewater, etc.
Community Rating System	A voluntary program for National Flood Insurance Program participating communities to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. <sup>3</sup>
Dry floodproofing	A structure is made watertight below the level that needs flood protection to prevent floodwaters from entering; requires sealing the walls with waterproof coatings, impermeable membranes, or a supplemental layer of masonry or concrete. <sup>4</sup>
Equity	(1) The fair, just and equitable management of all institutions serving the public directly or by contract; the fair, just and equitable distribution of public services and implementation of public policy; and the commitment to promote fairness, justice, and equity in the formation of public policy. <sup>5</sup> (2) Providing various levels of support based on specific needs to achieve greater fairness across environmental and social dimensions.
Economic vulnerability	The level of risk faced by a local economy or to an individual's ability to earn income. For example, local economies that are highly dependent on a single employer or producer face a higher level of economic vulnerability than does a more diversified local economy.
Environmental justice	The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income, with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. <sup>6</sup>
Floodplain	The flat or nearly flat land adjacent to a stream or river that experiences occasional flooding; includes the floodway (consists of the stream channel and adjacent areas that carry flood flows) and the flood fringe (areas covered by the flood, but which do not experience a strong current). <sup>7</sup> Floodplain maps typically indicate the 100-year and 500-year flood areas.
Green infrastructure	Vegetation, soils, and other elements and practices that reduce and treat stormwater at its source while delivering environmental, social, and economic benefits. <sup>8</sup>
Inclusion	The action of including/involving people or groups in activities. This context refers to the inclusion of underrepresented groups in the planning processes.
Living shoreline	A variety of structural and organic materials, such as wetland plants, submerged aquatic vegetation, oyster reefs, coir fiber logs, sand fill, and stone utilized to provide shoreline protection and maintain valuable habitat. <sup>9</sup>
Low impact design/development	Systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration, or use of stormwater to protect water quality and associated aquatic habitat. <sup>10</sup>

<sup>1</sup> [msc.fema.gov/portal](https://www.fema.gov/portal)

<sup>2</sup> [msc.fema.gov/portal](https://www.fema.gov/portal)

<sup>3</sup> [https://www.fema.gov/media-library-data/1503240360683-30b35cc754f462fe2c15d857519a71ec/20\\_crs\\_508\\_oct2017.pdf](https://www.fema.gov/media-library-data/1503240360683-30b35cc754f462fe2c15d857519a71ec/20_crs_508_oct2017.pdf)

<sup>4</sup> [www.fema.gov/media-library-data/20130726-1608-20490-9182/fema\\_551\\_ch\\_07.pdf](https://www.fema.gov/media-library-data/20130726-1608-20490-9182/fema_551_ch_07.pdf)

<sup>5</sup> <https://www.napawash.org/about-us/who-we-are/>

<sup>6</sup> [www.epa.gov/environmentaljustice](https://www.epa.gov/environmentaljustice)

<sup>7</sup> [www.sciencedaily.com/terms/floodplain.htm](https://www.sciencedaily.com/terms/floodplain.htm)

<sup>8</sup> [www.epa.gov/green-infrastructure/what-green-infrastructure](https://www.epa.gov/green-infrastructure/what-green-infrastructure)

<sup>9</sup> [www.habitat.noaa.gov/restoration/techniques/livingshorelines.html](https://www.habitat.noaa.gov/restoration/techniques/livingshorelines.html)

National Flood Insurance Program	A program that aims to reduce the impact of flooding on private and public structures by providing affordable insurance to property owners and by encouraging communities to adopt and enforce floodplain management regulations. <sup>11</sup>
Non-conforming uses/structures/lots	A use of property, a structure, or a lot size that was allowed under the zoning regulations at the time the use was established, the structure was erected, or the lot was platted, but which, because of subsequent changes in those regulations, is no longer a permitted use/structure/lot. <sup>12</sup>
Risk	The possibility that a natural disaster will occur that will have adverse effects. A risk calculation is a function of impact (i.e., consequences if the risk occurred) and the likelihood of the risk occurring.
Smart growth practices	A range of development and conservation strategies that help protect health and the natural environment and make communities more attractive, economically stronger, and more socially diverse. <sup>13</sup>
Social vulnerability/ socially vulnerable populations	Socioeconomic and demographic factors (age, income and poverty, education, housing, race, disability, social isolation, and more) that may affect an individual's ability to respond to hazard events.
Special Flood Hazard Area (SFHA)	The land area covered by the floodwaters of the base flood as identified on a National Flood Insurance Program map; the area where the National Flood Insurance Program's floodplain management regulations must be enforced and the area where the mandatory purchase of flood insurance applies. <sup>14</sup>
Substantial improvement	Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. <sup>15</sup>
Substantial damage	Damage of any origin sustained by a structure whereby the cost of restoring the structure to its before damaged condition would equal or exceed 50 percent of the market value of the structure before the damage occurred. <sup>16</sup>
Vulnerability	The diminished capacity of an individual or group to anticipate, cope with, resist and recover from the impact of a natural or man-made hazard. The concept is relative and dynamic. <sup>17</sup>
Vulnerability assessment	A study characterizing the physical location of hazards and identifying the social, environmental, and economic assets which may be impacted
Watershed	A watershed is an area of land that drains all the streams and rainfall to a common outlet such as the outflow of a reservoir, mouth of a bay, or any point along a stream channel. <sup>18</sup>
Wet floodproofing	Permanent or contingent measures applied to a structure or its contents that prevent or provide resistance to damage from flooding while allowing floodwaters to enter the structure or area. <sup>19</sup>

<sup>10</sup> [www.epa.gov/nps/urban-runoff-low-impact-development](http://www.epa.gov/nps/urban-runoff-low-impact-development)

<sup>11</sup> [www.fema.gov/national-flood-insurance-program](http://www.fema.gov/national-flood-insurance-program)

<sup>12</sup> [mrc.org/Home/Explore-Topics/Planning/Development-Regulations/Nonconforming-Uses-Structures-and-Lots-Regulation.aspx](http://mrc.org/Home/Explore-Topics/Planning/Development-Regulations/Nonconforming-Uses-Structures-and-Lots-Regulation.aspx)

<sup>13</sup> [www.epa.gov/smartgrowth/about-smart-growth](http://www.epa.gov/smartgrowth/about-smart-growth)

<sup>14</sup> [www.fema.gov/special-flood-hazard-area](http://www.fema.gov/special-flood-hazard-area)

<sup>15</sup> [www.fema.gov/floodplain-management-old/substantial-improvement#0](http://www.fema.gov/floodplain-management-old/substantial-improvement#0)

<sup>16</sup> [www.fema.gov/floodplain-management-old/substantial-improvement#0](http://www.fema.gov/floodplain-management-old/substantial-improvement#0)

<sup>17</sup> <https://www.ifrc.org/en/what-we-do/disaster-management/about-disasters/what-is-a-disaster/what-is-vulnerability/>

<sup>18</sup> [water.usgs.gov/edu/watershed.html](http://water.usgs.gov/edu/watershed.html)

<sup>19</sup> [www.fema.gov/wet-floodproofing](http://www.fema.gov/wet-floodproofing)

## COMMON ACRONYMS

BFE: Base Flood Elevation

BMP: Best Management Practice (stormwater)

CFM: Certified Floodplain Manager

CIP: Capital improvement plan

CRS: Community Rating System

EPA: Environmental Protection Agency

FAR: Floor area ratio

FEMA: Federal Emergency Management Agency

FIRM: Flood Insurance Rate Map

GI: Green infrastructure

GIS: Geographic Information Systems

LEED: Leadership in Energy and Environmental Design

LID: Low-impact design

LiMWA: Limit of Moderate Wave Action

NFIP: National Flood Insurance Program

NPDES: National Pollution Discharge Elimination System

PDR: Purchase of Development Rights

RCD: Resource Conservation District

RL: Repetitive loss properties

SBA: Small Business Administration

SD: Substantial damage

SFHA: Special Flood Hazard Area

SI: Substantial improvement

SLAMM: Sea Level Affecting Marshes Model

SLOSH maps: Sea, Lake and Overland Surge from Hurricanes flood maps

SRL: Severe repetitive loss properties

TDR: Transfer of Development Rights

## INTRODUCTION

What does it mean to be resilient? Climate-resilient communities understand potential hazards, risks and vulnerabilities, and are prepared and able to adapt when faced with change or unexpected circumstances. These communities can offer greater protection to the lives and property of residents and recognize that building resilience requires both hard and soft measures, from infrastructure enhancements to policies and governance, at the local and regional levels, and beyond.

In response to recent disasters and hazard-related events, more communities are working towards building resilience. But even motivated communities often find that challenges stand in the way – particularly when it comes to implementation. There might be political barriers or objections to resilience-building efforts in the community, such as an unwillingness to confront future problems, concerns about private property rights, or an expectation of high costs. Some communities may not prioritize resilience, choosing to focus their resources on other issues such as attracting business and jobs, or stimulating housing development. However, with some foresight and the help of model strategies, resilience can be effectively incorporated into a broad spectrum of community planning efforts and policies, allowing communities to avoid an “either/or” choice.

The **Resilience Implementation and Strategic Enhancements (RISE) Local Assessment Tool** helps you approach hazards and risks comprehensively; and assess and refine your laws and policies in a way that improves resilience and helps achieve desired community outcomes. The tool works by assessing two critical elements of building resilience:

- the “how” – once identified, resilience-enhancing measures can be successfully integrated into existing land use laws, building codes, and planning policies; and
- the “what” – gaps in policies and regulations that support resilience.

It does so by walking communities through the following Resilience Focus Areas:

1. Ensure comprehensive understanding of known hazards, risks and vulnerabilities, and their potential effects (physical, economic, social)
2. Conserve land in critical coastal areas, river corridors, and other hazard-prone environments
3. Reduce risk to people, buildings, and facilities in vulnerable areas
4. Plan for and encourage development in safer areas
5. Implement comprehensive stormwater management techniques
6. Improve the community capacity needed to enhance resilience
7. Build community support for improving resilience and remove barriers to implementation

Once you have completed the assessment, you will have a more comprehensive understanding of how your community is currently addressing resilience and working towards community goals of enhancing resilience. While the assessment won’t prescribe a solution for your community, it allows you to see your successes and strengths, and your gaps and challenges. In addition, it connects these factors to specific and applicable resources and strategies for improving resilience, including applicable land use codes and tools.

## WHO WILL BENEFIT FROM USING THIS TOOL?

This tool specifically addresses the challenges that face communities affected by coastal or riverine hazards but can be used by any community that desires to enhance its resilience. To focus on implementation more directly, **this tool presumes that your community has done some preliminary work on developing a community vision or goals focused on resilience.** While there is an emphasis on land use laws, codes, and zoning regulations, the assessment extends beyond regulatory issues to help your community also take stock of local initiatives, strategies, and plans.

## GETTING READY TO COMPLETE THE TOOL

### Who Can Help Fill This Out?

The assessment is often most effective when communities approach it collaboratively, with a variety of expertise present at the table. Forming a steering committee or review group is an efficient way to ensure that the necessary information can be accessed and interpreted. Additionally, forming a group to assess resilience may help to cultivate buy in from officials with the authority to make decisions and allocate funding. A well-functioning group generally consists of three to six (or more) people who are sources of key community information as well as individuals who are willing to be on-going champions of building resilience.

Working through this type of tool can bring communities together in unexpected ways and can lead to long-lasting partnerships. New connections are critical when moving into the implementation phase. Remember that some of these potential partners may be in your applicable state and federal agencies/offices.

### What Will I Need to Complete the Tool?

Successfully working through the assessment tool also requires access to key information and documents. It helps to have certain baseline information on hand or know where you can find the information you need (or who can help you find it).

Every community is different and has different needs and staffing structures. Table 1 provides suggestions to help get you started, recommends options for steering committee members, and provides examples of documents, plans, policies, and ordinances that may be useful to you as you work through the tool.

