Flood Smart Action Plan

Cohocton River

Acknowledgements

THIS REPORT WAS PREPARED BY

Stevie Adams (TNC)
Janet Thigpen (STC)
Dr. Kathryn Bryk Friedman (UB)

WITH CONTENT CONTRIBUTED BY

Stephanie Yezzi (STC)
Brian Conley (UBRI)
Alison Agresta (TNC)
David Richardson (TNC)
Matthew Sousa (Steuben County Planning)

IN COLLABORATION WITH

Steuben County Emergency Services, the Towns of Avoca, Bath, Campbell, Cohocton, and Erwin, the Villages of Avoca, Cohocton, Painted Post and Savona, Steuben County Soil and Water Conservation District, Steuben County Planning Department

FUNDING FOR THIS PROJECT WAS PROVIDED BY THE

Environmental Protection Fund through the New York State Department of Environmental Conservation with assistance from New York State Senator Thomas F. O'Mara, the Land Trust Alliance, the Corning Foundation, and the Community Foundation of Elmira-Corning and the Finger Lakes

SUGGESTED CITATION

Adams, S.L., J. Thigpen, and K. Bryk Friedman. 2019. Flood Smart Action Plan: Cohocton River. Bath, NY.

Flood Smart Communities is a complex, interdisciplinary, and information intensive project that the Core Team could not have done without the help, expertise and talents of so many. The authors wish to thank the following people whose thoughtful contributions of content, reviews, comments and other support helped to shape and inform this document. Special thanks go to the nine participating Towns and Villages for supporting the project and providing their extremely experienced officials and staff:

Town of Avoca: Ken Parsels, Supervisor; LeAnn Wightman, Village Clerk; Chuck Cagle, Code Enforcement Officer

Town of Bath: Ron Smith, Supervisor; Ron Dyer, Code Enforcement Officer; John Lysyczyn, Council Person

Town of Campbell: Terry Brethen, Planning Board Chair; Marvin Rethmel, Code Enforcement Officer

Town of Cohocton: Cheryl Deusenbery, Deputy Supervisor; Chuck Cagle, Code Enforcement Officer; Ray Schrader, Planning Board Chair

Town of Erwin: Rita McCarthy, Town Manager; Bryan Hallgren, Code Enforcement Officer

Village of Avoca: Peter Gledhill, Mayor; LeAnn Wightman, Village Clerk; Chuck Cagle, Zoning Officer

Village of Cohocton: Tom Cox, Mayor; Justin Coats, Public Works; Chuck Cagle, Code Enforcement Officer

Village of Painted Post: Larry Smith, Superintendent of Public Works

Village of Savona: Brian Scott, Mayor; Ken DeWert, Code Enforcement Officer

With gratitude to Jeff Parker, Velynda Parker and Chelsea Barnett (SWCD) for their review of modeling outputs, field work and invaluable expertise; to Chelsea Robertson (STC) and Amy Dlugos (Steuben County Planning) for their support, guidance and advice; and to Kristin France (TNC) and Ellen Weiss (TNC) for their editing and help with organization of information for this plan.

Published September 2019

COVER PHOTO Town of Bath © The Nature Conservancy

Acronyms

ACOE	Army Corps of Engineers
CRS	Community Rating System
FDPL	Flood Damage Prevention Law
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
G/FLRPC	Genesee/Finger Lakes Regional Planning Council
LFDPL	Local Flood Damage Prevention Law
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWI	National Wetlands Inventory
NYS DEC	NYS Department of Environmental Conservation
STC	Southern Tier Central Regional Planning and Development Council
SWCD	Soil & Water Conservation District
SFHA	Special Flood Hazard Area
TNC	The Nature Conservancy
UB	University of Buffalo
UBRI	University of Buffalo, Regional Institute
USDA	US Department of Agriculture
USEPA	US Environmental Protection Agency
USFWS	US Fish and Wildlife Service

Flash flooding in the Town of Cohocton Photo courtesy of Steuben County Office of Emergency Services.

Contents

CHAPTER ONE

Introduction

Town of Cohocton © The Nature Conservancy

Flooding on Liberty Street, Bath, 1935. Photo courtesy of the Steuben County Historical Society.

Flooding is an unfortunate reality for New York State communities situated in the Cohocton River Watershed. In the latter half of the 20th century, no less than 35 flooding events occurred in the region. The most significant of these was the "Great Flood of 1972" caused by Hurricane Agnes, which, by all accounts, resulted in "complete chaos."

Water rolled over dikes and flood walls; retaining walls were hurled out of the way; bridges were lost; trailers floated down the rivers; and buildings disappeared. Approximately two percent of the entire land area in the region was under water; 30 feet of water covered the Village of Painted Post. Twenty-three fatalities and billions of dollars in damage occurred in Steuben County. As devastating as this flood was, it is sobering to consider that the Cohocton River level measured at the Campbell gauge was even higher during the "Finger Lakes Flood" in 1935. Extensive damage from that flood spurred construction of levees protecting the Villages of Avoca, Bath, and Painted Post.

Hurricane Agnes flooding, Bath, 1972. Photo courtesy of Southern Tier Central Regional Planning and Development Board.

Flooding continues to pose challenges for development along the Cohocton River and in tributary valleys. Micro-storms that cause flash flooding occur more frequently than in years past. Agricultural practices, deforestation, and development alter upland runoff patterns, while sediment, debris, and stream bank erosion alter stream and river conditions. In addition, the current policy environment provides little support to help rural inland communities strengthen their local capacity to address flooding challenges. Although flash floods are common, most instances of flooding in the Cohocton River are "undeclared emergencies" – meaning that flooding events are not large enough to warrant a Presidential emergency declaration that then triggers a flow of funding under the Federal Emergency Management Act. **For all these reasons, now is the time for Cohocton River communities to be Flood Smart in addressing flood concerns and challenges.**

Project partners at the Community Resilience Building Workshop, 2017.
© The Nature Conservancy

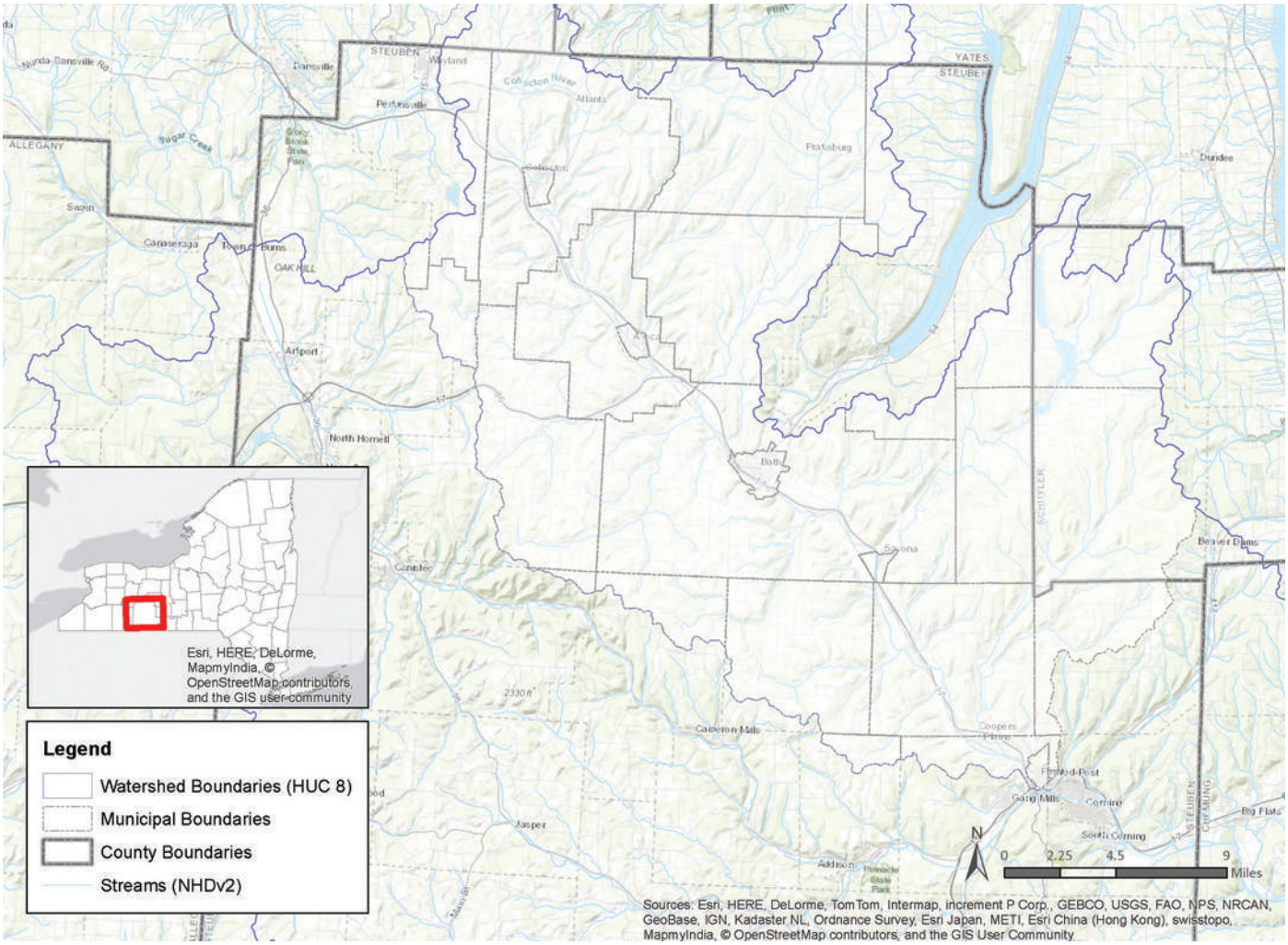
Participating Communities

- Town of Avoca
- Town of Bath
- Town of Campbell
- Town of Cohocton
- Town of Erwin
- Village of Avoca
- Village of Cohocton
- Village of Painted Post
- Village of Savona

The Flood Smart Approach

Flood Smart Communities is an innovative program that works with communities across New York State to proactively strategize about flooding concerns. It is based upon the premise that collaboration among different sectors (public officials, non-government organizations, academics, state agencies) is necessary to address flooding challenges. Developed by The Nature Conservancy, Southern Tier Central Regional Planning and Development Board, University at Buffalo, and Genesee/Finger Lakes Regional Planning Council, Flood Smart is not a "one size fits all" approach. Rather, it recognizes that each community has different strengths, needs and challenges. Two critical elements underlying the Flood Smart program are 1) the employment of an evidence-based and collaborative approach to understanding communities, and 2) the engagement and empowerment of local officials because they know the needs of their community best.

In 2016, nine communities situated along the Cohocton River committed to working with The Nature Conservancy (TNC), Southern Tier Central Regional Planning and Development Board (STC), the Steuben County Planning Department, the Steuben County Office of Emergency Services, and the University at Buffalo (UB) (the "Core Project Team") to develop a Flood Smart approach to flooding in this region.



The Flood Smart Approach: Strengthen Understanding of Participating Communities

Over a two-year period, the Core Project Team worked with the participating communities to develop a Flood Smart approach for the Cohocton River. The overarching goal of this approach was to reduce flooding vulnerability within the Cohocton River municipalities with coordinated and collaborative flood risk management strategies. Local governments and decision makers committed to identify proactive, forward-thinking actions that would lead to strong and safe communities and strive for solutions that provide multiple benefits.

Toward these ends, the Core Project Team focused on an evidence-based approach to understanding the participating communities. Members of the Core Project Team conducted interviews with municipal officials to gain a better understanding of strengths, barriers and challenges of flood management; conducted a vulnerability assessment (Appendix A); an assessment of land use plans and regulations (Appendix B); an assessment of stream flow and natural infrastructure (Appendix C); synthesized information generated by community members at a Community Resilience Building Workshop (Appendix D); a state policy gap analysis (Appendix E); and a

THE FLOOD SMART COMMUNITIES APPROACH

Steuben County SWCD does a great job of partnering with municipalities to reconstruct drainage facilities to handle larger storms. It also has a program to help landowners implement stream projects – one of only a handful in New York State.

floodplain function assessment (Appendix F). Team members also engaged local officials, representatives from the Steuben County Soil and Water Conservation District (SWCD) and the New York Department of Environmental Conservation (NYS DEC) in a Stream Dialogue on October 3, 2018 to discuss stream management (Appendix G).

From these assessments, a strong understanding of the participating communities emerged. **The good news is that the nine participating communities bring myriad strengths to the table.** First, collaboration among municipalities is informal but, by all accounts, strong. According to municipal officials, collaboration is "part of the culture" and "easy" for these communities. Relatedly, good working relationships exist among stakeholders at the municipal and county levels. For example, the Steuben County SWCD does a great job of partnering with municipalities to reconstruct drainage facilities to handle larger storms. It also has a program to help landowners implement stream projects – one of only a handful in New York State. Good working relationships also exist between municipalities and the County Emergency Management Office, County Planning Department, and Southern Tier Central; and with NYSDEC specifically when it comes to stream debris removal. This foundation of collaboration and strong relationships is important in taking steps to accomplish the Flood Smart goals.

Second, the watershed has many societal assets to address flood challenges. These range from residents' strong sense of community (and hence, a willingness to help neighbors during a crisis) to the use of zoning and land use authorities to manage development in flood-prone areas. Third, the ecosystem of the Cohocton River is considered an asset, with wetlands upstream and downstream of Atlanta in the Town of Cohocton, in the upper portion of Mud Creek, and in Meads Creek providing capacity to store excess water. Fourth, communities along the river boast infrastructure assets, such as highways I-390 and I-86 – both of which are elevated and hence not generally prone to riverine or flash flooding. Bus fleets, like those located in the Town of Bath, could be used to evacuate people in emergency situations. Other infrastructure assets include the Steuben County emergency management system and plan, i.e., the 211 help-line, emergency shelters and the

County building itself. This is particularly important, given that some municipalities do not have their own emergency management plans. Finally, the levees that protect the Villages of Avoca, Bath, and Painted Post and areas within the Town of Erwin are a significant strength, as these structures significantly reduce flood risks in these river-valley communities (but do not guarantee protection from all possible floods).

Notwithstanding these strengths, the evidence also suggests that the participating communities are vulnerable. First, many residents could be more affected by flooding because they are less likely to be able to prepare for, respond to and recover from a flood. Many residents are reluctant to leave their homes when faced with a flooding event. Additionally, runoff from hillsides can be increased by loss of tree cover due to logging activities and the infestation of invasive pests such as the emerald ash borer. Existing zoning and land use laws provide only partial protection against increased flood risks associated with new development. Low-lying areas that are developed or used for agriculture are vulnerable to damage, such as the floodplain between Avoca and Wallace and the hamlets of Campbell, Coopers Plains, and Long Acres, as well as the cottages around Lake Salubria. Meads Creek and other tributary streams are vulnerable to flash flooding and erosion damage, with housing development and septic systems particularly at risk. Debris in streams and other channels can divert flow patterns and cause increased streambank erosion. Farmland in upland areas can also be damaged by heavy rainfall, which erodes unprotected soils and may wash crops into ditches and onto roads.

Transportation infrastructure is at risk of flooding and erosion damage. Roads (e.g., State Route 415), culverts (located throughout the watershed), and railway lines (e.g., the B&H) are vulnerable to flooding. Residents who must drive to work are vulnerable if roads wash out; the same is true for those who rely on public transportation. Certain bridges over the river and tributaries are vulnerable to flooding with concerns that some of them will "plug up" and flood surrounding neighborhoods, including two bridges in Atlanta; the Maple Avenue Bridge in Cohocton; the Wood Road truss bridge; the Smith Road bridge; the bridge at Route 15; the bridge to the Veterans Administration; and bridges along Meads Creek at Wixon Road, Taft Road and Meads Creek Road just north of Hamm Road.

At risk housing in Coopers Plains, Town of Erwin. © The Nature Conservancy

The Flood Smart Approach: Empower Local Officials in Participating Communities

Recognizing this reality, and to engage and empower local stakeholders, the Core Project Team worked with the participating communities to develop an overall purpose, goals, objectives and actions for the Flood Smart initiative. The Core Project Team held facilitated workshops on December 4, 2017 (Appendix D), March 29, 2018 and June 6, 2018 at which municipal officials and other stakeholders discussed flooding challenges and devised a path forward.

Consensus emerged on the purpose, goals, objectives, and actions for the Flood Smart initiative:

1. Statement of Purpose

Given the increased frequency and intensity of flooding events in communities along the Cohocton River, municipal leaders desire to become "flood smart," which means becoming flood resilient. A flood resilient community is one in which residents and institutions have the capacity to prepare for, respond to, and recover from flooding.

To strengthen flood resiliency, leaders recognize that they need to:

- Bolster and protect critical infrastructure
- Prevent or reduce flood damage to property
- Proactively engage in emergency planning and response strategies, as well as comprehensive planning strategies
- Raise awareness and educate officials, residents and property owners so that they can make informed decisions about flood strategies and responses
- Maintain an appropriate balance between the natural environment, economic vitality, and healthy communities

Although there is a diversity of flooding causes, types and intensities across the watershed (thus preventing a "one size fits all" approach), municipal leaders agree that they represent communities with capacity constraints. Leaders also agree that a proactive approach is required. Under this initiative, the communities will develop holistic flood resiliency strategies and action steps that build capacity. Some strategies will be specific to individual community flooding challenges; others will be cross-jurisdictional, where appropriate. This document will serve as a long-term guide to understanding what flood resiliency means for these communities and how they can better prepare for, manage, mitigate against, and respond to flooding challenges in the future. The work that community leaders are investing into the Flood Smart process and action plan today will serve as the foundation for creating flood smart communities in the years and decades to come.

2. Goals, Objectives, and Actions

Further recognizing that each participating community has unique flooding challenges, the Core Project Team worked with local community officials to develop goals, objectives and action steps specific to their needs and are presented on pages 11 through 15. Community Profiles for each participating municipality, with baseline information on specific flooding challenges facing residents and local leaders as well as recommendations from the Core Project Team can be found in Chapter 2. Chapter 3 is a toolkit that provides guidance for implementing the community-identified objectives and actions.

GOAL 1: Maximize support and function of critical infrastructure to perform during and after flooding.

Objectives	Actions	Short- or Long-Term?	Overall Priority	T Avoca	V Avoca	T Bath	T Campbell	T Cohocton	V Cohocton	T Erwin	V Paintee Post	V Savona
a. Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**i.** Seek alternate locations and funding to relocate: * Coopers Plains Fire Department * Campbell Town Hall and Public Works * Campbell Fire Department * Campbell-Savona High School * Critical functions at the Bath VA Hospital Prior to relocation, elevate critical equipment. [Relocation of critical functions (such as emergency shelters), from flood-prone loctions is included in updating of emergency response plans (Actions 1.b.i and 3.e.i).]	Long-term	High	H	H	L			M	H		
	ii. Assess flood vulnerability, identify mitigation options (such as elevating vulnerable equipment), and implement any warranted measures, for: * Public water systems * Public sewer system	Assess: Short-term Implement: Long-term	Low			H				L	H	
b. Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.	**i.** Review emergency response plans (including comunication procedures, shelter locations, shelter access routes, plans for asset deployment, etc.) with key personnel and revise as warranted: * School plans * Critical facility plans [Municipal plans are addressed in Action 3e.i.]	Review: Short-term Revise: Short- or long-term	High			H		M	M	M	H	
c. Develop an inter-municipal communication plan to enable coordinated mobilization during an event.	**i.** Use the county Local Emergency Planning Committee to document existing capabilities for emergency communication between departments, municipalities, and organizations (railroads, utilities, etc.); identify deficiencies; and develop recommendations. [Including communication procedures in emergency response plans is addressed in Actions 1.b.i and 3.e.i.]	Short-term	Low			H				H	H	
d. Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**i.** Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emerency assistance. [Including plans for asset deployment in emergency response plans is adressed in Actions 1.b.i and 3.e.i.]	Both	High	H	H	H		M	M	L	H	

GOAL 2: Minimize flood damage to property.

Objectives	Actions	Short- or Long-Term?	Overall Priority	T Avoca	V Avoca	T Bath	T Campbell	T Cohocton	V Cohocton	T Erwin	V Paintee Post	V Savona
a. Enact stream setback requirements.	**i.** Draft and enact appropriate stream corridor protections in municipal land use regulations.	Depends on municipality	Medium	H	H	M	H	H	H		L	
b. Enforce development standards, including anchoring of floatable property in the floodway.	**i.** Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development.	Both	High			M	H	H	H	L	L	
	ii. Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	Long-term	High			M	H	H	H	H	L	
c. Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**i.** unicipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists. [Periodic training of municipal planning boards about floodplain management, stormwater management, and mapping resources is addressed in Action 4.b.i.]	Depends on municipality	High			H	H	H	H		L	
d. Seek funding to elevate or relocate existing structures in the floodplain.	**i.** Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years). [Identifing the highest risk properties is supported by Action 3.a.i (inventory of flood-prone assets) and Action 3.b.i (maps of the highest risk floodplains), and may be supplemented by other flood information (such as potential water depths/velocities).]	Short-term	High	H	H	M			M		M	
	ii. When mitigation funding is announced, contact owners of high risk structures to assess interest in a mitigation application. Apply for funding as warranted.	Long-term	Medium	H	H	L			M	H	M	
e. Protect existing floodplain development with wet floodproofing (to resist damage when floodwaters enter a building) and other practices.	**i.** Provide training on wet floodproofing techniques for municipal and private sector building professionals.	Short-term	Low			L					L	
	ii. Share information and establish inter-municipal collaboration for trained building personnel to provide floodproofing assistance; advertise the availability of this assistance.	Short-term	Low			L					L	
	iii. Apply for grant funding to assist interested property owners with floodproofing of existing development.	Long-term	Low			M				H	L	
f. Ensure that all fuel tanks in the floodplain are anchored and protected.	**i.** Provide building officials and propane/fuel oil providers with information and training about installation and permitting of fuel tanks in the floodplain.	Long-term	Low			H		H	H		L	
	ii. Municipality sends a letter to floodplain residents about the need to anchor fuel tanks.	Long-term	Low			M		H	H		L	

GOAL 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.

Objectives	Actions	Short- or Long-Term?	Overall Priority	T Avoca	V Avoca	T Bath	T Campbell	T Cohocton	V Cohocton	T Erwin	V Paintee Post	V Savona
a. Inventory assets in flood-prone areas (in and outside of the regulated floodplain).	**i.** Develop an inventory of existing assets and uses (including special needs populations and hazardous substances) in the regulated FEMA floodplain and other flood-prone areas. Encourage individuals to register for the County's special/functional needs inventory. [This inventory supports emergency response planning (Action 3.e.i) and mitigation (Action 2.d.i).]	Long-term	Medium			M			H			
b. Identify areas that should remain undeveloped and those that can be developed safely.	**i.** Develop a map of flood-prone areas for each municipality (in and outside of the FEMA floodplain) and distinguish between areas that should remain undeveloped (because of high risks and/or flood mitigation benefits of natural floodplains) and other areas where flood-safe development can occur. [This information supports comprehensive planning (Action 3.d.i), land use regulations (Action 3.d.ii),and mitigation (Action 2.d.i).]	Depends on municipality	High			M	H				M	
c. Conduct asset planning for highways and other municipal services, including assessment of the vulnerability to flooding.	**i.** Conduct a flood vulnerability assessment and develop a plan for improving flood resiliency for: * Highway departments * Other municipal services [Assessment of flood vulnerability of sewer and water systems is addressed as Action 1.a.ii.]	Short-term	Medium	H	H	H					H	
d. Review and update comprehensive plans, zoning, and other land use management tools.	**i.** Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards.	Depends on municipality	High	H	H	M	H	M		L	L	
	ii. Draft and adopt revisions to zoning and other land use regulations to promote flood-safe development (such as additional standards in floodplain overlay zones). [Revised regulations can include stream setback requirements (Action 2.a.i), floodplain development standards (Action 2.b.ii), and site plan review requirements (Action 2.c.i).]	Depends on municipality	High	H	H	M	H	H	H	L	H	
e. Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**i.** Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc, and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts. [Planning for deployment and inter-municipal sharing of highway department assets is supported by asset planning in Action 1.d.i.]	Depends on municipality	High			H	H	M	M		H	

GOAL 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.

Objectives	Actions	Short- or Long-Term?	Overall Priority	T Avoca	V Avoca	T Bath	T Campbell	T Cohocton	V Cohocton	T Erwin	V Painteе Post	V Savona
a. Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**i.** Convene an inter-municipal flood edcation task force to develop an outreach strategy with targeted messages, audiences, and outreach methods.	Short-term	High	H	H	M		M	L			
	ii. Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	Long-term	High	H	H	M		M	L	M		
b. Train municipal boards and elected officials on floodplain management regulations.	**i.** Participate in training about floodplain management, stormwater management, road drainage, use of mapping tools, and other natural resource topics, which are periodically offered at STC Regional Leadership Conference, Planning School, Cornell Local Roads Highway School, and other venues. Supplement this with additional interactive training at municipal Planning Board meetings. [Training and/or technical assistance for floodplain administrators is essential for enforcement and is included as Action 2.b.i.]	Both	Medium	H	H	L		L	L			
c. Educate the public about emergency operations (evacuation routes, shelters, etc.) and personal responsibilities for safety, preparedness, and response.	**i.** Expand the use of social media by the county, municipalities, and first responders to disseminate information about preparedness and real-time communication during flooding or other emergencies. Promote use of the Ready Steuben application. [Municipal emergency response planning in Action 3.e.i includes recommendation for a public communication chapter.]	Short-term	Low			M		L	L	M	M	
	ii. Conduct training about local flood hazards for fire departments and first resonders.	Both	Medium			M		L	L	L	H	
d. Promote disclosure of flood hazard information during real estate transactions.	**i.** Develop buyer-beware materials about flood risks and provide copies to real estate professionals and others for distribution.	Long-term	Medium			L	H	M	L	H		
	ii. Provide local training for insurance, real estate, and mortgage lending professionals about floodplain management and flood insurance.	Long-term	High			L	H	M	L	H		
	iii. Use signs to mark floodplains and historic flood levels. Post maps and other information in highly visible places.	Long-term	Medium			L	H	M	L			
	iv. Research municipal authority for requiring flood hazard disclosure during real estate transactions (by including flood zone and boundary on survey maps or other means).	Long-term	Medium			M	X	X				
e. Provide stream management education that includes the impacts of stream corridor and floodplain development, impacts of land use in the watershed (agriculture, forestry, development), and stream management techniques.	**i.** Form a stream education task force (following the stream summit in Action 5.a.i) to develop an outreach strategy, including dissemination of printed materials (Stream Processes Guide, brochures, etc.), interactive models, training/assistance (by SWCD), signs, and other approaches.	Short-term	Low			L		L	L	M		

GOAL 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.

Objectives	Actions	Short- or Long-Term?	Overall Priority	T Avoca	V Avoca	T Bath	T Campbell	T Cohocton	V Cohocton	T Erwin	V Paintee Post	V Savona
a. Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.	**i.** Conduct a stream summit to engage municipal representatives and stream professionals in dialog about stream management strategies, responsibilities, permitting, funding, etc.	Short-term	High			M	H	M			H	
	ii. Develop a stream management plan based on the information and recommendations from the stream summit. [Public education component of the stream management plan is addressed in Activity 4.e.i.]	Short-term	High			L	L	M			L	
b. Secure funding to implement stream remediation projects.	**i.** Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs.	Short-term	Medium	H	H	M	M		M		H	
	ii. Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects.	Long-term	High	H	H	M	H		M	M	H	
	iii. Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	Depends on municipality	High	H	H	H	H		M		H	
c. Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**i.** Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. [Municipal training about stormwater management, roadway drainage, and other natural resource issues is included in Action 4.b.i.]	Depends on current municipal capacity	High			M	M	M	M		M	
	ii. Consider additional natural resouce protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	Long-term	High	H	H	M	H	M	M		M	

Community Profiles

This section includes a watershed profile for the Cohocton River overall followed by a community profile for each of the 10 municipalities. The watershed profile makes recommendations that might be best tackled at a multi-municipality scale. In addition to exploring the municipality of interest, readers are encouraged to look at the watershed profile as well as the profiles of up and downstream municipalities.

The community profiles outline the:

- Current Situation, which explains the nature of the flooding challenges each municipality faces
- Core Team recommendations for improving the resilience of each community to flooding
- Actions municipalities prioritized for themselves through the Flood Smart Approach

Village of Avoca © The Nature Conservancy

Town and Village of Avoca © The Nature Conservancy

WATERSHED PROFILE

COHOCTON RIVER

CONTENTS

Current Situation

Nine Cohocton River corridor communities committed to participating in the Flood Smart approach. Their combined population is 28,493, about 30% of the population of Steuben County.

Typical streamflows in the Cohocton River Watershed are most influenced by precipitation, groundwater, and topography, with soils, development, and water alterations (withdrawals and additions) playing only a minimal role. The watershed lies on the glacially influenced Allegheny Plateau where streams have carved deep channels. Consequently, slopes are steep and flowing water has high levels of energy. Bedrock forms the valley walls along much of the Cohocton River. Runoff from the areas between river valleys runs down the steep valley sides where it recharges aquifers at the valley walls. Impervious surfaces do not cover a significant portion of any subwatershed, but certain soil types and shallow bedrock can contribute to surface water running off the land rather than soaking into it. The climate of the area is characterized by high levels of precipitation. Patterns are shifting to more frequent high intensity events during which high amounts of precipitation fall in short periods of time. This can cause more flash flooding.

Both historic and current development trends tend towards the flat areas adjacent to or in floodplains. Building in these areas reduces or eliminates the ability for floodplains to temporarily store flood flows, and just as importantly, these now impervious surfaces are shedding water to stream channels rather than allowing it to soak into the ground.

Flash flooding happens a lot in this area. From 2012 to 2017, nine flash flood events struck Steuben County causing an estimated $1.7 million in damage to public infrastructure alone. Two significant flash flood events occurred in Steuben County during the summer of 2018 both of which resulted from four inches of rain falling within just 45 minutes. Flash flooding is localized, hard to predict, and can occur anywhere water flows. Dollar amounts from individual flash flood events are often not high enough to qualify for federal or state disaster assistance. Consequently, these costs are shouldered by local municipal budgets.

Road flooding due to an ice jam in Steuben County. Photo courtesy of Steuben County Office of Emergency Services.

Fortunately, floodplains are still made up of largely contiguous natural and agricultural lands. Large floodplain and wetland complexes in the Towns of Cohocton and Avoca are very likely providing ecosystem services to downstream areas – possibly more so than the complexes that lie along the tributaries – as they lie within the flat valley bottom and thus are wider and have lower slopes which means they have greater capacity for temporarily storing flood waters and filtering sediment and nutrients. Floodplain and wetland complexes along tributary streams such as Five-Mile Creek, Mud Creek and Meads Creek are providing value to the flood prone and highly vulnerable Town of Campbell as well as more populated areas in Bath, Savona, Painted Post and Erwin. Downstream complexes in the Town of Erwin are very likely providing services to downstream areas like City of Corning, but just as importantly are keeping development out of harm's way.

A Path Forward

Through the Flood Smart Approach, the Core Team[1] sought the expertise and guidance of key stakeholders that included Steuben County Soil and Water Conservation District, Finger Lakes Land Trust, and New York State Department of Environmental Conservation. Conversations at meetings, workshops and one-on-one together with feedback on several assessments[2] culminated in recommendations for work that could be pursued at the multi-municipal scale or county-wide.

A culvert replacement project in Steuben County. Photo courtesy of the Steuben County Soil and Water Conservation District.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

[1] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[2] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Recommendations

FLOODPLAIN MAPPING AND COMMUNITY PLANNING

Why this is important: The Federal Emergency Management Agency (FEMA) develops flood hazard maps delineating areas, or floodplains, that are expected to be inundated by flooding with a 1% and 0.2% probability of occurring in any given year (the so-called 100-year and 500-year floods). All streams have floodplains. FEMA has only mapped high-hazard flood zones in about one third of the floodplains in the Cohocton River watershed. Floodplain maps provide municipal boards and emergency management agencies with crucial information for making decisions about emergency response, recovery and preparedness, as well as land use planning and management. It is important to look beyond the FEMA-mapped floodplains when making decisions about where to allow development.

Flood control levees and flood walls reduce—but do not eliminate—flood risks in protected areas. Because Flood Insurance Rate Maps (FIRMs) show areas as either in or out of the regulated floodplain, current mapping procedures do not account for the complex nature of flood risks in protected areas. A levee system is either accredited as providing sufficient protection from the 1% probability flood or the protected area is included in the regulated floodplain. When levee-protected areas are included in the regulated floodplain, the construction standards, flood insurance requirements, and flood insurance costs are the same as those applied to mapped floodplains with no levee protection. The program does not include a flood zone that is tailored to the flood risks in areas protected by flood control structures. In 2011, the Chemung Watershed Risk MAP project began to evaluate the 30 miles of levees in the Chemung River watershed (which includes the Cohocton River) to update FIRMs. It was determined that the levees needed to be accredited for FEMA to remove development receiving their protection from the high-risk zone. The engineering costs for local governments would have been prohibitive, and the levees remain unaccredited to date.

Standard insurance policies do not cover flood damage. In the nine participating municipalities, roughly one-third of structures in FEMA-mapped high-hazard floodplains have flood insurance (Table CRW1). Only one-tenth of all structures possibly at risk have flood insurance (many of these are in levee protected areas - because levee-protected areas are not mapped as high-risk floodplain, flood insurance is not required but it is strongly recommended). Dollars paid towards insurance premiums come back to the community when it needs them the most, while recovering from potentially devastating impacts of a flood.

Certain characteristics of a population might make it less able to prepare for, respond to, or recover from flooding impacts. These might include older or very young people, people without cars or with disabilities, or houses that were not built to modern-day building standards. Impacts to certain properties may be felt more by the community than others. These might include properties that provide jobs or have high economic output. Development in this watershed lies primarily along flat valley bottoms, thus most vulnerable populations and properties lie close to the river.

Table CRW1. The number of flood insurance policies in force compared to the number of structures within the FEMA-mapped floodplain and the UB modeled floodplains.

Municipality	Flood Insurance Policies in Force	911 address points in FEMA mapped floodplain	911 address points in UBRI modeled floodplains
T. Avoca	19	49	181
V. Avoca	3	11	163
T. Bath	25	116	523
T. Campbell	112	435	616
T. Cohocton	4	23	203
V. Cohocton	3	9	108
T. Erwin	112	249	783
V. Painted Post	3	0	492
V. Savona	1	7	168
TOTAL	282	899	3237

Recommendations:

R1. Complete LiDAR data, high quality FEMA floodplain maps and flood inundation mapping for the watershed.

R2. Certify levees in Avoca, Bath, Painted Post and Erwin.

R3. Undertake an education campaign with the goal of increasing the number of flood insurance policies.

R4. Undertake a flood safety campaign, targeting the most vulnerable populations.

R5. Develop a plan to buy out residents who have suffered repeated flood damage or are at high risk due to potential water depths, high velocity flood flows, or streambank erosion.

What the maps show:

Map CR1A & B. Note the amount of floodplain in blue that does not have cross-hatching. Those areas are not regulated by FEMA but are exposed to flooding.

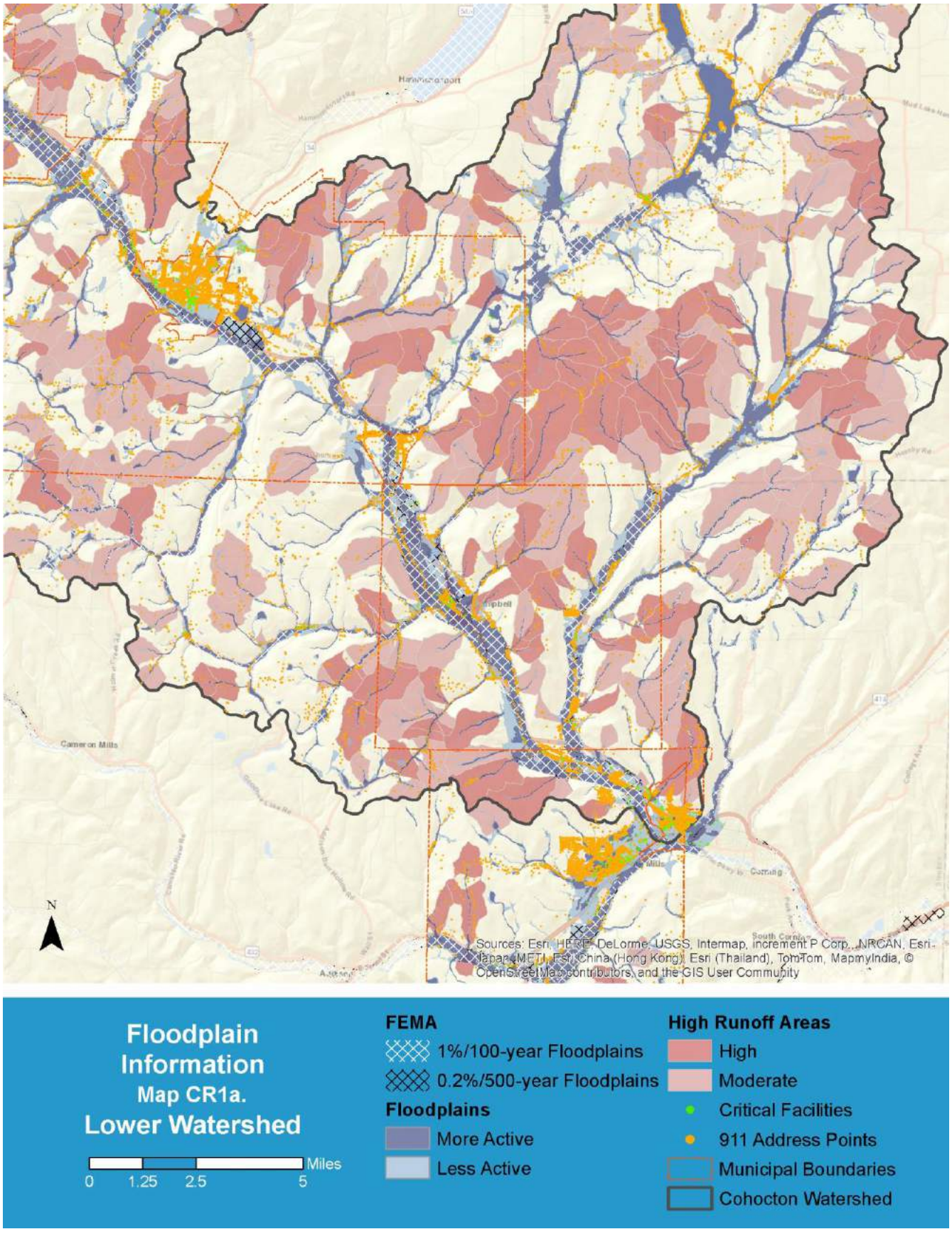
Map CR2A & B. Note particularly vulnerable areas in dark pink.

Looking at all the maps at the scale of the watershed can present some useful trends: for example, where floodplains may not be well mapped, where natural floodplain function is still intact, and where there are concentrations of vulnerable populations.

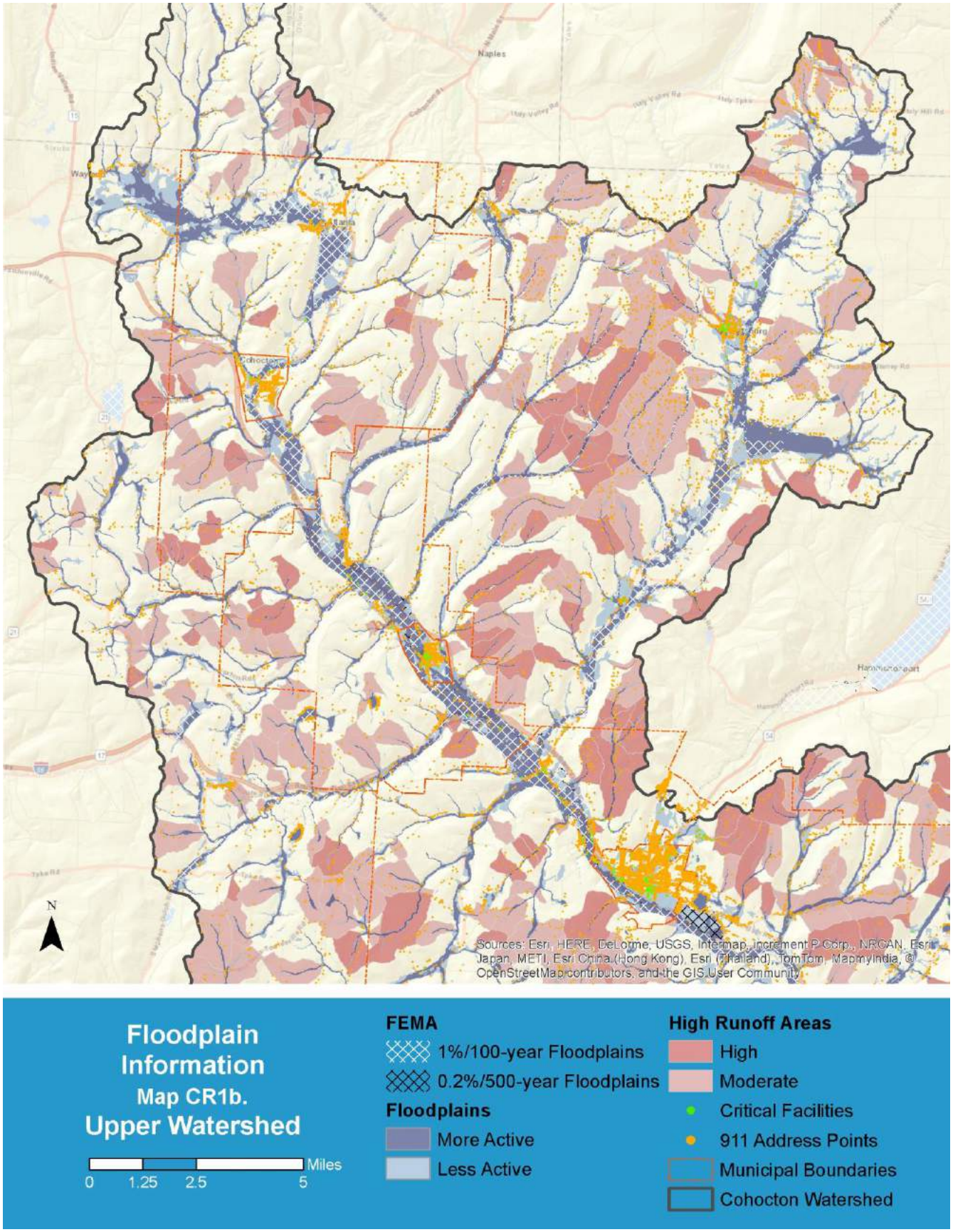
Information on How to do this: To prevent levee protected areas from being designated as high-risk flood zone by FEMA, levees need to be certified by a professional engineer or federal agency and then accredited by FEMA. If properties are designated as high-risk flood zone, many things are affected such as requirements for flood insurance coverage, the cost of flood insurance, construction standards for new development, and construction standards for substantial improvements to existing development.

Education campaigns may include workshops and/or trainings, public awareness campaigns, publicity about evacuation strategies, emergency kits for vulnerable populations, and other activities. Although some municipalities have populations that are more at-risk than others, each has vulnerable populations and residents reluctant to leave their homes when flooding occurs. Municipal officials should proactively work with personnel in senior centers, nursing homes, shelters, pre-schools, churches and daycare facilities to ensure vulnerable populations are prepared in a flooding event.

FLOODPLAIN INFORMATION CR1A



FLOODPLAIN INFORMATION CR1B



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes real time river gauges operated by the US Geological Survey (USGS) on the Cohocton, Tioga, Canisteo, and Chemung Rivers. Locally-operated Environmental Emergency Services (EES) gauges provide backup data at many USGE gauge sites (including Campbell, Bath, Avoca, Lindley, West Cameron, and Corning) and water level gauges at additional locations (including Scudder Bridge in Erwin, Addison and two sites on Meads Creek in Campbell). The National Weather Service provides daily river forecasts for the Cohocton River at Campbell, the Tioga River at Lindley, and the Canisteo River at West Cameron and provides river level forecasts as needed at Bath. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County and municipalities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R6. Identify sustainable funding for operation, maintenance and expansion of this stream and precipitation gauge network to extend periods of record and improve flood forecasting.

Where is this particularly important:

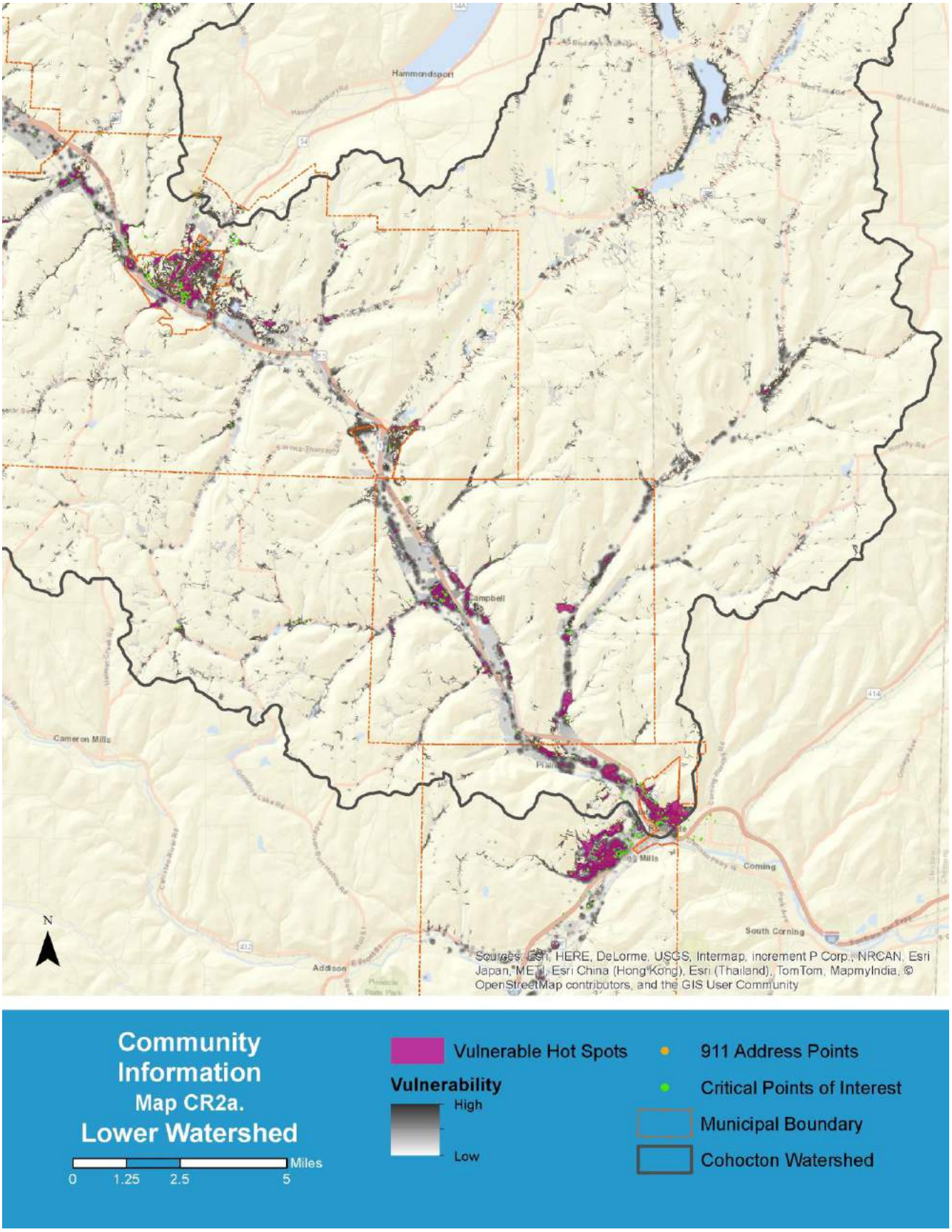
The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding.

