PREP Tool

Planning for Resilience: Evaluation and Prioritization

AN EVALUATION & PRIORITIZATION TOOL FOR LOCAL GOVERNMENTS IN VIRGINIA'S COASTAL REGION

Last updated: September 2021

Acknowledgements

The PREP Tool was created in 2021 by the following students at the Virginia Coastal Policy Center (VCPC) at William and Mary's Law School and and the Institute for Engagement & Negotiation (IEN) at the University of Virginia. In Spring 2021, Carolyn Heaps, through an independent study graduate urban and environmental planning course, mentored by Tanya Denkla Cobb, worked closely with Abram Gagnon, Bryce Ballard, and Mark Garrett, law students in the VCPC Practicum II course, mentored by Elizabeth Andrews. In Summer 2021, Sarah Henshaw (Research Assistant with VCPC) and Linnea Laux (Graduate Research Assistant with IEN), were mentored and suppored primarily by Elizabeth Andrews and Wie Yusuf, with additional support from The Resilience Adaptation Feasibility Tool (The RAFT) project Core Team. The RAFT is a partnership between IEN, VCPC, and the Institute for Coastal Adaptation & Resilience at Old Dominion University.

This project, Task # 92.02, was funded in part by the Virginia Coastal Zone Management Program led by the Virginia Department of Environmental Quality through Grant # NA20NOS4190207 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

We give thanks to the following individuals for their support in creating the PREP Tool:

- Rear Admiral Ann Phillips, Special Assistant to the Governor for Coastal Adaptation and Protection
- Alec Brebner, Executive Director, Crater Planning District Commission
- Ryan Franklin, William & Mary Law School J.D. 2021, VCPC Student
- Dr. Carl Hershner, Virginia Coastal Resilience Master Plan Technical Advisory Committee, Project Evaluation Subcommittee Chair and Professor Emeritus at VA Institute of Marine Science
- Lewie Lawrence, Executive Director, Middle Peninsula Planning District Commission
- Ashley Montgomery, Designer, Hanbury and Virginia Coastal Resilience Master Plan Technical Advisory Committee, Outreach Subcommittee Chair
- Denise Nelson, Environmental Engineer
- Kristin Owens, Floodplain & Dam Safety Manager, Henrico County
- Meg Pittenger, Assistant Director of Planning, City of Portsmouth
- Jay Ruffa, Director of Planning & GIS, Crater Planning District Commission
- Curt Smith, Deputy Director, Middle Peninsula Planning District Commission
- Professor Bev Wilson, Urban and Environmental Planning, University of Virginia

A Product of The Resilience Adaptation Feasibility Tool (The RAFT)

More information about The RAFT can be found at raft.ien.virginia.edu.
More information about The PREP Tool can be found at this webpage.

Table of Contents

2 Acknowledgements
3 Table of Contents
4 Introduction

Part I: Evaluation

8 Section 1: Risk Assessment
11 Section 2: Planning and Land Use
14 Section 3: Social Equity
18 Section 4: Economic Resilience
21 Section 5: Emergency Management
23 Section 6: Natural and Nature-Based Features
26 Section 7: Infrastructure

Part II: Recommended Actions

31 Section 1: Risk Assessment
32 Section 2: Planning and Land Use
34 Section 3: Social Equity
36 Section 4: Economic Resilience
38 Section 5: Emergency Management
39 Section 6: Natural and Nature-Based Features
40 Section 7: Infrastructure

Part III: Prioritization

44 Resilience Planning
48 Resilience Projects
50 Priority Table

Cover Photo by Ken Lund, "Rappahannock River, Fredericksburg, Virginia," July 31, 2008

Introduction

Coastal Resilience in Virginia

The global climate crisis is resulting in increased periods of intense precipitation, worsening coastal storm events, and rising sea levels. The result is a trend of more frequent, more extensive and more severe flooding in Virginia, both in localities bordering the Atlantic Ocean and the Chesapeake Bay, and localities farther inland.

To confront these imminent and growing threats, the Commonwealth of Virginia launched a statewide coastal resilience effort to plan for impacts and adjust to the changing environment. This effort, centered around the creation of a Coastal Resilience Master Plan, uses an approach that defines *resilience* as "the capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to the social well-being, health, the economy, and the environment." Local governments are at the forefront of responding to flood risk as public infrastructure and private property are increasingly impacted by flood waters. It is therefore imperative that local governments become leaders in resilience building efforts.

Our coastal resilience efforts are fundamental to protecting the current and future health of our **natural resources,** which in turn sustain and support humans.

Resilience cannot be achieved without considering long-term **economic viability** of our coastal communities to ensure that they thrive into the future. To address all of these important factors assessing vulnerabilities and risks and planning for resilience at the local level are of utmost importance.

Finally, a focus on ensuring **equity** is key to resilience. At the individual level, vulnerability to flooding is influenced and compounded by socioeconomic conditions and access to resources from government and other service providers. Systemic marginalization of persons of racial and ethnic minority groups has resulted in entrenched socioeconomic challenges for these groups.

Hurricane Dorian, 2019. Photo by Aileen Devlin, Virginia Sea Grant, September 6, 2019

Resilience Resources

The PREP Tool builds on a significant effort over the past decade to study and document flooding and its projected changes in Virginia. To learn more about anticipated climate change impacts, as well as existing and potential resilience efforts, we recommend the following additional resources:

- A Quick Guide to Resilience
- ADAPT VA Online Portal
- Virginia Institute for Marine Sciences Center for Coastal Resources Management Climate Change & Coastal Resilience Research
- Commonwealth Center for Recurrent Flooding Resiliency (CCRFR) Resources
- The Virginia Coastal Policy Center's Reports
- Old Dominion University's Institute for Coastal Adaptation and Resilience
- The RAFT's Resources

What is the PREP Tool?

The PREP Tool is a three-step process to support local governments in establishing a set of resilience priorities informed by their level of risk, resilience efforts to date, and best practices in resilience planning. **The tool provides a starting point for local governments who have not yet evaluated their vulnerabilities, assessed impacts, identified resilience-building actions, or developed resilience plans to guide future resilience efforts.** The Quick Guide to Resilience is designed to provide background information and definitions essential to the PREP Tool's seven categories:

1. Risk Assessment
2. Planning and Land Use
3. Social Equity
4. Economic Resilience
5. Emergency Management
6. Natural and Nature-Based Features
7. Infrastructure

PREP Tool users will work through three steps for each category: (1) **evaluation: assess level of resilience**; (2) **review & coordination: review evaluation results and recommended actions**; and (3) **prioritization: translate recommended actions into prioritized resilience actions**. In the evaluation section, a series of yes-or-no questions are used to identify opportunities to address resilience. The recommended actions corresponding to each question are steps appropriate for local governments to take, and address both public and private community assets. Because this tool is designed for localities that have not yet conducted extensive resilience planning, recommended actions provide a starting point for resilience planning.

The PREP tool is designed to align with the principles for coastal adaptation outlined in the Virginia Coastal Resilience Master Planning Framework. The tool was created while planning for the Virginia Coastal Resilience Master Plan and Community Flood Preparedness Fund was ongoing, and will be updated as the final plan and guidelines are released.

Who should complete the PREP Tool?

Completion of the PREP tool should not be the responsibility of one person. Locality staff and stakeholders with relevant expertise should work in subteams to complete individual sections. At the beginning of each section is a suggested list of staffers who could complete the section.

We recommend that the locality also engage representatives from the community, such as neighborhood organizations, Chamber of Commerce or other business development organizations, environmental groups, social, emergency, and health services' leadership, faith-based organizations, and school groups and youth leaders.

Use the table on the next page to identify staff and/or stakeholders and assign sections of the PREP tool evaluation for them to complete.

PREP TOOL TEAM

Locality: _____

Date Initiated: _____

PREP Tool Team Lead: _____

Name and Affiliation	Contact Info	Evaluation Sections

Part I: Evaluation

SECTION 1: RISK ASSESSMENT

The first step in mitigating risk is to understand the magnitude and main sources of the risk. The evaluation questions and references in this section will provide context to inform the remainder of the assessment.

Questions in this section will:

- Establish a baseline understanding of your locality's overall level of risk to coastal hazards, and how coastal hazards are expected to be impacted by climate change.
- Evaluate your locality's capacity and work to date to understand risk created by coastal hazards.

Who should complete this?

Individuals responsible for the following areas are best positioned to complete questions in Section 1.

- Land use and environmental planning (Director of Planning, Zoning Administrator, other planning staff)
- Floodplain management (Certified Floodplain Manager)
- Mapping (GIS Technician)
- Engineering (Civil Engineer or City Engineer)
- Budgeting and tax assessment (County / City Treasurer)
- National Flood Insurance Program Management

Community representatives to engage: Local environmental groups, resident and business groups from areas impacted by flooding, any other interested parties.