Table 1. Preparing to Complete the Tool – Useful Resources

PERSON/ AGENCY/ ORGANIZATION	RELEVANT RESILIENCE FOCUS AREA(S)	CAN ALSO HELP PROVIDE	STEERING COMMITTEE
Certified floodplain manager/ County Soil and Water Conservation District staff	All focus areas	<ul style="list-style-type: none"> <li>Hazard/flood insurance rate maps (FIRM)</li> <li>Hazard mitigation plan</li> <li>Emergency operations plan</li> <li>Post-disaster recovery plans and studies</li> <li>Municipal zoning code</li> </ul>	X
Chief Resilience	All focus areas	<ul style="list-style-type: none"> <li>Hazard mitigation plan</li> </ul>	X

Officer		<ul style="list-style-type: none"> <li>• Post-disaster recovery plans and studies</li> <li>• Context-appropriate environmental codes/regulations (for example, a coastal area plan)</li> </ul>	
City or land use attorney	Focus area 2 Focus area 7	<ul style="list-style-type: none"> <li>• Municipal zoning code</li> </ul>	
Coastal zone manager/planner	Focus area 1 Focus area 2 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Hazard/flood insurance rate maps (FIRM)</li> <li>• Hazard mitigation plan</li> <li>• Post-disaster recovery plans and studies</li> <li>• Context-appropriate environmental codes/regulations (for example, a coastal area plan)</li> </ul>	X
Code enforcement officer	Focus area 3 Focus area 5 Focus area 6	<ul style="list-style-type: none"> <li>• Municipal zoning code</li> <li>• Municipal building code</li> </ul>	
Community and economic development staff	Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Comprehensive/master plan</li> <li>• Municipal zoning code</li> </ul>	X
Developer liaison(s)	Focus area 3 Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Comprehensive/ master plan</li> <li>• Municipal zoning code</li> <li>• Municipal building code</li> <li>• Subdivision regulations</li> </ul>	
Emergency manager/ planner	All focus areas	<ul style="list-style-type: none"> <li>• Hazard/flood insurance rate maps (FIRM)</li> <li>• Hazard mitigation plan</li> <li>• Emergency operations plan</li> <li>• Post-disaster recovery plans and studies</li> </ul>	X
Health department/ public health staff	Focus area 1 Focus area 3 Focus area 4 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Community health assessment</li> </ul>	X
Land use planner	All focus areas	<ul style="list-style-type: none"> <li>• Comprehensive/master plan</li> <li>• Municipal zoning code</li> <li>• Subdivision regulations</li> </ul>	X
Local environmental organizations	Focus area 2 Focus area 7	<ul style="list-style-type: none"> <li>• Context-appropriate environmental codes/regulations</li> </ul>	
Natural resources planner or department	Focus area 1 Focus area 2 Focus area 4 Focus area 5 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Subdivision regulations</li> <li>• Context-appropriate environmental codes/regulations (for example, a coastal area plan)</li> </ul>	
Parks and recreation staff	Focus area 1 Focus area 2 Focus area 5 Focus area 7	<ul style="list-style-type: none"> <li>• Parks/ open space master plan</li> </ul>	

Public works	Focus area 1 Focus area 3 Focus area 5 Focus area 6	<ul style="list-style-type: none"> <li>• Emergency operations plan</li> <li>• Capital improvements plan</li> </ul>	X
Relevant municipal board members (including volunteer) or elected officials	Focus area 1 Focus area 6 Focus area 7	<ul style="list-style-type: none"> <li>• Municipal zoning code</li> <li>• Subdivision regulations</li> <li>• Comprehensive/master plan</li> </ul>	X
Stormwater manager/utility	Focus area 1 Focus area 5 Focus area 6	<ul style="list-style-type: none"> <li>• Stormwater management plan</li> <li>• Subdivision regulations</li> <li>• Context-appropriate environmental codes/regulations</li> </ul>	X
Sustainability planner	All focus areas	<ul style="list-style-type: none"> <li>• Comprehensive/master plan</li> <li>• Municipal zoning code</li> <li>• Municipal building code</li> <li>• Subdivision regulations</li> <li>• Context-appropriate environmental codes/regulations (for example, a coastal area plan)</li> </ul>	
Transportation planner and engineer	Focus area 1 Focus area 3 Focus area 5	<ul style="list-style-type: none"> <li>• Comprehensive transportation plan</li> <li>• Road conditions reports</li> </ul>	
Zoning administrator	Focus area 2 Focus area 3 Focus area 4 Focus area 5	<ul style="list-style-type: none"> <li>• Municipal zoning code</li> <li>• Subdivision regulations</li> </ul>	X

## Potential Challenges

The U.S. EPA report “Smart Growth Fixes for Climate Adaptation and Resilience” presents a selection of potential challenges that a community might face when working to implement strategies to improve resilience.<sup>20</sup> Table 2 provides a summary of example challenges that might be encountered. These are helpful to think about when completing the Assessment. Often a solution will emerge from a more comprehensive view of a problem.

Table 2. Potential Challenges to Implementing Resilience Strategies

BARRIERS	EXAMPLES
Regulatory and Policy	<ul style="list-style-type: none"> <li>• Allowing development in floodplains</li> <li>• Outdated flood maps</li> <li>• Conflicting regulations</li> <li>• Policy/regulations not guided by data/projections</li> </ul>
Fiscal	<ul style="list-style-type: none"> <li>• Perceptions of high cost</li> <li>• Inefficient public spending</li> </ul>
Uncertainty	<ul style="list-style-type: none"> <li>• Absence of reliable data about resilience risks</li> </ul>

<sup>20</sup> Resource material for this section was sourced from the publication “Smart Growth Fixes for Climate Adaptation and Resilience,” U.S. EPA, Office of Sustainable Communities, 2017. <https://www.epa.gov/smartgrowth/smart-growth-fixes-climate-adaptation-and-resilience>

	<ul style="list-style-type: none"> <li>• Perceptions of data complexity</li> </ul>
Societal Disparities	<ul style="list-style-type: none"> <li>• Areas most at risk affect those most vulnerable</li> <li>• Conflicting priorities/needs</li> </ul>
Timeframe of impacts	<ul style="list-style-type: none"> <li>• Discounting future impacts</li> <li>• “It won’t affect me”</li> </ul>
Legal issues	<ul style="list-style-type: none"> <li>• Authority to legislate (Home Rule states versus Dillon’s Rule states)</li> <li>• Conflicts with existing state or local law</li> <li>• Regulatory “takings”</li> </ul>
Community Consensus	<ul style="list-style-type: none"> <li>• “Not in My Back Yard” opposition</li> </ul>

## TOOL STRUCTURE

The **RISE Local Assessment Tool** is organized by the seven Resilience Focus Areas identified above, each broken into four activity types and collectively containing nearly 160 specific local land use and policy strategies. Within the tool, each goal is described, including how it helps build resilience. Examples of practical applications offer information about communities that illustrate focus areas. To dig deeper into the “how” and “what,” you are asked to answer a few context-setting questions and to work through a checklist of strategies to consider how you currently (or could): 1) study, adopt plans, and educate; 2) remove barriers and build partnerships; 3) adopt incentives; and 4) enact policies and supportive regulations. Each focus area includes targeted resources for these strategies that are included to both inform and inspire. These resources are examples of approaches that different communities have used to improve their resilience and, in the process, improve their economies, environment, health, and quality of life. The tool concludes with prioritization guidance and an action planning exercise to help synthesize what’s been learned.

## TOOL NAVIGATION

To ensure usefulness to a wide variety of communities, it was necessary to incorporate many resilience-building strategies. However, it is recognized that not all strategies will apply to every community attempting to enhance their resilience. For example, a city that is in the floodplain and fully built out may not find Focus Area 4 - *Plan for and encourage development in safer areas* - to be highly relevant to their community. Answering the questions in the Worksheet on page 60 and tabulating the results will help direct you to the most applicable and relevant resilience focus areas for your community.

### Understanding Key Challenges

Before you begin to evaluate the resilience strategies in each focus area, you may choose to start by answering the “Understanding Key Challenges” questions for each section. These questions are intended to help you define your community’s resilience priorities and can help stimulate steering committee discussions, particularly if you’re not sure where to begin. There are no right or wrong answers to these open-ended questions – use them in the way that makes the most sense for your community!

## Quick-Start Strategies



**RISE** identifies a few strategies in each focus area with a lower level of effort required for implementation. These strategies are useful for communities who are new to resilience implementation or who aren't sure where to start and are identified by an orange thumbs-up. Quick-start actions are those that require few resources or those that are fundamental to enhancing community resilience. Examples include identifying and cataloguing waste facilities located in hazardous areas, offering pre-disaster information to businesses, and educating the public about the risks of developing in environmentally sensitive areas.

## Community Rating System



The National Flood Insurance Program (NFIP) provides federally backed flood insurance within communities that enact and enforce floodplain regulations. To be covered by a flood insurance policy, a property must be in a community that participates in the NFIP. To qualify for the NFIP, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas. The objective of the ordinance is to minimize the potential for flood damage to future development. Under the Community Rating System (CRS), communities can be rewarded for doing more than simply regulating construction of new buildings to the minimum national standards. Under the CRS, the flood insurance premiums of a community's residents and businesses are discounted to reflect that community's work to reduce flood damage to existing buildings, manage development in areas not mapped by the NFIP, protect new buildings beyond the minimum NFIP protection level, preserve and/or restore natural functions of floodplains, help insurance agents obtain flood data, and help people obtain flood insurance. **RISE** helps communities identify actions that may meet the qualifications of CRS credited activities and thus make an informed decision as to whether they will pursue full CRS certification. These strategies and actions are identified by a blue wave icon.<sup>21</sup>

## Equity and Resilience



**RISE** integrates equity while addressing the social, economic, and environmental aspects of enhanced resilience. A resilient community understands that hazards and disasters have disproportionately adverse impacts on vulnerable populations (including economically disadvantaged, racial and ethnic minorities, the uninsured, low-income children and elderly residents, the homeless, and those with chronic health conditions) and works to understand and meet the needs of all. Strategies with an equity component are identified using a green icon representing a group of people.

<sup>21</sup> For more information on the CRS program, including procedures, creditable activities, credit points assigned to each activity, and examples of activities and how their credit is calculated click [www.CRSresources.org](http://www.CRSresources.org). Please note that final, or verified, credit can only be calculated by an ISO/CRS Specialist after a review of documentation provided by the community and the community's implementation of its activities at a verification visit (see National Flood Insurance Program Community Rating System Coordinator's Manual, Section 232 for additional information). Please also note that there are baseline requirements for participation in NFIP that may not be reflected in this assessment.

## Targeted Resources

Each focus area includes targeted resources for each strategy. These resources are examples of approaches that different communities have used to improve their resilience and, in the process, improve their economies, environment, health, and quality of life. Several types of resources are provided and identified by an icon. These include:

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

## TALKING POINTS FOR LOCAL PLANNERS

To enhance resilience local planners must effectively communicate with both the general public and elected leaders. In this capacity, planners should discuss the importance and usefulness of the **RISE** Local Assessment Tool with other staff and elected officials. To facilitate these conversations and begin to build support for enhanced resilience, planners should anticipate questions and concerns, minimize the use of jargon or politically charged statements, and keep conversations simple. Gaining the support of government leaders is critical to local resilience-building efforts. Elected officials can help secure funding for resilience programs and infrastructure investments, ensure vulnerability and hazard concerns are integrated into local land use plans, and enact policies that promote community resilience.

## FUNDING RESILIENCY

Funding is often a barrier to implementing resilience-related projects. However, research indicates a high return on these investments. Every \$1 invested in hazard mitigation and resilience can generate savings of between \$4 and \$11 in future disaster costs.<sup>22</sup> One common nature-based solution - conserving wetland buffer zones to preserve critical ecosystem services – was demonstrated to have prevented an estimated \$625 million in additional direct flood damages resulting from Hurricane Sandy.<sup>23</sup>

A variety of local, state, and federal funds are needed to support comprehensive resilience efforts. This funding may be in the form of grants, capital improvement funds, utility fees, and more. Private funding is another form of investment towards resilience building that is gaining traction. Campaigns and public outreach efforts can generate support from stakeholders such

<sup>22</sup> <https://www.nibs.org/page/mitigationsaves>

<sup>23</sup> <https://www.nature.com/articles/s41598-017-09269-z>

as businesses and individuals that may have an interest in protecting their own assets and investments. Innovative funding schemes can also be in the form of public-private partnerships, philanthropic opportunities, and regional funds. Examples of several resilience financing mechanisms are provided below.

[Rhode Island Infrastructure Bank](#): issues bonds, loans, and grants to finance infrastructure projects with a growing focus on resilience and sustainability.

[Regional Greenhouse Gas Initiative](#): a mandatory market-based cap-and-trade program for multiple states in the New England region in which proceeds are put towards strategies that mitigate flood damage to public infrastructure.

[Climate/Green bonds](#): While not a widespread practice in the United States, other nations have established these types of bonds that are used to finance climate or environmental projects that improve a community's resilience.

[Kresge's Environmental Program](#): an initiative providing grants that help communities and non-profit organizations increase their community's resilience capacity and make development more equitable and more resilient to a range of environmental factors.

## FOCUS AREA 1: Ensure Comprehensive Understanding of Known Hazards, Risks and Vulnerabilities, and their Potential Effects (Physical, Economic, and Social)

This focus area addresses the importance of recognizing the hazards that could affect your community and the people and places that are most at risk. Although this tool is geared towards communities that have already considered resilience issues, it does not mean that all information pertaining to hazards and risk is complete and up to date. This focus area ensures comprehensive understanding of key issues. A resilient community has a thorough understanding of the hazards it can expect to face, the potential range in severity of those hazards, and where they are most likely to occur. Potential impacts are investigated, mapped, and recognized. A resilient community recognizes that vulnerabilities are not limited to physical structures, and that social and economic vulnerability are equally important to address.

### EXAMPLES OF PRACTICAL APPLICATIONS

**New York Rising Community Reconstruction Program:** A recovery and resilience initiative to assist 124 communities severely affected by Superstorm Sandy, Hurricane Irene, and Tropical Storm Lee. The program directly engages residents and business owners through planning committees and public engagement events. At such meetings, community members coordinate with the state to develop reconstruction plans and identify projects to strengthen resilience. Thus far, 66 plans have been created. Each plan includes a thorough accounting of hazards, risks, and vulnerabilities. In most cases, projects will be implemented by local stakeholders, with support and technical assistance provided by the Governor's Office of Storm Recovery, which allocated over \$700 million in federal funds to support the planning and implementation of such community-developed projects.

**Louisiana Coastal Protection and Restoration Authority (CPRA) 2017 Coastal Master Plan:** Updated every five years, the Coastal Master Plan is designed to respond to the loss of coastal land and the threats from storm surge events by identifying, funding, and completing projects that build or maintain land, reduce risk, and improve resilience. Since CPRA was created and the first Coastal Master Plan was released in 2007, it has completed or funded 135 projects, resulting in over 36,000 acres of land benefits, 282 miles of levee improvements, and over 60 miles of barrier islands and berms. In addition, the plan provides individual fact sheets for 24 parishes, detailing hazards and risks, the projected impacts of future land use change and flood depths, as well as the 2017 Coastal Master Plan projects for each parish.