What the map shows:

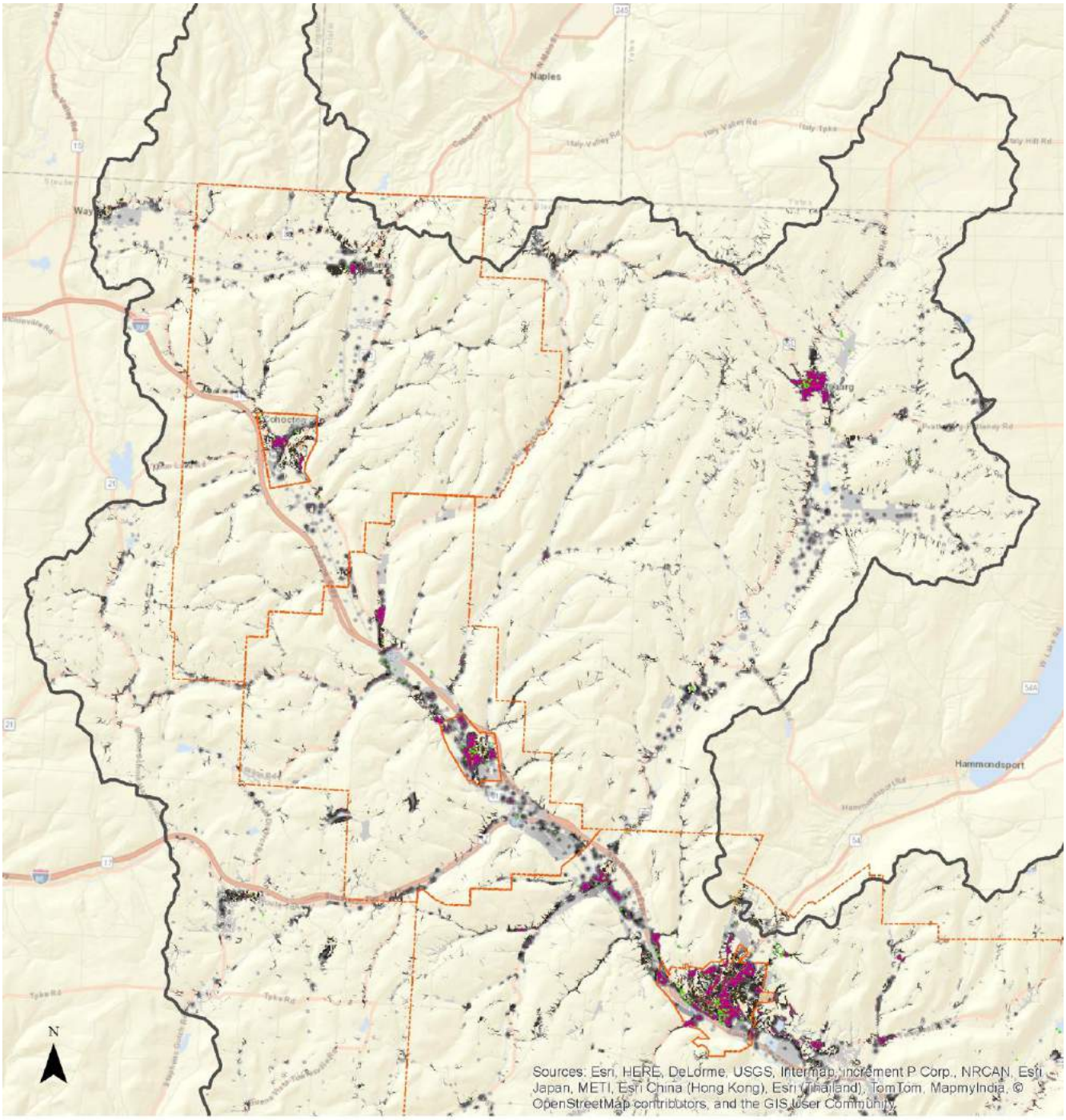
Map CR1A & B. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: EES relies on municipal, county, and private sector contributions for ongoing operation and maintenance expenses. Grant funding could enable installation of additional gauges.

COMMUNITY INFORMATION CR2A



COMMUNITY INFORMATION CR2B



Community Information
Map CR2b.
Upper Watershed

0 1.25 2.5 5 Miles

Vulnerable Hot Spots

Vulnerability
High
Low

911 Address Points
Critical Points of Interest
Municipal Boundary
Cohocton Watershed

NATURAL INFRASTRUCTURE

Why this is important: Natural floodplains and wetlands serve to reduce flood damage by acting as temporary water storage reservoirs to reduce peak flows and by acting as a buffer between people and flood flows. The Cohocton River watershed has few wetlands compared to the rest of New York State (5% of the land area in the Cohocton versus 9% on average across the state). Less than half of all mapped wetlands in the Watershed are protected to some degree by the State and only one-tenth receive the highest level of State protection. Nearly half of remaining natural floodplains receive some sort of protection either through local floodplain regulations, protection as a wetland by NYS DEC, or are in conservation ownership. Fortunately, high proportions of the watershed's floodplains and wetlands remain natural and are likely continuing to filter water and abate flooding. While NYS DEC maps and regulates wetlands larger than 12.4 acres, there are many small wetlands that provide cumulative benefits and therefore could provide cumulative impacts if they are filled.

Most mapped wetlands that lie in the jurisdictions of participating municipalities are in the upper areas of the watershed (T Cohocton) or in the tributaries (Mud Creek). Most floodplains and wetlands that could temporarily store flood flows and mitigate flooding for the "river corridor" municipalities, lie outside of their jurisdiction. Therefore, they could be greatly impacted by decisions made by upstream communities.

Recommendations:

R7. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

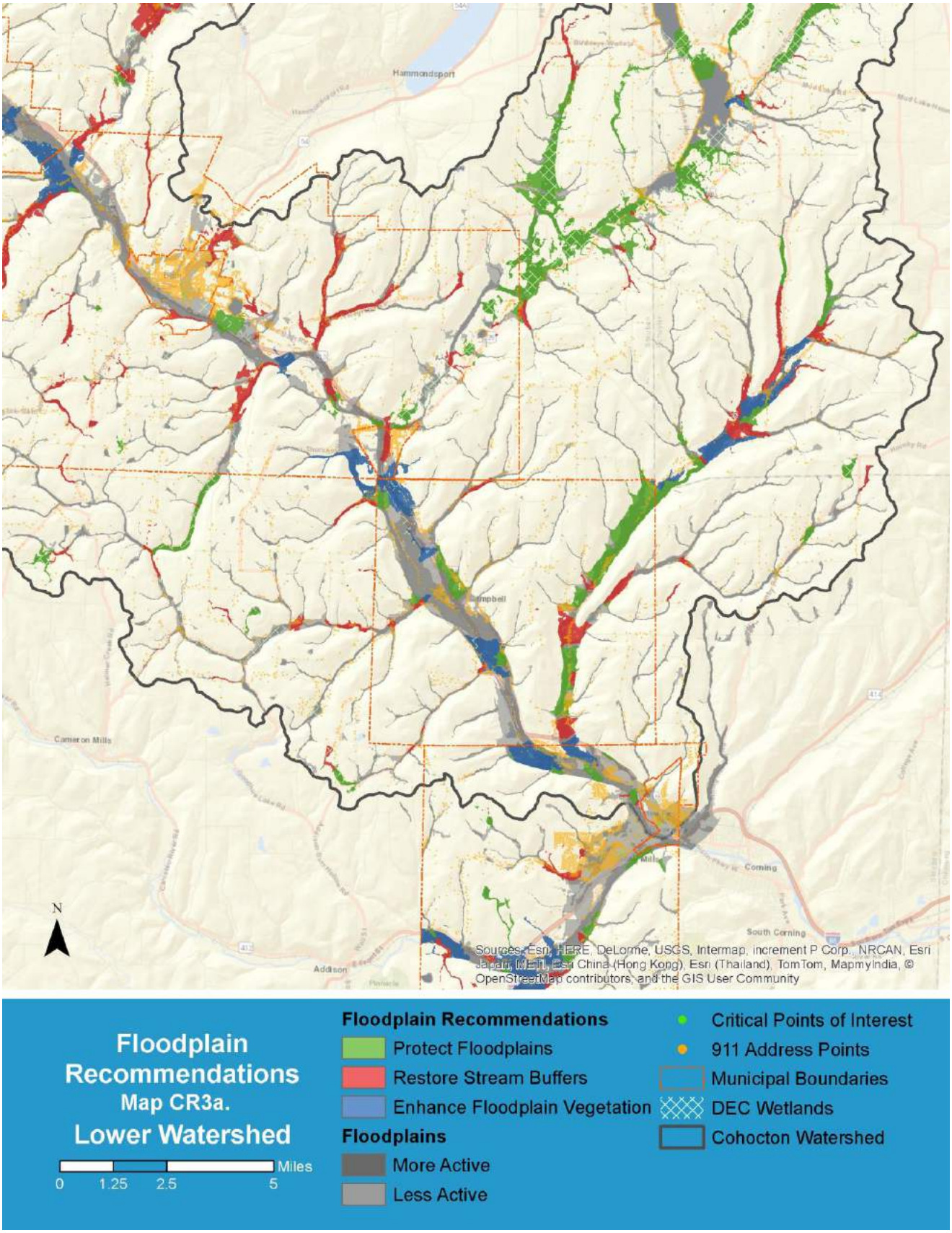
R8. Restore stream systems.

Where is this particularly important:
Wetlands and natural floodplains in Meads Creek, Mud Creek, and along the corridor of the Cohocton River in the Towns of Avoca and Cohocton.

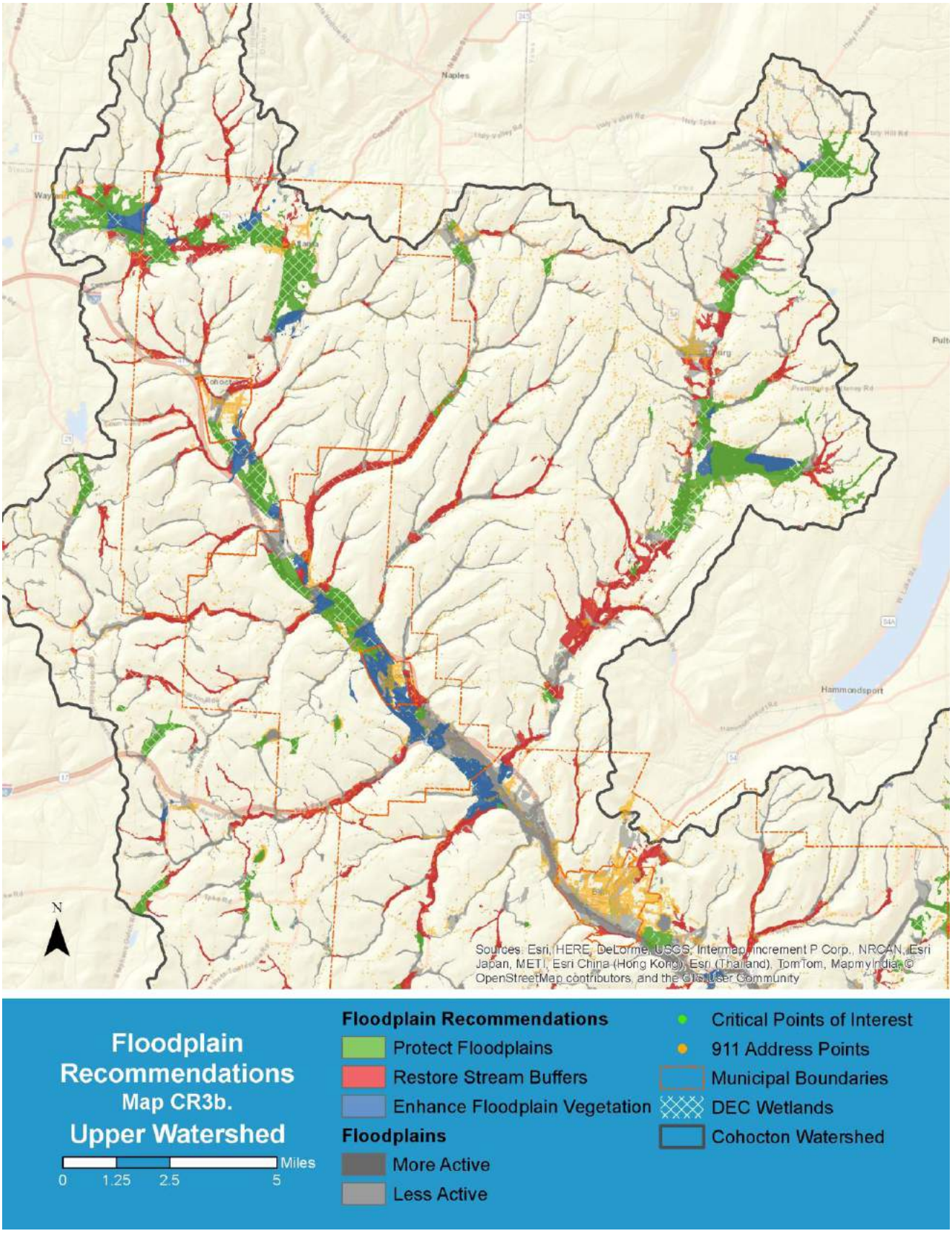
What the maps show:
Map CR3A & B. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R7) so they continue to provide that benefit (in green and blue) or restore (R8) so they can function better (in red).

Information on How to do this: There are multiple ways to protect natural floodplains and wetlands, so they continue to temporarily store flood flows and act as a buffer to keep people out of harm's way. Because water flows through one municipality into the next, upstream and downstream communities are connected by not only their flowing water, but by their land use decisions. Organizations like Southern Tier Central or Steuben County Planning can work with local governments and stakeholders to determine suitable methods for protecting or enhancing floodplains and wetlands as valuable resources. Options include acquisition or conservation easement, protective over-lay districts, zoning or local flood damage prevention laws that go above and beyond the minimum standards. Land trusts such as Finger Lakes Land Trust can work with localities and property owners to place lands in conservation ownership. Steuben County Soil and Water Conservation District could target eroding sections of streambanks for riparian buffer installation and the Upper Susquehanna Coalition could plant riparian buffers.

FLOODPLAIN RECOMMENDATIONS CR3A



FLOODPLAIN RECOMMENDATIONS CR3B



SURFACE RUNOFF

Why this is important: Several municipalities maintain stormwater systems for the more densely developed portions of their communities. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Roadways and roadside ditch networks have been shown to dramatically alter streamflows and stream channels. Hundreds of miles of ditches crisscross each watershed. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50% of rainfall in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel, turning the streams brown with each storm event. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. Right-sizing culverts is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes. It is important to note that portions of State Route 415 run along steep sections of valley wall. In rain events, a tremendous amount of sediment and debris can block culverts and wind up on the road inhibiting the ability of commuters to get to work and public transit from reaching users.

Recommendations:

R9. Support compliance with state stormwater permits for construction activities. Keep up with regular maintenance of stormwater systems and increase capacity where possible. Municipal land use regulations should require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R10. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow water flow, reduce sediment movement and encourage infiltration of water.

R11. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

R12. Target problematic portions of State Route 415 for short-term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment on the road.

Where is this particularly important:
With funding from the National Fish and Wildlife Foundation, TNC and the Susquehanna River Basin Commission will collect turbidity data in 2020 to determine which subwatersheds have high sediment loading. Until these outputs are available to focus work geographically, areas with high runoff could be targeted (CR1A & B).

What the maps show:
Map CR4A & B. Note culverts in black that were assessed for their capacity to pass streamflows. Also, note the degree of steep slopes in purple along Route 415 particularly in T. Avoca.

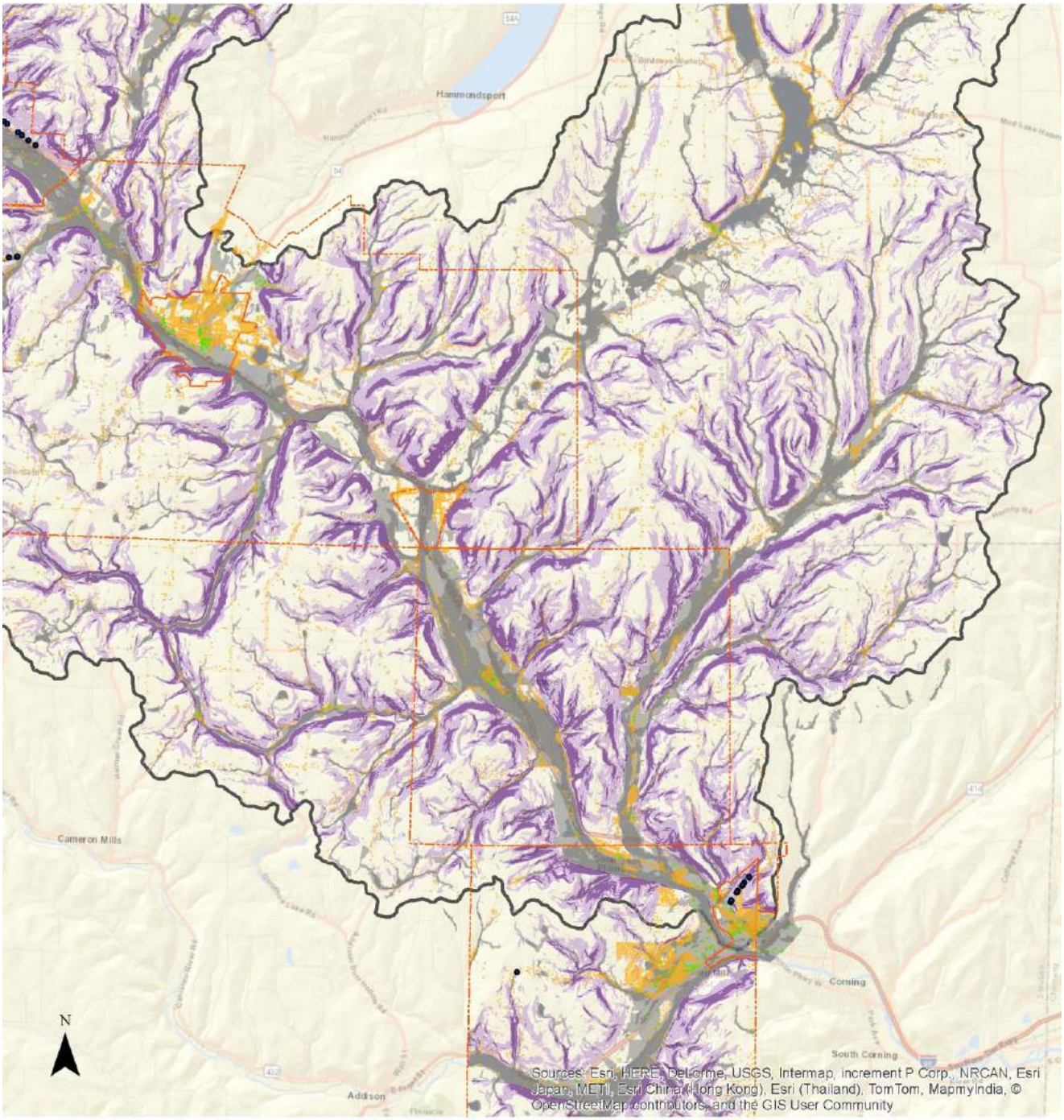
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), maintain drainage systems/storm sewers, increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

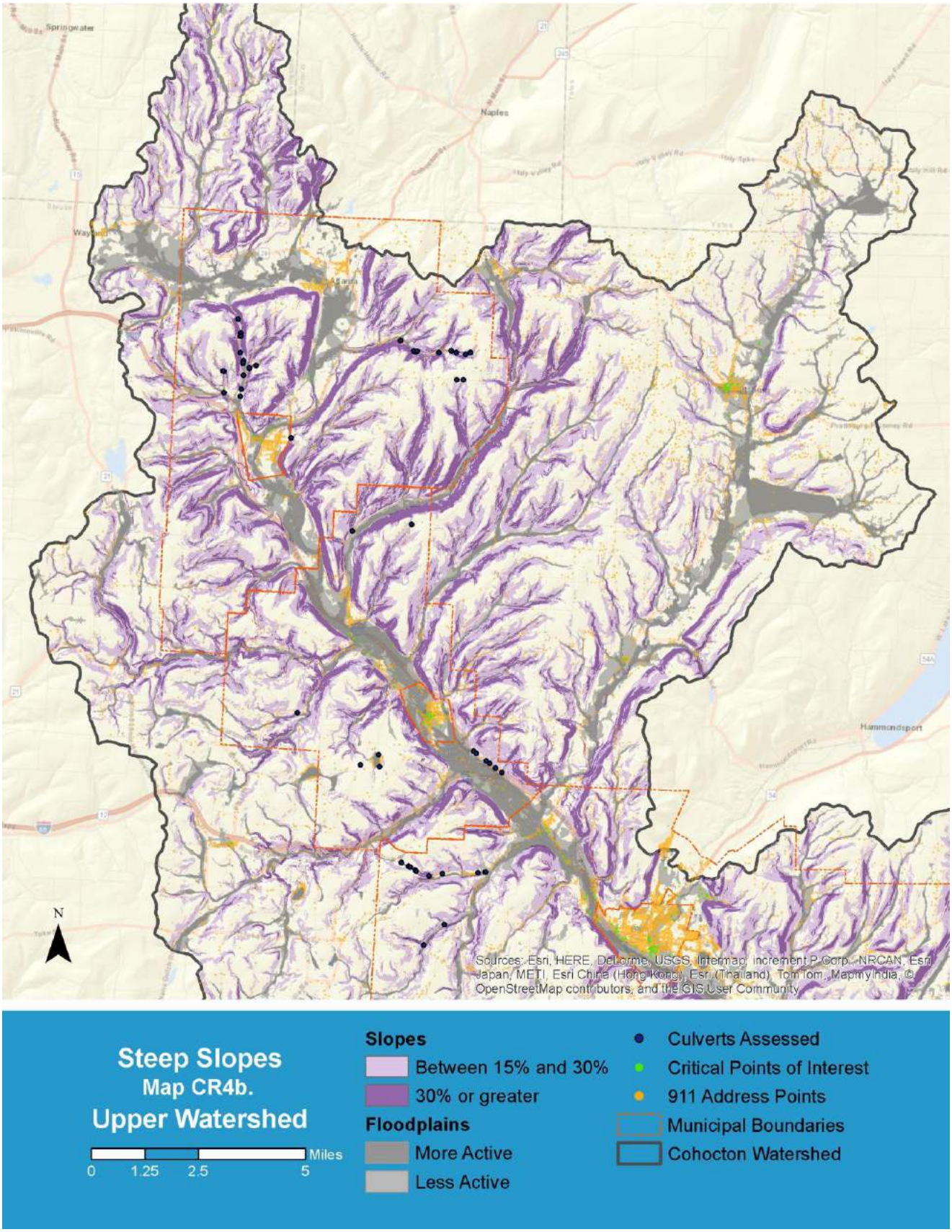
The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES CR4A



STEEP SLOPES CR4B



Town and Village of Avoca © The Nature Conservancy

COMMUNITY PROFILE

TOWN OF AVOCA

CONTENTS

Current Situation

The Town of Avoca is in north central Steuben County, New York on the upper Cohocton River. It has an estimated 2018 population of 2,218. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within the broad Cohocton River floodplain is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches and culverts causing road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from agriculture, development, roads, and timber harvesting). In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream.

Winter flooding in the broad river floodplain. Photo courtesy of Steuben County Office of Emergency Services.

While Flood Insurance Rate Maps (FIRMs) and Flood Insurance Study (FIS) reports provide readily available, baseline information, they have limitations for use as the sole means of estimating areas at risk because floodplains were not mapped for many streams and the maps are old. A section along the Cohocton River and Goff Creek was revised in 1992, but most of the map panels and studies have not changed since 1983. For example, there are numerous streams for which FEMA did not map flood hazards. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Town better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The last Comprehensive Plan adopted by the Town was in 1973 and mentions the then-recent 1972 flood, but pre-dates floodplain mapping and floodplain management strategies for preventing flood damage The Town adopted a “Local Law for Flood Damage Prevention” in 1992 (Local Law No. 1 of 1992). This law establishes standards for floodplain development but does not prevent development in areas that are at risk of flooding, does not address flooding and erosion risks outside of the FEMA-mapped floodplains, and does not reflect more recent changes to the NYS Model Local Law and the NYS Uniform Code. The Town’s Zoning regulations were adopted in 1989, with a 50-foot stream setback requirement for buildings.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains (Table TA1). The town is identified as an "economic hotspot" due to its high concentration of economically valuable assets that could be impacted by a flooding event.[1] The town also has a number of residential structures built before the first FIRMs were adopted by the Town which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. Additionally, agricultural lands in some areas are vulnerable to flooding or erosion damage from nearby waterways.

The Village of Avoca has approximately three miles of earthen levee that should be evaluated and certified by an engineer and then accredited by FEMA. Without this accreditation, levee protected areas will be designated as high-risk flood zone, which could impact the Town, as some of its municipal services are housed in structures protected by the levee.

Road damage due to flooding. Photo courtesy of Steuben County Office of Emergency Services.

Table TA1. A comparison of assessed values across land use categories within the Town of Avoca. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed value of $10.4 million	Assessed value of $4.3 million
Residential	181 structures assessed at $47.3 million	49 structures assessed at $1.9 million
Businesses	6 businesses with an estimated economic output of $16.6 million	4 businesses with an estimated economic output of $15.8 million
Agriculture	Assessed value of $266,700	Assessed value of $99,000

A Path Forward

Through the Flood Smart Approach, the Town of Avoca (T. Avoca) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1) of which T. Avoca gave the highest prioritization to 15. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table TA2 cross-walks the goals with Core Team recommendations and T. Avoca's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table TA2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources	**A1ai, di**		**A3ci**		
R2. Assess municipal facilities and mitigate	**A1ai**		**A3ci**	**A4ai, ii**	
R3. Educate & assist residents		**A2di, ii**		**A4ai, ii; A4bi**	
R4. Educate & assist businesses		**A2di, ii**		**A4ai, ii; A4bi**	
R5. Collaborate with agriculture					**A5cii**
R6. Protect remaining undeveloped floodplains			**A3di, ii**	**A4bi**	
R7. Protect & restore forested riparian buffers		**A2ai;**			**A5bi, ii, iii; A5cii**
R8. Seek assistance on stream maintenance		**A2ai**			
R9. Contribute funding to EES for gauges			**X**		
R10. Use forecasts & gauge data in plans			**X**		
R11. Limit or avoid development in most risky places		**A2ai**	**A3di, ii**	**A4bi**	**A5bi, iii; A5cii**
R12. Use standards to improve flood safety			**A3di**		
R13. Comply with state stormwater permits					**X**
R14. Limit land use on steep slopes			**A3di, ii**	**A4ai, ii; A4bi**	
R15. Modify roadside ditch cleaning practices				**A4bi**	
R16. Right-size road stream crossings			**A3ci**		**A5bi, ii, iii**

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: T. Avoca has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is imperative that first responders and service organizations can provide emergency assistance.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

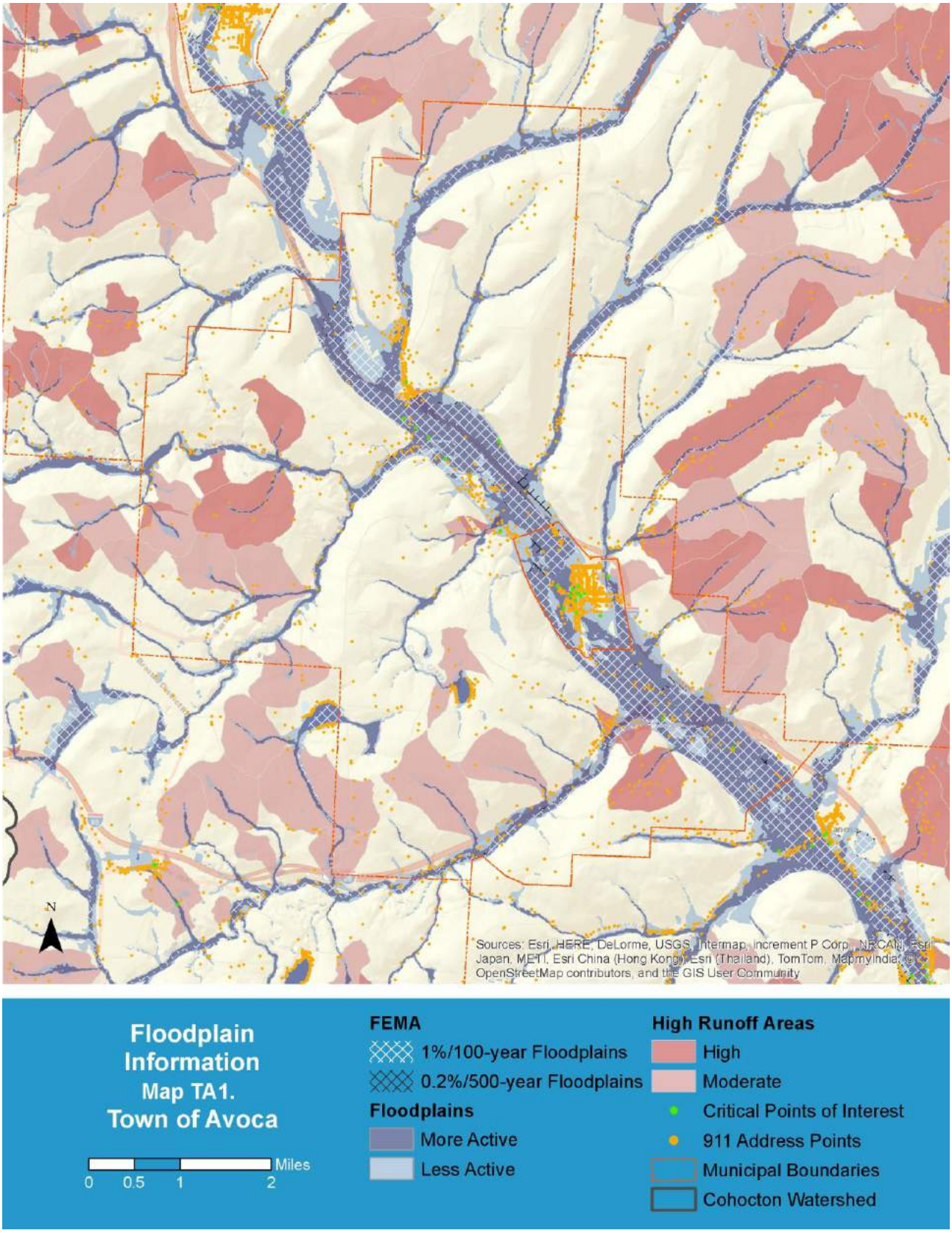
Town Hall, Wallace Fire Department (lies just outside of FEMA-mapped floodplain), NYSEG Wallace substation, the Agway storage tank, and municipal water lines and drinking water facilities.

What the maps show:

Map TA1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green. Map TA2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants (Chapter 3 Toolkit).

FLOODPLAIN INFORMATION TA1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: 86% of the Town's vulnerable assets are properties categorized as residential (70%) or industrial (16%). Given that only one-quarter of residential assessed value is in FEMA floodplains, approximately three-quarters of that vulnerable residential development is in places not covered by floodplain development standards and unlikely to be covered by flood insurance. This means that far more homes are at risk than the FEMA floodplains might indicate which the Town should consider in its plans, ordinances and emergency response.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

Where is this particularly important:

Particularly vulnerable areas[4] include the neighborhood at the intersection of 12 Mile Creek Rd/County Route 9 and Route 415, portions of Wallace, the area just north of the intersection of W. Creek Rd. and Cook Rd., the intersection of Reservoir Rd and Route 415, and the area around the intersection of County Route 70A and Bouten Rd.

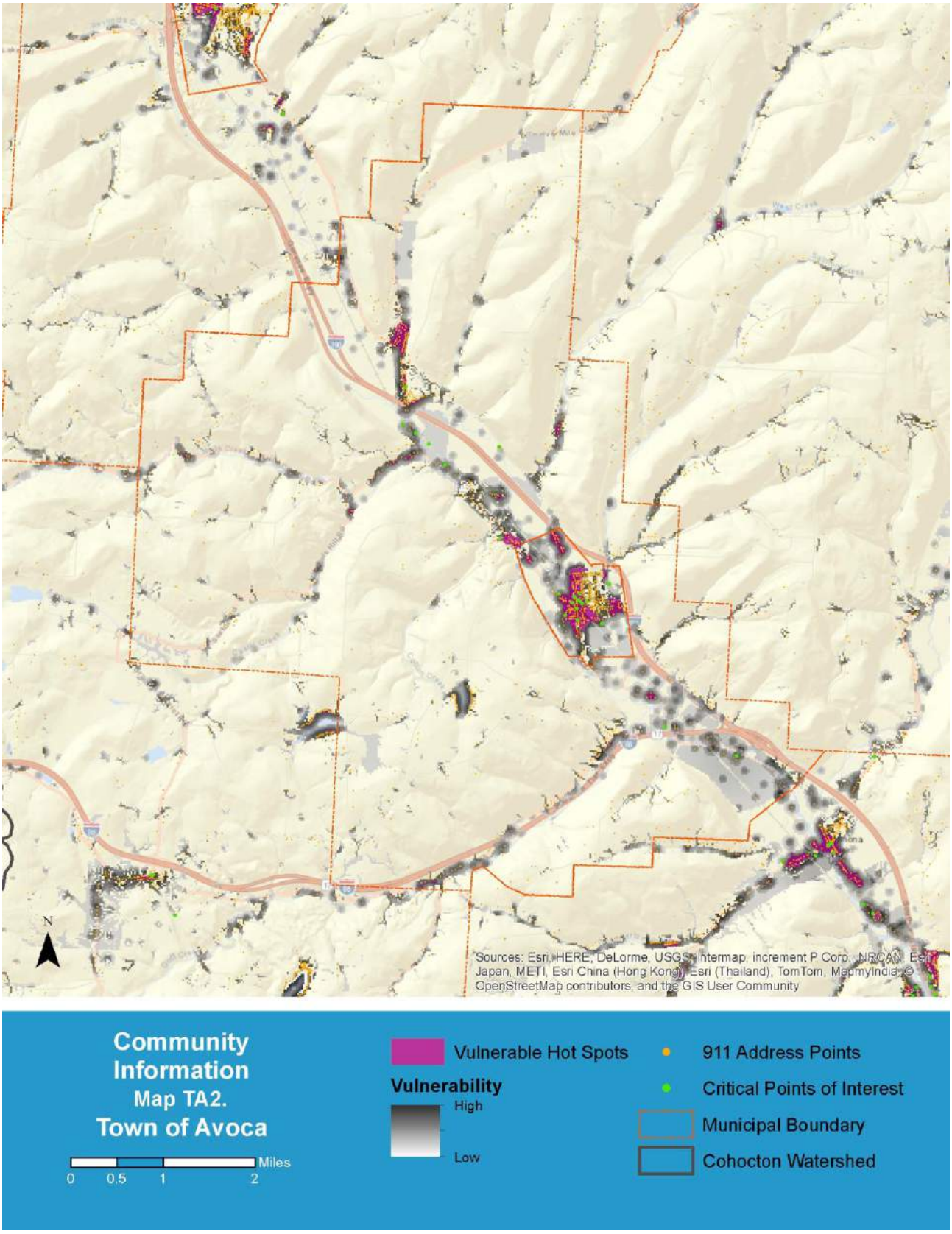
What the maps show:

Map TA2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Industrial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

COMMUNITY INFORMATION TA2



COLLABORATION WITH AGRICULTURE

Why this is important: Agriculture is a dominant land use and economic engine for municipalities throughout Steuben County, particularly in T. Avoca, T. Cohocton and T. Bath. Although farming can be a beneficial use of flood-prone areas, this results in farms and agricultural operations that are vulnerable to flooding and erosion damage. In addition, municipal representatives have noted instances where runoff from and erosion to agricultural land contributes to flooding.

Recommendation:

R5. Collaborate with the agricultural sector to identify, fund, and implement agricultural drainage practices that reduce damage to farmland, roads, streambanks, and neighboring properties.

Information on How to do this: Use of best management practices that reduce surface runoff can increase landscape resilience during droughts and decrease peak streamflows during floods. While these benefits can be critical to farmers experiencing increasing intense rain events, they can also benefit downstream communities. Practices include drainage swales, cover crops, conservation tillage, fencing livestock out of streams (with alternate watering sites if needed), establishing stable livestock stream crossing sites, stream buffers, buffers along road ditches, and wetland restoration. Town officials can identify funding (including USDA Farm Service Agency conservation programs) to implement strategies to reduce flood vulnerability of agricultural lands, protect stream functions, and mitigate surface runoff onto roads. The Steuben County Soil and Water Conservation District (SWCD) and the Upper Susquehanna Coalition may be able to assist with implementation.

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. Because of the high energy of this system, places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

During the October 2018 Stream Management Dialogue, municipal officials indicated that natural debris in streams is problematic because it alters flood patterns. Challenges include poor understanding of the permit process for stream debris removal; not knowing the areas most impacted by stream debris; not knowing best practices when it comes to stream maintenance and debris management; and lack of resources to do the work.

Recommendations:

R6. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R7. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

R8. Proactively seek assistance from, and collaborate with, the DEC, SWCD, the Steuben County Planning Department and Southern Tier Central on stream maintenance.

Where is this particularly important:

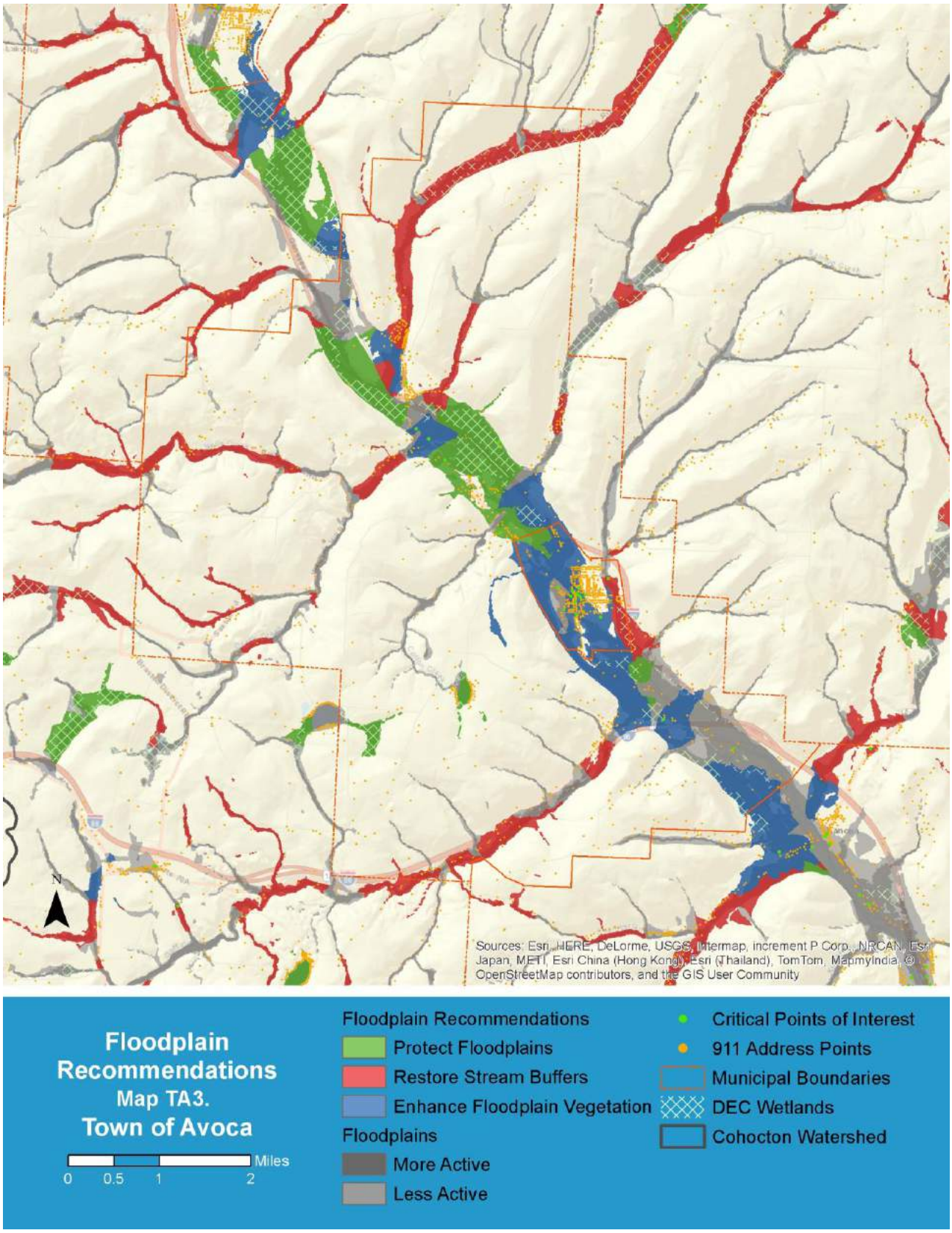
Tributaries such as West Creek, Michigan Hollow Creek, and the unnamed streams along Bauter Rd and Avoca Wheeler Rd. Areas along the Cohocton River itself.

What the maps show:

Map TA1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map TA3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R6) so they continue to provide that benefit (in green and blue) or restore (R7) so they can function better (in red).

Information on How to do this: T. Avoca should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the town from surrounding jurisdictions, T. Avoca should also work with upstream communities, like Towns of Cohocton and Wheeler, to determine suitable methods for protecting or enhancing floodplains and wetlands. Local land trusts or state agencies may partner to protect these valuable resources. The Town could work with partners like SWCD to install riparian buffers along West Creek, Michigan Hollow Creek, as well as ephemeral channels that flow down steep valley sides along Route 415. To tackle stream maintenance, Town officials could work with the DEC Regional Permit Administrator and its Division of Fish and Wildlife to help residents determine appropriate DEC contacts and whether a permit is necessary for debris removal (including assistance with state-regulated wetland or trout stream data). Officials could also distribute a pamphlet on debris management to property owners, which Southern Tier Central has developed.

FLOODPLAIN RECOMMENDATIONS TA3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream level gauges currently includes a real time river gauge at Avoca and two downstream in Bath and Campbell, which are operated by the US Geological Survey (USGS) with locally-operated Environmental Emergency Services (EES) gauges providing backup data at each site. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath, which support flood warnings for the entire river. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County and municipal governments are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R9. Contribute funding to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R10. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map TA1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Town regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R11. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R12. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map TA1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Town has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited, or the existing floodplain overlay district could require additional considerations before approving floodplain development proposals. The Town could enact site plan review and subdivision criteria that discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R13. Support compliance with state stormwater permits for construction activities. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R14. Limit land use on steep slopes (>15%).

