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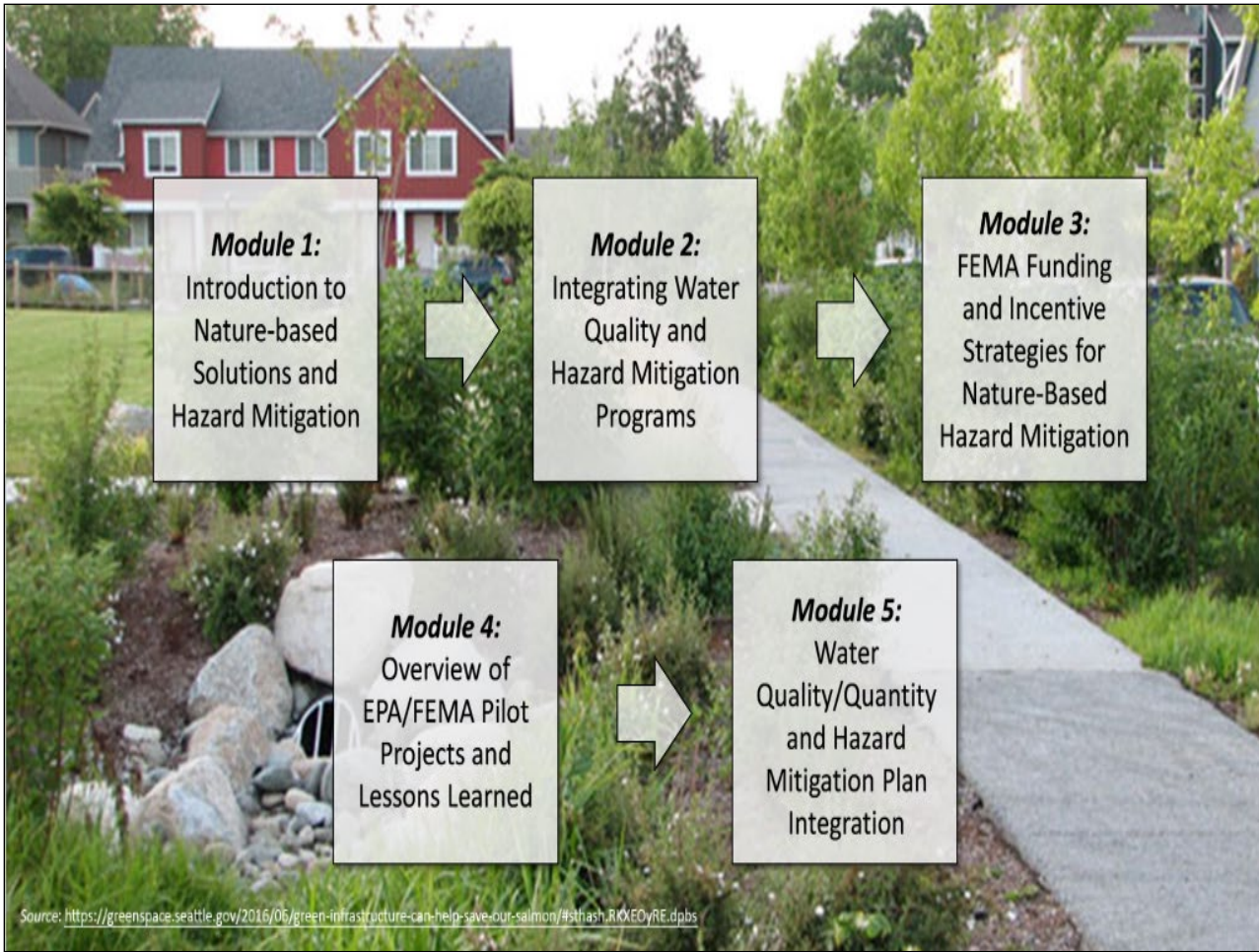
Creating Co-Benefits Through Hazard Mitigation Planning and Water Resource Management



Slide Notes

Creating Co-Benefits Through Hazard Mitigation Planning and Water Resource Management

This series is intended for water quality and hazard mitigation professionals that are interested in integrating water quality issues and/or nature-based solutions into state or local Hazard Mitigation Plans (HMPs), and highlights the benefits of working across water quality and hazard mitigation programs. Modules in this series can be used as training tools to help planners from both worlds explore activities of mutual interest and benefit. Case studies and examples are provided to assist hazard mitigation planners with integrating water resource programs into HMPs and help watershed planners understand the synergies between water resource plans and HMPs.



Slide Notes

Module one of this training is introductory and covers basic terminology that will be used throughout the materials; introduces different types of natural hazards; defines nature-based solutions and provides examples; explains the link between natural hazards, water quality/quantity issues, and nature-based solutions; introduces FEMA programs that can support the integration of nature-based solutions in hazard mitigation planning; and provides case study examples.

Module two covers water quality programs and planning, and outlines how these planning processes can align with FEMA planning and programs. Most of the water resource programs discussed in this training are required by the Clean Water Act (CWA) or the Safe Drinking Water Act (SDWA), and are implemented at the state, local, territory, and tribal (SLTT) levels.

Several of the programs have the potential for federal funding, which can be beneficial when looking for funding that can address the goals of both hazard mitigation and water quality programs.

Module three provides information on FEMA funding and incentive strategies that can be used to support nature-based resilience work.

Module four discusses a series of EPA pilot projects that explored how regional EPA water quality programs can work with their local FEMA counterparts to incorporate green infrastructure (GI)/low impact development (LID) practices into state and local FEMA Hazard Mitigation plans. This module describes project outputs, provides links to project materials, and discusses lessons learned.

Module five concludes the training by providing a series of case studies that highlight how water quality/quantity issues and/or nature-based solutions have been included in state and local hazard mitigation plans to achieve increased resilience and water quality benefits.

Slide Text

Module 1: Introduction to Nature-based Solutions and Hazard Mitigation

Module 2: Integrating Water Quality and Hazard Mitigation Programs

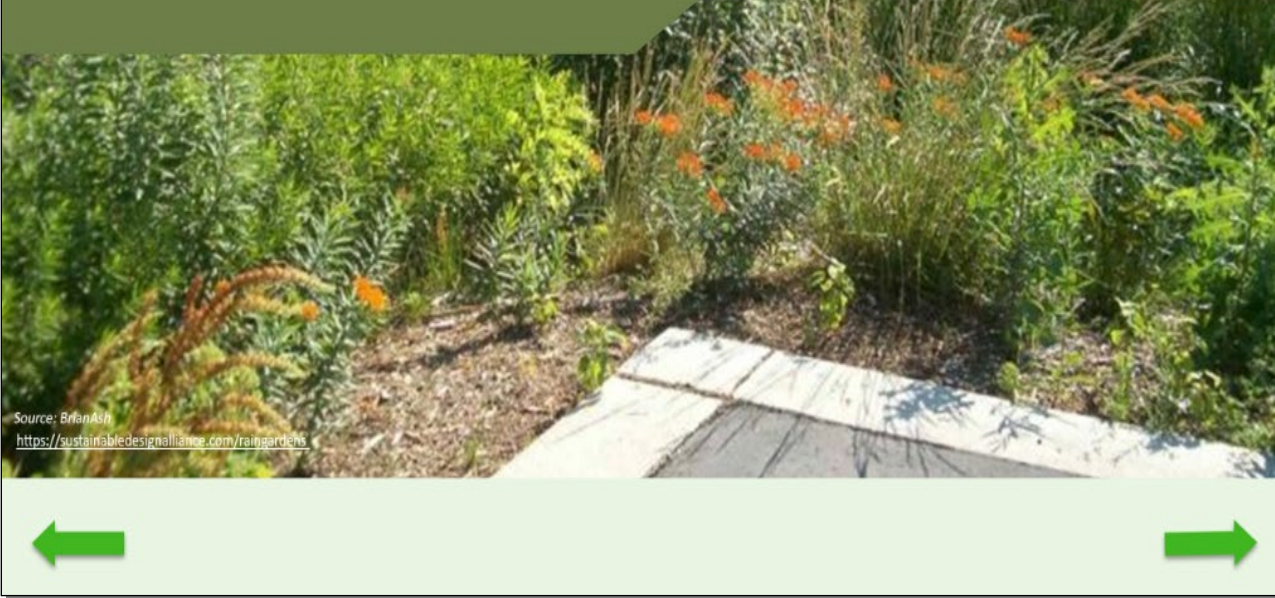
Module 3: FEMA Funding and Incentive Strategies for Nature-Based Hazard Mitigation

Module 4: Overview of EPA/FEMA Pilot Projects and Lessons Learned

Module 5: Water Quality/Quantity and Hazard Mitigation Plan Integration

Source: <https://greenspace.seattle.gov/2016/06/green-infrastructure-can-help-save-our-salmon/#sthash.RKXE0yRE.dpbs>

Module 1: Introduction to Nature-based Solutions and Hazard Mitigation

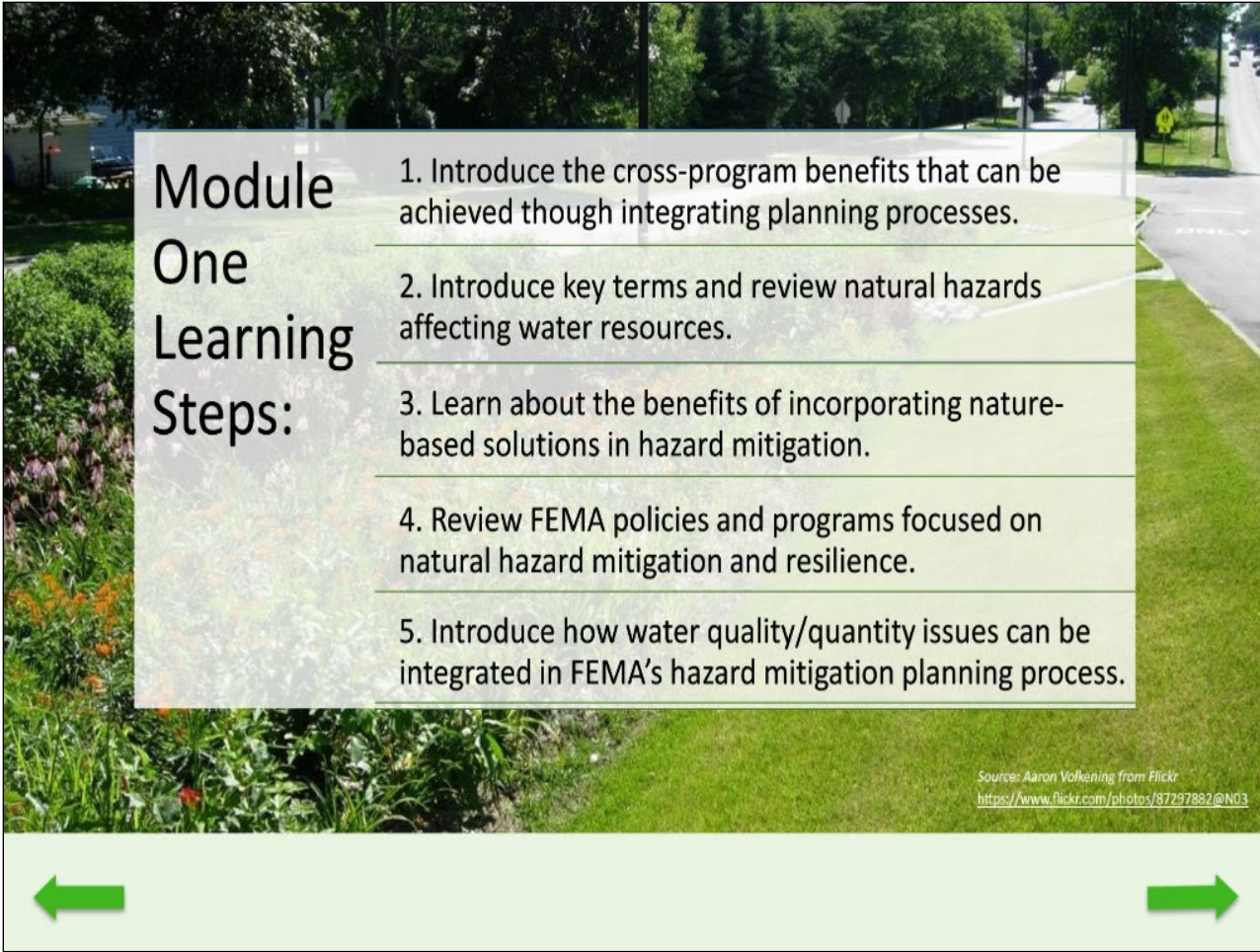


Source: BrianAsh
<https://sustainabledesignalliance.com/raingardens>

Slide Notes

Module 1: Introduction to Nature-based Solutions and Hazard Mitigation

Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>



Module One Learning Steps:

1. Introduce the cross-program benefits that can be achieved through integrating planning processes.
2. Introduce key terms and review natural hazards affecting water resources.
3. Learn about the benefits of incorporating nature-based solutions in hazard mitigation.
4. Review FEMA policies and programs focused on natural hazard mitigation and resilience.
5. Introduce how water quality/quantity issues can be integrated in FEMA's hazard mitigation planning process.

Source: Aaron Volkening from Flickr
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Slide Notes

Module One Learning Steps

The first module of this training will follow five learning steps.

1. Introduce the cross-program benefits that can be achieved through integrating planning processes.
2. Introduce key terms and review natural hazards affecting water resources.
3. Learn about the benefits of incorporating nature-based solutions in hazard mitigation.
4. Review FEMA policies and programs focused on natural hazard mitigation and resilience.

And 5. Introduce how water quality/quantity issues can be integrated into FEMA's hazard mitigation planning process.

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Benefits of Collaborating Across Hazard Mitigation and Water Quality Programs

- Integrated planning processes – water quality and hazard mitigation – more efficient
- Leveraging of hazard mitigation and water quality funds
- Water quality programs offer access to technical expertise on nature-based solutions to hazards
- Adopted broadly, water quality practices can help reduce risk from hazards

Slide Notes

Benefits of Collaborating Across Hazard Mitigation and Water Quality Programs

There are multiple potential benefits to integrating major federal water quality programs into Hazard Mitigation Plans (HMPs). One of which is the efficiencies that can be achieved through integrating and streamlining water quality and HMP processes.

This training will detail existing water quality management and HMP planning steps, and identify areas where they may overlap and be completed in tandem.

When planning is conducted in a collaborative, integrated manner between agencies, it is possible to streamline staff efforts, leverage additional technical expertise/data sources that may not have otherwise been included, and strengthen plans by including multiple program goals.

Integrated planning also opens the door for potential leveraging of multiple funding sources - both from water quality and hazard mitigation programs.

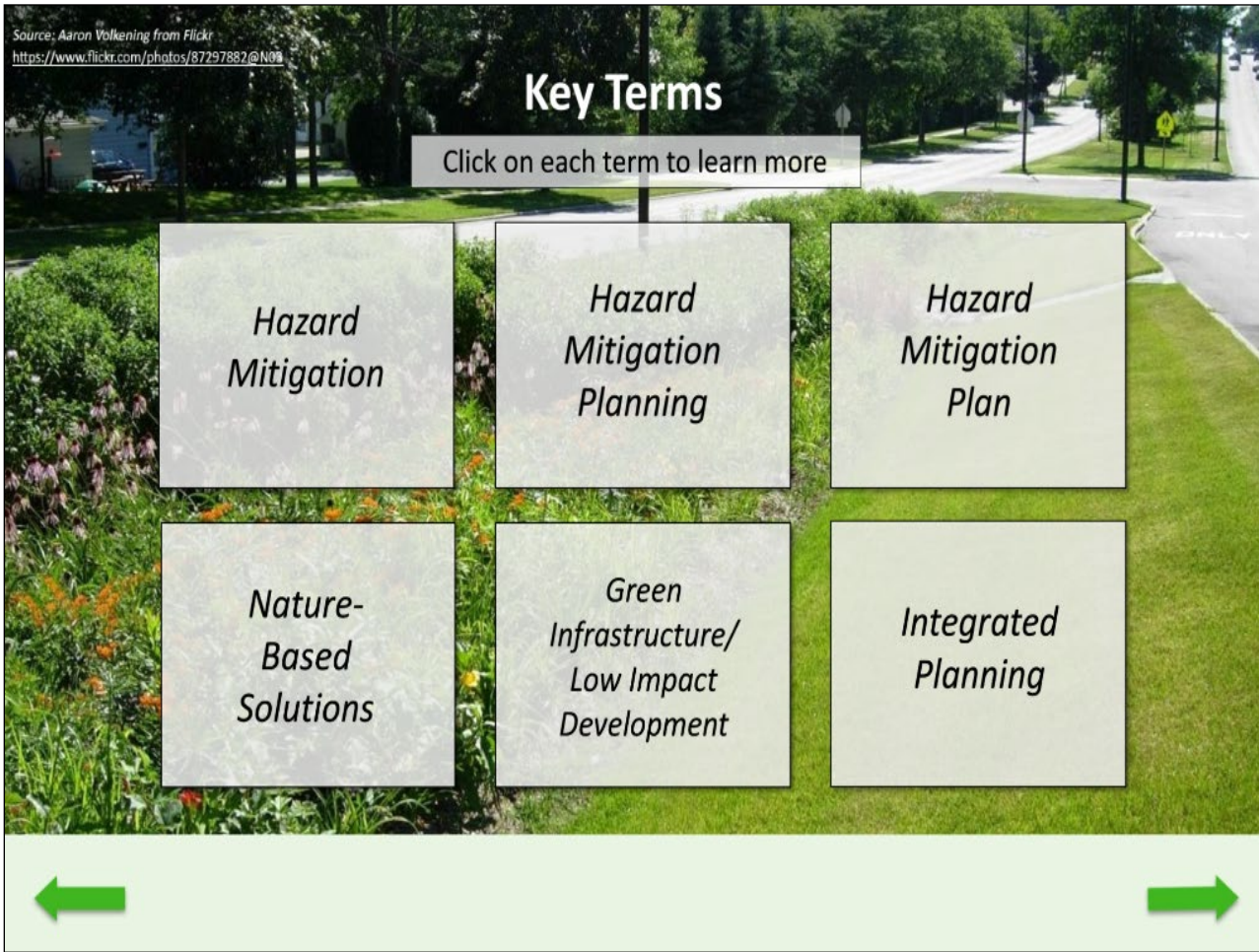
Slide Text

Integrated planning processes – water quality and hazard mitigation – more efficient

Leveraging of hazard mitigation and water quality funds

Water quality programs offer access to technical expertise on nature-based solutions to hazards

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Slide Notes

Key Terms

The following slide defines key terms that will be used throughout this training. Click on each term to learn more.

Slide Text

Hazard Mitigation

Hazard Mitigation Planning

Hazard Mitigation Plan

Nature- Based Solutions

Green Infrastructure/ Low Impact Development

Integrated Planning

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Slide Notes

Hazard Mitigation

Any sustained action taken to reduce or eliminate long-term risk to life and property from hazards. Mitigation is taking action now to prevent natural hazards from becoming disasters.

Mitigation comes in many forms: plans and regulations; natural systems protection or restoration; infrastructure projects; and education and outreach.



Slide Notes

Hazard Mitigation Planning

Planning that state, tribal, and local governments engage in to identify risks and vulnerabilities associated with natural disasters, and develop long-term strategies for protecting people and property from future hazard events (FEMA 2019a).

The slide features a background image of a park with a paved path, trees, and greenery. On the left side, the title "Hazard Mitigation Plan (HMP)" is written in a white, italicized font. To the right of the title, there are two paragraphs of white text. The first paragraph defines an HMP as a plan that assesses current and possible future risk and community capabilities to address risk for a given geographic area. The second paragraph states that a FEMA-approved HMP is required for eligibility for some FEMA grant programs. At the bottom of the slide, there is a light green horizontal bar containing two green arrows: one pointing left and one pointing right.

Slide Notes

Hazard Mitigation Plan (HMP)

A plan that assesses the current and possible future risk, and the community capabilities to address risk for a given geographic area. HMPs then assign long-term mitigation strategies to address vulnerabilities (FEMA 2019b). A FEMA-approved HMP is required in order to be eligible for some FEMA grant programs.



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Nature-Based Solutions

Engineered (as compared to naturally-occurring) landscape features or management practices used to provide hazard mitigation while producing environmental, economic, and social co-benefits.

Examples of nature-based practices include green infrastructure, constructed wetlands, living shorelines, ecosystem restoration, and some types of agricultural conservation practices.

Green Infrastructure (GI)/Low Impact Development (LID)

Nature-based systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. EPA currently uses the term green infrastructure to refer to the management of wet weather flows using these processes, and to refer to the patchwork of natural areas that provide habitat, flood and drought protection, as well as cleaner air and water.

Congress enacted the Water Infrastructure Improvement Act, which defines green infrastructure as "the range of measures that use plant or soil systems, permeable pavement or other permeable surfaces or substrates, stormwater harvest and reuse, or landscaping to store, infiltrate, or evapotranspire stormwater and reduce flows to sewer systems or to surface waters."

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Integrated Planning

In the context of this training, integrated planning refers to a planning approach that recognizes the synergies and common goals between hazard mitigation and water quality programs, and works to collaborate across programs, share data, and leverage resources and expertise. The goal of this collaboration is to produce robust hazard mitigation and/or water quality plans that address multiple goals, and implement practices that produce co-benefits for hazard resilience and water quality.

Note: Integrated Planning for the purpose of this training is not referring to the six planning elements found in the 2012 Integrated Municipal Stormwater and Wastewater Planning Framework as defined under Section 402(s) of the Clean Water Act.

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Slide Notes

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Slide Notes

Agencies

This training focuses on two primary federal agencies: The Environmental Protection Agency or EPA, and the Federal Emergency Management Agency or FEMA.

Click on each agency to learn more about their role in water quality/quantity management, resilience, and hazard mitigation.

Source: Hawkins Partners, Inc <https://www.rivernetwork.org/case-study/green-streets-restoring-rivers-revitalizing-neighborhoods-making-streets-safer/>

Agencies

EPA

EPA prioritizes the quality and resilience of the nation’s waters. The agency funds multiple programs, both required and voluntary, that support compliance with the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). The CWA was enacted with the goal of restoring and maintaining the chemical, physical, and biological integrity of the nation’s waters. The SDWA regulates drinking water quality and protects drinking water sources, focusing on waters designated for drinking use. These Acts also improve public health by making waters swimmable and fishable for safe recreation and consumption. Together these programs protect water quality from various risks, including natural hazards such as flood and drought.

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Slide Notes

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Slide Notes

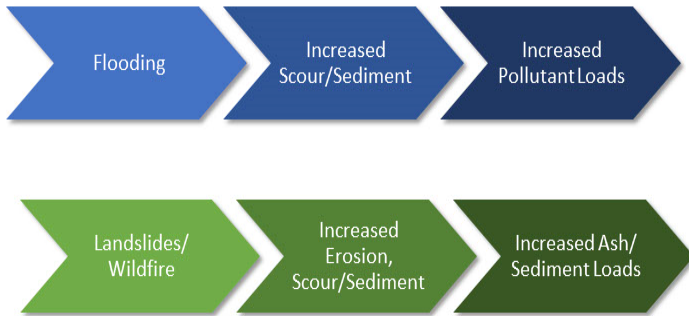
Federal Emergency Management Agency (FEMA)

FEMA manages and funds multiple natural disaster mitigation and recovery programs. The agency's hazard mitigation programs provide funding and/or technical support for eligible mitigation measures that reduce disaster losses. FEMA also: Reduces vulnerability of communities to disasters and their effects, and promotes individual and community safety, as well as the ability to adapt to changing conditions and withstand/rapidly recover from disruption due to emergencies.

Source: Hawkins Partners, Inc <https://www.rivernetnetwork.org/case-study/green-streets-restoring-rivers-revitalizing-neighborhoods-making-streets-safer/>

Natural Hazards & Water Quality and Quantity

Natural hazards drive changes in water quality and quantity



- Human activities can exacerbate the impacts of natural hazards
- Example: Poorly planned urban development, construction in floodplain areas, soil compaction, channelization of waterways, and removal of riparian vegetation can impact natural floodplain functions and worsen flooding along streams and rivers and increase pollutant loads
- Geographically-specific environmental factors interact with weather to make different regions of the United States more vulnerable to specific natural hazards

Slide Notes

Natural Hazards & Water Quality and Quantity

Many natural hazards have major impacts on water resources and their management. For example, a flood event can cause increased erosion along streams and rivers, resulting in increased pollutant loading to the waterbody.

Human activities can exacerbate or mediate these impacts. For example, poorly planned urban development, soil compaction, channelization of waterways, and removal of riparian vegetation can impact natural floodplain functions and worsen flooding along streams and rivers.

Construction of residential, commercial, and other developments in floodplain areas increases the potential risk of a flood event and can impair the natural functions of the floodplain.

Other natural phenomena, such as extreme weather events (e.g., extreme storms, heat waves, hurricanes) are key drivers of natural hazards, such as flooding, drought, and wildfire. Other geographically-specific environmental factors, such as land use and topography interact with weather to make different regions of the United States more vulnerable to specific natural hazards (e.g., wildfires in California and flooding along the Mississippi River).