### A. Understanding Key Challenges

- ◆ To what natural hazard events is your community most susceptible? What were the primary physical, economic, and social impacts of recent hazard events?
- ◆ Has your community been involved in the development of a Multi-Jurisdictional Hazard Mitigation Plan approved by the Federal Emergency Management Agency (FEMA)? Did you develop your own hazard mitigation plan? Document its name, date of plan, and URL, if available.
- ◆ Are there specific challenges you've faced in identifying your community's hazards and related community impacts?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess your community's current capacity for comprehensive understanding of known hazards and their potential physical, economic and social effects. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

STRATEGY		CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
 <b>Equity component</b>	 <b>Quick-start strategy</b>	 <b>CRS linkages</b>		
<b>Study, Adopt Plans, Educate</b>				
1.1	Comprehensive plan has a hazard mitigation or resilience chapter/section			
 1.2	Location of socially vulnerable populations (e.g. age, income and poverty, education, housing, race, disability, social isolation) is identified in comprehensive plan, relative to hazards/hazard-prone areas			
  1.3	Waste facilities identified in hazard-prone areas			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	1.4 Community floodplain data is accessible, current, useful, and/or accurate so that this information contributes to the improvement of local regulations, insurance rating, planning, disclosure, and property appraisals. This includes: implementing digital or paper systems that improve access, quality, and/or ease of updating flood data within the community; maintaining copies of all Flood Insurance Rate Maps (FIRMs) that have been issued for the community; maintaining benchmarks so surveyors can find them and can depend on them to be accurate; and maintaining coastal erosion data			
	1.5 Flood maps consider both historical events and projected flood lines and coastlines			
	1.6 Flood-prone areas (i.e. river corridor hazard areas and shallow, sheet flow flooding areas, or urban flooding areas) are identified in comprehensive plans/land use maps			
	1.7 V130/VE zone areas <sup>24</sup> or Limit of Moderate Wave Action (LiMWA) <sup>25</sup> identified in comprehensive plans (if applicable)			
	1.8 Erosion studies exist for vulnerable coastal areas			
	1.9 Erosion-prone areas (i.e. fluvial (riverine) erosion hazard areas; beach, dune, cliff and bluff erosion/accretion areas; inlet movement; and oyster reef and coral reef sedimentation zones) identified in comprehensive plans			
	1.10 Future flood-prone or erosion-prone areas have been identified by considering an increase in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
 	1.11 A current inventory of structures located in floodplains and their current elevation status is maintained			

<sup>24</sup> National Flood Insurance Program flood zone classifications. V130 means coastal flood with velocity hazard (wave action) and BFEs have not been determined. VE means an area inundated by 1% annual chance flooding with velocity hazard (wave action); where base flood elevations have been determined, and flood elevation includes wave heights equal to or greater than 3 feet. [www.fema.gov/zone-ve-and-v1-30](http://www.fema.gov/zone-ve-and-v1-30)

<sup>25</sup> A FEMA mapping standard for Flood Insurance rate maps; the inland limit of the area expected to receive 1.5-foot or greater breaking waves during the 1-percent-annual-chance flood event; may be included on more recent Flood Insurance Rate Maps. [www.fema.gov/vi/media-library/assets/documents/96413](http://www.fema.gov/vi/media-library/assets/documents/96413)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	1.12 A current inventory of repetitive loss properties (RL) <sup>26</sup> and severe repetitive loss properties (SRL) <sup>27</sup> is maintained			
	1.13 A current inventory of National Flood Insurance Program (NFIP) claims (and amounts) that have been paid out is maintained			
	1.14 A current inventory of critical community facilities (e.g., fire stations, town hall, hospitals, emergency shelters, utilities, schools, etc.) located within the Special Flood Hazard Area (SFHA) (or the 1%/100-year floodplain) is maintained			
	1.15 A current inventory of public infrastructure (e.g., bridges, roads, power and communication lines, etc.) located within the SFHA (or the 1%/100-year floodplain) is maintained			
	1.16 Locations where floods or high tides can infiltrate the water, sewer, or stormwater system(s) have been identified			
	1.17 A high-water mark campaign that records high water elevations following flood events to validate existing mapping and map hazards <sup>28</sup> is used			
	1.18 Maintain Federal Emergency Management Agency (FEMA) Elevation Certificates and other needed certifications for new and substantially improved buildings in the SFHA			
 	1.19 Community ensures timely identification of impending flood threats, disseminates warnings to appropriate floodplain occupants, and coordinates flood response activities to reduce the threat to life and property. This may include flood threat recognition system, emergency warning dissemination, flood response operations, critical facilities planning, and StormReady and/or TsunamiReady community designation			

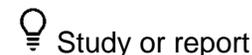
<sup>26</sup> A property for which two or more flood insurance claims of more than \$1,000 have been paid by the National Flood Insurance Program within any 10-year period since 1978. [crsresources.org/files/500/mapping\\_repetitive\\_loss\\_areas.pdf](https://crsresources.org/files/500/mapping_repetitive_loss_areas.pdf)

<sup>27</sup> A 1–4 family property that has had four or more claims of more than \$5,000 or two to three claims that cumulatively exceed the building's value; for the Community Rating System, non-residential buildings that meet those same criteria are also considered severe repetitive loss properties. [crsresources.org/files/500/mapping\\_repetitive\\_loss\\_areas.pdf](https://crsresources.org/files/500/mapping_repetitive_loss_areas.pdf)

<sup>28</sup> A community-based awareness program that increases local communities' awareness of flood risk and encourages action to mitigate that risk using signs and high-profile launch events. [www.fema.gov/high-water-mark-initiative](https://www.fema.gov/high-water-mark-initiative)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	<b>Remove Barriers &amp; Build Partnerships</b>			
1.20	County or regional planning efforts for hazard mitigation and/or disaster recovery have been joined or initiated			
	<b>Adopt Incentives</b>			
 1.21	Pre-disaster assistance and information is offered to businesses using Small Business Administration (SBA) and FEMA resources for developing Business Recovery Plans			
	<b>Enact Policies &amp; Supportive Regulations</b>			
1.22	Cross-referencing of plans (e.g. comprehensive plan, hazard mitigation plan, disaster recovery plans, coastal management plan, etc.) is required prior to plan adoption			
1.23	Coastal setbacks reflect erosion rates, as established through erosion studies			
1.24	Annexation policies consider an increase in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			

## C. Targeted Resources



STRATEGY	TYPE	Study, Adopt Plans, and Educate
1.1		<a href="#">Integrating Hazard Mitigation into the Local Comprehensive Plan</a> : A fact sheet from FEMA with a link to a guidebook from the American Planning Association (APA).
1.2		<a href="#">Community Based Vulnerability Assessment: A Guide to Engaging Communities in Understanding Social and Physical Vulnerability to Disasters</a> : A step-by-step guide to conducting a social vulnerability hazard assessment, by MDC and sponsored by FEMA.
		<a href="#">Social Vulnerability Index</a> : Tool developed by the Centers for Disease Control and Prevention (CDC) analyzes a variety of risk factors at a census block level.
1.3		<a href="#">Fort Worth, TX Floodplain Management Plan</a> : Wastewater facilities included on critical facilities hazard map.
1.4		<a href="#">Adoption of Flood Insurance Rate Maps</a> : Fact sheet produced by FEMA explains the flood insurance program, availability of maps, and more.
1.5		<a href="#">Fort Worth, TX Floodplain Management Plan</a> : Open Channel Studies.
		<a href="#">FEMA Flood Insurance Study data</a>
		<a href="#">Getting to Resilience: A Community Planning Evaluation Tool</a> : An online self-assessment tool to assist communities to reduce vulnerability and increase preparedness by linking planning, mitigation, and adaptation.
1.7		<a href="#">Limit of Moderate Wave Action (LiMWA) Fact Sheet</a>
1.8		<a href="#">Manasota Key, FL North Beach Erosion Study Update</a>
		<a href="#">State of Florida Critical Erosion Reports</a> : Conducted by county by the Florida Department of Environmental Protection.

		<a href="#">State of North Carolina Coastal Erosion Study</a>
1.11 – 1.15		<a href="#">Fort Worth, TX Floodplain Management Plan</a>
1.17		<a href="#">FEMA High Water Mark Initiative</a> : A community-based awareness program for recognizing flood risk and encouraging action to mitigate that risk.
<b>STRATEGY</b>	<b>TYPE</b>	<b>Remove Barriers and Build Partnerships</b>
1.20		<a href="#">FEMA Local Mitigation Handbook</a> : general guidance on multi-jurisdictional mitigation planning.
		<a href="#">Governors' South Atlantic Alliance</a> : Governors of North Carolina, South Carolina, Georgia and Florida spearhead collaboration around ocean and coastal challenges and opportunities, including environmental sustainability and disaster preparedness.
		<b>Other regional collaboration examples:</b> <a href="http://www.beachapedia.org/State_of_the_Beach/Model_Programs/Regional_Planning">www.beachapedia.org/State_of_the_Beach/Model_Programs/Regional_Planning</a>
		<b>Adopt Incentives</b>
1.21		<a href="#">U.S. Small Business Administration Prepare My Business</a>
		<a href="#">FEMA Emergency Preparedness Resources for Business</a>
		<a href="#">Hawaii Natural Disaster Economic Recovery Strategy</a>
		<a href="#">Florida Division of Emergency Management Get a Plan!</a>
		<b>Enact Policies &amp; Supportive Regulations</b>
1.23		<a href="#">Rhode Island General Laws, Title 46 Chapter 23</a> : Rhode Island Coastal Resources Management Program, Section 140 specifies that setbacks should be calculated from regularly updated erosion rates.

## FOCUS AREA 2: Conserve Land in Critical Coastal Areas, River Corridors, and Other Flood-Prone Environments

Encouraging development outside of vulnerable areas allows land to perform natural flood-reducing functions and reduces the risk that might be faced by people or structures located in flood-prone locations in your community. A resilient community protects lands in critical, flood-prone areas so that nature can perform its flood-reducing functions. Resilient communities encourage growth away from these sensitive environments to preserve the land and reduce risk to people and structures that might locate in dangerous flood-prone areas.

### EXAMPLES OF PRACTICAL APPLICATIONS

**Lancaster County Pennsylvania Growth Management Planning:** Establishes a framework for future land use and provides tools to assist municipalities in achieving growth management goals. Lancaster County provides two zoning tools to help municipalities incorporate natural resource identification and protection into subdivision and development proposals through site specific performance standards.

**Portland, OR Conservation Easements and Buyouts:** Portland, Oregon has placed conservation easements along critical watercourses designated as Environmental protections zones (Title 33, Chapter 33.430). The purpose of these zones is to protect resources and functional values that have been identified by the city as providing benefits to the public. The environmental regulations encourage flexibility and innovation in site planning and provide for development that is carefully designed to be sensitive to the site's protected resources.

**Charles City, IA Floodplains as Amenities:** After decades of fighting against the often-flooded Cedar River, Charles City transformed it into an asset. Using land acquired through FEMA flood buyouts, Charles City created a vibrant, inviting riverfront park with a whitewater course. Capitalizing on the river's natural features to help prevent future flooding, Charles City turned the river from an obstacle into an ecological and social benefit.

### A. Understanding Key Challenges

- ◆ Has your community been successful in conserving open space and natural areas in the past?
  - a) If yes, what has worked?
  
  - b) What, if anything, has been a challenge to conservation efforts?
  
- ◆ Are there key partners you need to help you conserve open space and natural areas? Are you working with them now or do you need help making connections?
  
- ◆ Are there concerns that your community’s efforts to conserve land in critical coastal areas, river corridors, and other flood-prone environments may result in a regulatory “taking” of private property?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to identify, acquire, and conserve land in critical coastal areas, river corridors and other flood-prone environments. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	Study, Adopt Plans, Educate			
 	2.1 Identify and designate important natural resource areas, including adopting plans that protect one or more natural functions within the community’s SFHA			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	2.2 Land conservation is considered when planning/designing capital improvements			
	2.3 A long-term tree canopy and/or open space goal has been established, and street trees are identified as critical infrastructure in comprehensive plan			
	2.4 A strategic plan for acquiring priority open space/critical conservation areas exists			
	<b>Remove Barriers &amp; Build Partnerships</b>			
 	2.5 A plan or program to acquire (through purchase or donation) conservation easements on property with sensitive natural features to ensure long-term protection is in place			
	<b>Adopt Incentives</b>			
	2.6 Dedicated funding sources are available for open space acquisition and management (e.g. bonds, sales taxes, or transfer taxes)			
	2.7 Incentives (e.g. tax abatements, fee waivers, expedited permitting, etc.) are provided for voluntary conservation/restoration of riparian buffers, open space, and/or wetland restoration			
	2.8 Wetland mitigation banking program <sup>29</sup> is available			
	2.9 Incentives are provided to preserve open land, such as a Purchase of Development Rights (PDR) <sup>30</sup> program			

<sup>29</sup> The creation, restoration, or under certain circumstances the increased protection, of an area of functioning wetland in advance of, and to offset anticipated wetland impacts within the same ecoregion. [www.water.ncsu.edu/watershedss/info/wetlands/mitbank.html](http://www.water.ncsu.edu/watershedss/info/wetlands/mitbank.html)

<sup>30</sup> A way to financially compensate willing landowners for not developing their land; an easement is purchased from the landowner that (usually) permanently restricts (all or certain types of) development on the land. The landowner retains ownership of the land and can use or sell it for purposes specified in the easement. [plannersweb.com/2004/01/purchase-of-development-rights-preserving-farmland-and-open-space/](http://plannersweb.com/2004/01/purchase-of-development-rights-preserving-farmland-and-open-space/)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	2.10 Critical open space and natural resources are conserved through participation in a land banking program <sup>31</sup>			
	Enact Policies & Supportive Regulations			
	2.11 Mandatory consistency reviews are performed to ensure that zoning districts are compatible with identified natural resource areas			
	2.12 Open space and natural features (e.g., water body buffer zone; source water protection zone) are conserved using overlay zoning districts			
	2.13 Open space and natural features are conserved through cluster/conservation requirements in subdivision regulations			
	2.14 Subdivision regulations restrict some/all tree/vegetation clearance			
	2.15 Subdivision regulations use Buildable Land Calculations <sup>32</sup> to remove vulnerable lands from development consideration			
	2.16 "Transition zones" near tidal marshes are designated and protected			
	2.17 Future projections are considered when determining regulatory setbacks for land adjacent to tidal waters			
 	2.18 Density standards <sup>33</sup> are established to conserve open space and natural areas by regulating the size and dimensions of lots and structures within sensitive areas			

<sup>31</sup> Governmental entities or nonprofit corporations that acquire title to land, to conserve open space and natural resources.