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

1A: Flood Risk Exposure

1. ADAPTVA and its Physical Vulnerability Index Score offer the best available science for resilience planning as required by the Community Flood Preparedness Fund (CFPF). ADAPTVA incorporates climate change, sea level rise (SLR), and storm surge, and contains current flood maps, making it a valuable resource. To get started, go to the Adapt VA Interactive Map Viewer. Zoom to your locality using the + button in the upper left, or by entering your locality's name in the search bar. Select the "Vulnerability/Risk" button and check the box next to "physical risk" to turn on that map layer. What is the highest Physical Vulnerability Index Score present in your locality? Find this number by clicking on a polygon within your locality's borders. It is the number next to "Index Score". You can read more about the Physical Vulnerability Index here.

   - ☐ 0.19 or less: negligible risk
   - ☐ 0.2-0.39: low risk
   - ☐ 0.4-0.59: moderate risk
   - ☐ 0.6-0.79: high risk
   - ☐ 0.8 or greater: very high risk

2. Visit the Virginia Flood Risk Information System (VFRIS). Use VFRIS to determine the flood zones and the extent of any Special Flood Hazard Areas (SFHA) within your locality. Review the results and list up to five neighborhoods that are most vulnerable because portions of them lie within the SFHA:

   _____

3. Visit the Coastal Virginia Sea Level with Minor and Moderate Flooding map viewer online. Zoom to your locality using the + button in the upper left of the map window. Review the results and approximate the percent of streets and structures in your locality that will be impacted by flooding by the year 2080 (to match the furthest-out prediction in the CRMPF). The map is pre-set to 2080. (For more information, explore the full report "Future Sea Level and Recurrent Flooding Risk for Coastal Virginia" by ODU and CCRFR.)

	Approx. % of streets impacted	Approx. % of structures impacted
Less than 25%		
26% to 50%		
51% to 75%		
More than 75%		

4. Visit the National Storm Surge Hazard Maps viewer online. Select the option in the top left of the screen for "Category 2" to model a Category 2 hurricane. Zoom to your locality using the + button in the upper left of the map panel. Explore the areas at risk of storm surge in your locality and identify top geographic areas of concern (these may be specific neighborhoods, a business district, or even a specific building or infrastructure). List these areas below:

   _____

5. Review the The Virginia Precipitation Intensity, Duration and Frequency Analysis, funded by the Chesapeake Bay Trust and the U.S. Environmental Protection Agency for the Bay Watershed, and by the Commonwealth Center for Recurrent Flooding Resilience - ODU/VIMS and the Virginia Transportation Research Center for the remainder of the Commonwealth – available from the Northeast Regional Climate Center. What is your locality's expected increase in rainfall?

_____

1B: Flood Risk Assessment

			Y	N
6	Has your locality completed or updated an exposure and/or vulnerability assessment with mapping for localized flood risks in the last five years?			
7	Does your locality's vulnerability assessment identify the following expected impacts of climate change?			
		Changes in frequency of flood risk:		
		Changes in severity of flood risk:		
		Changes in extent of flood risk:		
8	Have sources of flooding been identified and evaluated in the past five years?			
		Precipitation-driven (riverine, overwhelmed engineered drainage systems)		
		Coastal (storm surge, tidal nuisance)		
9	If you answered yes to question 8, have impacts of climate change on sources of flooding been identified and evaluated in the past five years?			
		Precipitation driven (changes in severity/frequency of precipitation events):		
		Coastal (storm surge, tidal-based, sea level rise):		
10	Has your locality identified assets (cultural, historical, economic, and infrastructural) that are vulnerable to flooding impacts?			
11	Has your locality identified populations which are exposed to flood risk?			
12	Was your locality's vulnerability assessment created with stakeholder input to ensure that diverse knowledge and perspectives informed the assessment?			
13	Has your locality identified and mapped flooding for different annual flood probabilities?			
14	If your locality has flood maps, are they drawn with small contour intervals and recently constructed streets/developments included?			
TOTAL				

SECTION 2: PLANNING & LAND USE

Incorporating resilience in planning and land-use activities ensures that long-range processes set in motion today will protect your community in the future.

Questions in this section will assess:

- Progress in planning for future conditions under climate change in hazard mitigation plans
- Progress in incorporating climate change risk into comprehensive plans, capital improvement plans, and water supply plans
- Efforts to include communities who are particularly vulnerable to climate hazards in the process of developing and updating plans

Who should complete this?

Individuals responsible for the following areas are likely to be best positioned to complete this section.

- Comprehensive and long-range planning
- Land use planning
- Site review and zoning administration
- Floodplain management

*Community representatives t*o engage: leaders or representatives of directly-impacted communities, neighborhood organizations

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

2A: Budgeting and Capital Improvement Planning

		Y	N
1	Does your locality's budget (operating budget and/or capital budget) specifically allocate funds for addressing coastal storm hazards and flood protection and mitigation?		
2	Has your locality incorporated coastal resilience projects into its Capital Improvement Plan (CIP)? *Resilience projects may include hazard mitigation or recovery projects to improve protection, upgrades to critical infrastructure, and improvements to water and wastewater management systems.*		
TOTAL			

2B: Comprehensive Planning

			Y	N
3	Does your locality's comprehensive plan recognize that climate change is resulting in relative sea level rise, more frequent and intense precipitation, and increased storm activity that increases the risk and impacts of flooding in your locality?			
4	Are you aware of areas of recurrent flooding outside of the Special Flood Hazard Area (SFHA), and if so, is your locality addressing that in the comprehensive plan?			
5	Does your locality's comprehensive plan include the following:			
		A discussion of resilience to flooding and storm hazards?		
		An assessment of the locality's current and future vulnerability to climate-related hazards for public property?		
		An assessment of the locality's current and future vulnerability to climate-related hazards for private property?		
		Goals and objectives for mitigating and adapting to flooding and other coastal hazards?		
		Goals and objectives for preserving and protecting natural resources that help mitigate coastal hazards?		
TOTAL				

2C: Land Use and Zoning Ordinances

		Y	N
6	Does your locality have a dedicated Floodplain Management Ordinance or Plan?		
7	Do your locality's land use or zoning ordinances limit development in the floodplain or incentivize development outside the floodplain?		
8	Do your locality's land use or zoning ordinances establish setbacks and/or buffers that protect flood-prone areas outside of the protected areas required by the CBPA or otherwise go beyond state-required minimums?		
9	Do your locality's land use ordinances establish any overlay districts, special conservation or recreation areas, or open space districts that limit or prohibit development in flood-prone areas?		
10	Does your locality have in place or participate in a property buyout program to voluntarily acquire properties located in the floodplain?		
11	Do your locality's land use ordinances go beyond Chesapeake Bay Preservation Act (CBPA) state-required minimums?		
12	Do your locality's land use ordinances establish low-impact development (LID) standards for new developments to offset any increased flooding in areas outside of the protected areas in the CBPA?		
TOTAL			

2D: Using Adaptive Management

			Y	N
13	Has your locality reviewed its plans and ordinances to ensure that they are coordinated in addressing coastal resilience?			
14	Does your locality incorporate data, scientific analyses, and approaches to resilience developed within the last five years into existing:			
		Floodplain management ordinance?		
		Zoning ordinance?		
		Subdivision ordinance?		
		Comprehensive plan?		
TOTAL				

SECTION 3: SOCIAL EQUITY

Underlying social inequity can distribute the impacts of coastal hazards disproportionately among different communities or individuals in a locality. Therefore, flooding resilience efforts must evaluate and address social inequities in order to serve all residents. Identifying and working with vulnerable communities to plan, implement, and support projects and policies accomplishes resilience goals while mitigating inequity. Conditions that may exacerbate risk due to coastal hazards include the following.

- Income below the federal poverty level
- Limited mobility and agency (elderly populations, residents of short- and long-term care facilities, and children)
- Limited English language skills
- Mental illness, physical illness, substance use disorders, and disabilities
- Homelessness
- A lack of health insurance
- A lack of reliable internet access or cell phone coverage
- A lack of reliable transportation
- Limited use of modern amenities, including transportation and communication technologies (e.g., Amish and conservative Mennonite communities)
- Temporary residency (migrant workers, second home owners, visiting tourists)
- Connection to at-risk historic or cultural resources (e.g. Tribal Nations and communities)
- Experience of historical traumas causing low trust of government messages or actions
- Historically excluded and underepresented populations due to race, Tribe, ethnicity, religion, and refugee or immigration status

Questions in this section will assess:

- Efforts to identify communities that are particularly vulnerable to climate change and coastal resilience issues
- Approaches to building social resilience through tracking demographic data, building social networks, and ensuring access to critical services and resources
- Progress in increasing participation in governmental decision making by historically marginalized communities
- Active engagement of all sectors of the community in shaping resilience efforts

Who should complete this?

