



MWH

BUILDING A BETTER WORLD



*Community Rating System (CRS) Application Assistance
and Outreach Consultant Services*

Floodplain Management / Storm Smart Recommendations Report

Prepared for Town of Barnstable – Growth Management Department
April 2015

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Introduction

Background

The Town of Barnstable has actively pursued and implemented a series of floodplain management activities that seek to reduce and avoid flood-related damage and disruption to the community. This includes adopting and administering floodplain regulations and participating in compliance with the National Flood Insurance Program (NFIP) since 1978. Further, in the interest of promoting sustainable and resilient approaches to community growth, the Town has employed a number of land use policies and regulatory measures that discourage or prevent new development from further encroaching on coastal high hazard and natural resource areas, coupled with policies and incentives to redirect growth to areas with greater adaptive capacity.

In recent years the Town of Barnstable Growth Management Department has also engaged in a number of activities to raise community awareness about climate change and build momentum toward more collaborative adaptation planning. With 170 miles of coastline, Barnstable is highly vulnerable to projected climate impacts including sea level rise and damage associated with increased storm intensity. These findings in addition to recent public opinion polling¹ on climate change suggest that Barnstable should pursue additional opportunities to advance coastal resilience and floodplain management planning in the community.

Many of the activities already in place or under consideration by the Town go beyond the minimum standards of the NFIP for local floodplain management. Further, a number of these activities are creditable under the NFIP's Community Rating System (CRS), a voluntary program that provides flood insurance rate reductions to policyholders within the community. In recognition of these efforts and the potential benefits of CRS participation, coupled with recently updated Flood Insurance Rate Maps and legislative reforms to the NFIP (which will result in higher flood insurance premiums for many), the Town of Barnstable is seeking to join the CRS.

In December 2014, the Town commissioned MWH Global to prepare its initial application and all required documentation to join the CRS. As part of this project, MWH was also tasked to prepare this report to identify specific floodplain management and climate adaptation actions the Town of Barnstable should consider for future implementation to achieve additional CRS credit.

The actions recommended in this report are based on particular opportunities for the Town of Barnstable to optimize credit points available through the CRS program. They include recommendations based on the latest CRS guidance, in addition to best practices for coastal storm and flood risk management that are consistent with the measures, standards, or policies promoted by the Massachusetts Office of Coastal Zone Management (CZM) StormSmart Communities program. Most importantly, the recommendations are tailored to the unique hazard risks and local capabilities, authorities and resources that exist in Barnstable.

What is the CRS?

The NFIP's Community Rating System (CRS) is a voluntary, incentive-based program that recognizes, encourages, and rewards community floodplain management activities that exceed minimum federal requirements. In exchange for a community's proactive efforts to reduce flood

¹ Public opinion polling conducted as part of the [New England Climate Adaptation Project \(NECAP\)](#).

risk, NFIP policyholders can receive discounted flood insurance premiums for buildings in the community. These reduced premiums are designed to reflect and reward community actions that meet the three goals of the CRS: (1) reduce flood damage to insurable property; (2) strengthen and support the insurance aspects of the NFIP; and (3) encourage a comprehensive approach to floodplain management.

The CRS uses a Class rating system to determine the premium rate reductions for resident policyholders. By participating, communities earn credit points for a wide range of activities organized into 4 categories: (1) Public Information; (2) Mapping and Regulations; (3) Flood Damage Reduction; and (4) Warning and Response. The total credit points earned across all categories determine a community's CRS Class.

There are 10 CRS Classes: Class 1 requires the most credit points and gives the greatest premium reduction or discount (45 percent), while Class 10 means the community does not participate in CRS or has not earned the minimum required credit points, and residents receive no premium reduction. The CRS classes, qualifying total credit points, and flood insurance premium discounts are shown in Table 1. As can be seen in the table, the maximum premium discounts are different for buildings located in the Special Flood Hazard Area (SFHA) as delineated on the community's effective Flood Insurance Rate Map (FIRM).

Table 1. CRS Classes, Credit Points, and Premium Discounts

CRS Class	Credit Points	Premium Reduction	
		In SFHA*	Outside SFHA**
1	4,500+	45%	10%
2	4,000–4,499	40%	10%
3	3,500–3,999	35%	10%
4	3,000–3,499	30%	10%
5	2,500–2,999	25%	10%
6	2,000–2,499	20%	10%
7	1,500–1,999	15%	5%
8	1,000–1,499	10%	5%
9	500–999	5%	5%
10	0–499	0%	0%

SFHA: Zones A, AE, A1–A30, V, V1–V30, AO, and AH as shown on the Flood Insurance Rate Map
Outside SFHA: Zones X, B, C, A99, AR, and D as shown on the Flood Insurance Rate Map
Preferred Risk Policies are not eligible for CRS premium discounts because they already have premiums lower than other policies. Preferred Risk Policies are available only in B, C, and X Zones for properties that are shown to have a minimal risk of flood damage.
Some minus-rated policies may not be eligible for CRS premium discounts.
Premium discounts are subject to change.

The CRS [Coordinator's Manual](#) is the official guidebook for the CRS and establishes the criteria for CRS classification. It explains how the program operates, what is credited, and how credits are calculated. The current manual was updated in 2013 and expires December 31, 2016.

The CRS is managed by the Federal Emergency Management Agency (FEMA) and administered by Insurance Services Office, Inc. (ISO). Among other services, ISO reviews CRS applications and submittals, calculates a community's credit points, and conducts site visits to communities every few years in order to document and verify creditable CRS activities. Each year, CRS communities must recertify with ISO that they are continuing to perform the activities that are being credited by submitting an annual recertification.

Current NFIP Participation and Potential Dollar Savings for Barnstable

Currently there are 1,216 NFIP policies in force in the Town of Barnstable providing approximately \$350 million in coverage. Total annual premiums amount to \$1,564,859 for an average annual premium of \$1,287 per policyholder. Figure 1 shows the CRS "What If" table for Barnstable, listing potential dollar savings in flood insurance premium reductions for all CRS Classes based on which zone the building is located in.

Figure 1. CRS "What If" Table for Barnstable

		TOTAL	SFHA *	X-STD/AR/A99 **	PRP ***
PIF		1,216	569	89	558
PREMIUM		\$1,564,859	\$1,150,531	\$158,262	\$256,066
AVERAGE PREMIUM		\$1,287	\$2,022	\$1,778	\$459
CRS Class					
09	Per Policy	\$54	\$101	\$89	\$0
	Per Community	\$65,440	\$57,526	\$7,913	\$0
08	Per Policy	\$101	\$202	\$89	\$0
	Per Community	\$122,966	\$115,053	\$7,913	\$0
07	Per Policy	\$148	\$303	\$89	\$0
	Per Community	\$180,492	\$172,579	\$7,913	\$0
06	Per Policy	\$202	\$404	\$178	\$0
	Per Community	\$245,932	\$230,106	\$15,826	\$0
05	Per Policy	\$250	\$506	\$178	\$0
	Per Community	\$303,459	\$287,632	\$15,826	\$0
04	Per Policy	\$297	\$607	\$178	\$0
	Per Community	\$360,985	\$345,159	\$15,826	\$0
03	Per Policy	\$344	\$708	\$178	\$0
	Per Community	\$418,511	\$402,685	\$15,826	\$0
02	Per Policy	\$391	\$809	\$178	\$0
	Per Community	\$476,038	\$460,212	\$15,826	\$0
01	Per Policy	\$439	\$910	\$178	\$0
	Per Community	\$533,564	\$517,738	\$15,826	\$0

* SFHA (Zones A, AE, A1-A30, V, V1-V30, AO, and AH): Discount varies depending on class.