R15. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R16. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map TA4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

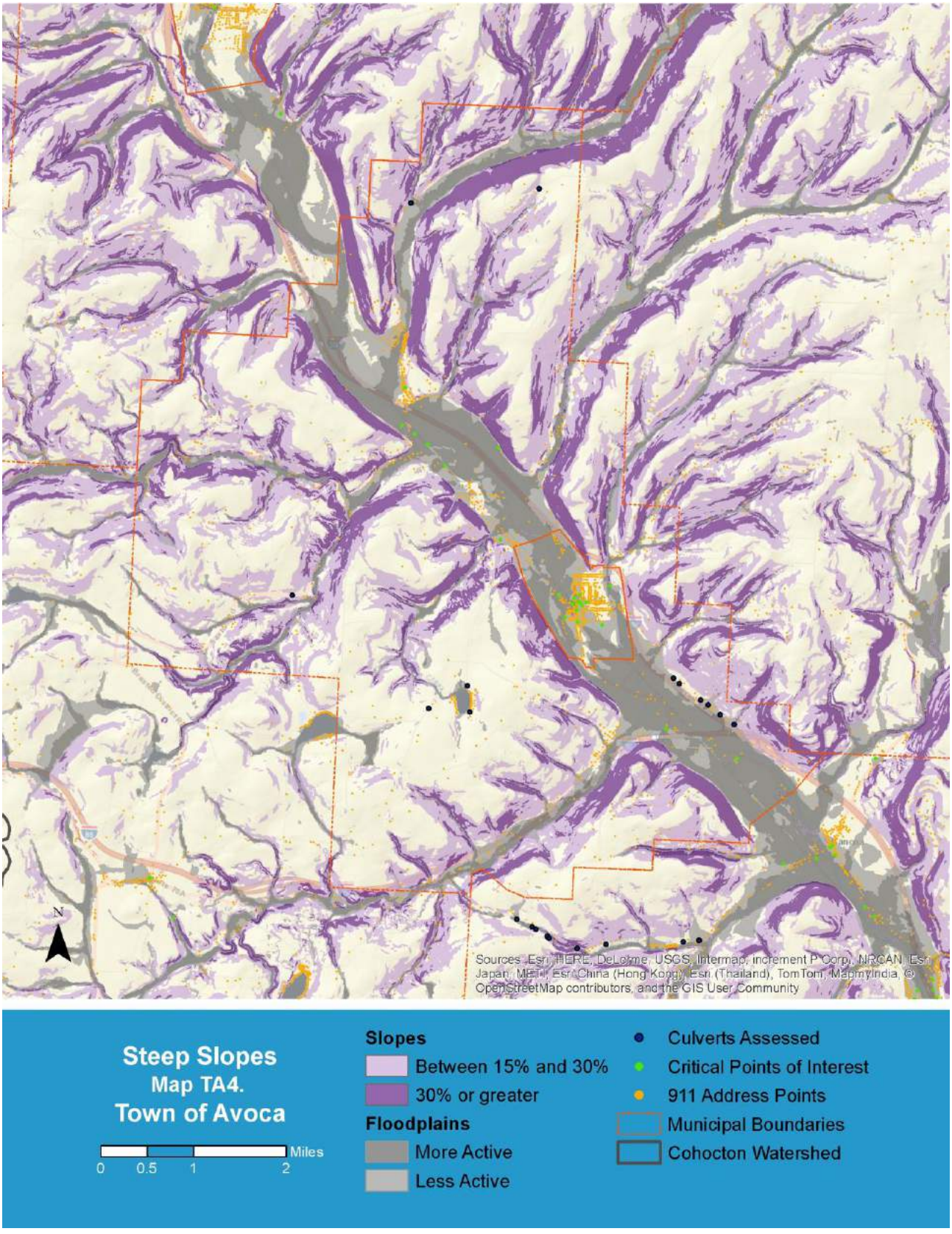
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES TA4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by T. Avoca. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. HIGH - Seek alternate locations and funding to relocate critical functions such as the Coopers Plains Fire Department.	**Co-Benefits:** Goal 2 – Relocating facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**Toolkit reference, online resources:** 1.2B, 1.3A
A1di. HIGH Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emergency assistance.	**Co-Benefits:** Goal 3 – This is important information to include in emergency planning to improve collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. HIGH Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. HIGH Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years). **A2dii.** HIGH When mitigation funding is announced, contact owners of high-risk structures to assess interest in a mitigation application. Apply for funding as warranted.	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Conduct asset planning for highways and other municipal services, including assessment of the vulnerability to flooding.	**Toolkit reference, online resources:** 3.2B, 3.7B, 3.9A
A3ci. HIGH Conduct a flood vulnerability assessment and develop a plan for improving flood resiliency for highway departments and other municipal services.	**Co-Benefits:** Goal 1 – Improving flood resiliency not only reduces flood impacts to municipal assets but also enables continuity of municipal services. Goal 3 – Important information to include in emergency planning.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3di. HIGH Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards. **A3dii.** HIGH Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4ai. HIGH Convene an inter-municipal flood education task force to develop an outreach strategy with targeted messages, audiences, and outreach methods. **A4aii.** HIGH Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Train municipal boards and elected officials on floodplain management regulations.	**Toolkit reference, online resources:** 2.2A, 2.2B, 2.2C, 2.2D, 2.2E, 2.4B
A4bi. HIGH Participate in training about floodplain management, stormwater management, road drainage, use of mapping tools, and other natural resource topics, which are periodically offered at STC Regional Leadership Conference, Planning School, Cornell Local Roads Highway School, and other venues. Supplement this with additional interactive training at municipal Planning Board meetings.	**Co-benefits:** Goal 2 – This type of training is intended to result in informed decisions that reduce property damage. Goal 3 – Knowledge of regulations results in more effective and consistent enforcement. Goal 5 – Effective enforcement of regulations can encourage maintaining a buffer of natural floodplains between people and floods.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. HIGH Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** HIGH Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** HIGH Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5cii. HIGH Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy

Kanona, Town of Bath © The Nature Conservancy

COMMUNITY PROFILE

TOWN OF BATH

CONTENTS

Current Situation

The Town of Bath is in north central Steuben County, New York on the Middle Cohocton River. It has an estimated 2018 population of 12,230. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within the broad river floodplain is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches and culverts causing road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture). In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream.

2014 flooding in Kanona, Town of Bath. Photo courtesy of Steuben County Office of Emergency Services.

The FEMA maps used to regulate floodplain development do not reflect current flood hazards because floodplains were not mapped for many streams and the areas that were mapped have not been updated since 1983. For example, there are numerous streams, such as the upstream reaches of Campbell Creek, for which FEMA did not map flood hazards. Consequently, vulnerability assessments limited to only FEMA -mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Town better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The Town adopted its "Local Law for Flood Damage Prevention" in 1983 (L.L. No. 1-1983) and amended it in 1987 (L.L. No. 3-1987). This law establishes standards for development in FEMA-mapped floodplains but does not prevent development in areas that are at risk of flooding, does not address flooding and erosion risks outside of the FEMA-mapped floodplains, and does not reflect more recent changes to the NYS Model Local Law and the NYS Uniform Code. The Town of Bath does not have zoning and the existing land use code does not effectively discourage or prohibit vulnerable uses of floodplains or in erosion hazard areas along streams. The Town's 2008 Comprehensive Plan effectively addressees flood risks, but recommendations have not been fully implemented. The Town of Bath does not have an emergency response plan in place. Town officials are concerned about fuel tanks at residential and non-residential structures in flood-prone areas. Because floodplain development permits are not generally requested for installation of propane and heating oil tanks, there is a concern that many may not be installed to resist flood damage.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The town is identified as a "structural hotspot" (Table TB1) due to its high concentration of structures built before the first Flood Insurance Rate Maps were adopted by the Town, which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The town is also identified as an "economic hotspot" (Table TB1) due to its high concentration of economically valuable assets that could be impacted by a flooding event.[1] Although farming can be a beneficial use of flood-prone areas, this results in agricultural lands that are vulnerable to flooding or erosion damage from nearby waterways.

The Town and Village of Bath have approximately three miles of earthen levee that should be evaluated and certified by an engineer and then accredited by FEMA. Without this accreditation, levee protected areas will be designated as high-risk flood zone. Although most of the development protected by the levee is within the Village of Bath, this protection extends into the town southeast of the Village limits.

The Bath Veterans Affairs Medical Center provides jobs and services for Bath and surrounding communities. © The Nature Conservancy

Table TB1. A comparison of assessed values across land use categories within the Town of Bath. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	892 structures assessed at $53.7 million	214 structures assessed at $31.9 million
Residential	532 structures assessed at $13 million	116 structures assessed at $2.5 million
Businesses	20 businesses with an estimated economic output of $47 million	8 businesses with an estimated economic output of $30 million
Agriculture	15,000 acres assessed at $700,000	5,000 acres assessed at $71,800

A Path Forward

Through the Flood Smart Approach, the Town of Bath (T. Bath) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1) of which T. Bath gave the highest prioritization to nine and medium to 20. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table TB2 cross-walks the goals with Core Team recommendations and T Bath's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table TB2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources		A2di	A3ci		
R2. Assess municipal facilities and mitigate	A1aii; A1bi	A2di	A3ci	A4ai, ii	
R3. Educate & assist residents	A1aii	A2ci; A2di; A2eiii; A2fi, ii	A3ai	A4ai, ii	
R4. Educate & assist businesses	A1aii	A2ci; A2di; A2eiii; A2fi, ii	A3ai	A4ai, ii	
R5. Educate & assist in levee protected areas		A2ci; A2eiii	A3ai	A4div	
R6. Collaborate with agriculture					A5ci
R7. Protect remaining undeveloped floodplains		A2ai	A3bi		A5bi, ii, iii; A5cii
R8. Protect & restore forested riparian buffers		A2ai			A5bi, ii, iii; A5cii
R9. Seek assistance on stream maintenance					A5ai
R10. Contribute funding to EES for gauges			X		
R11. Use forecasts & gauge data in plans	A1bi		A3ei		
R12. Limit or avoid development in most risky places		A2ai; A2bi, ii; A2ci	A3bi; A3dii		A5cii
R13. Use standards to improve flood safety		A2bii; A2ci	A3di		
R14. Comply with state stormwater permits					A5ci
R15. Limit land use on steep slopes				A4ai, ii	A5cii
R16. Modify roadside ditch cleaning practices	X				X
R17. Right-size road stream crossings			A3ci		A5bi, ii

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: T. Bath has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is imperative that first responders and service organizations can provide emergency assistance.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

Family Life Ministries, a communication tower, the NYSEG Kanona sub station, All Season Towing, NYS Police Bath Barracks, Gulf Gas Station, an emergency landing zone, the Bath sewage treatment plant, municipal water lines, and municipal drinking water facilities are at risk of flooding.

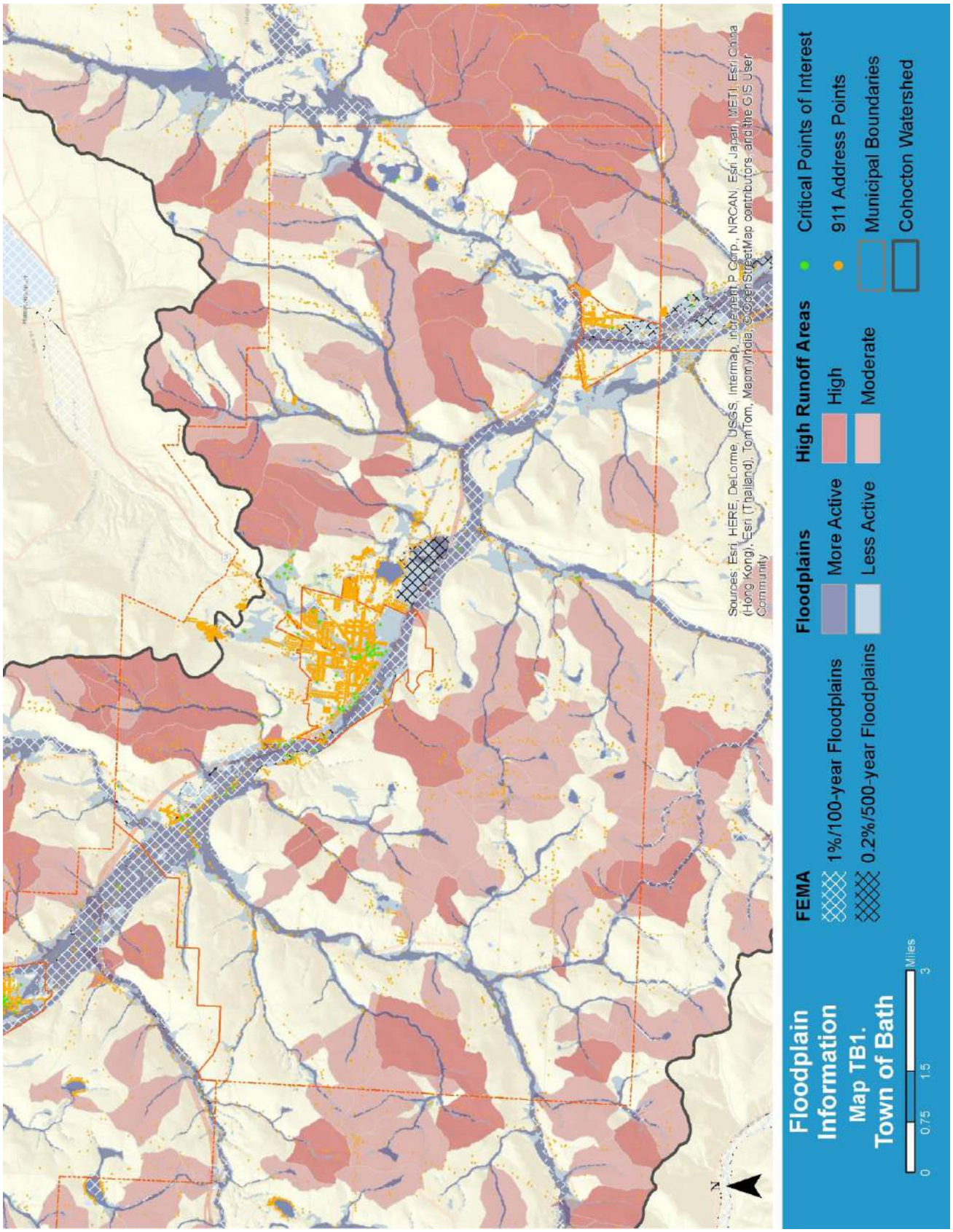
What the maps show:

Map TB1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green.

Map TB2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants (Chapter 3 Toolkit).

FLOODPLAIN INFORMATION TB1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: More than half of the Town's assets that are vulnerable to flooding are properties categorized as residential or commercial. Approximately 80% of that vulnerable residential and commercial development is in floodplains not mapped by FEMA which means it is not likely covered by floodplain development standards or by flood insurance. Additionally, 86% of the value in FEMA floodplains is attributed to properties that are categorized as providing a community service, services that may be needed in helping Town residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

R5. Educate and assist residents and business owners in levee protected areas to act to reduce their flood vulnerability.

Where is this particularly important:

Particularly vulnerable areas[4] include portions of Kanona, Spaulding Drive at Route 415, the Veteran's Administration, Faucett Road at Route 415, and Quinn Road at Telegraph Road.

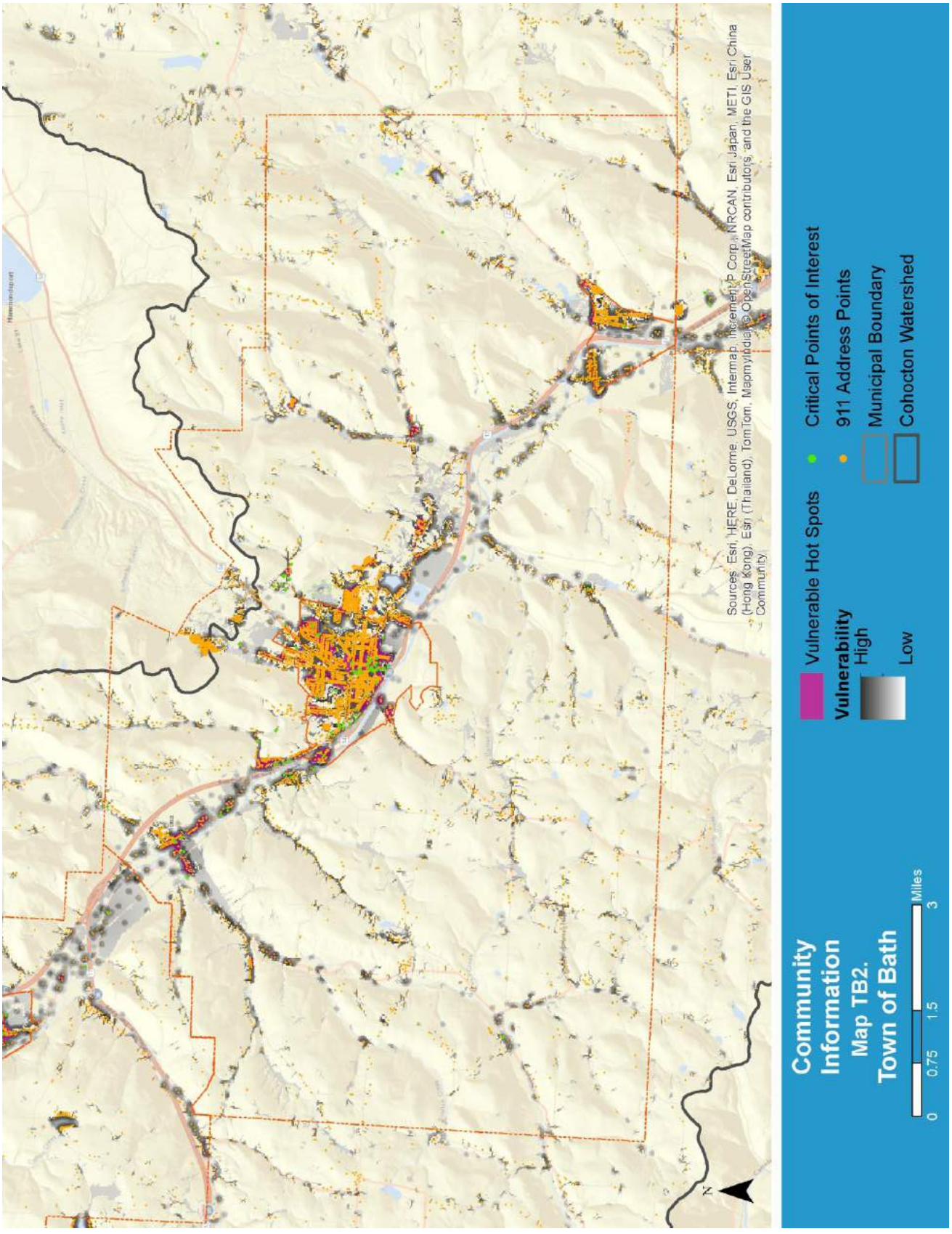
What the maps show:

Map TB2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

COMMUNITY INFORMATION TB2



COLLABORATION WITH AGRICULTURE

Why this is important: Agriculture is a dominant land use and economic engine for municipalities throughout Steuben County, particularly in T. Avoca, T. Cohocton and T. Bath. Although farming can be a beneficial use of flood-prone areas, this results in risks to farms and agricultural operations that are vulnerable to flooding and erosion damage. In addition, municipal representatives have noted instances where runoff from and erosion to agricultural land contributes to flooding.

Recommendation:

R6. Collaborate with the agricultural sector to identify, fund, and implement agricultural drainage practices that reduce damage to farmland, roads, streambanks, and neighboring properties.

Information on How to do this: Use of best management practices that reduce surface runoff can increase landscape resilience during droughts and decrease peak streamflows during floods. While these benefits can be critical to farmers experiencing increasing intense rain events, they can also benefit downstream communities. Practices include drainage swales, cover crops, conservation tillage, fencing livestock out of streams (with alternate watering sites if needed), establishing stable livestock stream crossing sites, stream buffers, buffers along road ditches, and wetland restoration. Town officials can identify funding (including USDA Farm Service Agency conservation programs) to implement strategies to reduce flood vulnerability of agricultural lands, protect stream functions, and mitigate surface runoff onto roads. The Steuben County Soil and Water Conservation District (SWCD) and the Upper Susquehanna Coalition may be able to assist with implementation.

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. Because of the high energy of this system, places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

During the October 2018 Stream Management Dialogue, municipal officials indicated that natural debris in streams is problematic because it alters flood patterns. Challenges include poor understanding of the permit process for stream debris removal; not knowing the areas most impacted by stream debris; not knowing best practices when it comes to stream maintenance and debris management; and lack of resources to do the work.

Recommendations:

R7. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alterations of floodplains.

R8. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

R9. Proactively seek assistance from, and collaborate with, the DEC, SWCD, the Steuben County Planning Department and Southern Tier Central on stream maintenance.

Where is this particularly important:

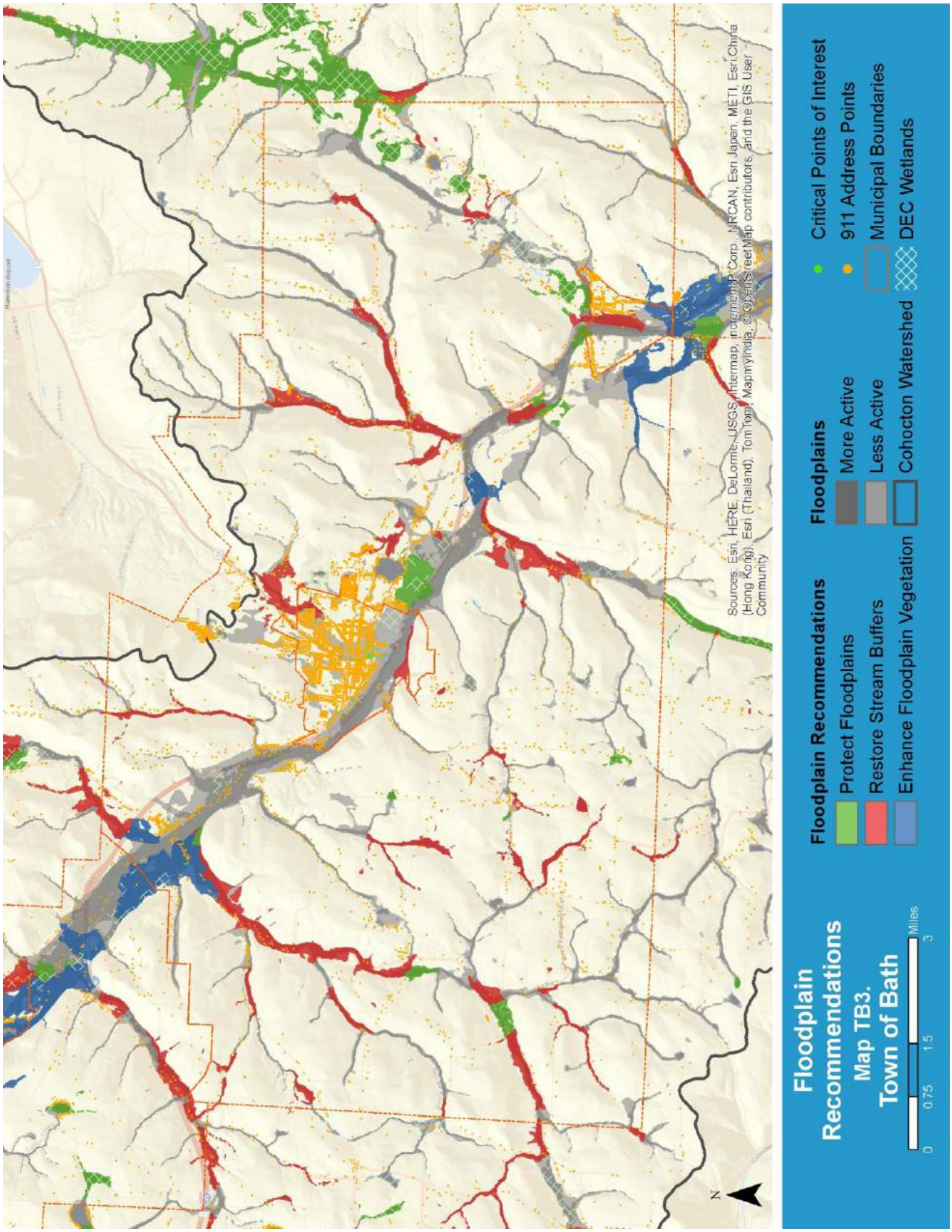
Tributaries such as Stocking, Campbell, and particularly Fivemile Creeks have steep watersheds and narrow valleys. It is important to note that farm fields on the boundary of the Town and Village of Bath between Route 54 and Rumsey Street (southwest of the Steuben County Jail) are critical to the infiltration of large amounts of surface runoff. Development placed on this land would be at extreme risk of flooding and potentially cause problems for adjacent areas if this infiltration function is impeded.

What the maps show:

Map TB1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map TB3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R7) so they continue to provide that benefit (in green and blue) or restore (R8) so they can function better (in red).

Information on How to do this: T. Bath should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the Town from surrounding jurisdictions, T. Bath should also work with upstream communities, like Towns of Avoca and Wheeler, to determine suitable methods for protecting or enhancing floodplains and wetlands. Local land trusts or state agencies partner to protect these valuable resources. The Town could work with partners like SWCD to install riparian buffers along Campbell Creek and Smith Run. To tackle stream maintenance, Town officials could work with the DEC Regional Permit Administrator and its Division of Fish and Wildlife to help residents determine appropriate DEC contacts and whether a permit is necessary for debris removal (including assistance with state-regulated wetland or trout stream data). Officials could also distribute a pamphlet on debris management to property owners, which Southern Tier Central is developing.

FLOODPLAIN RECOMMENDATIONS TB3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes a real time river gauge at the Bath VA, one upstream in Avoca, and a downstream gauge in Campbell, which are operated by the US Geological Survey (USGS) with locally-operated Environmental Emergency Services (EES) gauges providing backup data at each site. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County, T. Bath and other communities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R10. Continue the Town's contributions to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R11. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map TB1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Town regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R12. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R13. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map TB1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Town has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning, which the Town of Bath does not currently have, could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited, or a floodplain overlay zone could require additional considerations before approving floodplain development proposals. The Town could enact a stream setback requirement (for example to restrict building construction within 100 feet of a stream). Existing site plan review and subdivision criteria could be strengthened to discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R14. Support compliance with state stormwater permits for construction activities. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R15. Limit land use on steep slopes (>15%).

R16. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R17. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map TB4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

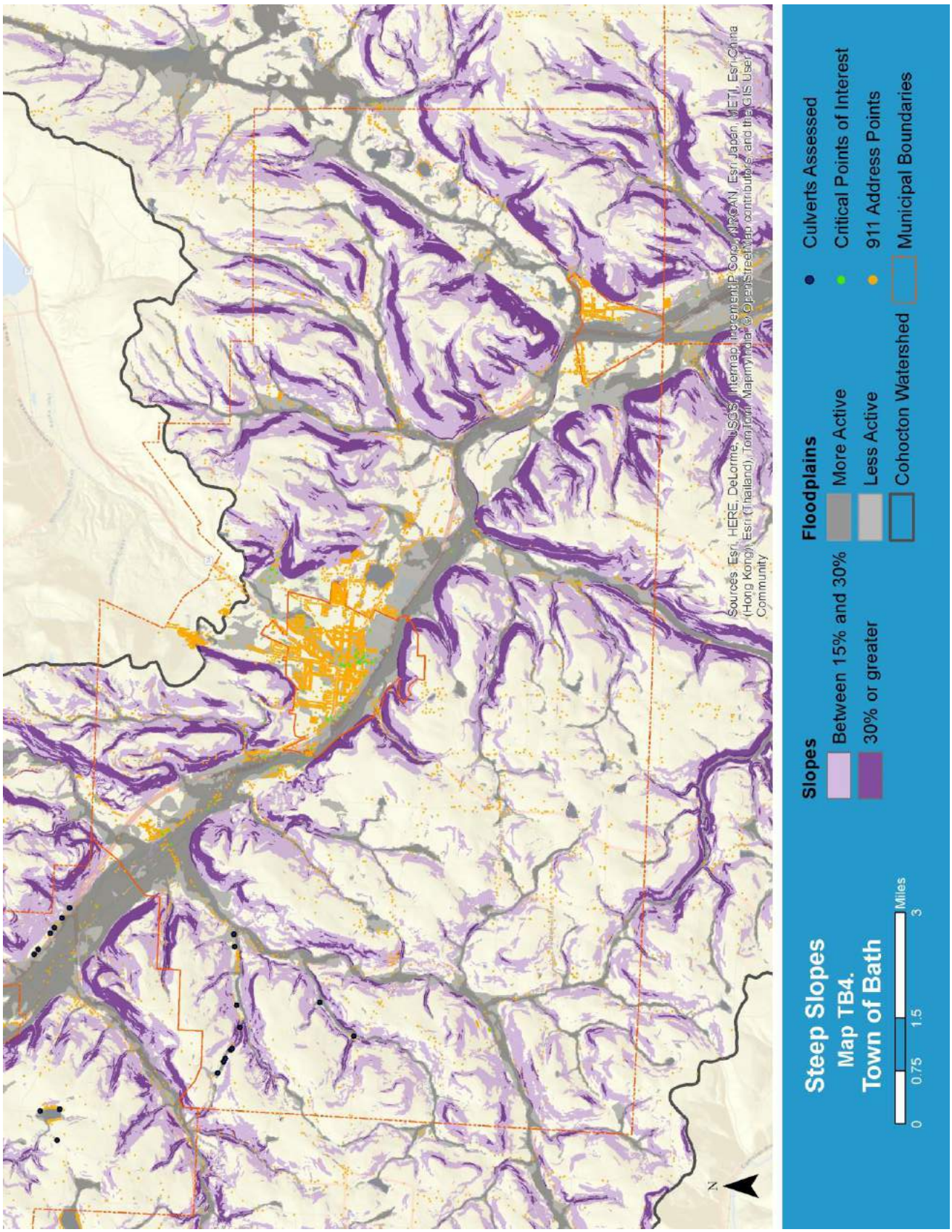
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES TB4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by T. Bath. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1aii. HIGH Assess flood vulnerability, identify mitigation options (such as elevating vulnerable equipment), and implement any warranted measures, for: Public water systems and public sewer systems.	**Co-Benefits:** Goal 2 – Mitigating flooding for facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.3B, 1.4B, 1.5A, 1.5B, 1.6A, 1.6B, 1.6C, 1.7A, 1.8A, 1.9A
A1bi. HIGH Review emergency response plans (including communication procedures, shelter locations, shelter access routes, plans for asset deployment, etc.) with key personnel and revise as warranted: School plans and critical facility plans	**Co-Benefits:** Goal 3 – This is an important step of creating and regularly updating an emergency response plan.
Objective: Develop an inter-municipal communication plan to enable coordinated mobilization during an event.	**Toolkit reference, online resources:** 1.2A, 1.3A
A1ci. HIGH Use the county Local Emergency Planning Committee to document existing capabilities for emergency communication between departments, municipalities, and organizations (railroads, utilities, etc.); identify deficiencies; and develop recommendations.	**Co-benefits:** Goal 3 – This is important information to include in emergency planning to improve communication, collaboration and preparedness.
Objective: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**Toolkit reference, online resources:** 1.2B, 1.3A
A1di. HIGH Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emergency assistance.	**Co-Benefits:** Goal 3 – This is important information to include in emergency planning to improve collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. MEDIUM Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bi. MEDIUM Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development. **A2bii.** MEDIUM Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**Toolkit reference, online resources:** 2.2A
A2ci. HIGH Municipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists.	**Co-Benefits:** Goal 3 –This process is an important land use management tool for keeping development out of harm's way. Goal 4 – Providing a process to local decision makers wil ensure that the appropriate information and check points are being included. Goal 5 – A strong review process can keep development out of harm's way and maintain natural floodplains.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. MEDIUM Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years).	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 2: Minimize flood damage to property (continued).	
Objective: Protect existing floodplain development with wet floodproofing (to resist damage when floodwaters enter a building) and other practices.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4E, 2.4F
A2eiii. MEDIUM Apply for grant funding to assist interested property owners with floodproofing of existing development.	
Objective: Ensure that all fuel tanks in the floodplain are anchored and protected.	**Toolkit reference, online resources:** 2.4G, 2.5A
A2fi. HIGH Provide building officials and propane/fuel oil providers with information and training about installation and permitting of fuel tanks in the floodplain. **A2fii.** MEDIUM Municipality sends a letter to floodplain residents about the need to anchor fuel tanks.	**Co-Benefits:** Goal 4 – This provides decision makers with important information.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Inventory assets in flood-prone areas (in and outside of the regulated floodplain).	**Toolkit reference, online resources:** 3.1B, 3.3B, 3.7A
A3ai. MEDIUM Develop an inventory of existing assets and uses (including special needs populations and hazardous substances) in the regulated FEMA floodplain and other flood-prone areas. Encourage individuals to register for the County's special/functional needs inventory.	
Objective: Identify areas that should remain undeveloped and those that can be developed safely.	**Toolkit reference, online resources:** 3.1B, 3.7D
A3bi. MEDIUM Develop a map of flood-prone areas for each municipality (in and outside of the FEMA floodplain) and distinguish between areas that should remain undeveloped (because of high risks and/or flood mitigation benefits of natural floodplains) and other areas where flood-safe development can occur.	**Co-Benefits:** Goal 2 – By preventing development in risky areas, property damage will be avoided. Goal 5 – By leaving risky areas undeveloped and flood mitigating floodplains natural, those areas can continue to mitigate floods, provide a buffer between people and floods, filter water and provide habitat.
Objective: Conduct asset planning for highways and other municipal services, including assessment of the vulnerability to flooding.	**Toolkit reference, online resources:** 3.2B, 3.7B, 3.9A
A3ci. HIGH Conduct a flood vulnerability assessment and develop a plan for improving flood resiliency for highway departments and other municipal services.	**Co-Benefits:** Goal 1 – Improving flood resiliency not only reduces flood impacts to municipal assets but also enables continuity of municipal services. Goal 3 – Important information to include in emergency planning.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3di. MEDIUM Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards. **A3dii.** MEDIUM Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety (continued).	
Objective: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**Toolkit reference, online resources:** 1.9A, 3.4A, 3.7C

A3ei. HIGH Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc., and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts.

Having an emergency plan in place that is regularly updated and well understood can mobilize help more quickly and reduce risks to emergency responders. Photo courtesy of Steuben County Office of Emergency Services.

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4ai. MEDIUM Convene an inter-municipal flood education task force to develop an outreach strategy with targeted messages, audiences, and outreach methods. **A4aii.** MEDIUM Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Educate the public about emergency operations (evacuation routes, shelters, etc.) and personal responsibilities for safety, preparedness, and response.	**Toolkit reference, online resources:** 4.1A, 4.2C
A4ci. MEDIUM Expand the use of social media by the county, municipalities, and first responders to disseminate information about preparedness and real-time communication during flooding or other emergencies. Promote use of the Ready Steuben application. **A4cii.** MEDIUM Conduct training about local flood hazards for fire departments and first responders.	**Co-benefits:** Goal 3 – Real time communication of information and training are important components of emergency plans.
Objective: Promote disclosure of flood hazard information during real estate transactions.	**Toolkit reference, online resources:** 4.4C
A4div. MEDIUM Research municipal authority for requiring flood hazard disclosure during real estate transactions (by including flood zone and boundary on survey maps or other means).	**Co-Benefits:** Goal 3 – By better understanding their risk, buyers can take steps to be prepared for an emergency.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.	**Toolkit reference, online resources:** 3.3A, 5.2A, 5.3E, 5.9A
A5ai. MEDIUM Conduct a stream summit to engage municipal representatives and stream professionals in dialog about stream management strategies, responsibilities, permitting, funding, etc.	**Co-Benefits:** Goal 2 – By having and implementing a well-balanced stream management plan, flooding and erosion damage can be reduced.
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. MEDIUM Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** MEDIUM Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** HIGH Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. MEDIUM Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** MEDIUM Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

Town of Campbell © The Nature Conservancy

COMMUNITY PROFILE

TOWN OF CAMPBELL

CONTENTS

Current Situation

The Town of Campbell is in central Steuben County, New York on the Lower Cohocton River. It has an estimated 2018 population of 3,334. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within these broad river floodplains is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches and culverts causing road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff and soil erosion (such as inadequate stormwater management from timber harvesting, agriculture, roads and development). In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream. Ice jams, typically forming at bridges, constrain flow which causes water to back up and flood vulnerable properties particularly along Main Street in the hamlet.

The FEMA maps used to regulate floodplain development do not reflect current flood hazards because floodplains were not mapped for many streams and the areas that were mapped have not been updated since 1982. For example, there are numerous streams for which FEMA did not map flood hazards. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Town better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

In 2014, the Town updated the Flood Damage Prevention regulations for floodway and floodplain development. These regulations encompass the immediate areas along the river and creeks that are most prone to flooding (the FEMA-mapped floodway/floodplains). New buildings are required to be raised three feet above the base flood elevation in these zones (exceeding the NYS Uniform Code freeboard standard of two feet). Campbell adopted a Timber Harvesting Law in 1999 to address drainage and stream impacts from logging activities. The Town developed a Comprehensive Plan in 2013 that recognizes the importance of flooding in Campbell. Additional community engagement and planning work could improve integration of the objectives of flood damage reduction and safety with other community objectives. The Town Zoning Law (Local Law No. 3 of 2014) includes numerous flood resiliency requirements, including a 50-foot stream setback for buildings, drainage requirements for driveways and new roads, stormwater management requirements, and steep slope restrictions.

An ice jam in 2011, Town of Campbell. Photo courtesy of Steuben County Office of Emergency Services.

2003 road damage from flash flooding in the Town of Campbell. Photo courtesy of Steuben County Office of Emergency Services.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The town is identified as a "structural hotspot" (Table TCa1) due to its high concentration of structures built before the first Flood Insurance Rate Maps were adopted by the Town, which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The town is also identified as an "economic hotspot" (Table TCa1) due to its high concentration of economically valuable assets that could be impacted by a flooding event.[1] Agricultural lands in some areas are vulnerable to flooding or erosion damage from nearby waterways.

Main Street flooding in Campbell. Photo courtesy of Steuben County Office of Emergency Services.

Table TCa1. A comparison of assessed values across land use categories within the Town of Campbell. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	902 structures assessed at $95 million	608 structures assessed at $71 million
Residential	616 structures assessed at $48 million	435 structures assessed at $32.3 million
Businesses	20 businesses with an estimated economic output of $166 million	13 businesses with an estimated economic output of $145 million
Agriculture	Assessed at $1.2 million	Assessed at $720,600

A Path Forward

Through the Flood Smart Approach, the Town of Campbell (T. Campbell) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1) of which T. Campbell gave the highest prioritization to 16 and medium to two. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table TCa2 cross-walks the goals with Core Team recommendations and T. Campbell's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table TCa1. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources	A1ai				
R2. Assess municipal facilities and mitigate	A1ai				
R3. Educate & assist residents		X		X	
R4. Educate & assist businesses		X		X	
R5. Protect remaining undeveloped floodplains		A2ai	A3bi		A5bi, ii, iii
R6. Protect & restore forested riparian buffers		A2ai			A5ai; A5bi, ii, iii; A5cii
R7. Contribute funding to EES for gauges			X		
R8. Use forecasts & gauge data in plans			A3ei		
R9. Improve communication on ice jams			A3ei		
R10. Limit or avoid development in most risky places		A2ai; A2bi, ii; A2ci	A3bi; A3dii		A5cii
R11. Use standards to improve flood safety		A2bii; A2ci	A3di		
R12. Manage stormwater & maintain systems					A5ci
R13. Modify roadside ditch cleaning practices	X				X
R14. Right-size road stream crossings					A5bi, ii
R15. Provide timber harvesting best practice information to property owners.					A5ci, ii

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: Many of T. Campbell's municipal assets are within the FEMA-mapped floodplain, as well as facilities that provide services that might be needed during a flood. T. Campbell has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is thus imperative that first responders and service organizations can provide emergency assistance.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

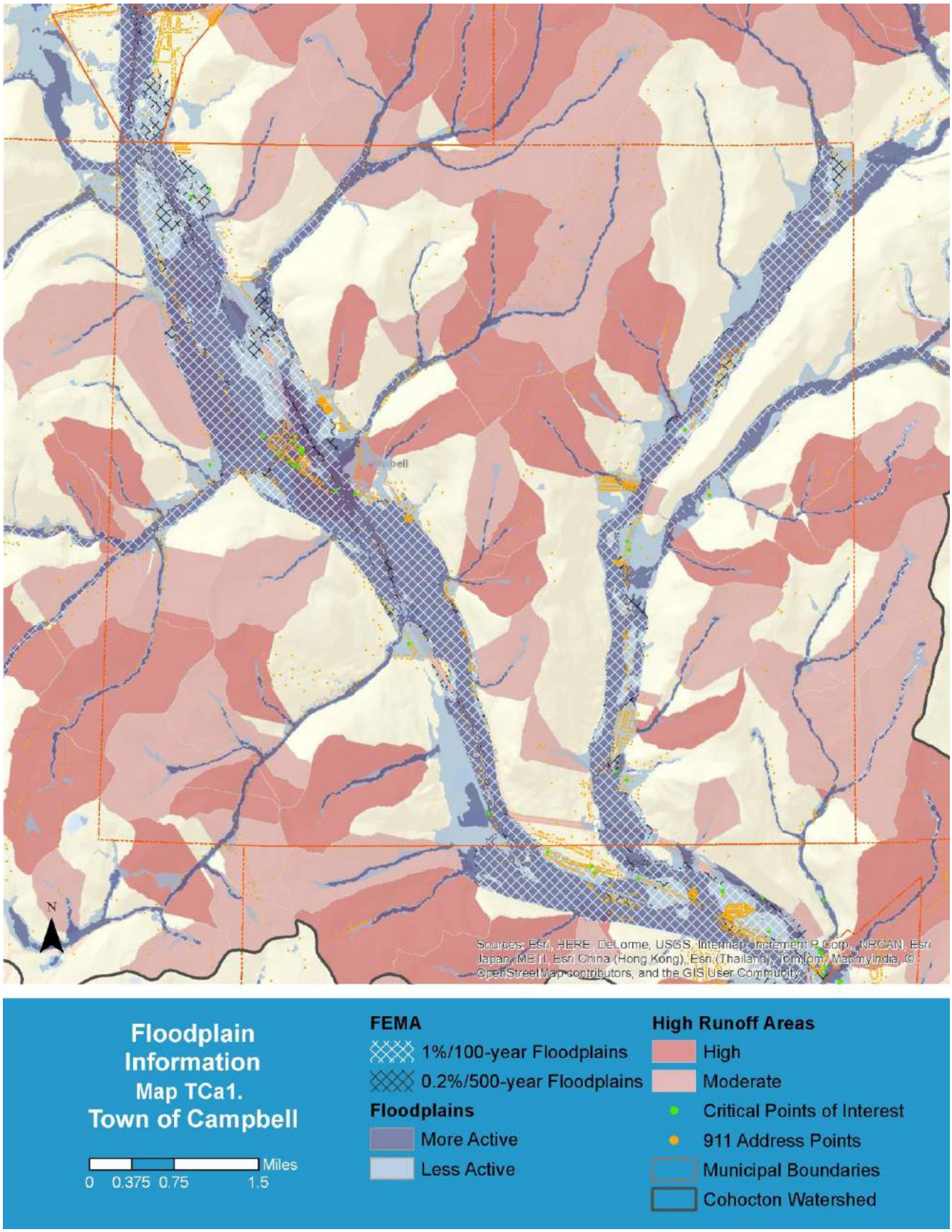
Town Hall, Highway Department, Fire Department, Campbell-Savona Junior/Senior High School/Red Cross Shelter, United Methodist Church, St. Joseph's Church, Southern Tier Library System, Agway, Citgo gas station, Dandy Mini-Mart, and NYSEG Campbell Substation are at risk of being impacted by flooding.

What the maps show:

Map TCa1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green.
Map TCa2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants (Chapter 3 Toolkit).

FLOODPLAIN INFORMATION TCA1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: 81% of the Town's vulnerable assets are properties categorized as residential (51%) or as providing a community service (30%). While roughly two-thirds of residential assessed value in floodplains is in FEMA-mapped floodplains, one-third is in places not covered by floodplain development standards and where few buildings are covered by flood insurance. Additionally, there is relatively high proportion of properties categorized as providing a community service, services that may be needed in helping residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures
that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

Where is this particularly important:

Particularly vulnerable areas[4] include the Hamlet of Campbell as well as areas on the other side of I-86 along Route 415, Frog Hollow at Meads Creek Road, and Taft Road by Hidden Forest Homes. Important assets to the community are the Upstate Niagara Cooperative, the town hall and public works department, fire department, Campbell-Savona Junior/Senior High School, churches, gas stations and businesses.