Individuals responsible for the following areas are likely to be best positioned to complete this section.

- Social services (Department of Social Services Representatives)
- Housing and community development (Director of Planning / Director of Housing & Community Development)
- Emergency management (Emergency Managers)
- Health care (Health Services Workers)

Community representatives to engage: Social, emergency, and health services institutions' leadership; Leaders of faith-based organizations; School groups and youth leaders

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

3A: Engaging directly-impacted and low-resourced communities

		Y	N
1	Has your locality identified communities that will be impacted by flooding and/or hazards, such as those who are physically vulnerable, socially vulnerable, under-resourced, or socially, physically, or technologically isolated?		
2	Has your locality engaged directly-impacted communities by providing them with meaningful information to understand and reduce their vulnerability to coastal hazards?		
3	If you answered yes to question 2, is that information catered to meet the needs of low-resourced communities? (e.g., provided in multiple languages)		
TOTAL			

3B: Building the community's capacity to participate in resilience activities

		Y	N
4	Has your locality used outreach approaches (i.e. local government website, social media, news media, in-person meetings) to educate the general public about coastal resilience topics?		
5	Does your locality offer training and/or educational opportunities to build residents' capacity to implement resilience solutions at the property or neighborhood scale?		
6	Does your locality support and invest in community-led coastal resilience initiatives? (Such as providing funding, education, training, or staff resources.)		
7	Does your locality publicly recognize residents' efforts to advance coastal resilience? (For example, through your website, on social media, through award programs, etc.)		
TOTAL			

3C: Establishing procedures to enable diverse public participation in resilience efforts

		Y	N
8	Has your locality established a formal policy that outlines a meaningful role and pathway for residents and business owners to provide input for coastal resilience decision-making?		
9	Does your locality have staff dedicated to engaging the public on coastal resilience issues?		
10	Does your locality hold at least one public meeting per year to address coastal resilience issues?		
11	Does your locality share the results of the public meeting(s)?		
12	Has your locality identified and implemented steps to facilitate engagement of historically excluded or isolated groups? (i.e. Are these groups contacted specifically for their feedback?)		
13	Has your locality identified community leaders who are "trusted messengers" for communication with historically excluded and underserved communities?		
14	Does your locality meet at least once annually with its identified community leaders to facilitate communication with historically excluded and underserved communities?		
TOTAL			

3D: Incorporating equity into resilience

		Y	N
15	Does your locality have a process to review the equity impacts of hazard mitigation or resilience actions?		
16	Has your locality developed strategies for low-resourced and/or historically excluded communities to access resources and assistance for increasing resilience to coastal hazards?		
17	Does your locality prioritize projects which advance opportunities to increase the resilience of directly-impacted, low-resourced, and historically excluded communities?		
18	Does your locality partner with nonprofit, community, or volunteer organizations to provide food, medical, and shelter assistance to directly-impacted, low-resourced communities before, during, and after flooding events?		
TOTAL			

SECTION 4: ECONOMIC RESILIENCE

To ensure economic resilience, coastal localities must identify and address economic vulnerabilities to coastal hazards, including those experienced by local businesses. Businesses are affected by these hazards in different ways from local government and attention should be paid to making sure that businesses that serve directly-impacted, low-resourced communities are considered.

Another way to increase a community's resilience is to participate in the National Flood Insurance Program (NFIP) offered by FEMA. Having access to federally subsidized flood insurance can enable flood-impacted residents and businesses to recover more quickly. Communities need to be aware of and plan for uses in Special Flood Hazard Areas (SFHAs) that are the most vulnerable to flooding. These SFHAs are designated on FEMA Flood Insurance Rate Maps (FIRMs), which FEMA updates periodically. Communities participating in the NFIP also can participate in the Community Rating System (CRS) to obtain reduced flood insurance rates for their residents.

Questions in this section will assess:

- The ability of a locality's economic base to withstand climate or coastal-related emergencies
- The locality's relationships and partnerships with the business community
- The locality's approach to floodplain management, the Community Rating System, and flood insurance

Who should complete this?

Individuals in the following roles are likely to be best positioned to complete this section.

- Town/City/County manager or their staff
- Town/City/County Treasurer or their staff
- Any additional people with knowledge of the economic factors or issues within the community

Community representatives to engage: Chamber of Commerce and members of the business community

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

4A: Economic Impacts

		Y	N
1	Has your locality conducted an economic impacts assessment of coastal storm and flood hazards (including property and infrastructure damage, unemployment, loss of businesses, impacts on vulnerable populations, utility restoration, and lost tax revenue) in the last five years?		
2	Does the impacts assessment consider changes in hazards predicted by climate forecasts?		
3	Does your locality include the business sector in risk assessments and determining the potential economic impacts of coastal hazards?		
4	Is your locality's economic development staff and/or an independent Chamber of Commerce involved in the locality's hazard mitigation and/or resilience planning?		
5	Does your locality provide the public, especially the business community, with localized, user-friendly information about economic costs and risks associated with coastal storm hazards?		
6	Does your locality's emergency reponse staff have channels to communicate with the business sector in the event of a severe weather emergency or evacuation?		
TOTAL			

4B: Business Preparedness

		Y	N
7	Does your locality communicate with businesses and the Chamber of Commerce about resilience issues and planning?		
8	Do you encourage businesses to undertake disaster preparedness activities?		
9	Do you encourage businesses and their employees to participate in disaster training, drills or exercises?		
10	Does your locality coordinate with businesses on re-entry or re-opening plans?		
TOTAL			

4C: NFIP's Community Rating System

		Y	N
11	Does your locality participate in the National Flood Insurance Program (NFIP)?		
12	Has FEMA updated your Flood Insurance Rate Maps (FIRM) in the past five years?		
13	Does your locality participate in the Community Rating System program through the National Flood Insurance Program (NFIP)?		
14	Is your locality actively working to ensure compliance with NFIP regulations in Special Flood Hazard Areas (SFHAs) to protect federally backed mortages?		
TOTAL			

SECTION 5: EMERGENCY MANAGEMENT

Well-organized emergency preparedness plans save lives and property, help ensure that localities can act in sufficient time, and contribute to faster and more efficient post-hazard recovery. Preparedness for those who will be directly impacted, including socially vulnerable populations, includes ensuring that residents have the opportunity to learn swimming and water safety skills. Communities should consider participating in regional, national, or statewide outreach events such as Hurricane Preparedness Week and Virginia Flood Awareness Week.

Questions in this section will assess:

- Efforts to educate the public about hazards, including collaborating with marginalized communities and businesses
- Progress to establish internal communication structures and build staff capacity
- Plans for providing shelter, healthcare, food, water, and medicine to residents during emergencies

Who should complete this?

Individuals responsible for the following areas are likely to be best positioned to complete this section.

- City Planning
- Emergency Response
- Social Services
- Health Services

Community representatives to engage: Community Emergency Response Team (CERT), neighborhood organizations, medically-fragile residents

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

5A: Emergency Management

			Y	N
1	Does your locality have an Emergency Operations Plan that has been updated within the last five years?			
2	Does your locality support residents' emergency preparedness such as providing information about risks and recommended preparedness actions?			
3	Has your locality established internal emergency management roles (e.g., standing committees, staff titles)?			
4	If you answered yes to the previous question, do these staff members participate in at least one training each year?			
5	Has your locality identified stakeholders who will require emergency response, including directly-impacted and low-resourced populations?			
6	Does the locality have a means of communicating emergency response plans to the public during a coastal hazard event?			
7	Does your locality conduct outreach at least once a year to inform residents about emergency preparedness?			
8	Has your locality implemented coastal hazard early warning signals/systems/tools for its residents?			
9	Has your locality developed plans to provide access to the following during emergencies and storms:			
		Food and water?		
		Healthcare?		
		Medicine?		
		Transportation?		
		Shelter?		
		Resources to assist residents with special needs or pets?		
10	Are shelters in areas accessible to directly-impacted, low-resourced communities?			
11	Does the locality provide residents with transportation to evacuate to public shelters during an emergency?			
TOTAL				

SECTION 6: NATURAL AND NATURE-BASED FEATURES

Effective resilience strategies are based in the best available science, and adapt to new information as it is received. The natural and nature-based features in a locality are the most basic elements of this science, and must be fully understood in order to create a resilience strategy that is robust and locality-specific. Understanding natural and nature-based features (e.g. permeable pavement, green roofs, cisterns, bioswales) can also allow for a holistic resilience approach that protects ecosystems and people.

Questions in this section will assess:

- Efforts to incorporate natural and nature-based features into resiliency planning
- Progress in identifying natural resources to conserve and restore
- Completion or encouragement of green infrastructure projects at the city, county, neighborhood, and site scale

Who should complete this?

Individuals responsible for the following areas are likely to be best positioned to complete this section.