** SFHA (Zones A99, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, and AR/AO): 10% discount for Classes 1-6; 5% discount for Classes 7-9.

*** Preferred Risk Policies are not eligible for CRS Premium Discounts.

It should be noted that although reduction in flood insurance premiums is what attracts most communities to the CRS, there are many other important benefits to CRS participation including enhanced public safety, reduction in damage to property and public infrastructure, avoidance of economic disruption and losses, reduction in human suffering, and protection of the environment. The CRS also provides communities with access to a variety of training, technical assistance and peer-to-peer networking opportunities, and the ability to evaluate the effectiveness of its floodplain management program against state and nationally recognized benchmarks.

How this Report is Organized

The recommendations in this report are organized to follow the same general categories and activities as presented in the CRS *Coordinator's Manual*, and are listed in order accordingly. This includes 19 different creditable activities under the following four categories:

1. *Public Information Activities*
This includes programs that advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities also generate data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community.
2. *Mapping and Regulations*
This includes programs that provide increased protection to new development. These activities include mapping areas not shown on the FIRM, preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing stormwater.
3. *Flood Damage Reduction Activities*
This includes programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting flood-prone structures, and maintaining drainage systems.
4. *Warning and Response*
This series provides credit for measures that protect life and property during a flood, through flood warning and response programs.

All recommendations in this report include the following information:

Recommended Action	Brief narrative description of the recommendation.
Benefits & Costs	Summary of the short and long-term benefits and costs to implementing the recommended action.
Implementation Plan	Information detailing required staffing and resources to carry the action out.

Level of Effort	Estimated level of effort to implement the action, including any documentation required for CRS credit. Effort is classified according to the following three levels: <ul style="list-style-type: none"> • Low: Requires minimal staff time and can be integrated into existing Town policies or activities with little effort. Some additional time may be required to document activities for CRS credit. • Moderate: Requires limited to moderate staff time to implement and/or document new activities, but at no added financial cost to the Town. • High: Requires significant staff time to create and manage a new activity or program, and/or requires the Town to incur a new financial expense to implement the action.
CRS Credit Points	Description of potential credit points under CRS for implementing the recommended action.

The recommendations included in this report are based on an extensive review of the new CRS *Coordinator's Manual*. They are also based on review of current plans, policies, regulations, and program activities in place for the Town of Barnstable relevant to coastal and floodplain management. All recommendations are generally consistent and in many cases very supportive of community goals, actions and strategies for risk reduction as stated in existing Town plans, including the *Comprehensive Plan*, *Multi-Hazard Mitigation Plan*, *Open Space and Recreation Plan*, *Coastal Resource Management Plan for Three Bays and Centerville River Systems*, and the *Long Range Natural Resource Management Plan for Sandy Neck Barrier Beach*. Recommendations were also informed by interviews with various Town staff, in addition to discussions with ISO/CRS Specialists and official CRS representatives with FEMA and the Commonwealth of Massachusetts.

A Note about Higher Regulatory Standards

It is widely recognized by floodplain management experts that the minimum NFIP requirements do not provide adequate long-term flood risk reduction for communities, and that the benefits of flood risk reduction achieved by higher regulatory standards far outweighs the burden of administering them. However, it is important to note that although the adoption of standards that exceed minimum NFIP requirements are encouraged by FEMA and credited by CRS, municipalities in Massachusetts are generally prohibited from regulating in the same arena as the State Building Code (780 CMR), including its flood-resistant construction standards. Therefore, even if recognized as a best practice for coastal and floodplain management, this report does not include recommendations for higher regulatory standards that the Town is currently preempted from pursuing. Regardless of these restrictions on the regulation of structures, the Town is encouraged to leverage the use of its zoning powers to regulate the use, form, design and compatibility of land development in known flood hazard areas in cases where such preemption issues do not exist.

Recommendations

1. PUBLIC INFORMATION ACTIVITIES

Recommendation 1.1: Create an elevation certificate inventory.

Recommended Action	Pull archived permit records to create an inventory of all completed Elevation Certificates (and V Zone Design or Floodproofing Certificates, as required) for new or substantially improved buildings built after the date of the Town's initial FIRM (April 3, 1978) and before the date of application to the CRS. The certificates must be properly completed and made accessible to all inquirers.
Benefits & Costs	<p>Previously completed Elevation Certificates for post-FIRM buildings are a key indicator of compliance with the NFIP. Although certificates for buildings constructed or substantially improved prior to the date of the Town's CRS application are not required for CRS participation, the Town can receive additional CRS credit by providing and maintaining such documentation.</p> <p>The costs associated with this action are limited to the staff time required to prepare or update the inventory from archived permit files going back as far as 1978 (all those that haven't been discarded since). The Town has been requiring and maintaining elevation certificates for many years, and any costs for preparing Elevation Certificates are passed on to the permit applicant.</p>
Implementation Plan	This action should be managed by the Building Division using existing resources.
Level of Effort	Low
CRS Credit Points	<p>This action can provide the Town up to 48 CRS credit points for maintaining Elevation Certificates for post-FIRM buildings (ECPO) under Activity 310: Elevation Certificates. <i>Maintaining the inventory by adding all new certificates (issued after the date of application to CRS) is a requirement for CRS participation and will provide an additional 38 credit points (scored as separate activity).</i></p> <p>To receive credit the Town must ensure the certificates are complete and the information is correct, and must make them available to inquirers upon request. The amount of credit points will be adjusted based on the number of post-FIRM buildings the Town has certificates for.</p>

Recommendation 1.2: Publicize flood map information services.

Recommended Action	<p>Increase publicity and enhance documentation for the Town's existing services to provide flood insurance map information. This should include more clearly describing the services on the Town's website, publicizing the services at least once a year (e.g., water/sewer bill stuffer, Public Access TV, or similar outreach project), and maintaining a tracking log of inquiries received. As part of this action the Town should update the existing Interactive Flood Insurance Maps site to provide information on who to contact for more information.</p>
Benefits & Costs	<p>Promoting the Town's existing map information services will help to ensure inquirers are informed and made aware of local flood hazards, requirements for flood insurance, and other related information. Documenting the inquiries received through a tracking log will help the Town to receive CRS credit for the service.</p> <p>Any costs associated with this action are limited to staff time relating to promotional activities and increased documentation for a service already being provided by the Town. Standard forms and templates for tracking and logging service inquiries are available through the CRS.</p>
Implementation Plan	<p>This action should be managed by the Conservation Division, with support from Community Services and other Town departments as appropriate or required. Ideally this action should be coordinated with and supported by an outreach project(s) as described in Recommendation 1.3 (expand flood-related public outreach efforts).</p>
Level of Effort	<p>Low</p>
CRS Credit Points	<p>This action can help provide the Town up to 90 CRS credit points under Activity 320: Map Information Service.</p> <p>The Town is currently doing everything that is required to maximize credit under Activity 320 except for the publicity and record keeping.</p>

Recommendation 1.3: Expand flood-related public outreach efforts.