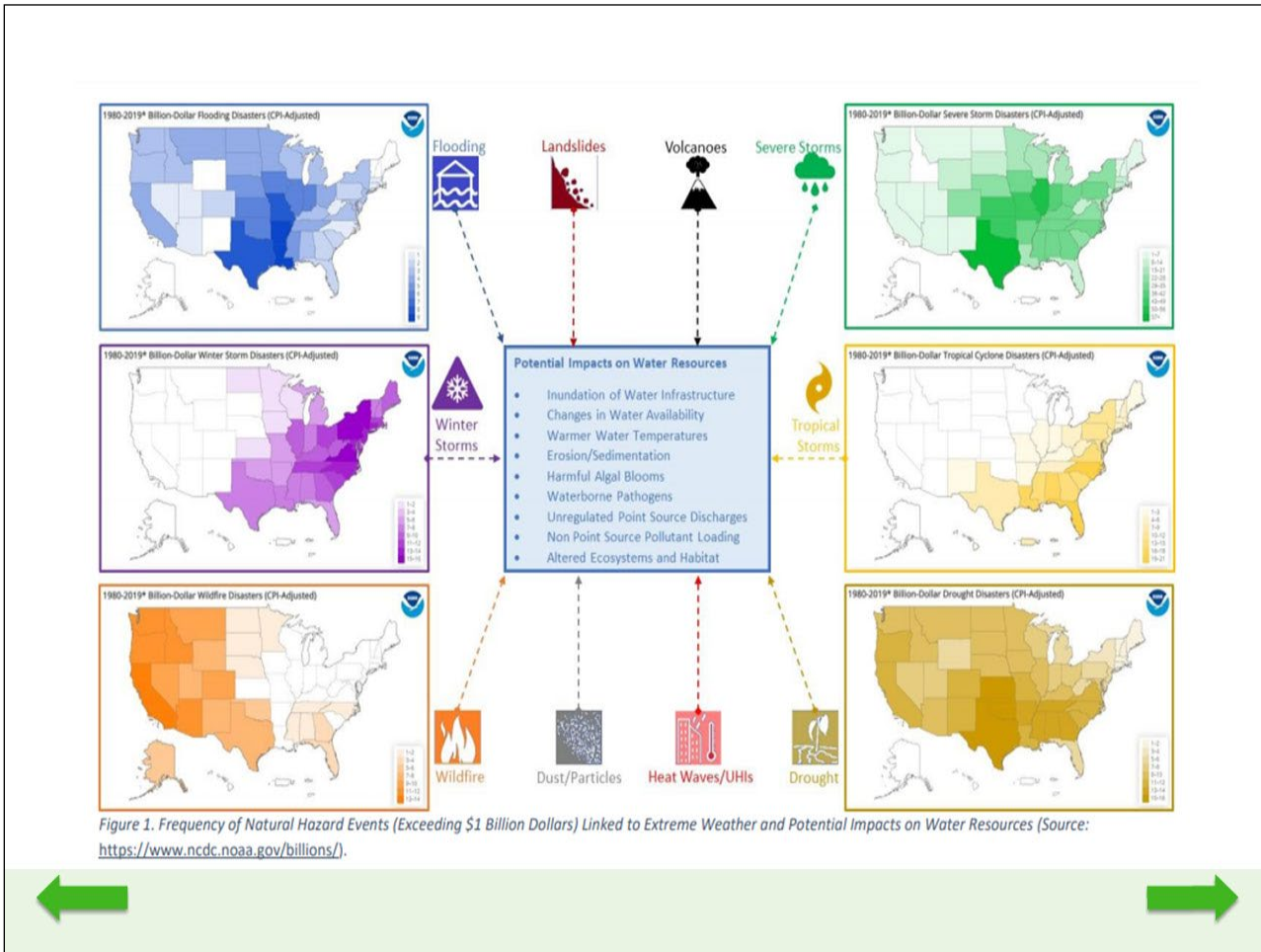
Slide Text

Natural Hazards & Water Quality and Quantity.

Natural hazards drive changes in water quality and quantity

Flooding → Increased Scour/Sediment → Increased Pollutant Loads

Landslides → Increased Erosion, Scour/Sediment → Increased Ash/Sediment Loads



Slide Notes

This figure from NOAA illustrates major natural hazards that can drive changes in water quality, and outlines regions of the country that have been at risk over the last 30 years. While it should be noted that nature-based solutions may have little mitigation effect on major natural disasters of the scale presented in this figure, these strategies can provide a buffer in less severe, recurring events, and support overall resilience.

For example, many communities have successfully employed GI practices along waterbodies and in floodplain areas to reduce localized flood events.

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Flooding, Landslides, Volcanoes, Severe Storms, Tropical Storms, Drought, Heat Waves/UHIs, Dust/Particles, Wildfire, Winter Storms may cause potential impacts on water resources:

- Inundation of Water Infrastructure
- Changes in Water Availability
- Warmer Water Temperatures
- Erosion/Sedimentation

- Harmful Algal Blooms
- Waterborne Pathogens
- Unregulated Point Source Discharges
- Non Point Source Pollutant Loading
- Altered Ecosystems and Habitat

Figure 1: Frequency of Natural Hazard Events (exceeding \$1 Billion Dollars) Linked to Extreme Weather and Potential Impacts on Water Resources (Source: <https://ncdc.noaa.gov/billions/>).

Natural Hazards and Water Quality

Natural hazards have direct and indirect impacts to both water quality and quantity.

Click on each tile to learn more about different types of hazards, and their potential impact on water quality/quantity.



Flooding



Drought



Wildfire



Extreme/Urban Heat



Landslides/Mudslides



Airborne and Dust Particles



Slide Notes

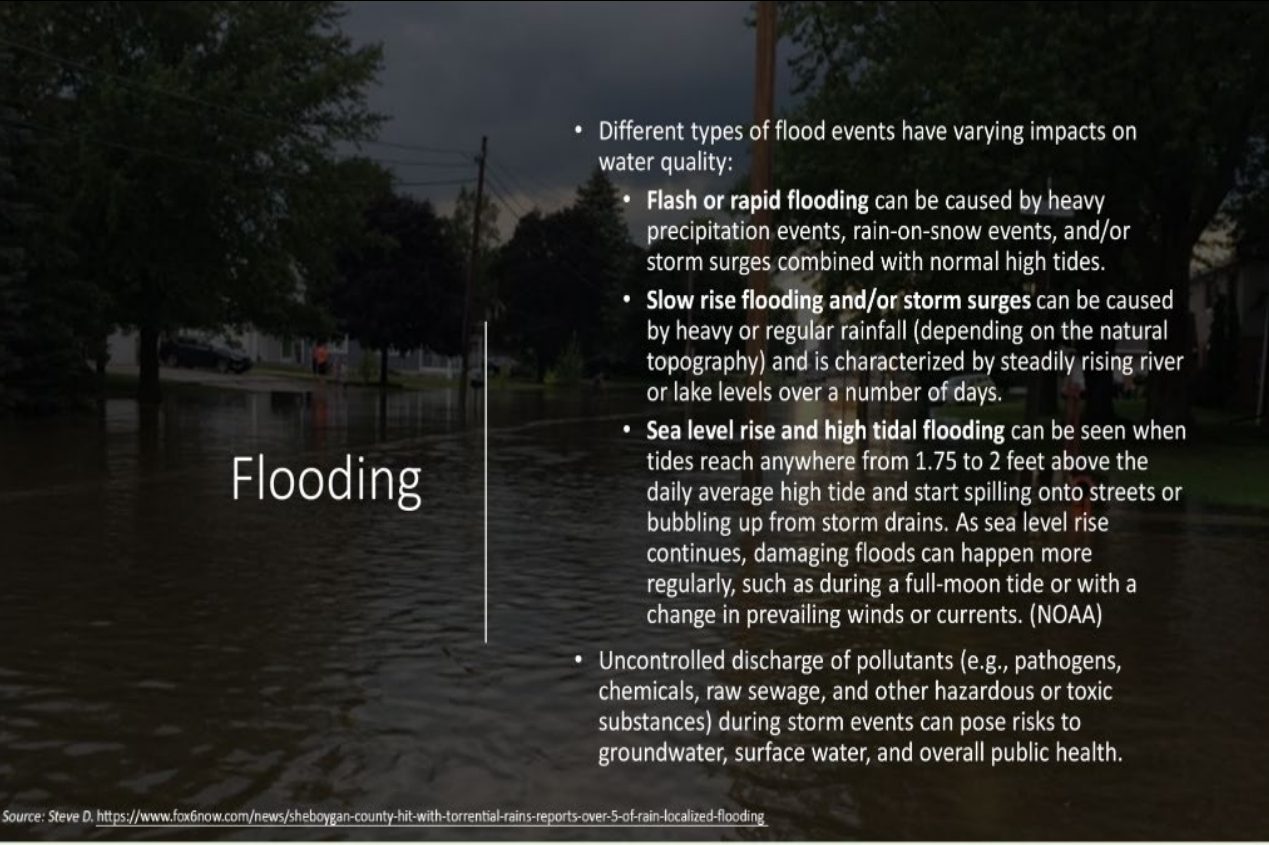
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Slide Text

Image buttons of:



- Flooding (Source: Steve Apps/WI State Journal/AP
<https://www.wired.com/story/wisconsin-floods-are-catastrophic-and-only-getting-worse/>)
- Drought (Source: Center for Disease Control
<https://www.cdc.gov/nceh/features/drought/index.html>)
- Wildfire (Source: Douglas County 2016 Multi-Jurisdictional Natural Hazard Mitigation Plan
<https://douglascounty-oregon.us/DocumentCenter/View/4360/Natural-Hazard-Mitigation-Plan-PDF>)
- Extreme/urban heat- (Source: Al Seib/Los Angeles Times via Getty Images
<https://www.newscientist.com/article/2084835-unprecedented-global-warming-as-2016-approaches-1-5-c-mark/>)
- Landslides/mudlines (Source: <https://www.shutterstock.com/search/mudslide>)
- Airborne and dust particles (Source: <https://www.farmanddairy.com/news/epa-decision-settles-the-dust-no-new-air-regulations-for-farmers/45424.html>)



Flooding

- Different types of flood events have varying impacts on water quality:
 - **Flash or rapid flooding** can be caused by heavy precipitation events, rain-on-snow events, and/or storm surges combined with normal high tides.
 - **Slow rise flooding and/or storm surges** can be caused by heavy or regular rainfall (depending on the natural topography) and is characterized by steadily rising river or lake levels over a number of days.
 - **Sea level rise and high tidal flooding** can be seen when tides reach anywhere from 1.75 to 2 feet above the daily average high tide and start spilling onto streets or bubbling up from storm drains. As sea level rise continues, damaging floods can happen more regularly, such as during a full-moon tide or with a change in prevailing winds or currents. (NOAA)
- Uncontrolled discharge of pollutants (e.g., pathogens, chemicals, raw sewage, and other hazardous or toxic substances) during storm events can pose risks to groundwater, surface water, and overall public health.

Source: Steve D. <https://www.fox6now.com/news/sheboygan-county-hit-with-torrential-rains-reports-over-5-of-rain-localized-flooding>



Slide Notes

Flooding

When thinking of hazards associated with water, flooding is one of the first hazards that comes to mind. Different types of flood events have varying impacts on water quality. Localized flooding negatively impacts communities in major ways and is often associated with the management of water quantity.

Urbanization and increases in impervious surfaces result in too much water within a localized area, and not enough water being retained or absorbed onsite. Stormwater flowing from streets and roads directly into a waterbody can cause water levels to increase rapidly, making flooding more likely to occur. Flooding has negative economic and safety impacts to local communities as well as water quality.

Specifically, uncontrolled discharge of pollutants (e.g., pathogens, chemicals, or raw sewage) during storm/flood events can pose risks to groundwater, surface water, and overall public health.

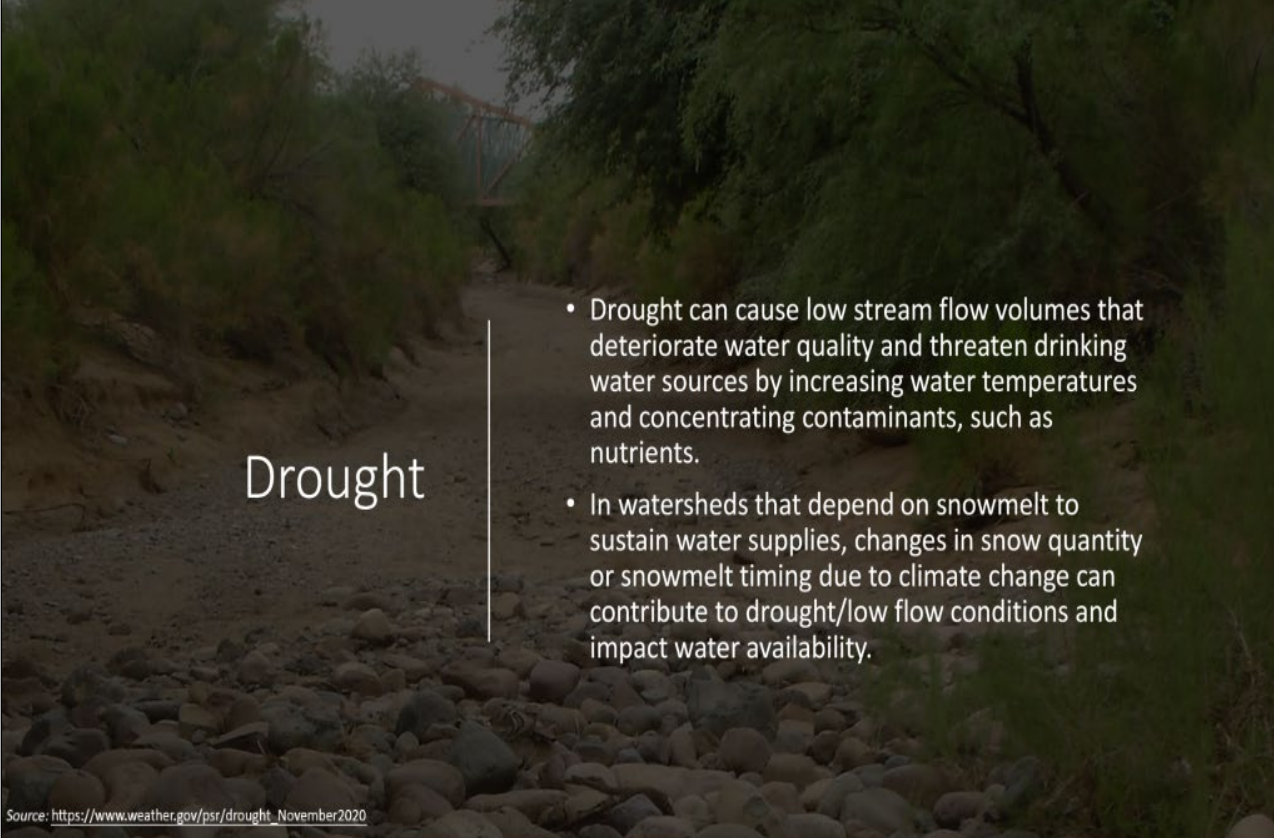
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Drought

- Drought can cause low stream flow volumes that deteriorate water quality and threaten drinking water sources by increasing water temperatures and concentrating contaminants, such as nutrients.
- In watersheds that depend on snowmelt to sustain water supplies, changes in snow quantity or snowmelt timing due to climate change can contribute to drought/low flow conditions and impact water availability.

Source: https://www.weather.gov/psr/drought_November2020

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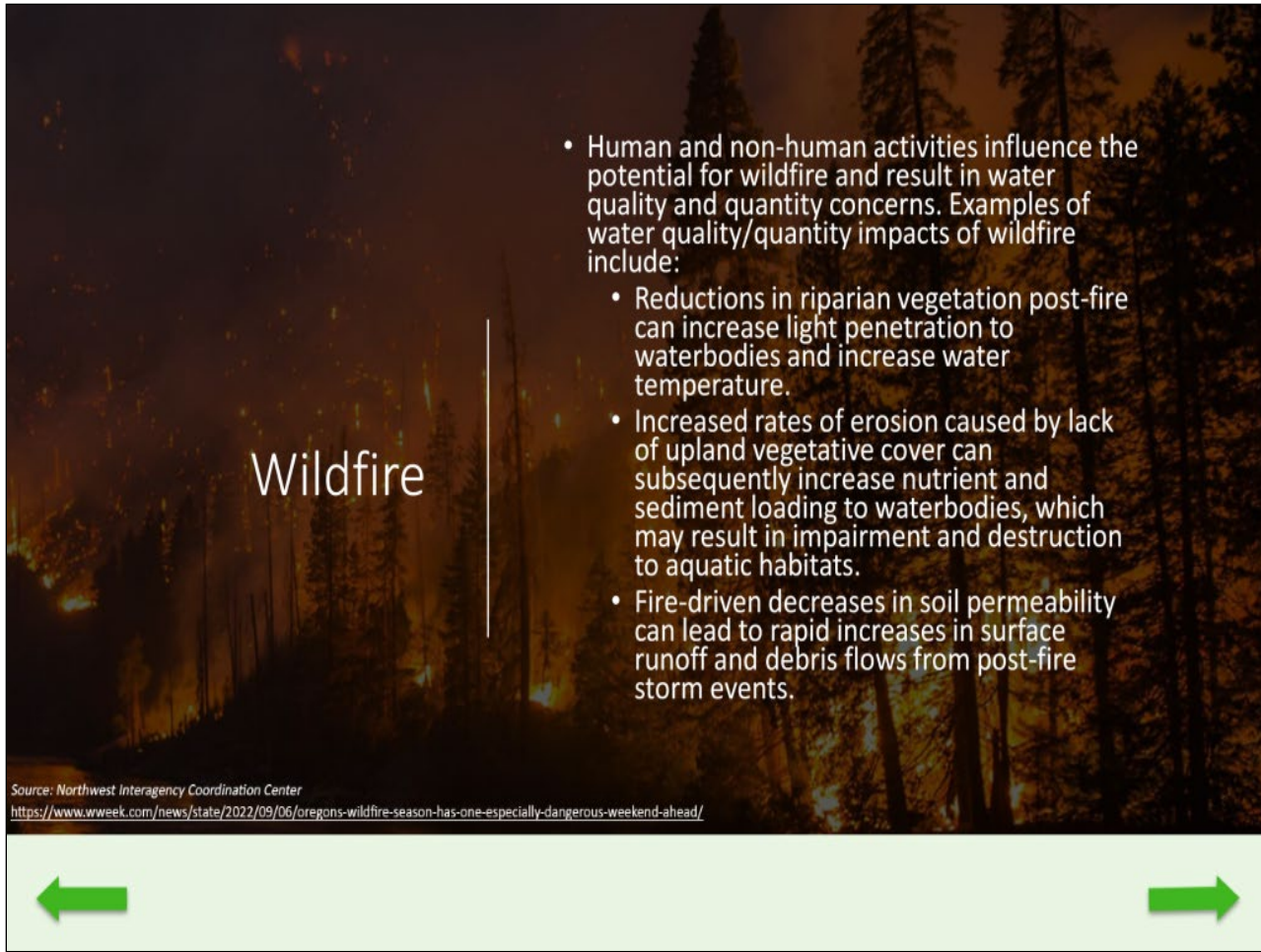
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Wildfire

- Human and non-human activities influence the potential for wildfire and result in water quality and quantity concerns. Examples of water quality/quantity impacts of wildfire include:
 - Reductions in riparian vegetation post-fire can increase light penetration to waterbodies and increase water temperature.
 - Increased rates of erosion caused by lack of upland vegetative cover can subsequently increase nutrient and sediment loading to waterbodies, which may result in impairment and destruction to aquatic habitats.
 - Fire-driven decreases in soil permeability can lead to rapid increases in surface runoff and debris flows from post-fire storm events.

Source: Northwest Interagency Coordination Center
<https://www.wweek.com/news/state/2022/09/06/oregons-wildfire-season-has-one-especially-dangerous-weekend-ahead/>

Slide Notes

Wildfire

Wildfires are another type of disaster that are becoming increasingly common and severe due to increasingly dry and hot conditions, particularly in the western United States. In addition to climate change factors, other human activities can also increase the potential wildfire risk and subsequent water quality issues.

Examples of water quality/quantity impacts of wildfire include:

Reductions in riparian vegetation post-fire that can increase light penetration to waterbodies and increase water temperature.

Increased rates of erosion caused by lack of upland vegetative cover can subsequently increase nutrient and sediment loadings to waterbodies, which may result in impairment and destruction to aquatic habitats.

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Extreme Heat/Urban Heat Islands

- Urban heat island: A metropolitan area that is considerably warmer than surrounding, more rural, areas because of human activities and infrastructure (e.g., high density of impervious surfaces including buildings and parking lots).
- Effects from urban heat islands or extreme heat events can increase thermal inputs to waterbodies. The temperature of stormwater runoff from urban, impervious surfaces can be elevated on hot days causing spikes in the temperature of receiving waters.

Source: Center for Disease Control <https://www.cdc.gov/nceh/features/extremeheat/index.html>

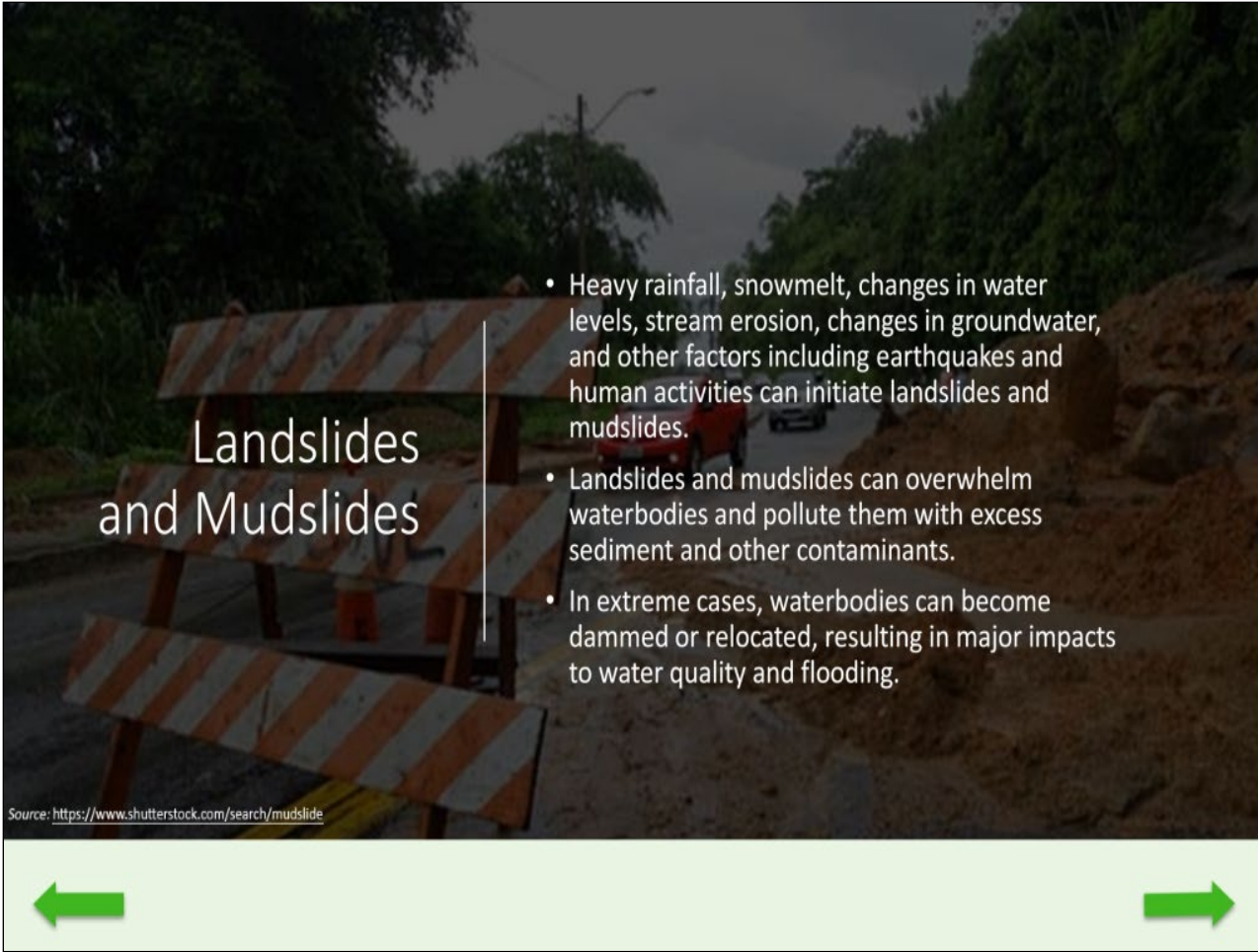
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Landslides and Mudslides

- Heavy rainfall, snowmelt, changes in water levels, stream erosion, changes in groundwater, and other factors including earthquakes and human activities can initiate landslides and mudslides.
- Landslides and mudslides can overwhelm waterbodies and pollute them with excess sediment and other contaminants.
- In extreme cases, waterbodies can become dammed or relocated, resulting in major impacts to water quality and flooding.

Source: <https://www.shutterstock.com/search/mudslide>



Slide Notes


Landslides and Mudslides

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Landslides and mudslides can overwhelm waterbodies and pollute them with excess sediment and other contaminants.

In extreme cases, waterbodies can become dammed or relocated, resulting in major impacts to water quality and quantity, potentially causing flooding.

Source: <https://www.shutterstock.com/search/mudslide>



Airborne and Dust Particles

- Acid precipitation (caused by sulfur and nitrogen oxides) and other particulate matter that impact nutrient balances can pollute waterbodies.
- Agricultural tilling, wildfire, and drought conditions can contribute to airborne particulate matter and/or dust storms.

Source: <https://lungdiseaseneews.com/2015/09/08/discovered-mechanism-underlying-farm-dust-could-lead-to-protection-against-asthma/>

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Other Water Quality Impacts from Natural Hazards

- Natural hazards can also exacerbate existing water quality-related issues, including **harmful algal blooms** and **erosion/sedimentation**.
- Click on each tile to learn more about the impact natural hazards may have on these water quality issues.



Source: <https://www.nrdc.org/harmful-algal-blooms>



Source: <https://medium.com/@hifza.hassan2000/soil-erosion-3ecc84e92669>



Slide Notes

Other Water Quality Impacts from Natural Hazards

Natural hazards can also exacerbate existing water quality-related issues, including harmful algal blooms and erosion/sedimentation.

Click on each tile to learn more about the impact natural hazards may have on these water quality issues.

Source: <https://www.nrdc.org/harmful-algal-blooms>

Source: <https://medium.com/@hifza.hassan2000/soil-erosion-3ecc84e92669>

Harmful Algal Blooms

- **Harmful Algal Blooms (HABs):** Nitrogen and phosphorus pollution from point and nonpoint sources can cause eutrophic conditions and algal blooms. Toxins produced by certain harmful algae and cyanobacteria can cause water-related illnesses in humans, pets, and agricultural livestock. HABs can also cause significant economic impacts in communities with fishing and/or tourism industries.
- Lakes, estuaries, and large rivers are more vulnerable to HAB events when eutrophication occurs together with warmer air/water temperatures and calm water conditions (e.g., still or slow-moving water, water with increased temperature, or summer droughts).

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Source: <https://www.nrdc.org/harmful-algal-blooms>

Erosion/Sedimentation

- **Erosion/Sedimentation:** Erosion and sediment transport from intense rainfall or channeled stormwater.
- Influenced by interactions with land use, topography, land management, soil properties, stormwater management and flood control infrastructure, riparian vegetation, construction, and other human activities.
- Often has negative impacts on water quality and aquatic life, while exacerbating water quantity issues in future storm events. May also increase the transport of other pollutants that have been adsorbed by the sediment (e.g., phosphorous and metals).
- Increased water quantity from floods, and loss of vegetated cover from wildfire or drought events can worsen erosion/sedimentation issues.

Source: <https://medium.com/@hifza.hassan2000/soil-erosion-3ecc84e92669>



Slide Notes

Erosion/Sedimentation: Erosion and sediment transport from intense rainfall or channeled stormwater.