<sup>32</sup> Land that is deemed not suitable for development (subject to flooding, erosion, improper drainage, and more) is not included in adequate building site calculations. This includes area such as steep slopes, floodplains, wetlands, stream corridors, riparian areas, and other important natural features.

<sup>33</sup> The permissible number of units (houses, square feet, people) in each area; typically measured in dwelling units per acre (residential) or by floor area ratio (FAR) for non-residential uses.

## C. Targeted Resources



STRATEGY	TYPE	Study, Adopt Plans, Educate
2.1		<a href="#">Raleigh, NC Greenprint Plan</a> : Adopted as part of the city's comprehensive plan, the Green Print Map and Plan highlight and connect environmentally sensitive areas throughout the city.
2.2		<a href="#">Rye, NH Capital Improvement Plan</a>
2.3		<a href="#">Phoenix, AZ Comprehensive Plan</a> : Establishes a goal of 25% tree canopy coverage of the city by 2030.
2.4		<a href="#">Durham, NC Third Fork Creek Watershed Management</a> : This plan prioritizes important natural areas to preserve in the Third Fork Creek Watershed and assesses the land acquisition cost compared to potential pollution reduction/prevention in selecting sites. It also prioritizes sites that connect existing green space areas and provide "green gems" in the more urbanized landscape.
		<a href="#">Pennsylvania Municipal Planning Code Quick Guide to Official Maps</a> : A guide for municipalities to implement an official map which can be used as a conservation tool by designating conservation areas, stormwater areas, open space reservations etc.
		<a href="#">State of Washington Growth Management Act</a> : Requires the identification and regulation of "critical areas", which include frequently flooded areas as well as ecologically sensitive areas. The critical area regulations establish buffers and setbacks for identified critical areas.
<b>Remove Barriers &amp; Build Partnerships</b>		
2.5		<a href="#">Orange County, NC Land Legacy Program</a> : The county works with other local governments, non-profits, state and federal agencies to acquire high priority land legacy sites. It also works successfully with landowners on estate planning and compact development design so they or their heirs may continue to use the land while dedicating a portion to conservation.
<b>Adopt Incentives</b>		
2.6		<a href="#">Suffolk County, NY Peconic Bay Region Community Preservation Fund</a> : A conservation program to preserve open space and farmland in five Long Island townships; the fund is financed by a 2% tax on real estate sales.
		<a href="#">King County, WA Conservation Futures Program</a> : For more than 30 years, government and nonprofit groups across King County have used the Conservation Futures Tax (CFT) to protect from development 111,000 acres of land, forests, shorelines, greenways and trails. Funding has supported such diverse projects as Seattle's Duwamish Head Greenbelt, development rights on the Snoqualmie Forest and Puget Sound shoreline in Burien.
2.7		<a href="#">Virginia Land Preservation Tax Credit</a> : Allows an income tax credit for 40% of the value of donated land or conservation easements.
		<a href="#">Portland, OR Offsite Mitigation</a> : This report summarizes the issues and feedback received to date regarding the feasibility of a program that would allow mitigation for the environmental impacts of development to occur off-site rather than on the site where the impacts occur. Off-site mitigation could be one component of a natural resource management program that enhances watershed

		health while allowing industry to thrive along the North Reach of the Willamette River.
2.8		<a href="#">King County, WA Wetland Banking Program</a> : King County has adopted administrative rules that establish criteria governing the creation and use of wetland mitigation banks in King County in accordance with the Metropolitan King County Council's directive codified at King County Code (KCC) 21A.24.345.
2.9		<a href="#">Suffolk County, NY Farmland Program</a> : Initiated in 1974, the first Purchase of Development Rights (PDR) program to preserve farmland in the United States. The Suffolk County Farmland program has acquired 10,500 acres into the program to date.
2.10		<a href="#">The Nantucket Land Bank</a> : The oldest land bank in the nation created to acquire, hold, and manage important open spaces, resources and endangered landscapes for the use and enjoyment of the public. To date, nearly half of Nantucket is forever-protected open space.
		<a href="#">Orange County, NC Land Legacy Program</a> : The Lands Legacy Program uses leveraged local funds with State and Federal dollars to protect highly important natural and cultural resource lands via outright purchase and through donated or purchased conservation easements.
2.11		<a href="#">Rye, NH Master Plan</a> (page 22)
		<a href="#">Deerfield, NH</a>
<b>Enact Policies &amp; Supportive Regulations</b>		
2.12		<a href="#">Chapel Hill, NC Resource Conservation District (RCD) Ordinance</a> : The Town's RCD overlay district ordinance requires natural vegetated buffers along all water bodies, including 150 buffers along each side of perennial streams and 50-foot buffers along each side of intermittent streams.
2.13		<a href="#">Saratoga Springs, NY Municipal Code</a> : Chapter 241 Subdivision Regulations, Article IV Conservation Subdivision Regulations. Addresses conservation subdivisions and cluster development with cluster development applied in more densely developed areas.
2.14		<a href="#">New Rochelle, NY Municipal Code</a> : Chapter 178: Impervious Surfaces. For development over a certain threshold a permit is required specifying the allowed amount of impervious surface and the required environmental mitigation.
2.15		<a href="#">Redmond, WA Municipal Code</a> : Section 20C.30.25 Site Requirements for Residential Zones. Establishes several density standards including Net Buildable Area Calculation, maximum lot coverage, minimum open space.
2.18		<a href="#">Islip, NY Municipal Code</a> : Chapter 68 Zoning, Article 1 General Provisions, Section 68-3. Amended zoning to relax height restrictions on dwellings located in FEMA-designated Special Flood Hazard Areas to accommodate elevations to increase flood protection.

## FOCUS AREA 3: Reduce Risk to People, Buildings, And Facilities in Vulnerable Areas

Your community's economic, social, and cultural assets may be in vulnerable areas or residents may dwell or construct buildings in vulnerable areas despite known risks. If so, there are steps that can reduce (though not eliminate) future risk and enhance resilience. A resilient community recognizes the risk facing people and assets in vulnerable areas and takes steps to reduce that risk through a combination of proactive and protective land use laws, building codes, and planning policies.

### EXAMPLES OF PRACTICAL APPLICATIONS

**Alquist Priolo Earthquake Fault Zoning Act California:** The main purpose of this policy is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The Act only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards.

**Planning for Rising Waters:** Final Report of the City of Kingston Tidal Waterfront Flooding Task Force: Report of Task Force charged with evaluating the present and future vulnerability to flooding, storm surge, and sea level rise along the Rondout-Hudson waterfront.

**Watertown, CT Subdivision Regulations, Section 5 Design Standards, 5.16 Requirements Regarding Flooding:** Land subject to flooding, as identified on the Federal Administration Flood Insurance Rate Map (FIRM) on file with the Town Clerk and Planning and Zoning Office, shall not be subdivided unless certain conditions are met.

**Hornby, NY Subdivision Regulations, Section 1.5 General Policy for Subdivision Design and Review (BLE):** Determines allowable density based on net acreage once unsafe areas (e.g., steep slopes, floodplains) are subtracted from gross acreage.

**Roseville, CA General Plan - Safety Element:** Implemented a series of tools to reduce risk in vulnerable areas including future conditions floodplains, compensatory storage requirements, two feet of freeboard, and stormwater provisions that assume total blockage of flow paths for setting pad elevations everywhere in the city.

### A. Understanding Key Challenges

- ◆ How would you characterize your community’s approach/attitude towards risk and vulnerability? Are there populations or places in your community that bear a disproportionate share of risk or vulnerability resulting from potential hazards?
  
- ◆ How has the community responded to proposals or new regulations to reduce risk? What about incentives?
  
- ◆ Are there specific challenges you’ve faced in reducing risk to people, buildings, and facilities in vulnerable areas?
  
- ◆ Does your community participate in NFIP’s Community Rating System (CRS)? What is your current class rating?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to reduce risk to people, buildings, and facilities in vulnerable areas. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	3.1 Study, Adopt Plans, Educate An up to date vulnerability assessment identifies current and projected vulnerable areas and associated risks to life and property			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
 	3.2 High quality, recent maps have been created and are used to identify and regulate development at risk from flood hazards. This includes new studies (as relevant) producing base flood elevations of floodways; review and approval of flood studies by a state or regional agency; new studies that exceed FEMA mapping criteria; more restrictive floodway standards; and mapping and regulation of special flood related hazard areas (ex. coastal erosion, tsunami hazard areas)			
	3.3 Vulnerability assessment results are incorporated into relevant plans (e.g. comprehensive plan, hazard mitigation plan, land use plans, etc.)			
 	3.4 The public is educated about the risks of developing in environmentally sensitive areas			
 	3.5 Provide the public with information needed to increase flood hazard awareness and to motivate actions to reduce flood damage, encourage flood insurance coverage, and protect the natural functions of floodplains. This includes outreach projects, flood response preparations, program for public information, and stakeholder delivery of flood-related information			
	3.6 Current and future flooding risks to critical infrastructure (such as water supply or wastewater treatment plants) have been assessed			
	3.7 Development incentives are regularly evaluated to ensure they do not encourage development in vulnerable areas			
 	3.8 Information is available to inquirers about the local flood hazard and about flood-prone areas that need special protection because of their natural functions including basic FIRM information, additional FIRM information (protected coastal barriers, floodways, or lines demarcating wave action), flood problems not shown on FIRM, flood depth data, special flood related hazards (like erosion, ice jams, or tsunamis), historical flood information, and natural floodplain functions			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	3.9 Capital improvement planning accounts for current and future hazards (i.e. bridges and culverts are designed to accommodate 1% annual chance flood events)			
	3.10 Real estate agents and/or landlords provide brochures or handouts advising potential buyers to investigate the flood hazard for a property			
	3.11 Provide the public with information about flood protection that is more detailed than that provided through outreach projects including a flood protection library (nine designated FEMA publications on flood protection topics housed in the public library), locally pertinent documents (additional references on the community's flood problem or local or state floodplain management programs housed in the public library), and/or flood protection website (including more information on the messages conveyed in the community's outreach projects; real-time gage information to see current water levels; flood height predictions; Elevation Certificates or the data from Elevation Certificates)			
	3.12 FEMA Emergency Management Institute (EMI) training on retrofitting and grant programs provided to flood protection advisors (see strategy 3.16)			
	3.13 Technical assistance is available to support improvement/expansion of flood insurance			
	3.14 A community-wide floodplain management plan has been adopted, containing an overall strategy of programs, projects, and measures to reduce the adverse impact of flood hazards on the community			
Remove Barriers & Build Partnerships				

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
  	3.15 A “seller’s disclosure” provision has been adopted, requiring any seller and/or their agent of real property within the regulated floodplain to disclose to the prospective buyer that the property is in a regulated floodplain (and/or that other flood hazards exist such as subsidence, erosion and/or wetlands), and whether the property has suffered damages from flooding			
 	3.16 Provide one-on-one flood protection assistance to people who are interested in protecting their property from flooding including one-on-one property protection advice (may include site visit) and/or financial assistance advice for flood protection projects)			
	<b>Adopt Incentives</b>			
 	3.17 Flood insurance coverage assessment has been conducted assessing community’s current level of coverage and identifying gaps			
	3.18 Historic districts or preservation requirements to slow reconstruction post disaster are in place			
	3.19 A flood insurance coverage improvement plan has been prepared by a committee including representation from local insurance agents			
	3.20 Projects included in the flood insurance coverage improvement plan are being/ have been implemented			
	3.21 Incentives (e.g. tax abatements, fee waivers, insurance premium discounts, expedited permitting, etc.) are provided for first floor elevations and elevated systems (in the SFHA) above minimum NFIP standards			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>	 <b>Quick-start strategy</b>	 <b>CRS linkages</b>	
	3.22 Land swaps <sup>34</sup> are coordinated to relocate development from hazard areas to safer areas			
	3.23 Incentives (e.g. tax abatements, fee waivers, insurance premium discounts, expedited permitting, etc.) are provided for wet or dry floodproofing of private structures			
	3.24 A plan or program is in place for strategic acquisition (buyout) of repetitive loss properties in hazard areas and their re-use as open space and/or green infrastructure			
	3.25 Alternative parking requirements are in place that encourage efficient land use and preservation of trees (i.e. parking, payment in-lieu of parking, reduced minimum parking requirements)			
	<b>Enact Policies &amp; Supportive Regulations</b>			
	3.26 A Green Area Ratio <sup>35</sup> is used to determine the required amount of green space/green cover for new development			
	3.27 International Code Series (ICS) building code standards adopted and enforced			
	3.28 Development code requires a minimum tree canopy coverage for building sites (25% to 40% for residential development and 10% to 15% for non-residential development)			
	3.29 Overlay zoning districts (e.g. limited development districts, hazard zoning districts, waterfront overlay districts, etc.) are used in hazard areas to limit allowable uses, provide for adequate setbacks, and apply additional standards			
	3.30 Flood damage prevention law is in place			
	3.31 Special use permit procedures include a review for conformance with special standards in hazard areas			

<sup>34</sup> An exchange of municipally owned land for privately owned land, used to strategically assemble and re-purpose large areas to increase resilience through open space, green infrastructure, and more.