Recommended Action	<p>Expand existing efforts to implement multiple public outreach projects each year to communicate key messages from the Town that also address the following six priority CRS topics:</p> <ol style="list-style-type: none"> 1. Know your flood hazard 2. Insure your property for your flood hazard 3. Protect people from the hazard 4. Protect your property from the hazard 5. Build responsibly 6. Protect natural floodplain functions <p>Outreach projects may include:</p> <ol style="list-style-type: none"> a) Information materials – brochures/flyers made available upon request and placed in Town Hall and Town Offices at 200 Main St. <i>For example, the Town could expand on the three brochures already in place at Town Offices.</i> b) General outreach projects – newspaper articles, signs, social media messages, and presentations for a general audience. <i>For example, Town staff could deliver presentations on the above topics at relevant public/community events or regularly scheduled meetings of local civic organizations and associations (e.g., Kiwanis Club, Cape Cod & Islands Board of REALTORS, Home Builders & Remodelers Association of Cape Cod, etc.).</i> c) Targeted outreach projects – information or key messages that are directed to a specific audience. <i>For example, the Town could send an annual letter to all floodplain residents, coastal property owners, or just those identified as owners of repetitive loss properties.</i>
Benefits & Costs	<p>Outreach projects credited under the CRS 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 and beneficial functions of shorelines and coastal floodplains.</p> <p>The costs associated with this action can vary greatly depending on the number and nature of projects, but are generally attributed to staff time and the fees associated with advertising, printing and reproduction, postage, etc. for conducting outreach. Many information materials can be provided to the Town by FEMA, the Massachusetts Department of Conservation and Recreation (DCR), Massachusetts Office of Coastal Zone Management (CZM), and other agencies or organizations free of charge.</p>
Implementation Plan	<p>This action should be managed by the Growth Management Department with active support from the Conservation Division</p>

	<p>and Community Services Department.</p> <p>If the Town develops a Program for Public Information (PPI) as described in Recommendation 1.5, then the PPI Committee would be responsible for managing this action.</p>
Level of Effort	Moderate to High
CRS Credit Points	<p>This action can provide the Town up to 200 CRS credit points for outreach projects (OP) under Activity 330: Outreach Projects. An additional 80 points can be provided if the projects are prepared and implemented as part of a Program for Public Information (PPI) credited under Activity 330. <i>PPI is further described in Recommendation 1.5.</i></p> <p>CRS provides the most points for targeted outreach projects (6 points per topic, per project). To maximize credit, the Town should consider distributing an informational brochure to flood-prone residents on an annual basis that addresses each of the six priority CRS topics.</p>

Recommendation 1.4: Develop pre-flood communications plan.

Recommended Action	Develop a communications plan for specific outreach projects to be implemented immediately before, during or after a major coastal flood event, including pre-packaged public information materials and messages to be disseminated accordingly. These materials may include document templates, mailers, press releases, etc. that communicate information people should know before, during, and after the event (for example, information on evacuation routes, shelter locations and other emergency protective measures, or information relating to re-entry, permits for repairs and rebuilding, etc.).
Benefits & Costs	Developing a pre-flood communications plan and an inventory of public information materials will strengthen the Town's ability to effectively distribute key messages to residents, businesses, and visitors in the event of a major flood event. The costs associated with this action are generally limited to staff time, along with possibly some printing/reproduction costs and fees for information dissemination.
Implementation Plan	This action should be managed by the Conservation Division with active support from Community Services, Growth Management Department, and Police Department. Outreach materials and key messages should be prepared in coordination with the Building Division, Health Division, Department of Public Works, Fire Departments, and other relevant agencies as appropriate. If the Town develops a Program for Public Information (PPI) as described in Recommendation 1.5, then the PPI Committee should be responsible for managing this action.
Level of Effort	Moderate
CRS Credit Points	This action can provide the Town up to 50 CRS credit points for flood response preparation (FRP) under Activity 330: Outreach Projects. An additional 20 points can be provided if the Town has a Program for Public Information (PPI) credited under Activity 330. <i>PPI is further described in Recommendation 1.5.</i> This action should be coordinated with Recommendation 4.1 (flood warning and response plan) to maximize credit points and eliminate duplication of effort.

Recommendation 1.5: Develop Program for Public Information (PPI).

Recommended Action	Develop a Program for Public Information (PPI) using the process described and credited under the CRS. The PPI is an organized, ongoing public information effort to convey messages that the Town determines are most important to its flood safety and the protection of natural shoreline and coastal floodplain functions.
Benefits & Costs	<p>The main benefits of developing and implementing a PPI include the organized structure and involvement of key stakeholders in managing a public information program, and for CRS purposes, the design and implementation of specific materials and messages in support of identified outreach projects. Another tangible CRS-related benefit is the bonus credit points awarded to each project covered in the PPI (see CRS Credit Points below).</p> <p>The costs associated with this action are primarily related to the staff time required to develop and manage a new program according to the seven-step planning and public involvement process required by CRS. For more information on this process and PPI examples, see page 330-12 in the <i>CRS Coordinator's Manual</i>.</p>
Implementation Plan	<p>This action should be managed by the Growth Management Department with active support from Community Services, the Conservation Division, and other Town departments selected for participation on the PPI Committee.</p> <p>Establishing and maintaining a PPI will require a significant effort, but the overall workload to implement this action can be eased if it is integrated or can leverage resources from other similar efforts and/or operating committees. If this action is pursued it is recommended that the Town establish a PPI committee that can serve multiple roles, including serving as the planning committee (or subcommittee, as appropriate) for maintaining and updating the Town's existing <i>Multi-Hazard Mitigation Plan</i>.</p> <p><i>* Another option worthy of further exploration is the development of a regional committee to prepare a multi-jurisdictional PPI in partnership with the Cape Cod Commission and other CRS communities on Cape Cod. This would still require active participation on the committee by Town staff but reduce the overall workload associated with developing, managing, and implementing the PPI process.</i></p>
Level of Effort	High
CRS Credit Points	This action provides a 40% multiplier that increases CRS credit points for each outreach project that is covered in the PPI (including those credited under OP and FRP described in

	<p>Recommendations 1.3 and 1.4, respectively), up to a maximum of 80 additional points. It can also assist with increasing credit for other CRS activities such as the flood information home page (Recommendation 1.8).</p> <p>This action should be coordinated with Recommendation 3.1 (updating the <i>Multi-Hazard Mitigation Plan</i>) to potentially maximize credit points and eliminate duplication of effort.</p>
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Recommendation 1.6: Engage stakeholders to support flood-related public outreach efforts.

Recommended Action	Solicit the endorsement and involvement of community stakeholder organizations that can support the delivery of outreach projects identified in the Program for Public Information (PPI) as suggested in Recommendation 1.5. Community stakeholders may include local news outlets (e.g., Barnstable Patriot, Barnstable-Hyannis Patch), civic organizations, neighborhood associations, and local businesses (insurance companies, realtors, etc.) identified in coordination with other organizations such as the Hyannis Area Chamber of Commerce.
Benefits & Costs	<p>The credibility and visibility of the Town's outreach messages will be enhanced if they are sent by numerous sources, and especially those not affiliated with local government.</p> <p>Any costs to implement this action would be fairly negligible to the Town; limited mainly to the staff time required to engage, monitor, and communicate with identified stakeholders. The costs of stakeholder-delivered outreach projects would be borne by the external stakeholder organizations but ideally integrated into some of their existing outreach activities.</p>
Implementation Plan	This action should be managed by the Growth Management Department as part of the PPI suggested in Recommendation 1.5.
Level of Effort	Low
CRS Credit Points	This action provides a 30% multiplier that increases CRS credit points for each outreach project (OP) that is delivered or otherwise endorsed by one or more stakeholder organizations, up to a maximum of 50 additional points. It is only available to communities with a PPI, so this action must be coordinated with Recommendation 1.5.

Recommendation 1.7: Establish collection of flood-related publications in Hyannis Public Library.