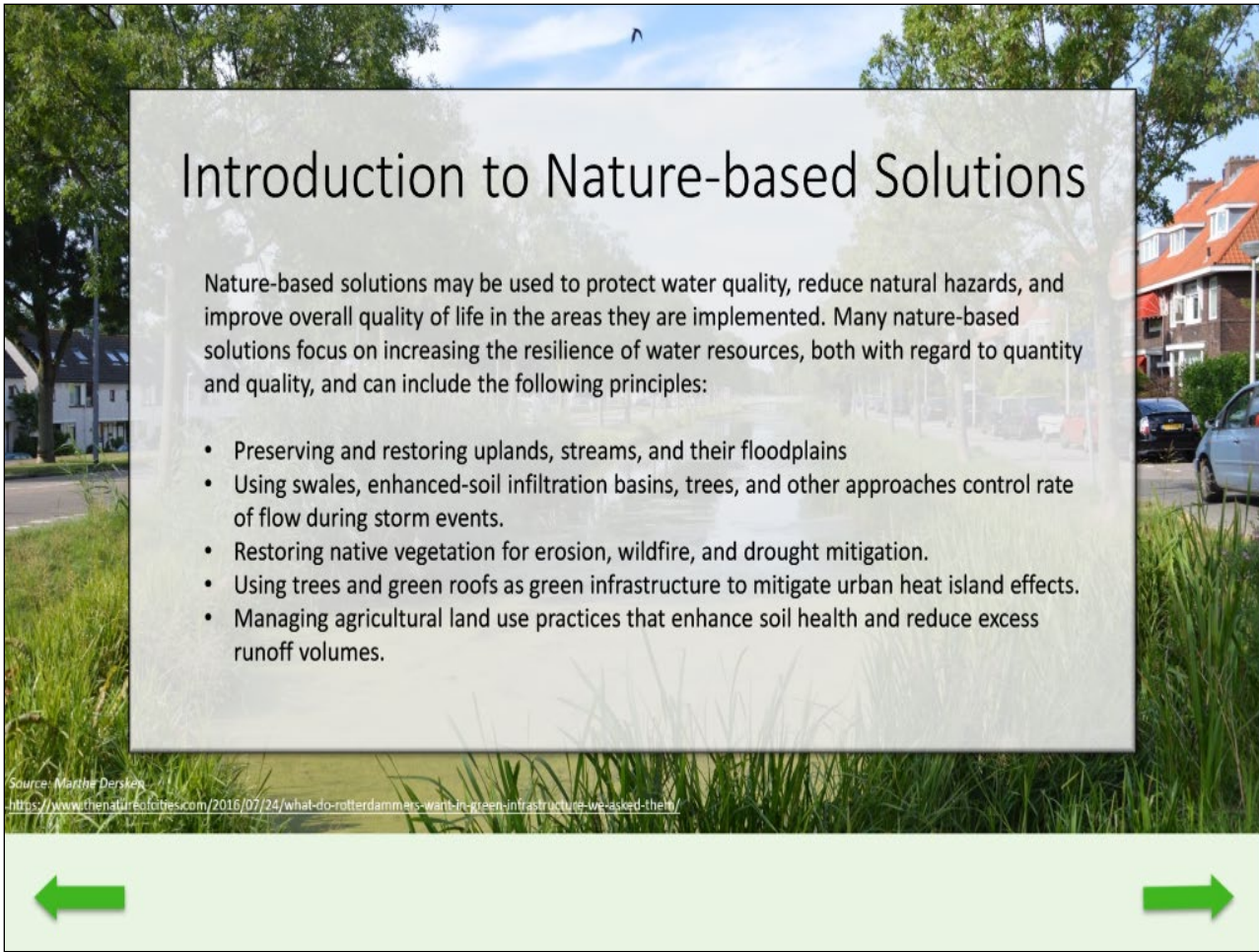
Land disturbances that expose soils (e.g., construction, mining, timber harvest, and heavy rainfall events in areas with low vegetative cover) can increase the risk of erosion/sediment loading to waterbodies.

Erosion/sedimentation is influenced by interactions with land use, topography, land management, soil properties, stormwater management and flood control infrastructure, riparian vegetation, construction, and other human activities.

Erosion/sedimentation often has negative impacts on water quality and aquatic life, while exacerbating water quantity issues in future storm events. It may also increase the transport of other pollutants that have been adsorbed by the sediment (e.g., phosphorous and metals).

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Introduction to Nature-based Solutions

Nature-based solutions may be used to protect water quality, reduce natural hazards, and improve overall quality of life in the areas they are implemented. Many nature-based solutions focus on increasing the resilience of water resources, both with regard to quantity and quality, and can include the following principles:

- Preserving and restoring uplands, streams, and their floodplains
- Using swales, enhanced-soil infiltration basins, trees, and other approaches control rate of flow during storm events.
- Restoring native vegetation for erosion, wildfire, and drought mitigation.
- Using trees and green roofs as green infrastructure to mitigate urban heat island effects.
- Managing agricultural land use practices that enhance soil health and reduce excess runoff volumes.

Source: Marthe Dersken
<https://www.thenatureofcities.com/2016/07/24/what-do-rotterdamers-want-in-green-infrastructure-we-asked-them/>

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Slide Notes

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Nature-based Practices with Hazard Mitigation Co-Benefits

Nature-based solutions meet multiple goals by aiming to increase resilience to impacts from natural hazards while protecting, managing, and restoring natural or modified ecosystems.

The examples are not intended to be a complete list of nature-based solutions, or a complete list of mitigation practices.

[Link to full document](#)

Nature-based BMPs with Co-Benefits for Water Quality and Hazard Mitigation	
Example Nature-based BMPs for Water Quality	Level of Overlap for Mitigating Natural Hazard Effects
Regional infiltration basins	
Neighborhood scale GI/LID practices such as rain gardens, bioretention, and permeable pavement	
Stream restoration including pooling and meandering to enhance infiltration	
Floodplain restoration including floodplain benching	
Stream (riparian) buffers	
Using park green space and ball fields to store and infiltrate	
Daylighting streams and stormwater pipes	
GI/LID building and zoning codes	
Agricultural soil health practices including soil conservation	
Protecting and restoring natural wetlands	

Natural Hazards

- Flood
- Fire
- Landslide
- Drought
- Urban Heat Island
- Airborne Dust and Particulates

Strong Overlap

Partial Overlap



Slide Notes

Nature-based Practices with Hazard Mitigation Co-Benefits

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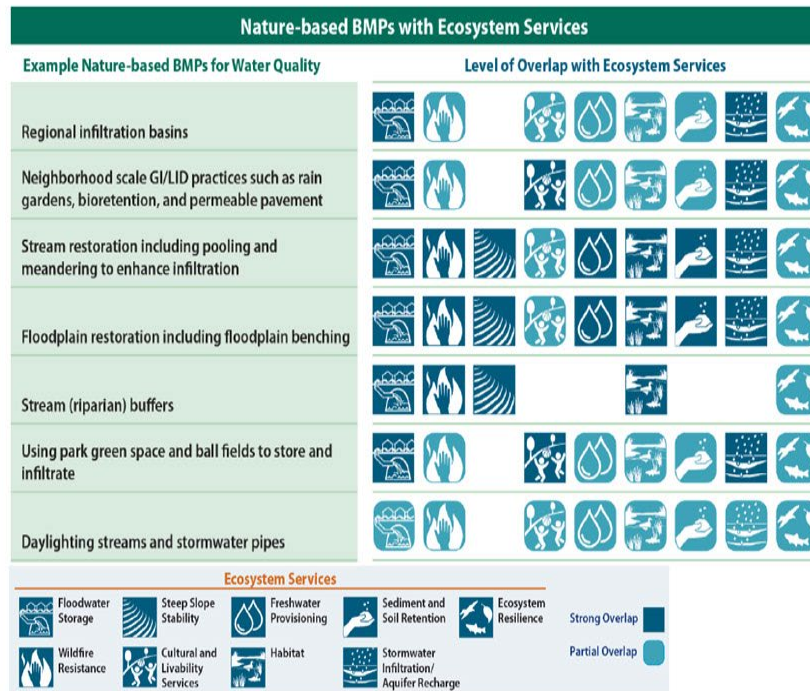
This crosswalk helps to illustrate the different benefits that can be achieved through practices that are commonly implemented in EPA’s water quality programs. The examples are not intended to be a complete list of nature-based solutions, or a complete list of mitigation practices.

Click the [link](#) to view the full crosswalk.

Nature-based Practices and Ecosystem Services

In addition to mitigating the impacts of natural hazards, nature-based solutions can provide additional benefits to the environment and human populations such as air quality, water filtration, and recreation space. These are known as ecosystem service benefits.

[Link to full document](#)



Slide Notes

Nature-based Practices and Ecosystem Services

In addition to mitigating the impacts of natural hazards, nature-based solutions can provide additional benefits such as air quality, water filtration, and recreation space. These are known as ecosystem service benefits. This crosswalk illustrates the different ecosystem services that can be achieved through various nature-based practices.

Click the [link](#) to view the full crosswalk.

Slide Text

Nature-based BMPs with Co-Benefits for Water Quality and Hazard Mitigation

Example Nature-based BMPs for Water Quality and Level of Overlap for Mitigating Natural Hazard Effects:

- Regional infiltration basins: flood (strong overlap), fire (partial overlap), landslide (strong overlap), drought (strong overlap), airborne dust and particles (partial overlap)
- Neighborhood scale GI/LID practices such as rain gardens, bioretention, and permeable pavement: flood (strong overlap), fire (partial overlap), urban heat islands (partial overlap)

- Stream restoration including pooling and meandering to enhance infiltration: flood (strong overlap), fire (partial overlap), landslide (strong overlap), drought (partial overlap), urban heat island (partial overlap), airborne dust and particles (partial overlap)
- Floodplain restoration including floodplain benching

Scales of Nature-Based Solutions

There are varying scales at which nature-based solutions (NBS) can be implemented. FEMA's [Building Community Resilience with Nature-Based Solutions: A Guide for Local Communities](#) defines the following types of NBS:

- “Watershed or landscape scale : Interconnected systems of natural areas and open space. These are large-scale practices that require long-term planning and coordination.
- Neighborhood or site scale: Distributed stormwater management practices that manage rainwater where it falls. These practices can often be built into a site, corridor, or neighborhood without requiring additional space.
- Coastal areas: Nature-based solutions that stabilize the shoreline, reducing erosion and buffering the coast from storm impacts. While many watershed and neighborhood-scale solutions work in coastal areas, these systems are designed to support coastal resilience.”

Slide Notes

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Coastal areas, which are nature-based solutions that stabilize the shoreline, reducing erosion and buffering the coast from storm impacts. While many watershed and neighborhood-scale solutions can work in coastal areas, these systems are specifically designed to support coastal resilience.”

Scales of Nature-Based Solutions

Watershed or Landscape Scale

- Wetland restoration and protection
- Floodplain restoration
- Large-scale land conservation or acquisition
- Stormwater parks
- Greenways

Neighborhood or Site Scale

- Rain gardens
- Green roofs
- Permeable pavement
- Biofiltration systems
- Vegetated swales
- Rainwater harvesting
- Tree canopy protection or restoration
- Green streets practices

Coastal Areas

- Coastal Wetlands
- Dunes
- Oyster Reefs
- Living shorelines
- Waterfront parks

Slide Notes/Text

Scales of Nature-Based Solutions

FEMA's nature-based solutions guide also provides examples of types of NBS practices that fall under each of these scales. This list is not exhaustive, but will give a sense of the variety of practices that can be implemented to address hazards on a variety of sites. Different types of funding may be available for different types and scales of practices. These scales include:

Watershed or Landscape Scale which includes wetland restoration and protection, floodplain restoration, large-scale land conservation or acquisition, stormwater parks, and greenways.

Neighborhood or Site Scale which includes rain gardens, green roofs, permeable pavement, biofiltration systems, vegetated swales, rainwater harvesting, tree canopy protection or restoration, and green streets practices. Coastal Areas which includes coastal wetlands, dunes, oyster reefs, living shorelines, and waterfront parks.

FEMA Hazard Mitigation Policies and Programs



- FEMA manages a suite of hazard mitigation and resilience-focused programs and grants
- Opportunity to include nature-based practices in FEMA hazard mitigation planning and strategies to leverage resources and expertise, and produce co-benefits
- The following slides provide background on FEMA policies and programs that support state and local hazard mitigation efforts



Slide Notes

FEMA Hazard Mitigation Policies and Programs

FEMA manages a suite of hazard mitigation and resilience-focused programs and grants. These programs provide the opportunity to include nature-based practices in FEMA hazard mitigation planning and strategies to leverage resources and expertise, and produce co-benefits.

The following slides will look at how FEMA's policies and programs support hazard mitigation/resilience, and how nature-based solutions can be included in these efforts.

FEMA Hazard Mitigation Approach and Policy Background

- Historically focused on response and recovery, but since the early 1990s has become increasingly focused on pre-disaster mitigation and resilience.
- FEMA's efforts include building resilience into urban and rural infrastructure and mitigation solutions that promote sustainable water supplies and functioning ecosystems.
- FEMA funds several grant programs to support pre-disaster mitigation efforts as well as post-disaster recovery.

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03/>

Slide Notes

FEMA Hazard Mitigation Approach and Policy Background

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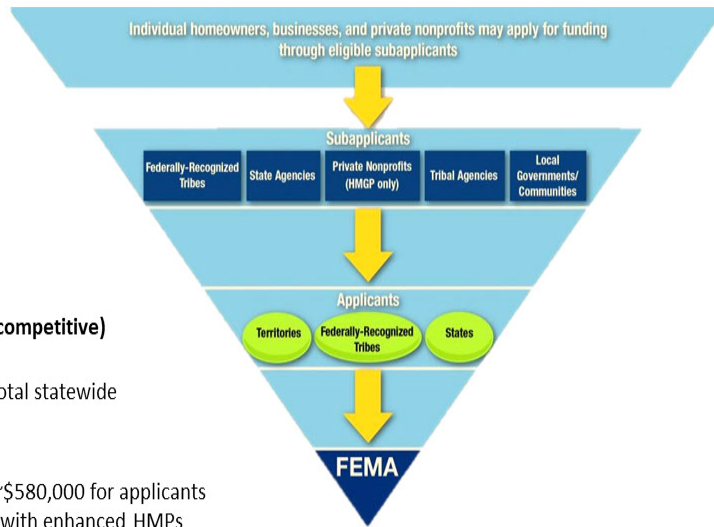
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Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03/>

Hazard Mitigation Assistance (HMA)

Four FEMA Hazard Mitigation Assistance (HMA) Funding Programs

- Building Resilient Infrastructure and Communities (BRIC) (competitive):**
 - Pre-disaster mitigation grant - 6% set aside from disaster funds ~\$1 billion in FY21
 - Emphasizes pre-disaster mitigation and resilience
 - Support for integrated planning
- Flood Mitigation Assistance (FMA) (competitive)**
 - For planning and projects ~ \$160M
- Hazard Mitigation Grant Program (HMGP) (non-competitive) Post disaster**
 - After Presidential Declaration ~15 – 20% of total statewide FEMA-funded recovery costs
- HMGP Post Fire**
 - Post-fire recovery after disaster declaration ~\$580,000 for applicants with standard HMPs and ~770,000 for those with enhanced HMPs



Slide Notes

Hazard Mitigation Assistance (HMA)

There are several grants that fall under FEMA’s Hazard Mitigation Assistance program. The Building Resilient Infrastructure and Communities (BRIC) and Flood Mitigation Assistance (FMA) programs focus on pre-disaster mitigation and increasing community resilience before a disaster event.

Both programs are competitive. The Hazard Mitigation Grant Program (HMGP) and HMGP Post-Fire grants are non-competitive and available to communities that have been impacted by a presidential-declared disaster event.

The image shown here illustrates how individuals and organizations may apply for FEMA funding through eligible applicants, which include states, territories, and federally recognized tribes.

Slide Text

Hazard Mitigation Assistance (HMA)

Four FEMA Hazard Mitigation Assistance (HMA) funding programs.

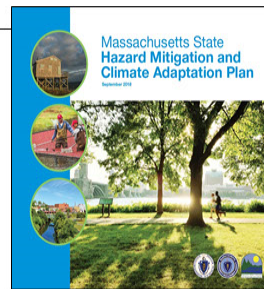
- Building Resilient Infrastructure and Communities (BRIC) (competitive):

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- HMGP Post Fire
 - Post-fire recovery after disaster declaration ~580,000 dollars for applicants with standard HMPs and ~770,000 for those with enhanced HMPs.

Individual homeowners, businesses, and private nonprofits may apply for funding through eligible subapplicants. Subapplicants include federally-recognized tribes, state agencies, private nonprofits (HMGP only), tribal agencies, and local governments/ communities. Subapplicants apply through applicants, which include territories, federally-recognized tribes, and states. Applicants apply to programs through FEMA.

FEMA Hazard Mitigation Plans: Overview

- The Stafford Act (1988) directs that each state have a HMP to be eligible for certain types of FEMA funding, including HMA funds.
- These plans focus on pre-disaster planning and address all natural hazards that can impact states and communities.
- The State Hazard Mitigation Officer is the HMP custodian.
- Jurisdictions may also participate in single or multi-jurisdiction HMPs.
- Tribal governments also work directly with FEMA and may maintain tribal-specific HMPs.
- FEMA grant applicants must have a FEMA-approved HMP and projects must be consistent with the plan to receive funding.



Slide Text

FEMA Hazard Mitigation Plans: Overview

The Stafford Act (signed in 1988) directs that each state have a HMP to be eligible for certain types of FEMA funding, including HMA funds.

These plans focus on pre-disaster planning and address all natural hazards that can impact states and communities. The State Hazard Mitigation Officer is the HMP custodian. Jurisdictions may also participate in single or multi-jurisdictional HMPs.

Tribal governments also work directly with FEMA and may maintain tribal-specific HMPs. FEMA grant applicants must have a FEMA-approved HMP and projects must be consistent with the plan to receive funding.

Examples include the Minnesota State Hazard Mitigation Plan, Massachusetts State Hazard Mitigation and Climate Adaptation Plan, and the Santa Clara Valley Water District Local Hazard Mitigation Plan.

HMP Elements and Planning Process

All HMPs include:

- Goal setting and 5-year planning process
- Natural hazard identification and risk assessment
- Mitigation Strategy to address identified risks
- Consideration of current and potential resources and capabilities to address natural hazards
- Identification of action items



Slide Notes

HMP Elements and Planning Process

Hazard mitigation planning follows a five-year cycle. These are “living” documents that are formally updated every five years. The planning cycle includes the following stages:

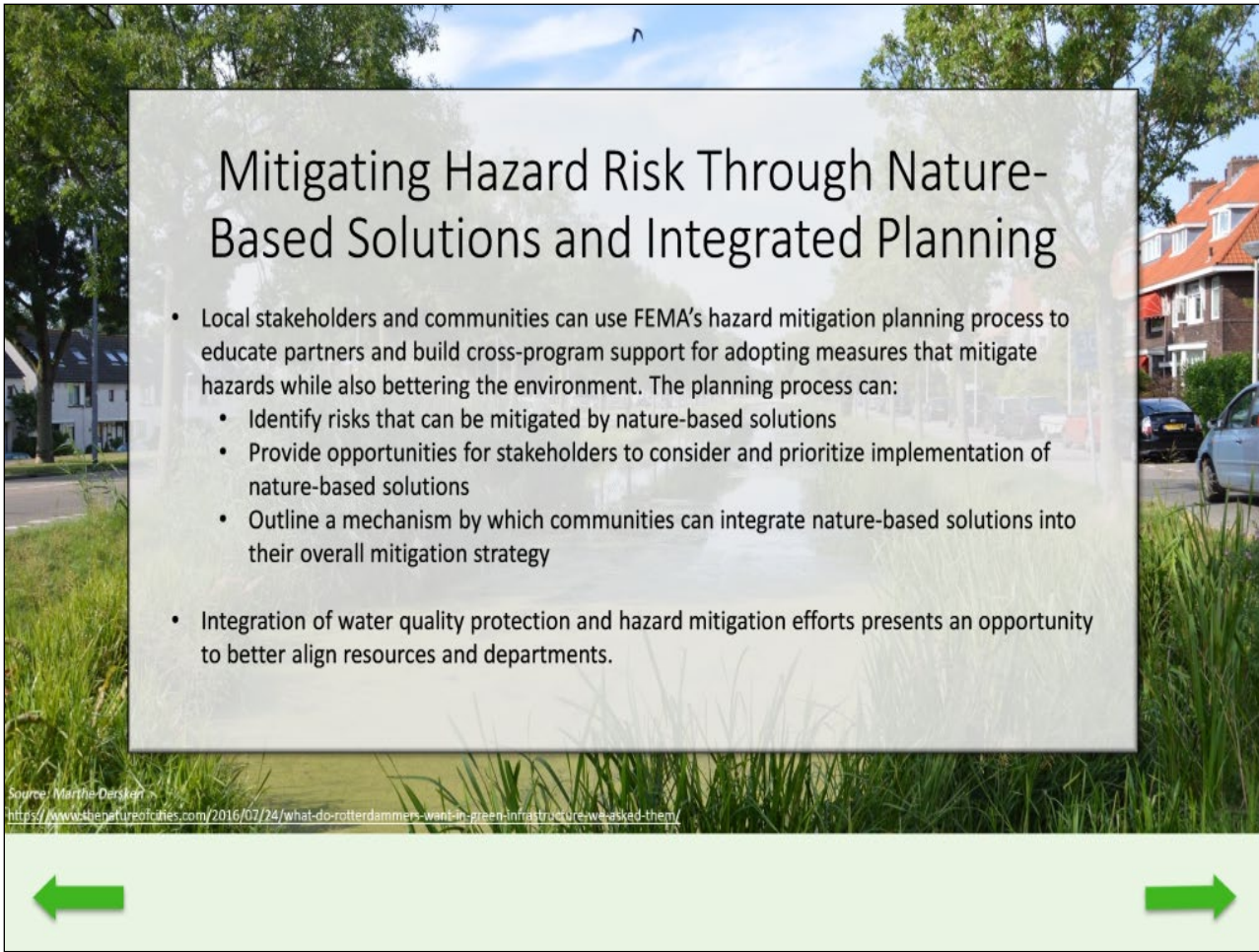
- The goal setting and 5-year planning process;
- Natural hazard identification and risk assessment;
- Mitigation Strategy to address identified risks;
- Consideration of current and potential resources and capabilities to address natural hazards; and
- Identification of action items to achieve the mitigation strategy.

Module 2 of this training will provide additional detail on how these planning steps may align with water quality planning.

Slide Text

HMP Elements and Planning Process

The 5 year state HMP Planning Cycle starts with organizing state resources. The next step is to assess risks. The next step is to develop the mitigation plan. The final step before the cycle begins again is to identify resources and implement the mitigation strategy and monitor progress.



Mitigating Hazard Risk Through Nature-Based Solutions and Integrated Planning

- Local stakeholders and communities can use FEMA's hazard mitigation planning process to educate partners and build cross-program support for adopting measures that mitigate hazards while also bettering the environment. The planning process can:
 - Identify risks that can be mitigated by nature-based solutions
 - Provide opportunities for stakeholders to consider and prioritize implementation of nature-based solutions
 - Outline a mechanism by which communities can integrate nature-based solutions into their overall mitigation strategy
- Integration of water quality protection and hazard mitigation efforts presents an opportunity to better align resources and departments.

Source: Marthe Derksen
<https://www.thenatureofcities.com/2016/07/24/what-do-rotterdamers-want-in-green-infrastructure-we-asked-them/>

Slide Notes

Mitigating Hazard Risk Through Nature-Based Solutions and Integrated Planning

Water (and other natural resources) know no jurisdictional boundaries. For example, watersheds, which are areas of land that drain to a common water body, are natural and vary in size based on differences in geology and hydrology.

Therefore, success in addressing water quality and natural hazards is dependent upon multi-jurisdictional and multi-departmental collaborative involvement. Managing natural resources from a non-jurisdictional perspective brings together stakeholders from different locations to focus on protecting resources and communities.

Local stakeholders and communities can use FEMA's hazard mitigation planning process to educate partners and build cross-program support for adopting measures that mitigate hazards while also bettering the environment. The planning process can:

Identify risks that can be mitigated by nature-based solutions

Provide opportunities for stakeholders to consider and prioritize implementation of nature-based solutions and outline a mechanism by which communities can integrate nature-based solutions into their overall mitigation strategy.

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Source: Marthe Dersken

<https://www.thenatureofcities.com/2016/07/24/what-do-rotterdamers-want-in-green-infrastructure-we-asked-them/>

Mitigating Hazard Risk Through Nature-Based Solutions and Integrated Planning



- State and Local Mitigation Planning Policies
 - Requires consideration of changing environmental or future conditions
 - Incentivizes the inclusion on nature-based solutions in hazard mitigation plans
 - Encourages integration with other planning efforts, including natural resources.
- The use of integrated hazard / water resource planning and the implementation of nature-based solutions are encouraged by both EPA and FEMA where feasible and cost-effective.
- Multiple FEMA funding and incentive programs (covered in Module 3) promote the use of NBS in hazard mitigation and flood risk planning



Slide Notes

Mitigating Hazard Risk Through Nature-Based Solutions and Integrated Planning

In 2015, FEMA updated their State Mitigation Plan Review Guide to require consideration of changing environmental and future conditions (like climate) in hazard mitigation planning, incentivize inclusion of nature-based solutions in hazard mitigation plans, and encourage integration with other planning efforts, including natural resources.

FEMA has also issued fact sheets to publicize its ability to fund eligible NBS projects such as stream restoration, enhancing soil infiltration, and stormwater retention. FEMA also promotes these concepts as mitigation planning best management practices for local plans.

The use of integrated hazard/water resource planning and the implementation of nature-based solutions are encouraged by both EPA and FEMA where feasible and cost-effective. Engineering designs by the private sector, SLTT entities, and other federal agencies (e.g., the Army Corps of Engineers, Natural Resource Conservation Service) are also increasingly focused on nature-based approaches.

Multiple FEMA funding and incentive programs (covered in Module 3) promote the use of NBS in hazard mitigation and flood risk planning.

HMPs as a tool for integrated planning

The effectiveness of hazard mitigation can be enhanced when implemented under a long-term, comprehensive planning process. State, local, territory, or tribal (SLTT) entities may choose to integrate their existing water quality programs with their HMPs for:

1. Compliance with the integration requirements for enhanced HMPs under FEMA’s 2015 State Mitigation Plan Review Guide
2. Efficiency in collection and management of datasets for natural resources, including water protection.
3. Alignment of planning for staff organization or development of land use policy, including conservation.
4. Alignment of planning or to assist in prioritization of construction and restoration projects for hazard mitigation.
5. Leveraging the additional partners and funding that become available when multiple objectives can be achieved in a strategy or action.
6. Achieving the SLTT’s HMP goal of protecting and enhancing the environment while mitigating hazards.
7. Efficiencies gained by multi-objective planning.