<sup>35</sup> A zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and mitigate urban heat islands by dedicating a certain proportion of a building site to landscaping and/or permeable surfaces. [doee.dc.gov/GAR](https://doee.dc.gov/GAR)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>	 <b>Quick-start strategy</b>	 <b>CRS linkages</b>	
	3.32 Design flood elevation <sup>36</sup> expands regulations applying to floodplains into adjacent areas that are vulnerable to flooding but not designated floodplains on the 100-year FIRM, including areas subject to shallow flooding			
	3.33 Elevation requirements are available with design guidelines for streets and infrastructure			
	3.34 New commercial or industrial facilities are required to have dry land <sup>37</sup> access to ensure emergency personnel and employees can reach facilities in the event of a flood			
	3.35 Subdivision/ land development/ site plan review ordinances prohibit development in flood prone areas and/or require that any regulatory floodplain in a subdivision be set aside as open space (i.e. used as drainage/flowage easements or back yards)			
	3.36 Development review process requires fiscal impact analyses that includes costs related to projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
	3.37 Subdivision/land development/site plan review ordinances require inclusion of BFE and notation of structures in relation to the SFHA with preliminary and final plat submissions <sup>38</sup>			
	3.38 Steep slope ordinance is modified to account for slopes exposed to increased moisture due to projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			

<sup>36</sup> The NFIP refers to the Base Flood Elevation (BFE) for lowest floor elevation requirements, while the International Codes (I-Codes) and ASCE 24 refer to the Design Flood Elevation (DFE). The DFE will always be the BFE or higher. [www.fema.gov/media.../fema\\_quick\\_ref\\_guide\\_flood\\_areas\\_022713\\_508.pdf](http://www.fema.gov/media.../fema_quick_ref_guide_flood_areas_022713_508.pdf)

<sup>37</sup> A vehicular access route that is above the base flood elevation and which connects land located in the floodplain to land outside the floodplain. [www.municode.com/library/wi/whitewater/codes/code\\_of\\_ordinances?nodeId=TIT19ZO\\_CH19.09DE\\_19.09.195DRAC](http://www.municode.com/library/wi/whitewater/codes/code_of_ordinances?nodeId=TIT19ZO_CH19.09DE_19.09.195DRAC)

<sup>38</sup> Base flood elevations are the computed elevations to which floodwater is anticipated to rise during the base flood; shown on FIRMS and flood profiles; the regulatory requirement for the elevation or floodproofing of structures. [www.fema.gov/base-flood-elevation](http://www.fema.gov/base-flood-elevation)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	3.39 Appropriate construction standards regulated in areas subject to a tsunami			
	3.40 Appropriate construction standards and setbacks regulated in areas subject to significant coastal erosion			
	3.41 Regulations state that, to the extent possible, if a lot in a new subdivision does not have a buildable site out of the regulatory floodplain, all new structures, pavement, and other development must be sited where they have the least impact on habitat			
	3.42 Building code and/or design guidelines contain regulations/restrictions for development in the SFHA including prohibiting fill, buildings, and/or storage of materials in the SFHA			
	3.43 Building code requires elevation of the first floor of a structure in the SFHA above BFE and/or has a freeboard requirement for buildings and building systems in the SFHA (above and beyond the minimum NFIP standards (i.e. increase the requirement from 1' above BFE to 2-3' above BFE)			
	3.44 Building code requires elevation of essential systems (i.e. heating, ventilation, and air conditioning) above the BFE			
	3.45 Design requirements for elevated structures include provisions for the height, scale, aesthetic, and materials for elevated buildings			
	3.46 Non-conversion agreements <sup>39</sup> are required to permanently restrict the use of spaces below first floors in elevated homes			
	3.47 Engineered foundations required in SFHA			
	3.48 Policies are in place to address non-conforming uses, structures, and/or lots <sup>40</sup>			

<sup>39</sup> A legal document that requires property owners to agree to refrain from altering their buildings in ways that would not meet the standards of local laws and regulations for flood damage prevention. [www.kdhnc.com/523/Non-Conversion-Agreement](http://www.kdhnc.com/523/Non-Conversion-Agreement)

<sup>40</sup> Policies may cover the allowable re-building of non-conforming structures following hazard damage as well as non-conforming uses or lots created because of zoning ordinance changes.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component  Quick-start strategy  CRS linkages			
	3.49 A pre-event law is adopted, enabling local land use moratoriums that suspend certain development activities within defined areas to allow a municipality time to develop new studies, plans, or land-use laws			
	3.50 Substantial improvement/damage provision in the flood damage prevention ordinance is amended to require cumulatively tracked improvements and repairs to structures within the regulated floodplain over a specified timeframe			
	3.51 The substantial improvement/damage threshold has been lowered below the minimum requirement of 50%			
	3.52 Regulations prohibit the use of fill for the elevation of structures, and/or require floodplain storage compensation at an appropriate site when fill is used			
	3.53 Enclosures below the base flood elevation in the SFHA are prohibited or limited			
	3.54 Elevation exemption for manufactured homes placed in existing manufactured home parks is eliminated			
	3.56 V-Zone rules enforced inland from the V-Zone boundary			

### C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
3.3		<a href="#">San Francisco, CA Creating Safe Growth Strategies for the San Francisco Bay Area</a> : provides a model other regions or communities could use to assess the vulnerability of their housing and residents and develop strategies to make development safer.
3.4		<a href="#">Hazus</a> : Hazus uses Geographic Information Systems (GIS) software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure.
3.9		<a href="#">Salem and Keene, NH (page 271), compensatory storage ordinance</a> :

3.7		<a href="#">King County, WA Basin Planning Program</a> : Basin plans were developed using future conditions hydrology to assure the design of capital facilities have enough capacity for projected future conditions.
<b>Remove Barriers &amp; Build Partnerships</b>		
3.15		<a href="#">Novato, CA Residential Resale Program</a> : Code Enforcement Resale Inspectors research properties prior to inspections, noting permits issued, permit status and pending code violations. All residential properties are required to set appointments for inspection prior to sale and only the property owner or the listing agent may order a resale inspection.
<b>Adopt Incentives</b>		
3.21		<a href="#">FEMA Community Rating System (CRS) Website</a> : Provides resources, guidance and sample programs to support the enhancement of Community's CRS programs.
3.24		<a href="#">Portland, OR Johnson Creek Willing Seller Program</a> : In 1997, Environmental Services developed the Johnson Creek Willing Seller Land Acquisition Program. The program helps move people and property out of areas that frequently flood. Restoration projects on land acquired through the program increase flood storage, improve fish and wildlife habitat, restore wetlands and create passive recreational activities for city residents.
3.25		<a href="#">Greensboro, NC Tree Preservation and Landscape Manual</a> : To allow a new development to preserve trees within or adjacent to a parking lot, a specified number of required off-street parking spaces may be reduced by the City Urban Forester or Environmental Officer by up to 10%.
		<a href="#">Cary, NC Town Development Ordinance Section 7.2.10.A.2</a> : Up to a 20% reduction in the number of parking spaces required in the site is allowed, to the extent that the reduction in the amount of required pavement will preserve existing healthy trees in an undisturbed, natural condition.
		<a href="#">Phoenix Code Incentive for Tree Preservation</a> : To increase tree preservation, reduce heat island effect, provide more shading for pedestrians and buildings, the following provision was added to the city code: Minimum parking may be reduced by one parking space for each tree 12" in diameter or larger that is preserved. A maximum of 2 parking spaces or 10% of the total required may be reduced, whichever is greater.
<b>Enact Policies &amp; Supportive Regulations</b>		
3.26		<a href="#">Seattle Green Factor</a> : A score-based code that is designed to improve the quantity and quality of urban landscaping through zoning-based requirements. Each zoning district has a green factor score that must be achieved.
		<a href="#">Washington, DC Green Area Ratio</a> : An environmental sustainability zoning regulation that sets standards for landscape and site design to help reduce stormwater runoff, improve air quality, and keep the city cooler. It is similar in design to the Seattle Green Factor (see above).
3.28		<a href="#">Chapel Hill, NC Minimum Tree Canopy Requirements</a> : The Town's regulations require a minimum tree canopy coverage of 30% for multifamily and commercial development, and 40% canopy coverage for all other development.
3.29		<a href="#">Perinton, NY Municipal Code, Chapter 208, Article VIII, Limited Development District</a> : Establishes a limited development district to ensure appropriate development is required to preserve water and air quality, preserve fish, wildlife and plant habitat, prevent the irretrievable loss of natural resources and maintain the aesthetic character of the community.

		<a href="#">Coxsackie, NY Municipal Code</a> : Chapter 155 Zoning, Article III Districts, Boundaries and Regulations, Section 155-10, Waterfront Residential District, establishes a waterfront residential district to protect the waterfront, maintain the existing residential character and allow for low impact water-dependent and water-related recreational uses appropriate for the community and the river.
3.34		<a href="#">Whitewater, WI Code of Ordinances</a> : Title 19 – ZONING, Chapter 19.09 DEFINITIONS, 19.09.195 - Dryland access
3.35		<a href="#">Pendleton, NY Municipal Code</a> : Chapter 220 Subdivision of Land, Article V General Requirements and Design Standards for Major Subdivision, Section 220-27 Drainage improvements. Prevents land subject to flooding from being platted for residential occupancy or any other uses that may increase danger to health, life or property or aggravate the flood hazard.
		<a href="#">Watertown, CT Subdivision Regulations</a> : Section 5 Design Standards, 5.16 Requirements Regarding Flooding. Restricts subdivisions in the SFHA to ensure that development is reasonably safe from flooding.
		<a href="#">CRS Coordinators Manual</a> : Section 422.e, page 420-20. Credit criteria and example language is provided for regulations that set aside all the regulatory floodplain in a subdivision as open space (such as drainage or flowage easements or back yards) or otherwise keep them free from development
3.37		<a href="#">King County, WA Title 21A.24.170: Notice of Critical Areas</a> : County Critical Areas ordinance requires notice on title and final plans of the presence of identified critical areas; provision is pursuant to mandates under the WA State Growth Management Act.
3.41		<a href="#">CRS Coordinators Manual</a> : Section 422.e, page 420-20. Credit criteria and examples are provided for regulations require that each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain
3.43		<a href="#">New Hampshire model ordinance language (page 281)</a> :
3.45		<a href="#">Elevation Design Guidelines for Historic Homes</a> : Provides guidelines for protecting historic resources through structural elevation.
3.46		<a href="#">Roseville, CA Deed Restriction Requirements</a> : Chapter 9.80, section 160.C.1 of the Roseville Municipal Code requires a formal restriction on the deed that restricts the allowed uses of the spaces below elevates floors for structures in the regulated floodplain.
		<a href="#">Horseheads Higher Floodplain Development Standards Recommendations</a> : Regulates the use of space in elevated structures below the elevated living space.
		<a href="#">CRS Resources guidance for higher regulatory standards</a> :
3.48		<a href="#">Utica, NY Municipal Code</a> : Chapter 2-29, Zoning, Article IV District Regulations, Division 6 Land Conservation District, Section 2-29-82 Uses and/or Structures Rendered Nonconforming by the Adoption, Provides regulations for non-conforming uses
3.49		<a href="#">James A. Coon Local Government Technical Series</a> : Land Use Moratoria (2015), guidance on post-disaster land use moratoria which suspends a landowner's right to obtain development approvals.
3.50		<a href="#">CRS Coordinators Manual</a> : Section 432.d, page 430-18. Provides credit criteria and example language for the cumulative substantial improvements element.

		<a href="#">CRS Coordinators Manual</a> : Section 432.e, page 430-19. Provides credit criteria and example language for the lower substantial damage threshold element.
		<a href="#">Roseville, CA Cumulative Substantial Improvement Requirements</a> : The city has adopted regulatory standards in its flood damage prevention ordinance that will track the cumulative improvements and repairs to structures in its regulated floodplain, for a period of 10-years. This requirement can be found in section 9.80.040 of the Roseville Municipal code.
3.51		<a href="#">CRS guidance for higher regulatory standards</a> :
3.52		<a href="#">Pierce County, WA Municipal Code</a> : Title 18E.70.40.C.4a requires new excavated storage volume be provided that is equivalent to the storage volume lost by the placement of fill or grading of a parcel within the designated floodplain.

## FOCUS AREA 4: Plan for and Encourage Development in Safer Areas

By proactively determining where growth can safely be accommodated now and in the future, your community can provide incentives for development in these locations to contribute to enhanced community resilience. A resilient community accommodates new growth while still protecting residents and assets and reducing hazard risks. New development is guided by principles that help to further enhance the community's ability to withstand hazards and unexpected events.

### EXAMPLES OF PRACTICAL APPLICATIONS

**Pinelands Development Credit Program:** The Pinelands Development Credit (PDC) Program is a regional transfer of development rights program that preserves important agricultural and ecological land. PDCs are allocated by the commission to landowners in the Preservation Area District, Special Agricultural Production Area and Agricultural Production Area, which are the sending areas. These credits can be purchased by property owners and developers who are interested in developing land in Pinelands Regional Growth Areas, which serve as the receiving areas. Typically, PDCs are used to increase residential densities in Regional Growth Areas. They may also be used in association with municipal variances in Regional Growth Areas, Pinelands Villages and Pinelands Towns, as well as for waivers of strict compliance approved by the Commission in any Pinelands management area.