Recommended Action	Coordinate with the Hyannis Public Library to establish a collection of flood protection publications and other locally pertinent documents that are catalogued and available at its location at 401 Main Street, Hyannis. All documents should be catalogued in the Cape Libraries Automated Materials Sharing (CLAMS) to ensure the publications are listed and available to all seven libraries in Barnstable.
Benefits & Costs	<p>A library collection of resources relevant to flood hazards and flood protection techniques will make detailed information available to residents, and provides an alternative to those who are hesitant to talk with Town staff or have limited access to the internet.</p> <p>The costs of implementing this action are limited to minor staff time to coordinate with the library on building the collection of materials. Most publications (including all those recommended below) are available free-of-charge.</p>
Implementation Plan	This action should be led by the Growth Management Department in coordination with the Library Director at Hyannis Public Library.
Level of Effort	Low
CRS Credit Points	<p>This action can provide the Town up to 20 CRS credit points for flood protection library (FLB) and locally pertinent documents (LPD) under Activity 350: Flood Protection Information.</p> <p>To maximize CRS credit points the collection should include copies of the following documents, in addition to any others the Town deems relevant to local conditions:</p> <ul style="list-style-type: none"> • The latest versions of the 10 FEMA publications listed in the <i>CRS Coordinator's Manual</i> (see Figure 350-1 on page 350-3), all of which can be ordered for free at FEMA's Resource & Document Library • The Town's <i>Multi-Hazard Mitigation Plan</i> • The Town's floodplain management ordinance (Town Code, Chapter 240-34: Zoning - Floodplain District) • The most recent Flood Insurance Study (FIS) report and copies of all effective FIRMs • The Coastal Resource Management Plan for Three Bays and Centerville River Systems • The Long Range Natural Resource Management Plan for Sandy Neck Barrier Beach • <i>StormSmart Coasts</i> publications as recommended by the Massachusetts Office of Coastal Zone Management

Recommendation 1.8: Establish a dedicated home page for flood-related information.

Recommended Action	<p>Establish a dedicated home page for all flood-related information on the Town's website, with a direct link from the Town's main home page. The page should include links to the Town's existing Interactive Flood Insurance Map, copies of effective FIRMs and other NFIP information, flood protection information, and other information credited by CRS including materials distributed through separate outreach projects. The page should also describe any relevant products or services the Town provides and how people can obtain additional information.</p>
Benefits & Costs	<p>A dedicated home page will provide one central location for people to access all pertinent flood information, eliminating the need to search among various sites spread among several department home pages.</p> <p>This action shouldn't result in any additional monetary costs, however it will require a moderate amount of staff time to collect and/or develop all the information and to design, host and maintain the home page. Much of this information already exists in various locations on the Town's website.</p>
Implementation Plan	<p>This action should be led by the Information Technology Department (site design and maintenance), in close coordination with the Conservation Division, Building Division, and Growth Management Department (content management).</p>
Level of Effort	<p>Moderate</p>
CRS Credit Points	<p>This action can provide the Town up to 76 CRS credit points for a flood protection website (WEB) under Activity 350: Flood Protection Information. An additional 29 points are provided if the website is part of a Program for Public Information (PPI) as described in Recommendation 1.5 and credited under Activity 330: Outreach Projects.</p> <p>To receive credit the flood information home page must include a link to FloodSmart (www.floodsmart.gov) or to FEMA's flood insurance page (https://www.fema.gov/national-flood-insurance-program). The Town must also commit to checking the website's links at least monthly and fixing those that are no longer accurate.</p>

Recommendation 1.9: Provide more information on future flood conditions due to sea level rise.

Recommended Action	<p>Using best available data, including the results of the mapping and vulnerability study (GIS analysis) performed by Cape Cod Cooperative Extension and Woods Hole Sea Grant staff, provide more information on potential future flood conditions for the Town of Barnstable based on anticipated sea level rise. This information should be provided through a specific outreach project(s) as described in Recommendation 1.3. In addition, the delineation of areas outside of current Special Flood Hazard Area that are predicted to be susceptible to flooding in the future should be added to existing flood risk maps (e.g., Risk and Vulnerability Assessment Map, etc.) and incorporated into all Town services and materials that provide flood map information.</p>
Benefits & Costs	<p>This action will help to increase the general awareness of future flood risks the Town and its residents should be prepared for with respect to the anticipated effects of sea level rise. The information provided can help answer questions on how properties and infrastructure may be affected by future flood hazards, and it can be used to inform new analyses or policy measures in existing Town plans, such as the <i>Multi-Hazard Mitigation Plan</i>, <i>Comprehensive Plan</i>, and existing coastal resource management plans.</p> <p>The costs of this action are limited to the staff time required to integrate available information into future public outreach projects and/or communication efforts with regard to flood map information services. The cost of providing a GIS analysis to identify how sea level rise will influence the extent flood hazard areas in Barnstable is being offset through in-kind staff support from Cape Cod Cooperative Extension and Woods Hole Sea Grant staff.</p>
Implementation Plan	<p>This action should be managed by the Growth Management Department, with active support from the Conservation Division, Natural Resources Division, and the Information Technology Department/GIS Unit.</p>
Level of Effort	<p>Moderate</p>
CRS Credit Points	<p>This action can help provide the Town up to 20 CRS credit points for other flood problems not shown on the FIRM (MI3) under Activity 320: Map Information Service.</p>

Recommendation 1.10: Incentivize voluntary flood mitigation and climate adaptation measures.

Recommended Action	<p>Identify incentives that the Town can provide to drive to voluntary flood mitigation and climate adaptation measures. Examples include:</p> <ul style="list-style-type: none"> • Encouraging or allowing modified development rights (higher density, increased dimensions, bulk, etc.) for projects that avoid, return, protect or otherwise preserve portions of developable lands within the Special Flood Hazard Area as permanent open space. • Waiving or discounting permit fees and regulatory barriers (e.g., height restrictions) for new development projects that incorporate higher design flood elevations (“freeboard”) to reduce the risk of future flood conditions, and in turn reduce flood insurance premiums for the property owner. For a successful example of this activity, see the Town of Hull’s freeboard incentive program.
Benefits & Costs	<p>Although the Town of Barnstable is limited in terms of adopting and enforcing higher regulatory standards beyond the State Building Code, it does have the ability to incentivize protective and adaptive actions through various policy and program measures. The benefits of this action are to not only accommodate but rather promote higher construction standards for development in known hazard areas. While hazard avoidance is the ideal solution to eliminate risk completely, incorporating freeboard is the single most effective means for reducing flood risk to a structure built in a flood hazard area and has the additional benefit of significantly reducing flood insurance costs.</p> <p>The costs of this action are limited to the staff time necessary to research and identify the specific incentives to consider for Barnstable. The costs of any activities required to implement or offer these incentives would have to be determined and considered as part of this action.</p>
Implementation Plan	<p>This action should be led by the Growth Management Department with support from the Conservation Division and Building Division.</p>
Level of Effort	<p>Moderate</p>
CRS Credit Points	<p>This action can help provide the Town with additional CRS credit points for outreach projects (OP) under Activity 330: Outreach Projects, as well as potentially some additional credit points for open space preservation (OSP) under Activity 420, completed flood mitigation projects under Activity 520: Acquisition and Relocation, and Activity 530: Flood Protection.</p>

2. MAPPING AND REGULATIONS

Recommendation 2.1: Create and maintain CRS Impact Adjustment Map(s).