- Comprehensive and long-range planning
- Community development
- Zoning administration
- Environmental management and planning
- Hazard mitigation planning
- Parks and recreation

Community representatives to engage: local property owners, neighborhood organizations, business owners, environmental advocacy groups, community green space advocates

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

6A: Natural Resources

		Y	N
1	Has your locality undertaken a natural features analysis (an assessment which ranks how vulnerable different stretches of shoreline are to coastal hazards)?		
2	Has your locality identified and mapped natural resources that are important for ecosystem health and are at risk of being lost due to flooding and coastal storm hazards (such as coastal forests and tidal marshes)?		
3	Does your locality take steps to assess coastal vulnerabilities in terms of erosion, storm surges, wind, and waves in order to determine a location's sensitivity to coastal hazards?		
4	Has your locality undertaken an assessment of how effective your wetlands and marshes are at mitigating these coastal hazards?		
5	Does your locality take part in sediment management, specifically concerning dredged sediments, to improve coastal resilience?		
6	Does your locality educate or inform residents and property owners of the benefits that natural resource protections provide to communities that are at an increased risk of flooding due to frequent/intense coastal storms?		
7	Does your locality offer incentives to property owners for the use of conserved or restored natural areas (e.g., wetlands and marshes) to increase coastal resilience?		
8	Does your locality have an award or appreciation program for businesses or individuals who adopt natural resource protection practices?		
TOTAL			

6B: Natural and Nature-Based Features

		Y	N
9	Has your locality taken steps to integrate natural resources (such as wetlands, riparian buffers, and oyster reefs) into defenses against erosion, flooding and coastal storm hazards through projects, programs, or policies?		
10	Do your locality's plans for transportation and other public works promote incorporation of green infrastructure and NNBF?		
11	Does your locality's subdivision ordinance encourage the use of green infrastructure and/or NNBF in new developments?		
12	Has your locality implemented projects that utilize NNBF to increase coastal resilience?		
13	Does your locality incentivize property owners to implement green infrastructure and NNBF to increase coastal resilience?		
14	Does your locality take steps to educate the public of the benefits of green infrastructure and NNBF (e.g. webinars, demonstration sites)?		
TOTAL			

SECTION 7: INFRASTRUCTURE

Like land use and planning, infrastructure decisions have long-term impacts and are therefore important to include in a resilience assessment. Furthermore, infrastructure damage is often a major source of economic and human impact in disasters. Infrastructure resilience plays an important role in reducing the overall impact of disasters of any kind.

Questions in this section will assess:

- Resilience considerations and priorities are in public infrastructure projects
- Efforts to support residents, businesses, and property owners in their efforts to incorporate resilience into projects on private property
- Stormwater, critical transportation infrastructure, critical facilities, and water supply/ wastewater management infrastructure projects

Who should complete this?

Individuals responsible for the following areas are likely to be best positioned to complete this section.

- Public works
- Engineering
- Public outreach and communications
- Transportation planning
- Hazard mitigation planning
- Community and economic development
- Emergency food planning services

Community representatives to engage: water utilities, septic and well system users, leadership from critical service providers (Red Cross, hospitals, food banks, churches, etc.)

Notes

Use this space to record any thoughts or comments that you have about this section, including data gaps, information needs, and people to involve.

Completed by: _____

Date Completed: _____

7A: Stormwater Infrastructure

		Y	N
1	Has your locality conducted a vulnerability assessment of stormwater infrastructure to coastal flooding and storm hazards?		
2	Does your locality offer incentives for private property owners to implement measures that manage stormwater (such as rain gardens or constructed wetlands)?		
3	Does your locality fund stormwater management projects through stormwater utility fees, user fees, grants, or other creative funding mechanisms?		
4	Does the locality implement one or more stormwater BMPs (such as rain gardens, bioswales, permeable pavers, etc.) on public property for educational demonstration?		
5	Does your locality's stormwater ordinance go above and beyond the minimum state requirements?		
TOTAL			

7B: Critical Facilities

			Y	N
6	Does your locality have any of the following that are located in the floodplain?			
		Hospital:		
		Fire station:		
		Police station:		
		Food bank or distribution center:		
		Emergency shelter:		
		Schools:		
7	Does your locality have a plan for emergency services to protect critical facilities from storms, developed/updated within the last five years?			
8	Does your locality notify residents which critical facilities are operational during coastal storm hazards, and how to access them?			
9	Does your locality have a contingency plan for continued operations of critical facilities in the event of a hazard or severe weather event, developed/updated in the last five years?			
10	Does your locality inspect critical facilities for exposure to storms and flooding or damage on a regular basis?			
11	Have your locality's critical facilities been flood-proofed, where necessary?			
12	If any critical facilities have been identified as at-risk of sea level rise impacts or recurrent flooding, have you established plans to adapt or relocate the facilities?			
TOTAL				

7C: Wastewater and Water Supply Services

			Y	N
13	Has your locality evaluated whether any of the following facilities are located in the floodplain?			
		Water supply facility:		
		Water treatment facility:		
		Wastewater management facility:		
14	Has your locality conducted an assessment of the impacts of flooding and saltwater intrusion on drinking water supply . . .			
		From public sources?		
		From private sources?		
15	Has your locality undertaken a study to assess and determine threat of rising groundwater tables and saltwater intrusion to local septic systems?			
16	Does your locality have channels of communication with water and wastewater utilities to manage ongoing challenges to accessing potable water, including during and after a storm event?			
17	Does your locality have channels of communication with private well and water system owners to ensure that all are informed about how they can increase their water system resiliency to flooding impacts?			
18	Does your locality's stormwater management policy include consideration of opportunities for stormwater capture and re-use?			
TOTAL				

7D: Transportation Infrastructure

		Y	N
19	Has your locality assessed its transportation infrastructure's vulnerability to coastal hazards?		
20	Has your locality identified its critical transportation infrastructure?		
21	Does your locality have a current plan to protect vulnerable critical transportation infrastructure from coastal hazards, developed/updated in the last five years?		
22	Does your locality have a contingency plan for critical transportation infrastructure vulnerable to flooding that has been created and/or updated in the past five years?		
TOTAL			

Part II: Recommended Actions

Evaluation Results and Gap Analysis

Once your PREP Tool team has completed the evaluation for each section, compile the results in the table below. Identify which resilience actions are a top priority for your locality based on the results.

	Total # of Y	Total # of Questions	Priority Recommendation Area? Y/N
Section 1A	N/A	**N/A**	
Section 1 Total (1B)		**13**	
Section 2A		2	
Section 2B		7	
Section 2C		7	
Section 2D		5	
Section 2 Total		**21**	
Section 3A		3	
Section 3B		2	
Section 3C		2	
Section 3D		7	
Section 3E		4	
Section 3 Total		**18**	
Section 4A		6	
Section 4B		4	
Section 4C		5	
Section 4 Total		**15**	
Section 5 Total (5A)		**16**	
Section 6A		8	
Section 6B		6	
Section 6 Total		**14**	
Section 7A		5	
Section 7B		12	
Section 7C		9	
Section 7D		4	
Section 7 Total		**30**	

For any sections you identify as prioirities, explore the corresponding section in the recommendation pages that follow to identify specific resilience activities your local government can take. Many of the recommended actions include links to examples and resources to support you in moving forward.
As you are reviewing the activities, focus on identifying projects that make sense for your locality based on where you are currently positioned in exploring resilience topics (i.e. consider sequencing resilience activities to begin with assessment, followed by planning and scoping, implementing, and monitoring). Thorough prioritization will occur during the final step of the PREP Tool on page 50.

RECOMMENDED ACTIONS

SECTION 1: Risk Assessment

General Resources:

- The U.S. Climate Resilience Toolkit is an online resource featuring five "Steps to Resilience" for establishing a resilience plan. Within the Steps to Resilience are helpful guidance, tips, and resources for exploring hazards and assessing vulnerability and risks, relevant to this section of the PREP Tool.
- ADAPTVA is a Virginia-specific portal featuring scientific forecasts, case studies, tools, resources, and policy summaries for climate change adaptation.
- The Quick Guide to Resilience is designed to offer accessible resiliency resources for Virginia citizens and local government staff on topics like the causes of flooding, flooding policies and initiatives in Virginia, and paying for resilience measures.

Flood Risk Assessment

1a: Conduct a vulnerability assessment or update your current vulnerability assessment by incorporating the best science and spatial analysis (mapping) that addresses localized flood risks.

If you are just beginning the vulnerability assessment, use the assessment results from section 1A (Flood Risk Exposure) as a starting point. Then, expand the assessment to include the different recommended elements below. If you are updating your vulnerability assessment, ensure you include the most current data and expand the scope of the assessment by including the recommended elements below.