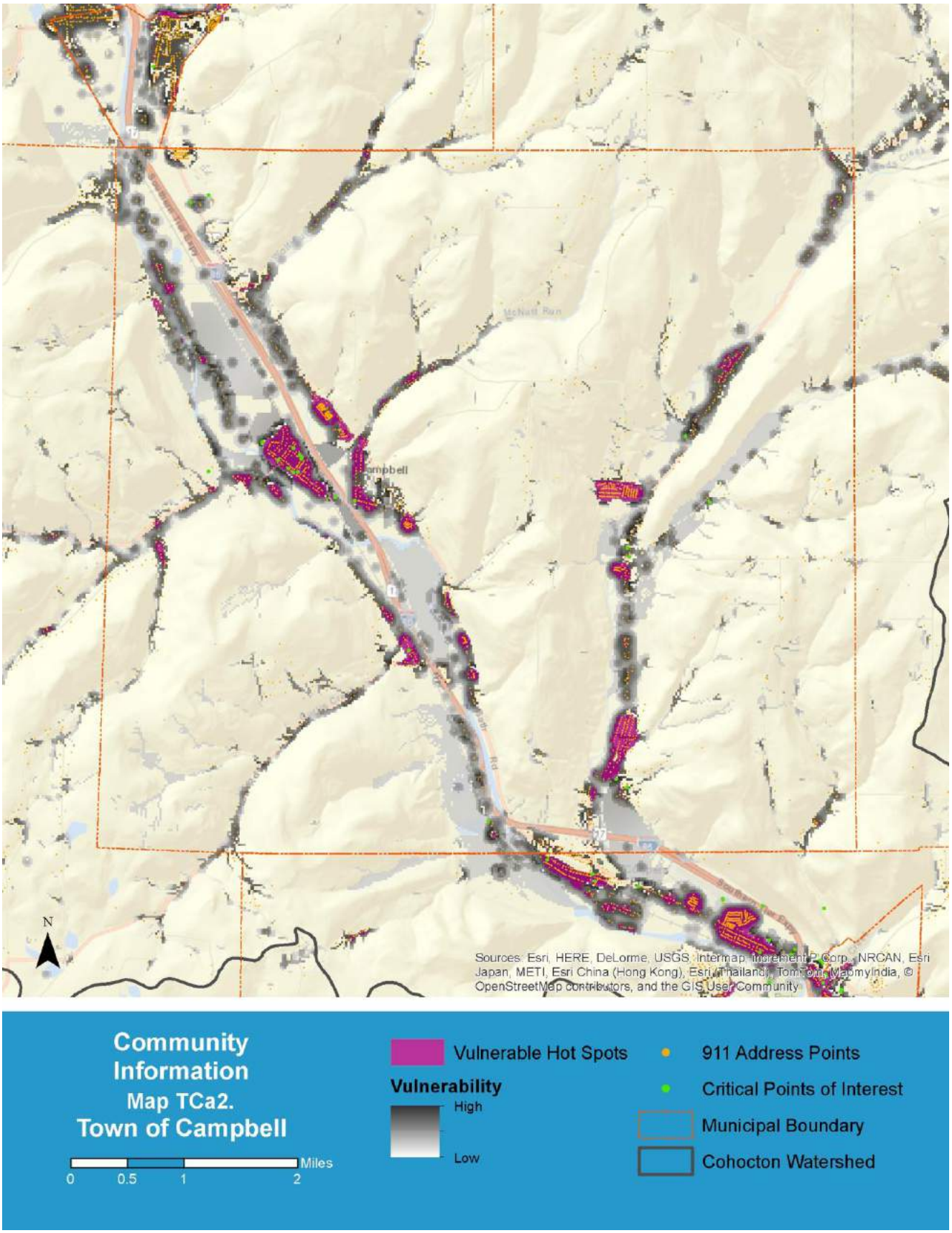
What the maps show:

Map TCa2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

FLOODPLAIN INFORMATION TCA2



NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R5. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R6. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

Where is this particularly important:

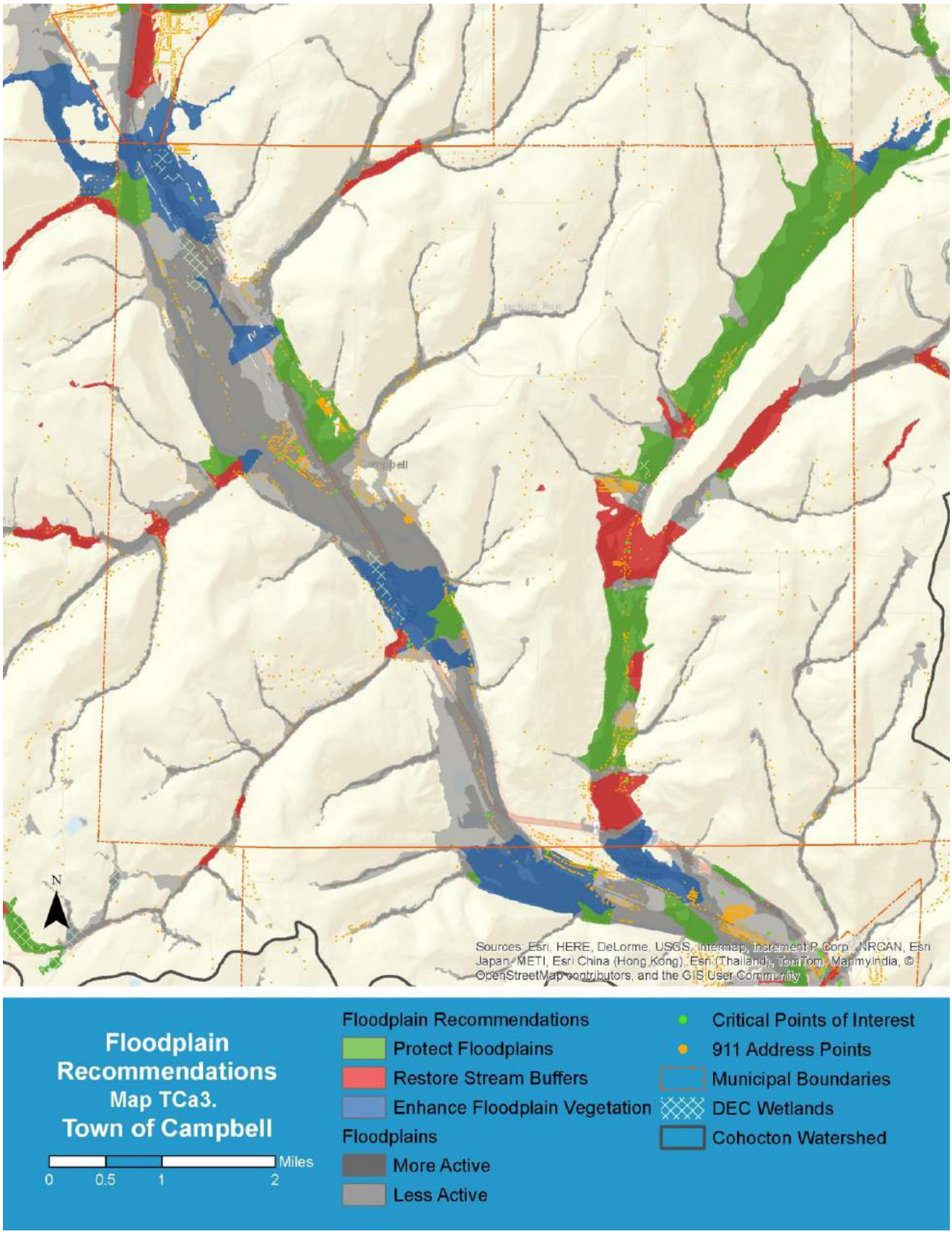
It is important to note that tributaries are prone to flash flooding therefore it is particularly important to allow floodplains to flood where they can do so safely in order to reduce flooding impacts downstream. Tributaries such as Michigan Creek, Wolf Run, and McNutt Run have steep watersheds and narrow valleys.

What the maps show:

Map TCa1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map TCa3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R5) so they continue to provide that benefit (in green and blue) or restore (R6) so they can function better (in red).

Information on How to do this: T. Campbell should seek opportunities to protect and restore natural features that can mitigate flooding. The Town is fortunate in that it has quite a bit of natural floodplain within its jurisdiction along Meads Creek that could be protected or enhanced. Because water flows into the town from surrounding jurisdictions, officials also should work with upstream communities like the Towns of Bath and Orange to determine suitable methods for protecting or enhancing floodplains outside of the jurisdiction of the township. Local land trusts or state agencies may partner to protect these valuable resources. Gravel berming along stream channels should be prohibited and existing berms removed. The Town could work with Steuben County Soil and Water Conservation District (SWCD), the Upper Susquehanna Coalition, adjacent townships, and other partners to target areas for restoration along Michigan Creek and Meads Creek.

FLOODPLAIN RECOMMENDATIONS TCA3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes real time river gauges at Campbell, Bath and Avoca, which are operated by the US Geological Survey (USGS) with locally-operated Environmental Emergency Services (EES) gauges providing backup data at each site, as well as EES water level gauges at Scudder Bridge in Erwin and two sites on Meads Creek in Campbell. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County, T. Campbell and other communities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R7. Continue the Town's contributions to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R8. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

R9. Monitor river ice conditions and improve communication about ice jam breakups.

What the maps show:

Map TCa1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing flood warnings and real-time gauge data in the municipal emergency response plan. Sometimes ice jam breakups upstream can cause problems for the municipality. Obtain training (from the U.S. Army Corps of Engineers or National Weather Service) and establish procedures for monitoring river ice throughout the winter, routine reporting to the National Weather Service, and informing downstream communities of any ice jam formation or breakup. Emergency response plans could include a procedure for Steuben County Office of Emergency Services to notify downstream municipalities about upstream breakups.

LAND USE TOOLS

Why this is important: Local land use authority allows local governments to go above and beyond the minimum standards required by New York State. FEMA-mapped floodplains do not cover all streams and, given increasing intense rainfall, flash flooding has already and will continue to be more of a problem. T. Campbell has gone above and beyond minimum standards in key areas and has committed to enforcement of those standards.

Recommendations:

R10. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R11. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map TCa1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas. Map TCa4. Steep slopes are depicted in shades of purple, dark purple have steeper slopes than light purple. Note the amount of steep slopes along streams that flow through the Town.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Town has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). The underlying zoning in the floodplain could be revised to limit the density and vulnerability of allowed uses. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited, or the existing floodplain overlay zone could require additional considerations before approving floodplain development proposals. The Town could consider increasing the stream setback requirement to restrict building construction within 100 feet of a stream or within a variable-width riparian buffer that is based on topography (e.g. Natural Heritage Program's Riparian Buffer Opportunity Assessment). Site plan review and subdivision criteria could be strengthened to discourage or prohibit vulnerable uses and/or require protection of natural features. Officials have noted that flash flooding is exacerbated by soil erosion from logging practices on the hills surrounding population centers. Dialog with foresters, forest landowners, and neighboring municipalities, along with review of the town's 1999 Timber Harvesting Law, are recommended to develop a strategy for reducing adverse impacts from timber harvesting.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

T. Campbell maintains stormwater systems for its more densely developed areas. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R12. Support compliance with state stormwater permits for construction activities. Keep up with regular maintenance of stormwater systems and increase capacity where possible. Be sure local regulations encourage rather than discourage green infrastructure practices.

R13. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R14. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

R15. Provide timber harvesting property owners with information on best management practices including the benefits of hiring a forester; encourage highway departments to work with loggers to determine necessary road protection measures and document pre-project conditions.

What the maps show:

Map TCa1. Note areas in red and pink that indicate high amounts of surface runoff. Map TCa4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

SURFACE RUNOFF (Continued)

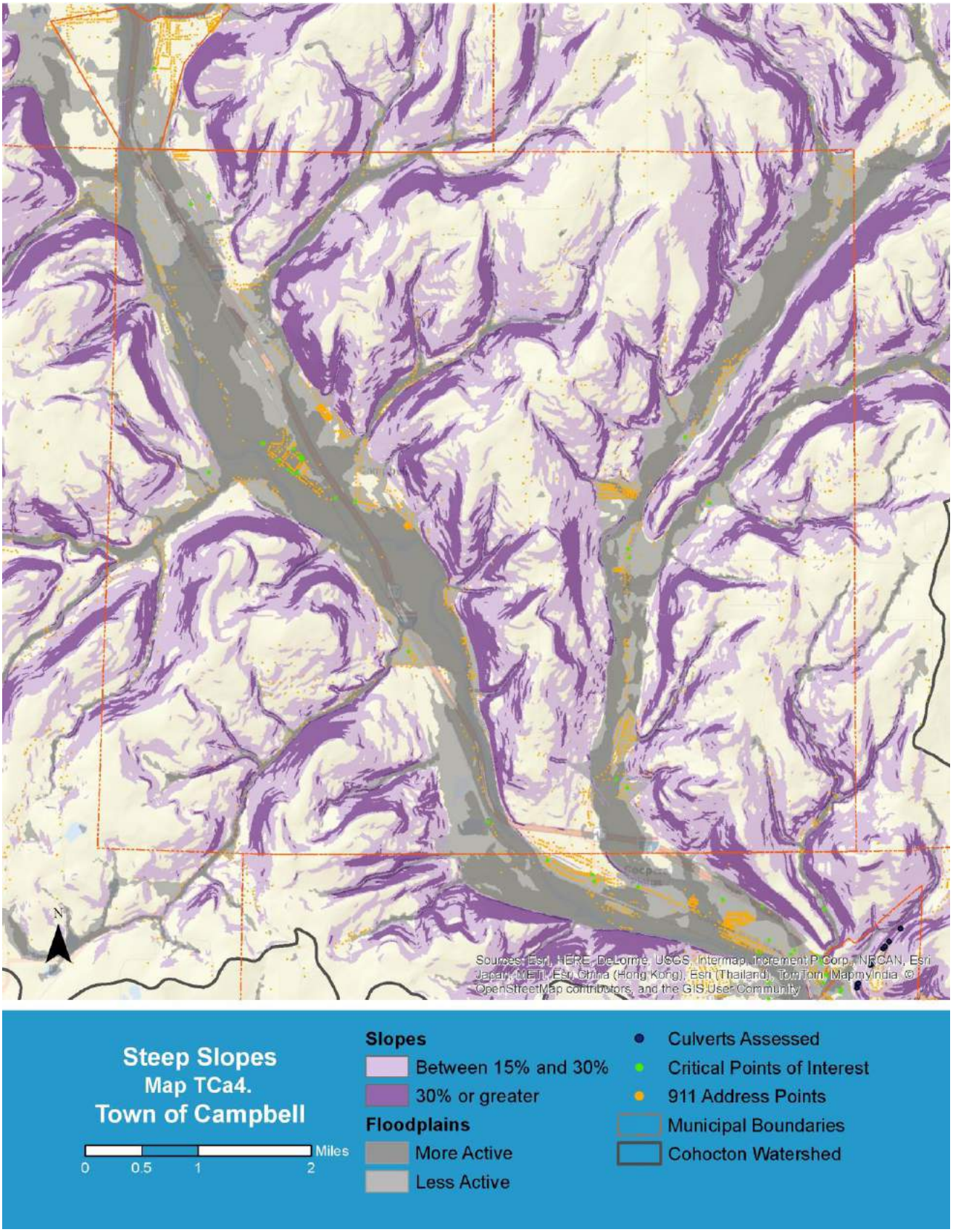
Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES)Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP), encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), maintain drainage systems/storm sewers, increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

Even with logging regulations on the books, T. Campbell experiences drainage challenges when timber harvesting doesn't include revegetation and proper measures to prevent rutting and erosion particularly along roads. Educational information could be shared with property owners considering timber harvesting so they are empowered to provide oversight. Consultation with a professional forester can help ensure that best practices are followed and impacts are reduced.

STEEP SLOPES TCA4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by T. Campbell. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. HIGH Seek alternate locations and funding to relocate critical infrastructure.	**Co-Benefits:** Goal 2 – Relocating facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. HIGH Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bi. HIGH Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development. **A2bii.** HIGH Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**Toolkit reference, online resources:** 2.2A
A2ci. HIGH Municipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists.	**Co-Benefits:** Goal 3 –This process is an important land use management tool for keeping development out of harm's way. Goal 4 – Providing a process to local decision makers wil ensure that the appropriate information and check points are being included. Goal 5 – A strong review process can keep development out of harm's way and maintain natural floodplains.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Identify areas that should remain undeveloped and those that can be developed safely.	**Toolkit reference, online resources:** 3.1B, 3.7D
A3bi. HIGH Develop a map of flood-prone areas for each municipality (in and outside of the FEMA floodplain) and distinguish between areas that should remain undeveloped (because of high risks and/or flood mitigation benefits of natural floodplains) and other areas where flood-safe development can occur.	**Co-Benefits:** Goal 2 – By preventing development in risky areas, property damage will be avoided. Goal 5 – By leaving risky areas undeveloped and flood mitigating floodplains natural, those areas can continue to mitigate floods, provide a buffer between people and floods, filter water and provide habitat.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3di. HIGH Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards. **A3dii.** HIGH Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.
Objective: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**Toolkit reference, online resources:** 1.9A, 3.4A, 3.7C
A3ei. HIGH Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc., and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts.	

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Promote disclosure of flood hazard information during real estate transactions.	**Toolkit reference, online resources:** 4.4C
A4di. HIGH Develop buyer-beware materials about flood risks and provide copies to real estate professionals and others for distribution. **A4dii.** HIGH Provide local training for insurance, real estate, and mortgage lending professionals about floodplain management and flood insurance. **A4diii.** HIGH Use signs to mark floodplains and historic flood levels. Post maps and other information in highly visible places. **A4div.** HIGH Research municipal authority for requiring flood hazard disclosure during real estate transactions (by including flood zone and boundary on survey maps or other means).	**Co-Benefits:** Goal 3 – By better understanding their risk, buyers can take steps to be prepared for an emergency.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.	**Toolkit reference, online resources:** 3.3A, 5.2A, 5.3E, 5.9A
A5ai. HIGH Conduct a stream summit to engage municipal representatives and stream professionals in dialog about stream management strategies, responsibilities, permitting, funding, etc.	**Co-Benefits:** Goal 2 – By having and implementing a well-balanced stream management plan, flooding and erosion damage can be reduced.
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. MEDIUM Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** HIGH Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** HIGH Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. MEDIUM Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** HIGH Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.


Town of Cohocton © The Nature Conservancy

COMMUNITY PROFILE

TOWN OF COHOCTON

CONTENTS

Current Situation

The Town of Cohocton is in northwest Steuben County at the headwaters of the Cohocton River. It has an estimated 2018 population of 2,548. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within the broad river floodplain is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches and culverts causing road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture). In some locations, flooding problems are made worse by unstable stream banks, beaver dams and trees or other debris that naturally accumulate within the stream.

The FEMA maps used to regulate floodplain development do not reflect current flood hazards because floodplains were not mapped for many streams and the areas that were mapped have not been updated since 1983. For example, there are numerous streams, such as the very upper reaches of the Cohocton River and Reynolds Creek, for which FEMA did not map flood hazards. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Town better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The Town has a local law for Flood Damage Prevention (Local Law No. 1 of 1987) and zoning laws (Local Law No. 1 of 2002) on the books, although both could be updated. The floodplain management regulations do not reflect changes that have been made to the NYS Model Local Law and the NYS Uniform Code. The Town models best practice language with respect to stream setbacks or riparian buffers. It has Site Plan Review standards (Site Plan Review: Zoning Chapter 720, Site Development Plans and Zoning Chapter 730, Special Use Permit) that encourage protection of natural features and require consideration of susceptibility to flooding, but do not explicitly discourage or prohibit vulnerable uses of floodplains. The Town adopted an emergency plan in 2018 and a Comprehensive Plan in 2019.

1972 flooding in Atlanta, Town of Cohocton. Photo courtesy of Town of Cohocton Historian.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The town has a high concentration of structures in the floodplain (Table TCo1) and built before the first Flood Insurance Rate Maps were adopted, which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The town is identified as an "economic hotspot" (Table TCo1) due economically valuable assets, such as businesses and agricultural lands, that could be impacted by a flooding event.[1]

The Town has done a good job of keeping development out of the floodplain and working to improve its flood resilience. Since Flood Smart communities: Cohocton River was initiated, the Town of Cohocton has completed an emergency plan and addressed flooding in its Comprehensive Plan.

Larrowe Milling Company, Town of Cohocton. Photo courtesy of Town of Cohocton Historian.

Table TCo1. A comparison of assessed values across land use categories within the Town of Cohocton. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $11 million	Assessed at $931,000
Residential	203 structures assessed at $9.8 million	23 structures assessed a t $865,000
Businesses	1 business with an estimated economic output of $2.4 million	0 businesses
Agriculture	Assessed at $509,000	Assessed at $40,000

A Path Forward

Through the Flood Smart Approach, the Town of Cohocton (T. Cohocton) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1), of which T. Cohocton prioritized 19. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table TCo2 cross-walks the goals with Core Team recommendations and T. Cohocton's prioritized actions. T. Cohocton has completed four actions that it originally prioritized, thus they have been removed from Table TCo2 (A1bi, A1di, A3di, and A3ei).

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table TCo2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Educate & assist residents		A2fi, ii		A4ai, ii;	
R2. Collaborate with agriculture					A5ci
R3. Protect remaining undeveloped floodplains		A2ai			A5cii
R4. Protect & restore forested riparian buffers		A2ai			A5cii
R5. Seek assistance on stream maintenance					A5ai, ii
R6. Contribute funding to EES for gauges			X		
R7. Use forecasts & gauge data in plans			A3ei		
R8. Limit or avoid development in most risky places		A2ai; A2bi, ii; A2ci	A3dii		A5cii
R9. Use standards to improve flood safety		A2bi, ii; A2ci	A3di, ii		
R10. Comply with state stormwater permits					A5ci
R11. Limit land use on steep slopes				A4ai, ii	A5cii
R12. Modify roadside ditch cleaning practices	X				X
R13. Right-size road stream crossings			X		X

Recommendations

COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: Around 90% of T. Cohocton's assessed values are categorized as residential. When comparing the number of structures found in FEMA floodplains versus all floodplains, far more homes are at risk than the FEMA floodplains might indicate which means they are not likely covered by floodplain development standards or by flood insurance.

Recommendations:

R1. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

Where is this particularly important:

Particularly vulnerable areas[4] include areas in Atlanta at the intersection of Beecher St. and the Cohocton River and the neighborhood around River St. and Main St. There are also a number of small scattered areas of concern in Blackcrick Hollow, near Jones Rd. and Route 415, and around the Hamlets of Atlanta and North Cohocton. The NYSEG Atlanta Substation, Steuben County Highway Shop, and Peek Gas Well are at risk of flooding.

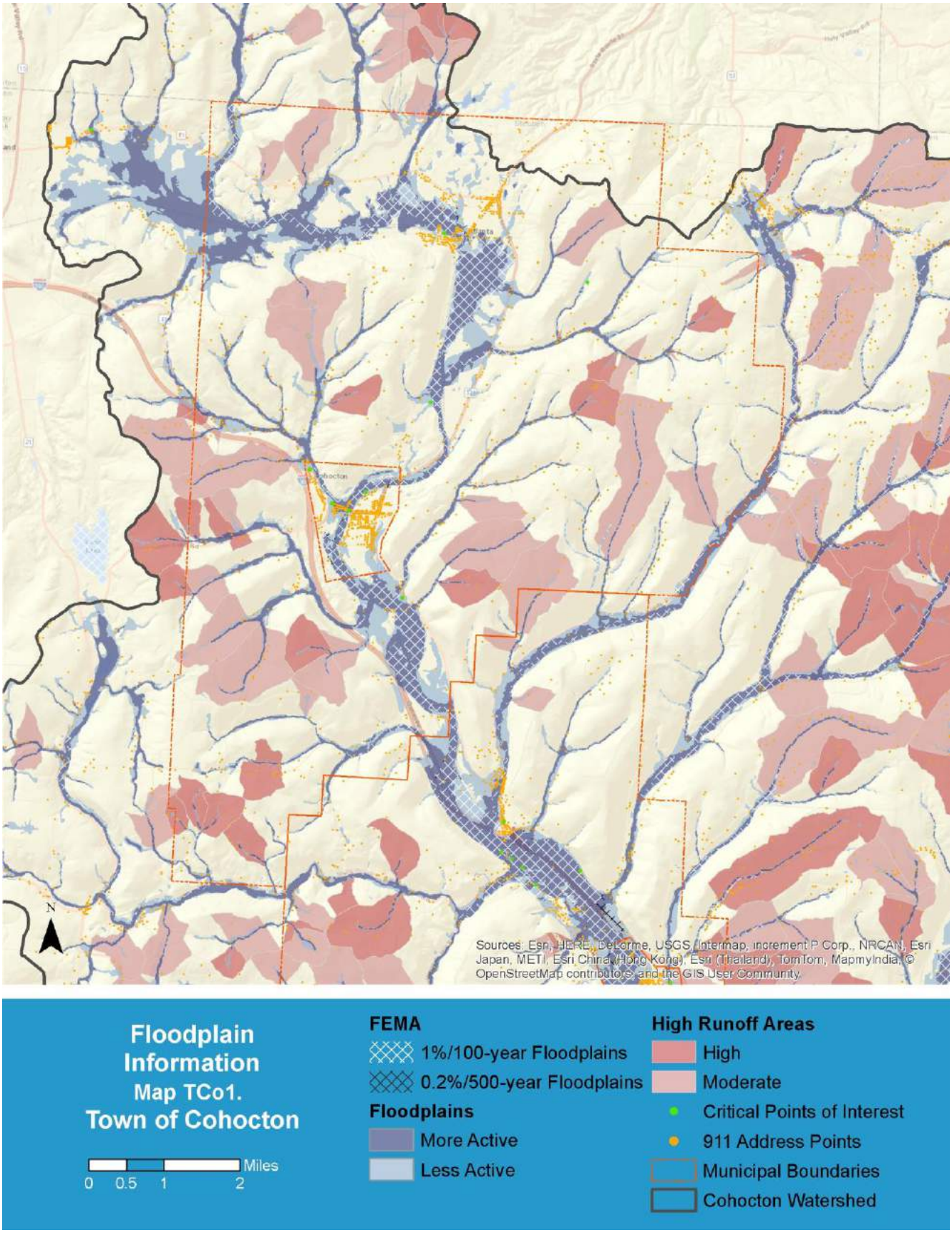
What the maps show:

Map TCo1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue, along with the 911 address points in orange and critical facilitates in green. Map TCo2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in dark gray to black scored high overall. Also note the critical facilities in green and 911 address points in orange that lie in the vulnerable hot spots.

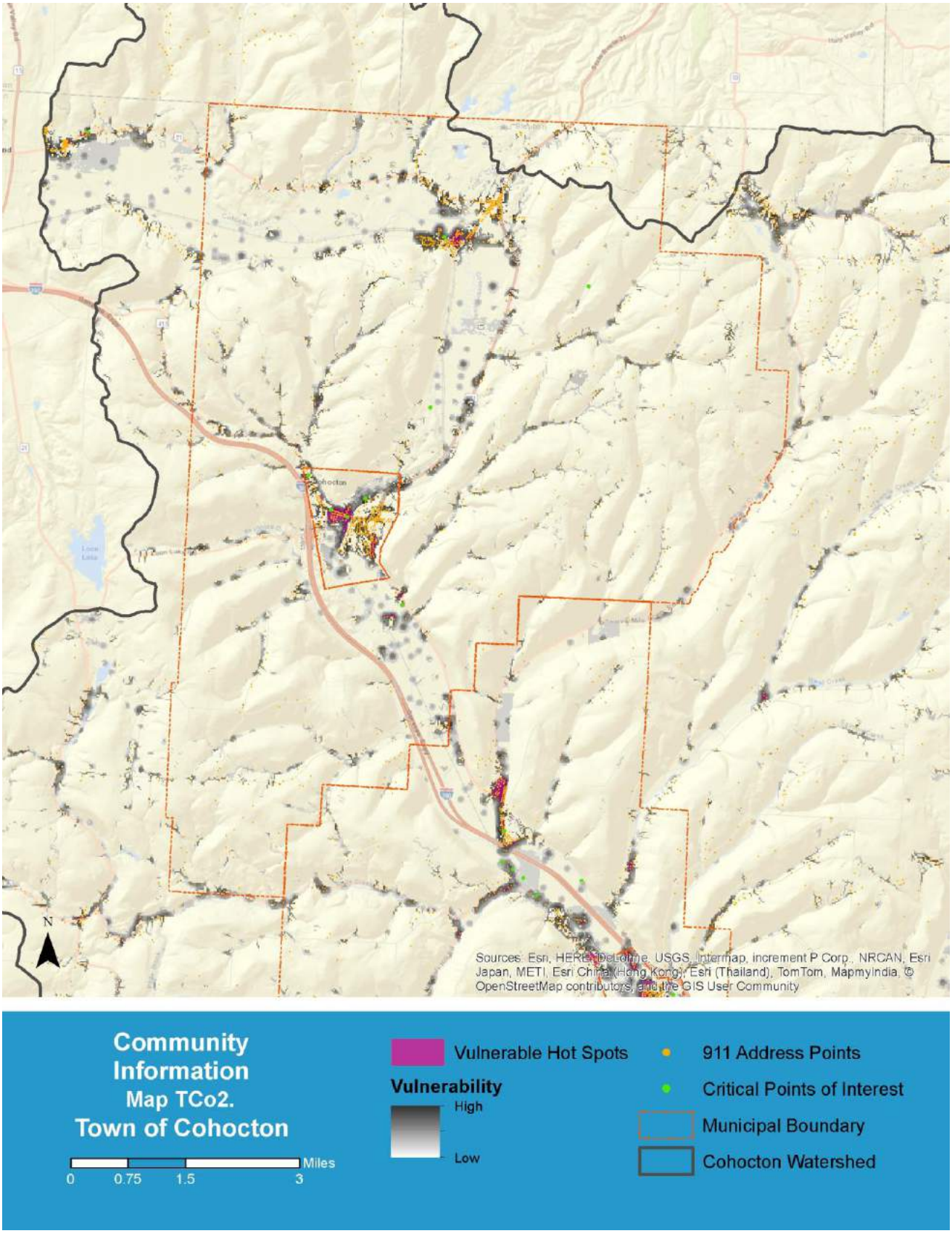
Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

FLOODPLAIN INFORMATION TCO1



COMMUNITY INFORMATION TCO2



COLLABORATION WITH AGRICULTURE

Why this is important: Agriculture is a dominant land use and economic engine for municipalities throughout Steuben County, particularly in T. Avoca, T. Cohocton and T. Bath. Although farming can be a beneficial use of flood-prone areas, this results in farms and agricultural operations that are vulnerable to flooding and erosion damage. In addition, municipal representatives have noted instances where runoff from and erosion to agricultural land contributes to flooding.

Recommendation:

R2. Collaborate with the agricultural sector to identify, fund, and implement agricultural drainage practices that reduce damage to farmland, roads, streambanks, and neighboring properties.

Information on How to do this: Use of best management practices that reduce surface runoff can increase landscape resilience during droughts and decrease peak streamflows during floods. While these benefits can be critical to farmers experiencing increasing intense rain events, they can also benefit downstream communities. Practices include drainage swales, cover crops, conservation tillage, fencing livestock out of streams (with alternate watering sites if needed), establishing stable livestock stream crossing sites, stream buffers, buffers along road ditches, and wetland restoration. Town officials can identify funding (including USDA Farm Service Agency conservation programs) to implement strategies to reduce flood vulnerability of agricultural lands, protect stream functions, and mitigate surface runoff onto roads. The Steuben County Soil and Water Conservation District (SWCD) and the Upper Susquehanna Coalition may be able to assist with implementation.

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. T. Cohocton has one of the highest proportions of wetlands in the Cohocton River watershed. Here wide natural floodplains remain along much of the River. However, in areas downstream of the Village of Cohocton, the steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

During the October 2018 Stream Management Dialogue, municipal officials indicated that natural debris in streams is problematic because it alters flood patterns. Challenges include poor understanding of the permit process for stream debris removal; not knowing the areas most impacted by stream debris; not knowing best practices when it comes to stream maintenance and debris management; and lack of resources to do the work.

Recommendations:

R3. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R4. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

R5. Proactively seek assistance from, and collaborate with, the DEC, SWCD, the Steuben County Planning Department and Southern Tier Central on stream maintenance.

Where is this particularly important:

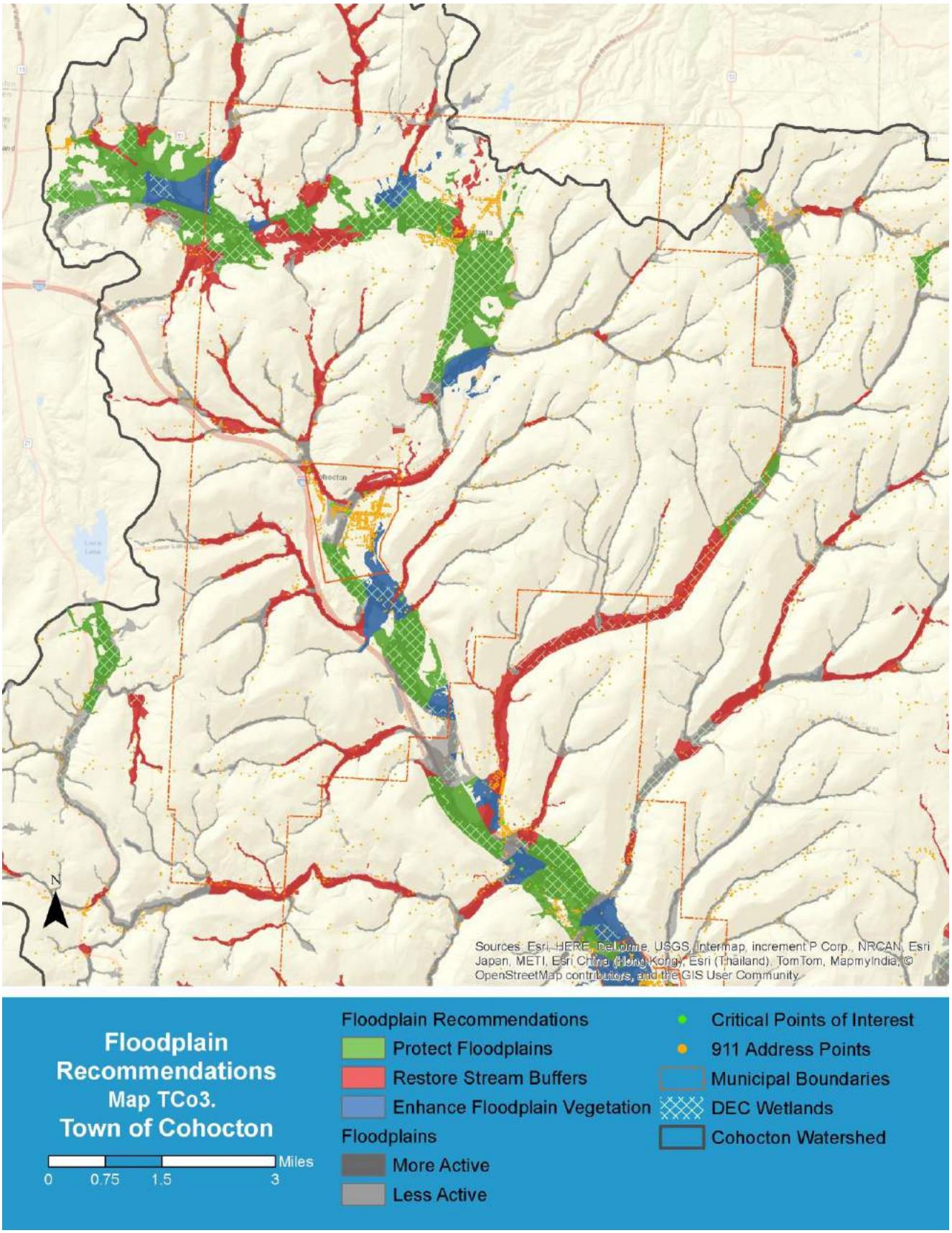
Protect floodplains from west of Atlanta downstream to where the river crosses to the west side of the railroad tracks along Atlanta Back Road, downstream of the Village of Cohocton along Route 415 to the Avoca Town line. Areas along Reynolds Creek and Blackcrick and Davis Hollows as well as ephemeral channels that flow down steep valley sides along Route 415 could be targeted for streambank stabilization.

What the maps show:

Map TCo1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map TCo3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R3) so they continue to provide that benefit (in green and blue) or restore (R4) so they can function better (in red).

Information on How to do this: T. Cohocton should seek opportunities to protect and restore natural features that can mitigate flooding. Because natural floodplains in T. Cohocton are likely providing flood mitigation benefits to downstream jurisdictions, downstream municipalities have been advised to work with T. Cohocton to determine suitable methods for protecting or enhancing floodplains and wetlands. Local land trusts or state agencies may partner to protect these valuable resources. T. Cohocton could work with the SWCD and other partners to target areas to install riparian buffers and restore streambanks. To tackle stream maintenance, Town officials could work with the NYS DEC Regional Permit Administrator and its Division of Fish and Wildlife to help residents determine appropriate NYS DEC contacts and whether a permit is necessary for debris removal (including assistance with state-regulated wetland or trout stream data). See Appendix G for more information. Officials could also distribute a pamphlet on debris management to property owners, which Southern Tier Central has developed.

FLOODPLAIN RECOMMENDATIONS TCO3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network can support advance warning. However, because T. Cohocton is located at the headwaters of the Cohocton River, existing streamflow gauges are located downstream (in Avoca, Bath, Campbell, and Erwin) where real-time data are of limited value to the Town. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath, which support flood warnings for the entire river. In addition, Environmental Emergency Services (EES) operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County, T. Cohocton and other communities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R6. Continue the Town's contributions to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R7. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map TCo1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Town regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R8. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R9. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map TCo1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if T. Cohocton has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development. Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited. Or a floodplain overlay zone could require additional considerations before approving floodplain development proposals. Subdivision regulations and stronger site plan review standards could discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R10. Support compliance with state stormwater permits for construction activities. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R11. Limit land use on steep slopes (>15%).

R12. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R13. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map TCo4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

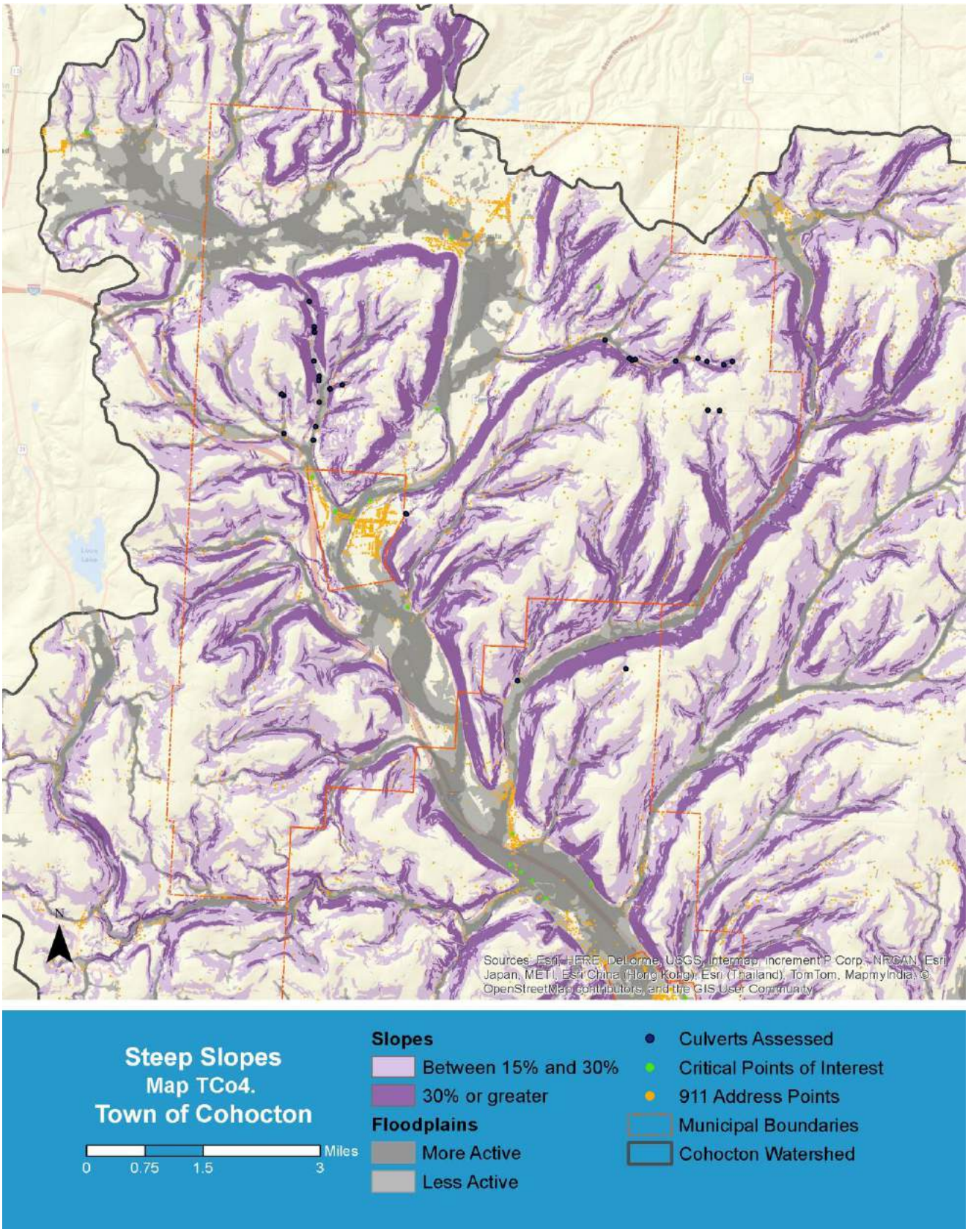
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read the Stormwater Pollution Prevention Plan (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES TCO4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by T. Cohocton. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.

Actions 1bi and 1di were originally prioritized but have since been completed.

As in much of Steuben County, the Town of Cohocton has experienced regular flooding for decades. River Street flooding, Atlanta, 1962. Photo courtesy of Town of Cohocton Historian.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. HIGH Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bi. HIGH Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development. **A2bii.** HIGH Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**Toolkit reference, online resources:** 2.2A
A2ci. HIGH Municipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists.	**Co-Benefits:** Goal 3 –This process is an important land use management tool for keeping development out of harm's way. Goal 4 – Providing a process to local decision makers wil ensure that the appropriate information and check points are being included. Goal 5 – A strong review process can keep development out of harm's way and maintain natural floodplains.
Objective: Ensure that all fuel tanks in the floodplain are anchored and protected.	**Toolkit reference, online resources:** 2.4G, 2.5A
A2fi. HIGH Provide building officials and propane/fuel oil providers with information and training about installation and permitting of fuel tanks in the floodplain. **A2fii.** HIGH Municipality sends a letter to floodplain residents about the need to anchor fuel tanks.	**Co-Benefits:** Goal 4 – This provides decision makers with important information.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3dii. HIGH Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4ai. MEDIUM Convene an inter-municipal flood education task force to develop an outreach strategy with targeted messages, audiences, and outreach methods. **A4aii.** MEDIUM Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Promote disclosure of flood hazard information during real estate transactions.	**Toolkit reference, online resources:** 4.4C
A4di. MEDIUM Develop buyer-beware materials about flood risks and provide copies to real estate professionals and others for distribution. **A4dii.** MEDIUM Provide local training for insurance, real estate, and mortgage lending professionals about floodplain management and flood insurance. **A4diii.** MEDIUM Use signs to mark floodplains and historic flood levels. Post maps and other information in highly visible places. **A4div.** MEDIUM Research municipal authority for requiring flood hazard disclosure during real estate transactions (by including flood zone and boundary on survey maps or other means).	**Co-Benefits:** Goal 3 – By better understanding their risk, buyers can take steps to be prepared for an emergency.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.	**Toolkit reference, online resources:** 3.3A, 5.2A, 5.3E, 5.9A
A5ai. MEDIUM Conduct a stream summit to engage municipal representatives and stream professionals in dialog about stream management strategies, responsibilities, permitting, funding, etc. **A5aii.** MEDIUM Develop a stream management plan based on the information and recommendations from the stream summit.	**Co-Benefits:** Goal 2 – By having and implementing a well-balanced stream management plan, flooding and erosion damage can be reduced.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. MEDIUM Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** MEDIUM Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

COMMUNITY PROFILE

TOWN OF ERWIN

CONTENTS

Current Situation

The Town of Erwin is in southeast Steuben County on the Lower Cohocton River at the confluence of the Cohocton, Tioga and Chemung Rivers. It has an estimated 2018 population of 8,163. These rivers regularly flood -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within these broad river floodplains is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches and culverts causing road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture). In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream. Ice jams along reaches of the river within the Town of Erwin and breakup of jams in upstream municipalities can lead to flooding.

The FEMA maps used to regulate floodplain development do not reflect current flood hazards because floodplains were not mapped for many streams and the areas that were mapped have not been updated since 1980. For example, the effects of development since 1980 including changes in the amount and velocity of water flowing across the land and in stream channels (stormwater/drainage systems and impervious surfaces) have not been incorporated into modeling and the resulting mapping of floodplains. Also, there are some reaches of some streams, such as Weaver Creek, for which FEMA did not map flood hazards. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Town better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

One of the levees that protects the Town of Erwin. © The Nature Conservancy

In 2005, the Town adopted a Green Infrastructure Plan to address drainage concerns and a zoning law that includes a stream corridor overlay district that protects vegetation and prohibits structures in riparian areas. In 2010, the Town updated its Comprehensive Plan, which recognizes flood hazards and beneficial natural features. The Town updated the Local Law for Flood Damage Prevention in 2001 to include a higher standard for repetitive damage and cumulative improvements, as well as the freeboard requirements that were later added to the NYS Uniform Code. The Town has subdivision regulations and site plan review that can be used to address flooding and has an emergency response plan.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The town is identified as a "structural hotspot" (Table TE1) due to its high concentration of structures built before the first Flood Insurance Rate Maps were adopted, which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The town is also identified as an "economic hotspot" (Table TE1) due to its high concentration of economically valuable assets that could be impacted by a flooding event.[1]

The town has approximately six miles of earthen levee that should be evaluated and certified by an engineer and then accredited by FEMA. Without this accreditation, levee protected areas will be designated as high-risk flood zone.

At risk housing in Coopers Plains, Town of Erwin.
© The Nature Conservancy

Table TE1. A comparison of assessed values across land use categories within the Town of Erwin. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $228.1 million	Assessed at $68 million
Residential	783 structures assessed at $82 million	249 structures assessed at $18.5 million
Businesses	12 businesses with an estimated economic output of $23.3 million	6 businesses with an estimated economic output of $10.7 million
Community Services	Assessed at $21.4 million	Assessed at $3.4 million

A Path Forward

Through the Flood Smart Approach, the Town of Erwin (T. Erwin) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1) of which T. Erwin gave the highest prioritization to 12. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table TE2 cross-walks the goals with Core Team recommendations and T. Erwin's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table TE2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources	A1ai				
R2. Assess municipal facilities and mitigate	A1bi				
R3. Educate & assist residents		A2dii; A2eiii		A4aii	
R4. Educate & assist businesses		A2dii; A2eiii		A4aii	
R5. Educate & assist in levee protected areas		A2eiii		A4aii; A4ci	
R6. Protect remaining undeveloped floodplains				A4aii; A4ei	A5bii
R7. Prevent filling of floodplains				A4ei	
R8. Protect & restore forested riparian buffers				A4aii; A4ei	A5bii
R9. Continue funding EES gauges					
R10. Use forecasts & gauge data in plans	A1bi			A4ci	
R11. Monitor river ice and improve communication about ice jams	A1bi				
R12. Limit or avoid development in most risky places		A2bii		A4aii; A4ei	
R13. Use standards to improve flood safety		A2bii		A4dii	
R14. Manage stormwater and maintain systems				A4aii; A4ei	
R15. Modify roadside ditch cleaning practices				A4aii	
R16. Right-size road stream crossings					A5bii

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: T. Erwin has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is thus imperative that first responders and service organizations can provide emergency assistance.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

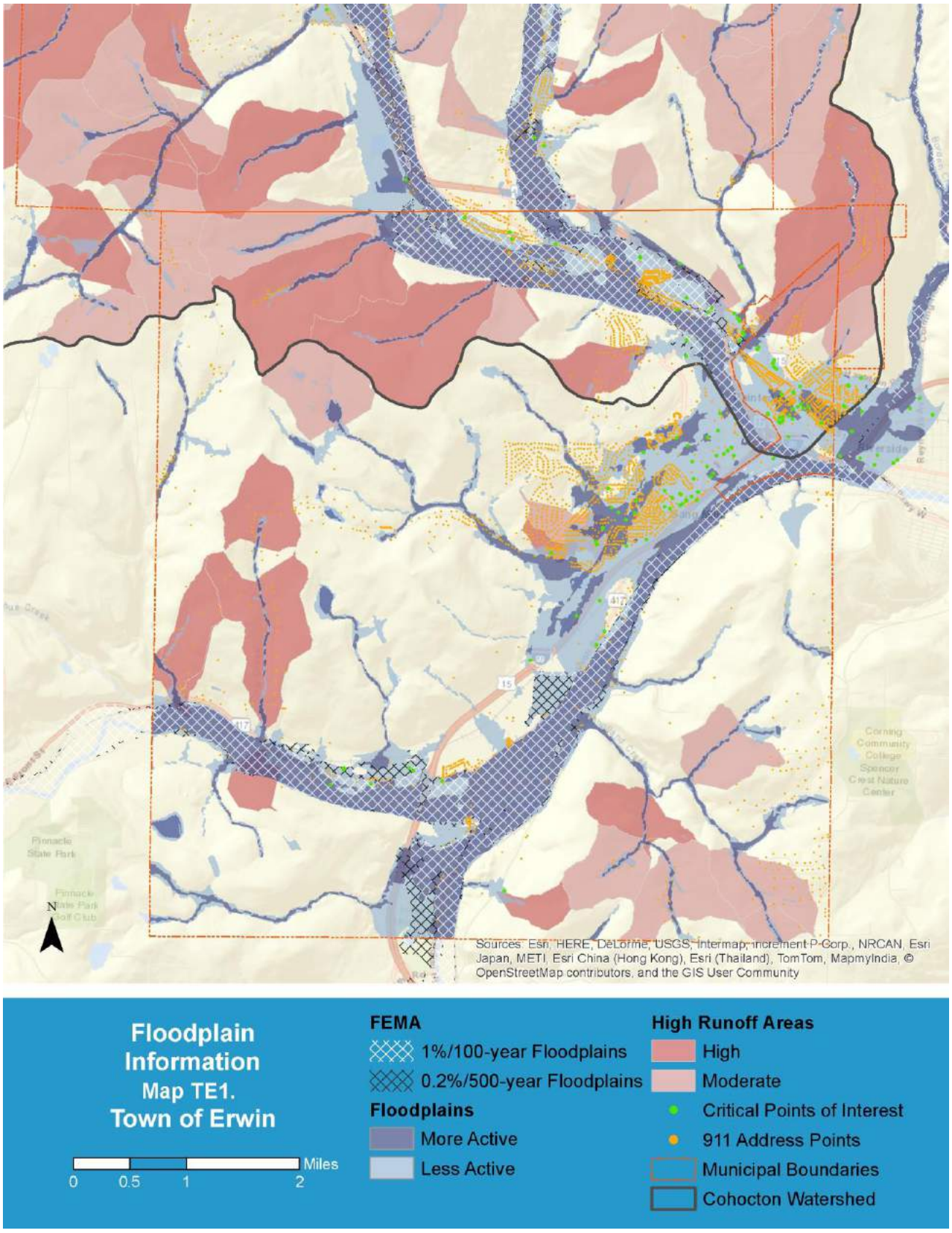
Coopers Plains Park, Millennium Pipeline Company, Coopers Plains United Methodist Church, Corning-Painted Post Airport, Coopers Plains-Long Acre Fire Department, Pioneer Park, Walmart, Corning Inn, Emerald Spring Pond Apartments, Badger Creek Meadow Apartments, Absolut Care Three Rivers Senior Living, Scudder Webber Park, Old Emeritus Painted Post Retirement Home, Brookdale Senior Living Home, the Kwik Fill gas station, municipal sewer and water lines and underground fiber optic networks are at risk of flooding.