Recommended Action	Create and maintain “impact adjustment maps” to routinely document and calculate impact adjustment ratios as required for creditable CRS activities, and as described in the CRS Coordinator’s Manual (pages 400-6 to 400-14).
Benefits & Costs	<p>Impact adjustment maps will help the Town to determine the numerators and denominators for determining impact adjustment ratios. The maps will aid the Town in deciding on which options to apply in calculating the size of the Special Flood Hazard Area and other factors so that it receives the maximum possible credit points for several CRS activities. Another benefit of the impact adjustment maps is the ability for the Town to share a helpful visual presentation of the floodplain management activities in place across the community.</p> <p>The cost to implement this activity is limited to the staff time required to develop and maintain the impact adjustment maps as needed, but at a minimum in advance of any verification cycle visits (typically once every 5 years). The Town already has GIS data and capabilities in place to develop and update these maps.</p>
Implementation Plan	This activity should be led by the Information Technology Department/GIS Unit using existing resources, in coordination the Growth Management Department (and specifically the CRS Coordinator), and the ISO/CRS Specialist assigned to Massachusetts CRS communities. GIS staff is also encouraged to coordinate with other local/regional CRS Coordinators to further discuss this action as successfully implemented for their jurisdiction.
Level of Effort	Moderate
CRS Credit Points	No CRS credit points are awarded for this activity; however the impact adjustment maps should be carefully considered and used to maximize the total credit points awarded for relevant CRS activities during the initial and regular verification cycle visits.

Recommendation 2.2: Maximize CRS credit points for open space preservation.

Recommended Action	Support, expand, and further document the Town's open space planning efforts for lands located in the Special Flood Hazard Area in order to maximize CRS credit points for open space preservation. This includes integrating CRS-specific activities and documentation requirements with the Town's <i>Open Space and Recreation Plan</i> , coordinating future efforts with the Land Acquisition and Preservation Committee, and updating or enhancing existing parcel records and other GIS databases as required for ISO credit verification.
Benefits & Costs	<p>Keeping identified flood hazard areas free from development reduces risk to life and property and protects the natural and beneficial functions of floodplains. Due to the large amount of floodplain open space that is currently and/or permanently protected in its natural state, the Town of Barnstable has the ability to receive significant CRS credit points under Activity 420: Open Space Preservation. This action will help to ensure that these points are recognized, maximized and sustained over time.</p> <p>The costs associated with this action include local staff time, primarily associated with collecting, cataloguing, and maintaining documentation required by ISO during verification visits. Opportunity costs for implementing this action may include the loss of new private property development and tax revenues for the Town, yet as demonstrated through many past efforts and existing community goals, policies and strategies, the benefits of preserving open space in hazardous or natural resource areas typically will outweigh those costs or concerns.</p>
Implementation Plan	This action should be led by the Growth Management Department in coordination with the Conservation Division, Information Technology Department/GIS Unit, and the Town's Land Acquisition and Preservation Committee.
Level of Effort	Moderate
CRS Credit Points	This action will support the Town in maximizing the potential CRS credit points under Activity 420: Open Space Preservation. Up to 2,020 total credit points can be awarded based on the percentage of permanently preserved open space in the regulatory floodplain.

Recommendation 2.3: Regulate hazardous materials in known floodplain areas.

Recommended Action	<p>Review the potential of amending Town Code Chapter 108 (Hazardous Materials) and/or Chapter 240-34 (Zoning - Floodplain District) to regulate the storage or processing of hazardous materials in the Special Flood Hazard Area. For the latter this may include adding certain extremely hazardous materials as a prohibited use or requiring the storage of hazardous materials to comply with specific elevation, containment and/or anchoring requirements.</p>
Benefits & Costs	<p>Hazardous, flammable, and explosive materials can be easily transported during a flood event creating threats to public health and safety, as well as water quality and other natural features. Regulating the storage or processing of these materials in identified special flood hazard areas reduces the risk to these threats.</p> <p>The costs associated with this action include local staff time to research the potential of amending existing Town regulations. The potential costs of implementing these regulations in Barnstable require more analysis, and would have to be studied and further evaluated as part of this action.</p>
Implementation Plan	<p>This action should be led by the Growth Management Department in coordination with the Conservation Division, Building Division, and Health Division.</p>
Level of Effort	<p>Moderate</p>
CRS Credit Points	<p>If this action leads to the Town's regulation of hazardous materials specific to the Special Flood Hazard Area, it can provide the Town a maximum of 50 CRS credit points for development limitations (DL) under Activity 430: Higher Regulatory Standards. However the amount of credit points awarded would likely be on the lower end based on required impact adjustments (excluding areas credited for Open Space Preservation) and current CRS credit criteria.</p>

Recommendation 2.4: Establish higher flood protection standards for critical facilities.

Recommended Action	Amend Town Code Chapter 240-34 (Zoning - Floodplain District) to establish higher protection standards for new or substantially improved critical facilities within Special Flood Hazard Areas. Options to consider include prohibiting new, non-water dependent critical facilities to be located in FEMA V Zones and/or A Zones, and where not prohibited, requiring more resilient design flood elevations. At a minimum these design flood elevations should provide protection to at least one foot above the 0.2% chance (500-year) flood level, or the elevation determined from using an approach that uses the best available hydrologic and hydraulic data and methods that integrate current and future changes in flooding based on climate science.
Benefits & Costs	Providing enhanced flood protection for new facilities that will provide critical services or that are vital to flood response activities can help to reduce potential damage to the facilities, disruption to services they provide, and risks to public health and safety. The costs associated with this action to the Town would include the staff time required to research, draft and enact the amended ordinance language. Higher flood protection standards will likely result in increased costs association with the construction of new or substantially improved critical facilities, but the long-term benefits of reduced risk and avoided flood damages and/or disruptions to the services they provide will likely greatly outweigh such costs.
Implementation Plan	This action should be led by the Growth Management Department in coordination with the Department of Public Works, Conservation Division, and the Police Department.
Level of Effort	Moderate
CRS Credit Points	This action can provide the Town up to 80 CRS credit points for a protection of critical facilities (PCF) under Activity 430: Higher Regulatory Standards.

Recommendation 2.5: Designate a Coastal A Zone to encourage more resilient development practices in areas subject to special flood hazards.

Recommended Action	<p>Designate a formal “Coastal A Zone” to identify those areas of the Special Flood Hazard Area outside of V Zones but still subject to wave effects, velocity flows, erosion, scour, or combinations of these forces. This area should be defined as that portion of the SFHA landward of the V Zone and seaward of the line noted as the Limit of Moderate Wave Action (LiMWA) on current FIRMs.</p> <p>At a minimum, the Town could then encourage higher development standards (similar to V Zones) for the Coastal A Zone through its flood map information services, site plan review process, and other outreach measures. In addition, the Town should explore the potential of amending its zoning regulations to prohibit certain uses in Coastal A Zones, such as the use of fill for structural support, or certain types of development that is not compatible with the special flood hazards present in these areas. However prior to enacting any additional regulatory measures the Town must carefully consider potential preemption issues associated with the State Building Code.</p>
Benefits & Costs	<p>FEMA has concluded that its current minimum criteria for construction in A Zones does not provide adequate protection in coastal A zones, and in fact, has long recommended the use of V zone construction practices in coastal A Zones. However, there was no meaningful way to designate coastal A Zones in Barnstable until the latest FIRMs were produced for the Town (effective July 2014). Now, with the ability to easily designate such boundaries, the Town can pursue initiatives to encourage more resilient development practices to further protect life and property from known special flood hazards in these areas.</p> <p>The costs to implement this action will vary depending on how much staff time is dedicated to updating existing information, including outreach materials, definitions in the Town Code, and possible amendments to existing regulatory language.</p>
Implementation Plan	<p>This action should be led by the Growth Management Department with support from the Conservation Division, Natural Resources Division, Information Technology/GIS Unit, and Building Division.</p>
Level of Effort	<p>Moderate to High</p>
CRS Credit Points	<p>This action can provide additional CRS credit points if the Town adopts more stringent standards for designated Coastal A Zones, including points for development limitations (DL) and Coastal A Zones (CAZ) under Activity 430: Higher Regulatory Standards.</p>

Recommendation 2.6: Support a Town staff member to become a Certified Floodplain Manager.