Slide Notes

HMPs as tools for integrated planning

The integration of water quality protection into hazard mitigation planning has been promoted by changes in FEMA policy, and funding is potentially available for projects that integrate water quality and hazard mitigation. Some SLTT entities are now using the HMP as a tool to enhance the advancement of water protection goals.

The effectiveness of hazard mitigation can be enhanced when implemented under a long-term, comprehensive planning process. While several SLTT entities have integrated aspects of water resources and water quality protection into their HMPs, this approach remains underutilized and under-promoted.

The intent of this series is to help hazard mitigation planners and watershed planners start the process of integrating existing water resource programs and plans into HMPs.

Slide Text

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Case Study: Lake Erie Harmful Algal Blooms (HABs)

Problem: Water quality, public health, and economic impacts of harmful algal blooms (HABs) in Lake Erie. These HAB events were attributed to nutrients from major rivers, like the Detroit and Thames Rivers, during storms. Heavy rains carry the nutrients from farms, urban infrastructure, residential lawns, and wastewater treatment plants into the lake, stimulating increased algal growth (USEPA 2018b).

Response: In 2018, EPA created a U.S. Action Plan for Lake Erie, which outlines federal and state efforts needed to achieve the phosphorus reduction targets adopted under the Great Lakes Water Quality Agreement. In this action plan, EPA outlines the major sources of phosphorus for each state, how each state could reduce these sources, and how progress for reducing phosphorus loadings will be measured. EPA also began to require more detailed state-wide action plans for development around Lake Erie

Nature-based Solutions: A project completed by the Neighborhood, Environment, and Water research collaborations for Green Infrastructure (NEW-GI) implemented GI to help manage stormwater flowing into Lake Erie. NEW-GI helped create and implement bioretention systems, including bioretention low-growing flower gardens, that not only helped limit stormwater flows, but also provided safe, attractive, and healthy alternatives for stormwater mitigation to mitigate HABs. [LINK TO FULL CASE STUDIES](#)

Slide Notes

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Case Study: Kentucky Stream Restoration Project

Problem: Poor stormwater infrastructure led to extreme flooding following a storm event that resulted in loss of life in Lexington, KY in 2006.

Response: In 2014, the University of Kentucky received a FEMA grant to implement the Stream Restoration Project. This project addressed flooding problems caused by an underdeveloped and inefficient flooding system on University of Kentucky's main campus.

Nature-based Solutions: The Stream Restoration Project incorporated ways to improve stormwater quality, while creating attractive natural landscape features on campus. A series of natural detention basins and an 8.3 acre-feet underground detention facility under a new parking lot, were created to help reduce heavy stormwater flows. Grasses, wildflowers and over 100 trees were planted along these natural detention basins (EcoGro 2015). Not only have these plants helped to reduce stormwater flows, they also helped support pollinator species that are critically declining (Turpin 2018). [LINK TO FULL CASE STUDIES](#)

Slide Notes

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Module 2: Integrating Water Quality and Hazard Mitigation Programs



Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>



Slide Notes

Module 2: Integrating Water Quality and Hazard Mitigation Programs

Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>



Module One Recap:

- Introduce benefits of cross-program collaboration
- How natural hazards impact water quality
- Introduction to nature-based solutions
- How nature-based practices can mitigate the impacts of natural hazards while protecting/improving water quality
- FEMA hazard mitigation policies and programs

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

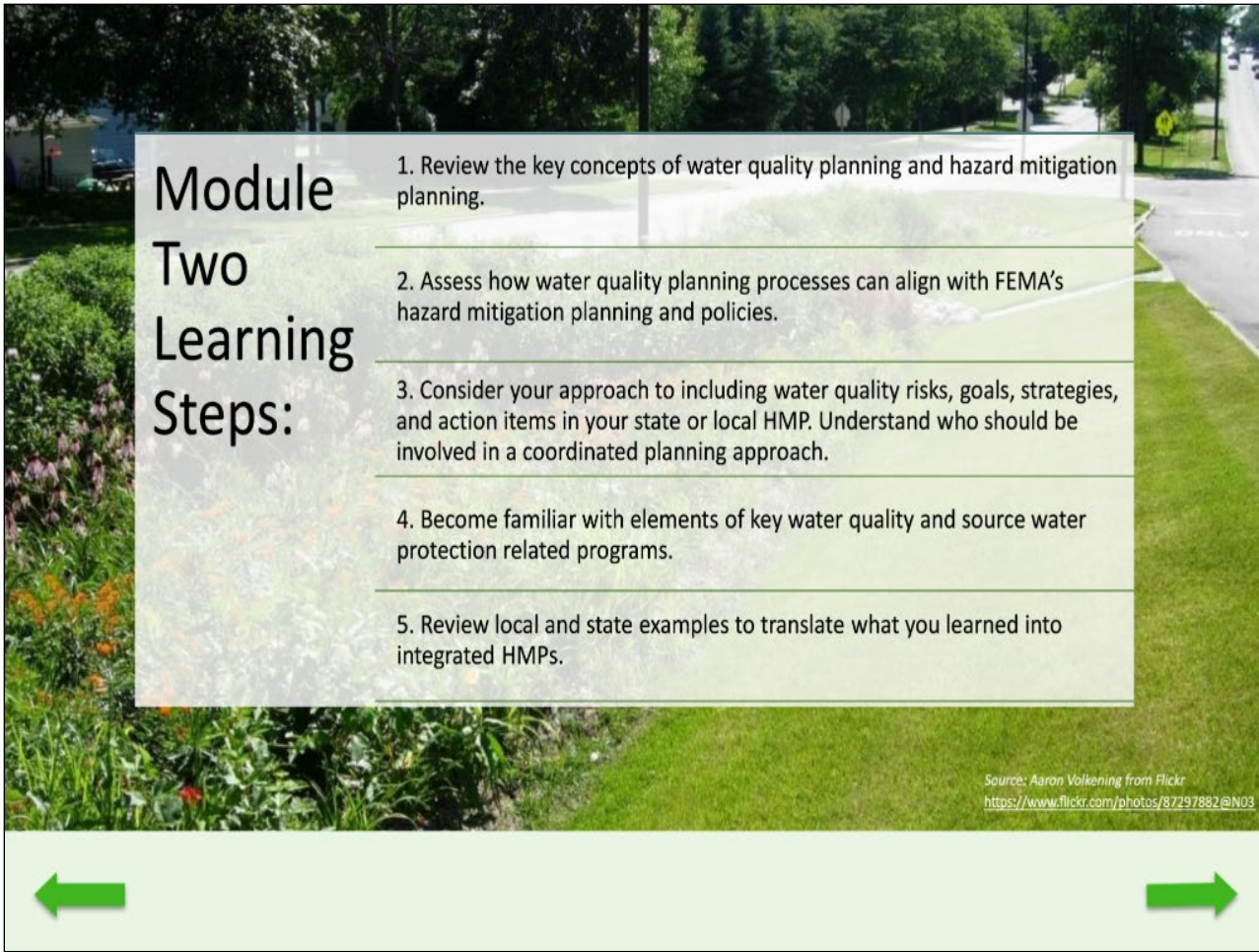
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Module One Recap

In Module One of this training, we introduced some of the potential efficiencies and benefits that can be achieved by collaborating across programs. The first Module also detailed how natural hazards such as drought, flood, and fire impact water quality and quantity. We then introduced nature-based solutions, and described how GI/LID and other nature-based practices can create co-benefits through mitigating the impacts of natural hazards while protecting and improving water quality.

Finally, Module One introduced several FEMA policies and programs related to natural hazard mitigation, including natural hazard mitigation planning and the natural Hazard Mitigation Assistance (HMA) grant programs.

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Module Two Learning Steps:

1. Review the key concepts of water quality planning and hazard mitigation planning.
2. Assess how water quality planning processes can align with FEMA's hazard mitigation planning and policies.
3. Consider your approach to including water quality risks, goals, strategies, and action items in your state or local HMP. Understand who should be involved in a coordinated planning approach.
4. Become familiar with elements of key water quality and source water protection related programs.
5. Review local and state examples to translate what you learned into integrated HMPs.

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

Slide Notes

Module Two Learning Steps

The second module of this training will accomplish two primary goals:

1. Introduce EPA's water quality programs that likely apply to most jurisdictions and show how they align with hazard mitigation planning.
2. Demonstrate to mitigation and water quality professionals how and where the water quality program elements can fit into a hazard mitigation plan framework.

These goals are broken into five learning steps.

1. Review the key concepts of water quality planning and hazard mitigation planning.
2. Assess how water quality planning processes can align with FEMA's hazard mitigation planning and policies.
3. Consider your approach to including water quality risks, goals, strategies, and action items in your state or local Hazard Mitigation Plan. Understand who should be involved in a coordinated planning approach.

4. Become familiar with elements of key water quality and source water protection related programs.
5. Review local and state examples to translate what you learned into integrated HMPs.

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>

Water Quality Programs

Water quality programs can be either regulatory or non-regulatory. These programs, whether required or voluntary, support compliance with the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA)

- Clean Water Act (CWA): Focuses on restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife."
- Safe Drinking Water Act (SDWA): Regulates drinking water quality and protects drinking water sources.

Source: National Parks Service <https://www.nps.gov/im/glkn/water-quality-rivers.htm>

Slide Notes

Water Quality Protection Programs

Water quality protection programs include both regulatory and non-regulatory programs. These programs, whether required or voluntary, support compliance with the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA).

The Clean Water Act (CWA): Focuses on restoring and maintaining the chemical, physical, and biological integrity of the nation's waters so they can support "the protection and propagation of fish, shellfish, and wildlife."

The Safe Drinking Water Act (SDWA): Regulates drinking water quality and protects drinking water sources, focusing on waters designated for drinking use.

Source: National Parks Service <https://www.nps.gov/im/glkn/water-quality-rivers.htm>

Key Water Quality Program List and Objectives

Program	Program Objective
Nonpoint source pollution (NPS) control	Support state, local, territory, and tribal (SLTT) entities in nonpoint source (NPS) pollution control by providing funding through the CWA section 319 program. An approved watershed plan is required to receive funding.
Municipal Separate Storm Sewer System (MS4) Permits	Reduce the pollutants that co-mingle with stormwater runoff and are mobilized into local surface waters. Applicable to municipalities or large commercial/industrial entities
Drinking water source water protection (SWP)	Protect public health by protecting drinking water sources.
Wetlands protection and restoration	Protect and restore wetland resources for their economic, environmental, and human health benefits.
Water Quality Standards (WQS) and Total Maximum Daily Loads (TMDLs)	Surface WQS establish the goals for a waterbody and serve as the basis for assessing waters, identifying impaired waters, establishing TMDLs for restoring impaired waters, and setting conditions in NPDES permits for stormwater and wastewater.



Slide Notes

Key Water Quality Program List and Objectives

The Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) statutes authorize the following water quality programs. The programs listed here are relevant to hazard mitigation/resilience and will be the focus of this module.

Slide Text

Key water quality list and objectives

There are various program that comprise the water quality list. Each program also has program objectives. The program list and their corresponding program objectives include:

Nonpoint source pollution (NPS) control. The program objective is to support state, local, territory, and tribal (SLTT) entities in nonpoint source (NPS) pollution control by providing funding through the CWA section 319 program. An approved watershed plan is required to receive funding.

Municipal separate storm sewer system (MS4) permits. The program objective is to reduce the pollutants that co-mingle with stormwater runoff and are mobilized into local surface waters. Applicable to municipalities or large commercial/industrial entities.

Drinking water source water protection (SWP). The program objective is to protect public health by protecting drinking water sources.

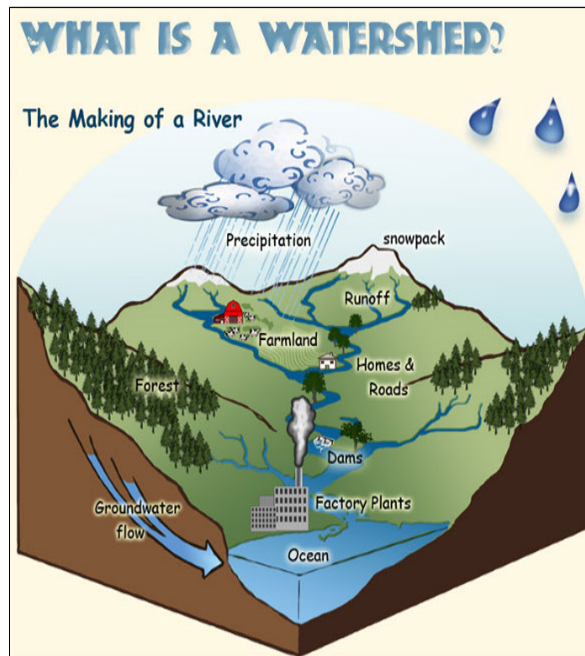
Wetlands protection and restoration. The program objective is to protect and restore wetland resources for their economic, environmental, and human health benefits.

The Water Quality Standards (WQS) and Total Maximum Daily Loads (TMDLs). The program objective is: Surface WQS establish the goals for a waterbody and serve as the basis for assessing waters, identifying impaired waters, establishing TMDLs for restoring impaired waters, and setting conditions in NPDES permits for stormwater and wastewater.

Watershed Planning

Watershed planning plays a role in each of the water quality programs listed on the previous slide.

- **Watershed:** Land area that drains to a common waterway, such as a stream, lake estuary, wetland, aquifer, or ocean. Land use decisions directly impact watershed health.
- **Watershed Planning:** A geographically-focused planning process that involves public and private stakeholders within a watershed area. In developing a watershed plan, participants identify all stressors (land, water, and air) on watershed health, consider water quality goals, and develop a strategy for addressing stressors and achieving goals.



<https://www.fs.fed.us/rm/boise/research/techtrans/projects/scienceforkids/watersheds.shtml>

Slide Notes

Watershed Planning

Watershed planning includes many of the same steps as in hazard mitigation planning, including: building the team, assessing risks to water quality, setting goals, and developing strategies to achieve the goals, and preparing and implementing plans within a specific geographic area.

Watersheds provide a logical spatial unit for coordinating water resource programs because they are resource-based as opposed to jurisdictional-based. Watershed management is a resource management approach, as well as a risk management approach, with success measured in terms of improving and maintaining environmental quality and protecting public health.

EPA encourages state/local/territory/tribal (SLTT) entities to develop watershed plans to address the complex and diffuse nature of water pollution, and the substantial costs associated with pollution mitigation. As with Hazard Mitigation Plans (HMPs), these watershed plans are required for eligibility for grants under EPA's CWA Section 319 Nonpoint Source program.

Slide Text

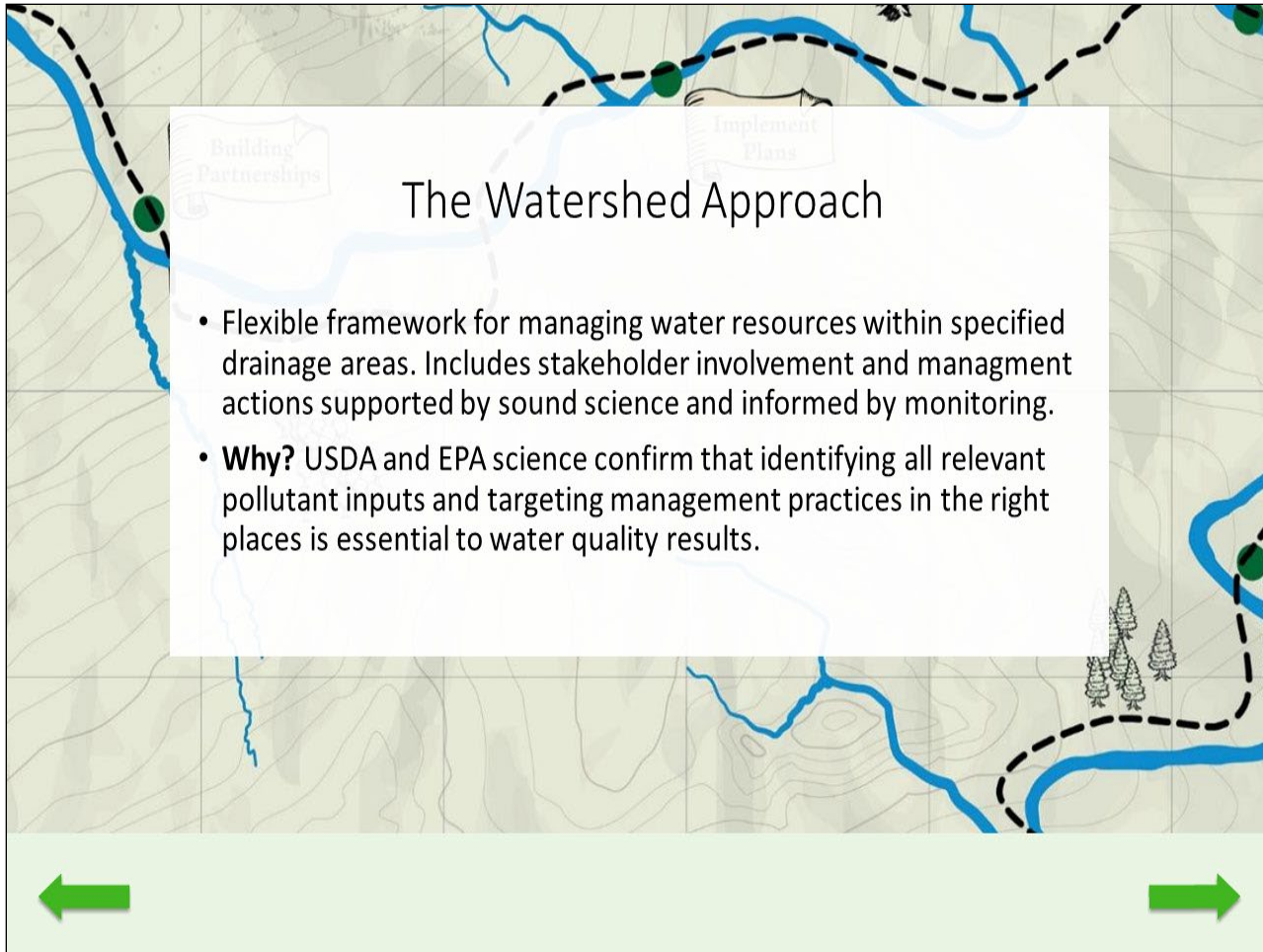
Watershed Planning

Watershed planning plays a role in each of the water quality programs listed on the previous slide.

Watershed: Land area that drains to a common waterway, such as a stream, lake estuary, wetland, aquifer, or ocean. Land use decisions directly impact watershed health.

Watershed Planning: A geographically-focused planning process that involves public and private stakeholders within a watershed area. In developing a watershed plan, participants identify all stressors (land, water, and air) on watershed health, consider water quality goals, and develop a strategy for addressing stressors and achieving goals.

The making of a river shows the various elements of a watershed. Precipitation mixes with runoff from snowpack and travels through farmland, homes, and roads. This water forms a river which can be stopped or altered by dams and factory plants. Eventually this water from the river and water from groundwater flow will enter oceans or lakes.



The Watershed Approach

- Flexible framework for managing water resources within specified drainage areas. Includes stakeholder involvement and management actions supported by sound science and informed by monitoring.
- **Why?** USDA and EPA science confirm that identifying all relevant pollutant inputs and targeting management practices in the right places is essential to water quality results.

Slide Notes

The Watershed Approach

The watershed approach is not a new concept. This is a flexible framework for managing water resources within specified drainage areas. Watershed planning includes stakeholder involvement and management actions supported by sound science and informed by monitoring.


What has been changing is our understanding of best approaches and practices over time. USDA and EPA science confirm that identifying all relevant pollutant inputs and targeting management approaches in the right places is essential to water quality results. Long-term studies helped to define the elements shaping what EPA now refers to as a 9-element plan.

Slide Text

The watershed approach

Flexible framework for managing water resources within specified drainage areas. Includes stakeholder involvement and management actions supported by sound science and informed by monitoring.

Why? USDA and EPA science confirm that identifying all relevant pollutant inputs and targeting management practices in the right places is essential to water quality results.



Watershed Based Plans: The Map for Water Quality Results

- Watershed plans are the **technical** workplan guiding work related to:
 - Pollutant loads, sources, critical areas, and practices that will have greatest impact on water quality
- They are also critical for **engaging** affected stakeholders and landowners in the process along the way. Without local capacity and landowner engagement projects don't happen.

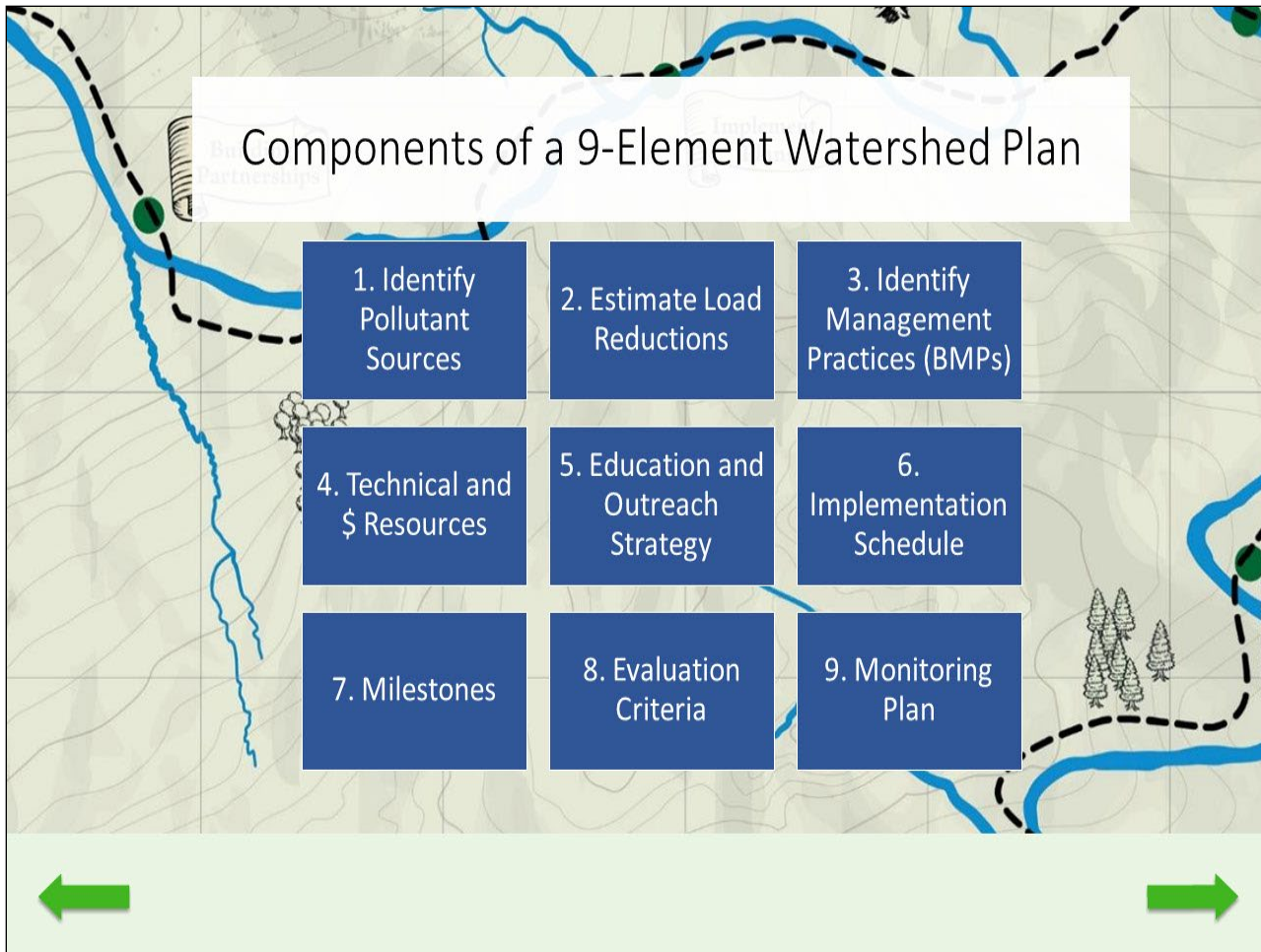
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Slide Notes

Watershed Based Plans: The Map for Water Quality Results

Watershed plans are the technical workplan guiding work related to pollutant loads, sources, critical areas and practices that will have the greatest impact on water quality. They are also critical for engaging affected stakeholders and landowners in the process along the way. Without local capacity/landowner engagement projects don't happen.

We are going to look at these elements in more detail, but simply put, these elements include both technical and engagement aspects.