**Snoqualmie, WA: Guiding Safe Growth:** The City of Snoqualmie made a conscious decision to guide new growth out of the floodplain and direct it towards safer areas. This created two distinct divisions within the City: the historic core, which contains development in or near floodplains and Snoqualmie Ridge which is where all the new planned unit development occurred. By planning for growth in safer areas they successfully reduced flood risk for new development.

### A. Understanding Key Challenges

- ◆ Is encouraging development in safer areas a priority for your community? If not, what issues tend to stand in the way?
- ◆ Are there key partners you need to help you encourage development in safer areas? Are you working with them now or do you need help making connections?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to plan for and encourage development in safer areas. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

STRATEGY		CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>				
Study, Adopt Plans, Educate				
	4.1	Safe development areas have been identified and designated as targeted growth areas in local comprehensive plan; a safe growth audit has been conducted		
	4.2	Current hazard information and future projections have been incorporated into capital improvement planning and Infrastructure investments in safer growth areas are prioritized		
 	4.3	Data is used to identify safe growth areas, inform hazards analysis, and develop future projections		
	 	4.4	Community has a detailed mitigation plan for repetitive loss areas.	

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	4.5 Community has a plan to acquire, relocate, or otherwise clear buildings and critical facilities out of the special flood hazard area and out of the V-Zone and/or coastal A-Zone <sup>41</sup>			
	<b>Remove Barriers &amp; Build Partnerships</b>			
	4.6 Community has planned for managed retreat			
	<b>Adopt Incentives</b>			
	4.7 Incentives are provided for infill development in areas with existing development and infrastructure, directing development away from designated conservation areas			
	4.8 “Receiving” areas of Transfer of Development Rights (TDR) program are targeted the community’s safe growth areas			
	4.9 Incentives are provided (e.g. height or density bonuses, tax abatement, expedited permitting, fee waivers, etc.) for development in safer growth areas			
	<b>Enact Policies &amp; Supportive Regulations</b>			
	4.10 Flexible zoning, such as dynamic zoning or floating zones, to encourage development in safer areas has been adopted			
	4.11 Regulations state that, to the extent possible, each lot in a new subdivision must provide a building site that is on natural high ground, out of the regulatory floodplain			
	4.12 New municipal buildings are required to be constructed in well-connected, safe areas			

<sup>41</sup> According to FEMA and the National Flood Insurance Program, any building located in an A or V zone is considered to be in a Special Flood Hazard Area, and is lower than the Base Flood Elevation. V zones are the most hazardous of the Special Flood Hazard Area.

### C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
4.3		<a href="#">New York Community Risk and Resiliency Act, State Generated Sea Level Rise projections</a> : Data helps identify safe growth areas, inform hazard analysis, and develop future projections.
		<b>Remove Barriers &amp; Build Partnerships</b>
		<b>Adopt Incentives</b>
4.8		<a href="#">New York Department of State Transfer of Development Rights (TDR)</a> : Technical guidance for New York municipalities to implement a Transfer of Development Rights program as a resource preservation tool.
		<a href="#">Lancaster County, PA TDR Practitioner’s Handbook</a> : A detailed guide to TDR programs.
		<a href="#">Transfer of Development Rights American Farmland Trust</a> : An overview of the history, purpose, benefits and potential drawbacks of a TDR program.
4.9		<a href="#">CRS Coordinators Manual</a> : Section 422.e- page 420-20. Provides credit criteria and examples for local requirements and incentives that relocates development from flood-prone portions of property.
		<b>Enact Policies &amp; Supportive Regulations</b>
4.11		<a href="#">CRS Coordinators Manual</a> : Section 422.e, page 420-20. Credit criteria and examples are provided for regulations require that each lot in a new subdivision provide a building site that is on natural high ground, out of the regulatory floodplain.

## FOCUS AREA 5: Implement Comprehensive Stormwater Management Techniques

Effectively managed stormwater flow slows and spreads out, allowing time for the water to infiltrate the ground instead of running off into water bodies or storm drains. This is as important in developed areas where urban flash flooding occurs as it is in rural areas where river or stream flooding occurs. A resilient community recognizes that stormwater does not stop at municipal boundaries and that mitigation is best approached at the regional, watershed level. A resilient community employs multiple systems that share the mitigation workload rather than relying on a single system to carry excess water away.

### EXAMPLES OF PRACTICAL APPLICATIONS

**Portland, OR Stormwater Management Plan and Program:** Specifies that BMPs, including sustainable stormwater management systems, will be implemented to reduce pollutants in stormwater and the volume of runoff. To ensure that private property owners implement the BMP requirements, the city amended its codes governing new and redevelopment to remove barriers and create incentives for green infrastructure. A key feature of the program includes Green Streets. Another notable element is the Ecoroof Program, which provides an incentive in Central City for eco-roof installation by providing a floor area bonus. The Green Streets and Ecoroofs have generated significant city- and nation-wide interest, and self-guided walking and biking tours are available, connecting the green sites.

**Hoboken, NJ Green Infrastructure Strategic Plan:** Between July 2002 and July 2012, the city recorded 26 dates with greater than 2 inches of precipitation and tides of 4 feet or higher. During these storm events, Hoboken's sewer infrastructure is severely overtaxed. This plan identifies the most cost-effective, place-based green infrastructure projects to address current and anticipated stormwater management and flooding issues. It considers city assets most important to protect and evaluates how the measures can improve transit resiliency as

### A. Understanding Key Challenges

- ◆ Does your community have experience with green infrastructure/low-impact design?
  
- ◆ How has green infrastructure been received by the community? Are people interested, or is there a feeling that it will be too expensive/not effective?
  
- ◆ Do your community’s codes and ordinances provide for the protection of natural features with stormwater management benefits (e.g., trees, open space, riparian areas, etc.), or do you typically rely on structural stormwater management methods?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community’s current capacity to think about stormwater at a regional scale and manage it effectively. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	<b>Study, Adopt Plans, Educate</b>			
	5.1 Goal(s) within comprehensive plan encourages green infrastructure (GI) in new development			
	5.2 A municipal stormwater design manual that illustrates context-appropriate green infrastructure is available			
	5.3 Development and redevelopment are regulated according to a watershed management master plan			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	5.4 Regional source water supply protection plan or strategy is in place			
	<b>Remove Barriers &amp; Build Partnerships</b>			
	5.5 A green infrastructure cost share or fee credit program is available			
	5.6 Green infrastructure is featured in a sustainable-streetscapes program			
	5.7 Green infrastructure techniques and/or other integrated stormwater management methods are required in capital improvement plan (CIP)			
	5.8 A stormwater utility is used as a funding source for green infrastructure and other stormwater management activities			
 	5.9 County or regional efforts to discuss managing stormwater at the watershed level have been joined or initiated			
	<b>Adopt Incentives</b>			
	5.10 Incentives (e.g. tax abatements, fee waivers, development intensity bonus, expedited permitting, etc.) are provided for green infrastructure			
	5.11 Incentives (e.g. tax abatements, fee waivers, development intensity bonus, expedited permitting, etc.) are provided for on-site stormwater retention/management			
	<b>Enact Policies &amp; Supportive Regulations</b>			
	5.12 Submission and approval of a stormwater site design plan is required during site plan review and development is regulated on a case-by-case basis ensuring peak flow of stormwater runoff does not exceed pre-development runoff			
	5.13 Stormwater performance standards are required for new development or redevelopment sites (e.g. capture and infiltrate the first 1-1.5 inches of rain using green infrastructure)			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	5.14 Site plan requirement that requires development to retain all stormwater on site has been adopted			
	5.15 Natural channels on public and private property are inspected and debris removed as appropriate. Interference with proper stormwater drainage is prohibited in zoning ordinance regulations			
	5.16 Clean Water Act Section 402 National Pollution Discharge Elimination System (NPDES) permits have been updated to consider projected increases in extreme weather events (i.e. changing precipitation patterns, changing or alternative coastlines, etc.)			
	5.17 Green- and complete-streets design standards have been adopted			
	5.18 Local building code requires check valves on wastewater pipes to prevent sewage from backflowing into basements			
	5.19 Density standards are in place to improve stormwater management, limit development in vulnerable areas, and reduce future damages			
	5.20 Natural storm and flood mitigation strategies are implemented (e.g. restoring natural ('living') shorelines, mangrove planting, natural or artificial reefs, and/or dune restoration)			

### C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, Educate
5.1		<a href="#">Imagine Austin Comprehensive Plan</a> : Has several key themes, including compact and connected growth; green infrastructure (integrating nature into the city); and sustainable management of water resources.
		<a href="#">City of Raleigh, NC 2030 Comprehensive Plan</a> : Policies and strategies encourage use of green infrastructure in new development and redevelopment.

5.3		<a href="#">Handbook for Developing Watershed Plans to Restore and Protect Our Waters</a> : Helps communities develop and implement watershed plans to meet water quality standards and protect water resources.
		<a href="#">Athens-Clarke County, GA Watershed Management Program</a> : Describes process for assessing the conditions of watersheds and developing plans to protect, restore, and improve them.
		<a href="#">Durham, NC Third Fork Creek Watershed Management Plan</a> : Helped the city prioritize and implement projects to clean up and revitalize Third Fork Creek. Helped the city prioritize and implement projects to clean up and revitalize Third Fork Creek.
		<a href="#">Vista, CA Agua Hedionda Watershed Management Plan</a> : A regional, comprehensive plan for preserving, restoring, and enhancing watershed functions and minimizing future degradation in this urbanizing watershed.
5.4		<a href="#">Beaver Lake Watershed Protection Strategy; Northwest AR</a> : A regional, multi-jurisdictional strategy for protecting a high-quality drinking water supply and recreation area and for restoring impaired streams.
		<a href="#">Lake Maumelle Watershed Management Plan, Central AR</a> : A comprehensive, regional plan for protecting high-quality drinking water supply.
<b>Remove Barriers &amp; Build Partnerships</b>		
5.5		<a href="#">City of Durham, NC Rain Catchers Project, Ellerbee Creek Watershed</a> : A residential incentive program including outreach to homeowners; a reverse auction; selection of participants; and city funding of design, and installation of green infrastructure BMPs.
		<a href="#">Washington, DC River Smart Homes Program</a> : A residential green infrastructure incentive program in which the city performs audits and installs the BMPs for interested property owners. In turn, the property owner typically provides about a 10% cost-share and signs a maintenance agreement.
		<a href="#">Philadelphia, PA Rain Check Program and Stormwater Incentive Program</a> : A homeowner education program for cost-sharing and installing green infrastructure BMPs with individual homeowners; also targets non-residential sites most impacted by stormwater fees and provides grants up to \$100,000 per impervious acre managed.
		<a href="#">City of Raleigh, NC Stormwater BMP Cost-Share</a> : Provides cost share funds for green infrastructure BMPs for new and existing developments going beyond the city's stormwater management requirements. For priority watershed areas, the cost share is 90% of design and installation of the BMP; developments in non-priority watersheds receive 75% cost share.
		<a href="#">Portland, OR Green Streets Program</a> : Supports green infrastructure retrofits of streets in residential, commercial, and industrial areas to capture the storm peak and reduce combined sewer overflows.
5.7		<a href="#">Nashville, TN Integrated Ordinance</a> : An ordinance directing coordination among four city departments in developing an annual list of priority green infrastructure projects to fund in the city's CIP.
		<a href="#">Austin, TX Integrated Mission Project Selection</a> : An adopted city protocol that requires maximizing multi-benefits across city divisions in selecting CIP projects.

		Adopt Incentives
5.10		<a href="#"><u>The Stormwater Calculator - Identifying Green Infrastructure Solutions</u></a> : EPA’s desktop application that estimates the annual amount of rainwater and frequency of runoff from a specific site anywhere in the United States.
		<a href="#"><u>Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scale</u></a> (2009): Guides local government staff through a review of relevant local codes and ordinances across multiple departments ensuring that codes work together to support a green infrastructure.
		<a href="#"><u>Seattle, WA Floor Area Ratio (FAR) Bonus</u></a> : The green building FAR incentive in the Low-Rise zones increases FAR by 0.2 for green building. The greatest bonus is for apartment uses in zone LR3 inside the urban centers and urban villages: increase from base FAR of 1.5 to 2.0 for green building.
		<a href="#"><u>Austin, TX Density Bonus</u></a> : The city’s Green Roof Density Bonus gives a density bonus of up to seven square feet for every square foot of green roof installed. Projects incorporating Green Stormwater Quality Infrastructure (biofiltration, rainwater harvesting, and other GI water quality controls) may receive additional credit if including green roofs in the project design.
		<a href="#"><u>Raleigh, NC Advancing Green Infrastructure</u></a> : Actions to advance green infrastructure on a voluntary basis include a new expedited review process, code revisions to remove barriers, green street design templates, educational factsheets to use in the early phases of concept plan review, an enhanced green infrastructure cost-sharing program, and more.
		<a href="#"><u>Philadelphia, PA Expedited Post-Construction Stormwater Plan Review</u></a> : Two types of expedited review for applicants proposing green infrastructure strategies: Disconnection Green Review (applicable to redevelopments exempt from city’s channel protection requirements that meet 95% stormwater disconnection criteria) and Surface Green Review (applicable to all new development and redevelopment that meet 100% disconnection criteria).
		<a href="#"><u>Minneapolis, MN Stormwater Fee Credit</u></a> : New development and redevelopment are eligible for a stormwater fee credit if they install a BMP that goes beyond the stormwater requirements.
5.11		<a href="#"><u>Seattle, WA Priority Green</u></a> : A prerequisite for the city’s expedited review program, Priority Green, is the Green Stormwater Infrastructure Calculator showing 100% green infrastructure or all flat surfaces outside of building footprint as permeable pavement.
		<a href="#"><u>Chicago, IL Green Elements Permit</u></a> : Two-tiered approach to green permitting. Tier 1 is high number of green elements and LEED certified. Tier 2 includes one or more green elements—including green infrastructure—from an approved menu.
		<a href="#"><u>Durham, NC Building Height Bonus</u></a> : Offers incentives for the development applicant to provide desired amenities on the development site including 15 to 25 additional feet of building height for sustainable stormwater management.
		Enact Policies & Supportive Regulations
5.12		<a href="#"><u>New York State Stormwater Management Design Manual</u></a> : Provides designers with a general overview on how to size, design, select, and locate stormwater management practices at a development site to comply with state stormwater performance standards.