What the maps show:

Map TE1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green. Map TE2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in dark gray to black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants (Chapter 3 Toolkit).

FLOODPLAIN INFORMATION TE1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: When all floodplains are considered, one-third of T. Erwin's at-risk assessed value lies in residential properties and half lies in commercial or industrial. Approximately 500 residential structures are in floodplains not mapped by FEMA, which means they are not likely covered by floodplain development standards or by flood insurance. Over half of the value in FEMA floodplains is attributed to properties that are categorized as industrial. These properties provide jobs or house valuable equipment and inventory, so flood impacts to them could ripple into the community in the form of lost wages, disrupted supply chains or unavailable products. Even if commercial and industrial facilities do not experience flood damages directly, their productivity could be impacted by missed work of flood-affected employees or closed transportation corridors. There are approximately 15 miles of mostly earthen levees in the Erwin/Painted Post/Corning area, six miles of which protect Gang Mills. Levees reduce flood risk but do not eliminate it.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures
that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

R5. Educate and assist residents and business owners in levee protected areas to act to reduce their flood vulnerability.

Where is this particularly important:

Particularly vulnerable areas[4] include Coopers Plains at the neighborhoods along Main St. and Erie St., Mountain View Pl., Mill St. Ext., and Naylor Ln., with the last three areas lying in very active parts of the floodplain; Route 415 from the airport to Robert Dann Dr., with Pioneer Rd. lying in a very active floodplain; several neighborhoods and commercial areas in Gang Mills. Mountain View Pl. and Mill St. Ext. are particularly at risk as the steep valley wall on the opposite side of the Cohocton River prevents flood waters from spreading onto the floodplain in that direction which means flood waters will flow through the low-lying areas of Mountain View Pl. and Mill St. Ext. Additionally, industrial areas along Addison Rd. are physically and economically vulnerable.

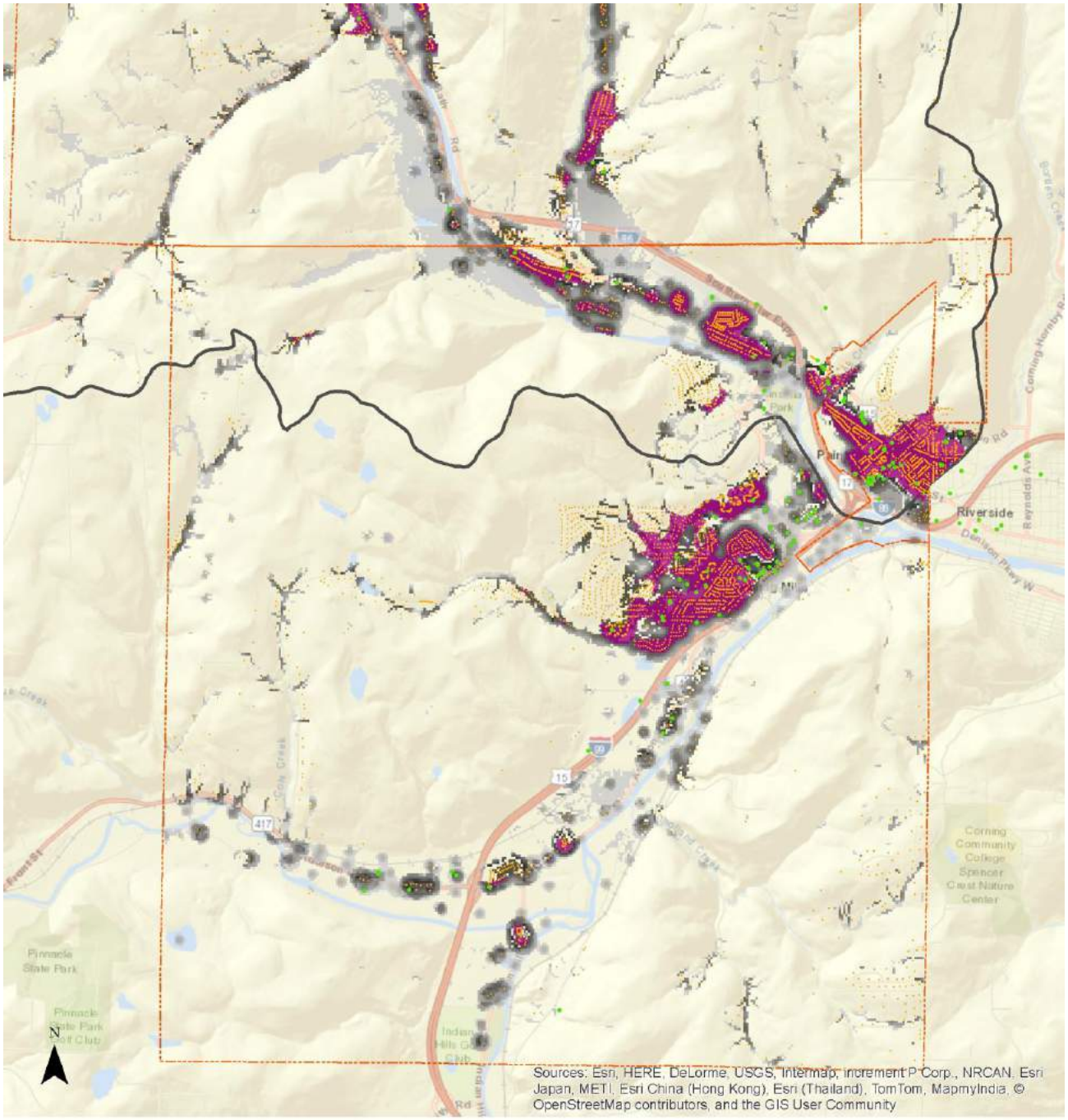
What the maps show:

Map TE2. Note vulnerable hot spots in
dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Having an emergency plan, an after-emergency recovery plan and insuring their property can help residents prepare for and recover from flooding more quickly and effectively. Commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was com**pleted that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the** four categories (Appendix A).

COMMUNITY INFORMATION TE2



Community Information
Map TE2.
Town of Erwin

0 0.5 1 2 Miles

Vulnerable Hot Spots

Vulnerability
High
Low

911 Address Points
Critical Points of Interest
Municipal Boundary
Cohocton Watershed

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R6. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R7. Prevent filling of floodplains that have high potential to store flood flows.

R8. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

Where is this particularly important:

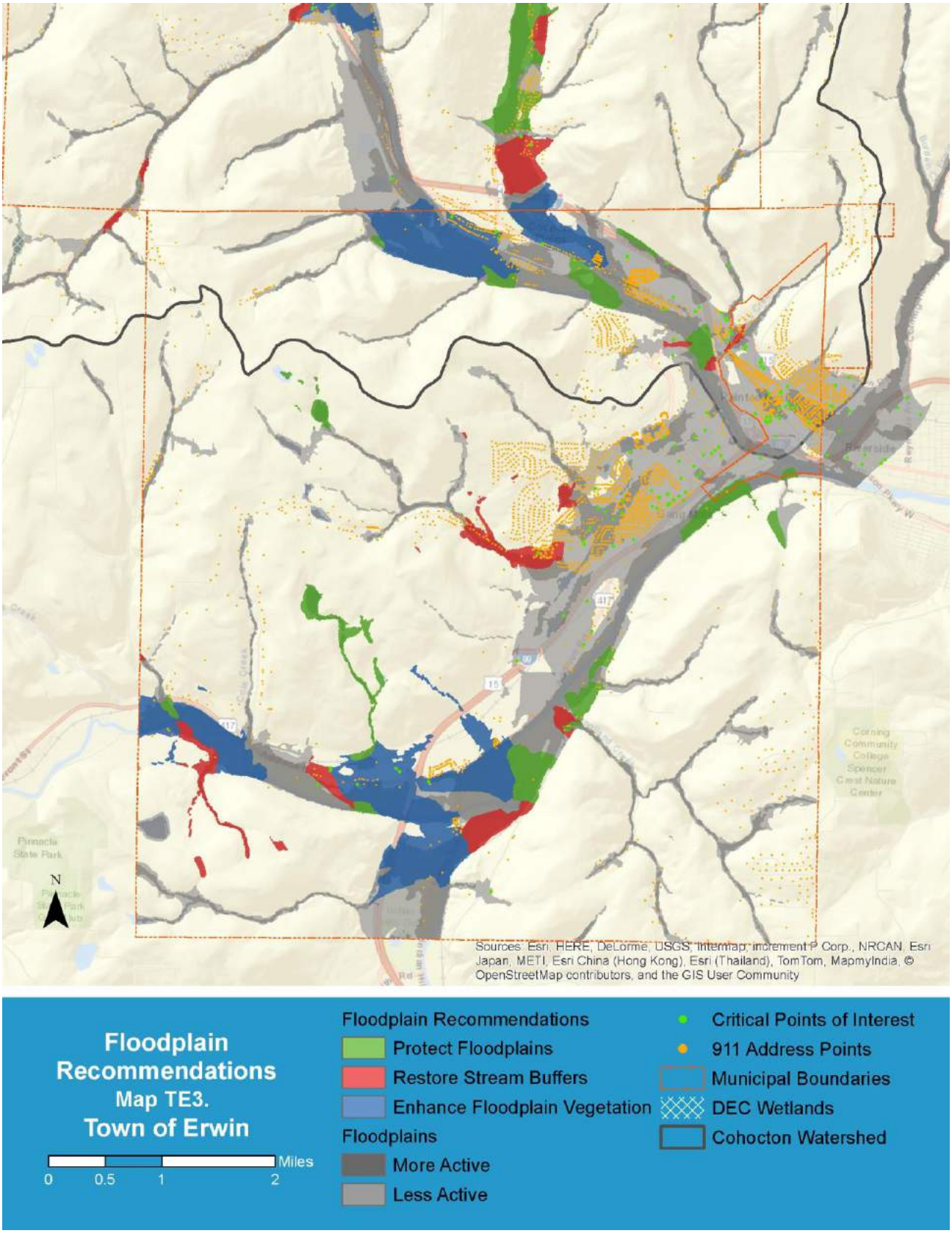
Areas along the Cohocton River in Coopers Plains, at the confluence of Meads Creek and Cohocton River, along Meads Creek, south of Gang Mills on the Tioga River, and along Canisteo River are important for the temporary storage of flood flows.

What the maps show:

Map TE1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map TE3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R6) so they continue to provide that benefit (in green and blue) or restore (R8) so they can function better (in red).

Information on How to do this: T. Erwin should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the Town from surrounding jurisdictions, T. Erwin should also work with upstream communities on the Cohocton River, like Towns of Campbell, Bradford and Hornby, and on Canisteo River, like Towns of Addison and Rathbone, to determine suitable methods for protecting or enhancing floodplains and wetlands. Local land trusts or state agencies may partner to protect these valuable resources. T. Erwin could work with Steuben County Soil and Water Conservation District (SWCD), the Upper Susquehanna Coalition, and other partners to target areas to install riparian buffers along Weaver and Meads Creeks. Map TE2 could help identify beneficial natural features that are recognized in the 2010 Comprehensive Plan.

FLOODPLAIN RECOMMENDATIONS TE2



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes real time river gauges operated by the US Geological Survey (USGS) on the Cohocton, Tioga, Canisteo, and Chemung Rivers. Locally-operated Environmental Emergency Services (EES) gauges provide backup data at many USGE gauge sites (including Campbell, Bath, Avoca, Lindley, West Cameron, and Corning) and water level gauges at additional locations (including Scudder Bridge in Erwin, Addison and two sites on Meads Creek in Campbell). The National Weather Service provides daily river forecasts for the Cohocton River at Campbell, the Tioga River at Lindley, and the Canisteo River at West Cameron. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County, T. Erwin and other communities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R9. Continue the Town's contributions to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R10. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

R11. Monitor river ice conditions and improve communication about ice jam breakups.

What the maps show:

Map TE1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing flood warning and real-time gauge data in the municipal emergency response plan. Sometimes ice jam breakups upstream can cause problems for the municipality. Obtain training (from the U.S. Army Corps of Engineers or National Weather Service) and establish procedures for monitoring river ice throughout the winter, routine reporting to the National Weather Service, and informing downstream communities of any ice jam formation or breakup. Emergency response plans could include a procedure for Steuben County Office of Emergency Services to notify T. Erwin about upstream breakups.

LAND USE TOOLS

Why this is important: Although Town regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R12. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R13. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map TE1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if T. Erwin has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited. Or a floodplain overlay zone could require additional considerations before approving floodplain development proposals. Site plan review and subdivision criteria can be used to discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

T. Erwin maintains stormwater systems for its more densely developed areas. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R14. Effectively manage and maintain stormwater systems, utilizing green infrastructure where appropriate or other methods for dispersal and infiltration of concentrated flows.

R15. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R16. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map TE4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

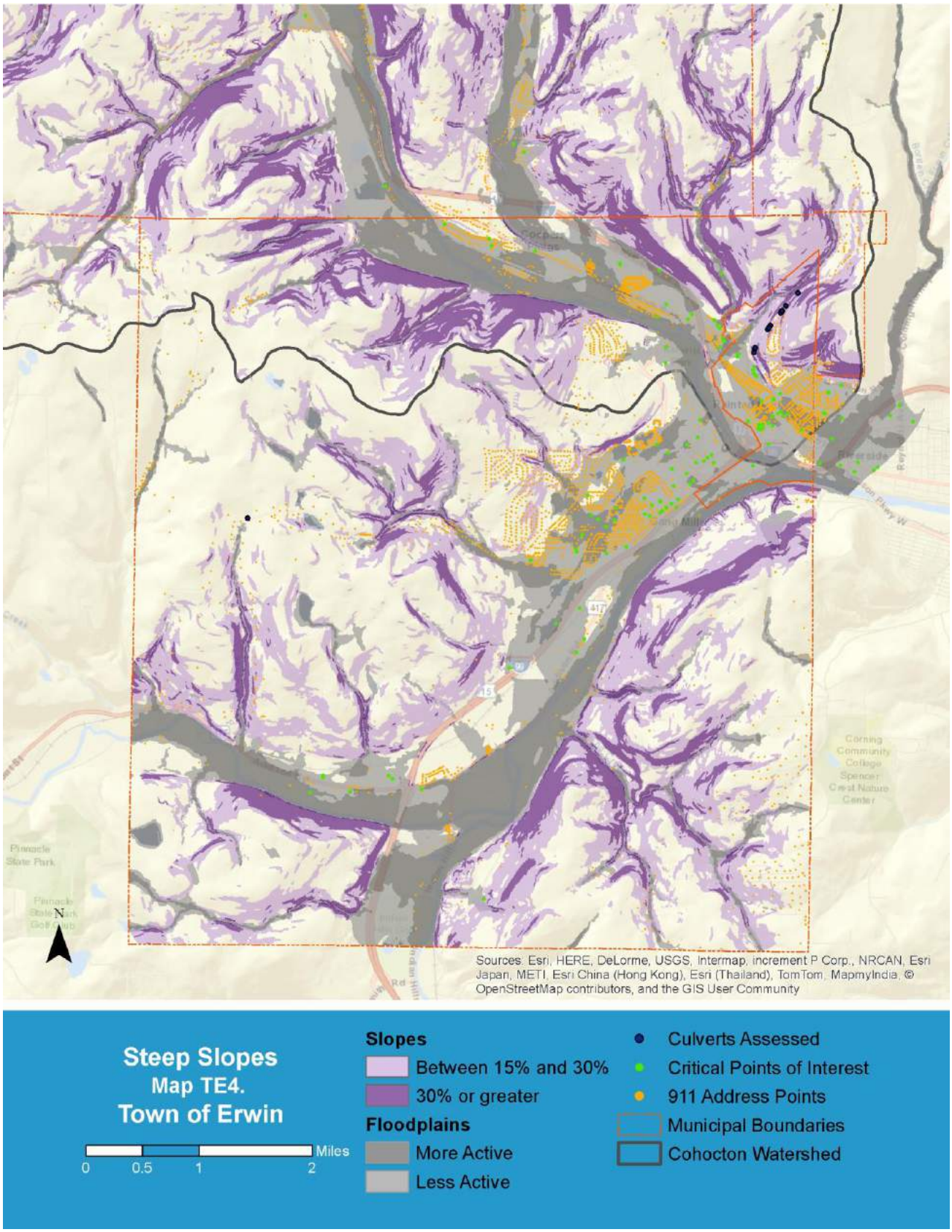
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP), encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), maintain drainage systems/storm sewers, increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES TE2



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by T. Erwin. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. HIGH - Seek alternate locations and funding to relocate critical functions such as the Coopers Plains Fire Department.	**Co-Benefits:** Goal 2 – Relocating facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.3B, 1.4B, 1.5A, 1.5B, 1.6A, 1.6B, 1.6C, 1.7A, 1.8A, 1.9A
A1bi. MEDIUM Review emergency response plans (including communication procedures, shelter locations, shelter access routes, plans for asset deployment, etc.) with key personnel and revise as warranted: School plans and critical facility plans	**Co-Benefits:** Goal 3 – This is an important step of creating and regularly updating an emergency response plan.
Objective: Develop an inter-municipal communication plan to enable coordinated mobilization during an event.	**Toolkit reference, online resources:** 1.2A, 1.3A
A1ci. HIGH Use the county Local Emergency Planning Committee to document existing capabilities for emergency communication between departments, municipalities, and organizations (railroads, utilities, etc.); identify deficiencies; and develop recommendations.	**Co-benefits:** Goal 3 – This is important information to include in emergency planning to improve communication, collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bii. HIGH Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2dii. HIGH - When mitigation funding is announced, contact owners of high-risk structures to assess interest in a mitigation application. Apply for funding as warranted.	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.
Objective: Protect existing floodplain development with wet floodproofing (to resist damage when floodwaters enter a building) and other practices.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4E, 2.4F
A2eiii. HIGH Apply for grant funding to assist interested property owners with floodproofing of existing development.	

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.
No actions were prioritized as high or medium for this goal.

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4aii. MEDIUM Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Educate the public about emergency operations (evacuation routes, shelters, etc.) and personal responsibilities for safety, preparedness, and response.	**Toolkit reference, online resources:** 4.1A, 4.2C
A4ci. MEDIUM Expand the use of social media by the county, municipalities, and first responders to disseminate information about preparedness and real-time communication during flooding or other emergencies. Promote use of the Ready Steuben application.	**Co-benefits:** Goal 3 – Real time communication of information and training are important components of emergency plans.
Objective: Promote disclosure of flood hazard information during real estate transactions.	**Toolkit reference, online resources:** 4.4C
A4di. HIGH - Develop buyer-beware materials about flood risks and provide copies to real estate professionals and others for distribution. **A4dii.** HIGH - Provide local training for insurance, real estate, and mortgage lending professionals about floodplain management and flood insurance.	**Co-Benefits:** Goal 3 – By better understanding their risk, buyers can take steps to be prepared for an emergency.
Objective: Provide stream management education that includes the impacts of stream corridor and floodplain development, impacts of land use in the watershed (agriculture, forestry, development), and stream management techniques.	**Toolkit reference, online resources:** 4.2D
A4ei. MEDIUM - Form a stream education task force to develop an outreach strategy, including dissemination of printed materials (Stream Processes Guide, brochures, etc.), interactive models, training/assistance (by SWCD), signs, and other approaches.	**Co-Benefits:** Goal 5 – Natural systems can benefit when the needs of stream channels and associated floodplains are understood and considered in land use decisions.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bii. MEDIUM Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

Village of Avoca © The Nature Conservancy

COMMUNITY PROFILE

VILLAGE OF AVOCA

CONTENTS

Current Situation

The Village of Avoca is in north central Steuben County, New York on the upper Cohocton River. It lies within the Town of Avoca and has an estimated 2018 population of 928. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within the broad river floodplain is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches, culverts and stormwater systems causing flooding on roadways, road damage and sediment accumulation on roads. In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream.

While FEMA has mapped floodplains for all waterways in the Village, they may not fully represent current flood hazards. FEMA maps have not been updated since 1983 and therefore may not reflect land use changes that have occurred since. Additionally, while the Village is protected by a levee system, levees do not protect the community from all flood damages and FEMA maps do not depict the flood hazard to areas located behind the levee. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Village better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

Village of Avoca levee.
© The Nature Conservancy

The Village amended their Land Use and Development Law in 2005, which includes Special Permit and Subdivision requirements that discourage vulnerable uses in floodplains. These regulations also encourage vegetated buffers and/or wetlands along waterways, but this stream setback provision does not apply to all types of uses or in all zones. It adopted a Comprehensive Plan in 2010 but it is void of any reference to natural resource protection, stormwater management, flooding, levees or floodplains. Adopted in 1987, the Village's local flood damage prevention law is not consistent with floodplain standards in the NYS Uniform Code and should be updated based on the most recent NYS Model Local Law.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The village is identified as a "structural hotspot" [1] due to its high concentration of structures built before the first Flood Insurance Rate Maps were adopted which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The value and number of flood-vulnerable homes increases dramatically (Table VA1) when areas are included that are behind the levee and thus are not protected from the largest floods. The village is also identified as a "social hotspot" due to its high concentration of residents subject to flood impacts who may not have the resources to prepare for, respond to, or recover from flooding. When all uses in areas identified as physically vulnerable are examined, $942,000 in assessed value of community service structures are identified (Table VA1). The vulnerability of these types of structures is compounded by the fact that the Village has a high proportion of people likely to be affected by flooding (whether due to social factors, because their homes were built prior to floodplain development standards, or because they go to work, school or other activities out of the Village – if roads wash out, they will be in jeopardy).

The Village is surrounded by three miles of earthen levee and last experienced a "significant" flood event in the 1930s. The exception is the N. Main Street area which is not protected by the levee and has experienced intense flooding over the past 50 years. The levee system should be evaluated and certified by an engineer and then accredited by FEMA. Without this accreditation, levee protected areas will be designated as high-risk flood zone.

Table VA1. A comparison of assessed values across land use categories within the Village of Avoca. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $10.4 million	Assessed at $599,000
Residential	163 structures assessed at $7.5 million	11 structures assessed at $570,000
Commercial	Assessed at $850,000	Assessed at $29,000
Community Services	Assessed at $942,000	No assessed properties in this category

Levee protected development along Salmon Creek.
© The Nature Conservancy

A Path Forward

Through the Flood Smart Approach, the Village of Avoca (V. Avoca) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1), of which V. Avoca prioritized 15. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table VA2 cross-walks the goals with Core Team recommendations and V. Avoca's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table VA2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources	**A1ai, di**	**A2di, ii**	**A3ci**		
R2. Assess municipal facilities and mitigate	**A1ai**	**A2di, ii**	**A3ci**	**A4ai, ii**	
R3. Educate & assist residents		**A2di, ii**		**A4ai, ii; A4bi**	
R4. Educate & assist businesses		**A2di, ii**		**A4ai, ii; A4bi**	
R5. Educate & assist in levee protected areas					
R6. Protect remaining undeveloped floodplains			**A3di, ii**	**A4bi**	
R7. Protect & restore forested riparian buffers		**A2ai**			**A5bi, ii, iii; A5cii**
R8. Contribute funding to EES for gauges			**X**		
R9. Use forecasts & gauge data in plans			**X**		
R10. Limit or avoid development in most risky places		**A2ai**	**A3di, ii**	**A4bi**	**A5bi, ii, iii; A5cii**
R11. Use standards to improve flood safety			**X**		
R12. Maintain Stormwater system & comply with state stormwater permits					**X**

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: V. Avoca has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is thus imperative that first responders and service organizations can provide emergency assistance. V. Avoca and Town of Avoca facilities are in the levee protected area; however, levees cannot provide protection from all floods and thus municipal facilities should be assessed for their vulnerability.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

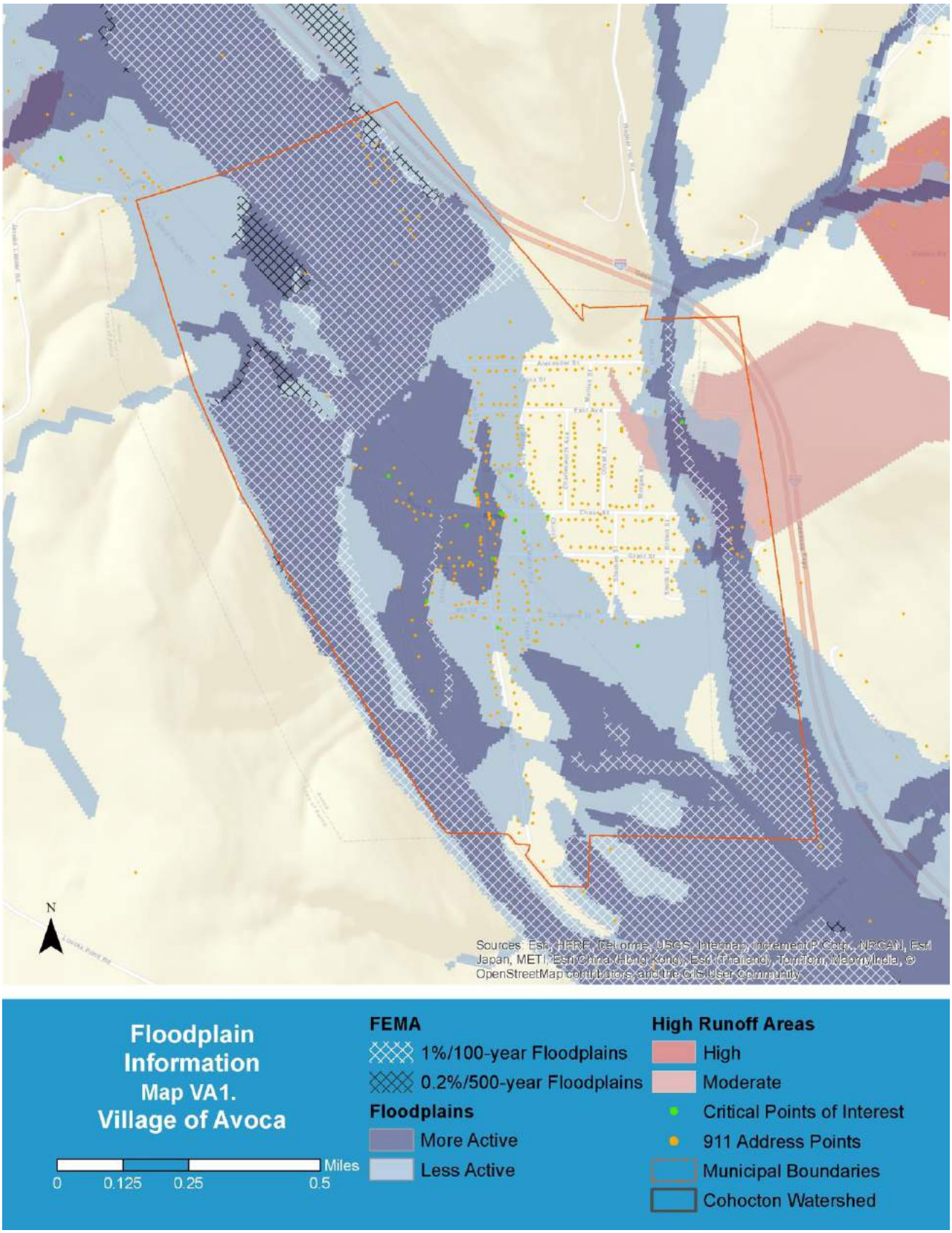
Avoca Town Highway Shop, Avoca Village Street Department, Avoca Fire Ambulance Department, Avoca Hose Company, Village and Town Offices and Court, Avoca Post Office, Haines Airfield, Cohocton Valley Home, Five Star Bank, Avoca Baptist Church, municipal water lines, and municipal drinking water facilities are at risk of flooding.

What the maps show:

Map VA1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green.
Map VA2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants. See the Toolkit Section in Chapter 3.

FLOODPLAIN INFORMATION VA1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: Roughly three-quarters of the Village's assessed value in floodplains is residential and approximately 150 homes have flood risk but are not mapped by FEMA. This means they are not likely covered by floodplain development standards or by flood insurance. Additionally, 10% of the assessed value in floodplains is attributed to properties that are categorized as providing a community service, services that may be needed in helping Village residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

R5. Educate and assist residents and business owners in levee protected areas to act to reduce their flood vulnerability.

Where is this particularly important:

Particularly vulnerable areas[4] include agricultural properties on Route 415 at Reservoir Rd./Mackey Rd., properties on N. Main St. north (outside) of the levee, the area around the intersection of Wagner Hill Rd/Ward St. and East Ave., the neighborhood at the intersections of Grant St. and Chase St. with Salmon Creek, and the west side of the village.

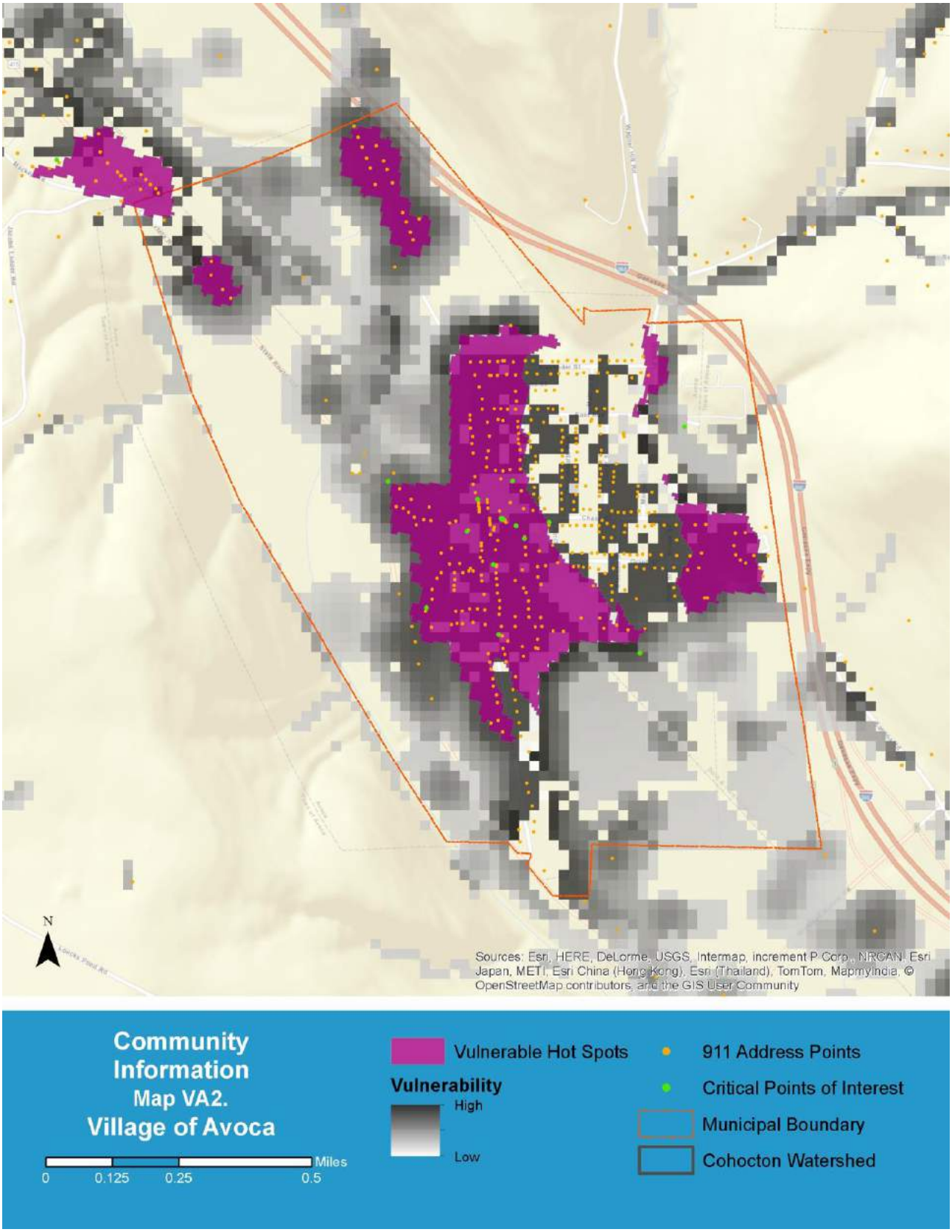
What the maps show:

Map VA2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

COMMUNITY INFORMATION VA2



NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R6. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R7. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

Where is this particularly important:

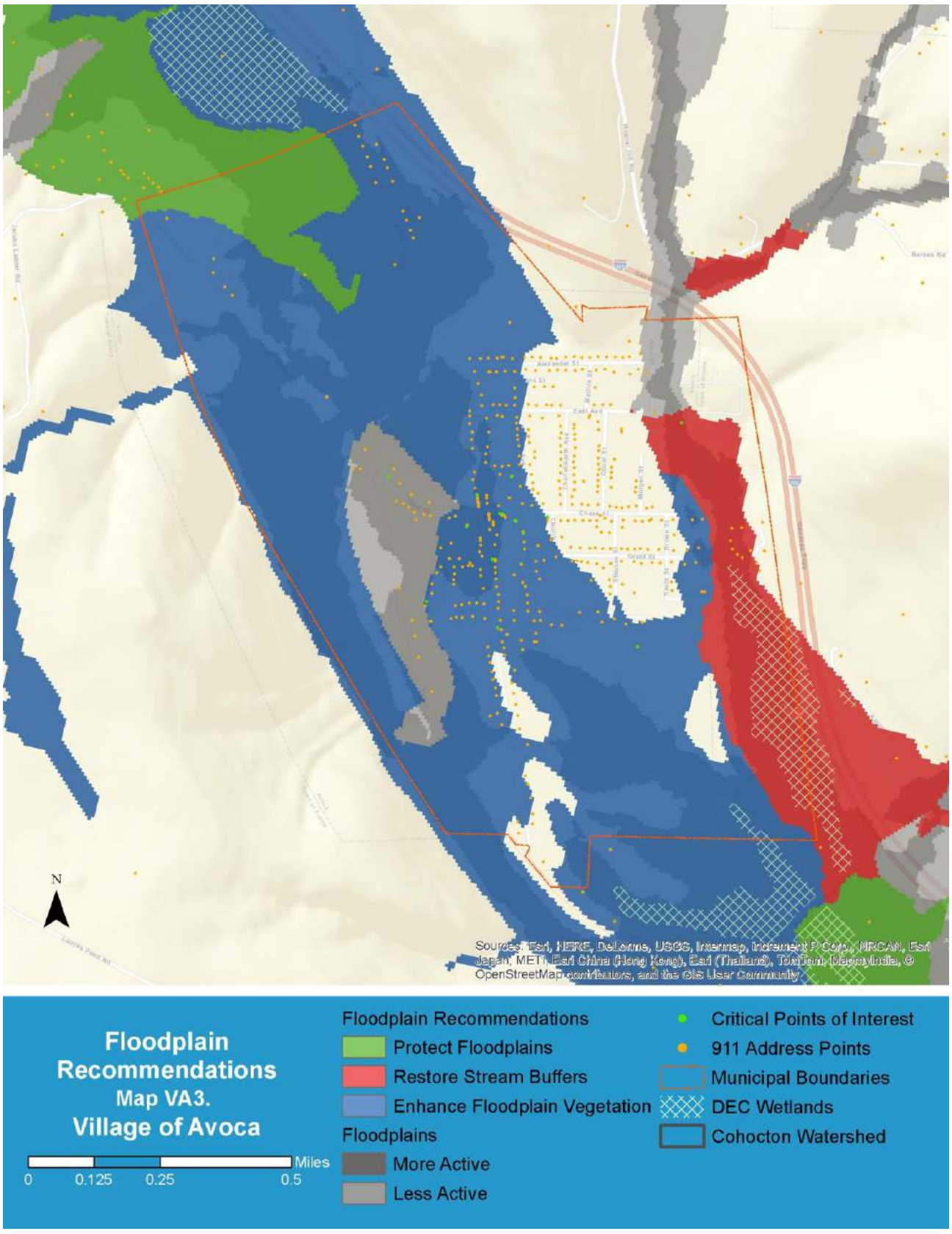
Salmon Creek and the Cohocton River

What the maps show:

Map VA1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map VA3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R6) so they continue to provide that benefit (in green and blue) or restore (R7) so they can function better (in red).

Information on How to do this: V. Avoca should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the village from surrounding jurisdictions, V. Avoca should also work with upstream communities, like Towns of Avoca and Cohocton, to determine suitable methods for protecting or enhancing floodplains and wetlands particularly along reaches of Salmon Creek upstream of the Village. Local land trusts or state agencies may partner to protect these valuable resources. V. Avoca could work with Steuben County Soil and Water Conservation District (SWCD) and other partners to identify possible projects.

FLOODPLAIN RECOMMENDATIONS VA3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes a real time river gauge at Avoca and two downstream in Bath and Campbell, which are operated by the US Geological Survey (USGS) with locally-operated Environmental Emergency Services (EES) gauges providing backup data at each site. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath which support flood warnings for the entire river. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County and municipal governments are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R8. Contribute funding to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R9. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map VA1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Village regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R10. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R11. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map VA1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching mainly due to the protection of the levee for all but the largest floods. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Village has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited. Or the existing floodplain overlay zone could be used to require additional considerations before approving floodplain development proposals. The Village could apply stream setback requirements to all buildings and all zones.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

Much of V. Avoca is flat and thus suitable for encouraging surface runoff to slow, spread and soak into the ground where it falls. Water flowing across smooth surfaces quickly finds its way into rivers and streams, with much of this water arriving at the same time and contributing to high peak flows. Vegetation, low spots, and uneven surfaces can reduce flooding by holding back the water. Allowing runoff to spread out, rather than concentrating flows in ditches or channels, slows the water and absorbs its energy. This reduces erosion and peak flows. Water that soaks into the soil is water that does not contribute to flooding.

V. Avoca maintains a stormwater system in its downtown area. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Recommendations:

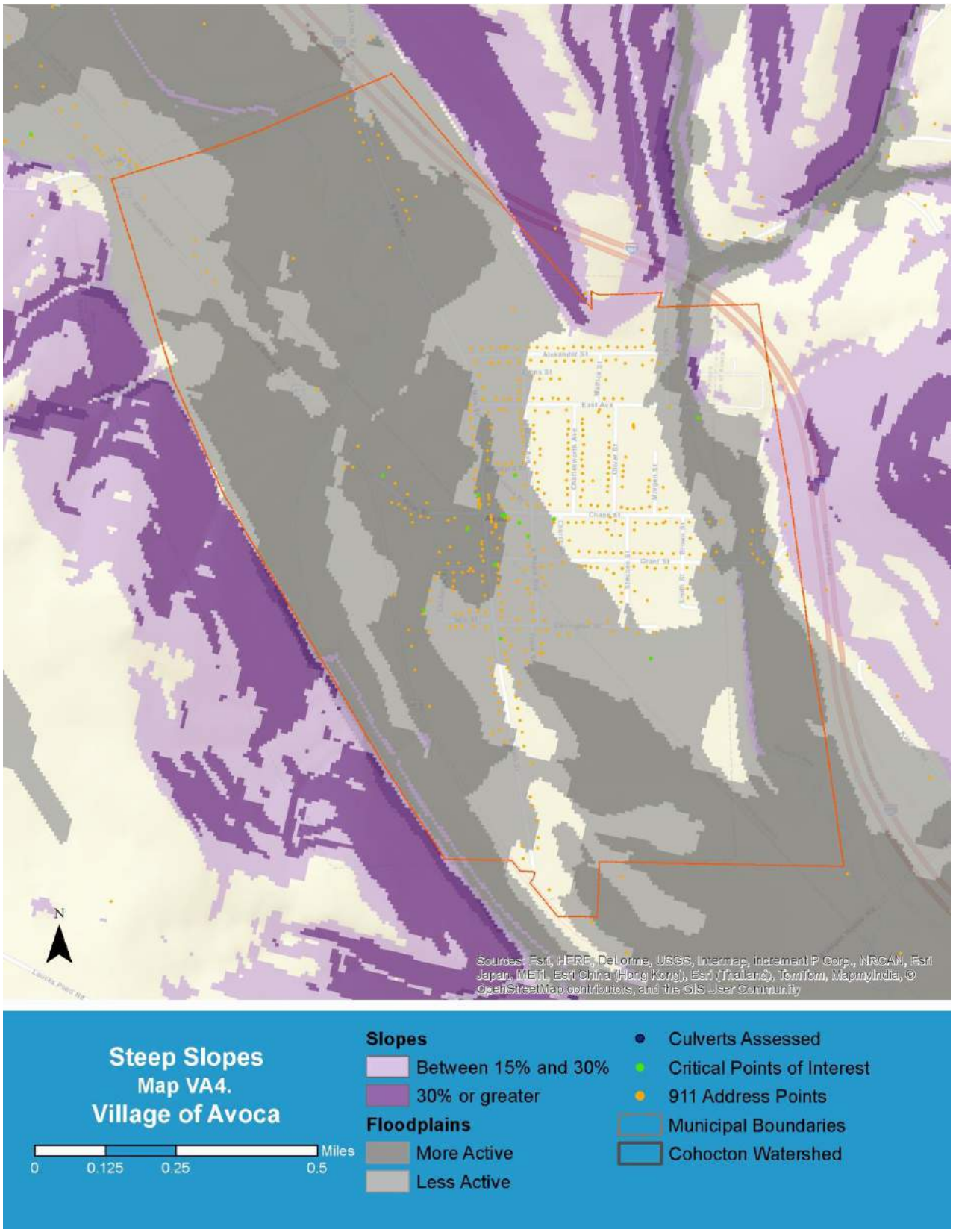
R12. Support compliance with state stormwater permits for construction activities. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

What the maps show:

Map VA3. The large extent of floodplain in shades of blue indicates V. Avoca is very flat and much of it is elevationally connected to the Cohocton River. Map VA4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%. While V. Avoca has few steep slopes within its boundaries, there are many upstream of the village that contribute surface runoff to the river and Salmon Creek.

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), maintain drainage systems/storm sewers, increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

STEEP SLOPES VA4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by V. Avoca. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. HIGH Seek alternate locations and funding to relocate critical facilities.	**Co-Benefits:** Goal 2 – Mitigating flooding for facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**Toolkit reference, online resources:** 1.2B, 1.3A
A1di. HIGH Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emergency assistance.	**Co-Benefits:** Goal 3 – This is important information to include in emergency planning to improve collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. HIGH Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. HIGH Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years). **A2dii.** HIGH When mitigation funding is announced, contact owners of high-risk structures to assess interest in a mitigation application. Apply for funding as warranted.	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Conduct asset planning for highways and other municipal services, including assessment of vulnerability to flooding.	**Toolkit reference, online resources:** 3.2B, 3.7B, 3.9A
A3ci. HIGH Conduct a flood vulnerability assessment and develop a plan for improving flood resiliency for highway departments and other municipal services.	**Co-Benefits:** Goal 1 – Improving flood resiliency not only reduces flood impacts to municipal assets but also enables continuity of municipal services. Goal 3 – Important information to include in emergency planning.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3di. HIGH Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards. **A3dii.** HIGH Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4ai. HIGH Convene an inter-municipal flood education task force to develop an outreach strategy with targeted messages, audiences, and outreach methods. **A4aii.** HIGH Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Train municipal boards and elected officials on floodplain management regulations.	**Toolkit reference, online resources:** 2.2A, 2.2B, 2.2C, 2.2D, 2.2E, 2.4B
A4bi. HIGH Participate in training about floodplain management, stormwater management, road drainage, use of mapping tools, and other natural resource topics, which are periodically offered at STC Regional Leadership Conference, Planning School, Cornell Local Roads Highway School, and other venues. Supplement this with additional interactive training at municipal Planning Board meetings.	**Co-benefits:** Goal 2 – This type of training is intended to result in informed decisions that reduce property damage. Goal 3 – Knowledge of regulations results in more effective and consistent enforcement. Goal 5 – Effective enforcement of regulations can encourage maintaining a buffer of natural floodplains between people and floods.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. HIGH Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** HIGH Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** HIGH Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5cii. HIGH Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

COMMUNITY PROFILE

VILLAGE OF COHOCTON

CONTENTS

Current Situation

The Village of Cohocton is in northwest Steuben County, New York on the upper Cohocton River. It lies within the Town of Cohocton and has an estimated 2018 population of 841. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within the broad river floodplain is vulnerable to flooding with additional flood risks along tributary streams and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches, culverts and stormwater systems causing flooding on roadways, road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture). In some locations, flooding problems are made worse by unstable stream banks and trees or other debris that naturally accumulate within the stream.