**Slide Notes**

Components of a 9-Element Watershed Plan

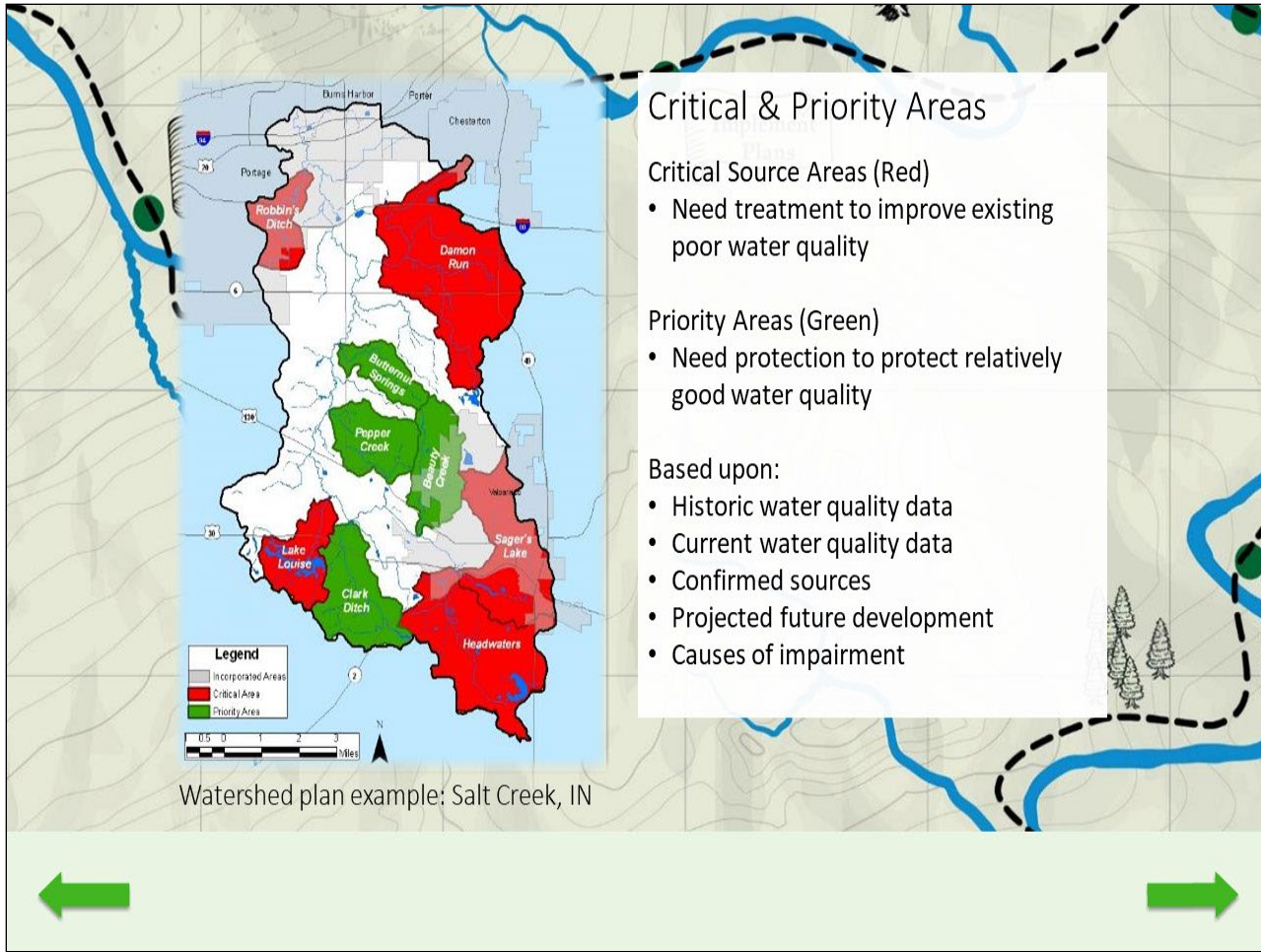
EPA has identified nine minimum elements that are critical for achieving improvements in water quality.

These nine elements have been developed over time, and have emerged as a combination of best practices in environmental planning, years of watershed research, and lessons learned from nonpoint source (NPS) program long-term monitoring work.

Slide Text

Components of a 9- Element Watershed Plan

1. Identify pollutant sources
2. Estimate load reductions
3. Identify management practices (BMPs)
4. Technical and financial resources
5. Education and outreach strategy
6. Implementation schedule
7. Milestones
8. Evaluation criteria
9. Monitoring plan



Slide Notes

Critical & Priority Areas

The elements of a watershed-based plan help outline and detail the necessary work to be completed in geographically focused areas, called critical areas.

Within each watershed there are usually critical areas that, when prioritized, will produce more benefit to water quality than others. Critical source areas (noted in red) need treatment to improve existing poor water quality. Priority areas (noted in green) need protection to protect relatively good water quality. Critical area planning is essential to successful watershed management. A holistic plan will prioritize both restoration and protection.

Slide Text

Critical & Priority Areas

Critical Source Areas (Red)

- Need treatment to improve existing poor water quality.

Priority Areas (Green)

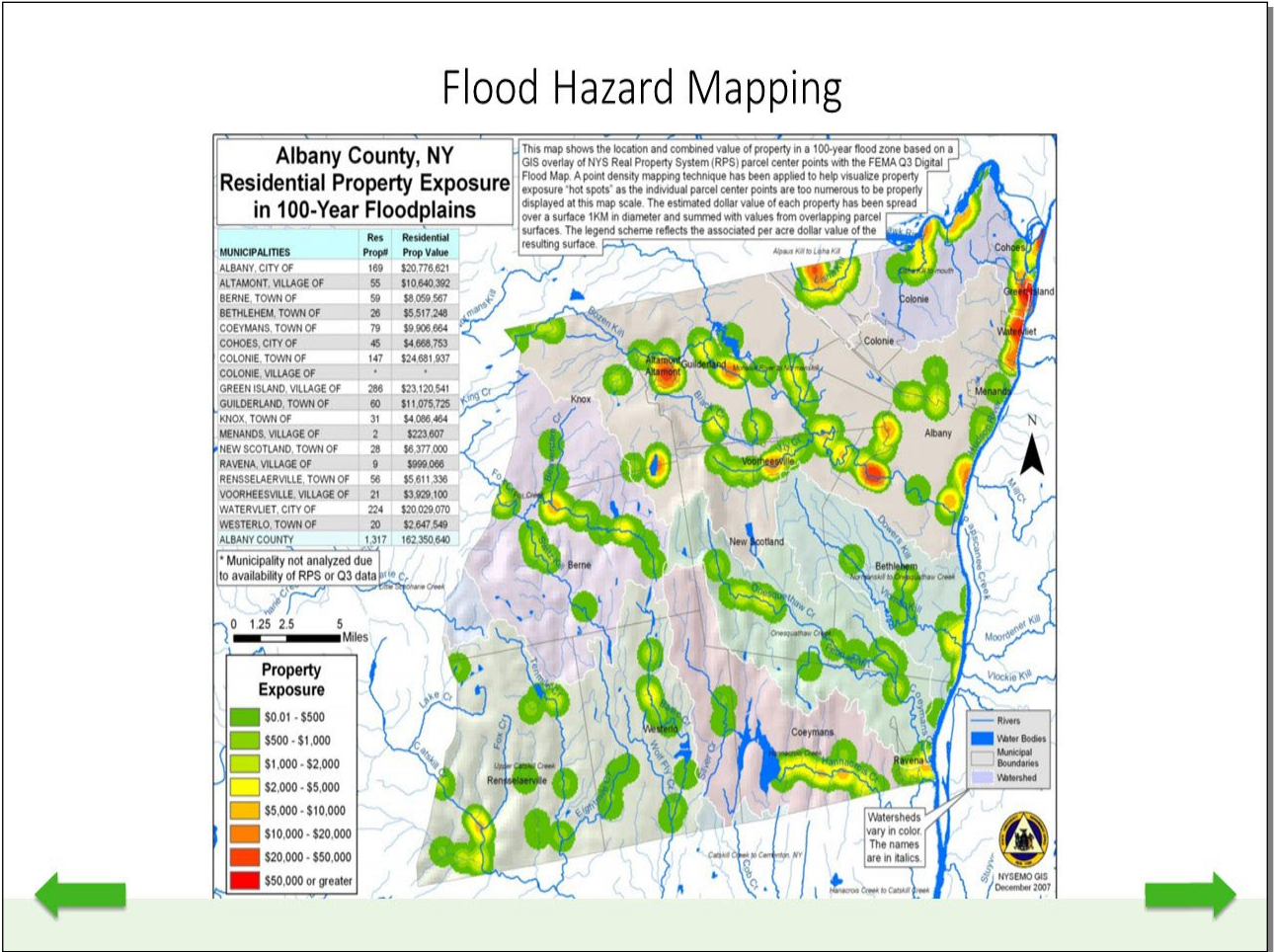
- Need protection to protect relatively good water quality.

Based upon:

- Historic water quality data
- Current water quality data
- Confirmed sources
- Projected future development
- Causes of impairment

Watershed plan example: Salt Creek, IN

Flood Hazard Mapping



Slide Notes

Flood Hazard Mapping

This map is from Albany County, NY’s Multi-Jurisdictional Multi-Hazard Mitigation Plan. This map illustrates flood-prone areas within the county and estimates the potential exposure to flood risk in a dollar amount.

This type of priority area mapping is similar to critical source area identification in watershed planning.

This map shows both municipal and watershed boundaries. In an integrated planning effort, critical source area maps for watershed planning may be compared to hazard maps like the one shown here to identify common areas where Nature-Based Solutions may achieve multiple goals.

Slide Text

Flood Hazard Mapping

Albany County, NY residential property exposure in 100 year floodplains.

Municipalities:

Albany, City of. Res Prop# 169. Residential Prop Value: \$20,776,621

Altamont, Village of. Res Prop# 55. Residential Prop Value: \$10,640,392

Berne, Town of. Res Prop# 59. Residential Prop Value: \$8,059,567

Bethlehem, Town of. Res Prop# 26. Residential Prop Value: \$5,517,248

Coeymans, Town of. Res Prop# 79. Residential Prop Value: \$ 9,906,664

Cohoes, City of. Res Prop# 45. Residential Prop Value: \$4,668,753

Colonie, Town of. Res Prop# 147. Residential Prop Value: \$24,681,937

Colonie, Village of. Municipality not analyzed due to availability of RP3 or Q3 data.

Green Island, Village of Res Prop# 286. Residential Prop Value: \$23,120,541

Guilderland, Town of. RPS# 60. Residential Prop Value: \$11,075,725

Know, Town of: RPS# 31. Residential Prop Value: \$4,086,464

Menands, Village of: RPS # 2. Residential Prop Value: \$223,607

New Scotland, Town of. RPS# 28. Residential Prop Value: \$6,377,000

Ravena, Village of. RPS# 9. Residential Prop Value: \$999,066

Rensselaerville, Town of. RPS# 56. Residential Prop Value: \$5,611,336

Voorheesville, Village of. RPS# 21. Residential Prop Value: \$3,929,100

Watervliet, City of. RPS# 224. Residential Prop Value: \$20,029,070

Westerlo, Town of. RPS# 20. Residential Prop Value: \$2,647,549

Albany County. RPS# 1,317. Residential Prop Value: \$162,350,640

This map shows the location and combined value of property in a 100-year flood zone based on a GIS overlay of NYS Real Property System (RPS) parcel center points with the FEMA Q3 Digital Flood Map. A point density mapping technique has been applied to help visualize properly displayed at this map scale. The estimated dollar value of each property has been read over a surface 1 KM in diameter and summed with vales from overlapping parcel surfaces. The legend scheme reflects the associated per acre dollar value of the resulting surface.

Review of Hazard Mitigation Programs

Hazard mitigation focuses on lessening the impact of disasters to protect the life, property and environment of those impacted. FEMA implements a variety of programs (described in Module One and Three) to reduce losses that could result from disasters. These programs are focused on ensuring comprehensive mitigation planning is conducted at state/local/territory/tribal (SLTT) levels.

Hazards covered by FEMA programs and planning include:

- *High-damage, less frequent* events, such as hurricanes, earthquakes, volcanic eruptions, extreme flooding
- *Frequent or continuous* events, such as nuisance/annual flooding, drought

Hazard mitigation plans provide a roadmap for reducing the impacts of natural hazards identified by the jurisdiction.

See Module One for more information on the Hazard Mitigation Planning Process



Slide Notes

Review of Hazard Mitigation Programs

As we learned in Module One, hazard mitigation focuses on lessening the impact of disasters to protect the life, property and environment of those impacted. FEMA implements a variety of programs (described in Modules One and Three) to reduce losses that can result from disasters. These programs are focused on ensuring comprehensive mitigation planning is conducted at state/local/territory/tribal (SLTT) levels.

Hazards covered by FEMA programs and planning include:

High-damage, less frequent events, such as hurricanes, earthquakes, volcanic eruptions, and extreme flooding, or frequent or continuous events, such as nuisance/annual flooding, and drought.

Most water quality-related risks will fall into the frequent or continuous low-damage events category. They might be a secondary or indirect impact from a primary hazard. While low-damage events might not make headlines, resulting impacts can become major over time and affect valuable resources including fisheries, economically important recreational waterbodies, and drinking water supplies.

Recent HMPs have addressed water pollution hazards and other threats to the ecosystem services that provide for human health and well-being.

Hazard mitigation plans provide a roadmap for reducing the impacts of natural hazards identified by the jurisdiction.

See Module One for more information on the Hazard Mitigation Planning Process



Slide Notes

Watershed Planning/Local Hazard Mitigation Planning Crosswalk

By implementing water quality programs, SLTT entities have collected a wealth of information on natural resources and sources of risks to aquatic and wildlife habitat, and public health. This information includes implementation plans with responsible offices and points of contact. Because of this wealth of information on an invaluable resource, water, these programs offer critical resources to support or strengthen hazard mitigation planning and implementation.

The figure shown here illustrates the local hazard mitigation planning 9-step process and provides suggestions on where watershed planning steps may be integrated. Be aware that HMPs tend to include several counties and they do not always align with the boundaries of a watershed.

Slide Text

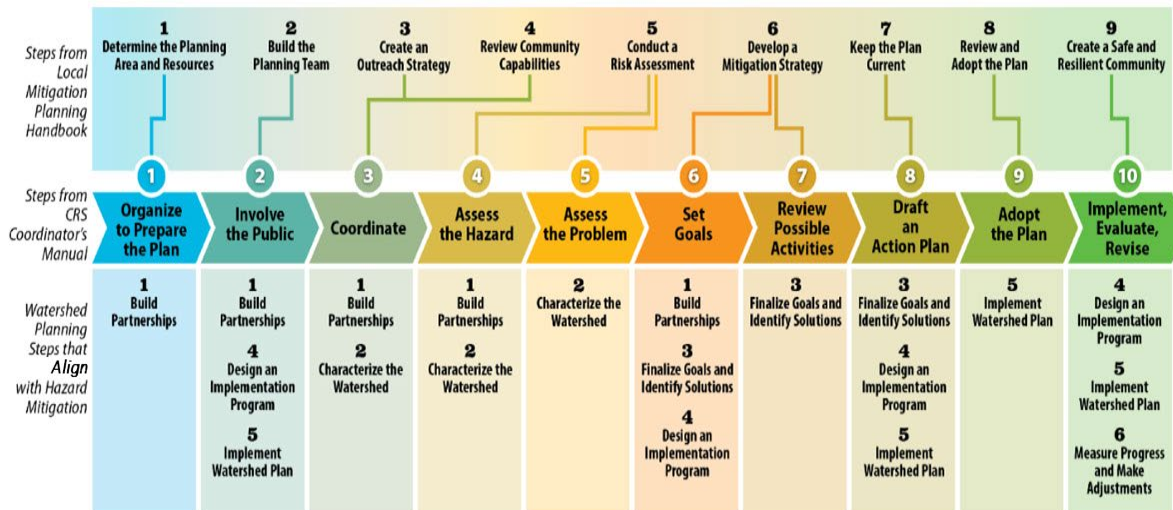
Watershed Planning/Local Hazard Mitigation Planning Crosswalk

Steps from local mitigation planning handbook and watershed planning steps that align with hazard mitigation are shown.

1. Determine the planning area and resources
 - o 1. Build partnerships
2. Build the planning team

- 1. Build partnerships
 - 4. Design an implementation program
 - 5. Implement watershed plan
- 3. Create an outreach strategy
 - 1. Build partnerships
 - 2. Characterize the watershed
- 4. Review community capabilities
 - 1. Build partnerships
 - 2. Characterize the watershed
- 5. Conduct a risk assessment
 - 1. Build partnerships
 - 2. Characterize the watershed
- 6. Develop a mitigation strategy
 - 1. Build partnerships
 - 3. Finalize goals and identify solutions
 - 4. Design an implementation program
- 7. Keep the plan current
 - 3. Finalize goals and identify solutions
 - 4. Design an implementation program
 - 5. Implement watershed plan
 - 6. Measure progress and make adjustments
- 8. Review and adopt the plan
 - 5. Implement watershed plan
- 9. Create a safe and resilient community
 - 4. Design an implementation program
 - 5. Implement watershed plan
 - 6. Measure progress and make adjustments

Watershed Planning, CRS Planning, and Local Hazard Mitigation Planning Crosswalk



Slide Notes

Watershed Planning, CRS Planning, and Local Hazard Mitigation Planning Crosswalk

The Community Rating System (CRS) is another FEMA program and is a component of the National Flood Insurance Program (NFIP). CRS is a voluntary incentive program that recognizes and encourages community floodplain management practices, nature-based solutions, and the adoption of modernized building codes that exceed the minimum requirements of the NFIP.

The CRS program provides discounted flood insurance premium rates to participating communities. In identifying potential actions to reduce flood risk beyond NFIP requirements, the CRS program has 10 key planning steps that are shown on this slide. More information on the CRS program is provided in Module 3.

Slide Text

Step from the local mitigation planning handbook are shown. These steps lead to steps from the CRS coordinator's manual which are comprised of watershed planning steps that align with hazard mitigation.

The steps from the local mitigation planning handbook are:

1. Determine the planning areas and resources. The step from the CRS coordinator's manual is to organize to prepare the plan. The watershed planning step is 1, build partnerships.

2. Build the planning team. The step from the CRS coordinator's manual is to organize to involve the public. The watershed planning step is 1, build partnerships, 4, design an implementation program, and 5, implement watershed plan.
3. Create an outreach strategy. The step from the CRS coordinator's manual is to coordinate. The watershed planning step is 1, build partnerships, 2, characterize the watershed.
4. Review community capabilities. The step from the CRS coordinator's manual is to coordinate and to assess the hazard. The watershed planning step is 1, build partnerships, 2, characterize the watershed.
5. Conduct a risk assessment. The step from the CRS coordinator's manual is to assess the hazard and to assess the problem. The watershed planning step is 1, build partnerships, 2, characterize the watershed.
6. Develop a mitigation strategy. The step from the CRS coordinator's manual is to set goals and review possible activities. The watershed planning step is 1, build partnerships, 3, finalize goals and identify solutions, 4, design an implementation program.
7. Keep the plan current. The step from the CRS coordinator's manual is to draft an action plan. The watershed planning step is 3, finalize goals and identify solutions, 4, design an implementation program, 5, implement watershed plan.
8. Review and adopt the plan. The step from the CRS coordinator's manual is to adopt the plan. The watershed planning step is 5, implement watershed plan.
9. Create a safe and resilient community. The step from the CRS coordinator's manual is to implement, evaluate, revise. The watershed planning step is 4, design an implementation program, 5, implement watershed plan, 6, measure progress and make adjustments.

Example of Water Quality and Hazard Mitigation Planning Integration

Hazard Mitigation Planning: Core Capability Assessment

- Purpose of “Core Capability Assessment” Phase: Identify those core capabilities, or lack thereof, that can be utilized to support implementing actions that may be identified in the plan. Typically, this includes legal/regulatory, technical, and financial capabilities available at a local level.
- Example: California requires local HMPs to consider climate change impacts, which can affect water through increased runoff and water scarcity/drought. Therefore, water program management, infrastructure, planning expertise, and implementation activities are likely to be identified as core capabilities.

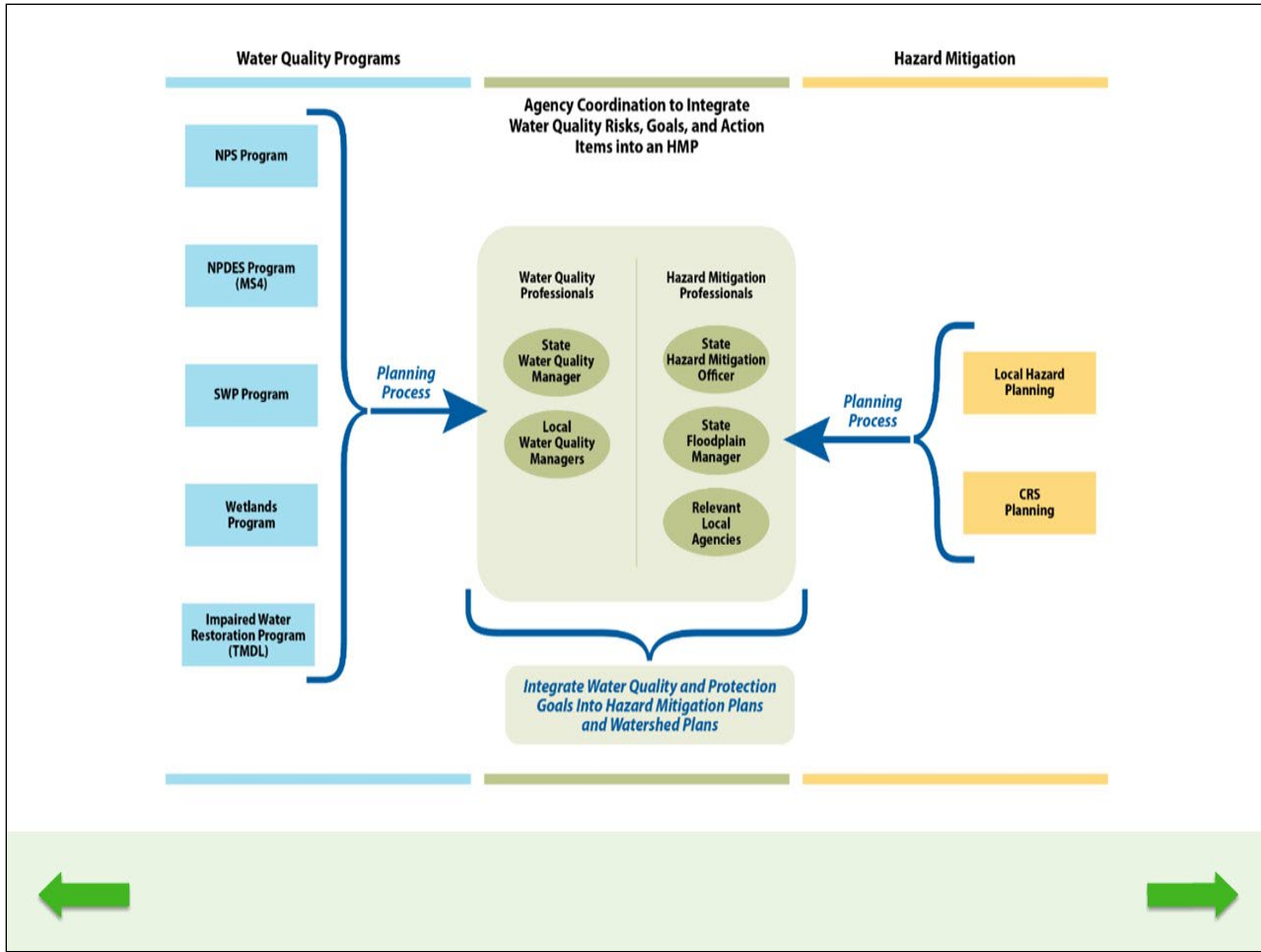
Slide Notes

Example of Water Quality and Hazard Mitigation Planning Integration

Plan coordination can ensure a consistent message among the water quality programs that also conforms with floodplain management and hazard mitigation programs and goals. Together, an inter-agency team can determine how water quality programs and goals fit into the state HMP, and how to devise a strategy that benefits both programs and the public. This slide shows an example of how the Core Capability Assessment phase of the hazard mitigation planning process may connect to water quality planning.

The purpose of the Core Capability Assessment phase is to identify state or local core capabilities, or lack thereof, that can be utilized to support implementing actions that may be identified in the hazard mitigation plan. Typically, this includes legal/regulatory, technical, and financial capabilities available at a local level.

California is an example of how water quality programs may be included in this phase of the HMP planning process. California requires local HMPs to consider climate change impacts, which can affect water through increased runoff and water scarcity/drought. Therefore, water quality program management, infrastructure, planning expertise, and implementation activities are likely to be identified as core capabilities.



Slide Notes

This diagram helps to simply illustrate the various water quality and hazard mitigation programs, planning processes, and professionals that can work together to achieve cross-program benefits.

Slide Text

A diagram is shown which is divided into Water Quality Programs (which include NPS Program, NPDES Program (MS4), SWP Program, Wetlands Program, and Impaired Water Restoration program (TMDL) that leads through the planning process into the Agency Coordination to Integrate Water Quality Risks, Goals, and Action Items into an HMP stage. This is broken into Water Quality Professionals, such as the state water quality manager and the local water quality manager, and Hazard Mitigation Professionals, which includes the State Hazard Mitigation Office, the State Floodplain Manager and the Relevant Local Agencies. Water quality professionals and hazard mitigation professionals are both part of integrated water quality and protection goals into hazard mitigation plans and watershed plans. The planning process also includes Local Hazard Planning and the CRS Planning.

Type of Plan	Risk Management Type			Authority (Act/Authorization)
	Water Quality <small>(e.g., Harmful Algal Blooms (HABs), Fish/Shellfish Contamination, Fish Kills, Drinking Water Source Protection)</small>	Water Quantity <small>(e.g., Flooding, Drought)</small>	Land Management <small>(e.g., Development Impacts, Wildfire, Landslide, Stream Erosion, Urban Heat Island)</small>	
Watershed Plans and TMDLs	Primary	Secondary	Primary	Clean Water Act
Drinking Water Source Water Assessment	Primary	Secondary (can be primary in certain plans)	Primary	Safe Drinking Water Act
Stormwater Management Plan for MS4	Primary	Secondary	Primary	Clean Water Act
Hazard Mitigation Plan	Secondary (can be primary)	Primary	Primary	The Stafford Act and amendments (implemented by FEMA)
Flood Hazard Management Plan	Secondary	Primary	Primary	Various Flood Insurance Acts, implemented by FEMA
Wetlands protection and restoration	Primary	Primary	Primary	Clean Water Act
Integrated Stormwater Wastewater plans	Primary	Primary	Secondary	Clean Water Act



Slide Notes

Water resource protection and hazard mitigation planning address various risks. This table provides an overview of common water quality related plans, their primary and secondary risk management focus items, and the associated regulated authority or regulation to support those items. Note, the risk management types are defined as “primary”, “secondary”, or both. “Primary” means the hazard type is the main focus of that Type of Plan. “Secondary” means the hazard type is an ancillary focus of that Type of Plan.