		<a href="#">Voorheesville, NY Zoning Ordinance</a> : Article XIX Special Regulations, Site Plan Review. Establishes requirements for stormwater site design practices.
5.13		<a href="#">Chapel Hill, NC Stormwater Performance Standard</a> : Includes a volume requirement encouraging the use of green infrastructure: “runoff volume leaving the site post-development shall not exceed the stormwater runoff volume leaving the site pre-development (existing conditions) for the local 2-year frequency, 24-hour duration storm event.”
		<a href="#">Phoenix, AZ Stormwater Performance Standards</a> : All developments shall not increase the 100-year, 2-hour peak runoff, change the time of the peak, nor increase the total runoff from its predevelopment values; all new developments must make provisions to retain the stormwater runoff from a 100-year, 2-hour duration storm (translating to a 2.5-inch storm event); standard used for water quality, channel protection and flood control.
		<a href="#">Washington, DC Stormwater Standard</a> : Requires development to retain the 90 <sup>th</sup> percentile storm (1.2 inches of rainfall). At least 50% of the rainfall must be retained on site; up to 50% may be retained off site. The city operates a retention trading program so development can achieve the retention goal cost-effectively.
		<a href="#">Georgia Stormwater Management Manual</a> : The 2016 edition has a runoff reduction standard that requires development to retain the first 1.0 inch of rainfall on the site to the maximum extent practicable.
5.15		<a href="#">Reducing Damage from Localized Flooding: A Guide for Communities</a> : Intended to help local offices in cities, towns, villages, and counties understand what they can do to reduce the damage, disruption, and public and private costs that result from localized flooding.

## FOCUS AREA 6: Expand Community Capacity to Enhance Resilience

To enhance resilience, your community can investigate and understand its barriers to success and identify possible solutions. A resilient community has the capacity, resources, and tools necessary to prepare for, withstand, and respond to system shocks and unexpected events.

### EXAMPLES OF PRACTICAL APPLICATIONS

***Palm Beach County, FL Comprehensive Planning for Resilience:*** Palm Beach County has taken a proactive and inclusive approach to planning and implementing resilience building strategies. This has been accomplished through the development of three separate plans that have been cross-checked for conflicts and integrated to take advantage of conflicts. Palm Beach County has a widely recognized comprehensive plan with a vision for the future that guides the county's growth and development. This comprehensive plan contains a robust coastal management element, as required by Florida law. They have also developed a hazard mitigation plan and a post-disaster redevelopment plan (PDRP). Instead of trying to make decisions in the hectic days following a disaster, the PDRP builds resilience by planning and developing goals for recovery and redevelopment. The plan also contains actions that can be taken before a disaster occurs, to support the capacity of residents, businesses, and other community stakeholders. Examples include identifying sites for post-disaster temporary office space, maintaining inventories of land or vacant buildings that can be used for temporary housing, assisting small businesses with business continuity planning, facilitating mutual aid agreements (both public and private), and more.

## A. Understanding Key Challenges

- ◆ Does your community have a pre- or post-disaster recovery plan? If yes, when was this plan created and was it a successful process? If no, has your community considered developing a pre-disaster recovery plan?
  
- ◆ Do you feel your staff has the expertise necessary to address resilience challenges? Does your community encourage or provide incentives for advanced training or certifications for staff members that could support greater capacity for community resilience (such as the trainings provided by the Association of Climate Change Officials)?
  
- ◆ What is the source of your community's authority to legislate (ex. Home Rule state or Dillon's Rule state)?
  
- ◆ What are some tools your community could use to help address resilience challenges?
  
- ◆ Are there specific challenges you've faced in building the capacity needed to enhance community resilience?

## B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess a community's current capacity to handle system shocks. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
	<b>Study, Adopt Plans, Educate</b>			
	6.1 Staff is trained in long term flood resilience planning and/or implementation, including: <ul style="list-style-type: none"> <li>• GIS and GIS-based scenario planning tools</li> <li>• Sea, Lake and Overland Surge from Hurricanes (SLOSH) flood maps</li> <li>• Sea Level Affecting Marshes Model (SLAMM)</li> <li>• FIRM</li> </ul>			
	6.2 A program to build technical capacity among local developers to support resilient development practices has been implemented			
	<b>Remove Barriers &amp; Build Partnerships</b>			
	6.3 A Certified Floodplain Manager (CFM) is on staff			
	6.4 Local government emergency response personnel, floodplain manager, department of public works personnel, hazard mitigation planner, and/or marine resources agent (or the like) is involved in developing/updating the community's comprehensive plan			
	6.5 The local government planner or zoning administrator is involved in developing/updating the community's hazard mitigation plan			
	6.6 Groups such as local businesses, schools, hospitals/medical facilities, agricultural landowners, water and wastewater utilities, and others who could be affected by floods are involved in the hazard mitigation plan drafting process			
	6.7 Small businesses are assisted with continuity planning and mutual aid agreements			
	6.8 Partnerships are developed to help local businesses evaluate their exposure to natural events and take steps to reduce exposure			

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
6.9	Public-private partnerships are developed to promote renewable energy			
	<b>Adopt Incentives</b>			
 	6.10 Resources are devoted to promoting commercial/residential mitigation activities that can reduce flood insurance rates			
	6.11 Financial incentive packages are available to assist businesses remaining in the community following a disaster			

### C. Targeted Resources

 Checklist

 Guidebook

 Example/ application

 Tool or toolkit

 Study or report

STRATEGY	TYPE	Study, Adopt Plans, and Educate
6.1		<a href="#">NOAA Office for Coastal Management Digital Coast Academy</a> : Offers a variety of methods and mediums of information, including classroom, instructor-led; online, instructor-led; self-guided resources; case studies; publications; quick references; and videos and webinars.
		<a href="#">Community Flood Resilience Toolkit</a> : A roadmap for municipal leaders to increase their community's resilience to flooding. Action E-1 (p26) supports training for staff and volunteers.
6.2		<a href="#">California, Regional Resilience Toolkit</a> : A toolkit designed for government agencies and community groups to address multi-hazard resilience, with a focus on the San Francisco Bay Area, the Central Coast region, and Mt. Shasta area of northern California.
<b>Remove Barriers &amp; Build Partnerships</b>		
6.3		<a href="#">Association of State Floodplain Managers</a> : To become a CFM, must pass Association of State Floodplain Manager's (ASFPM) Certified Floodplain Manager exam.
		<a href="#">FEMA Floodplain Management Requirements</a> : Desk reference to reinforce understanding of government officials administering and enforcing local floodplain management regulations.
6.5		<a href="#">Local Mitigation Planning Handbook, Task 2 – Build the Planning Team</a> : Identifies planning/community development department as important partner with authority to regulate development and involved in hazard mitigation activities, thus critical to the planning team.

6.6		<a href="#"><u>FEMA Local Mitigation Planning Handbook, Task 3 – Create an Outreach Strategy</u></a> : Identifies stakeholders and how to engage them. Stakeholders listed include businesses, academia, non-profit and for-profit institutions, and local and regional agencies involved in hazard mitigation activities. Emphasizes the importance of stakeholder input to the planning process.
		<a href="#"><u>Coastal Resilience Index</u></a> : An index that provides a method of self-assessment of a community’s resilience to coastal hazards, identifying weaknesses a community may want to address prior to the next hazard event and guiding community discussion.
		<a href="#"><u>Community Resilience Assessment</u></a> : An assessment for community members and decision-makers to identify their community’s resilience strengths, challenges, and priorities.
		<a href="#"><u>U.S. Climate Resilience Toolkit</u></a> : Online toolkit maintained by NOAA to assist communities with resilience building by exploring hazards, assessing vulnerability and risks, investigating options, prioritizing and planning improvements, and taking action.
6.7		<a href="#"><u>FEMA Business Continuity of Operations Plan template</u></a> : Continuity planning improves resiliency by identifying key products and services.
<b>Adopt Incentives</b>		
6.10		<a href="#"><u>Mississippi Development Authority Disaster Recovery Division, Homeowner Elevation Grant Program</u></a> : Program awards \$30,000 grants to approved applicants in targeted counties to offset costs of elevating homes to FEMA elevation requirements to reduce flood insurance rates.
6.11		<a href="#"><u>U.S. Department of Commerce Economic Development Administration’s Public Works and Economic Adjustment Assistance Program</u></a> : Grant program to “leverage existing regional assets and support the implementation of economic development strategies that advance new ideas and creative approaches to advance economic prosperity in distressed communities”. Can be used to support economic recovery, specifically aimed at job creation or retention projects and initiatives to keep employers from leaving a disaster area.

## FOCUS AREA 7: Build Support for Improving Community Resilience and Remove Barriers to Implementation

It is important to inform and engage a range of community groups to improve your chances of earning their “buy-in.” Proactively identifying and overcoming challenges and barriers to strategy implementation is key to moving your efforts forward. A resilient community builds support through frequent, innovative, and robust engagement with citizens, stakeholders, and elected officials who are representative of the whole community.

### EXAMPLES OF PRACTICAL APPLICATIONS

***Norfolk, VA City Manager’s Office of Resilience:*** As a part of the Rockefeller Foundation’s 100 Resilient Cities program, the City of Norfolk developed “Norfolk Resilient City,” a resilience strategy and action plan aimed at improving the resiliency of individuals, systems and neighborhoods. The actionable recommendations from the strategy can all be characterized as “collective and coordinated action to build resilience.” The Office of Resilience supports the implementation of these actionable recommendations by 1) defining and translating a resilient Norfolk, 2) coordinating the city and its partners to support this vision of resiliency, and 3) fostering an environment for business innovation and economic growth. The Office also provides updates on the steps the City has taken to implement the strategy’s actionable recommendations.

***New Orleans Mayor’s Office of Resilience and Sustainability:*** As a part of the Rockefeller Foundation’s 100 Resilient Cities program, the City of New Orleans developed “Resilient NOLA”, a resilience strategy to meet urgent threats, amend their history of inequity and risk, adapt to a shifting natural environment, invest in equity, develop flexible and reliable systems, and prepare for the future. The Mayor’s Office of Resilience and Sustainability and the Chief Resilience Officer, in coordination with the City Planning Commission and Hazard Mitigation Office, are responsible for implementing the strategy, integrating it into existing policies and procedures, and assessing the regional implications of policy changes.

### A. Understanding Key Challenges <sup>42</sup>

- ◆ What concerns do residents have about planning for resilience?
- ◆ Are there political impediments or community objections to resilience-building efforts in your community (ex. an unwillingness to confront future problems, concerns about protecting private property, perception of high costs for improving resilience or reducing vulnerability to hazards)?
- ◆ Do your community’s efforts meet or exceed existing state or federal laws?
- ◆ Are there specific challenges you’ve faced in building the capacity needed to enhance community resilience?

### B. Inventory Your Local Programs, Policies, and Codes

The strategies below assess how a community handles potential barriers to implementation of resilience-enhancing strategies. The targeted examples at the end of this goal area provide more information about specific strategies. To inventory your policies, please read through the strategies described below and indicate if you are **currently using** this strategy, if you would **like to use** or implement this strategy and provide any available local links or resources available to provide more information.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 Equity component	 Quick-start strategy	 CRS linkages	
	Study, Adopt Plans, Educate			
 	7.1 A website or regularly mailed bulletin informs the public about upcoming/ongoing/complete community resilience efforts			
 	7.2 Multilingual outreach is conducted to inform the public about upcoming/ongoing/complete community resilience efforts			

<sup>42</sup> Questions adapted from Beatley, Timothy, *Planning for Coastal Resilience: Best Practices for Calamitous Times*. Island Press, Washington: DC, 2009.