Incorporate changes in frequency, severity, and extent of flood risk by evaluating changes in precipitation-driven flooding, as well as coastal flooding due to sea level rise.

- Example: Coastal (Sea Level Rise) - Sea Level Rise and Potential Inundation Maps produced during The RAFT for communities on Virginia's Eastern Shore
- Example: Precipitation - Virginia Beach Analysis of Historical and Future Heavy Precipitation
- Resource: Coastal (Sea Level Rise) - NOAA's Office of Coastal Management Sea Level Rise data or Adapt VA Interactive Map
- Resource: Special Flood Hazard Areas - FEMA's National Flood Hazard Layer Viewer
- Resource: Storm Surge - NOAA's National Storm Surge Hazard Map viewer
- Resource: Projected Intensity-Duration-Frequency (IDF) Curve Data Tool for the Chesapeake Bay Watershed and Virginia, available from NOAA.
- Resource: Virginia Flood Risk Information System.
- Resource: Coastal Virginia Sea Level with Minor and Moderate Flooding map viewer.

Identify cultural, historic, economic, and infrastructural assets and characterize their vulnerability to flooding.

- Example: "Weather it Together: A Cultural Resource Hazard Mitigation Plan for the City of Annapolis"
- Resource: National Park Service Guidelines on Flood Adaptation for Rehabilitating Historic Buildings; see "Planning and Assessment for Flood Risk Reduction" (page 13).

RECOMMENDED ACTIONS

- Resource: Virginia's Comprehensive Historic Preservation Plan: 2016-2021
- Resource: EPA's Planning Framework for a Climate-Resilience Economy includes Step 3:
- Resource: Transportation - US DOT Vulnerability Assessment Scoring Tool (VAST) and user's guide
- Resource: Drinking water and wastewater utilities - EPA's Climate Resilience Evaluation and Awareness Tool (CREAT)
- Resource: Energy - US Energy Information Administration's Energy Infrastructure with FEMA National Flood Hazard Map

Identify populations who will be most exposed to flood risk.

- Resource: The RAFT's Vulnerable Populations & Natural Hazards Exercise

Conduct community/stakeholder outreach to collect diverse knowledge and perspectives to update the vulnerability assessment, especially to identify community assets.

- Resource: ASERT Framework
- Resource: Participation in The RAFT (Resilience Adaptation Feasibility Tool) can help to accomplish this task.

Map flooding for annual flood probabilities at .01 (100 year) and .002 (500 year) levels.

Incorporate small contour intervals and recently constructed streets and developments in your locality's flood maps.

- Resource: FEMA NFIP Flood Studies and Maps (pg. 3-16)

SECTION 2: Planning & Land Use

General Resources

- Virginia Coastal Policy Center reports on zoning and planning for coastal resilience
- AdaptVA resources on planning for coastal resilience

Budgeting and Capital Improvement Planning

2a: Revise your locality's budgeting processes (operating budget and capital improvement planning) operating budget and capital improvement plan to prioritize resilience projects that address specifically allocate funds for coastal storm hazards and flood protection and mitigation.

2b: Revise your locality's budgeting processes (operating budget and capital improvement planning) to include with criteria that prioritize using funding to address the needs of under-resourced communities and/or those that are vulnerable to or directly impacted by coastal hazards and flooding.

Comprehensive Planning

2c: Incorporate resilience into your locality's comprehensive plan. Include the following elements in the comprehensive plan:

RECOMMENDED ACTIONS

Recognition that climate change is resulting in relative sea level rise and , more frequent and intense precipitation and increased severe storm activity events that increases the risk and impacts of flooding in your locality.

- Example: Comprehensive Plans from Accomack County, the Town of Chincoteague, and Northampton County

Discussion of how climate change is impacting your locality both currently and in the future.

- Be specific about how climate change is impacting your locality both currently and in the future, in terms of flooding, storms, sea level rise, financial damage, and impact on tax base.

Include an assessment of the locality's current and future vulnerability to coastal hazards for public and private property.

- Include an assessment of areas of recurrent flooding outside of the SFHA

Lay out specific goals and objectives for mitigating and adapting to flooding and other coastal hazards, preserving and protecting natural resources that help mitigate coastal hazards, and preserving and protecting critical infrastructure and essential services from coastal storm hazards.

- Example: Portmouth's Comprehensive Plan, Goals Section
- Example: The RAFT Incorporating Resiliency in Comprehensive Planning Workshop

Land Use and Zoning Ordinances

2d: Create or update your Floodplain Management Ordinance or Plan.

- Resource: FEMA Requirements
- Resource: Model Ordinance from Virginia Department of Conservation and Recreation
- Resource: AdaptVA's Complete Chart of Coastal VA ordinances

2e: Create land use policies that limit development in the floodplain (overlay districts, special conservation or recreation areas, or open space districts) and incentivize development outside the floodplain.

- Example: Norfolk's Zoning Ordinance and Resilience Quotient

Establish setbacks and/or buffers that protect flood-prone areas (other than required by the Chesapeake Bay Preservation Act).

Create or begin participation in a regional property buyout program to voluntarily acquire properties located in the floodplain.

- Resource: Virginia Coastal Policy Center Report: "Planning for Managed Retreat"

Establish low-impact development (LID) standards for new developments to offset increased flooding.

- Example: Town of Warsaw's LID standard

Using Adaptive Management

2f: Conduct a comprehensive review of you locality's plans and ordinances to ensure consistency across plans and ordinances in addressing coastal resilience

RECOMMENDED ACTIONS

Update any of your locality's plans and ordinances - such as the Comprehensive Plan, Hazard Mitigation Plan, Emergency Operations Plan, Zoning Ordinance, and Subdivision Ordinance - to incorporate data, scientific analyses, and approaches to resilience developed within the last five years.

- Resource: The Virginia Institute of Marine Science recommends specific data, analysis, and approaches to resilience to local governments
- Resource: The Plan Integration for Resilience Scorecard (PIRS)

SECTION 3: Social Equity

General Resources:

- Guide to Equitable, Community Driven Climate Preparedness Planning (2017), Urban Sustainability Directors Network
- Equitable Adaptation Legal & Policy Toolkit (2020), Georgetown Climate Center
- Communities who have not yet participated in The Resilience Adaptation Feasibility Tool (The RAFT) program are encouraged to take advantage of this effort, when it comes to your region, to build robust networks focused on coastal resilience and identify actions to improve resilience that the community wishes to pursue

Engage Directly-impacted and Low-resourced Communities

3a: Develop strategies for engaging stakeholders inclusively in coastal adaptation approaches.

Identify communities that will be impacted by flooding and/or hazards, including physically and socially vulnerable populations, or those who are under-resourced or socially, physically, or technologically isloated.

- Resource: The RAFT's Vulnerable Populations & Natural Hazards Exercise

Engage directly-impacted and low-resourced communities directly. Provide them with meaningful information to understand and reduce vulnerabilities to coastal hazards. Customize information to meet these populations' needs (e.g., provide in multiple languages or formats, where appropriate).

Building the Community's Capacity to Participate in Resilience Activities

3b: Develop strategies to build community capacity to participate in resilience decisions and activities.

Use outreach approaches (i.e. local government website, social media, news media, in-person meetings) to educate the general public about coastal resilience topics.

- Example: the City of Norfolk has a flooding webpage designed for residents explaining basic flood concepts, strategies for property owners, and an overview of the city's flood resilience efforts.
- Resource: the Mid-Atlantic Regional Integrated Sciences and Assessments (MARISA) program has created "Community Climate Outlooks" as outreach tools for cities and counties in the coastal Commonwealth.

RECOMMENDED ACTIONS

Offer training and/or educational opportunities to build residents' capacity to implement resilience techniques at the property or neighborhood scale.

Support and invest in community-led coastal resilience initiatives (such as providing funding, education, training, or staff resources).

- Example: The City of Hampton established a Resilient and Innovative Neighbor (RAIN) pilot grant program in partnership with the Chesapeake Bay Foundation to offer $1,000 in reimbursement to homeowners who install rain retention measures on their property.

Publicly recognize residents' efforts to advance coastal resilience (For example, through your website, on social media, through award programs, etc.).

- Example of a resident award program: The Elizabeth River Project's River Star programs recognize homeowners, businesses, and schools that commit to taking specific measures to protect the health of the watershed.

Establishing Procedures to Enable Diverse Public Participation in Resilience Efforts

3c: Develop a formal policy that outlines a meaningful role and pathway for residents and business owners to influence coastal resilience decision-making. Consider the following components for the policy and process:

- Resource: The Working Group on Legal Frameworks for Public Participation authored "Making Public Participation Legal." Page 13 includes a Model Municipal Public Participation Ordinance

Designate or hire staff to engage the public on coastal resilience issues. Ensure these individuals are familiar with principles of collaborative governance and deliberative democracy.