Slide Text

A table is shown with the risk management type. It includes the type of plan, water quality (e.g., Harmful Algal Blooms (HABs), Fish/Shellfish Contamination, Fish Kills, Drinking Water Source Protection) water quantity (e.g., flooding, drought), land management (e.g., Development Impacts, Wildfire, Landslide, Stream Erosion, Urban Heat Island), and authority (Act/Authorization). The table reads as follows:

Type of Plan: Watershed Plans and TMDLs, Water Quality: Primary, Water Quantity: Secondary, Land Management: Primary, Authority: Clean Water Act

Type of Plan: Drinking Water Source Water Assessment, Water Quantity: Primary, Water Quality: Secondary (can be primary in certain plans), Land Management: Primary, Authority: Safe Drinking Water Act

Type of Plan: Stormwater Management Plan for MS4 ,Water Quality: Primary, Water Quantity: Secondary, Land Management: Primary, Authority: Clean Water Act

Type of Plan: Hazard Mitigation Plan, Water Quality: Secondary (can be primary), Water Quantity: Primary, Land Management: Primary, Authority: The Stafford Act and amendments (implemented by FEMA)

Type of Plan: Flood Hazard Management Plant, Water Quality: Secondary, Water Quantity: Primary, Land Management: Primary, Authority: Various Flood Insurance Acts, implemented by FEMA

Type of Plan: Wetlands protection and restoration, Water Quality: Primary, Water Quantity: Primary, Land Management: Primary , Authority: Clean Water Act

Type of Plan: Integrated Stormwater Wastewater plans, Water Quality: Primary, Water Quantity: Secondary, Land Management: Secondary, Authority: Clean Water Act

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

	Step 1. Organize to Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Step 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise
Recommended CRS Steps to Meet Local Mitigation Plan Requirements	Step 1. Determine the Planning Area and Resources	Step 2. Build the Planning Team	Step 3. Create an Outreach Strategy	Step 4. Review Community Capabilities	Step 5. Conduct an Assessment	Step 6. Develop a Mitigation Strategy	Step 7. Keep the Plan Current	Step 8. Review and Adopt the Plan	Step 9. Create a Safe and Resilient Community	
Recommended Local Hazard Mitigation Planning Steps										
1. BUILD PARTNERSHIPS										
Identify key stakeholders	●	■	●	■	●	■	●	■	●	■
Identify issues of concern to include in the watershed plan	●	■	●	■	●	■	●	■	●	■
Set preliminary goals	●	■	●	■	●	■	●	■	●	■
Conduct public outreach	●	■	●	■	●	■	●	■	●	■

Slide Notes

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

Existing planning processes in water quality and hazard mitigation programs can be used as overarching frameworks to coordinate and achieve multiple plan objectives and goals. There are overlaps and similarities between the watershed planning process and the hazard mitigation planning process.

Previous slides provided a high-level comparison of the steps involved in watershed planning, local mitigation planning, and CRS requirements. The next few slides provide further detail on how the specific sub-steps of the watershed planning process can overlap with the 9 steps taken for local mitigation planning and the 10 steps of CRS. Where planners see beneficial overlap, they should look for opportunities to collaborate and leverage resources.

The first step in the watershed planning process, Building Partnerships, includes identifying and engaging key stakeholders, identifying issues of concern in the watershed, setting preliminary goals for the watershed plan, and conducting public outreach. These activities align with several hazard mitigation planning steps including:

Step 1. Determine the Planning Area and Resources, Step 2. Building the Planning Team, Step 3. Create an Outreach Strategy, Step 4. Review Community Capabilities, Step 5. Conduct an Assessment, and Step 6. Develop a Mitigation Strategy.

The first phase of the watershed planning process also aligns with several of the CRS planning steps including Step 1. Organize to Prepare the Plan, Step 2. Involve the Public, Step 3. Coordinate, Step 5. Address the Problem, and Step 6. Set Goals.

Slide Text

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

1. Build Partnerships

Recommended Local Hazard Mitigation Planning Steps include: Step 1. Determine the Planning Area and Resources (includes identifying key stakeholders and identifying issues of concern to include in the watershed plan), Step 2. Building the Planning Team (includes identifying key stakeholders, identifying issues of concern to include in the watershed plan, setting preliminary goals, and conducting public outreach) Step 3. Create an Outreach Strategy (includes identifying key stakeholders, identifying issues of concern to include in the watershed plan, setting preliminary goals, and conducting public outreach), Step 4. Review Community Capabilities (includes identifying key stakeholders and conducting public outreach) Step 5. Conduct an Assessment (includes identifying issues of concern to include in the watershed plan), and Step 6 (includes setting preliminary goals.)

Recommended CRS Steps to Meet Local Mitigation Plan Requirements include Step 1. Organize to Prepare the Plan (includes identifying key stakeholders), Step 2. Invoice the Public (includes identifying issues of concern to include in the watershed plan and conduct public outreach), Step 3. Coordinate (includes identifying key stakeholders and conducting public outreach, Step 4. Assess the Hazard (includes identifying issues of concern to include in the watershed plan), Step 5. Assess the Problem, Step 6. Set Goals (includes setting preliminary goals).

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

Recommended CRS Steps to Meet Local Mitigation Plan Requirements	Step 1. Organize to Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Set 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise
Recommended Local Hazard Mitigation Planning Steps	Step 1. Determine the Planning Area and Resources	Step 2. Build the Planning Team	Step 3. Create an Outreach Strategy	Step 4. Review Community Capabilities	Step 5. Conduct an Assessment	Step 6. Develop a Mitigation Strategy	Step 7. Keep the Plan Current	Step 8. Review and Adopt the Plan	Step 9. Create a Safe and Resilient Community	Step 10. Implement, Evaluate, Revise
2. CHARACTERIZE THE WATERSHED										
Collect existing data and create a watershed inventory			●	■	●					
Analyze data				■	●					
Identify causes and sources of pollution that need to be controlled*				■	●					
Identify data gaps and collect additional data if needed				■	●					
Quantify pollutant loads				■	●					



Slide Notes

The second step in the watershed planning process, Characterize the Watershed, includes collecting existing data to create a watershed inventory, performing data analysis and identifying data gaps, identifying causes of pollution in the watershed that need to be controlled, and quantifying pollutant loads. These activities align with several hazard mitigation planning steps including: Step 3. Create an Outreach Strategy, Step 4. Review Community Capabilities, and Step 5. Conduct an Assessment.

The second phase of the watershed planning process also aligns with several CRS planning steps including Step 3. Coordinate, Step 4. Assess the Hazard, and Step 5. Assess the Problem.

Slide Text

Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

2. Characterize the Watershed

Recommended Local Hazard Mitigation Planning Steps include: Step 3. Create an Outreach Strategy (includes collecting existing data and creating a watershed inventory), Step 4. Review Community Capabilities (includes collecting existing data and creating a watershed inventory) Step 5. Conduct an Assessment (includes analyzing data, identifying causes and sources of pollution that need to be controlled, identifying data gaps and collect additional data if needed, and quantifying pollutant loads).

Recommended CRS Steps to Meet Local Mitigation Plan Requirements include Step 3. Coordinate (Includes collecting existing data and creating a watershed inventory), Step 4. Assess the Hazard (includes includes analyzing data, identifying causes and sources of pollution that need to be controlled, identifying data gabs and collect additional data if needed, and quantifying pollutant loads).

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

Recommended CRS Steps to Meet Local Mitigation Plan Requirements	Step 1. Organize to Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Set 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise
Recommended Local Hazard Mitigation Planning Steps	Step 1. Determine the Planning Area and Resources	Step 2. Build the Planning Team	Step 3. Create an Outreach Strategy	Step 4. Review Community Capabilities	Step 5. Conduct an Assessment	Step 6. Develop a Mitigation Strategy	Step 7. Keep the Plan Current	Step 8. Review and Adopt the Plan	Step 9. Create a Safe and Resilient Community	
3. FINALIZE GOALS AND IDENTIFY SOLUTIONS										
Set overall goals and management objectives						■	●	●		
Develop indicators/targets						■	●	●		
Determine load reductions needed*						■	●	●		
Identify critical areas						■	●	●		
Develop management measures to achieve goals*						■	●	■		



Slide Notes

The third step in the watershed planning process, Finalize Goals and Identify Solutions, includes setting goals and watershed management objectives, determining necessary pollutant load reductions, developing indicators/targets, identifying critical areas for BMP implementation, and developing management measures to achieve goals. These activities align with two hazard mitigation planning steps: Step 6. Develop a Mitigation Strategy and Step 7. Keep the Plan Current.

The third phase of the watershed planning process also aligns with several of the CRS planning steps including Step 6. Set Goals, Step 7. Review the Possible Activities, and Step 8. Draft an Action Plan.

Slide Text

Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

3. Finalize Goals and Identifying Solutions

Recommended Local Hazard Mitigation Planning Steps include Step 6. Develop a Mitigation Strategy (includes setting overall goals and management objectives, developing indicators/targets, determining load reductions needed, identifying critical areas, and develop management measures to achieve goals), Step 7. Keep the Plan Current (includes setting overall goals and management objectives, developing indicators/targets, determining load reductions needed, identifying critical areas, and develop management measures to achieve goals).

Recommended CRS Steps to Meet Local Mitigation Plan Requirements include Step 6. Set Goals (includes setting overall goals and management objectives, developing indicators/targets, determining load reductions needed, and identifying critical area), Step 7. Review Possible Activities (includes determining load reductions needed, identifying critical areas, and developing management measures to achieve goals), and Step 8. Draft an Action Plan (includes developing management measures to achieve goals).

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

	Step 1. Organize to Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Step 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise
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4. DESIGN AN IMPLEMENTATION PROGRAM										
Develop implementation schedule*		●					●	●	■	
Develop interim milestones to track implementation of management measures*							●	●	■	
Develop criteria to measure progress towards meeting watershed goals*							●	●	■	
Develop monitoring component*							●	●	■	
Develop information/education component*		■					●	●	■	■
Develop evaluation process							●	●	■	■
Identify technical and financial assistance needed to implement plan*						■	●	●	■	●
Assign responsibility for revising the plan		●					●	●	■	■

Slide Notes

The fourth step in the watershed planning process, Design an Implementation Program, includes developing an implementation schedule, interim milestones to track implementation progress, criteria to measure progress toward meeting watershed goals, a monitoring regime, an informational/educational component, and an overall project/progress evaluation process.

This stage also includes identifying technical and financial assistance needed to implement the plan and assigning responsibility for plan evaluation and revision over time. These activities align with several hazard mitigation planning steps including: Step 2. Building the Planning Team, Step 6. Develop a Mitigation Strategy, Step 7. Keep the Plan Current, and Step 9. Create a Safe and Resilient Community.

The fourth phase of the watershed planning process also aligns with several CRS planning steps including Step 2. Involve the Public, Step 6. Set Goals, Step 8. Develop an Action Plan, and Step 10. Implement, Evaluate, and Revise.

Slide Text

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

- 4. Design an Implementation Program

Recommended Local Hazard Mitigation Planning Steps include Step 2. Build the Planning Team (includes developing implementation schedule and assigning responsibility for revising the plan), Step 6. Develop a Mitigation Strategy (includes developing implementation schedule, developing interim milestones to track implementation of management measures, developing criteria to measure progress towards meeting watershed goals, developing monitoring component, developing information/education component, developing evaluation process, identifying technical and financial assistance needed to implement plan, and assigning responsibility for revising the plan), Step 7. Keep the Plan Current (includes developing implementation schedule, developing interim milestones to track implementation of management measures, developing criteria to measure progress towards meeting watershed goals, developing monitoring component, developing information/education component, developing evaluation process, identifying technical and financial assistance needed to implement plan, and assigning responsibility for revising the plan), and Step 9. Create a Safe and Resilient Community (includes identifying technical and financial assistance needed to implement plan).

Recommended CRS Steps to Meet Local Mitigation Plan Requirements includes Step 2. Involve the Public (includes developing information/education component), Step 6. Set Goals (includes assigning responsibility for revising the plan), Step 8. Draft an Action Plan (includes developing implementation schedule, developing interim milestones to track implementation of management measures, developing criteria to measure progress towards meeting watershed goals, developing monitoring component, identifying technical and financial assistance needed to implement plan, and assigning responsibility for revising the plan) and Step 10. Implement, Evaluate, Revise (includes develop information/education component, develop evaluation process, and assign responsibility for revising the plan).

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

■ Recommended CRS Steps to Meet Local Mitigation Plan Requirements	Step 1. Organize to Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Set 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise	
● Recommended Local Hazard Mitigation Planning Steps	Step 1. Determine the Planning Area and Resources	Step 2. Build the Planning Team	Step 3. Create an Outreach Strategy	Step 4. Review Community Capabilities	Step 5. Conduct an Assessment	Step 6. Develop a Mitigation Strategy	Step 7. Keep the Plan Current	Step 8. Review and Adopt the Plan	Step 9. Create a Safe and Resilient Community		
5. IMPLEMENT WATERSHED PLAN											
Implement management strategies								●	■	●	■
Conduct monitoring								●	■	●	■
Conduct information/education activities		●	■					●	■	●	■

Slide Notes

The fifth step in the watershed planning process, Implement Watershed Plan, includes implementing management activities outlined in the plan, conducting monitoring to track progress toward the plan’s goals, and conducting informational/educational activities. These activities align with several hazard mitigation planning steps: Step 2. Building the Planning Team, Step 7. Keep the Plan Current, Step 8. Review and Adopt the Plan, and Step 9. Create a Safe and Resilient Community.

The fifth phase of the watershed planning process also aligns with several of the CRS planning steps including Step 2. Involve the Public, Step 8. Draft an Action Plan, Step 9. Adopt the Plan, and Step 10. Implement, Evaluate, and Revise.

Slide Text


How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

- 5. Implement Watershed Plan

Recommended Local Hazard Mitigation Planning Steps includes Step 2. Build the Planning Team (includes conducting information/education activities), Step 7. Keep the Plan Current (includes implementing management strategies, conducting monitoring, and conducting information/education activities), Step 8. Review an Adopt the Plan (includes implementing management strategies, conducting monitoring, and conducting information/education activities), and Step 9. Create a Safe and Resilient Community (includes implementing management strategies, conducting monitoring, and conducting information/education activities).

Recommended CRD Steps to Meet Local Mitigation Plan Requirements includes Step 2. Involve the Public (includes conducting information/education activities), Step 8. Draft an Action Plan (includes implementing management strategies), Step 9. Adopt the Plan (includes implementing management strategies), and Step 10. Implement, Evaluate, Revise (includes implementing management strategies, conducting monitoring, and conducting information/education activities).

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

 Recommended CRS Steps to Meet Local Mitigation Plan Requirements	Step 1. Organize to Determine the Planning Area and Prepare the Plan	Step 2. Involve the Public	Step 3. Coordinate	Step 4. Assess the Hazard	Step 5. Assess the Problem	Set 6. Set Goals	Step 7. Review Possible Activities	Step 8. Draft an Action Plan	Step 9. Adopt the Plan	Step 10. Implement, Evaluate, Revise
<ul style="list-style-type: none"> Recommended Local Hazard Mitigation Planning Steps 	Step 1. Determine the Planning Area and Resources	Step 2. Build the Planning Team	Step 3. Create an Outreach Strategy	Step 4. Review Community Capabilities	Step 5. Conduct an Assessment	Step 6. Develop a Mitigation Strategy	Step 7. Keep the Plan Current	Step 8. Review and Adopt the Plan	Step 9. Create a Safe and Resilient Community	
6. MEASURE PROGRESS AND MAKE ADJUSTMENTS										
Review, evaluate information								●		●
Prepare annual workplans								●		●
Report back to stakeholders and others								●		●
Make adjustments to program								●		●



Slide Notes

The sixth and final step in the watershed planning process, Measure Progress and Make Adjustments, includes reviewing and evaluating monitoring data, preparing annual workplans, reporting to stakeholders, and making adjustments to the program as needed. These activities align with two hazard mitigation planning steps: Step 7. Keep the Plan Current, and Step 9. Create a Safe and Resilient Community.

The final phase of the watershed planning process also aligns with the CRS planning Step 10. Implement, Evaluate, and Revise.

Slide Text

How Hazard Mitigation Planning Steps and CRS Overlap with Detailed Watershed Planning Sub-steps

6. Measure Progress and Make Adjustments

Recommended Local Hazard Mitigation Planning Steps includes Step 7. Keep the Plan Current (includes review, evaluate information, prepare annual workplans, report back to stakeholders and others, and make adjustments to program) and Step 9. Create a Safe and Resilient Community (includes review, evaluate information, prepare annual workplans, report back to stakeholders and others, and make adjustments to program).

Recommended CRS Steps to Meet Local Mitigation Plan Requirements includes Step 10. Implement, Evaluate, Revise (includes review, evaluate information, prepare annual workplans, report back to stakeholders and others, and make adjustments to program).

State Example: State of Washington 2018 HMP

Hazard Mitigation Plan Goals:

- Goal 1: Coordinate, across multiple agencies, the delivery of planning guidance and technical assistance to local jurisdictions, especially in areas relating to risk reduction activities.
- Goal 3: Develop a comprehensive understanding of hazards and potential risks, applicable and accessible to all state agencies and local partners.

Mitigation Strategy:

- “Reduce the Conversion of Ecologically Important Land for Development.”

Recommendation:

- Coordinating with water quality programs could help make this strategy more successful. Examples include:
 - Source Water Plans
 - TMDL Implementation Plans
 - Watershed Plans
 - Wetlands programs

Slide Notes

State Example: State of Washington 2018 HMP

This slide provides an example of how water quality issues can be integrated into hazard planning at the state level. Washington State’s 2018 HMP profiled hazards include flood and climate change. One mitigation strategy related to these risks is to “Reduce the Conversion of Ecologically Important Land for Development.” This strategy has the potential to not only reduce vulnerability to flooding, but also create water quality benefits if strategically implemented in critical areas in a watershed.

Although Washington state did not include them in their 2018 HMP, coordinating with water quality programs could help make this strategy more successful. A source water protection or watershed plan could identify critical natural areas for protection and funds from the Clean Water or Drinking Water State Revolving Funds (CWSRF or DWSRF) may be available.

If there are impaired waters under a TMDL area, development restrictions may be considered by the community to prevent additional degradation and NPS program funding can be used to install practices that reduce both flooding and pollutant loading into streams by slowing down and trapping water. Additionally, identifying wetlands may create avenues for protection under state or local programs.

Slide Text

State Example: State of Washington 2018 HMP

Hazard Mitigation Plan Goals:

- Goal 1: Coordinate, across multiple agencies, the delivery of planning guidance and technical assistance to local jurisdictions, especially in areas relating to risk reduction activities.
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 - Wetlands Programs

Local Example: King County Regional HMP Update

Background:

- State of Washington has mandated water quality and quantity management program – focus on watersheds that drain to the Puget Sound.
- Guidance for these areas is provided in *Stormwater Management Manual for Western Washington*.

King County Regional HMP Update:

- 27 municipal planning partners had established stormwater management programs under Washington State mandates and had adopted BMPs from the *Stormwater Management Manual for Western Washington*.
- This program served as a source of projects, information on drainage needs based on risk and vulnerability to stormwater issues and, a source for the local match under FEMA hazard mitigation grant programs.
- Resulting HMP identified and prioritized over 700 mitigation actions, of which over 50 of the actions were related to stormwater management.



Slide Notes

Local Example: King County Regional HMP Update

This slide illustrates an example of how state water quality programs can be integrated and provide support in local hazard mitigation planning efforts.

Slide Text

Local Example: King County Regional HMP Update

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Benefits of Integrated Planning

- Funding
- Existing Data Sources
- Stakeholders
- Subject Matter and Local Technical Expertise
- Outreach
- Alignment of Efforts

Click on each tab to learn more

Slide Notes

Benefits of Integrated Planning

Now that you are familiar with how the planning steps overlap for water quality protection and hazard mitigation, it is important to understand how linking the two planning efforts can benefit both programs. Click on each of the tabs to learn about the numerous benefits of integrating hazard mitigation and water quality planning processes.

Slide Text

Benefits of Integrated Planning

Funding, Existing Data Sources, Stakeholders, Subject Matter and Local Technical Expertise, Outreach, Alignment of Efforts. Click on each tab to learn more.

Benefits of Integrated Planning



Using funds available for water quality protection and hazard mitigation can help support more projects to reduce flooding and other hazards.

For example, funding available from stormwater utilities can be a core capability to support hazard mitigation action and help meet the potential required local match for FEMA and other federal grants.



Slide Notes

Funding

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For example, funding available from stormwater utilities can be a core capability to support hazard mitigation action and help meet the potential required local match for FEMA and other federal grants.

Benefits of Integrated Planning

- Funding
- Existing Data Sources
- Stakeholders
- Subject Matter and Local Technical Expertise
- Outreach
- Alignment of Efforts

When planners use existing mapping and other data gathered under an alternate planning effort, this can augment their own data and even save time and resources spent gathering information.



Slide Notes

Existing Data Sources

When planners use existing mapping and other data gathered under an alternative planning effort, this can augment their own data and even save time and resources spent gathering information.

Benefits of Integrated Planning



Planners can save time and resources used to identify stakeholders by engaging with groups already convened for water resource protection efforts.



Slide Notes

Stakeholders

Planners can save time and resources used to identify stakeholders by engaging with groups already convened for water resource protection/restoration efforts.

Benefits of Integrated Planning



Planners can rely on subject matter experts already identified from other planning efforts. Many water quality programs implemented at the local level offer subject-matter expertise and existing partnerships that can be utilized by hazard mitigation planners to better understand risk, and potential actions to reduce risk.



Slide Notes

Subject Matter and Local Technical Expertise

Planners can rely on subject matter experts already identified from other planning efforts. Many water quality programs implemented at the local level offer subject-matter expertise and existing partnerships that can be utilized by hazard mitigation planners to better understand risk, and potential actions to reduce risk.

Benefits of Integrated Planning



Planners can use existing outreach strategies developed for other planning and regulatory compliance efforts as a starting point for developing their own strategy. This can save time and money and allow planners to include strategies they might not have developed on their own. Some outreach efforts may be able to be combined.

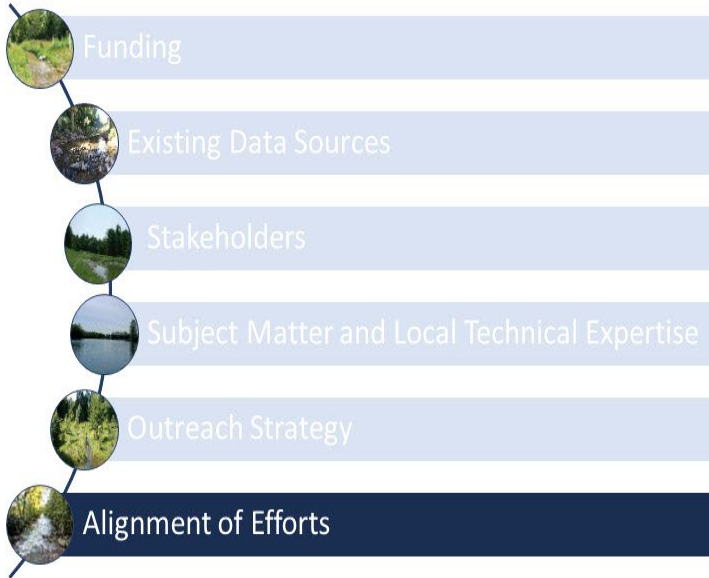


Slide Notes

Outreach Strategy

Planners can use existing outreach strategies developed for other planning and regulatory compliance efforts as a starting point for developing their own strategy. This can save time and money and allow planners to include strategies they might not have developed on their own. Some outreach efforts may be able to be combined.

Benefits of Integrated Planning



By talking early in the planning process, programs can avoid duplicate projects that target the same issue or area in a watershed.

Early discussions can also resolve any potential issues with conflicting projects.



Slide Notes

Alignment of Efforts

By talking early in the planning process, programs can avoid duplicate projects that target the same issue or area in a watershed. Early discussions can also resolve any potential issues with conflicting projects.

Module 3: Funding and Incentive Strategies for Nature-Based Hazard Mitigation



Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>



Slide Notes

Module 3: Funding and Incentive Strategies for Nature-Based Hazard Mitigation

Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>

Module Two Recap:

- Introduce common water quality programs
- Outline both watershed planning and hazard mitigation planning processes
- Assess how watershed planning and hazard mitigation planning processes may align to foster co-benefits
- Review local and state examples of integrated planning
- Detail benefits of integrating planning efforts

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

Slide Notes

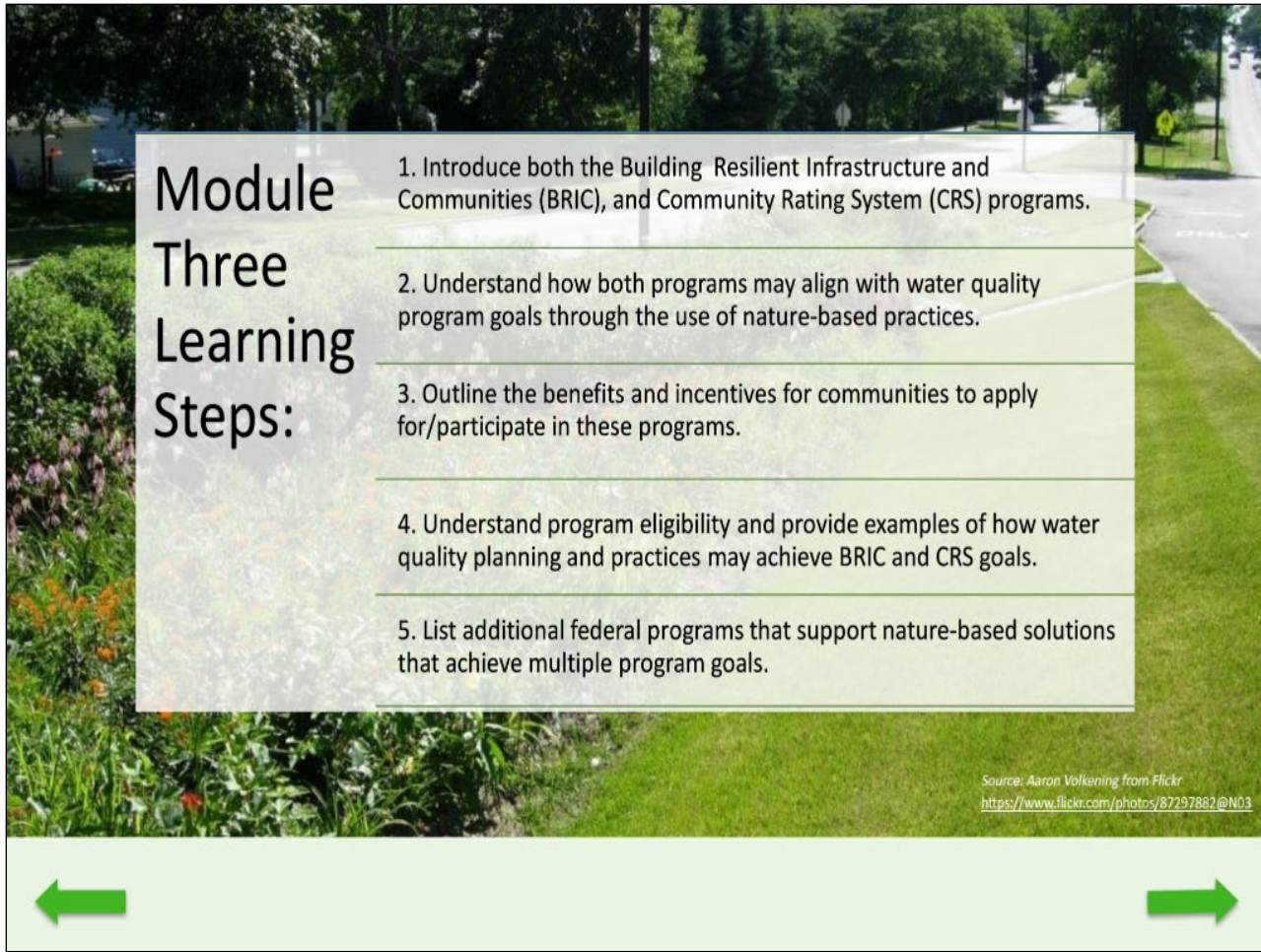
Module Two recap. Module Two of this training introduced water quality programs that fall under the Clean Water Act and Safe Drinking Water Act, outlined how watershed planning may align with hazard mitigation planning to foster co-benefits, reviewed examples of hazard mitigation plans that include water quality issues, and detailed the multiple benefits that can be achieved through integrated planning.