Recommended Action	The Town should identify and support at least one regulatory staff member to join the Association of State Floodplain Managers (ASFPM) and to obtain and maintain professional accreditation as a Certified Floodplain Manager (CFM®).
Benefits & Costs	<p>ASFPM is an organization of professionals involved in floodplain management, flood hazard mitigation, NFIP, and flood preparedness, warning and recovery. The CFM program recognizes continuing education and professional development that enhances the knowledge and performance of floodplain management professionals. Membership in both helps to ensure ensuring that local regulatory staff is kept informed of relevant changes or trends in the above topics and remain highly qualified to perform their assigned duties. This action would also help implement Mitigation Action #14 in the Town's <i>Multi-Hazard Mitigation Plan</i>.</p> <p>The costs associated with implementing this action include the staff time required for training and preparing to take the CFM exam and to maintain CFM certification through required Continuing Education Credits (CECs). The discounted exam fee for ASFPM members is \$100 and the subsequent recurring annual fees to maintain membership/certification is between \$160-200.</p>
Implementation Plan	This action should be led jointly by the Conservation Division and Growth Management Department.
Level of Effort	Moderate
CRS Credit Points	This action can provide the Town up to an additional 25 CRS credit points for regulations administration (RA) under Activity 430: Higher Regulatory Standards (5 points for each CFM or graduate of approved FEMA courses; or 25 points if all proposed development projects in the SFHA and all final inspections and project approvals are reviewed and approved by a CFM).

Recommendation 2.7: Create an inventory of archived FIS and FIRM information.

Recommended Action	Develop and maintain a standard collection of <u>all</u> older Flood Insurance Study (FIS) reports and FIRMs issued by FEMA for the Town of Barnstable, and make the collection readily accessible to potential inquirers. This collection can be in hard copy or digital format, but must be made available to the public upon request (i.e., moved from archives to more accessible location).
Benefits & Costs	<p>Having older FIRMs on hand can enable a person to review historical records of mapped floodplains in an area or for a particular property, and to verify any flood protection criteria that was required when it was built. It can also help with tracking substantial improvement requirements, compliance, and eligibility for grandfathered flood insurance premiums.</p> <p>The costs associated with this action are limited to the staff time required to create the collection from existing, archived records – currently being stored upstairs at the Town Offices at 200 Main Street. Copies of older FIRMs and historic map products for Barnstable are also available for free from FEMA’s Map Service Center (https://msc.fema.gov/).</p>
Implementation Plan	This action should be led by the Building Division with support from the Conservation Division.
Level of Effort	Low
CRS Credit Points	This action can provide the Town up to an additional 15 CRS credit points for FIRM Maintenance (FM) under Activity 440: Flood Data Maintenance.

Recommendation 2.8: Adopt the *Massachusetts Stormwater Handbook, Volume 1*.

Recommended Action	<p>Coordinate with Town Council to formally adopt the <i>Massachusetts Stormwater Handbook, Volume 1</i> to document that future development and infrastructure projects meet, at a minimum, the standards and best management practices recommended therein. Relevant provisions of the Town Code should also then be updated with language to clarify that the most recent version of the Handbook applies to site development standards for most development activities (specify applicable jurisdiction, and not just those in the Craigville Beach District), and to the maximum extent feasible.</p>
Benefits & Costs	<p>The <i>Massachusetts Stormwater Handbook</i> was developed by the Massachusetts Department of Environmental Protection to provide guidance for meeting the Stormwater Management Standards required under the State's Wetlands Protection Act and Clean Water Act, and as currently already being implemented and enforced by the Town of Barnstable.</p> <p>This action more formally and clearly adopts and documents the stormwater management standards and practices currently being implemented in Barnstable, and the only costs associated with this action is the staff time required to prepare and execute the formal adoption process and make any relevant clarifications or required changes to the language in the Town Code.</p>
Implementation Plan	<p>This action should be led by the Department of Public Works in coordination with the Growth Management Department and Conservation Division.</p>
Level of Effort	<p>Low</p>
CRS Credit Points	<p>Per existing guidance from FEMA and ISO, this action can provide the Town up to 271 CRS credit points for stormwater management regulations (SMR) under Activity 450: Stormwater Management. These points are available through Uniform Minimum Credit (UMC) in Massachusetts.</p>

Recommendation 2.9: Reevaluate current buffers and setbacks for coastal development.

Recommended Action	Reevaluate the Town’s current wetlands buffer zone and setback regulations for non-water dependent coastal development to account for updated data on projected rates of coastal erosion and sea level rise.
Benefits & Costs	<p>As stated in Chapter 740 (Wetlands Buffer Activity) of the Town Code, “the effect of an accelerated rise in sea level will be an appreciable acceleration in coastal erosion processes and their notable manifestations: land erosion, storm damage, flooding, and loss of coastal wetlands.” In recognition of new and more readily available data on the rate of sea level rise and coastal erosion, the Town has an opportunity to review and update its existing wetlands protection and zoning regulations to better protect new coastal development and natural resources. These regulations should be based on best available projections for shoreline change, coupled with the useful life expectancy of new structures and other critical factors identified through the review and deliberation process. Such regulations can reduce the potential for property damage and help avoid the need for shoreline armoring projects that can lead to adverse environmental impacts.</p> <p>Another option for the Town is to clarify in its Wetlands Protection regulations that “land subject to flooding or inundation by groundwater, surface water, tidal action or coastal storm flowage” includes areas of future flooding or inundation due to sea level rise.</p> <p>This action will require significant staff time for research and coordination efforts, but there would be no cost for obtaining updated data and locally relevant information on projected rates of coastal erosion and sea level rise. This information and helpful technical assistance is available through numerous sources including but not limited to the Massachusetts Office of Coastal Zone Management and Wood Hole Oceanographic Institute.</p>
Implementation Plan	This action should be led by the Conservation Commission, with support from the Conservation Division, Growth Management Department, and Natural Resources Division.
Level of Effort	Moderate to High
CRS Credit Points	If this action leads to increased buffer or setback requirements it could provide the Town additional CRS credit points for open space preservation (OSP) and natural shoreline protection (NSP) under Activity 420: Open Space Preservation, and erosion data maintenance (EDM) under Activity 440: Flood Data Maintenance.

Recommendation 2.10: Amend the site plan review process to include consideration of climate change and sea level rise.

Recommended Action	Incorporate the consideration of of sea level rise or other climate-related impacts into the Town's existing site plan review process to increase awareness and promote climate adaptation measures.
Benefits & Costs	<p>The Town's current site plan review does not explicitly require consideration of sea level rise or other climate-related impacts; however it does seek to promote functional and aesthetic design, construction and maintenance of development activities and to minimize any harmful effects on surrounding areas. Incorporating the consideration of climate change impacts, particularly sea level rise, will help to ensure that development activities regulated by site plan review identify and address potential climate adaptation measures to reduce any adverse impacts on the development and surrounding areas. This action would also help implement Mitigation Action #11 in the Town's <i>Multi-Hazard Mitigation Plan</i> which states "Buildings and infrastructure in areas of projected sea level rise should be designed for protection from flooding as well as to minimize risk to human health and safety."</p> <p>This action will require additional staff time to research and implement the amendment to the site plan review process, and may result in some additional costs to the applicant to address the new provisions.</p>
Implementation Plan	This action should be led by the Building Division in coordination with the Growth Management Department and Conservation Division.
Level of Effort	Moderate
CRS Credit Points	This action won't provide additional CRS credit points, but should be coordinated with Recommendation 1.9 (provide more information on future flood conditions based on projected sea level rise).