- Resource: The Institute for Engagement & Negotiation created a Toolkit outlining its Equitable Collaboration Framework that can serve as a resource for training engagement staff.

Hold at least one public meeting per year to address coastal resilience issues. Publicly share the results of the meeting in accessible formats.

Identify and implement steps to facilitate engagement of historically marginalized groups. For example, contact these groups specifically for their feedback.

Identify community leaders who serve as "trusted messengers" for communication with low-resourced and historically marginalized communities. Meet at least once annually with identified community leaders to facilitate communication with historically exculded communities.

Provide Services to Meet Vulnerable Populations' Needs

3d: Establish a process to review the equity impacts of hazard mitigation or resilience actions. Use this process to prioritize projects which advance opportunities for directly-impacted, low-resourced, and historically marginalized communities.

Develop strategies and resources for low-resourced and/or historically marginalized communities to access resources and assistance for increasing resilience to coastal hazards.

RECOMMENDED ACTIONS

Partner with nonprofit, community, or volunteer organizations to provide food, medical, and shelter assistance to directly-impacted, low-resourced communities before, during, and after flooding events.

SECTION 4: Economic Resilience

Economic Impacts

4a: Conduct an economic impacts assessment of coastal storm and flood hazards (including property and infrastructure damage, unemployment, loss of businesses, impacts on vulnerable populations, utility restoration, and lost tax revenue).

- Example: An economic impacts assessment of coastal flooding from Virginia Beach by Dewberry

Consider changes in hazards predicted by climate forecasts.

- Example: The City of Norfolk, Mayor's Advisory Commission on Climate Change Mitigation and Adaptation, "Climate Action Plan," (May 2019).
- Resource: VIMS, Center for Coastal Resources Management, "Climate Change Impacts in Virginia: Natural Resource Database"

Include the business sector in relevant risk assessments and determine the potential impacts on economic and local government service provision impacts of coastal hazards.

Involve the locality's economic development staff and/or an independent Chamber of Commerce in the locality's hazard mitigation and/or resilience planning.

- Resource: Virginia Chamber of Commerce Database

Provide the public with localized, user-friendly information about economic costs and risks associated with coastal storm hazards.

Identify and develop channels to commmunicate with the business sector in the event of a severe weather emergency or evacuation.

Business Preparedness

4b: Support business preparedness by communicating to businesses and the Chamber of Commerce about resilience issues and planning, and encourage businesses and their employees to participate in disaster training, drills, and exercises.

- Resource: Insurance Institute for Business and Home Safety
- Resource: CCRFR's Coastal Virginia Tourism Resilience Assessment
- Resource: Coastal Virginia Small Business Resilience Self-Assessment and Guide
- Resource: Resilience in a Box
- Resource: Ready.gov training resources
- Resource: Ready.gov business resources
- Resource: FEMA National Preparedness Courses

RECOMMENDED ACTIONS

4c: Work with businesses to coordinate their re-entry and re-opening plans following a disaster.

- Resource: US Chamber of Commerce, Reopening Plans

NFIP's Community Rating System

4d: If your locality does not participate in the NFIP, consider the advantages of participation, which allows residents access to flood insurance.

- Resource: NFIP guidelines, Flood Insurance Manual (Effective Oct. 2021)

4e: It is important to know how updated your Flood Insurance Rate Maps are to ensure that the maps reflect current flood risks. If your maps are not current (within the past five years), you can request that FEMA/NFIP update your FIRM.

- Resource: FEMA Flood Map Service Center

4f: If your locality does not participate in the Community Rating System (CRS) program through the National Flood Insurance Program (NFIP), consider the advantages of participation such as reduced flood insurance costs.

- Resource: FEMA NFIP CRS homepage
- Resource: VA Department of Conservation and Recreation, communities that participate in CRS and their cost savings,

4g: If your locality is at risk of losing federally backed mortgages due to violation(s) of FEMA's flood insurance regulations, research FEMA guidelines to determine why the locality was found non-compliant. Identify actions your locality can take for future compliance with FEMA regulations in Special Flood Hazard Areas (SFHAs) to protect federally backed mortgages.

- Resource: FEMA, Flood Insurance
- Resource: FEMA, For Real Estate, Insurance, and Lending Professionals

SECTION 5: Emergency Management & Response

General Resources:

- FEMA Hazard Mitigation Assistance Grants
- FEMA Preparedness Grants
- DHS Emergency Shelter
- DHS Emergency Food and Water
- US Army Corp of Engineers' Resilience Projects
- American Planning Association Website

Emergency Management

5a: Ensure your locality has an updated (within the last five years) Emergency Operations Plan (EOP). Update your Emergency Operations Plan if it has not been updated within the last five years.

RECOMMENDED ACTIONS

Note: Some localities are included in the EOP of their county; in this case, check when your county's EOP was last updated. Encourage the county to update its EOP if it has not been updated in the last five years.

- Resource, FEMA Comprehensive Preparedness Guide 101: Developing and Maintaining Emergency Operations Plans (2021)

5b: Develop strategies to support residents' emergency preparedness.

- Virginia Department of Emergency Management: Flood Preparation
- ODU Homeowner's Handbook to Prepare for Natural Hazards

5c: Establish strong emergency management policies and processes, including:

Establish internal emergency response roles (e.g., standing committees, staff titles).

Ensure that staff members participate in at least one training each year for their established internal emergency response roles.

Identify all stakeholders who will require emergency response.

- Resource: FEMA Planning Guides

Establish a means of communicating emergency response plans to the public during an emergency.

- Resource: FEMA training manual, "Communicating in an Emergency" (Feb. 2014)

Schedule outreach at least once a year to inform residents about emergency preparedness.

Implement coastal hazard early warning signals/systems/tools for residents, particularly those most impacted, including the socially vulnerable.

5d: Create or update plans for the provision of food, health and medicines to residents during and immediately after hazardous events.

Develop partnerships to provide access to food and water, healthcare, medicine, transportation, and shelter during emergencies and storms.

Ensure shelters and food distribution centers are in areas accessible to directly impacted, low-resourced communities

Provide residents with transportation to evacuate to public shelters during an emergency.

SECTION 6: Natural and Nature-Based Features

General Resources:

- "Green Infrastructure Toolkit" - Georgetown Climate Center

Natural Resources

6a: Conduct an assessment of your locality's natural resources.

Conduct a natural features analysis (an assessment which ranks how vulnerable different stretches of shoreline are to coastal hazards)

Work with local environmental and neighborhood groups to identify and map natural resources that are important for ecosystem health and are at risk of being lost due to flooding and coastal storm hazards, such as coastal forests and tidal marshes.

- Resource: "Comprehensive Coastal Resource Management Guidance: Planning Information and Guidance for the Living Shoreline Preference" – VIMS
- Resource: The Coastal Geospatial and Education Mapping System (Coastal GEMS)
- Resource: Conserve VA
- Resource: ADAPT VA Interactive Map - Natural Resources

Assess coastal vulnerabilities in terms of erosion, storm surges, wind and waves.

6b: Develop a plan for integrating natural resources such as wetlands, riparian buffers, and oyster reefs into defenses against erosion, flooding, and coastal storm hazards.

Assess the effectiveness of wetlands and marshes for mitigating coastal hazards.

Implement sediment management programs to improve coastal resilience.

- Resource: "Comprehensive Coastal Resource Management Guidance: Planning Information and Guidance for the Living Shoreline Preference" – VIMS

6c: Encourage residents and property owners to protect natural resources.

Educate or inform residents and property owners of the benefits that natural resource protections provide to communities that are at an increased risk of flooding due to more frequent or intense coastal storms.

Hold community training sessions to educate the public on the benefits that natural resources provide to communities at increased risk of flooding due to frequent/intense coastal storms.

Offer incentives to property owners for the use of conserved or restored natural areas (e.g., wetlands and marshes)

RECOMMENDED ACTIONS

- Resource: The RAFT's Methods for Incentivizing Private Action for Resilience

Create an award or appreciation program for businesses or individuals who adopt natural resource protection practices

Natural and Nature-Based Features

6d: Integrate NNBF strategies into appropriate locality plans (such as transportation plans, public works plans, subdivision ordinance, etc.).

- Example: Review of Colonial Beach Codes from Professor Karen Firehock's Green Infrastructures class at the University of Virginia

6e: Implement locality projects that utilize NNBF to increase coastal resilience.

- Example: Redesign of Warsaw Stormwater Park from Professor Karen Firehock's Green Infrastructures class at the University of Virginia
- More work from this class is available on the RAFT Research and Policy Products page

6f: Encourage private and public property owners to implement green infrastructure and NNBF.

Provide incentives for private and public property activities that increase coastal resilience via the use of nature-based infrastructure, such as green roofs and rain gardens.

- Resource: The RAFT's Methods for Incentivizing Private Action for Resilience
- Resource: EPA, "What is Green Infrastructure?"