Slide Text

Module Two Recap

Introduce common water quality programs, outline both watershed planning and hazard mitigation planning processes, assess how watershed planning and hazard mitigation planning processes may align to foster co-benefits, review local and state examples of integrated planning, and detail benefits of integrating planning efforts.

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Module Three Learning Steps:

1. Introduce both the Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs.
2. Understand how both programs may align with water quality program goals through the use of nature-based practices.
3. Outline the benefits and incentives for communities to apply for/participate in these programs.
4. Understand program eligibility and provide examples of how water quality planning and practices may achieve BRIC and CRS goals.
5. List additional federal programs that support nature-based solutions that achieve multiple program goals.

Source: Aaron Volkering from Flickr
<https://www.flickr.com/photos/87297882@N03>

Slide Notes

Module 3 Learning Steps

The third module of this training will accomplish two primary goals:

1. Assess how FEMA's Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs may work alongside water quality programs to promote and incentivize the adoption of nature-based practices and create co-benefits for water quality and community resilience.
2. Outline additional federal funding and financing mechanisms that may be used to plan for, or construct nature-based solutions that achieve multiple benefits.

These goals will be accomplished in five learning steps. 1. Introduce both the Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs. 2. Understand how both programs may align with water quality program goals through the use of nature-based practices.

3. Outline the benefits and incentives for communities to apply for/participate in these programs. 4. Understand program eligibility and provide examples of how water quality planning and practices may achieve BRIC and CRS goals. 5. List additional federal programs that support nature-based solutions that achieve multiple program goals.

Slide Text

Module Three Learning Steps

1. Introduce both the Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs
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5. List additional federal programs that support nature-based solutions that achieve multiple program goals.

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Integrating Planning Through Nature-Based Solutions

- Nature-based solutions can help to mitigate the impacts of multiple natural hazard types (described in Module 1) while protecting water quality from nonpoint source pollution.
- Nature-based solutions can be employed to achieve hazard mitigation/resilience and water quality goals.
- Integrating elements that are common to both planning objectives can help to align planning processes, create support for actions that protect water quality, and potentially provide direct economic benefits to the homeowners and businesses.

Source: <https://nrcsolutions.org/coastal-marshes/>

Slide Notes

Integrating Planning Through Nature-Based Solutions

FEMA defines nature-based practices as sustainable planning, design, environmental management, and engineering practices that weave natural features or processes into the built environment to build more resilient communities.

Integrating planning elements that are common to both planning objectives can help to align planning processes, create support for actions that protect water quality, and potentially provide direct economic benefits to homeowners and businesses.

Source: <https://nrcsolutions.org/coastal-marshes/>

Slide Text

Integrating Planning Through Nature-Based Solutions

Nature-based solutions can help to mitigate the impacts of multiple natural hazard types (described in Module 1) while protecting water quality from nonpoint source pollution.

Nature-based solutions can be employed to achieve hazard mitigation/resilience and water quality goals.

Programs This Module Will Cover



FEMA

Building Resilience Infrastructure and Communities (BRIC) (funding program):

Annual FEMA pre-disaster grant program. BRIC program guiding principles are supporting communities through capability and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Community Rating System (incentive program): A component of the National Flood Insurance Program (NFIP) and is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the NFIP.

Both programs promote innovative solutions to addressing flooding and other natural hazards.

Slide Notes

Programs This Module Will Cover

This module will focus primarily on two FEMA programs: the Building Resilient Infrastructure and Communities (BRIC) and the Community Rating System (CRS). These programs were chosen as the focus areas of this training because both promote the use of nature-based solutions and other innovative approaches in addressing natural hazards.

An important distinction to keep in mind is that while BRIC is a grant program that can provide direct funding for nature-based hazard mitigation practices, CRS is an incentive program that functions by providing discounts on flood insurance for NFIP communities that exceed NFIP requirements to reduce flood risk.

As you proceed through the rest of the module, keep in mind that you are building an understanding of the BRIC and CRS programs so that you can identify program elements and activities that are common to BRIC, CRS, and water resource management. These common components can help to reinforce the objectives of both endeavors.

Slide Text

Programs This Module Will Cover

Building Resilience Infrastructure and Communities (BRIC) (funding program): Annual FEMA pre-disaster grant program. BRIC program guiding principles are supporting communities through capability and capacity-building; encouraging and enabling innovation; promoting partnerships; enabling large projects; maintaining flexibility; and providing consistency.

Community Rating System (incentive program): A component of the National Flood Insurance Program (NFIP) and is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the NFIP.

Both programs promote innovative solutions to addressing flooding and other natural hazards.

Introduction to the BRIC Program



- Building Resilient Infrastructure and Communities (BRIC) is an annual FEMA grant program that supports pre-disaster mitigation activities.
- BRIC priorities are to:
 - Incentivize public infrastructure projects
 - Incentivize projects that mitigate risk to one or more lifelines
 - **Incentivize projects that incorporate nature-based solutions**
 - Incentivize adoption and enforcement of modern building codes
 - **Incentivize activities that promote climate adaptation and resilience with respect to those hazards**
 - Promote the goal of equity, by helping members of particularly disadvantaged groups, who might be at special risk as a result of current hazards, including those associated with climate change
- Total available grant funds equal up to 6% of federal post-disaster funds
 - In 2021 \$1 billion BRIC funds were available

Slide Notes

Introduction to the BRIC Program

The Disaster Recovery Reform Act, Section 1234; amended Section 203 of the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) and authorizes BRIC. The BRIC program was established in 2020 and replaced the former Pre-Disaster Mitigation (PDM) program. BRIC is an annual FEMA grant program that supports pre-disaster mitigation activities.

The BRIC priorities are to: incentivize public infrastructure projects, incentivize projects that mitigate risk to one or more lifelines, incentivize projects that incorporate nature-based solutions, incentivize adoption and enforcement of modern building codes, incentivize activities that promote climate adaptation and resilience with respect to those hazards, and to promote the goal of equity, by helping members of particularly disadvantaged groups, who might be at special risk as a result of current hazards, including those associated with climate change.

Total available grant funds equal 6% of federal post-disaster funds.

In 2021 \$1 billion in BRIC funds were available.

Slide Text

Introduction to the BRIC Program

Building Resilient Infrastructure and Communities (BRIC) is an annual FEMA grant program that supports pre-disaster mitigation activities.

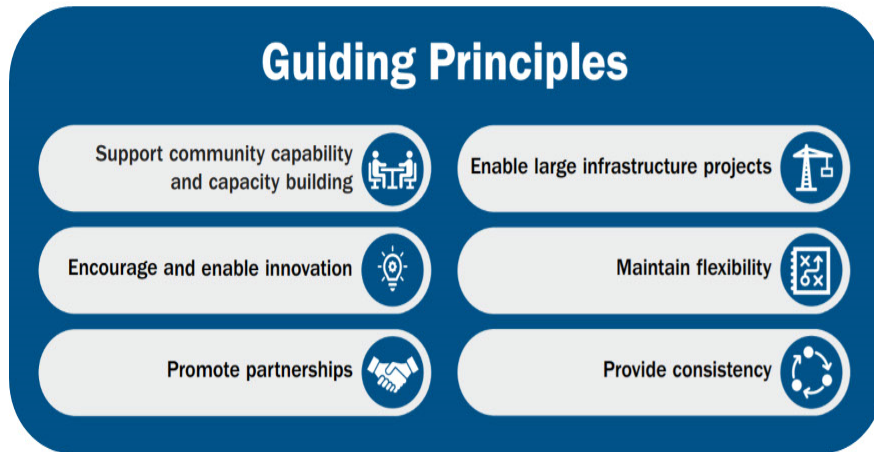
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- Incentivize public infrastructure projects
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- Incentivize projects that incorporate nature-based solutions
- Incentivize adoption and enforcement of modern building codes
- Incentivize activities that promote climate adaptation and resilience with respect to those hazards
- Promote the goal of equity, by helping members of particularly disadvantaged groups, who might be at special risk as a result of current hazards, including those associated with climate change.

BRIC Program Goals and Requirements

BRIC Projects must:

- Be cost-effective
- Reduce or eliminate risk and damage from future natural hazards
- Meet either of the two latest International Building Codes
- Align with the applicable hazard mitigation plan
- Meet all environmental and historic preservation (EHP) requirements



From FEMA Building Resilient Infrastructure and Communities (BRIC) grant program Infographic

Slide Notes

BRIC Program Goals and Requirements

FEMA states that the BRIC program is guided by the following principles: supporting community and capacity building, enabling large infrastructure projects, encouraging and enabling innovation, maintaining flexibility, promoting partnerships, and providing consistency.

These principles are an expansion of the more traditional hazard mitigation methods promoted under the former Pre-Disaster Mitigation Program and will help communities move towards a more comprehensive resilience planning that includes both traditional mitigation solutions (i.e., levees and other structural solutions) as well as alternative solutions like nature-based solutions and updated building codes.

In addition to following these guiding principles, BRIC projects should meet the following requirements: Be cost-effective (as determined by FEMA's benefit-cost analysis (BCA) method), reduce or eliminate risk and damage from future natural hazards, meet either at least two of the latest International Building Codes, align with the applicable state or local hazard mitigation plan, and meet all environmental and historic preservation (EHP) requirements.

Slide Text

BRIC Program Goals and Requirements

BRIC Projects must: Be cost-effective, Reduce or eliminate risk and damage from future natural hazards, Meet either of the two latest International Building Codes, Align with the applicable hazard mitigation plan, Meet all environmental and historic preservation (EHP) requirements.

Figure showing Guiding Principles include: support community capability and capacity building, encourage and enable innovation, promote partnerships, enable large infrastructure projects, maintain flexibility, and provide consistency.

BRIC Project Types

Three types of projects can be implemented using BRIC funds:

- **Capability and Capacity-Building (C&CB) Activities:** Activities that enhance the knowledge, skills, and expertise of the current workforce to expand or improve the administration of mitigation assistance.
 - Opportunity to provide technical training/workshops on the design/implementation nature-based practices
- **Mitigation Projects:** Cost-effective projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure.
 - Opportunity to include nature-based practices as mitigation actions
- **Management Costs:** Financial assistance to reimburse the recipient and subrecipient for eligible and reasonable indirect costs, direct administrative costs, and other administrative expenses associated with a specific mitigation project or C&CB activity.

Source: <https://www.peachtreecornersga.gov/222/Floodplain-Management>

Slide Notes

BRIC Project Types

Three types of projects can be implemented using BRIC funds:

Capability and Capacity-Building Activities: Activities that enhance the knowledge, skills, and expertise of the current workforce to expand or improve the administration of mitigation assistance. This activity type may be used to provide technical training/workshops on the design/implementation of nature-based practices.

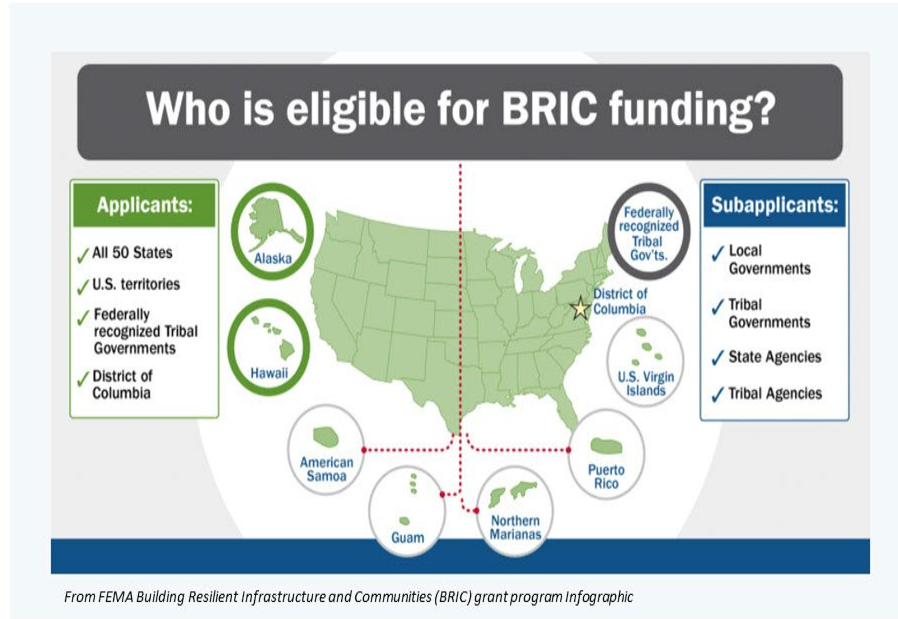
Mitigation Projects: Cost-effective projects designed to increase resilience and public safety; reduce injuries and loss of life; and reduce damage and destruction to property, critical services, facilities, and infrastructure. This activity type is an opportunity to include nature-based practices as mitigation actions.

Management Costs: Financial assistance to reimburse the recipient and subrecipient for eligible and reasonable indirect costs, direct administrative costs, and other administrative expenses associated with a specific mitigation project or C&CB activity.

Source: <https://www.peachtreecornersga.gov/222/Floodplain-Management>

BRIC Eligibility and Application Process

- Eligible applicants can submit BRIC applications on behalf of subapplicants.
- Homeowners, business operators, and non-profit organizations cannot apply directly to FEMA, but can be included in a subapplication.



Slide Notes

BRIC Eligibility and Application Process

BRIC applicants must have experienced a presidentially-declared disaster in the last 10 years (currently all eligible applicants listed on this slide meet this criteria) and have an approved and adopted Hazard Mitigation Plan.

BRIC applicants include: States, Territories, Federally recognized Tribal Governments, and the District of Columbia.

BRIC subapplicants include: Local governments, Tribal governments, state agencies, and Tribal agencies.

Slide Text

BRIC Eligibility and Application Process

Eligible applicants can submit BRIC applications on behalf of subapplicants.

Homeowners, business operators, and non-profit organizations cannot apply directly to FEMA, but can be included in a subapplication.

A map shows who is eligible for BRIC funding: Applicants include all 50 states (including Alaska and Hawaii), U.S. territories (including American Samoa, Guam, the Northern Marianas, Puerto Rico, and the U.S. Virgin Islands) Federally recognized Tribal Governments, and District of Columbia. Subapplicants include Local Governments, Tribal Governments, State Agencies, and Tribal Agencies.

BRIC Funding Amounts and Allocation

FEMA uses three categories to allocate BRIC funding:

- **State/Territory Allocation:** All 50 states, the District of Columbia, and U.S. territories
- **Tribal Set-Aside:** All Indian tribal governments (federally recognized)
- **National Competition for Mitigation Projects:** Remaining funds which are not awarded from the State/Territory Allocation or Tribal Set-Aside will be included in the national competition.

Total Available BRIC FUNDING \$1 Billion			
Uses of Assistance	\$56M State/Territory Allocations	\$25M Tribal Set-Aside	\$919M National Competition for Mitigation Projects
Management Costs	✓	✓	✓
Capability and Capacity Building Activities	✓	✓	✓
Mitigation Projects	✓	✓	✓

2021 BRIC funding allocation by funding category and project type (funding amounts change year to year)

From FEMA Building Resilient Infrastructure and Communities (BRIC) grant program Infographic

Slide Notes

BRIC Funding Amounts and Allocation

FEMA uses three categories to allocate BRIC funding: State/Territory Allocation, which includes all 50 states, the District of Columbia, and U.S. territories; Tribal Set-Aside which includes all Indian tribal governments that are federally recognized; and the National Competition for Mitigation Projects. The remaining funds which are not awarded from the State/Territory Allocation or Tribal Set-Aside will be included in the national competition.

Slide Text

The total available BRIC funding is \$1 billion.

\$56 million is used for assistance for State/Territory Allocations. This includes management costs, capability and capacity building activities, and mitigation projects.

\$25 million is used for tribal set-asides. This includes management costs, capability and capacity building activities, and mitigation projects.

\$919 million is used for national competition for mitigation projects. This includes management costs and mitigation projects.

2021 BRIC funding allocation by funding category and project type (funding amounts change year to year)

From FEMA Building Resilient Infrastructure and Communities (BRIC) grant program Infographic

BRIC Cost-Share Requirements

Non-Federal Cost Share

- Required for all subapplications funded under BRIC.
- May consist of cash, donated or third-party in-kind services, materials, or any combination thereof.
- Cost share breakdown for BRIC is as follows:
 - 75 percent federal/25 percent non-federal, with some exceptions
 - Small impoverished communities (defined in BRIC application criteria) are eligible for an increase in cost share up to 90 percent federal/10 percent non-federal.
 - FEMA waives non-federal cost share for island areas, including American Samoa, Guam, the Northern Mariana Islands, and the U.S. Virgin Islands, when the non-federal cost share for the entire award is under \$200,000.

Slide Notes

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FEMA Benefit-Cost Analysis Requirement



- FEMA grant applications require a Benefit-Cost Analysis (BCA) to “determine the future risk reduction benefits of a (proposed) hazard mitigation project and compares those benefits to its costs. A project is considered cost-effective when the benefit/cost ratio is 1.0 or greater.”
- FEMA’s 2013 Mitigation Policy, FP-108-024-01, includes a cost-benefit analysis consideration of environmental improvements in combination with avoiding losses to properties and critical facilities/infrastructure.
- Under FP-108-024-01 nature-based solutions may be eligible for funding intended for environmental protection as well as hazard mitigation.
- See FEMA’s 2015 [State Mitigation Plan Review Guide](#) for additional program information

Slide Notes

FEMA Benefit-Cost Analysis Requirement

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FEMA’s 2013 Mitigation Policy, FP-108-024-01, includes a cost-benefit analysis consideration of environmental improvements in combination with avoiding losses to properties and critical facilities/infrastructure. Under FP-108-024-01 nature-based solutions may be eligible for funding intended for environmental protection as well as hazard mitigation. See FEMA’s 2015 [State Mitigation Plan Review Guide](#) for additional program information.

Benefit Cost Analysis (BCA) and Ecosystem Services

- Traditional FEMA BCA methodology focused on avoided loss of built structures
- Recognizing the benefits of natural systems, FEMA released the 2013 policy, *Considerations of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance Programs*. This policy:
 - Allowed inclusion of ecosystem service (ES) benefits in BCA if the BCR of an acquisition/open space project was 0.75 or greater using traditional risk reduction benefit
- Revised again in 2016 to expand ES benefit allowance to all project type
- Further revised in 2020 to remove the 0.75 traditional benefit cost ratio requirement

[FEMA BCA tools and guidance](#)

Source: <https://ijc.org/en/wqb/opportunities-collaborate-restore-enhance-and-protect-great-lakes-coastal-wetlands>

Slide Notes

Benefit Cost Analysis (BCA) and Ecosystem Services

As previously discussed, FEMA requires BRIC applicants to show cost-effectiveness by completing a benefit-cost analysis (BCA) of the proposed project using FEMA-approved methodology. To be eligible for BRIC funding a project must achieve a BCA of greater than or equal to 1.0. Traditionally, this BCA analysis focused on the monetary amount attributed to potential avoided losses of built structures in a disaster/extreme weather event. In 2013, BRIC updated their BCA requirements with the Considerations of Environmental Benefits in the Evaluation of Acquisition Projects under the Hazard Mitigation Assistance Programs policy.

This update allowed for the inclusion of ecosystem services (ES) benefits in the BCA calculation in specifically acquisition/open space projects if the benefit cost ratio (BCR) was 0.75 or greater using traditional risk reduction benefits. This policy was further revised in 2016 to expand the ability to apply ES benefits to all hazard mitigation projects.

Finally, this policy was revised again in 2020 to remove the 0.75 traditional benefit cost ratio requirement and allow projects to include any amount of approved environmental benefits in their BCA. Click the [link](#) for additional tools and resource on FEMA BCA tools and guidance.

Source: <https://ijc.org/en/wqb/opportunities-collaborate-restore-enhance-and-protect-great-lakes-coastal-wetlands>

Slide Text

Benefit Cost Analysis (BCA) and Ecosystem Services

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Revised again in 2016 to expand ES benefit allowance to all project type

Further revised in 2020 to remove the 0.75 traditional benefit cost ratio requirement

Click the FEMA BCA tools and guidance [link](#).

Connecting with Your State, Tribal, or Local Hazard Mitigation Program





Meet to discuss water quality programs/planning, the nexus between programs, and the potential co-benefits of program/plan integration.



Encourage your hazard mitigation officer to include general information on water quality and/or nature-based practices in state, tribal, or local HMP.



Speak in terms of risk reduction. E.g., how may water quality practices reduce volume of runoff.




Slide Notes

Connecting with Your State, Tribal, or Local Hazard Mitigation Program

If you are in a water quality program and are interested in collaborating with your state or local hazard mitigation planning team, or pursuing a project that may be eligible for BRIC funding, a good first point of contact is your state or local hazard mitigation officer (HMO)/program. To be eligible for BRIC funding, proposed projects must align with the goals/strategies in a FEMA-approved state or local hazard mitigation plan.

In your first conversation with your state or local hazard mitigation program, a few good points to keep in mind are to: Discuss water quality programs/planning, the nexus between programs, and the potential co-benefits of plan integration, encourage the hazard mitigation officer to include general information on water quality, nature-based solutions, and/or agricultural conservation practices in your state or local HMP. Speak in terms of risk reduction. For example, how may water quality practices reduce runoff volume.

Slide Text

Connecting with Your State, Tribal, or Local Hazard Mitigation Program

Meet to discuss water quality programs/planning, the nexus between programs, and the potential co-benefits of program/plan integration.

Encourage your hazard mitigation officer to include general information on water quality and/or nature-based practices in state, tribal, or local HMP.

Speak in terms of risk reduction. E.g., how may water quality practices reduce volume of runoff.

Introduction to the CRS Program



Community Rating System: A voluntary incentive program through FEMA that encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP). The CRS program provides discounted flood insurance premium rates to participating communities.

CRS discounts reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program:

- Reduce and avoid flood damage to insurable property
- Strengthen and support the insurance aspects of the National Flood Insurance Program
- Foster comprehensive floodplain management

Note: FEMA is re-examining the CRS program, under "CRS Next." While it is too early to determine what changes may occur, some changes or updates to the CRS program have occurred in 2021, and more are likely to follow. To participate in CRS Next, or to learn more, see FEMA-CRS-Next@fema.dhs.gov.

Slide Notes

Introduction to the Community Rating System (CRS) Program

The National Flood Insurance Program (NFIP) provides federally backed flood insurance to policy holders in participating communities. To be eligible to purchase coverage under an NFIP flood insurance policy (either for the structure or its contents), a property must be in a community that participates in the NFIP.

To qualify for the NFIP, a community adopts and enforces a floodplain management ordinance to regulate development in flood hazard areas. The objective of the ordinance is to minimize the potential for flood damage to future development. Today, over 22,000 communities in 56 states and territories participate in the NFIP.

If a community is certified by FEMA as being in full compliance and in good standing with the minimum NFIP standards, they may apply to join the CRS (at no fee). If they join, policy holders in the community will receive discounted flood insurance rates for their community's preemptive actions to reduce flooding. One of the three goals of the program is to foster comprehensive floodplain management by, among other things, preserving and restoring the natural functions and resources of floodplains such as peak flow control, infiltration promotion, and channel stabilization.

CRS is a voluntary incentive program through FEMA that encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP). The CRS program provides discounted flood insurance premium rates to participating communities. CRS discounts reflect the reduced flood risk resulting from the community's efforts that address the goals of the program.

Note: FEMA is re-examining the CRS program, under "CRS Next." While it is too early to determine what changes may occur, some changes or updates to the CRS program have occurred in 2021, which was the time this training was developed, and more are likely to follow. To participate in CRS Next, or to learn more, see <mailto:FEMA-CRS-Next@fema.dhs.gov>

Slide Text

Introduction to the CRS Program

The National Flood Insurance Program is shown.

Community Rating System: A voluntary incentive program through FEMA that encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP). The CRS program provides discounted flood insurance premium rates to participating communities.

CRS discounts reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program: Reduce and avoid flood damage to insurable property, strengthen and support the insurance aspects of the National Flood Insurance Program and foster comprehensive floodplain management.

CRS Classes, Credit Points, and Premium Discounts

CRS Class	Credit Points (cT ¹)	Premium Discount Rate
1	4,500+	45%
2	4,000–4,499	40%
3	3,500–3,999	35%
4	3,000–3,499	30%
5	2,500–2,999	25%
6	2,000–2,499	20%
7	1,500–1,999	15%
8	1,000–1,499	10%
9	500–999	5%
10	0–499	0

[National Flood Insurance Program Community Rating System | FEMA.gov](https://www.fema.gov/national-flood-insurance-program-community-rating-system)



Slide Notes

CRS Classes, Credit Points, and Premium Discounts

A community receives a CRS classification based on meeting the prerequisites for certain classes and the total credit for its activities. There are 10 CRS rating classes. Class 1 requires the most credit points and gives the greatest premium discount. A community that does not apply for the CRS, or does not obtain the minimum number of credit points (500), is automatically a Class 10 community and receives no discount on flood insurance premiums. (Note: the exact allocation of credits may change slightly with updates to the CRS - this module is based on the 2017 version of the program.)

Under FEMA’s Equity in Action, Risk Rating 2.0 (RR 2.0) implemented on October 1, 2021, the NFIP revised its tools for assessing risk and rating flood insurance policies nationwide. Within CRS Communities, RR 2.0 will apply the maximum available flood insurance discount earned through CRS activities to all federally backed flood insurance policies located within the community.

With few exceptions, there will be no distinction between discounts for structures located in or outside the Special Flood Hazard Areas in terms of the CRS Discount. For more information about RR 2.0, visit FEMA’s website at (<https://www.fema.gov/flood-insurance/risk-rating>).

In addition, in 2021, FEMA issued an addendum to the 2017 CRS Coordinators Manual. This included pre-requisites for entry into the CRS program, amended the Elevation Certificate requirements, added credits related to preserving Endangered Species, and more. For specific information about the 2021 addendum, visit [National Flood Insurance Program Community Rating System | FEMA.gov](#).