3. FLOOD DAMAGE REDUCTION ACTIVITIES

Recommendation 3.1: Update the Town’s Multi-Hazard Mitigation Plan using the CRS’s recommended 10-step planning process.

Recommended Action	Update the Town’s existing <i>Multi-Hazard Mitigation Plan</i> using the 10-step planning process in CRS Activity 510 (Floodplain Management Planning) to maximize CRS credit points. The process is consistent with but goes beyond FEMA’s current minimum requirements for updating local mitigation plans, which the Town has successfully followed in the past.
Benefits & Costs	<p>The Town has already prepared and adopted a FEMA-approved <i>Multi-Hazard Mitigation Plan</i> that addresses flooding as a priority hazard. During its required 5-year update of the plan in 2016 the Town has the opportunity to satisfy multiple program requirements through one planning process. The standard 10-step planning process outlined by CRS requires some additional criteria be met, such as increased involvement by the public and other stakeholders, but will typically result in a more robust and enhanced plan – particularly for flooding hazards. While the CRS may provide up to a maximum of 50 points for the existing plan, many more points can be achieved through following its 10-step process (see CRS Credit Points below).</p> <p>This action will require significant staff time to manage, document, and complete the 10-step planning process, though some of this time will be required regardless in order to update the existing <i>Multi-Hazard Mitigation Plan</i> to remain current and in compliance with FEMA requirements. Additional costs may include expenses associated with the advertising and logistics required for facilitating public/stakeholder involvement activities, printing and reproduction costs, or the support of outside help during the plan update process.</p>
Implementation Plan	This action should be led by the Growth Management Department but supported by many other Town departments and staff through active participation in the plan update process.
Level of Effort	High
CRS Credit Points	This action can provide the Town up to 382 CRS credit points for floodplain management planning (FMP) under Activity 510: Floodplain Management Planning.

Recommendation 3.2: Review and amend existing plans to maximize CRS credit for natural floodplain functions planning.

Recommended Action	<p>Review other existing plans that seek to protect natural floodplain functions, and amend or update as needed to meet the criteria for CRS credit for a natural floodplain functions plan. This includes but is not limited to the following plans :</p> <ul style="list-style-type: none"> • <i>Coastal Resource Management Plan for Three Bays and Centerville River Systems</i> • <i>Long Range Natural Resource Management Plan for Sandy Neck Barrier Beach</i> • <i>Town of Barnstable Comprehensive Plan</i> – particularly Section 1 (Land Use) and Section 2 (Natural Resources) • <i>Town of Barnstable Open Space and Recreation Plan</i>
Benefits & Costs	<p>The primary benefit of this action is an increased emphasis on the value and protection of natural floodplain functions in existing plan documents, which can increase general awareness and bolster community support to continue protecting these natural resources, but also result in additional CRS credit points (see CRS Credit Points below).</p> <p>The costs of this action are limited to local staff time required to review and amend/update existing plans. Some plans may require only minor revisions, such as more detailed information on the implementation measures for specific actions, or descriptions of progress made since the plan was prepared or last updated.</p>
Implementation Plan	<p>This action should be led by the Growth Management Department in coordination with the Conservation Division and Natural Resources Division, and supported by the Town’s Planning Board, Land Acquisition and Preservation Committee, Sandy Neck Board, and other pertinent boards or committees.</p>
Level of Effort	<p>Moderate</p>
CRS Credit Points	<p>This action can provide the Town up to an additional 100 CRS credit points for natural floodplain functions plan (NFP) under Activity 510: Floodplain Management Planning. This includes up to 80 points for a plan (or combination of plans) that meet all criteria and cover the entire SFHA, or up to 15 points for each plan that meets certain designated criteria.</p>

Recommendation 3.3: Develop an inventory of mitigated floodplain properties.

Recommended Action	Develop and maintain an inventory of mitigated floodplain properties. At a minimum this inventory should include a list of properties that have had an insurable, pre-FIRM building that has been (a) acquired, demolished or relocated outside of the Town’s regulatory floodplain, and is now preserved as open space; (b) retrofitted to protect it from at least the 25-year flood; or (c) protected by a small flood control project as credited by CRS (including storm drain improvements, diversions, retention/detention basins, etc., but not including coastal structural projects).
Benefits & Costs	This action will primarily benefit the Town’s record-keeping practices and documentation required by CRS for past flood mitigation activities that are eligible for credit even if completed in advance of joining the CRS program (going as far back as April 3, 1978 – the date of the initial FIRM). The inventory also helps capture information on previously implemented mitigation projects that can be used to support mitigation planning, document success stories, conduct loss avoidance studies, etc. The costs to implement this action may include significant staff time to research and document past flood mitigation projects for which records may not exist or be easily accessible.
Implementation Plan	This action should be led by the Information Technology Department/GIS Unit, in coordination with the Building Division, Assessing Division, Department of Public Works, and other departments as needed.
Level of Effort	High
CRS Credit Points	This action will help support the Town in maximizing CRS credit points for completed flood mitigation projects under Activity 520: Acquisition and Relocation and Activity 530: Flood Protection. The total amount of points is based on the number of buildings cleared or protected from flood hazards.

Recommendation 3.4: Develop an inventory of properties for potential flood mitigation projects.

Recommended Action	Develop and maintain an inventory of properties identified or targeted for potential flood mitigation projects. At a minimum this inventory should include a list of floodplain properties with insurable buildings that the Town and/or property owner is interested in protecting against future flood events, including but not limited to (a) pre-FIRM buildings with a finished floor elevation below the current base flood elevation; (b) buildings on FEMA's repetitive loss list; (c) critical facilities; or (d) buildings in V Zones or Coastal A zones.
Benefits & Costs	<p>This action will help the Town identify, evaluate, and prioritize properties in the community for future flood mitigation projects, including those that may be eligible for financial support through existing mitigation grant programs. The inventory could also identify and prioritize the preferred mitigation technique for each property (i.e., acquisition, elevation, etc.). In so doing the inventory will help the Town to better organize resources to implement all the general mitigation actions identified under the "Property Protection" category in the current <i>Multi-Hazard Mitigation Plan</i>. It may also further support the Town's adopted land use strategy for the reclamation or "undevelopment" of existing developed properties as described in the <i>Open Space and Recreation Plan</i>.</p> <p>The costs to implement this action may include a large investment of staff time up front, but would decrease over time and especially if integrated with other activities recommended in this report (especially Recommendations 1.3, 1.5, and 3.1).</p>
Implementation Plan	This action should be managed by the Growth Management Department in coordination with the Conservation Division, Community Services, Department of Public Works, and the Building Division.
Level of Effort	High
CRS Credit Points	This action will not result in any CRS credit points per se, however it can greatly support and/or lead to other creditable activities under Activity 330: Outreach Projects, Activity 420: Open Space Preservation; Activity 510: Floodplain Management Planning; Activity 520: Acquisition and Relocation, or Activity 530: Flood Protection.