Construct nature-based infrastructure demonstration sites to educate the public about the resilience benefits associated with nature-based infrastructure.

Acknowledge the work of resident leaders, volunteers, and/or business owners who advance coastal resilience by implementing nature-based infrastructure practices by highlighting their work on social media, presenting awards, etc.

SECTION 7: Infrastructure

Stormwater Infrastructure

7a: Conduct a vulnerability assessment of the existing stormwater management system to determine if the infrastructure is adequate for existing (or predicted) flooding and storm hazards.

- Example: "Watershed Retrofit Study" - Arlington County, VA

7b: Provide incentives (such as by providing grants or tax deductions) for private property activities that manage stormwater (such as rain gardens or constructed wetlands).

- Example: "Philadelphia Stormwater Grant Program" - City of Philadelphia, PA

7c: Identify funding sources that can be used to pay for stormwater management projects.

- Resource: "How to Pay for Green Infrastructure: Funding and Financing" - Georgetown Climate Center

Consider adoption of a stormwater utility fee pursuant to Va. Code § 15.2-2114 to fund stormwater and flood control improvements.

- Resource: Quick Guide to Resilience - Paying for Resilience Measures

7d: Provide demonstrational BMPs on public property for stormwater education.

- Examples: "Engineering with Nature Atlas" - USACE
- Resource: Green Infrastructure Pilot Projects - Georgetown Climate Center

7e: Develop stormwater policies that surpass minimum state requirements in floodprone areas.

- Resource: Virginia Stormwater Management Program Regulations

Critical Facilities

7f: Develop plans to protect critical facilities and ensure continuity of operations

Identify critical facilities such as hospitals, fire and police stations, food banks, emergency shelters, and schools located in the floodplain.

Develop or update an emergency services plan to protect critical facilities from storms and flooding, and update it atleast every five years.

Task locality staff with contacting community leaders and community organizations to ensure that residents are notified of and know which critical facilities are operational and can be accessed during coastal storm hazard emergencies.

Develop a contingency plan for continuing emergency services, including identifying necessary parties to carry out the plan, in the event of a coastal storm hazard/severe weather event. Update the plan every five years.

Inspect and assess critical facilities for exposure to storms and flooding on a regular basis, and flood-proof critical facilities where necessary.

Establish plans to adapt or relocate any critical facilities at risk of sea level rise impacts or recurrent flooding.

- Resource: "Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards" - FEMA

Water Supply and Wastewater Services

7g: Develop plans to protect critical water infrastructure and ensure continuity of operations

Identify critical water infrastructure such as water supply and treatment and wastewater treatment facilities located in the floodplain.

Work with public and/or private sources to Identify and evaluate the vulnerability of the locality's water supply, conduct an analysis of the impacts of flooding and saltwater intrusion, and address how to reduce their impacts on the locality's water supply.

- Resource: EPA, "Flood Resilience: A Basic Guide for Water and Wastewater Utilities"

Update the water supply plan to address coastal hazards and dangers they pose to potable water supply

- Resource: "Building Resilience in Coastal Communities" - U.S. Climate Resilience Toolkit

Develop a contingency plan for continuing water services during and after a severe storm event, including identifying necessary parties (such as water and wastewater utilities).

- Resource: "Resilient Strategies Guide for Water Utilities" - EPA

7h: Hold public educational events and disseminate educational materials about safe drinking water and what private well and water system owners can do to increase their water system resiliency, particularly in case a storm impacts their water supply.

- Resource: "Flood Resilience: A Basic Guide for Water and Wastewater Utilities" - EPA

Revise your stormwater policy to include water management and/or co-benefit considerations.

Critical Transportation Infrastructure

7i: Develop plans to protect critical transportation infrastructure.

Work with VDOT to assess transportation infrastructure vulnerability and identify critical transportation infrastructure

- Example: "Sea Level Rise and Storm Surge Impacts to Roadways in Hampton Roads" - Hampton Roads Transportation Planning Organization
- Resource: The Coastal Virginia Road Accessibility and Flooding Tool by VIMS CCRM

Create/update the locality's plan to address the danger to critical transportation infrastructure that coastal storm hazards pose.

Create/update a contingency plan for continuing critical transportation services, including identifying necessary parties to carry out the plan, in the event of a coastal storm hazard.

Part III: Prioritization

Prioritizing Resilience Planning and Projects

The PREP Tool is designed to help localities take the first step in planning for resilience and to identify projects that can be implemented to build momentum for increasing resilience. Using the results of the evaluation and the recommended actions, you can now prioritize next steps to develop a resilience plan and/or initiate projects to quickly build resilience.

Resilience Planning

The PREP Tool is primarily intended to guide localities in developing a resilience plan. This resilience plan is an important first step for coastal localities to build resilience in a way that is comprehensive and integrated across different management and planning functions, and that addresses the needs of community members who are vulnerable to or directly impacted by hazards and disasters that are amplified by climate change. The resilience plan can also be useful in supporting your locality's efforts to seek funding for resilience projects and activities.

For example, the resilience plan could be useful for identifying and documenting needs for hazard mitigation projects that could be funded by the FEMA Building Resilient Infrastructure and Communities (BRIC) program. Furthermore, a resilience plan is a requirement for applying for project funding through the Virginia Community Flood Preparedness Fund (VCFPF). The VCFPF also provides funding for capacity building and planning activities such as developing a resilience plan.

The table and steps outlined below will help you prioritize recommended actions to support resilience planning:

Step 1: Start with the recommended actions you identified from Part II. Select the appropriate boxes in the left-most column if the recommended actions were identified in Part II.

Step 2: Identify 5 to 7 recommended actions as priorities.

There are several ways to prioritize recommended actions from Step 1. First, you can prioritize those recommended actions that are consistent with residents' preferences and priorities (as reflected in current planning and other outreach efforts) and/or that build on existing or planned resilience initiatives. For example, if your locality will be updating the comprehensive plan within the next two years, then you should prioritize recommended actions related to comprehensive planning. Or, if your locality's residents have expressed concerns about community preparedness for hazards such as hurricanes, then you could prioritize recommended actions related to resident and business disaster preparedness. **In the third column ("Residents' priorities and/or current/planned resilience initiatives'") identify those recommended actions that should be prioritized given their fit with residents' preferences and priorities, and/or that build on existing or planned resilience initiatives.**

Second, you can prioritize recommended actions by identifying those actions that support the development of a resilience plan as defined by the VCFPF and that encompass a wide range of Capacity Building and Planning Activities that are eligible for funding by the VCFPC and other funding sources. Guidelines for this prioritization approach are provided below:

- Your recommended actions, as a whole, must meet all five of the VCFPF required resilience planning elements:
  1. It is project-based, with projects focused on flood control and resilience.
  2. It incorporates nature-based infrastructure to the maximum extent possible.
  3. It includes considerations of all parts of a locality regardless of socioeconomics or race.
  4. It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation.
  5. It is based on the best available science, and incorporates climate change, sea level rise, storm surge (where appropriate), and current flood maps.
- The fourth column in the table shows which VCFPF resilience planning elements are addressed by the different recommended actions. Prioritize those projects that help you meet all five resilience planning elements.
- Your proposal to the VCFPF will also receive higher scores if it addresses multiple categories of Capacity Building and Planning Activities beyond the development of a new resilience plan. These categories include:
  A. Resource assessments, planning, strategies, and development.
  B. Policy management and/or development.
  C. Stakeholder engagement and strategies.
  D. Goal planning, implementation, and evaluation
  E. Long-term maintenance strategy
- The fifth column in the table shows the categories of eligible Capacity Building and Planning Activities that the recommended actions fall into. As appropriate, prioritize those projects that help your locality undertake activities beyond development of a new resilience plan.

Step 3: Compile your resilience planning recommended actions and determine next steps. In the table 'Prioritized Resilience Actions' on p. 50, list the top resilience planning priority actions you identified from Step 2. List the residents' preferences and priorities and/or existing or planned resilience initiatives relevant to the prioritized action. Copy the Resilience Plan Elements and Capacity Building and Planning Activities information into this table. Identify staff resources (department, staff person, etc.) and/or potential community partners that would support this action. List next steps your locality will take to accomplish this prioritized planning activity.