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
				
				
	7.3	An annual plan of actions is produced, prioritizing the year's resilience building projects and efforts		
	7.4	A post-disaster recovery/redevelopment plan is created		
	7.5	A post-disaster redevelopment ordinance is adopted		
	7.6	An initiative established to promote/ensure equitable considerations throughout the process of resilience planning		
	<b>Remove Barriers &amp; Build Partnerships</b>			
	7.7	Hazard mitigation plan identifies projects that could be included in pre-disaster grant applications		
	7.8	A dedicated Resilience Officer or Office of Resilience is established to plan and coordinate resilience building efforts and to identify funding opportunities for resilience projects		
	7.9	Development review for resilience requirements and permitting activities is conducted from a centralized location that streamlines processes and eliminates inefficiencies		
	7.10	A developer liaison is available to assist developers in meeting resilience goals		
	7.11	State and regional agency financial support for public infrastructure that supports resilience has been sought/identified		
	7.12	Special assessment districts <sup>43</sup> are created to fund resilient infrastructure improvements		
	7.13	A capital reserve fund is created to save for resilient infrastructure improvements		

<sup>43</sup> A flexible tool that can be used to channel property tax revenue increases for extraordinary needs (such as flood mitigation or resilience strategies); typically apply only in defined districts that will benefit from the project(s) being funded. [urbanland.uli.org/infrastructure-transit/using-special-assessments-to-fund-transit-investments/](http://urbanland.uli.org/infrastructure-transit/using-special-assessments-to-fund-transit-investments/)

	STRATEGY	CURRENTLY HAVE/USE? (Y/N)	WOULD LIKE TO HAVE/IMPROVE? (Y/N)	YOUR LOCAL LINKS & RESOURCES
	 <b>Equity component</b>  <b>Quick-start strategy</b>  <b>CRS linkages</b>			
 	7.14 The current inventory of non-conforming structures located in the regulatory floodplain is maintained and frequently updated to prevent rebuilding in hazard areas, in the event of significant damage			
	Adopt Incentives			
	7.15 Expedited development review/permitting is available for proposals that improve resilience in high hazard areas or for proposals located outside of high hazard areas			
	7.16 A voluntary incentive program is available for strengthening buildings beyond code requirements			
	Enact Policies & Supportive Regulations			
	7.17 Zoning and building codes are reviewed every five years and updated, if needed			
	7.18 Code is amended or ordinances adopted to allow renewable energy on individual properties and in communal installations (microgrids) <sup>44</sup>			

### C. Targeted Resources

-  Checklist
-  Guidebook
-  Example/ application
-  Tool or toolkit
-  Study or report

STRATEGY	TYPE	Study, Adopt Plans, and Educate
7.1		<a href="#">Roseville, CA Floodplain Management website</a>
		<a href="#">King County, WA Flood Information website</a>

<sup>44</sup> A microgrid is an energy system capable of operating in parallel with, or independently from, the main power grid. The primary purpose is to ensure local, reliable, and affordable energy security. [www.generalmicrogrids.com/about-microgrids](http://www.generalmicrogrids.com/about-microgrids)

		<a href="#">Pierce County, WA Flood Information website</a>
7.2		<a href="#">National Resource Center on Advancing Emergency Preparedness for Culturally Diverse Communities (“Diversity Preparedness”)</a> : A web-based library of resources and information on disaster preparedness for culturally diverse communities and other at-risk populations. The planning tools, fact sheets, trainings, and other materials available through this site have been developed by academic centers, government agencies, and non-profit organizations from across the United States. They are geared for public health, healthcare, emergency management, and social service providers who work with diverse and high-risk communities.
7.4		<a href="#">Leon County, FL Post Disaster Redevelopment Plan</a> : Post-disaster recovery/redevelopment plan.
		<a href="#">Chatham County GA Redevelopment Plan</a> : Post-disaster recovery/redevelopment plan.
<b>Remove Barriers &amp; Build Partnerships</b>		
7.6		<a href="#">Seven Principles for Equitable Adaption</a> : Research article that focuses on domestic law, that describes climate change and its impacts and the role of socioeconomic factors in determining their magnitude.
		<a href="#">Equity in Building Climate Adaption Planning</a> : Provides a guide to localities to enable them to integrate an equity lens as they seek to build resilience in designing adaptation plans
7.8		<a href="#">New Orleans, LA Chief Resilience Officer</a> : Oversees the implementation of the nation’s first Comprehensive Resilience Strategy, development of the city’s climate action plan and sea level rise and climate adaptation strategies.
7.11		<a href="#">Delta Regional Authority (DRA) Community Infrastructure Fund</a> : As a complement to the SEDAP investments, the DRA created the Community Infrastructure Fund (CIF) to target physical infrastructure projects that help build safer, more resilient communities in the Delta region. CIF investments can be used for projects that address flood control, basic infrastructure development, and transportation improvements.
		<a href="#">Clean Water State Revolving Fund (CWSRF)</a> : The U.S Environmental Protection Agency’s (EPA) Clean Water State Revolving Fund (CWSRF) program is the largest public source of water quality financing in the country. Each CWSRF program has a priority system that evaluates and ranks projects. Ranking criteria primarily focus on public health and water quality but can also address other concerns including infrastructure resiliency. States may encourage projects promoting system resiliency through targeted rating criteria, such as offering priority points, and funding incentives, such as reduced interest rates and waiver of fees.
		<a href="#">Incorporating Resilience into Transportation Planning and Assessment</a> A report initiated to explore how to incorporate resilience into long-term transportation planning for state departments of transportation and metropolitan planning organizations and to inform the Transportation Research Board.
7.14		<a href="#">FEMA guidance for hazard mitigation planning</a> : Assists with creating an inventory of non-conforming structures located in the floodplain.
<b>Adopt Incentives</b>		
7.16		<a href="#">Going Beyond Code: A Guide to Creating Effective Green Building Programs for Energy-Efficient and Sustainable Communities</a> : Designed to help state and local governments design and implement successful “beyond code” programs for new commercial and residential buildings. While focuses on energy efficiency and green building standards, recommends a voluntary

		incentive program, among other financing strategies.
		<b>Enact Policies &amp; Supportive Regulations</b>
7.18		<a href="#">Delaware Valley Regional Planning Commission (DVRPC) Renewable Energy Ordinance Framework for Solar PV</a> : A resource for municipalities as they develop and update zoning ordinances to govern the siting of small-scale solar PV energy systems in their community.

## PRIORITIZATION, ACTION PLANNING, AND IMPLEMENTATION WORKSHEETS

Use the results of the Resilience Focus prioritization; the inventory of local programs, policies, and codes; and the targeted examples to help set your action agenda for next steps. Fill in the following worksheets to get started.

### Resilience Focus Prioritization Questions

Answer the following questions to help prioritize resilience goal areas and focus staff time and resources. Mark the number of topics you are interested in for each goal area in the tabulation table.

QUESTION	Y	N	CONSIDER COMPLETING:
Does my community have a thorough understanding of the hazards it can expect to face, the potential range in severity of those hazards, and where they are most likely to occur?			Focus Area 1
Is information pertaining to coastal hazards and risk in my community (maps, plans, risk assessments) up to date?			
Does my community understand and consider our social and economic vulnerabilities? <sup>45</sup>			
Does my community protect lands in critical, flood-prone areas so that nature can perform its flood-reducing functions?			Focus Area 2
Does my community have dedicated funding sources for open space acquisition and management (for example bonds, sales taxes, or transfer taxes)?			
Does my community encourage growth away from sensitive environments to preserve land and reduce risk to people and structures that might locate in dangerous flood-prone areas?			
Has my community taken steps to reduce risk through a combination of proactive and protective land use laws, building codes, and planning policies?			Focus Area 3
Are there populations and/or places in my community that bear a disproportionate share of risk or vulnerability resulting from potential hazards?			
Has my community conducted a vulnerability assessment to identify current and projected vulnerable areas and associated risks to life and property and has it incorporated the results of that assessment into relevant plans (e.g. comprehensive plan, hazard mitigation plan, land use plans, etc.)?			
Has my community identified where growth can safely be accommodated now and in the future?			Focus Area 4
Does my community provide incentives for development			

<sup>45</sup> Social vulnerability refers to the increased burden of hazard impacts on certain populations within the community, based on race, income, education, language spoken and more; economic vulnerability refers to the local or regional economy's ability to recover following an unexpected shock to the system.

QUESTION	Y	N	CONSIDER COMPLETING:
in safe growth locations to enhance community resilience?			
Is new development guided by smart growth principles helping to further enhance my community's ability to withstand hazards and unexpected events in my community?			
Does my community manage stormwater using a wide variety of measures spreading the burden of mitigation instead of relying on a single system to carry excess water away?			Focus Area 5
Does my community have experience with/uses/requires green infrastructure/low-impact design?			
Does my community coordinate with neighboring jurisdictions to explore watershed-based approaches to floodplain management, stormwater management, and green infrastructure?			
Do my community's codes and ordinances provide for the protection of natural features with stormwater management benefits (e.g., trees, open space, riparian areas etc.)?			
Does my community encourage and/or provide incentives for advanced training or certifications for staff members to support greater capacity for building community resilience (such as the trainings provided by the Association of Climate Change Officials, requiring CFMS for staff, or participating in the Community Rating System)?			Focus Area 6
Has my community considered/developed a post-disaster recovery plan?			
Do my community's resilience efforts meet and/or exceed existing state or federal laws?			
Does my community's staff have the range of expertise necessary to address resilience challenges?			Focus Area 7
Has my community identified and involved anchor institutions (hospitals, colleges, other major employers) that can support the community's vision for greater resilience?			
Does my community have a community champion/group who is advancing resilience efforts and building coalitions?			
Does my community have forward-thinking community leaders who understand the long-term challenges of building resilience?			
Does my community prioritize spending for hazard mitigation, disaster recovery, and improved resilience?			

FOCUS AREAS	TOPICS OF INTEREST (#)	IDENTIFIED PRIORITY? Y/N
Focus Area 1. Ensure comprehensive understanding of known hazards, risks and vulnerabilities, and their potential impacts (physical, economic, and social)		

FOCUS AREAS	TOPICS OF INTEREST (#)	IDENTIFIED PRIORITY? Y/N
Focus Area 2. Conserve land in critical coastal areas, river corridors, and other flood-prone environments		
Focus Area 3. Reduce risk to people, buildings, and facilities in vulnerable areas		
Focus Area 4. Plan for and encourage development in safer areas		
Focus Area 5. Implement comprehensive stormwater management techniques		
Focus Area 6. Build capacity and develop tools to enhance resilience		
Focus Area 7. Build support for improving community resilience and remove barriers to implementation		

### Identify Priority Strategies

For each of the focus areas you responded to in the tool, identify three to five priority strategies that you would like to implement or explore further.

**FOCUS AREA:**

STRATEGIES

**FOCUS AREA:**

STRATEGIES


**FOCUS AREA:**

STRATEGIES

**Develop Action Agenda**

The following matrix will help you to clarify, prioritize, and define roles and responsibilities for moving forward for each of the resilience strategies that you have identified as a priority. For each strategy, identify the following:

- **Lead role:** The individual, agency, office, or organization who will champion this resilience strategy
- **Supporting cast:** Other individuals, offices, organizations, etc. who can help move the strategy further towards implementation or assist once the strategy has been implemented
- **Timeframe:** The amount of time estimated to complete the strategy or action being discussed; typically described as short term (0-6 months), mid-term (6 months- 1 year), or long-term (beyond one year)
- **Next Steps:** Actions that can be taken in the next 90 days to move the strategy towards implementation
- **Resources:** Time, funding, and/or materials – anything you will need to fully implement the action

A sample strategy has been filled out to show how the action agenda can be used.

RESILIENCE STRATEGY	LEAD ROLE	SUPPORTING CAST	TIMEFRAME	NEXT STEPS	RESOURCES NEEDED
<p><b>Example:</b> A green infrastructure cost share or fee credit program is made available</p>	<p>Office of Stormwater Management</p>	<p>Planning Dept. Public Works Public Affairs Local environmental Groups</p>	<p>Mid-term: 6 months – 1 year</p>	<p>Research existing cost share/fee credit programs and produce a feasibility study</p> <p>Identify likely users or residents/businesses who would be most interested</p> <p>Investigate funding support resources</p>	<p>Staff time to research best practices and determine feasibility</p> <p>Funds to support cost sharing/ fee credits</p>

RESILIENCE STRATEGY	LEAD ROLE	SUPPORTING CAST	TIMEFRAME	NEXT STEPS	RESOURCES NEEDED

## ADDITIONAL RESOURCES

The **National Flood Insurance Program's Community Rating System** is a comprehensive resource for strategies that may help reduce risk to hazards and build community resilience.

[www.fema.gov/national-flood-insurance-program-community-rating-system](http://www.fema.gov/national-flood-insurance-program-community-rating-system)

US EPA's **Smart Growth Fixes for Climate Adaptation and Resilience** is a publication that aims to help communities address some of the expenses and political challenges of preparing for and adapting to climate change.

[www.epa.gov/sites/.../smart\\_growth\\_fixes\\_climate\\_adaptation\\_resilience.pdf](http://www.epa.gov/sites/.../smart_growth_fixes_climate_adaptation_resilience.pdf)

Community Risk and Resiliency Act (CRRRA), **Projected Sea Level Rise** for New York

[www.dec.ny.gov/energy/102559.html](http://www.dec.ny.gov/energy/102559.html)

New York Department of State, **Model Local Laws to Increase Resilience**

<https://www.dos.ny.gov/opd/programs/resilience/index.html>

National Academies of Sciences, Engineering, and Medicine, **Building and Measuring Community Resilience: Actions for Communities and the Gulf Research Program**

<https://www.nap.edu/catalog/25383/building-and-measuring-community-resilience-actions-for-communities-and-the>

NOAA Climate Program Office, **U.S. Climate Resilience Toolkit** <https://nemac.unca.edu/us-climate-resilience-toolkit>

FEMA **Community Resiliency Toolkit** <https://www.fema.gov/media-library/assets/documents/129896>

New Jersey Resilient Coastal Communities Initiative **Getting to Resilience A Community Planning Evaluation Tool** <http://www.prepareyourcommunitynj.org/>

Community Resilience Organizations, **Community Resilience Assessment**

<https://tools.gocros.org/community>

U.S Climate Resilience Toolkit, **Coastal Resilience Index**

<https://toolkit.climate.gov/tool/coastal-resilience-index>

RAND Corp., **Incorporating Resilience into Transportation Planning and Assessment**

[https://www.rand.org/pubs/research\\_reports/RR3038.html](https://www.rand.org/pubs/research_reports/RR3038.html)

US EPA, **Creating Safe Growth Strategies for the San Francisco Bay Area**

<https://www.epa.gov/smartgrowth/creating-safe-growth-strategies-san-francisco-bay-area>

US EPA, **Regional Resilience Toolkit: 5 Steps to Build Large-Scale Resilience to Natural Disasters** <https://www.epa.gov/smartgrowth/regional-resilience-toolkit>