Recommendation 3.5: Update existing regulations to explicitly prohibit debris disposal throughout the Town’s drainage system.

Recommended Action	Revise Town Code Chapter 701 (Property Use Violations) to more specifically prohibit the illicit dumping or disposal of debris throughout all natural and manmade watercourses, drainage ways and stormwater conveyance systems.
Benefits & Costs	<p>This revision to existing regulations will more specifically and clearly address the problem of keeping natural watercourses and the Town’s drainage and stormwater systems free of materials that can obstruct flows and cause overbank flooding. Conformance and enforcement of this ordinance can also help minimize the Town’s efforts on debris removal and channel clearance/maintenance work caused by illicit dumping.</p> <p>The costs to implement this action is limited to the staff time required to revise or amend the language in the existing chapter of the Town Code, and in getting the updated chapter adopted by Town Council. There are unlikely to be any additional costs to be borne by the Town in enforcing the amended ordinance, but this should be considered in the process of drafting any clarifying language for existing regulations.</p>
Implementation Plan	This action should be led by the Conservation Commission and supported by the Conservation Division, in coordination with the Department of Public Works and the Health Division.
Level of Effort	Low
CRS Credit Points	This action can provide the Town up to an additional 15 CRS credit points for stream dumping regulations (SDR) under Activity 540: Drainage System Maintenance. An addition 10 points can be provided for this action if the Town publicizes the regulatory requirements through an outreach project (Recommendation 1.3) or an additional 15 points if such outreach is coordinated through a Program for Public Information (Recommendation 1.5).

Recommendation 3.6: Develop a pre-event plan for disaster recovery and redevelopment.

Recommended Action	Develop a pre-event plan to assist the Town with long-term disaster recovery and redevelopment activities following a major coastal storm and flood event.
Benefits & Costs	<p>Although Barnstable hasn't experienced major hurricane or coastal storm event in many years, the potential for major destruction remains possible and particularly due to potential storm surge flooding. Evidence has shown that preparing a long-term recovery and redevelopment plan in advance of a major flood event will help expedite post-event decision making, and will support enhanced implementation of processes and procedures that promote resilient reconstruction practices. Such a plan can help the Town to (1) pre-identify issues or policy matters that would arise following an event, (2) to adopt specific measures or policies to guide post-disaster construction in a way that achieves its goals and priorities, and (3) to establish an organizational structure to manage the recovery process in a manner consistent with the National Disaster Recovery Framework, and puts the Town in the best position to manage its own recovery and redevelopment process following a declared disaster event.</p> <p>This action would require significant staff time, though many examples, best practices, and guidance on pre-event recovery planning (including model code language) are available to assist.</p>
Implementation Plan	<p>This action should be led by the Planning Board with primary support coming from the Growth Management Department, Conservation Division, Department of Public Works, Building Division, Police Department, and Fire Departments and should be conducted in conjunction with regional emergency management officials.</p> <p>In order to eliminate duplication of effort and increase efficiencies, this action could be coordinated and even integrated with future updates to the Town's <i>Comprehensive Plan</i>, <i>Multi-Hazard Mitigation Plan</i>, or <i>Comprehensive Emergency Management Plan</i>.</p>
Level of Effort	High
CRS Credit Points	<p>This action is not a creditable activity under CRS but could likely support the identification and implementation of post-storm activities that would result in numerous actions that would provide additional CRS credit.</p> <p><i>* 10 CRS credit points would be provided if the Town updated its Multi-Hazard Mitigation Plan as described in Recommendation 3.1 and included post-disaster redevelopment policies/procedures.</i></p>

4. WARNING AND RESPONSE

Recommendation 4.1: Update the Town's CEMP to include a detailed flood warning and response plan.

Recommended Action	<p>Update the flood section of the Town's <i>Comprehensive Emergency Management Plan</i> (CEMP) to include a detailed flood warning and response plan that includes the following:</p> <ul style="list-style-type: none"> a) Description of the existing methods and warning devices (e.g., CodeRED) used to disseminate emergency warnings to the general public; b) Identification of specific flood response actions to be taken at different flood or storm surge levels/scenarios as shown on a flood inundation map (e.g., Town of Barnstable Risk and Vulnerability Assessment Map, FIRMs, etc.); c) Assignment of person, department or other office responsible for implementing each action; d) Definition of the time needed to carry out the action; and e) Other critical information that designated agencies and organizations will need in order to perform their assigned responsibilities.
Benefits & Costs	<p>When integrated with existing Town emergency management functions, the flood warning and response plan has the potential to enhance the Town's coordinated response to imminent flood threats, reducing property damages and the risk to public safety.</p> <p>The costs associated with this action are limited to staff time to prepare the plan, as the Town already has a flood threat recognition and warning dissemination system in place (CodeRED), in addition to other planning and mapping requirements.</p>
Implementation Plan	<p>This action should be led by the Police Department, in coordination with the Growth Management Department and Conservation Division.</p> <p>Upon completion the flood warning and response plan (or updated CEMP) should be formally adopted by Town Council.</p>
Level of Effort	<p>Moderate to High</p>
CRS Credit Points	<p>This action can provide the Town up to 115 CRS credit points for flood response operations (FRO) under Activity 610: Flood Warning and Response.</p> <p>In order to receive credit, the Town must also receive some credit for other ongoing activities including its flood threat recognition</p>

	<p>system (manual), emergency warning dissemination (CodeRED), and critical facilities planning – each of which is also creditable under Activity 610. The Town must also conduct at least one exercise and evaluation of the flood warning and response plan each year.</p> <p>This action should be coordinated with one or more outreach projects credited under Activity 330 that tells residents and businesses how they will be warned and the safety measures they should take during a flood event.</p>
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Recommendation 4.2: Conduct flood risk assessments and encourage preparation of emergency action plans for critical facilities.

Recommended Action	Conduct more detailed, site-specific flood risk assessments for the 24 critical facilities identified in the Town's <i>Multi-Hazard Mitigation Plan</i> to be in flood hazard areas and/or hurricane inundation zones (and others as appropriate) in order to identify potential flood mitigation measures. The assessments should also be used to encourage the preparation of emergency action plans for each facility to ensure maximum protection during an imminent flood or coastal storm event. These emergency action plans should be coordinated with the Town's CEMP and flood warning and response plan described in Recommendation 4.1.
Benefits & Costs	<p>This action will help the Town identify specific vulnerabilities to facilities that are critical to flood response activities or crucial to the health and safety of the public before, during, and after a flood, and lead to the identification of measures that can minimize damage and disruption to the services they provide. For public facilities this may include the identification of flood mitigation activities to be included in the Town's Capital Improvements Plan or in applications for outside hazard mitigation grant funding. This action will also help enhance the coordination between the Town and privately-owned facilities on flood mitigation, warning and response activities.</p> <p>This action will also support the implementation of Mitigation Action #20 in the <i>Town's Multi-Hazard Mitigation Plan</i> (identify, evaluate, and fund measures to reduce the vulnerability of critical facilities, including fire stations, hospitals and airports, to natural hazards).</p>
Implementation Plan	This action should be led by the Police Department in coordination with the Growth Management Department, Conservation Division, and Department of Public Works. The assessments should also be conducted in close coordination with the owners and operators of the facilities, as required.
Level of Effort	High
CRS Credit Points	<p>This action can provide the Town up to 75 CRS credit points for critical facilities planning (CFP) under Activity 610: Flood Warning and Response.</p> <p>This action should be coordinated with an outreach project credited under Activity 330 that is specifically aimed at the owners and operators of critical facilities.</p>