While FEMA has mapped floodplains for all waterways in the Village, they may not fully represent current flood hazards. FEMA maps have not been updated since 1983 and therefore may not reflect land use changes that have occurred since nor do they capture a topographical depression on the southeast side of the Village along Route 415 that is known to cause flood problems. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Village better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The Village updated its zoning regulations in 2010 ("The Zoning Law of the Village of Cohocton, NY") which models best practice language with respect to stream setbacks or riparian buffers. It enacted a Local Law for Flood Damage Prevention as an overlay district within the zoning law (Cohocton Village Zoning Law, Section 310 District Regulations, Flood Plain Overlay Zone), but the language has not been updated since the 1980s, so it does not reflect changes that have been made to the NYS Model Local Law and the NYS Uniform Code. The Village adopted a Comprehensive Plan in 2019.

Sediment accumulation at the Maple Avenue bridge, Village of Cohocton.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The Village is identified as a "structural hotspot" [1] due to its high concentration of floodplain structures built before the first Flood Insurance Rate Maps were adopted by the Village, which means many homes were not built to modern building regulations and are at risk of being impacted by a flood. The value and number of flood-vulnerable homes increases dramatically (Table VC1) when considering all floodplains not just those mapped by FEMA. The Village is also identified as an "social hotspot" due to its high concentration of residents in flood-prone areas who may not have the resources to prepare for, respond to, or recover from flooding. When all property types in floodplains are examined, $511,000 in assessed value of community and public service structures are identified (Table VC1). The vulnerability of these types of structures is compounded by the fact that the Village has a high proportion of people likely to be affected by flooding (whether due to social factors, because their homes were built prior to floodplain development standards, or because they go to work, school or other activities out of the Village – if roads wash out, they will be in jeopardy).

Table VC1. A comparison of assessed values across land use categories within the Village of Cohocton. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $6.3 million	Assessed at $415,000
Residential	108 structures assessed at $4.7 million	9 structures assessed at $315,000
Businesses		2 businesses with an estimated economic output of $1.8 million
Community Services/Public Services	Assessed at $511,000	Assessed at $48,000

Road damage caused by flash flooding and erosion, Steuben County. Photo courtesy of Steuben County Office of Emergency Services.

A Path Forward

Through the Flood Smart Approach, the Village of Cohocton (V. Cohocton) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1), of which V. Cohocton gave the highest priority to seven and medium to seven others. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table VC2 cross-walks the goals with Core Team recommendations and V. Cohocton's prioritized actions. Since Flood Smart communities: Cohocton River was initiated, the V. Cohocton has completed an emergency plan and addressed flooding in its Comprehensive Plan. It has completed two actions that it originally prioritized, thus they have been removed from Table VC2 (A1bi and A1di).

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table VC2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Relocate crucial resources	A1ai	A2di, ii			
R2. Assess municipal facilities and mitigate	A1ai; A1bi	A2di, ii			
R3. Educate & assist residents		A2ci; A2di, ii; A2fi, ii	A3ai		
R4. Educate & assist businesses		A2ci; A2di, ii; A2fi, ii	A3ai		
R5. Protect remaining undeveloped floodplains		A2ai			A5bi, ii, iii; A5cii
R6. Protect & restore forested riparian buffers		A2ai			A5bi, ii, iii; A5cii
R7. Contribute funding to EES for gauges			X		
R8. Use forecasts & gauge data in plans	A1bi		A3ei		
R9. Limit or avoid development in most risky places		A2ai; A2bii; A2ci			A5cii
R10. Use standards to improve flood safety		A2bii; A2ci	A3di		
R11. Comply with state stormwater permit					A5ci
R12. Limit land use on steep slopes					A5cii
R13. Modify roadside ditch cleaning practices	X				X
R14. Right-size road stream crossings					A5bi, ii

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: V. Cohocton has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is thus imperative that first responders and service organizations can provide emergency assistance. The Maple Ave/Route 415 bridge in the Village is specifically vulnerable to flooding because it can plug with sediment and debris which could cause flooding in the surrounding neighborhood.

Recommendations:

R1. Relocate resources crucial to flood response and recovery to higher ground; work with remaining critical facilities to prepare emergency response and flood mitigation plans then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

Cohocton Village Barns, St. Paul's Lutheran Church and Red Cross Shelter, Cohocton Landing Zone, B&B Enterprises Towing, municipal water lines, and municipal drinking water facilities are at risk of flooding.

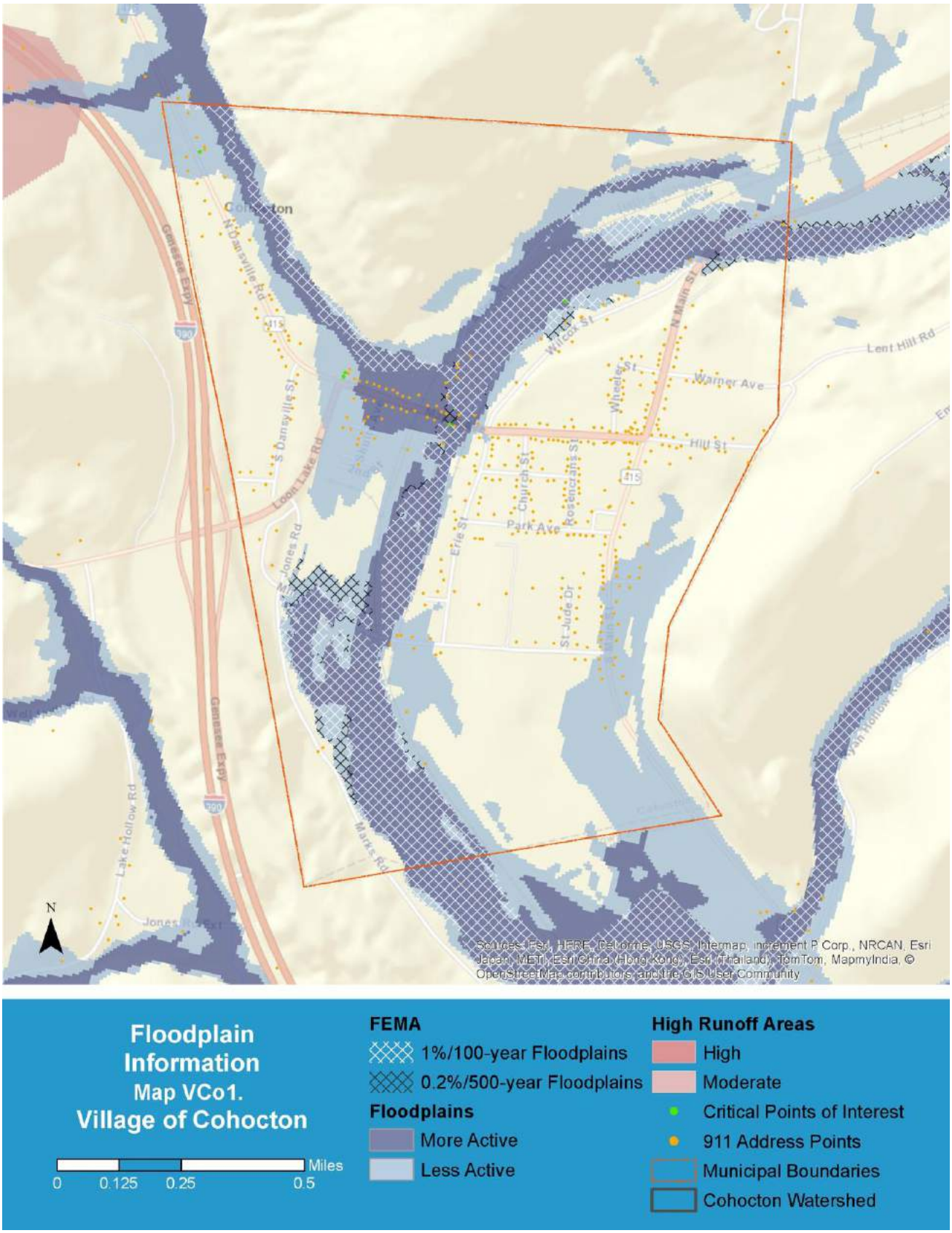
What the maps show:

Map VCo1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green.

Map VCo2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants. See the Toolkit Section in Chapter 3.

FLOODPLAIN INFORMATION VCo1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: Roughly three-quarters of the Village's assessed value in floodplains is residential and approximately 100 homes have flood risk but are not mapped by FEMA. This means they are not likely covered by floodplain development standards or by flood insurance. Additionally, 10% of the assessed value in floodplains is attributed to properties that are categorized as providing a community or public service, services that may be needed in helping Village residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

Where is this particularly important:

Particularly vulnerable areas[4] lie along Allen Street and Wilcox Street, to the west of the Cohocton River along Maple Avenue, and on the east side of S. Main Street between Park Avenue and Mill Street.

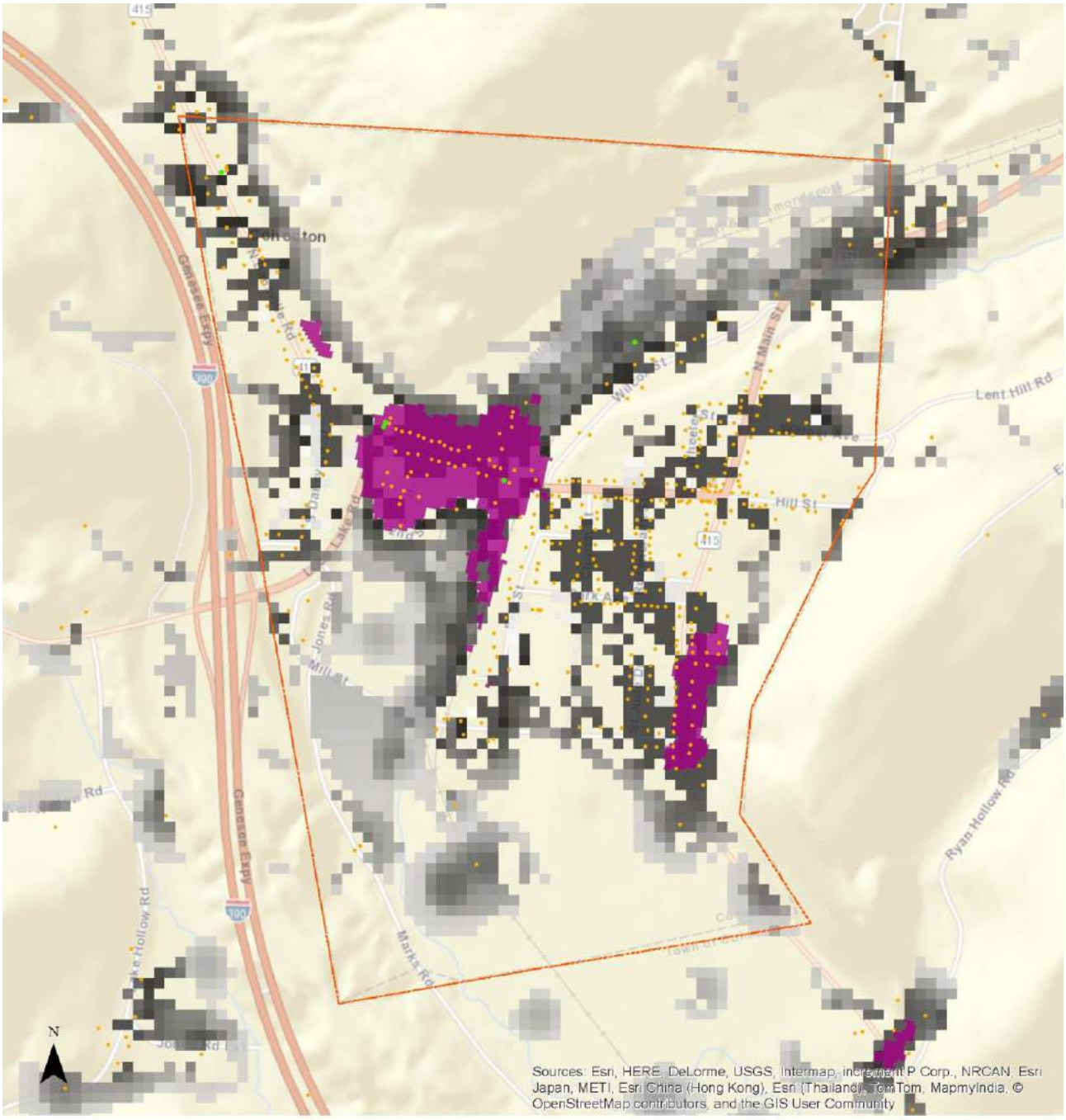
What the maps show:

Map VCo2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Industrial and commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

COMMUNITY INFORMATION VCo2



Community Information
Map VCo2.
Village of Cohocton

0 0.125 0.25 0.5 Miles

Vulnerable Hot Spots

Vulnerability
High
Low

911 Address Points
Critical Points of Interest
Municipal Boundary
Cohocton Watershed

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R5. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R6. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

Where is this particularly important:

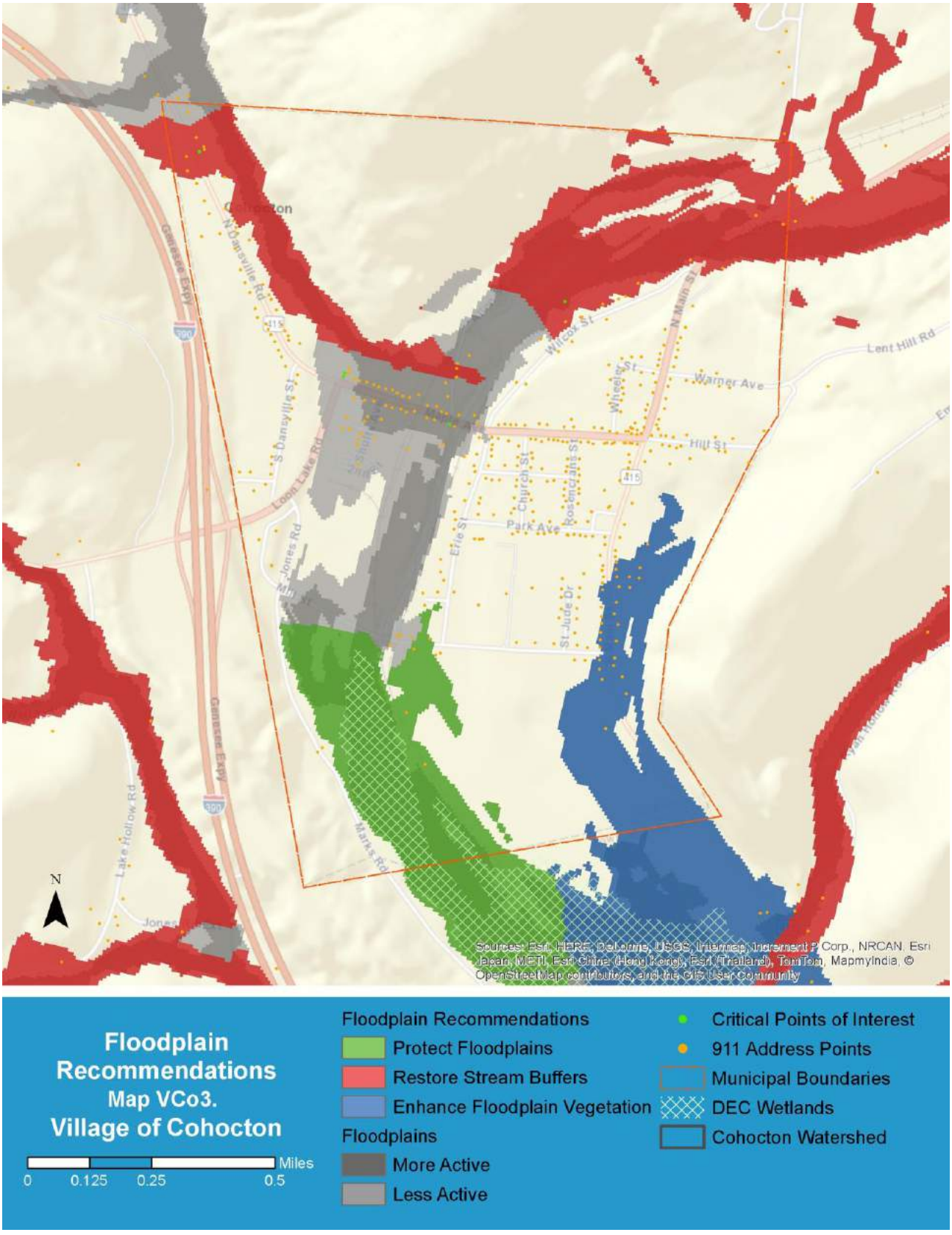
Along the Cohocton River upstream and downstream of the downtown area of the Village and the small tributary entering the River just north of the Maple St. bridge from the west.

What the maps show:

Map VCo1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map VA3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R5) so they continue to provide that benefit (in green and blue) or restore (R6) so they can function better (in red).

Information on How to do this: V. Cohocton should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the Village from surrounding jurisdictions, V. Cohocton should also work with its upstream neighbor, the Town of Cohocton, to determine suitable methods for protecting or enhancing floodplains and wetlands, particularly along the Cohocton River upstream of the village. Local land trusts or state agencies may be interested in partnering to protect these valuable resources. V. Cohocton could work with Steuben County Soil and Water Conservation District (SWCD), the Upper Susquehanna Coalition, and other partners to identify possible restoration projects.

FLOODPLAIN RECOMMENDATIONS VCo3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network can support advance warning. However, because V. Cohocton is located at the headwaters of the Cohocton River, existing streamflow gauges are located downstream (in Avoca, Bath, Campbell, and Erwin) where real-time data are of limited value to the Village. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath, which support flood warnings for the entire river. In addition, Environmental Emergency Services (EES) operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County and municipal governments are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R7. Contribute funding to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R8. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map VCo1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Village regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R9. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R10. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map VA1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Village has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited. Subdivision regulations and stronger site plan review standards could discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R11. Support compliance with state stormwater permits for construction activities. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R12. Limit land use on steep slopes (>15%).

R13. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R14. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map VCo4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

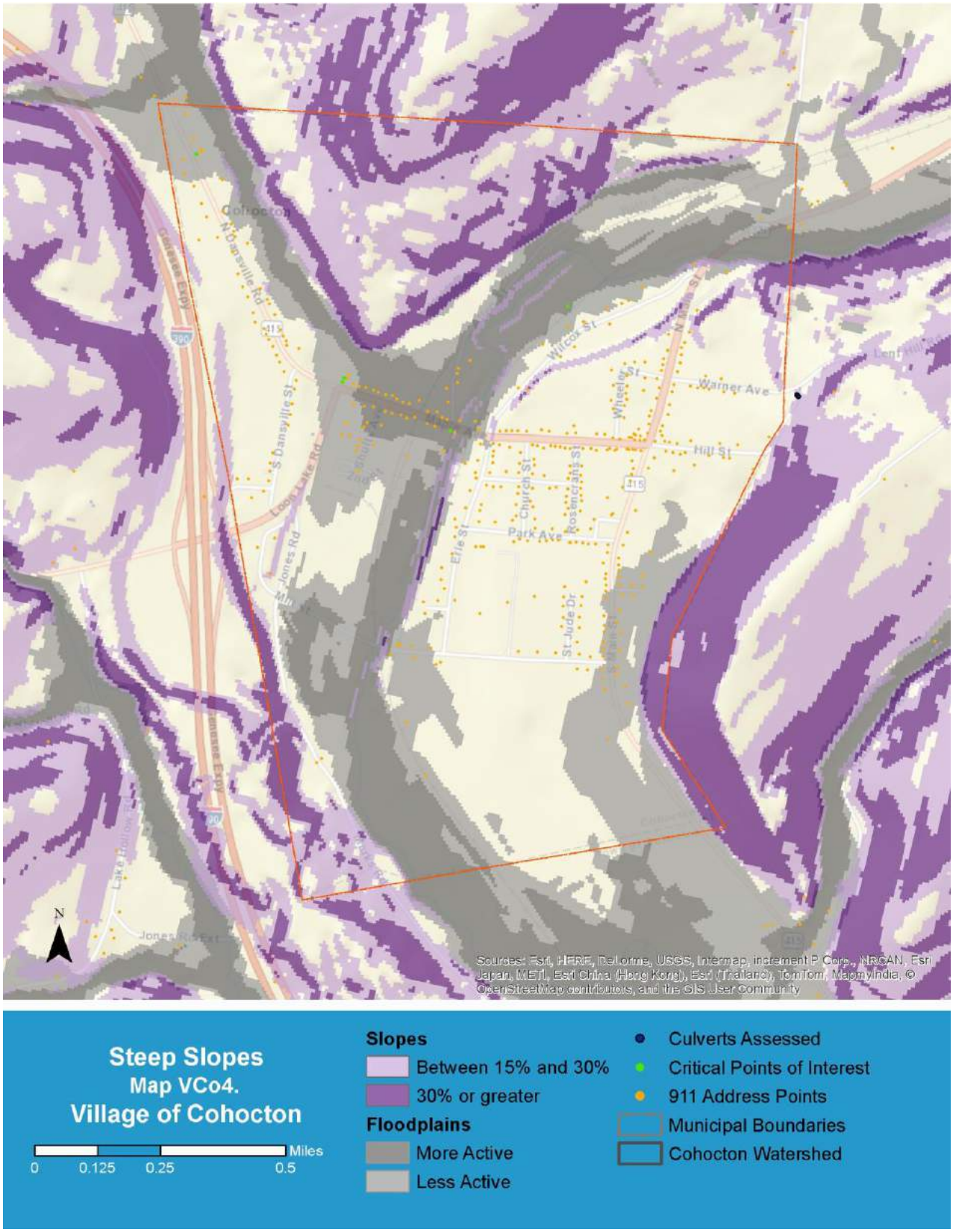
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES VCo4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by V. Cohocton. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. MEDIUM Seek alternate locations and funding to relocate critical functions (such as emergency shelters) from flood-prone locations.	**Co-Benefits:** Goal 2 – Mitigating flooding for facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.

Goal 2: Minimize flood damage to property.	
Objective: Enact stream setback requirements.	**Toolkit reference, online resources:** 2.2A
A2ai. HIGH Draft and enact appropriate stream corridor protections in municipal land use regulations.	**Co-Benefits:** Goal 3 – This is an important land use management tool for keeping buffers between people and floods. Goal 5 – Protecting stream corridors allows them to continue to mitigate flood flows, filter water and provide habitat.
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bi. HIGH Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development. **A2bii.** HIGH Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**Toolkit reference, online resources:** 2.2A
A2ci. HIGH Municipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists.	**Co-Benefits:** Goal 3 –This process is an important land use management tool for keeping development out of harm's way. Goal 4 – Providing a process to local decision makers wil ensure that the appropriate information and check points are being included. Goal 5 – A strong review process can keep development out of harm's way and maintain natural floodplains.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. MEDIUM Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years). **A2dii.** MEDIUM When mitigation funding is announced, contact owners of high-risk structures to assess interest in a mitigation application. Apply for funding as warranted.	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 2: Minimize flood damage to property (continued).	
Objective: Ensure that all fuel tanks in the floodplain are anchored and protected.	**Toolkit reference, online resources:** 2.4G, 2.5A
A2fi. HIGH Provide building officials and propane/fuel oil providers with information and training about installation and permitting of fuel tanks in the floodplain. **A2fii.** MEDIUM Municipality sends a letter to floodplain residents about the need to anchor fuel tanks.	**Co-Benefits:** Goal 4 – This provides decision makers with important information.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Inventory assets in flood-prone areas (in and outside of the regulated floodplain).	**Toolkit reference, online resources:** 3.1B, 3.3B, 3.7A
A3ai. MEDIUM Develop an inventory of existing assets and uses (including special needs populations and hazardous substances) in the regulated FEMA floodplain and other flood-prone areas. Encourage individuals to register for the County's special/functional needs inventory.	
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3dii. MEDIUM Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.
Objective: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**Toolkit reference, online resources:** 1.9A, 3.4A, 3.7C
A3ei. HIGH Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc., and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts.	

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.
No actions were assigned a high or medium priority.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. MEDIUM Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** MEDIUM Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** MEDIUM Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. MEDIUM Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** MEDIUM Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

Village of Painted Post © The Nature Conservancy

COMMUNITY PROFILE

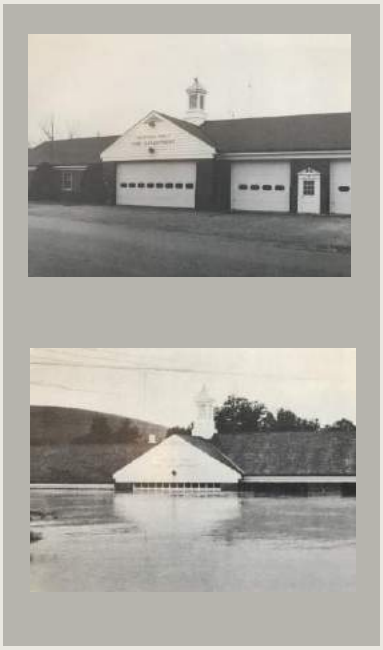
VILLAGE OF PAINTED POST

CONTENTS

Current Situation

The Village of Painted Post is in southeast Steuben County, New York on the Lower Cohocton River at the confluence of the Cohocton, Tioga and Chemung Rivers. It lies within the Town of Erwin and has an estimated 2018 population of 1,801. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within these broad river floodplains is vulnerable to flooding with additional flood risks along tributary streams and drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches, culverts and stormwater systems causing flooding on roadways, road damage and sediment accumulation on roads. Flood hazards are also increased by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture). Although the Village does not directly experience flooding from ice jams, Village officials sometimes are unaware of ice jam breakups upstream, which can cause problems.



The Painted Post Fire Department before (top) and during (bottom) flooding in 1972. Photos courtesy of Village of Painted Post.

While FEMA has developed a map to regulate floodplain development, it may not fully represent current flood hazards. There are no structures in the FEMA high-hazard (1% annual probability/100-year) floodplains in the Village of Painted Post. The FEMA map was updated in 2000, with the levee-protected area shown as a moderate hazard floodplain (0.2% annual probability/500-year). While the Village is protected by a levee system, levees do not protect the community from all flood damages and FEMA maps do not depict the flood hazard to areas located behind the levee. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Village better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The Village of Painted Post Comprehensive Plan was updated in 2017 and effectively addresses flood risks within the Village. The Village enacted a local law for Flood Damage Protection (Local Law No. 1 of 2000), which regulates any development that may occur in the FEMA-mapped high-hazard floodplain. At the time of this writing, the Zoning Law was being updated based on the Comprehensive Plan. The 2014 Zoning Law includes numerous flood resiliency requirements, including a 50-foot stream setback for structures, vegetated buffers along waterways, drainage requirements for driveways and new roads, stormwater management requirements and steep slope restrictions.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. Although there are no structures located in the FEMA-mapped floodplain, the number and value of homes behind the levee is significant (Table VPP1) and may not be protected from the largest floods. The Village is also identified as an "economic hotspot" due to its high concentration of economically valuable assets that could be impacted by a flooding event that affects levee-protected floodplains (Table VPP1).

The Corning/Painted Post area is protected by a 9-mile levee system. During the 1972 Hurricane Agnes food, the Hodgman Creek dike was compromised, and the Ingersoll-Rand Plant had to be evacuated. Painted Post was inundated by 30 feet of water. After this disaster, the levee was repaired and flood control dams were constructed in the Tioga River watershed, reducing the flood risk along the Tioga River and backwater effects on the lower Cohocton River. The levee system should be evaluated and certified by an engineer and then accredited by FEMA. Without this accreditation, levee protected areas will be designated as high-risk flood zone.

Road damage from flash flooding and erosion, Steuben County. Photo courtesy of Steuben County Office of Emergency Management.

Table VPP1. A comparison of assessed values across land use categories within the Village of Painted Post. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $61.8 million	0 structures
Residential	492 structures assessed at $29.3 million	0 structures
Businesses	24 businesses with an estimated economic output of $72 million	0 businesses
Commercial	Assessed at $15.7 million	0 commercial structures
Industrial	Assessed at $6.8 million	0 industrial structures
Community Services	Assessed at $6.3 million	0 community service structures

A Path Forward

Through the Flood Smart Approach, the Village of Painted Post (V. Painted Post) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1) of which V. Painted Post prioritized 18. To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals. Table VPP2 cross-walks the goals with Core Team recommendations and V. Painted Post's prioritized actions.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table VPP2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions (A#, green = high, black = medium) established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Prepare emergency plans and mitigate		A2di	A3ci		
R2. Assess municipal facilities and mitigate	A1aii; A1bi	A2di	A3ci		
R3. Educate & assist residents		A2di, ii			
R4. Educate & assist businesses		A2di, ii			
R5. Educate & assist in levee protected areas				A4ci, ii	
R6. Protect & restore streams					A5ai; A5bi, ii, iii; A5cii
R7. Contribute funding to EES for gauges			X		
R8. Use forecasts & gauge data in plans	A1bi		A3ei		
R9. Monitor river ice and improve communication about ice jams	X				
R10. Limit or avoid development in most risky places			A3bi; A3dii		A5cii
R11. Use standards to improve flood safety			A3dii		
R12. Manage stormwater & maintain systems					A5ci
R13. Modify roadside ditch cleaning practices					A5bi, ii
R14. Right-size road stream crossings			A3ci		A5bi, ii

Recommendations

CRITICAL AND MUNICIPAL FACILITIES

Why this is important: V. Painted Post has a high proportion of residents who are likely to be affected by flooding because they are elderly, disabled or otherwise without the resources to prepare for, respond to or recover from flooding. It is thus imperative that first responders and service organizations can provide emergency assistance. V. Painted Post and Town of Erwin (T. Erwin) facilities are in the levee protected area. Because levees cannot provide protection from all floods, municipal facilities should be assessed for their vulnerability.

Recommendations:

R1. Work with all critical facilities to prepare emergency response and flood mitigation plans; then mitigate flood risk.

R2. Assess the flood vulnerability of municipal facilities and seek or set aside funding to undertake protective measures, such as dry floodproofing, flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, and/or securing a means of backup power generation.

Where is this particularly important:

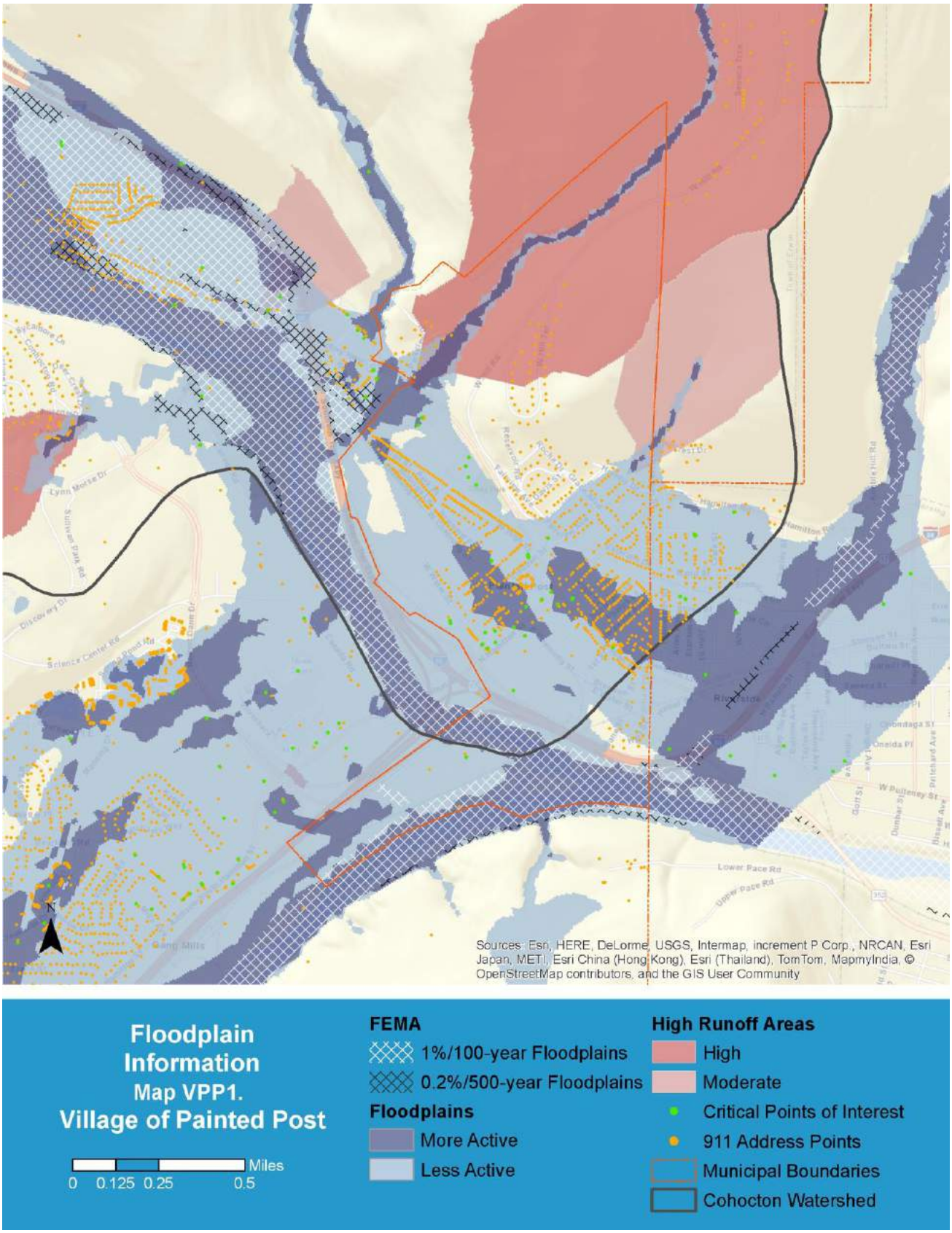
Painted Post Police Department, Fire Department and Village Offices, Painted Post Post Office, Painted Post Monument, Painted Post-Erwin Museum at the Depot, Corning-Painted Post Board of Education, Corning-Painted Post Middle School and Red Cross Shelter, Dresser-Rand, Village Mini-Mart, Craig Park pump house, pool and skate park, Quail Bay West Apartments, Village Square Apartments, M&T Bank, Chemung Canal Trust Co. Bank, First Heritage Federal Credit Union, First Baptist Church, First Presbyterian Church, Church of Immaculate Heart of Mary, NYSEG Ingersoll Rand substation, municipal water lines, and municipal drinking water facilities are at risk of flooding.

What the maps show:

Map VPP1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green. Map VPP2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: At risk resources should be identified, prioritized, and included in the Steuben County Hazard Mitigation Plan. This will make these projects eligible to apply for mitigation grants. See the Toolkit Section in Chapter 3.

FLOODPLAIN INFORMATION VPP1



COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: Roughly half of the Village's assessed value in floodplains is residential and about one-third is commercial or industrial but no structures are located in FEMA floodplains. This means many structures are not likely covered by floodplain development standards or by flood insurance. Additionally, 10% of the assessed value in floodplains is attributed to properties that are categorized as providing a community service, services that may be needed in helping Village residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R3. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R4. Educate and assist commercial property owners with wet floodproofing and dry floodproofing protection measures.

R5. Educate and assist residents and business owners in levee protected areas to act to reduce their flood vulnerability.

Where is this particularly important:

Particularly vulnerable areas[4] include development between Hodgman Park and W. High Street/Route 415 as well as neighborhoods on the east side of the Village north of E. High Street/Route 415.

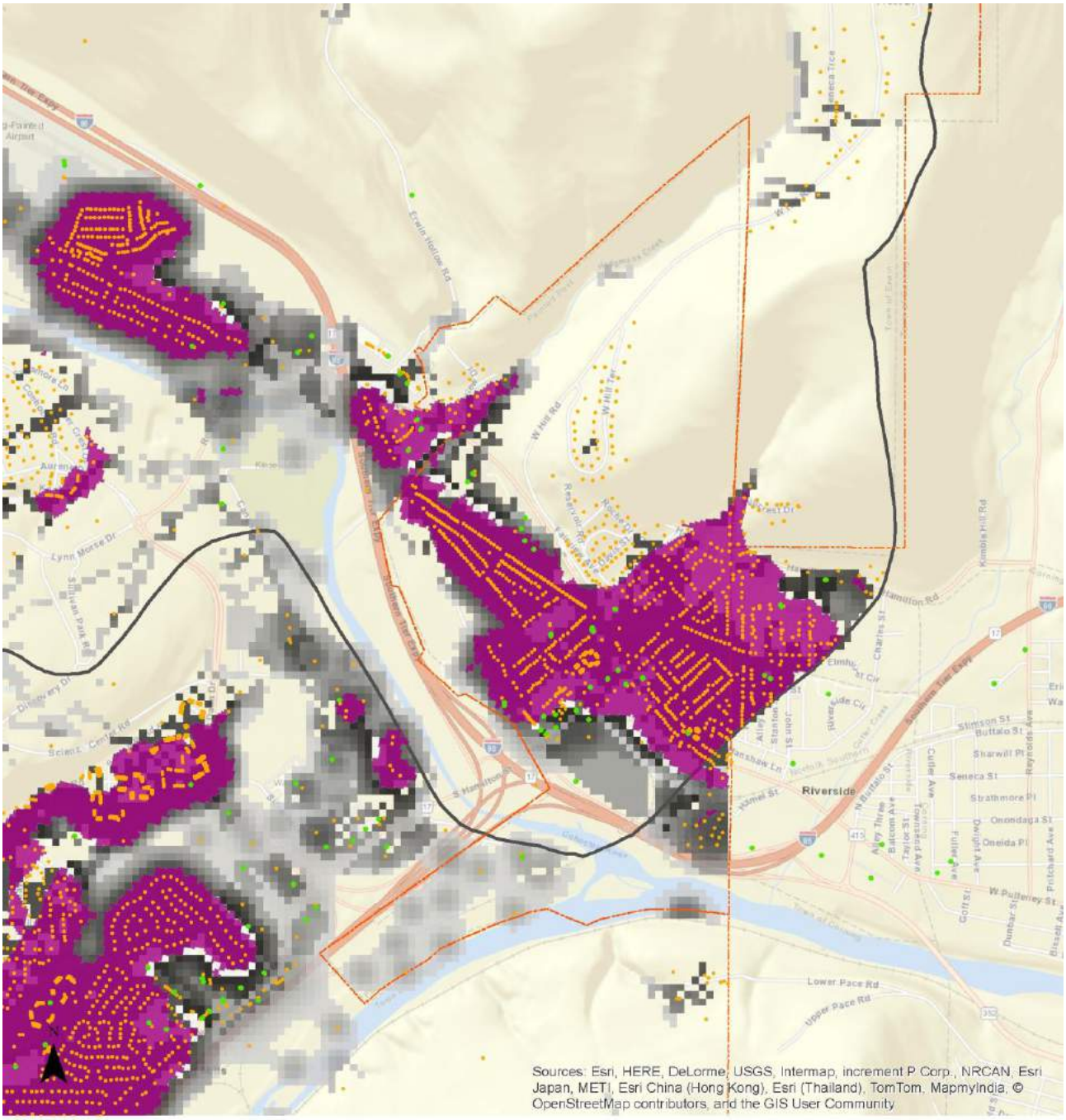
What the maps show:

Map VPP2. Note vulnerable hot spots in dark pink, critical facilities in green and 911 address points in orange that lie in them.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Industrial and ommercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

COMMUNITY INFORMATION VPP2



Community Information
Map VPP2.
Village of Painted Post

0 0.2 0.4 0.8 Miles

Vulnerable Hot Spots

Vulnerability
High
Low

911 Address Points
Critical Points of Interest
Municipal Boundary
Cohocton Watershed

NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R6. Restore stream systems to stabilize streambanks.

Where is this particularly important:

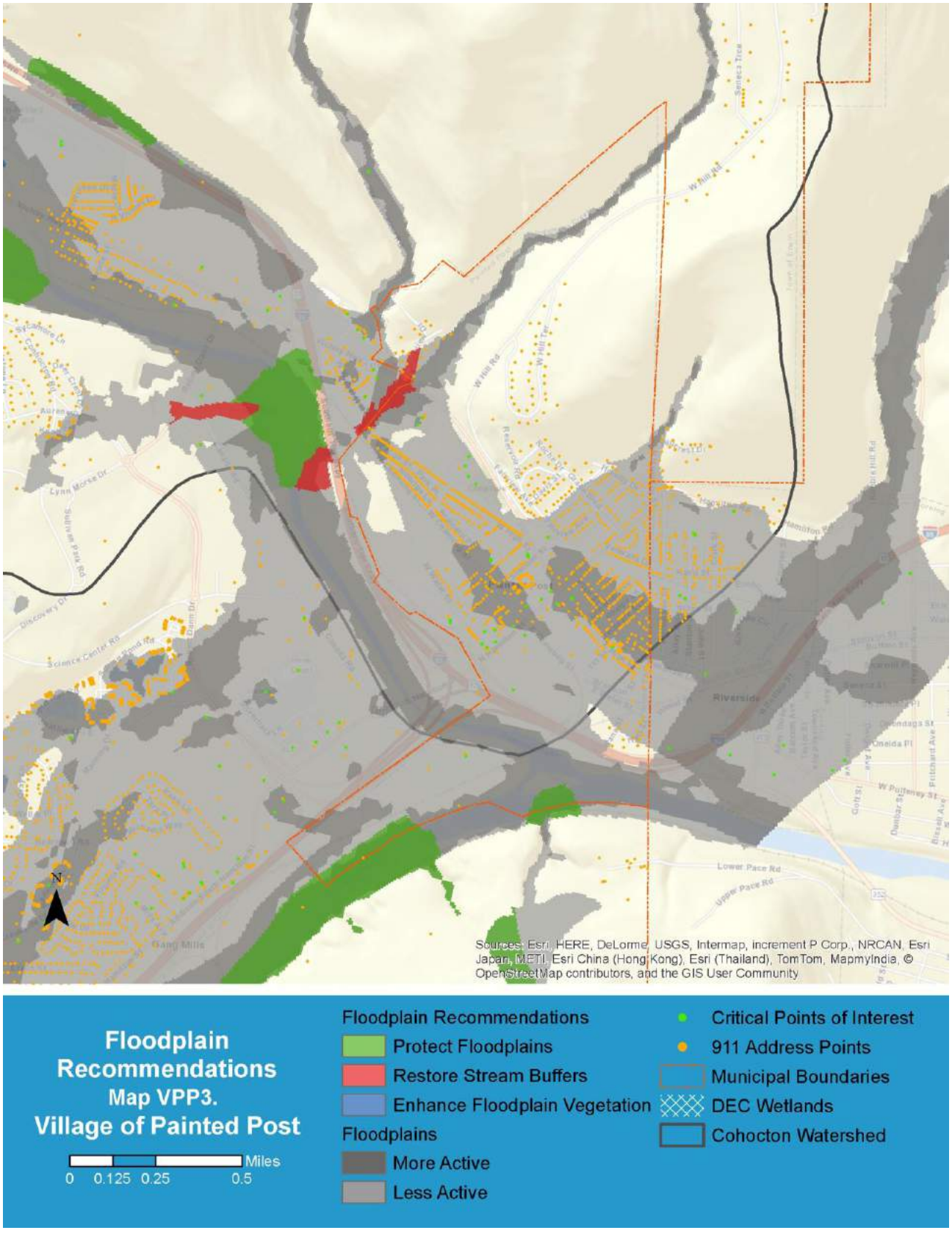
Hodgman's Creek and Cohocton River

What the maps show:

Map VPP1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map VPP3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance so they continue to provide that benefit (in green and blue) or restore so they can function better (in red).

Information on How to do this: V. Painted Post should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows past the Village from surrounding jurisdictions, V. Painted Post should also work with upstream communities, like T. Erwin and Town of Campbell (T. Campbell), to determine suitable methods for protecting or enhancing floodplains and wetlands particularly along the Cohocton River. Local land trusts or state agencies may be interested in partnering to protect these valuable resources. The lower portion of Hodgman's Creek is maintained by the NYSDEC in accordance with stream channel to design conditions for the levee. However, upstream of the levee, there may be opportunities to mitigate flooding by protecting and restoring floodplain and riparian functions. Thus it is important that the Village work with T. Erwin, T. Campbell and Steuben County Soil and Water Conservation District to target areas for streambank stabilization and floodplain reconnection projects in the upper portion of the Hodgman's Creek watershed, both within and upstream of the Village.

FLOODPLAIN RECOMMENDATIONS VPP3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes real time river gauges operated by the US Geological Survey (USGS) on the Cohocton, Tioga, Canisteo, and Chemung Rivers. Locally-operated Environmental Emergency Services (EES) gauges provides backup data at many USGE gauge sites (including Campbell, Bath, Avoca, Lindley, West Cameron, and Corning) and water level gauges at additional locations (including Scudder Bridge in Erwin and two sites on Meads Creek in Campbell). The National Weather Service provides daily river forecasts for the Cohocton River at Campbell, the Tioga River at Lindley, and the Canisteo River at West Cameron. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County and municipal governments are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R7. Contribute funding to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R8. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

R9. Monitor river ice conditions and improve communication about ice jam breakups.

What the maps show:

Map VPP1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing flood warning and real-time gauge data in the municipal emergency response plan. Sometimes ice jam breakups upstream can cause problems for the municipality. Obtain training (from the U.S. Army Corps of Engineers or National Weather Service) and establish procedures for monitoring river ice throughout the winter, routine reporting to the National Weather Service, and informing downstream communities of any ice jam formation or breakup. Emergency response plans could include a procedure for Steuben County Office of Emergency Services to notify V. Painted Post and T. Erwin about upstream breakups.

LAND USE TOOLS

Why this is important: Although Village regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R10. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R11. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map VPP1. Note the large proportion of floodplains in shades of blue that are not covered by FEMA's maps in the hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream, of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Village has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). It Is anticipated that ongoing Zoning updates will further enhance flood resilience.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

V. Painted Post maintains a stormwater system in its downtown area that is below capacity for handling the amount of water that is generated by intense rain storms. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R12. Support compliance with state stormwater permits for construction activities. Keep up with regular maintenance of stormwater systems and increase capacity where possible. Be sure local regulations encourage rather than discourage green infrastructure practices.