From Part II	Resilience Planning Action	Residents' priorities and/or current/planned resilience initiatives	Resilience Plan Elements	Capacity Building and Planning Activities
Assessment of Flood Risks and Vulnerabilites				
[ ]	R1a: Conduct a vulnerability assessment or update your current vulnerability assessment by incorporating the best science and spatial analysis (mapping) that addresses localized flood risks.	[ ]	3, 5	
Strategies for prioritizing resources and decisions that support coastal resilience projects and/or vulnerable communities				
[ ]	R2a: Revise your locality's budgeting processes (operating budget and capital improvement planning) operating budget and capital improvement plan to prioritize resilience projects that address specifically allocate funds for coastal storm hazards and flood protection and mitigation.	[ ]	3,4	A,B
[ ]	R2b: Revise your locality's budgeting processes (operating budget and capital improvement planning) to include with criteria that prioritize using funding to address the needs of under-resourced communities and/or those that are vulnerable to or directly impacted by coastal hazards and flooding	[ ]	3,4	A,B
[ ]	R2f: Conduct a comprehensive review of your locality's plans and ordinances to ensure consistency across plans and ordinances in addressing coastal resilience	[ ]	4	A,D,E
Planning strategies that recognize climate impacts, identifies mitigation and adaptation to coastal hazards and flooding, and guides growth and development away from high risk locations				
[ ]	R2c: Incorporate resilience into your locality's comprehensive plan.	[ ]	3,4,5	D
[ ]	R2d: Create or update your Floodplain Management Ordinance or Plan to meet FEMA requirements or those identified in the Virginia Department of Conservation & Recretation model ordinance.	[ ]	3,4,5	
[ ]	R2e: Create land use policies that limit development in the floodplain (overlay districts, special conservation or recreation areas, or open space districts) and incentivize development outside the floodplain.	[ ]	3,4,5	B
Engaging stakeholders in and building community capacity for resilience				
[ ]	R3a: Develop strategies for engaging stakeholders inclusively in coastal adaptation approaches.	[ ]	3	C
[ ]	R3b: Develop strategies to build community capacity to participate in resilience decisions and activities.	[ ]	3	C
[ ]	R3c: Develop a formal policy that outlines a meaningful role and pathway for residents and business owners to influence coastal resilience decision-making.	[ ]	3,4	B,C
[ ]	R3d: Develop strategies for incorporating equity into approaches to build coastal resilience.	[ ]	3,4	

From Part II	Resilience Planning Action	Residents' priorities and/or current/planned resilience initiatives	Resilience Plan Elements	Capacity Building and Planning Activities
Strategies for economic resilience				
[ ]	R4a: Conduct an economic impacts assessment of coastal storm and flood hazards (including property and infrastructure damage, unemployment, loss of businesses, impacts on vulnerable populations, utility restoration, and lost tax revenue).	[ ]	3,4,5	A
Strategies to address community-wide preparedness for and response to coastal hazards				
[ ]	R5a: Ensure your locality has an updated (within the last five years) Emergency Operations Plan (EOP). Update your Emergency Operations Plan if it has not been updated within the last five years.	[ ]	3,4	D
[ ]	R5b: Develop strategies to support residents' emergency preparedness.	[ ]		D,E
[ ]	R5d: Create or update plans for the provision of food, health, and medicines to residents during and immediately after hazard events.	[ ]		
Strategies for protecting natural resources and using natural and nature-based features (NNBF) for hazard and flood mitigation				
[ ]	R6a: Conduct an assessment of your locality's natural resources.	[ ]	2,3,4,5	A
[ ]	R6b: Develop a plan for integrating natural resources such as wetlands, riparian buffers, and oyster reefs into defenses against erosion, flooding, and coastal storm hazards.	[ ]	1,2,3,5	D
[ ]	R6d: Integrate NNBF strategies into appropriate locality plans (such as transportation plans, public works plans, subdivision ordinance, etc.).	[ ]	1,2,3,4,5	B,D
Strategies to protect critical facilities and infrastructure				
[ ]	R7a: Conduct a vulnerability assessment of the existing stormwater management system to determine if the infrastructure is adequate for existing (or predicted) flooding and storm hazards.	[ ]	1,3,4,5	A
[ ]	R7c: Identify funding sources that can be used to pay for stormwater management projects.	[ ]		A
[ ]	R7f: Develop plans to protect critical facilities and ensure continuity of operations	[ ]	1,3,4,5	A,D,E
[ ]	R7g: Develop plans to protect critical water infrastructure and ensure continuity of operations	[ ]	1,3,4,5	A,D,E
[ ]	R7i: Develop plans to protect critical transportation infrastructure.	[ ]	1,3,4,5	A,D,E

Resilience Projects

The PREP Tool also offers a starting point for your locality to build momentum and move the needle on resilience by implementing specific projects. Consider selecting two to three projects from the list below to take small but concrete steps toward building resilience. The next table and steps outlined below will help you prioritize resilience projects:

Step 1: Start with the recommended actions you identified from Part II. Select the appropriate boxes in the left-most column if the recommended actions were identified in Part II.

Step 2: Identify 2 to 3 recommended actions as priority resilience projects. Prioritize these projects according to your locality's capacity to implement them and the resilience benefits offered by the projects.

First, assess the implementation needs for the recommended actions identified in Step 1. Follow the guidelines below:

- Assess the timeframe for project implementation. Indicate in the third column if the project can be implemented in a short (S), medium (M), or long (L) timeframe.
- Estimate the staff resources needed to implement the project and the costs associated with implementation. Categorize these needs in the fourth and fifth columns – low (L), medium (M), high (H).
- Determine if there are community partners (for example, nonprofit organizations, faith-based organizations, regional planning district commission, Chamber of Commerce, state agencies) who can support project implementation.

Prioritize the projects that your locality has the capacity to implement.

Then, rate the benefits of the project by following the guidelines below:

- Determine if the project is consistent with residents' preferences and priorities and/or builds on existing or planned resilience initiatives. Indicate this fit in the sixth column.
- Assess the resilience benefits of the project in terms of:
  A. Mitigating risks to and/or reducing vulnerabilities for residents
  B. Mitigating risk to socially and physically vulnerable populations and/or enhancing social equity
  C. Mitigating risks to economic assets and/or building economic resilience
  D. Mitigating risks to and/or reducing vulnerabilities of community assets
  E. Encouraging community buy-in and support for resilience

These benefits are listed in the last column of the table. Prioritize the projects that provide your locality with the most resilience benefits.

Step 3: Compile your resilience projects and determine next steps. In the table 'Prioritized Resilience Actions' on p. 50, list the top resilience projects you identified from Step 2. Describe the residents' preferences and priorities and/or existing or planned resilience initiatives relevant to the project. Identify staff resources (department, program, staff person, etc.) and/or potential community partners that would support this project. List next steps your locality will take to implement this resilience project.

From Part II	Resilience Project	Implementation Needs			Resilience Benefits	
		Timeframe (S, M, L)	Staff Resources (L, M, H)	Costs (L, M, H)	Residents' priorities and/or current/planned resilience initiatives	Benefits
[ ]	**R4b:** Support business preparedness by communicating to businesses and the Chamber of Commerce about resilience issues and planning, and encourage businesses and their employees to participate in disaster training, drills, and exercises.				[ ]	C
[ ]	**R4c:** Work with businesses to coordinate their re-entry and re-opening plans following a disaster.				[ ]	C
[ ]	**R4d:** If your locality does not participate in the NFIP, consider the advantages of participation, which allows residents access to flood insurance. Develop a plan for applying for NFIP participation.				[ ]	A,B,D
[ ]	**R4e:** It is important to know how updated your Flood Insurance Rate Maps are to ensure that the maps reflect current flood risks. If your maps are not current (within the past five years), you can request that FEMA/NFIP update your FIRM.				[ ]	A,B,C,D
[ ]	**R4f:** If your locality does not participate in the Community Rating System (CRS) program through the National Flood Insurance Program (NFIP), consider the advantages of participation such as reduced flood insurance costs.				[ ]	A,B,C,D
[ ]	**R5c:** Establish strong emergency management policies and processes				[ ]	A,B,C
[ ]	**R6c:** Encourage residents and property owners to protect natural resources.				[ ]	D,E
[ ]	**R6e:** Implement locality projects that utilize NNBF to increase coastal resilience.				[ ]	A,D
[ ]	**R6f:** Encourage private and public property owners to implement green infrastructure and NNBF.				[ ]	A,D,E
[ ]	**R7b:** Provide incentives (such as by providing grants or tax deductions) for private property activities that manage stormwater (such as rain gardens or constructed wetlands).				[ ]	A,B,E
[ ]	**R7d:** Provide demonstrational BMPs on public property for stormwater education.				[ ]	E
[ ]	**R7e:** Develop stormwater policies that surpass minimum state requirements in flood prone areas by comparing minimum state stormwater management requirements to local requirement				[ ]	A,B,C,D
[ ]	**R7h:** Hold public educational events and disseminate educational materials about safe drinking water and what private well and water system owners can do to increase their water system resiliency, particularly in case a storm impacts their water supply				[ ]	A,B,E

Prioritized Resilience Actions

Resilience Planning Actions	Relevant residents' priorities and/or current/planned resilience initiatives	Resilience Plan Elements	Capacity Building and Planning Activities	Staff resources and/or community partners	Next steps