R13. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R14. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:

Map VPP4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), maintain drainage systems/storm sewers, increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Problematic culverts, particularly along West Hill Road, should be targeted for short term solutions such as a response plan to get the road open quickly if road damage occurs and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES VPP4

Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized by V. Painted Post. Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1aii. HIGH Assess flood vulnerability, identify mitigation options (such as elevating vulnerable equipment), and implement any warranted measures, for: Public water systems and public sewer systems.	**Co-Benefits:** Goal 2 – Mitigating flooding for facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.3B, 1.4B, 1.5A, 1.5B, 1.6A, 1.6B, 1.6C, 1.7A, 1.8A, 1.9A
A1bi. HIGH Review emergency response plans (including communication procedures, shelter locations, shelter access routes, plans for asset deployment, etc.) with key personnel and revise as warranted: School plans and critical facility plans	**Co-Benefits:** Goal 3 – This is an important step of creating and regularly updating an emergency response plan.
Objective: Develop an inter-municipal communication plan to enable coordinated mobilization during an event.	**Toolkit reference, online resources:** 1.2A, 1.3A
A1ci. HIGH Use the county Local Emergency Planning Committee to document existing capabilities for emergency communication between departments, municipalities, and organizations (railroads, utilities, etc.); identify deficiencies; and develop recommendations.	**Co-benefits:** Goal 3 – This is important information to include in emergency planning to improve communication, collaboration and preparedness.
Objective: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**Toolkit reference, online resources:** 1.2B, 1.3A
A1di. HIGH Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emergency assistance.	**Co-Benefits:** Goal 3 – This is important information to include in emergency planning to improve collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. MEDIUM Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years). **A2dii.** MEDIUM When mitigation funding is announced, contact owners of high-risk structures to assess interest in a mitigation application. Apply for funding as warranted.	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Identify areas that should remain undeveloped and those that can be developed safely.	**Toolkit reference, online resources:** 3.1B, 3.7D
A3bi. MEDIUM Develop a map of flood-prone areas for each municipality (in and outside of the FEMA floodplain) and distinguish between areas that should remain undeveloped (because of high risks and/or flood mitigation benefits of natural floodplains) and other areas where flood-safe development can occur.	**Co-Benefits:** Goal 2 – By preventing development in risky areas, property damage will be avoided. Goal 5 – By leaving risky areas undeveloped and flood mitigating floodplains natural, those areas can continue to mitigate floods, provide a buffer between people and floods, filter water and provide habitat.
Objective: Conduct asset planning for highways and other municipal services, including assessment of the vulnerability to flooding.	**Toolkit reference, online resources:** 3.2B, 3.7B, 3.9A
A3ci. HIGH Conduct a flood vulnerability assessment and develop a plan for improving flood resiliency for highway departments and other municipal services.	**Co-Benefits:** Goal 1 – Improving flood resiliency not only reduces flood impacts to municipal assets but also enables continuity of municipal services. Goal 3 – Important information to include in emergency planning.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3dii. HIGH Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety (continued).	
Objective: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**Toolkit reference, online resources:** 1.9A, 3.4A, 3.7C
A3ei. HIGH Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc., and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts.	

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate the public about emergency operations (evacuation routes, shelters, etc.) and personal responsibilities for safety, preparedness, and response.	**Toolkit reference, online resources:** 4.1A, 4.2C
A4ci. MEDIUM Expand the use of social media by the county, municipalities, and first responders to disseminate information about preparedness and real-time communication during flooding or other emergencies. Promote use of the Ready Steuben application. **A4cii.** HIGH Conduct training about local flood hazards for fire departments and first responders.	**Co-benefits:** Goal 3 – Real time communication of information and training are important components of emergency plans.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.	**Toolkit reference, online resources:** 3.3A, 5.2A, 5.3E, 5.9A
A5ai. HIGH Conduct a stream summit to engage municipal representatives and stream professionals in dialog about stream management strategies, responsibilities, permitting, funding, etc.	**Co-Benefits:** Goal 2 – By having and implementing a well-balanced stream management plan, flooding and erosion damage can be reduced.
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bi. HIGH Develop and maintain a list of stream/river problem areas, including culvert/bridge replacement needs. **A5bii.** HIGH Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** HIGH Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. MEDIUM Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** MEDIUM Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.


Village of Savona © The Nature Conservancy

COMMUNITY PROFILE

VILLAGE OF SAVONA

CONTENTS

Current Situation

The Village of Savona is in central Steuben County, New York on the Middle Cohocton River. It lies within the Town of Bath and has an estimated 2018 population of 868. The Cohocton River regularly floods -- as flooding is a natural process -- but flooding damage only began to occur as the floodplains of the river and its tributaries were developed.

Development within these broad river floodplains is vulnerable to riverine flooding with additional flood risks along Mud Creek and other drainageways. Intense micro-storms, which are more frequent than in years past, dump significant amounts of water quickly. The resulting flash flooding overwhelms the capacity of ditches, culverts and stormwater systems causing flooding on roadways, road damage and sediment accumulation on roads. Flood hazards are also increased at the base of steep hillsides and by upland land uses that increase runoff (such as inadequate stormwater management from development, roads, timber harvesting, and agriculture).

At risk businesses, Village of Savona. © The Nature Conservancy

While FEMA has mapped floodplains for all waterways in the Village, they may not fully represent current flood hazards. FEMA maps have not been updated since 1980 and therefore may not reflect land use changes that have occurred since nor do they capture flood challenges caused by hillside runoff on the southeast side of the Village on Maple Street north of Platt Hill Road. Consequently, vulnerability assessments limited to only FEMA-mapped floodplains do not present a complete picture. For this project, two floodplain layers were generated: 1) by University of Buffalo Regional Institute (UBRI) to help the Village better understand where vulnerable areas lie, and 2) by The Nature Conservancy (TNC) to illustrate where more and less active floodplains lie for all streams.

The Village adopted zoning regulations in 2004 that include special considerations for any proposed uses in the floodplain overlay zone and allows cluster development. However, it does not include a stream setback requirement or riparian buffer protection. The Village adopted a Comprehensive Plan in August 2014 that addresses flood risks in the village and promotes flood safe land use patterns. The plan includes information about FEMA-mapped special flood hazard areas, historic flood events, wetlands and slope of the land. An Economic Development Plan for Bath and Savona includes information about FEMA-mapped floodplains, but fails to consistently promote flood resiliency. The Village included a Local Law for Flood Damage Prevention in the 2004 zoning law, but the language was retained from earlier versions and does not reflect changes that have been made to the NYS Model Local Law and the NYS Uniform Code. The Village has an emergency response plan, but a comprehensive update and inclusion of more detailed flood information is recommended.

What's at Stake

Based on two floodplain datasets (UBRI and TNC), areas that are physically vulnerable to flooding extend beyond the FEMA-mapped floodplains. The Village is identified as a "social hotspot" [1] due to its high concentration of residents who would likely be affected by flooding because they do not have the resources to prepare for, respond to, or recover from flooding. There are no community services located in the FEMA-mapped floodplains; yet when all floodplains are examined, the assessed value of structures related to community services totals $5.6 million (Table VS1). This vulnerability is compounded by the fact that the Village has a larger percentage of at-risk people vulnerable to flooding, whether due to social factors, or because their homes were built prior to FEMA-mapped floodplains and floodplain development standards.

Road damage due to flash flooding and erosion, Steuben County. Photo courtesy of Steuben County Office of Emergency Services.

Table VS1. A comparison of assessed values across land use categories within the Village of Savona. Assessed values were summed for parcels that lie within the FEMA floodplains as well as for parcels that lie in all areas that are potentially vulnerable to flooding.

	All Floodplains	FEMA Floodplains
All Properties	Assessed at $9.7 million	Assessed at $212,000
Residential	168 structures assessed at $3.8 million	7 structures assessed at $188,000
Businesses	2 businesses with an estimated economic output of $900,000	0 businesses
Commercial	Assessed at $233,500	Assessed at $23,400
Community Services	Assessed at $5.6 million	0 community service structures

A Path Forward

Through the Flood Smart Approach, the Village of Savona (V. Savona) worked with eight other municipalities and the Core Team[2] to develop five watershed-wide goals and 38 actions (Chapter 1). To inform development of these, the Core Team studied the participating communities through several assessments.[3] Evidence from these assessments is presented along with associated Core Team recommendations that present different approaches to the problem, build on findings of the various assessments, and help the municipalities reach their goals.

[1] Appendix A, Vulnerability Assessment

[2] Core Team members: Steuben County Emergency Services and Planning Department, Southern Tier Central Regional Planning and Development Board, The Nature Conservancy, and University of Buffalo

[3] Study included one-on-one interviews with each municipality, a vulnerability assessment (Appendix A), a local land use assessment (Appendix B), a natural environment assessment (Appendix C), a Community Resilience Building Workshop synthesis (Appendix D), a policy gap analysis (Appendix E), a floodplain function assessment (Appendix F), and a Stream Dialogue synthesis (Appendix G).

Table VS2. Matrix of the primary connections between watershed-wide goals (Goal #), the Core Team's recommendations (R#), and prioritized actions established by the municipalities. See Recommendations section for details on the numbered recommendations and the Actions section for details on the numbered Actions as well as additional connections and co-benefits. Xs denote where recommendations intersect with goals but a municipality may not have prioritized an action.

Recommendations	Goal 1 Maximize Function of Critical Infrastructure	Goal 2 Minimize Flood Damage	Goal 3 Emergency Preparedness and Land Use Planning	Goal 4 Educate Decision Makers	Goal 5 Maximize Benefits of Natural Systems
R1. Educate & assist residents		**A2ci; A2di;**		**A4ai, ii**	
R2. Educate & assist businesses		**A2ci; A2di;**		**A4ai, ii**	
R3. Protect remaining undeveloped floodplains			**A3bi**		**A5bii, iii; A5cii**
R4. Protect & restore forested riparian buffers					**A5bii, iii; A5cii**
R5. Continue funding to EES for gauges			**X**		
R6. Use forecasts & gauge data in plans	**A1bi**		**A3ei**		
R7. Limit or avoid development in most risky places		**A2bi, ii; A2ci**	**A3bi; A3dii**		**A5cii**
R8. Use standards to improve flood safety		**A2bii; A2ci**	**A3di**		
R9. Maintain Stormwater system & comply with state stormwater permits					**A5ci**
R10. Modify roadside ditch cleaning practices	**X**				**X**
R11. Right-size road stream crossings					**A5bii**

Recommendations

COMMUNITY EDUCATION AND ASSISTANCE

Why this is important: Nearly 170 residential structures are at risk of flooding in V. Savona with a high proportion of them built prior to floodplain development standards and likely not covered by flood insurance. Additionally, 60% of the assessed value in floodplains is attributed to properties that are categorized as providing a community or public service, services that may be needed in helping Village residents prepare for or respond to flooding. If these properties are experiencing flooding themselves, they may not be able to help when they are most needed.

Recommendations:

R1. Educate and assist residents with wet floodproofing protection measures that reduce the potential for damage when water enters the lower part of a building.

R2. Educate and assist community service and commercial property owners with wet floodproofing and dry floodproofing protection measures.

Where is this particularly important:

Particularly vulnerable areas[4] lie along Mud Creek around Oak Hill Road, on the north side of E. Lamoka Avenue from Orchard Street to Main Street, and along Main Street from McCoy Street to Seaman Place. Additional vulnerable hot spots are on Maple Street north of Platt Hill Road and on the west side of the Cohocton River along Route 12 and Grove Street.

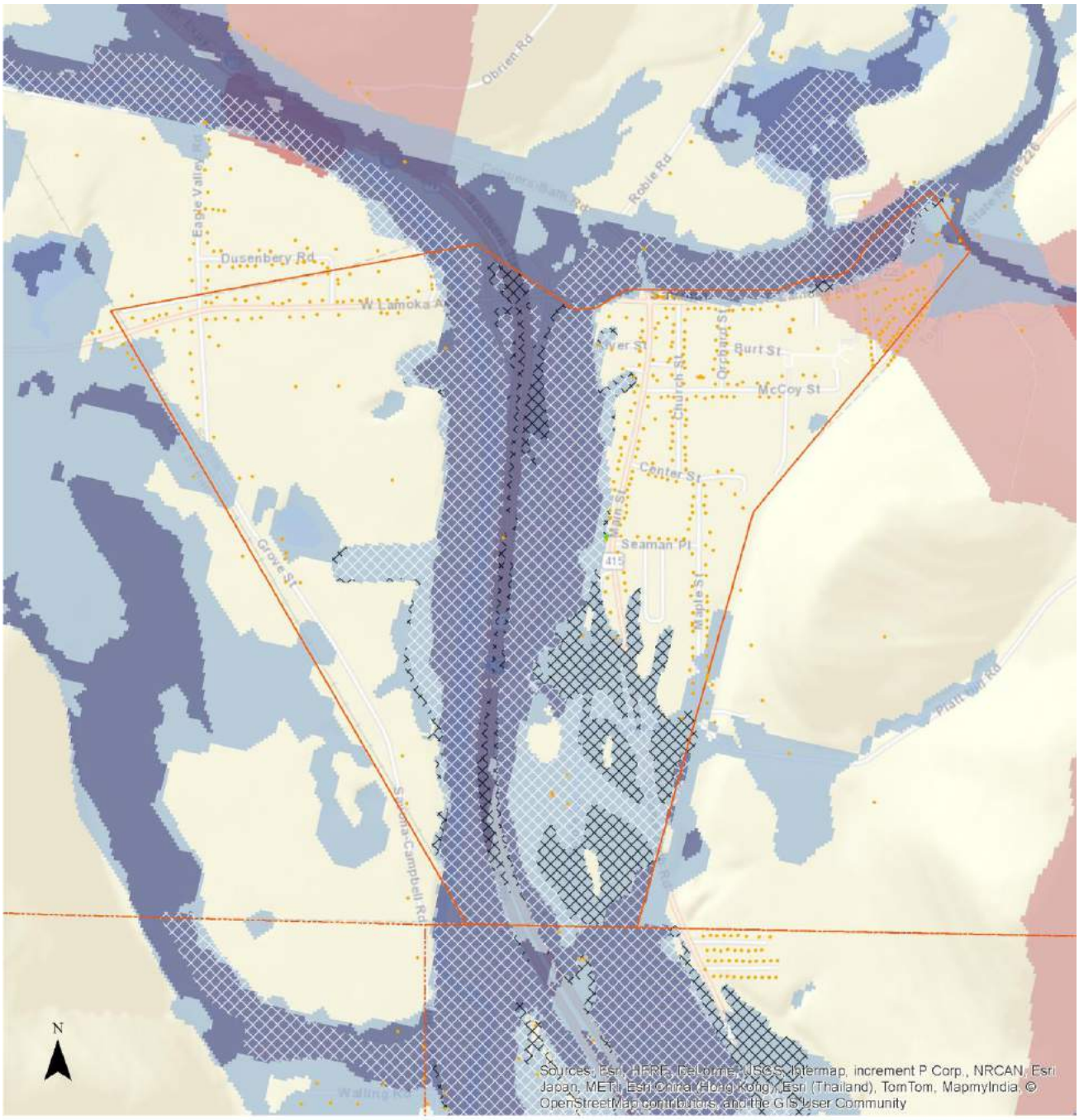
What the maps show:

Map VS1. Note differences between the FEMA floodplains in hatching and floodplains modeled by TNC in shades of blue along with the 911 address points in orange and critical facilitates in green. Map VS2. Note the locations of vulnerable hot spots in dark pink. These are areas that scored high in 3 of the 4 categories of vulnerability. Areas in black scored high overall.

Information on How to do this: Wet floodproofing techniques reduce the potential for damage when water enters the lower part of a building. Dry floodproofing measures keep water out of buildings. Wet flood-proofing includes flood vents (to equalize water pressure on foundation walls), backflow valves that prevent sewage from backing up into the building, elevating equipment (furnace, water heater, electrical panels, etc.) above the flood level, storing valuable items in upper levels, proper installation of fuel tanks, use of flood-damage resistant building materials, backup power generation, and flood insurance. Officials could explore FEMA Hazard Mitigation grants, which are used to help protect properties from future flooding. Insuring their property and having a plan for during and after an emergency can help residents prepare for and recover from flooding more quickly and effectively. Commercial facilities should also have plans and procedures for responding to flood alerts by relocating or protecting inventory and hazardous substances.

[4] A vulnerability assessment was completed that used indicators of physical, structural, social and economic vulnerability to find hot spots that scored high in three of the four categories (Appendix A).

FLOODPLAIN INFORMATION VS1



Floodplain Information
Map VS1.
Village of Savona

0 0.125 0.25 0.5 Miles

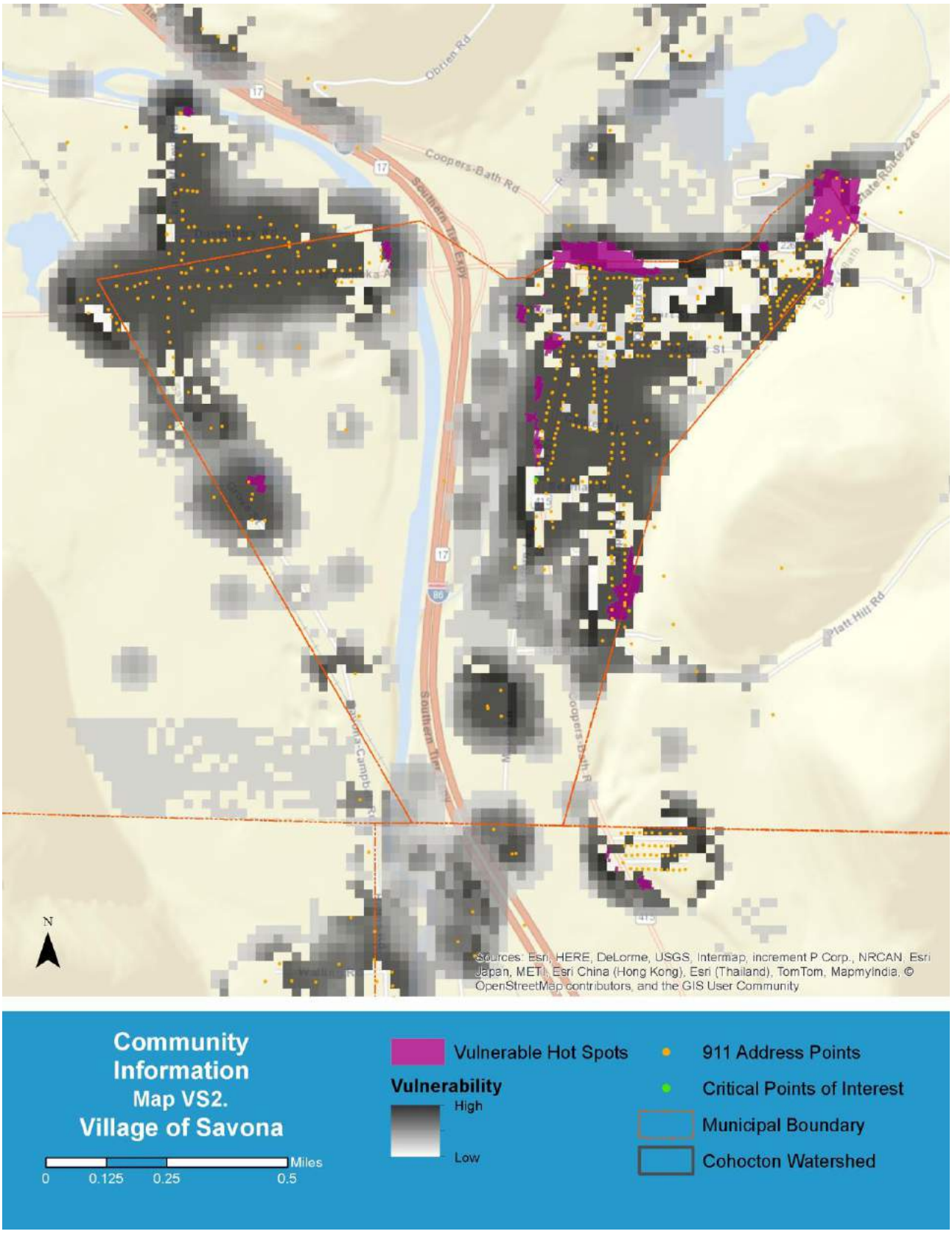
FEMA
- 1%/100-year Floodplains
- 0.2%/500-year Floodplains

Floodplains
- More Active
- Less Active

High Runoff Areas
- High
- Moderate

- Critical Points of Interest
- 911 Address Points
- Municipal Boundaries
- Cohocton Watershed

COMMUNITY INFORMATION VS2



NATURAL INFRASTRUCTURE

Why this is important: Natural features like wetlands and undeveloped floodplains mitigate flood risk by temporarily storing flood flows, decreasing peak flood flows downstream, and reducing erosive energy. The steep terrain and narrow valleys of tributaries to the Cohocton River leave little room for stream flows to get out onto floodplains where they can spread out and slow down and wetlands in this region are sparse. The places where flows can access floodplains or wetlands are critical areas for reducing downstream flood severity by storing and slowing down floodwater.

Recommendations:

R3. Actively protect all remaining undeveloped floodplains, or, at a minimum, minimize alteration of floodplains.

R4. Restore and protect forested buffers along stream systems to stabilize streambanks, slow down over-bank flows, and improve the ability of floodplains to mitigate flooding.

Where is this particularly important:

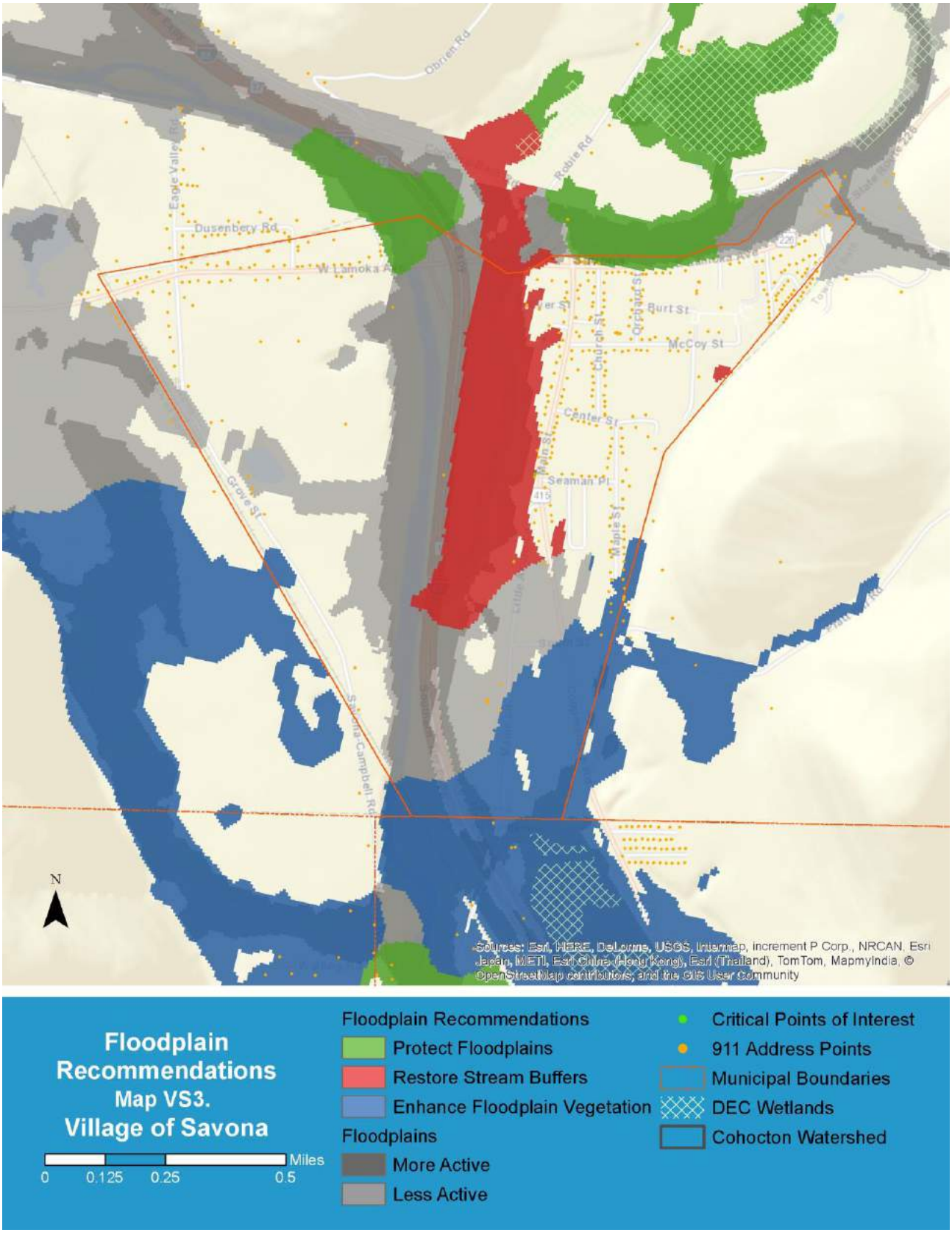
Along the Cohocton River at V. Savona's northern boundary, along Mud Creek at and upstream of V. Savona's northern boundary, at the south end of V. Savona at the confluence of Mud Creek and the Cohocton River.

What the maps show:

Map VS1. Note how narrow the floodplains in shades of blue are for tributaries to the Cohocton River. Map VA3. Areas in green and blue are places where floodplains have good potential to temporarily store flood flows because they are big, wide and flat. Green areas also slow and spread water because they are vegetated, a condition that could be improved in blue areas if they were planted. Red areas have a mix of good storage and good slowing/spreading but could be improved with planting. Because of the benefits they provide, recommendations are made for specific areas to either protect/enhance (R3) so they continue to provide that benefit (in green and blue) or restore (R4) so they can function better (in red).

Information on How to do this: V. Savona should seek opportunities to protect and restore natural features that can mitigate flooding. Because water flows into the Village from surrounding jurisdictions, V. Savona should also work with its upstream neighbors, the Towns of Bath and Bradford, to determine suitable methods for protecting or enhancing floodplains and wetlands, particularly along the Cohocton River and Mud Creek. Local land trusts or state agencies may be interested in partnering to protect these valuable resources. V. Savona could work with Steuben County Soil and Water Conservation District (SWCD), the Upper Susquehanna Coalition, and other partners to identify possible restoration projects along Mud Creek.

FLOODPLAIN RECOMMENDATIONS VS3



ADVANCE WARNING

Why this is important: The concentration of development in low lying valleys and floodplains means that high proportions of development are at risk of flooding. *Every minute of advance flood warning is a minute that can be spent saving lives*. Availability of stream flow and precipitation data at numerous points along a stream network is critical to providing effective advance warning. A network of stream flow gauges currently includes real time river gauges at Campbell, Bath and Avoca, which are operated by the US Geological Survey (USGS) with locally-operated Environmental Emergency Services (EES) gauges providing backup data at each site, as well as an EES water level gauge at Scudder Bridge in Erwin. The National Weather Service has a daily Cohocton River forecast point in Campbell and provides river level forecasts as needed at Bath. In addition, EES operates a network of precipitation gauges throughout the watershed, which are used (in conjunction with other information) to provide advance warning of flash flooding. Because EES is a non-profit organization, annual contributions from Steuben County, V. Savona and other communities are important for EES operations that support local response to flood emergencies, including the local gauge network, flash flood warnings, and advocacy for federal resources (including funding for USGS gauges).

Recommendations:

R5. Continue the Village's contributions to EES for operation, maintenance, and expansion of the stream and precipitation gauge network.

R6. Access and use warnings, forecasts, and gauge data in municipal emergency response plans.

What the maps show:

Map VS1. Note that 911 address points in orange primarily along valley bottoms and in floodplains in shades of blue or in hatching.

Information on How to do this: Include procedures for accessing and utilizing real-time gauge data in the municipal emergency response plan.

LAND USE TOOLS

Why this is important: Although Village regulation of development in the FEMA-mapped floodplains is consistent with federal and state standards, those standards are not intended to prohibit development in the floodplain and the mapped floodplains do not include all areas subject to flooding. Local land use authority allows local governments to use additional tools that go above and beyond the state and federal level of floodplain management.

Recommendations:

R7. Limit or avoid development in the highest risk parts of floodplains that are unsafe due to flood depths, high velocities, and/or erosion potential.

R8. Establish standards that will improve flood safety and reduce damage in all flood risk areas, including in and near wetlands and at the base of valley walls, as these areas are naturally prone to flooding.

What the maps show:

Map VS1. Note the proportion of floodplains in shades of blue that are not covered by FEMA's maps in the black and white hatching. V. Savona has a fair amount of 0.2%/500-year floodplains in black hatching. Also note the high proportion of areas that have high amounts of surface water runoff in shades of red and that they lie upstream of populated areas.

Information on How to do this: Floodplain development standards can be applied to areas not mapped by FEMA if the Village has an actionable map of additional floodplains. Higher standards can be adopted for regulated floodplain development (such as increased protection of critical facilities). Zoning could be used to regulate the types of use and densities in flood-prone areas. It is possible to establish a Conservation Zone in the floodplain, within which building construction is prohibited. The Village could adopt a dataset that represents streams with setback requirements. Site plan review and subdivision criteria could discourage or prohibit vulnerable uses and/or require protection of natural features.

SURFACE RUNOFF

Why this is important: Tree cover and natural land surfaces slow and soak up precipitation and surface runoff for smaller rain events. Development (particularly on steep slopes) removes the protective vegetation and alters drainage patterns, resulting in erosion of soils, increased flood flows, and washing of sediment and debris into downhill areas. This causes damage to roads and structures, destabilizing stream systems and increasing maintenance costs.

V. Savona maintains a stormwater system in its downtown area that is below capacity for handling the amount of water that is generated by intense rain storms. Diverting runoff into pipes and culverts as part of a drainage network, combined with high amounts of impervious surfaces, means that during a rainfall event more water is trying to move into and pass through these pipes more quickly because water storage capacity on the land has been reduced or eliminated. As flash flooding continues to increase throughout the Northeast region, drainage networks may be overwhelmed more frequently, making associated flooding impacts more frequent.

Roadways and roadside ditch networks dramatically alter streamflows and stream channels. Many miles of ditches crisscross the landscape. While the ditches drain roads, they also efficiently intercept the runoff from adjacent hillslopes, capturing about 20 percent of the runoff in each watershed. Ditches rapidly shunt the water to streams, where it is discharged, like a high-velocity faucet. Studies in central New York documented that ditch networks capture not just road-top runoff, but as much as 50 percent of a rainfall event in the associated drainage basins. As a result, a greater proportion of runoff no longer moves downslope as slow diffuse flow. Instead it is concentrated and rapidly shunted past wetlands, thereby increasing peak flow by as much as 300% and magnifying downstream flooding. Ditches are also conduits of road salts, fertilizers, and viable pathogens from lawns and farms to streams. Unprotected ditches are a significant source of suspended sediment and gravel. The ditch outputs disturb the natural stream flow and cause erosion along the stream banks.

Of the culverts assessed (recommended for assessment by highway departments and NYS DEC) in the nine participating municipalities, 100% are undersized for current flow conditions. Flows for this region are estimated to increase by 15% which adds urgency to the need to right-size culverts now. This is important to reduce the risk of blow outs, given the high energy of stream systems, increasing flash flooding, and anticipated increases in flow volumes.

Recommendations:

R9. Support compliance with state stormwater permits for construction activities. Keep up with regular maintenance of stormwater systems and increase capacity where possible. Be sure local regulations require good drainage practices for small projects not covered by state stormwater permits and encourage rather than discourage green infrastructure practices.

R10. Modify roadside ditch cleaning practices to reduce removal of vegetation and improve ditch design to slow down water flow, reduce sediment movement and encourage infiltration of water.

R11. Size and build road stream crossings so that the structure opening is 1.25 times the bank full width of the stream.

What the maps show:
Map VS4. Note steep slopes in shades of purple. All these areas have a slope of at least 15% with the darker shades having slopes of at least 30%.

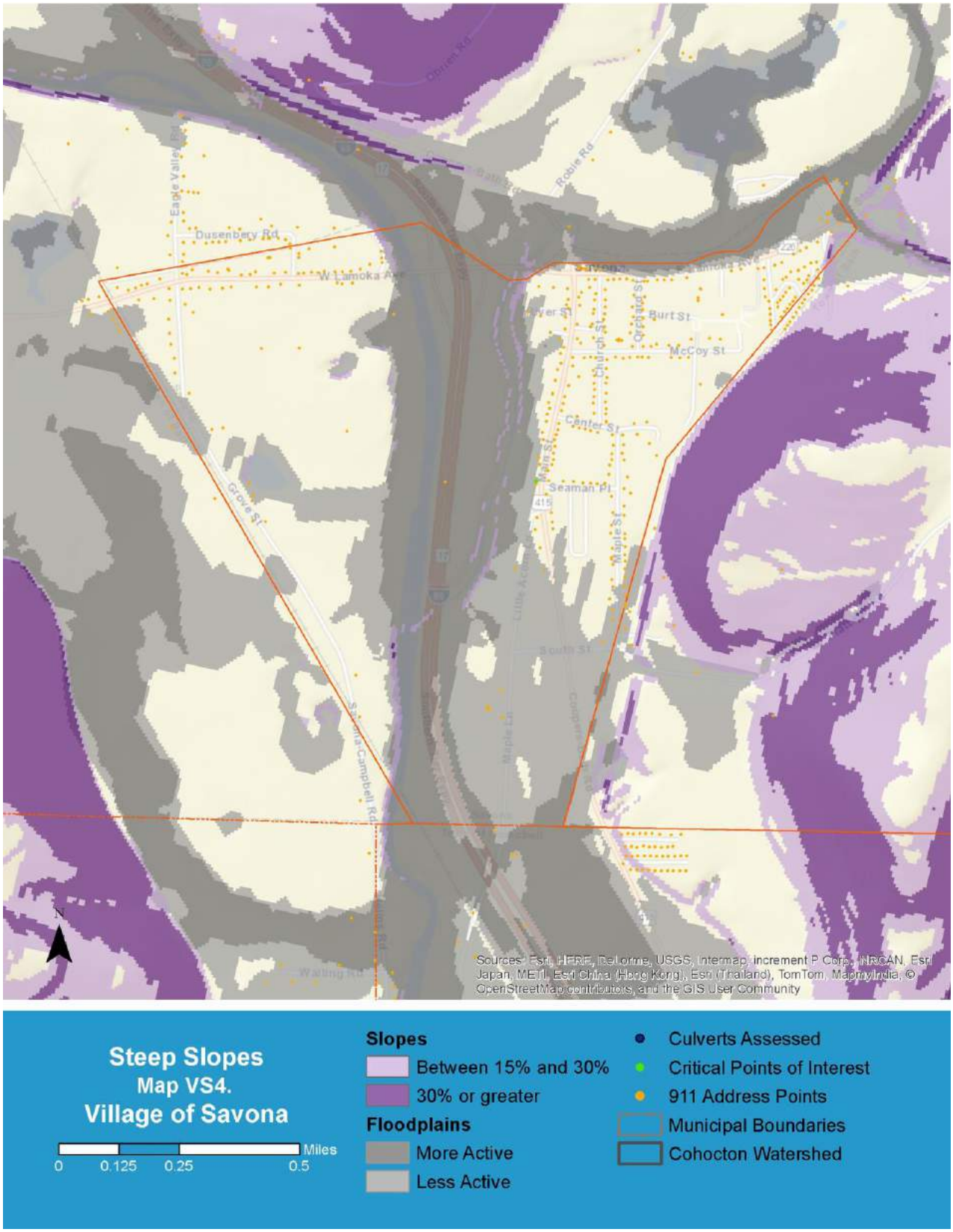
SURFACE RUNOFF (Continued)

Information on How to do this: Support compliance with the State Pollutant Discharge Elimination System (SPDES) Stormwater Construction Permit, request and read Stormwater Pollution Prevention Plans (SWPPP) for construction projects, consider municipal stormwater requirements for construction below the 1-acre/5-acre threshold, restrict/regulate development on steep slopes through local ordinances, encourage green infrastructure/remove regulations that make green infrastructure harder (such as excessive parking requirements), increase stormwater capacity where possible, and look for opportunities to disperse/infiltrate concentrated flow.

The Cornell Local Roads Program offers detailed suggestions for creating and managing roadside ditches in a manner that will protect the quantity and quality of water resources.

Particularly problematic culverts should be targeted for short term solutions such as a response plan to get the road open quickly and longer-term solutions for right sizing culverts and reducing the amount of sediment that blocks the road.

STEEP SLOPES VS4



Actions

To achieve the watershed-wide goals, specific actions were developed and prioritized for Cohocton River communities (see Chapter 1). Each action is included with the goal that describes the primary reason for completing that action. Secondary reasons or "co-benefits" are also included as these could be important when designing projects or applying for grant funds. For more information on who can help with implementation, online resources and grant programs, references to the Toolkit Sections in Chapter 3 are provided.

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.	
Objective: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.4A, 1.5A, 1.5B, 2.2E, 2.4C, 2.4D, 2.4E, 2.4G
A1ai. Seek alternate locations and funding to relocate critical functions such as the Coopers Plains Fire Department.	**Co-Benefits:** Goal 2 – Relocating facilities and critical infrastructure not only reduces flood impacts to municipal assets but also enables continuity of municipal services.
Objective: Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.	**Toolkit reference, online resources:** 1.1A, 1.2C, 1.3A, 1.3B, 1.4B, 1.5A, 1.5B, 1.6A, 1.6B, 1.6C, 1.7A, 1.8A, 1.9A
A1bi. Review emergency response plans (including communication procedures, shelter locations, shelter access routes, plans for asset deployment, etc.) with key personnel and revise as warranted: School plans and critical facility plans	**Co-Benefits:** Goal 3 – This is an important step of creating and regularly updating an emergency response plan.
Objective: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)	**Toolkit reference, online resources:** 1.2B, 1.3A
A1di. Use county Crisis Track software and existing shared service efforts to compile and maintain a database of highway department assets that can support inter-departmental emergency assistance.	**Co-Benefits:** Goal 3 – This is important information to include in emergency planning to improve collaboration and preparedness.

Goal 2: Minimize flood damage to property.	
Objective: Enforce development standards, including anchoring of floatable property in the floodway.	**Toolkit reference, online resources:** 2.2B, 2.2C, 2.2D, 2.3A, 2.3B, 2.4B
A2bi. Municipal floodplain administrator periodically attends floodplain management training and/or obtains technical assistance with permitting of floodplain development. **A2bii.** Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards.	**Co-Benefits:** Goal 4 – Providing floodplain administrators with training will help them do their jobs more effectively and give them confidence in making decisions. Codifying decisions into local law helps them be applied consistently.
Objective: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).	**Toolkit reference, online resources:** 2.2A
A2ci. Municipality revises development review process by: requiring site plan review of all floodplain development proposals, addressing flood risks in subdivision proposals, requiring floodplain boundary on site maps, and developing appropriate checklists.	**Co-Benefits:** Goal 3 –This process is an important land use management tool for keeping development out of harm's way. Goal 4 – Providing a process to local decision makers wil ensure that the appropriate information and check points are being included. Goal 5 – A strong review process can keep development out of harm's way and maintain natural floodplains.
Objective: Seek funding to elevate or relocate existing structures in the floodplain.	**Toolkit reference, online resources:** 2.1A, 2.2E, 2.4C, 2.4D, 2.4E
A2di. Identify existing development in the highest risk (unsafe) areas that should be targeted for removal or elevation. Include this information in the County Hazard Mitigation Plan (which is updated every 5-7 years).	**Co-Benefits:** Goal 1 – This is an important mitigation strategy for reducing flood damage to properties. Goal 5 – Relocating structures out of floodplains and returning those areas to nature allows them to mitigate flood flows, filter water and provide habitat.

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.	
Objective: Identify areas that should remain undeveloped and those that can be developed safely.	**Toolkit reference, online resources:** 3.1B, 3.7D
A3bi. Develop a map of flood-prone areas for each municipality (in and outside of the FEMA floodplain) and distinguish between areas that should remain undeveloped (because of high risks and/or flood mitigation benefits of natural floodplains) and other areas where flood-safe development can occur.	**Co-Benefits:** Goal 2 – By preventing development in risky areas, property damage will be avoided. Goal 5 – By leaving risky areas undeveloped and flood mitigating floodplains natural, those areas can continue to mitigate floods, provide a buffer between people and floods, filter water and provide habitat.
Objective: Review and update comprehensive plans, zoning, and other land use management tools.	**Toolkit reference, online resources:** 3.1A, 3.1B, 3.2A, 3.2B, 3.3A, 3.5A, 3.6A, 3.7A, 3.8A, 3.8B
A3di. Update municipal comprehensive plans and include discussion of natural resource protection, stormwater management, and flood hazards (including the maps prepared for Action 3.b.i); develop goals and recommendations that promote safety from flooding and other hazards. **A3dii.** Draft and adopt revisions to zoning and other land use regulations in order to promote flood-safe development (such as additional standards in floodplain overlay zones).	**Co-Benefits:** Goal 2 – Flood safe development supported by plans and land use tools will reduce property damage. Goal 4 – Supporting decisions with adopted standards and associated checklists ensures that they become part of a standard operating procedure which continues to educate decision makers into the future. Goal 5 – Protecting natural floodplains allows them to mitigate flood flows, provide a buffer between people and floods, filter water and provide habitat.
Objective: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.	**Toolkit reference, online resources:** 1.9A, 3.4A, 3.7C
A3ei. Establish municipal emergency planning team to update or develop the Town/Village emergency response plan. The plan should include: (1) chains of command, roles and responsibilities, (2) procedures for accessing precipitation and stream gauge data, coordination with other facilities/ municipalities/ agencies, obtaining equipment, opening shelters, designating evacuation routes, etc., and (3) a public communication chapter, including pre-event communication strategies, signs to identify shelter facilities, pre-scripted messages for use during events, and post-flood handouts.	

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.	
Objective: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.	**Toolkit reference, online resources:** 4.2A, 4.2B, 4.2C, 4.3A, 4.3B, 4.3C, 4.4A, 4.4B
A4ai. Convene an inter-municipal flood education task force to develop an outreach strategy with targeted messages, audiences, and outreach methods. **A4aii.** Identify and develop locally applicable outreach materials, including brochures, information to post in municipal buildings (such as maps), webpages, social media content, direct mailing to residents, media packet, signs, etc. Seek funding if needed.	**Co-Benefits:** Goal 2 – Providing different types of decision makers with information on risk and solutions can result in informed decisions that reduce property damage.
Objective: Promote disclosure of flood hazard information during real estate transactions.	**Toolkit reference, online resources:** 4.4C
A4dii. Provide local training for insurance, real estate, and mortgage lending professionals about floodplain management and flood insurance.	**Co-Benefits:** Goal 3 – By better understanding their risk, buyers can take steps to be prepared for an emergency.

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.	
Objective: Secure funding to implement stream remediation projects.	**Toolkit reference, online resources:** 5.1A, 5.3A, 5.3B, 5.3C, 5.3D, 5.3E, 5.4A, 5.6A, 5.7A, 5.10A
A5bii. Identify grants and other sources of funding for stream remediation and culvert/bridge replacement. Apply for funding for high priority projects. **A5biii.** Allocate local funding for stream protection/ restoration activities, including local match for grant funding.	**Co-Benefits:** Goal 2 – Addressing problem areas can reduce property damage by reducing erosion, flooding, and sediment deposition. Goal 3 – Knowing where problem areas lie is useful for land use planning and even emergency response.
Objective: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).	**Toolkit reference, online resources:** 5.1A, 5.3E, 5.3F, 5.3G, 5.3H, 5.3I, 5.5A, 5.8A, 5.10A, 5.10B
A5ci. Provide landowners with education and technical assistance with managing runoff from developed areas, construction sites, agricultural operations, timber harvesting, etc. **A5cii.** Consider additional natural resource protection strategies, such as steep slope regulations, riparian buffer protection (Action 2.a.i), timber harvesting regulations, urban tree initiatives, etc.	**Co-Benefits:** Goal 2 – By protecting natural floodplains and reducing risky development, property damage can also be reduced. Goal 3 – Best practices are more likely to be implemented when they are supported through regulations and incentives. Goal 4 – Implementing best practices can educate possible users through local examples.

A wetland under typical flows (left) and under flood flows (right). Notice that it is acting as a temporary reservoir – storing flood flows. Protecting natural floodplains and maintaining riparian corridors allows areas adjacent to streams to continue to serve this purpose. © The Nature Conservancy.

CHAPTER THREE

Toolkit

Narrowing of the floodplain at Coopers Plains, Town of Erwin. © The Nature Conservancy

Emergency Response

Goal 1: Maximize support and function of critical infrastructure to perform during and after flooding.

OBJECTIVES

Objective 1a: Permanently relocate facilities so that there is NO critical infrastructure in the floodway or floodplain.

Objective 1b: Develop and implement emergency response plans for maintaining critical services during a flood, including temporary relocation of facilities if needed.

Objective 1c: Develop an intermunicipal communication plan to enable coordinated mobilization during an event.

Objective 1d: Conduct asset planning for highway equipment and services. (Who has what? What can be borrowed? How can it be deployed?)

WHO CAN HELP?

Steuben County Office of Emergency Services

Primary local contact and technical resource for questions and assistance related to emergency planning, mitigation, and response. Radio communication (Objective 1c).
www.steubencony.org/Pages.asp?PGID=25

NYS Department of Homeland Security and Emergency Services (DHSES)

Provides emergency management training and a variety of disaster preparedness programs to help protect communities from natural and man-made disasters. www.dhses.ny.gov/contact/

Federal Emergency Management Agency (FEMA)

Disaster assistance, funding, training and preparedness programs for communities and emergency responders including online resources for individuals.
www.fema.gov/region-ii-nj-ny-pr-vi-0

NYS Department of Health (NYS DOH)

Provides information on protecting drinking water systems for residents as well as information on emergency preparedness.
www.health.ny.gov/environmental/water/drinking/doh_pub_contacts_map.htm

NY State Education Department (NYSED)

Offers information on protecting schools before and during an emergency including emergency response planning.
www.nysed.gov/contact-NYSED

ONLINE RESOURCES

1.1. Flood Smart Action Plan: Cohocton River

A. **Chapter 2: Community Profiles.** Floodplain Information maps show more and less active floodplains and Community Information maps provide an indication of vulnerability, which can inform priorities for Objectives 1a and 1b.

1.2. Steuben County Office of Emergency Services

A. **Local Emergency Planning Committee (LEPC).** Web page describes Steuben County LEPC, which is a resource for developing an intermunicipal communication plan for Objective 1c.
www.steubencony.org/pages.asp?PID=158

B. **Crisis Track: Damage Assessment Software for Local Government.** Steuben County uses this software to coordinate disaster management and resources. It is a resource for implementing asset planning for Objective 1d.
www.crisistrack.com/

C. **Best Practices.** Web page with links to guidance and training resources for fire departments and others, including a Fire Department Vulnerability Assessment Program (supports Objectives 1a and 1b).
www.steubencony.org/pages.asp?PID=12911

1.3. NYS Homeland Security and Emergency Services

A. **Comprehensive Emergency Management Plan (CEMP).** Volume 1 is the State Multi-Hazard Mitigation Plan, which supports Objective 1a. Volume 2 provides the State's planning framework for response and short-term recovery, which supports Objectives 1b, 1c, and 1d. www.dhses.ny.gov/planning/cemp/index.cfm

B. **Planning: State Guidance and Resources.** Web page provides links to tools and resources for Emergency Planning, Continuity of Operations Planning, Dam Safety, etc. (supports Objective 1b).
www.dhses.ny.gov/planning/state/

1.4. Association of State Floodplain Managers (ASFPM)

A. **No Adverse Impact (NAI) How-to Guide for Mitigation, 2016.** Presents tools for mitigating flood risks, including acquisition/relocation and mitigating critical facilities, which support Objective 1a.
www.floods.org/ace-images/ASFPM-MitigationFinalJuly28.pdf

B. **No Adverse Impact (NAI) How-to Guide for Emergency Services, 2019.** Emergency service tools presented in this guide include flood response and protecting critical facilities, which support Objective 1b.
www.floods.org/ace-images/NAI_EmergencyServicesMay2019Final.pdf

1.5. Federal Emergency Management Agency (FEMA)

A. **Inland Flooding Ready Business Toolkit.** Guidance document is useful for businesses and other organizations conduct a self-assessment and conduct mitigation and preparedness planning. (Supports Objectives 1a and 1b).
www.fema.gov/media-library/assets/documents/152383

B. **Emergency Preparedness Resources for Businesses.** Website provides links to templates, worksheets, and other resources to help businesses and other organizations develop emergency plans. Includes Emergency Response Plan template for identifying a response team, contacts, and goals the plan aims to cover. (Supports Objectives 1a and 1b). www.fema.gov/media-library/resources-documents/collections/357

1.6. NYS Department of Health

A. **Preparing Emergency Response Plans – Drinking Water Systems.** Web page with resource links (supports Objective 1b for public water supplies). www.health.ny.gov/environmental/emergency/water/drinking/preparing_emergency_response_plans.htm

B. **Drinking Water System Emergency Preparedness and Response Resources.** Web page with resource links (supports Objective 1b for public water supplies). www.health.ny.gov/environmental/emergency/water/drinking/resources.htm

C. **Information for Health Care Providers.** Web page with resource links for emergency preparedness (supports Objective 1b for health care providers). www.health.ny.gov/environmental/emergency/health_care_providers/

1.7. NYS Department of Education

A. **Quick Guide to Emergency Response Planning, Requirements in Education Law § 807 and 2801-a, and Commissioner's Regulation 155.17, November 2016, 12 pages.** Supports Objective 1b for schools. www.p12.nysed.gov/sss/documents/QuickGuideEmerPlanningNov2016_final.pdf

1.8. U.S. Department of Education, Readiness and Emergency Management for Schools (REMS)

A. **Guide for Developing High-Quality School Emergency Operations Plans.** Online document supports Objective 1b for schools. rems.ed.gov/K12GuideForDevelHQSchool.aspx

1.9. Bath and North East Somerset Council, UK

A. **Flood Emergency Plans Guidance and Template: National Planning Policy Framework (NPPF) and the Technical Guidance Note on Flooding, 2012.** Document developed by a Business Continuity and Emergency Planning team provides guidance and a template to highlight matters to consider when developing a Flood Emergency Plan (FEP), including flood warnings, safe routes, and evacuation options (supports Objective 1b). repo.floodalliance.net/jspui/handle/44111/1266

1.10. Additional resources listed for Property Damage (Goal 2) provide information about relocation, elevation, and floodproofing techniques, which support protection of critical facilities for Objective 1a.

FUNDING OPPORTUNTIES

ACTIVITY	Funding Source
Asset inventory	CSC; LWRP; HMA
Relocations and buyouts	HMA
Floodproofing	HMA; CSC
Flood mitigation	CSC; HMA
Emergency planning and preparedness	Preparedness Grants

● State ● Foundations ● Federal

New York State Funding

- **CSC: Climate Smart Communities (NYS Department of Environmental Conservation):** CSC grants provide 50/50 matching grants to cities, towns, villages and counties of the State of New York and boroughs of New York City for eligible climate adaptation and mitigation projects. Download the CSC grants fact sheet (PDF) for an overview of the program. Funds are available for two broad categories. The first category supports implementation projects related to climate change adaptation and the reduction of greenhouse gases outside the power sector (transportation, methane and refrigerants. The second category supports planning projects related to Climate Smart Communities certification actions. The opportunity is part of the state Consolidated Funding Application (CFA) and due in late July. www.dec.ny.gov/energy/109181.html
- **LWRP: Local Waterfront Revitalization Program (NYS Department of State):** Funding is available for developing and implementing Local Waterfront Revitalization plans for designated waterways, including the Cohocton River. Municipal applicants are eligible. Part of the CFA program due in late July. www.dos.ny.gov/opd/grantOpportunities/epf_lwrpGrants.html

Federal Funding

- **HMA: Hazard Mitigation Assistance (Federal Emergency Management Agency):** FEMA administers three grant programs for hazard mitigation projects and hazard mitigation planning. Hazard mitigation measures are any sustainable action taken to reduce or eliminate long-term risk to people and property from future disasters. www.fema.gov/hazard-mitigation-assistance
    - **Flood Mitigation Assistance Program (FMA):** The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. www.fema.gov/flood-mitigation-assistance-grant-program

- **Pre-Disaster Mitigation Assistance Program (PDM):** Funding is for implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. www.fema.gov/pre-disaster-mitigation-grant-program

- **Hazard Mitigation Grant Program (HMGP):** HMGP grants support assists in implementing hazard mitigation planning and post-disaster projects following a Presidential major disaster declaration. www.fema.gov/hazard-mitigation-grant-program

- **Preparedness Grants (FEMA):** FEMA's Preparedness Grant programs strive to improve the capability of citizens and first responders to prepare for, protect against, respond to, recover from, and mitigate all hazards. These grants help to develop and sustain capabilities at the state and local, tribal, and territorial levels and in our nation's highest-risk transit systems, ports, and along our borders to prevent, protect against, respond to, recover from, and mitigate terrorism and other high-consequence disasters and emergencies. www.fema.gov/grants

    - **Emergency Management Performance Grant (EMPG):** The EMPG program provides federal funds to assist in preparing for all hazards. The federal government provides direction, coordination, guidance, and assistance to support a comprehensive all hazards emergency preparedness system. The EMPG program will provide federal funds to assist state, local, tribal, and territorial emergency management agencies to obtain the resources required to support prevention, protection, mitigation, response, and recovery. www.fema.gov/emergency-management-performance-grant-program

Property Damage

Goal 2: Minimize flood damage to property.

WHO CAN HELP?

Southern Tier Central Regional Planning & Development Board (STC)

Provides planning assistance, training, and floodplain management assistance, as well as updating of floodplain management regulations, higher standards for floodplain development, and incorporation of flood risks into land use regulations.
www.stcplanning.org/index.asp?pageId=9

Steuben County Planning Department

Assists local governments with planning and heavily supports the natural environment when considering economic development. Responsible for all GIS data maintained by Steuben County.
www.steubencony.org/Pages.asp?PGID=33

Steuben County Office of Emergency Services

Coordinates development of the county's Hazard Mitigation Action Plan and assists with mitigation grant proposals.
www.steubencony.org/Pages.asp?PGID=25

U.S. Army Corps of Engineers (USACE)

Aims to reduce the consequences of flooding through nonstructural floodproofing including elevation, relocation, dry and wet floodproofing and buyouts.
www.usace.army.mil/Missions/Civil-Works/Project-Planning/nnc/

NYS Department of Homeland Security and Emergency Services (DHSES):

The DHSES Office of Emergency Management provides assistance with hazard mitigation planning and administers mitigation grants.
www.dhses.ny.gov/contact/

OBJECTIVES

Objective 2a: Enact stream setback requirements.

Objective 2b: Enforce development standards, including anchoring of floatable property in the floodway.

Objective 2c: Provide for Planning Board review of development in the floodplain and support this review with appropriate resources (training, maps, checklists, etc.).

Objective 2d: Seek funding to elevate or relocate existing structures in the floodplain.

Objective 2e: Protect existing floodplain development with wet floodproofing (to resist damage when floodwaters enter a building) and other practices.

Objective 2f: Ensure that all fuel tanks in the floodplain are anchored and protected.

ONLINE RESOURCES

2.1. Flood Smart Action Plan: Cohocton River

A. **Chapter 2: Community Profiles.** Community Information maps provide an indication of vulnerability, which can inform priorities for Objectives 2d and 2e.

2.2. Southern Tier Central Regional Planning & Development Board (STC)

A. **Municipal Land Use Strategies for Improving Flood Resilience:** Protecting Health, Safety, and Welfare, 2017. Guidance document provides ideas and resources to help local governments integrate flood hazards into land use management activities. Information supports implementation of stream corridor protection and planning board review for Objectives 2a and 2c.
stcplanning.org/usr/Program_Areas/Flood_Mitigation/Flood%20Resistant%20Communities/LandUseStrategiesForFlooding.pdf

B. **Floodplain Management Standards.** Web page includes information sheets and forms to assist with implementation of floodplain development requirements. These reference materials support improved floodplain management for Objective 2b. stcplanning.org/index.asp?pageId=108

C. **Update and Clarification of Floodplain Development Standards:** Recommendations for the Town of Cohocton, 2016. Document presents STC's recommendations for incorporating clarifications into the New York Model Law for Flood Damage Prevention. These recommendations supports Action 2bii, "Update municipal Local Law for Flood Damage Prevention; consider clarifying language (about fuel tanks and other topics) and additional standards."
stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/TCohocton_FP_Reg_Recommendations.pdf

D. **Higher Floodplain Development Standards, Recommendations for the Town of Southport, 2015.** Document presents optional language for higher standards that can be incorporated into local Flood Damage Prevention Laws and forms to facilitate implementation. Supports consideration of additional standards when updating the municipal Local Law for Flood Damage Prevention (Action 2bii).
stcplanning.org/usr/Program_Areas/Flood_Mitigation/Floodplain%20Management/Southport_Proposed_FP_Standards.pdf

E. **Floodproofing: Protect Your Property from Flood Damage.** Web page provides basic information about floodproofing existing flood-prone buildings and links to information sheets about various floodproofing techniques, the advantages and disadvantages of each, and considerations to assist with selecting appropriate protection strategies. This information supports elevation and floodproofing for Objectives 1a, 2d, and 2e.
stcplanning.org/index.asp?pageId=107

2.3. Association of State Floodplain Managers (ASFPM)

A. **No Adverse Impact (NAI) How-to Guide for Regulations & Development Standards, 2017.** This NAI guide prevents regulatory tools for preventing adverse impacts to other properties and to safety that support consideration of additional floodplain management standards for Objective 2b.
www.floods.org/ace-images/ASFPMRegulationsGuideApril2017.pdf

B. **A Guide for Higher Standards in Floodplain Management, 2013.** Guide presents sample language for incorporating higher standards into local floodplain management regulations (supports Objective 2b).
www.floods.org/ace-files/documentlibrary/committees/3-13_Higher_Standards_in_Floodplain_Management2.pdf

2.4. Federal Emergency Management Agency (FEMA)

A. **National Flood Insurance Program (NFIP) Technical Bulletins.** Web page provides links to technical bulletins that provide guidance on NFIP regulatory requirements, including bulletins about openings in foundation walls (flood vents), flood damage-resistant materials, wet floodproofing, crawl space construction, and other topics (supports enforcement for Objective 2c and floodproofing for Objective 2e).
www.fema.gov/nfip-technical-bulletins

B. **National Flood Insurance Program, Floodplain Management Requirements, A Study Guide and Desk Reference for Local Officials, FEMA 480, 2005.** Reference document about administering and enforcing local floodplain management regulations (supports training needs for Objective 2b).
www.fema.gov/media-library/assets/documents/902

C. **Hazard Mitigation Assistance.** Web page with information and links for mitigation ideas, FEMA's mitigation grant programs, and program guidance (supports Objectives 1a and 2d).
www.fema.gov/hazard-mitigation-assistance

D. **Fact Sheet:** Acquisition of Property after a Flood Event, 2018. Fact sheet describes FEMA's post-flood buyout program, how to determine if a property is eligible, and the next steps to take in order to complete a buyout process. Information about property acquisition supports Objectives 1a and 2d.
www.fema.gov/news-release/2018/11/13/fact-sheet-acquisition-property-after-flood-event

E. **Homeowner's Guide to Retrofitting, FEMA P-132, 3rd edition, 2014.** Provides guidance for variety of techniques for retrofitting existing buildings to prevent future flood damage. Detailed information about floodproofing, relocation, demolition, and elevation projects supports Objectives 1a, 2d, and 2e.
www.fema.gov/media-library/assets/documents/480

F. **Reducing Flood Risk to Residential Buildings That Cannot Be Elevated, FEMA P-1037, 2015.** Presents flood protection measures for retrofitting existing buildings (supports Objective 2e).
www.fema.gov/media-library/assets/documents/109669

G. **Hurricane Recovery Advisories, 2013, Hurricane Sandy.** Web page with links to building science advisories, including "Reducing Flood Effects in Critical Facilities" (supports Objective 1a) and "Protecting Building Fuel Systems from Flood Damage" (supports Objective 2f).
www.fema.gov/media-library/assets/documents/30966

2.5. National Oil Heat Research Alliance

A. **Recommended Practice for Home Heating Oil Tank Flood Resistance.** Best practices paper on properly securing aboveground storage tanks (supports Objective 2f).
noraweb.org/wp-content/uploads/2015/07/NORA-Tank-Securement.pdf

FUNDING OPPORTUNTIES

ACTIVITY	Funding Source
Relocations and buyouts	HMA
Floodproofing	HMA; CSC
Flood mitigation	CSC; HMA

● State ● Foundations ● Federal

New York State Funding

- **CSC: Climate Smart Communities (NYS Department of Environmental Conservation):** CSC grants provide 50/50 matching grants to cities, towns, villages and counties of the State of New York and boroughs of New York City for eligible climate adaptation and mitigation projects. Download the CSC grants fact sheet (PDF) for an overview of the program. Funds are available for two broad categories. The first category supports implementation projects related to climate change adaptation and the reduction of greenhouse gases outside the power sector (transportation, methane and refrigerants. The second category supports planning projects related to Climate Smart Communities certification actions. The opportunity is part of the state Consolidated Funding Application (CFA) and due in late July. www.dec.ny.gov/energy/109181.html

Federal Funding

- **HMA: Hazard Mitigation Assistance (Federal Emergency Management Agency):** FEMA administers three grant programs for hazard mitigation projects and hazard mitigation planning. Hazard mitigation measures are any sustainable action taken to reduce or eliminate long-term risk to people and property from future disasters. www.fema.gov/hazard-mitigation-assistance

    - **Flood Mitigation Assistance Program (FMA):** The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. www.fema.gov/flood-mitigation-assistance-grant-program

    - **Pre-Disaster Mitigation Assistance Program (PDM):** Funding is for implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. https://www.fema.gov/pre-disaster-mitigation-grant-program

    - **Hazard Mitigation Grant Program (HMGP):** HMGP grants support assists in implementing hazard mitigation planning and post-disaster projects following a Presidential major disaster declaration. www.fema.gov/hazard-mitigation-grant-program

Planning

Goal 3: Maximize the use of emergency preparedness and land use planning tools to proactively improve flood safety.

OBJECTIVES

Objective 2a: Inventory assets in flood-prone areas (in and outside of the regulated floodplain).

Objective 3b: Identify areas that should remain undeveloped and those that can be developed safely.

Objective 3c: Conduct asset planning for highways and other municipal services, including assessment of the vulnerability to flooding.

Objective 3d: Review and update comprehensive plans, zoning, and other land use management tools.

Objective 3e: Update municipal emergency response plans and include information about coordination with individual facilities, who has what equipment, chains of command, established roles and responsibilities, shelters, evacuation routes, etc.

WHO CAN HELP?

Steuben County Planning Department

Assists local governments with planning and heavily supports the natural environment when considering economic development. Responsible for all GIS data maintained by Steuben County.
www.steubencony.org/Pages.asp?PGID=33

Steuben County Office of Emergency Services

Assists with municipal emergency plans and maintains Steuben County's special/functional needs inventory.
www.steubencony.org/Pages.asp?PGID=25

Southern Tier Central Regional Planning & Development Board (STC)

Provides planning assistance, training and floodplain management assistance as well as assistance in updating floodplain management regulations, higher standards for floodplain development, and incorporation of flood risks into land use regulations.
www.stcplanning.org/index.asp?pageId=9

ONLINE RESOURCES

3.1. Flood Smart Action Plan: Cohocton River

A. **Appendix B: Assessment of Land Use Plans and Regulations.** Plans and land use regulations for each project municipality were reviewed for consistency with best practices for flood resilience. Recommendations support Objective 3d.

B. **Chapter 2: Community Profiles.** Floodplain Information maps show more and less active floodplains in relation to those mapped by FEMA. Community Information maps provide an indication of vulnerability. This information supports land use management for Objective 3d.

3.2. Southern Tier Central Regional Planning & Development Board (STC)

A. **Municipal Land Use Strategies for Improving Flood Resilience: Protecting Health, Safety, and Welfare, 2017.** Guidance document provides ideas and resources to help local governments integrate flood hazards into land use management activities. Information supports comprehensive planning and revisions to land use regulations for Objective 3d.
stcplanning.org/usr/Program_Areas/Flood_Mitigation/Flood%20Resistant%20Communities/LandUseStrategiesForFlooding.pdf

B. **Online Mappers for Natural Features, Central and Western New York.** Handout provides a list with links to online mapping services can be utilized to evaluate asset vulnerabilities (Objective 3c) and integrate natural resources into comprehensive plans (Objective 3d). Available map data includes geology, soils, slopes, aquifers, watersheds, wetlands, and other environmental maps.
stcplanning.org/usr/Program_Areas/Environmental%20Planning/OnlineMappersForNaturalFeatures.pdf

3.3. Steuben County

A. **GIS in Steuben County, NY.** Web page provides links to online map viewers, including maps of wetlands, approximate FEMA floodplains, and soils, which supports land use planning for Objective 3d.
steubencounty-scnygis.opendata.arcgis.com/

B. **Human Needs Task Force.** Web page describes the task force whose mission includes identifying unmet needs of disaster victims. Task force helps to develop and maintain a special needs database, which supports Objective 3a.
www.steubencony.org/pages.asp?PID=401

3.4. NYS Department of Homeland Security and Emergency Services (NYS DHSES)

A. **Emergency Planning Guide for Community Officials.** Guidance document supports Objective 3e.
www.dhses.ny.gov/planning/state/emergency.cfm

3.5. New York State Department of State (NYS DOS)

A. **Model Local Laws to Increase Resilience, 2019.** Web page includes table of contents and links to download a document with numerous examples of local law language that municipalities can adapt and use to increase resilience to flooding (Supports Objective 3d). www.dos.ny.gov/opd/programs/resilience/index.html

3.6. NYS Climate Smart Communities (CSC) certification program with actions and tools that can help communities adapt to flood hazards

A. **CSC PE6 Action: Comprehensive Plan with Sustainability Elements.** Information about the comprehensive plan CSC action includes steps for completing a new or updated comprehensive plan, which supports Objective 3d. Exit this popup window to access information about additional certification actions that can support planning and land use management efforts, including smart growth principles (6.2), natural resource inventory (PE6), preserving natural areas through regulations (6.19), vulnerability assessments (PE7), resiliency planning (PE7), and adaptation strategies (PE7). climatesmart.ny.gov/actions-certification/actions/#open/action/66

3.7. Association of State Floodplain Managers (ASFPM)

A. **No Adverse Impact (NAI) How-to Guide for Planning, 2014.** NAI guides promote improved flood risk management practices. Planning present factors for effective planning and planning tools, including comprehensive planning (supports Objective 3d) and risk assessment (supports Objective 3a). www.floods.org/ace-images/PlanningFinal6_16_16.pdf

B. **No Adverse Impact (NAI) How-to Guide for Infrastructure, 2016.** Guide includes multiple tools for protecting infrastructure from flood damage, including "effective management of local road systems" (supports Objective 3c). www.floods.org/ace-images/ASFPM-InfrastructureFinalJuly28.pdf

C. **No Adverse Impact (NAI) How-to Guide for Emergency Services, 2019.** Emergency service tools presented in this guide include flood response, which can support improved integration of flood risks into municipal emergency response plans for Objective 3e. www.floods.org/ace-images/NAI_EmergencyServicesMay2019Final.pdf

D. **ASFPM Riverine Erosion Hazards White Paper, 2016.** White paper encourages mapping of riverine erosion hazard areas to support improved management of these high-risk areas (supports Objective 3b). www.floods.org/ace-images/ASFPMRiverineErosionWhitePaperFeb2016.pdf

3.8. American Planning Association (APA)

A. **Comprehensive Plan Standards for Sustaining Places.** Web page includes a link to a matrix of "comprehensive plan standards" for addressing sustainability, which lists standards that can be used in evaluating existing comprehensive plans and generating new ones. Full 2015 report is available for members or for purchase. (Supports Objective 3d.) www.planning.org/sustainingplaces/compplanstandards/

B. **Subdivision Design and Flood Hazard Areas, PAS Report 584, 2016.** Report (developed jointly with ASFPM) provides guidance for using the subdivision and site plan review process to reduce flood vulnerability (supports land use management for Objective 3d). www.planning.org/nationalcenters/hazards/subdivisiondesign/

3.9. Federal Emergency Management Agency (FEMA)

A. **Risk Assessment Table.** Template could be used to document assets and vulnerabilities for asset planning in Objective 3c. www.fema.gov/media-library/assets/documents/89542

3.10. See additional emergency planning resources listed for Emergency Response (Goal 1)

FUNDING OPPORTUNTIES

ACTIVITY	Funding Source
Land use planning and regulations	CSC; LWRP
Asset inventory	CSC; LWRP; HMA
Emergency planning and preparedness	Preparedness Grants

● State ● Foundations ● Federal

New York State Funding

- **CSC: Climate Smart Communities (NYS Department of Environmental Conservation):** CSC grants provide 50/50 matching grants to cities, towns, villages and counties of the State of New York and boroughs of New York City for eligible climate adaptation and mitigation projects. Download the CSC grants fact sheet (PDF) for an overview of the program. Funds are available for two broad categories. The first category supports implementation projects related to climate change adaptation and the reduction of greenhouse gases outside the power sector (transportation, methane and refrigerants. The second category supports planning projects related to Climate Smart Communities certification actions. The opportunity is part of the state Consolidated Funding Application (CFA) and due in late July. www.dec.ny.gov/energy/109181.html

- **LWRP: Local Waterfront Revitalization Program (NYS Department of State):** Funding is available for developing and implementing Local Waterfront Revitalization plans for designated waterways, including the Cohocton River. Municipal applicants are eligible. Part of the CFA program due in late July. www.dos.ny.gov/opd/grantOpportunities/epf_lwrpGrants.html

Federal Funding

- **HMA: Hazard Mitigation Assistance (Federal Emergency Management Agency):** FEMA administers three grant programs for hazard mitigation projects and hazard mitigation planning. Hazard mitigation measures are any sustainable action taken to reduce or eliminate long-term risk to people and property from future disasters. www.fema.gov/hazard-mitigation-assistance

    - **Flood Mitigation Assistance Program (FMA):** The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. www.fema.gov/flood-mitigation-assistance-grant-program

- **Pre-Disaster Mitigation Assistance Program (PDM):** Funding is for implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. www.fema.gov/pre-disaster-mitigation-grant-program

- **Hazard Mitigation Grant Program (HMGP):** HMGP grants support assists in implementing hazard mitigation planning and post-disaster projects following a Presidential major disaster declaration. www.fema.gov/hazard-mitigation-grant-program

- **Preparedness Grants (FEMA):** FEMA's Preparedness Grant programs strive to improve the capability of citizens and first responders to prepare for, protect against, respond to, recover from, and mitigate all hazards. These grants help to develop and sustain capabilities at the state and local, tribal, and territorial levels and in our nation's highest-risk transit systems, ports, and along our borders to prevent, protect against, respond to, recover from and mitigate terrorism and other high-consequence disasters and emergencies. www.fema.gov/grants

    - **Emergency Management Performance Grant (EMPG):** The EMPG program provides federal funds to assist in preparing for all hazards. The Federal Government provides direction, coordination, guidance, and assistance to support a comprehensive all hazards emergency preparedness system. The EMPG Program will provide federal funds to assist state, local, tribal, and territorial emergency management agencies to obtain the resources required to support prevention, protection, mitigation, response, and recovery. www.fema.gov/emergency-management-performance-grant-program

Education

Goal 4: Maximize informed decision making and community action by educating officials, residents, businesses and others about flood safety, preparedness and recovery.

OBJECTIVES

Objective 4a: Educate municipal personnel and the public (particularly floodway and floodplain residents) about the likelihood and possible impacts of flooding and strategies for reducing impacts.

Objective 4b: Train municipal boards and elected officials on floodplain management regulations.

Objective 4c: Educate the public about emergency operations (evacuation routes, shelters, etc.) and personal responsibilities for safety, preparedness, and response.

Objective 4d: Promote disclosure of flood hazard information during real estate transactions.

Objective 4e: Provide stream management education that includes the impacts of stream corridor and floodplain development, impacts of land use in the watershed agriculture, forestry, development), and stream management techniques.

WHO CAN HELP?

Southern Tier Central Regional Planning & Development Board (STC) Offers a yearly, one-day Regional Leadership Conference as well as municipal training and assistance and evening educational courses through the Planning School Program. Technical planning, flood mitigation, and public outreach assistance is provided to communities as needed. www.stcplanning.org/index.asp?pageId=9

Steuben County Office of Emergency Services: Manages and maintains the Ready Steuben mobile app for preparing and alerting residents for emergencies. The app includes county alerts as well as alerts from the National Weather Service. www.steubencony.org/Files/Documents/emo/ready_steuben_mobile_app.pdf

Steuben County SWCD: Offers technical assistance and education to communities to help protect natural resources. www.facebook.com/SteubenSWCD/

New York State Floodplain and Stormwater Managers Association (NYSFSMA): State chapter of the Association of State Floodplain Managers, providing training through the annual conference and other events on a variety of floodplain and stormwater management topics. www.nyfloods.org/content.aspx?page_id=4&club_id= 735785

NYS Department of Environmental Conservation (NYSDEC): Offers training and assistance on National Flood Insurance Program floodplain management training. www.dec.ny.gov/lands/24267.html

Cornell Local Roads Program: Provides training and technical assistance to local officials and employees responsible for highways and bridges. www.clrp.cornell.edu/clrp/staff.html

ONLINE RESOURCES

4.1. Steuben County Office of Emergency Services

A. **Ready Steuben.** Website and mobile app provide Steuben County residents with information and resources regarding disaster planning and preparedness. Website provides information and links tailored for families, businesses, schools, and individuals with special needs. Supports Objective 4c. readysteuben.com/

4.2. Southern Tier Central Regional Planning & Development Board (STC)

A. **Flood Education Plan, 2014.** Plan presents key flood messages, target audiences, and a strategy for educating the public about flooding issues in Steuben, Schuyler, and Chemung Counties (supports Objective 4a). www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Education/FloodEducationPlan.pdf

B. **Guidelines for Levee-Protected Areas, 2016.** Information sheet about managing flood risks in areas protected by levees and floodwalls (supports Objective 4a). www.stcplanning.org/usr/Program_Areas/Flood_Mitigation/Education/LeveedAreaGuidelines.pdf

C. **Flood Safety.** Website has links to flood safety handouts (supports Objective 4a). www.stcplanning.org/index.asp?pageId=106

D. **Managing Stream Corridors / Stream Processes.** Web page has links to stream management handouts and to download "Stream Processes: A Guide to Living in Harmony with Streams," an illustrated guide that promotes understanding of natural stream processes and the impacts of human intervention (supports Objective 4e). www.stcplanning.org/index.asp?pageId=103

4.3. Association of State Floodplain Managers (ASFPM)

A. **No Adverse Impact How-to Guide for Education & Outreach, 2014.** This guide outlines a variety of outreach tools and provides useful information about developing a public information program and conducting education sessions (supports Objective 4a). www.floods.org/ace-images/EducationFinal6_16_16.pdf

B. **K-12 Flood Education Resources.** Website is a searchable library of a wide range of flood education materials from across the country (supports Objective 4a). www.floodsciencecenter.org/products/k-12-flood-education/

C. **The Costs & Benefits of Building Higher, 2018.** Handout details the difference in flood insurance costs and construction costs for various elevation efforts (supports Objective 4a). www.floods.org/ace-images/BenefitsCostFreeboardFlyerFinalFeb2018.pdf

4.4. Federal Emergency Management Agency (FEMA)

A. **Information for Policyholders.** Website provides information for flood insurance policyholders about insurance claims, Letters of Map Amendments (LOMAs), identifying flood risk, and other insurance information (supports Objective 4a). www.fema.gov/information-policyholders

B. **Cost of Flood:** Web page links to information to help insurance agents and flood insurance policy holders understand the "NFIP Policy Declarations" page that FEMA sends to policyholders about how the policy is rated (supports Objective 4a). www.fema.gov/cost-of-flood

C. **Community Rating System (CRS) Resources, 300 Series:** Public Information. Under activity "340: Hazard Disclosure," this web page includes resources that support actions for Objective 4d: "Flood hazard check before you buy" and "Template: Real Estate Hazard Disclosure Brochure." Both resources can be downloaded in Word format for editing by municipalities. crsresources.org/300-3/

FUNDING OPPORTUNITIES

ACTIVITY	Funding Source
Outreach and education	Resilient Communities; Chesapeake Bay Stewardship; HWCP; NOAA
Training	Training initiative can be folded into a larger restoration or planning effort

● State ● Foundations ● Federal

Foundations

- **Chesapeake Bay Stewardship Fund:** Includes the Innovative Nutrient and Sediment Reduction Grant Program and the Small Watershed Grants Program. These programs benefit the communities, farms, habitats and wildlife of the Chesapeake Bay region. NFWF also makes targeted investments that support networking and information-sharing among restoration partners on emerging technologies, successful restoration approaches, and new partnership opportunities. www.nfwf.org/chesapeake/Pages/home.aspx

Federal Funding

- **HWCP:** Healthy Watersheds Consortium Program (Environmental Protection Agency): Developing funding mechanisms, plans, or other strategies to implement large-scale watershed protection, source water protection, green infrastructure, or related landscape conservation objectives; building the sustainable organizational infrastructure, social support, and long-term funding commitments necessary to implement large-scale protection of healthy watersheds; and supporting innovative or catalytic projects that may accelerate funding for or implementation of watershed protection efforts, or broadly advance this field of practice. www.epa.gov/hwp/healthy-watersheds-consortium-grants-hwcg

- **NOAA: National Oceanic and Atmospheric Administration:** NOAA Office of Education supports formal, informal and non-formal education projects and programs through competitively awarded grants and cooperative agreements to a variety of educational institutions and organizations. Environmental literacy grants support education programs that use science to promote stewardship and informed decision making. The Bay Watershed Education and Training (B-WET) program funds projects that provide K-12 audiences with "Meaningful Watershed Educational Experiences." www.noaa.gov/office-education/grants

Natural Systems

Goal 5: Maximize the flood protection and other benefits of natural systems by implementing management strategies that balance environmental, economic, and social concerns.

WHO CAN HELP?

Steuben County Soil and Water Conservation District (SWCD)

Offers technical assistance and education to communities to help protect natural resources. www.facebook.com/SteubenSWCD/

Upper Susquehanna Coalition (USC)

Aims to improve water quality in the Upper Susquehanna River Basin through planning, education and project implementation. The USC includes teams oriented around topics such as agriculture, riparian buffers, streams and wetlands. Contact USC through the county SWCD office.

Finger Lakes Land Trust (FLLT)

Conserves the lands and waters of the Finger Lakes region, ensuring scenic vistas, clean water, local foods, and wild places for everyone. www.fllt.org/

OBJECTIVES

Objective 5a: Coordinate with entities involved in stream management to develop a stream management plan that addresses flood hazards, erosion, sediment, debris, and riparian vegetation.

Objective 5b: Secure funding to implement stream remediation projects.

Objective 5c: Implement best practices for managing stormwater runoff from development, roadway drainage, agricultural operations (to reduce surface runoff from fields), and logging operations (especially on steep slopes).

ONLINE RESOURCES

5.1. Flood Smart Action Plan: Cohocton River

A. **Chapter 2:** Community Profiles. Floodplain Information maps show more and less active floodplains. Floodplain Recommendations maps show recommended areas for protecting, restoring, and enhancing floodplain functions. This information is useful to prioritize implementation of activities for Objective 5b. Steep Slopes maps and the high runoff areas shown on Floodplain Information maps can help to target activities in for Objective 5c.

5.2. Southern Tier Central Regional Planning & Development Board (STC)

A. **Managing Stream Corridors / Stream Processes.** Webpage has links to stream management handouts and to download "Stream Processes: A Guide to Living in Harmony with Streams," an illustrated guide that promotes understanding of natural stream processes and the impacts of human intervention (supports Objective 5a). www.stcplanning.org/index.asp?pageId=103

5.3. New York State Department of Environmental Conservation (NYS DEC)

A. **Stream Crossings: Protecting and Restoring Stream Continuity.** Website describes stream crossing problems, recommended standards, and permit requirements (supports Objective 5b). www.dec.ny.gov/permits/49060.html

B. **Stream Crossings: Guidelines and Best Management Practices.** Website provides recommendations to assist in designing, installing and replacing stream crossing structures (supports Objective 5b). www.dec.ny.gov/permits/49066.html

C. **Riparian Buffers.** Webpage outlines the importance of protecting and restoring riparian buffers and provides information on a variety of funding sources to complete this work (supports Objective 5b). www.dec.ny.gov/chemical/106345.html

D. **Trees for Tribs.** Website outlines the Trees for Tribs program that aims to restore riparian buffers. In addition to program information (grant program, Buffer in a Bag, etc.), site also provides useful resources, including planting and maintenance guides, maintenance checklists, and other fact sheets (supports Objective 5b). www.dec.ny.gov/animals/77710.html

E. **Stream Corridor Management: A Basic Reference Manual, 1986.** Guidance manual for local officials addresses land-use related stream problems and ways that those problems can be prevented or remediated. Includes information about best management practices for minimizing disturbance to streams (supports Objectives 5a, 5b, and 5c). www.dec.ny.gov/docs/water_pdf/streambmps.pdf

F. **Municipal Official's Guide to Forestry in New York State, 2005.** Document presents existing programs and opportunities for additional actions that municipalities can undertake to promote good forest land stewardship (supports Objective 5c). www.dec.ny.gov/docs/lands_forests_pdf/guidetoforestry.pdf

G. **Construction Stormwater Toolbox.** Webpage with information about the state General Permit for Stormwater Discharges from Construction Activity and links to resources, including the state's design standards and "Better Site Design" document. www.dec.ny.gov/chemical/8694.html

H. **New York State Forestry: Voluntary Best Management Practices for Water Quality, BMP Field Guide, 2018.** Field guide of best management practices for timber harvesting (supports Objective 5c). www.dec.ny.gov/docs/lands_forests_pdf/forestrybmp.pdf

I. **Timber Harvesting: Stewardship of Forest Land.** Webpage with information about permits, responsible forest management, and more (supports Objective 5c). www.dec.ny.gov/lands/5242.html

5.4. New York Natural Heritage Program

A. **Statewide Riparian Opportunity Assessment.** This program was created to identify and prioritize riparian sites in need of protection and restoration throughout New York State. Website presents information about the program, with links to the project report and online maps of priorities (supports Objective 5b). www.nynhp.org/treesfortribsny

5.5. U.S. Army Corps of Engineers—Buffalo District

A. **Wetlands—What You Should Know Before You Buy or Build.** Regulatory fact sheet about federal wetland regulations for New York State (supports Objective 5c). www.lrb.usace.army.mil/Portals/45/docs/regulatory/DistrictInfo/FactSheets/NY-Wetlands_What_You_Should_Know_Revised_13MAY2019.pdf?ver=2019-05-13-150727-513

5.6. North Atlantic Aquatic Connectivity Collaborative (NAACC)

A. **Climate-Friendly Stream Crossings Toolkit.** Website compiles resources and tools spanning a range of topics related to improving road-stream crossings (culverts and bridges), supports Objective 5b. streamcontinuity.org/naacc/climate-friendly-stream-crossings-toolkit

5.7. U.S. Geological Survey (USGS)

A. **StreamStats. Online tool provides estimated streamflow statistics at any point along a stream channel.** This information about discharges is helpful for appropriately sizing culverts and other stream crossings (supports Objective 5b). streamstats.usgs.gov/ss/

5.8. Cornell Local Roads Program

A. **Ditching Best Management Practices.** Website presents research results about roadside ditches and best management practices, with links to additional resources, including "Stormwater Management" (CLRP No. 14-03), "Roadway and Roadside Drainage" (CLRP No. 98-5), "Roadside Ditches: Best Management Practices to Reduce Floods, Droughts, and Water Pollution" (factsheet), and "Basic Guidelines for Successful Roadside Ditch Management (presentation) (supports Objective 5c). www.clrp.cornell.edu/researchprojects/Ditching.html

5.9. Pennsylvania Department of Environmental Protection

A. **Guidelines for Maintaining Streams in Your Community.** This booklet is a simple guide to working in and near streams to avoid causing conditions to worsen in the next flood event and impacting downstream neighbors. Although permit information is different in New York, information in this guide supports Objective 5a. files.dep.state.pa.us/Water/FactSheets/StreamMaintenance/StreamMaintenanceBooklet_forWeb.pdf

5.10. Association of State Floodplain Managers (ASFPM)

A. **No Adverse Impact (NAI) How-to Guide for Infrastructure, 2016.** Guide about flood protection strategies for infrastructure recognizes the benefits of natural or green infrastructure and provides information about bio-engineered embankments and riparian buffers (supports Objectives 5b and 5c). www.floods.org/ace-images/ASFPM-InfrastructureFinalJuly28.pdf

B. **No Adverse Impact (NAI) How-to Guide for Mitigation, 2016.** This guide presents tools for mitigating flood risks, including sustainable stormwater management, which supports Objective 5c. www.floods.org/ace-images/ASFPM-MitigationFinalJuly28.pdf

5.11. Additional land use planning resources are listed for Planning (Goal 3)

FUNDING OPPORTUNTIES

ACTIVITY	Funding Source	Notes
Stream management planning	LWRP; CSC; Chesapeake Bay Stewardship; HWCP	Some of these opportunities include standalone planning funds, others include planning as part of a larger project usually coupled with restoration work.
Stream/riparian restoration	Chesapeake Bay Stewardship; Resilient Communities; WQIP Aquatic Habitat; WQIP Non-Ag/ Non-Point; HWCP; EBTJV	
Culvert and bridge assessment	CSC; Bridge NY; HWCP	This work can usually be folded into a larger restoration project, depending on the funding source.
Culvert and bridge replacement/ upgrade	WQIP Aquatic Habitat; Bridge NY; National Fish Passage Program; Chesapeake Bay Stewardship; Resilient Communities; HWCP; EBTJV	
Urban and Community Forestry	UCF	
Implementing BMPs	Chesapeake Bay Stewardship; Resilient Communities; HWCP	Implementing BMP's is a common metric in all NFWF grant programs.

● State ● Foundations ● Federal

New York State Funding

- **Bridge NY (NYS Department of Transportation):** The BRIDGE NY program provides funding to rehabilitate and replace municipally owned bridges and culverts. Projects will be evaluated based on the resiliency of the structure, including such factors as hydraulic vulnerability and structural resiliency; the significance and importance of the bridge including traffic volumes, detour considerations, number and types of businesses served and impacts on commerce; and the current bridge and culvert structural conditions. Biennial program. Next RFP is expected to be posted in 2020 (assuming funding is secured). www.dot.ny.gov/BRIDGENY

- **CSC: Climate Smart Communities (NYS Department of Environmental Conservation):** CSC grants provide 50/50 matching grants to cities, towns, villages and counties of the State of New York and boroughs of New York City for eligible climate adaptation and mitigation projects. Download the CSC grants fact sheet (PDF) for an overview of the program. Funds are available for two broad categories. The first category supports implementation projects related to climate change adaptation and the reduction of greenhouse gases outside

the power sector (transportation, methane and refrigerants. The second category supports planning projects related to Climate Smart Communities certification actions. The opportunity is part of the state Consolidated Funding Application (CFA) and due in late July. www.dec.ny.gov/energy/109181.html

- **Green Innovation Grant Program (Environmental Facilities Corporation):** Supports projects across New York State that utilize unique stormwater infrastructure design and create cutting-edge green technologies. Projects selected for funding go beyond offering a greener solution. They maximize opportunities to leverage the multiple benefits of green infrastructure, spur innovation in the field of stormwater management, build capacity to construct and maintain green infrastructure, and/or facilitate the transfer of new technologies and practices to other areas across the state. Municipalities and SWCDs are eligible to apply. This is part of the CFA program and due in late July. www.efc.ny.gov/GIGP

- **LWRP: Local Waterfront Revitalization Program (NYS Department of State):** Funding is available for developing and implementing Local Waterfront Revitalization plans for designated waterways, including the Cohocton River. Municipal applicants are eligible. Part of the CFA program due in late July. www.dos.ny.gov/opd/grantOpportunities/epf_lwrpGrants.html

- **UCF: Urban and Community Forestry Grants (NYS Department of Environmental Conservation):** Provides support and assistance to communities to develop comprehensive projects to create healthy urban and community forests while enhancing the quality of life for urban residents. Eligible project types include tree inventory, community forest management plan, tree planting, tree maintenance, and education programming. www.dec.ny.gov/lands/5285.html

- **WQIP:** Water Quality Improvement Program (NYS Department of Environmental Conservation)

    - **Aquatic Habitat Restoration:** Focus is specifically on road/stream crossings (bridges, culverts, and dams) and aquatic organism connectivity. Municipalities, Soil & Water Conservation Districts (SWCDs), and non-profits are eligible to apply for up to $250,000.

    - **Non-Agricultural Nonpoint Source Abatement and Control:** Projects need to focus on water quality, including nutrient reduction strategy, streambank restoration, erosion control, riparian buffers, etc. Municipalities and SWCDs are eligible to apply. Part of the CFA program due in late July.

  Part of the CFA program due in late July. www.dec.ny.gov/pubs/4774.html

Foundations

- **Chesapeake Bay Stewardship Fund:** Includes the Innovative Nutrient and Sediment Reduction Grant Program and the Small Watershed Grants Program. These programs benefit the communities, farms, habitats and wildlife of the Chesapeake Bay region. NFWF also makes targeted investments that support networking and information-sharing among restoration partners on emerging technologies, successful restoration approaches, and new partnership opportunities. www.nfwf.org/chesapeake/Pages/home.aspx

- **Resilient Communities:** Restore wetlands, coastal habitats and other ecosystems to help communities address floods, storm events and sea level-rise. Aquatic migration connection is a suggested project example. Also includes funding capacity building and demonstration projects. RFP is usually released in the winter. www.nfwf.org/resilientcommunities/Pages/home.aspx

Federal Funding

- **EBTJV:** Eastern Brook Trout Joint Venture: Each summer, the Eastern Brook Trout Joint Venture requests project proposals that are focused on conserving and restoring habitat that will support healthy and productive populations of wild Brook Trout. Federal funding supports the National Fish Habitat Action Plan and is administered by the U.S. Fish and Wildlife Service. Maximum award is $50,000. easternbrooktrout.org/funding-opportunities

- **HMA: Hazard Mitigation Assistance (Federal Emergency Management Agency):** FEMA administers three grant programs for hazard mitigation projects and hazard mitigation planning. Hazard mitigation measures are any sustainable action taken to reduce or eliminate long-term risk to people and property from future disasters. www.fema.gov/hazard-mitigation-assistance

    - **Flood Mitigation Assistance Program (FMA):** The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended, with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP). FMA provides funding to States, Territories, federally-recognized tribes and local communities for projects and planning that reduces or eliminates long-term risk of flood damage to structures insured under the NFIP. FMA funding is also available for management costs. Funding is appropriated by Congress annually. www.fema.gov/flood-mitigation-assistance-grant-program

    - **Pre-Disaster Mitigation Assistance Program (PDM):** Funding is for implementing a sustained pre-disaster natural hazard mitigation program. The goal is to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters. This program awards planning and project grants and provides opportunities for raising public awareness about reducing future losses before disaster strikes. Mitigation planning is a key process used to break the cycle of disaster damage, reconstruction, and repeated damage. PDM grants are funded annually by Congressional appropriations and are awarded on a nationally competitive basis. www.fema.gov/pre-disaster-mitigation-grant-program

    - **Hazard Mitigation Grant Program (HMGP):** HMGP grants support assists in implementing hazard mitigation planning and post-disaster projects following a Presidential major disaster declaration. www.fema.gov/hazard-mitigation-grant-program

- **HWCP: Healthy Watersheds Consortium Program (Environmental Protection Agency):** Supports healthy watershed development projects or local demonstration/training projects. Examples include developing funding mechanisms, plans, or other strategies to implement large-scale watershed protection, source water protection, green infrastructure, or related landscape conservation objectives; building the sustainable organizational infrastructure, social support, and long-term funding commitments necessary to implement large-scale protection of healthy watersheds; and supporting innovative or catalytic projects that may accelerate funding for or implementation of watershed protection efforts, or broadly advance this field of practice. www.epa.gov/hwp/healthy-watersheds-consortium-grants-hwcg

- **National Fish Passage Program (U.S. Fish and Wildlife Service):** The goal of the National Fish Passage Program is to restore native fishes and other aquatic species to self-sustaining levels by reconnecting habitat that has been fragmented by barriers. Administered through local FWS offices. www.fws.gov/policy/710fw1.pdf