Slide Text

CRS Classes, Credit Points, and Premium Discounts

The National Flood Insurance Program Community Rating System is shown.

CRS Class: 1, Credit Points (cT¹): 4,500+, Premium Discount Rate: 45%

CRS Class: 2, Credit Points (cT¹): 4,000-4,499, Premium Discount Rate: 40%

CRS Class: 3, Credit Points (cT¹): 3,500-3,999, Premium Discount Rate: 35%

CRS Class: 4, Credit Points (cT¹): 3,000-3,499, Premium Discount Rate: 30%

CRS Class: 5, Credit Points (cT¹): 2,500-2,999, Premium Discount Rate: 25%

CRS Class: 6, Credit Points (cT¹): 2,000-2,499, Premium Discount Rate: 20%

CRS Class: 7, Credit Points (cT¹): 1,500-1,999, Premium Discount Rate: 15%

CRS Class: 8, Credit Points (cT¹): 1,000-1,499, Premium Discount Rate: 10%

CRS Class: 9, Credit Points (cT¹): 500-999, Premium Discount Rate: 5%

CRS Class: 10, Credit Points (cT¹): 0-499, Premium Discount Rate: 0

CRS Series, Category, and Activity Overview

CRS Organization

- Four series of activities
- 3-7 activities per series

Activities with a direct or indirect connection to environmental elements and/or nature-based solutions are bolded.

Series	Category	Activity
300 Series Overview: This series credits programs that advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities also generate data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community.		
300	Public Information Activities	310 Elevation Certificates
		320 Map Information Service
		330 Outreach Projects
		340 Hazard Disclosure
		350 Flood Protection Information
		360 Flood Protection Assistance
		370 Flood Insurance Promotion
400 Series Overview: This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the Flood Insurance Rate Map (FIRM), preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing stormwater. The credit is adjusted to recognize impacts for growing communities.		
400	Mapping and Regulations	410 Flood Hazard Mapping
		420 Open Space Preservation
		430 Higher Regulatory Standards
		440 Flood Data Maintenance
		450 Stormwater Management
500 Series Overview: This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting flood-prone structures, and maintaining drainage systems.		
500	Flood Damage Reduction Activities	510 Floodplain Management Planning
		520 Acquisition and Relocation
		530 Flood Protection
		540 Drainage System Maintenance
600 Series Overview: This series provides credit for measures that protect life and property during a flood, through flood warning and response programs. There is credit for the maintenance of levees and for state regulatory programs for dams, as well as for programs that prepare for the potential failure of levees and dams.		
600	Warning and Response	610 Flood Warning and Response
		620 Levees
		630 Dams

Slide Notes

CRS Series, Category, and Activity Overview

The CRS is divided into four series of activities. Within each series, there are three to seven activities, for a total of 19 creditable activities. Each activity has one or more elements, which are the basic credit level for the CRS. Credit points are based upon the extent to which an element advances the three goals of CRS.

The environmentally related activities, and activities that contain an optional environmental element, are emphasized with bold, italicized font. Non-environmental activities associated with each series are also included here to provide context as to where the environmentally related activities occur in the CRS rating system. The remainder of this module will focus only on the environmentally-related activities.

Communities can pick which of the 19 activities they want to implement, with a few exceptions. The CRS program has identified specific prerequisites for communities seeking certain class types. While there is flexibility in picking from the 19 actions, some classes require that communities achieve credit for specific activities.

For example, under Section 310, as a prerequisite for achieving CRS Class 9, communities must develop a plan for managing floodplain-related construction certificates (including Elevation Certificates) within their communities and must maintain a 90% accuracy rate for those construction certificates each year.

To learn more about eligible activities, requirements for application, assistance resources, and specific requirements for becoming a Class 1-4 community (those receiving the most discounts) and a Class 6 community, refer to the 2017 National Flood Insurance Program: Community Rating System Coordinator's Manual or visit the CRS Resources website. To see if your community is already in the CRS program, and what its classification is, visit the current NFIP Flood Insurance Manual.

Slide Text

CRS Series, Category, and Activity Overview

CRS Organization: four series of activities, 3-7 activities per series

Activities with a direct or indirect connection to environmental elements and/or nature-based solutions are bolded.

300 Series Overview: This series credits programs that advise people about the flood hazard, encourage the purchase of flood insurance, and provide information about ways to reduce flood damage. These activities also generate data needed by insurance agents for accurate flood insurance rating. They generally serve all members of the community.

Series: 300, Category: Public Information Activities, Activity: 310 (Elevation Certificates), 320 (Map Information Service), 330 (Outreach Projects), 340 (Hazard Disclosure), 350 (Flood Protection Information), 360 (Flood Protection Assistance), 370 (Flood Insurance Promotion).

400 Series Overview: This series credits programs that provide increased protection to new development. These activities include mapping areas not shown on the Flood Insurance Rate Map (FIRM), preserving open space, protecting natural floodplain functions, enforcing higher regulatory standards, and managing stormwater. The credit is adjusted to recognize impacts for growing communities.

Series: 400, Category: Mapping and Regulations, Activity: 410 (Flood Hazard Mapping), 420 (Open Space Preservation), 430 (Higher Regulatory Standards), 440 (Flood Data Maintenance), 450 (Stormwater Management).

500 Series Overview: This series credits programs for areas in which existing development is at risk. Credit is provided for a comprehensive floodplain management plan, relocating or retrofitting flood-prone structures, and maintaining drainage systems.

Series: 500, Category: Flood Damage Reduction Activities, Activity: 510 (Floodplain Management Planning), 520 (Acquisition and Relocation), 530 (Flood Protection), 540 (Drainage System Maintenance)/

600 Series Overview: This series provides credit for measures that protect life and property during a flood, through flood warning and response programs. There is credit for the maintenance of levees and for state regulatory programs for sams, as well as for programs that prepare for the potential failure of levees and dams.

2021 Addendum to the 2017 CRS Coordinators Manual

- Under Activity 370 (Flood Insurance Promotion), credit for a flood insurance coverage plan (element CP) is increased, as is that for providing technical assistance (element TA). Three new elements are introduced:
 - providing credit for distributing flood insurance information (element FIB),
 - for holding insurance-related town hall meetings (element FIM), and;
 - for a state requirement for continuing education for flood insurance agents (element SCE).
- Under Activity 510 (Floodplain Management Planning), credit is made available for developing a floodplain species assessment in addition to, or as an alternative to, a natural functions plan (element NFP).
- A new creditable element is added under Activity 510 (Floodplain Management Planning) for communities that develop a plan for managing substantial damage properties within their jurisdictions (element SDP).
- Under Activity 610 (Flood Warning and Response), communities can receive credit for incorporating into their flood response operations plans specific measures for implementing substantial damage assessments after a flood (elements FRO2 and FRO5).



Slide Notes

2021 Addendum to the 2017 CRS Coordinators Manual

In addition to the activities listed on the previous slide, effective in the 2021 addendum to the 2017 CRS Coordinators Manual there are four new opportunities for communities to earn CRS credit, and two new prerequisites.

Under Activity 370 (Flood Insurance Promotion), credit for a flood insurance coverage plan (element CP) is increased, as is that for providing technical assistance (element TA). Three new elements are introduced: providing credit for distributing flood insurance information (element FIB), for holding insurance-related town hall meetings (element FIM), and; for a state requirement for continuing education for flood insurance agents (element SCE).

Under Activity 510 (Floodplain Management Planning), credit is made available for developing a floodplain species assessment in addition to, or as an alternative to, a natural functions plan (element NFP).

A new creditable element is added under Activity 510 (Floodplain Management Planning) for communities that develop a plan for managing substantial damage properties within their jurisdictions (element SDP).

Under Activity 610 (Flood Warning and Response), communities can receive credit for incorporating into their flood response operations plans specific measures for implementing substantial damage assessments after a flood (elements FRO2 and FRO5).

2021 Addendum to the 2017 CRS Coordinators Manual Contd.

- As a prerequisite to achieving CRS Class 9, communities must develop a plan for managing floodplain-related construction certificates (including Elevation Certificates) within their communities and must maintain each year a 90% accuracy rate for those construction certificates.
- As a prerequisite for achieving CRS Class 8, communities must adopt and enforce at least one foot of freeboard for residential buildings in all numbered zones of the Special Flood Hazard Area (SFHA).
- The CRS approach to crediting stormwater management regulations (element SMR) and watershed master plans (element WMP) under Activity 450 (Stormwater Management) is being modified with this Addendum.
- Beginning in 2021, the CRS focus is shifting from watershed-wide management to a focus on managing the area within the community's jurisdiction, i.e., what the community itself has authority to manage. This is reflected by some changes in terminology and by modifications to the impact adjustments for elements SMR and WMP.



Slide Notes

2021 Addendum to the 2017 CRS Coordinators Manual Continued

As a prerequisite to achieving CRS Class 9, communities must develop a plan for managing floodplain-related construction certificates (including Elevation Certificates) within their communities and must maintain each year a 90% accuracy rate for those construction certificates. As a prerequisite for achieving CRS Class 8, communities must adopt and enforce at least one foot of freeboard for residential buildings in all numbered zones of the Special Flood Hazard Area (SFHA).

The CRS approach to crediting stormwater management regulations (element SMR) and watershed master plans (element WMP) under Activity 450 (Stormwater Management) is being modified with this Addendum.

Beginning in 2021, the CRS focus is shifting from watershed-wide management to a focus on managing the area within the community's jurisdiction, i.e., what the community itself has authority to manage. This is reflected by some changes in terminology and by modifications to the impact adjustments for elements SMR and WMP.

Water Quality Planning

Source Water Protection Planning: protects public health by completing source water assessments for all public water systems to provide water utilities, community governments, and others with information needed to protect drinking water and minimize pollutants in drinking water sources.

Stormwater Management Planning for Municipal Separate Storm Sewer Systems (MS4s): prevents stormwater runoff from washing harmful pollutants into local surface waters by implementing basic NPDES permit requirements and other control measures for MS4 areas.

Watershed Management Planning: can address all water concerns through an integrated planning effort that controls quality and quantity. It can include nonpoint source pollution, wetlands mapping and protection, functional wetlands mapping designations, greenways and riparian protection buffers mapping, and restoring impaired waterways to meet state water quality standards. Watershed plans can also include information gathered from assessments already completed for source water protection and stormwater management planning.

Slide Notes

Water Quality Planning

These different types of water quality planning were introduced in Module 2 and follow processes that may align with hazard mitigation or CRS planning processes. The next slide lists the various activities that are eligible for different CRS credits and the type of water quality plan that the activity may align with or already be included in.

Source Water Protection Planning: protects public health by completing source water assessments for all public water systems to provide water utilities, community governments, and others with information needed to protect drinking water and minimize pollutants in drinking water sources.

Stormwater Management Planning for Municipal Separate Storm Sewer Systems (MS4s): prevents stormwater runoff from washing harmful pollutants into local surface waters by implementing basic NPDES permit requirements and other control measures for MS4 areas.

Watershed Management Planning: can address all water concerns through an integrated planning effort that controls quality and quantity. It can include nonpoint source pollution, wetlands mapping and protection, functional wetlands mapping designations, greenways and riparian protection buffers mapping, and restoring impaired waterways to meet state water quality standards. Watershed plans can also include information gathered from assessments already completed for source water protection and stormwater management planning.

CRS Activities and Potential Alignment with Water Quality Planning

Activity		Description ¹	Water Quality Planning Programs in Which CRS Activities Might Overlap ²
300 Public Information Activities			
320	Map Information Service	The OBJECTIVE of this activity is to provide inquirers with information about the local flood hazard and about flood-prone areas that need special protection because of their natural functions.	<ul style="list-style-type: none"> • Stormwater Management • Watershed Management (Includes Wetlands Protection)
330	Outreach Projects	The OBJECTIVE of this activity is to provide the public with information needed to increase flood hazard awareness and to motivate actions to reduce flood damage, encourage flood insurance coverage, and protect the natural functions of floodplains.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
350	Flood Protection Information	The OBJECTIVE of this activity is to provide the public with information about flood protection that is more detailed than that provided through outreach projects.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
400 Mapping and Regulations			
410	Flood Hazard Mapping	The OBJECTIVE of this activity is to improve the quality of the mapping that is used to identify and regulate development at risk from flood hazards.	<ul style="list-style-type: none"> • No direct overlap, but mapping information helpful in identifying source water hazards
420	Open Space Preservation	The OBJECTIVES of this activity are to (1) Prevent flood damage by keeping flood-prone lands free of development, and (2) protect and enhance the natural functions of floodplains.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
430	Higher Regulatory Standards	The OBJECTIVE of this activity is to credit regulations to protect existing and future development and natural floodplain functions that exceed the minimum criteria of the NFIP.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
440	Flood Data Maintenance	The OBJECTIVE of this activity is to make community floodplain data more accessible, current, useful, and/or accurate so that the information contributes to the improvement of local regulations, insurance rating, planning, disclosure, and property appraisals.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
450	Stormwater Management	The OBJECTIVE of this activity is to prevent future development from increasing flood hazards to existing development, to protecting existing hydrologic functions within the watershed, and to maintain and improve water quality.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management

Slide Notes

CRS Activities and Potential Alignment with Water Quality Planning

This slide provides an overview of CRS activities that credit water quality-related planning. The maximum credit can be earned when all elements within an activity are being implemented and all credit criteria are met. In some activities, maximum credit cannot be provided unless credit has been earned in other activities. For example, additional credit is provided in some activities if the community has adopted a Program for Public Information under Activity 330 (Outreach Projects).

Slide Text

CRS Activities and Potential Alignment with Water Quality Planning

300 Public Information Activities

Activity: 320 Map Information Service, Description: The OBJECTIVE of this activity is to provide inquiries with information about the local flood hazard and about flood-prone areas that need special protection because of their natural functions. Water Quality Planning Programs in Which CRS Activities Might Overlap: stormwater management, watershed management (includes wetlands protection).

Activity: 330, Description: The OBJECTIVE of this activity is to provide the public with information needed to increase flood hazard awareness and to motivate actions to reduce flood damage, encourage flood insurance coverage, and protect the natural functions of floodplains., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, watershed management.

Activity: 350 Flood Protection Information, Description: The OBJECTIVE of this activity is to provide the public with information about flood protection that is more detailed than that provided through outreach projects., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, watershed management.

400 Mapping and Regulations

Activity: 410 Flood Hazard Mapping, Description: The OBJECTIVE of this activity to improve the quality of the mapping that is used to identify and regulate development at risk from flood hazards., Water Quality Planning Programs in Which CRS Activities Might Overlap: no direct overlap, but mapping information helpful in identifying source water hazards.

Activity: 420 Open Space Preservation, Description: The OBJECTIVE of this activity is to improve the quality of the mapping that is used to identify and regulate development at risk from flood hazards., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, watershed management.

Activity: 430 Higher Regulatory Standards, Description: The OBJECTIVE of this activity is to credit regulations to protect existing and future development and natural floodplain functions that exceed the minimum criteria of the NFIP., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, watershed management.

Activity: 440 Flood Data Maintenance, Description: The OBJECTIVE of this activity is to make community floodplain data more accessible, current, useful, and/or accurate to that the information contributes to the improvement of local regulations, insurance rating, planning, disclosure, and property appraisals., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, and watershed management.

Activity 450 Stormwater Management, Description: The OBJECTIVE of this activity is to prevent future development from increasing flood hazards to existing development, to protecting existing hydrologic functions within the watershed, and to maintain and improve water quality., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, and watershed management.

CRS Activities and Potential Alignment with Water Quality Planning Contd.

Activity		Description ¹	Water Quality Planning Programs in Which CRS Activities Might Overlap ²
500 Flood Damage Reduction Activities			
510	Floodplain Management Planning	The OBJECTIVE of this activity is to credit the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of the hazard on the community and help meet other community needs.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management
520	Acquisition and Relocation	The OBJECTIVE of this activity is to encourage communities to acquire, relocate, or otherwise clear existing buildings out of the flood hazard area.	<ul style="list-style-type: none"> • Stormwater Management • Watershed Management
530	Flood Protection	The OBJECTIVE of this activity is to protect buildings from flood damage by (1) Retrofitting the buildings so that they suffer no or minimal damage when flooded, and/or (2) constructing small flood control projects that reduce the risk of flood waters' reaching the buildings.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management
540	Drainage System Maintenance	The OBJECTIVE of this activity is to ensure that the community keeps its streams, channels, and storage basins clear of debris so that their flood-carrying and storage capacity are maintained.	<ul style="list-style-type: none"> • Source Water Protection • Stormwater Management • Watershed Management

Slide Text

CRS Activities and Potential Alignment with Water Quality Planning Continued

500 Flood Damage Reduction Activities

Activity: 510 Floodplain Management Planning, Description: The OBJECTIVE of this activity is to credit the production of an overall strategy of programs, projects, and measures that will reduce the adverse impact of the hazard on the community and help meet other community needs., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management.

Activity: 520 Acquisition and Relocation, Description: The OBJECTIVE of this activity is to encourage communities to acquire, relocate, or otherwise clear existing buildings out of the flood hazard area., Water Quality Planning Programs in Which CRS Activities Might Overlap: stormwater management, watershed management.

Activity: 530 Flood Protection, Description: The OBJECTIVE of this activity is to protect buildings from flood damage by (1) Retrofitting the buildings so that they suffer no or minimal damage when flooded, and/or (2) constructing small flood control projects that reduce the risk of flood waters reaching the buildings., Water Quality Planning Programs in Which CRS Activities Might Overlap: source water protection, stormwater management, watershed management.

Example Elements with Dual Benefits for Water Quality Planning and Earning of CRS Credits

Activity	Element #	Element Name	Element Description Aspect with Dual Benefit
330 Outreach Projects	332.a	Outreach projects	Training included under outreach requirements for MS4s, nonpoint source 319-related training, or drinking watershed protection or water restoration outreach
350 Flood Protection Information	352.c	Flood protection website	Posting information that jurisdictions prohibit stream dumping, or water quality initiatives under the MS4 permit, Source Water Protection Area, Resource Protection Areas, etc.
420 Open Space Preservation (OSP)	422.c	Natural functions open space	OSP-credited parcels that are preserved in or restored to their natural state
	422.f	Open space incentives	Local requirements and incentives that keep flood-prone portions of new development open
	422.h	Natural shoreline protection	Programs that protect natural channels and shorelines
430 Higher Regulatory Standards	432.a	Development limitations	Prohibiting fill, buildings, and/or storage of hazardous materials in the Special Flood Hazard Area (SFHA, i.e. 100-year floodplain) prevents damages, preserves water quality and protects habitat
440 Flood Data Maintenance	442.a	Additional map data	Other overlays or data bases used for regulation or mitigation programs and for areas with natural floodplain functions (e.g., wetlands, designated riparian habitat)
450 Stormwater Management	452.a	Stormwater management regulations	Regulating development on a case-by-case basis to ensure that the peak flow of stormwater runoff from each site will not exceed the pre-development runoff
	452.b	Watershed master plan	Having a comprehensive watershed-based plan to deal with the impacts of development and redevelopment on the frequency and volume of flows throughout the watershed.
	452.c	Erosion and sedimentation control regulations	Regulations to minimize erosion from land disturbed during construction, reduce stormwater pollution
	452.d	Water quality regulations	Regulations that improve the quality of stormwater runoff and reduce flooding
510 Floodplain Management Planning	512.a	Floodplain management planning	A community-wide floodplain management plan that follows a 10-step planning process, incorporates other relevant plans, and ensures all possible mitigation measures are considered
	512.c	Natural floodplain functions plan	Adopting plans that protect one or more natural functions within the community's Special Flood Hazard Area (i.e. the 100-year floodplain)

Slide Notes

Example Elements with Dual Benefits for Water Quality Planning and Earning of CRS Credits

As described previously, CRS activities are made up of different elements that earn credit. A few examples of elements that have dual benefits for water quality planning and earning CRS credits are provided in this table. Some of these CRS activities don't directly have a water quality planning component, such as outreach on flood hazards, but rather provide a forum for combining outreach messaging, such as how flood hazards include water pollution risks and how periodic flooding- instead of creating hazards-should naturally create and augment aquatic and wetland habitat wherever feasible.

Communities should look for their own opportunities to leverage efforts undertaken for both flooding and water quality (which often involves managing water quantity). Such leveraging can accelerate or expand local water quality programs and/or allow communities to earn CRS credits and reduce insurance premiums.

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Activity: 330 Outreach Projects, Element #: 332.a, Element Name: Outreach projects, Element Description Aspect with Dual Benefit: Training included under outreach requirements for MS4s, nonpoint source 319-related training, or drinking watershed protection or water restoration outreach.

Activity: 350 Flood P, Element #: 352.c, Element Name: Flood protection website, Element Description Aspect with Dual Benefit: Posting information that jurisdictions prohibit stream dumping, or water quality initiatives under the MS4 permit, Source Water Protection Area, Resource Protection Areas, etc.

Activity: 420 Open Space Preservation (OSP), Element #: 422.c, Element Name: Natural functions open space, Element Description Aspect with Dual Benefit: OSP-credited parcels that are preserved in or restored to their natural state.

Activity: 420 Open Space Preservation (OSP), Element #: 422.f, Element Name: Open space incentives, Element Description Aspect with Dual Benefit: Local requirements and incentive that keep flood-prone portions of new development open.

Activity: 420 Open Space Preservation (OSP), Element #: 422.h, Element Name: Natural shoreline protection, Element Description Aspect with Dual Benefit: Programs that protect natural channels and shorelines.

Activity: 430 Higher Regulatory Standards, Element #: 432.a, Element Name: Development limitations, Element Description Aspect with Dual Benefit: prohibiting fill, buildings, and/or storage of hazardous materials in the Special Flood Hazard Area (SFHA, i.e. 100-year floodplain) prevents damages, preserves water quality and protects habitat.

Activity: 440 Flood Data Maintenance, Element #: 442.a, Element Name: Additional map data, Element Description Aspect with Dual Benefit: Other overlays or data bases used for regulation or mitigation programs and for areas with natural floodplain functions (e.g., wetlands, designated riparian habitat).

Activity: 450 Stormwater Management, Element #: 452.a, Element Name: Stormwater management regulations, Element Description Aspect with Dual Benefit: Regulating development on a case-by-case basis to ensure that the peak flow of stormwater runoff from each site will not exceed the pre-development runoff.

Activity: 450 Stormwater Management, Element #: 452.b, Element Name: Watershed master plan, Element Description Aspect with Dual Benefit: Having a comprehensive watershed-based plan to deal with the impacts of development and redevelopment on the frequency and volume of flows throughout the watershed.

Activity: 450 Stormwater Management, Element #: 452.c, Element Name: Erosion and sedimentation control regulations, Element Description Aspect with Dual Benefit: Regulations to minimize erosion from land disturbed during construction, reduce stormwater pollution.

Activity: 450 Stormwater Management, Element #: 452.d, Element Name Water quality regulations, Element Description Aspect with Dual Benefit: Regulations that improve the quality of stormwater runoff and reduce flooding.

Activity: 510 Floodplain Management Planning, Element #: 512.a, Element Name: Floodplain management planning, Element Description Aspect with Dual Benefit: A community-wide floodplain management plan that follows a 10-step planning process, incorporates other relevant plants, and ensures all possible mitigation measures are considered.

Activity: 510 Floodplain Management Planning, Element #: 512.c, Element Name: Natural floodplain functions plan, Element Description Aspect with Dual Benefit: Adopting plans that protect one or more natural functions within the community's Special Flood Hazard Area (i.e. the 100-year floodplain).

Example Elements with Dual Benefits for Water Quality Planning and Earning of CRS Credits Contd.

Activity	Element #	Element Name	Element Description Aspect with Dual Benefit
540 Drainage System Maintenance	542.a	Channel debris removal	Inspecting natural channels annually on public and private property and removing debris as appropriate. (This could be a community's best opportunity to fund a regular stream inspection program.)
	542.b	Problem site maintenance	Paying special attention to known problem flooding sites, such as those needing more frequent inspections
	542.c	Capital improvement program	Having a capital improvement program that corrects drainage problems
	542.d	Stream dumping regulations	If the community has and publicizes regulations and provides enforcement prohibiting dumping of trash in streams, canals, and ditches and it applies throughout the entire community
	542.e	Storage basin maintenance	Annually inspecting public and private storage basins and performing the required maintenance. (This could be a community's best opportunity to fund a regular stormwater basin inspection program.)



Slide Notes

Example Elements with Dual Benefits for Water Quality Planning and Earning of CRS Credits Continued.

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Example Elements with Dual Benefits for Water Quality Planning and Earning of CRS Credits Contd.

Activity: 540 Drainage System Maintenance, Element #: 542.a, Element Name: Channel debris removal, Element Description Aspect with Dual Benefits: Inspecting natural channels annually on public and private property and removing debris as appropriate. (This could be a community's best opportunity to fund a regular stream inspection program.)

Activity: 540 Drainage System Maintenance, Element #: 542.b, Element Name: Problem site maintenance, Element Description Aspect with Dual Benefits: Playing special attention to known problem flooding sites, such as those needing more frequent inspections.

Activity: 540 Drainage System Maintenance, Element #: 542.c, Element Name: Capital improvement program, Element Description Aspect with Dual Benefits: Having a capital improvement program that corrects drainage problems.

Activity: 540 Drainage System Maintenance, Element #: 542.d, Element Name: Steam dumping regulations, Element Description Aspect with Dual Benefits: If the community has and publicizes regulations and provides enforcement prohibiting dumping of trash in streams, canals, and ditches and it applies throughout the entire community.

Activity: 540 Drainage System Maintenance, Element #: 542.e, Element Name: Storage basin maintenance, Element Description Aspect with Dual Benefits: Annually inspecting public and private storage basins and performing the required maintenance. (This could be a community's best opportunity to fund a regular stormwater basin inspection program.)

Is CRS Participation Relevant for Your Community?

Considerations for Joining the CRS Program

Step 1: Does Your Community Have Significant Flood Risk?

Step 2: Is Your Community a Member of the NFIP?

Step 3: Does Your Community Have the Capacity to Maintain/Document a CRS Program?

Step 4: Is Your Community in Full Compliance and Good Standing with the Minimum Requirements of the NFIP?

Step 5: Is There Political Support for the CRS Program in Your Community?



Slide Notes

Is CRS Participation Relevant for Your Community?

The CRS is a beneficial program for many, but it does not work for every community. The following slides illustrate a decision flow chart of the five key steps that a community should consider before making a commitment to the CRS program.

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Considerations for Joining the CRS Program

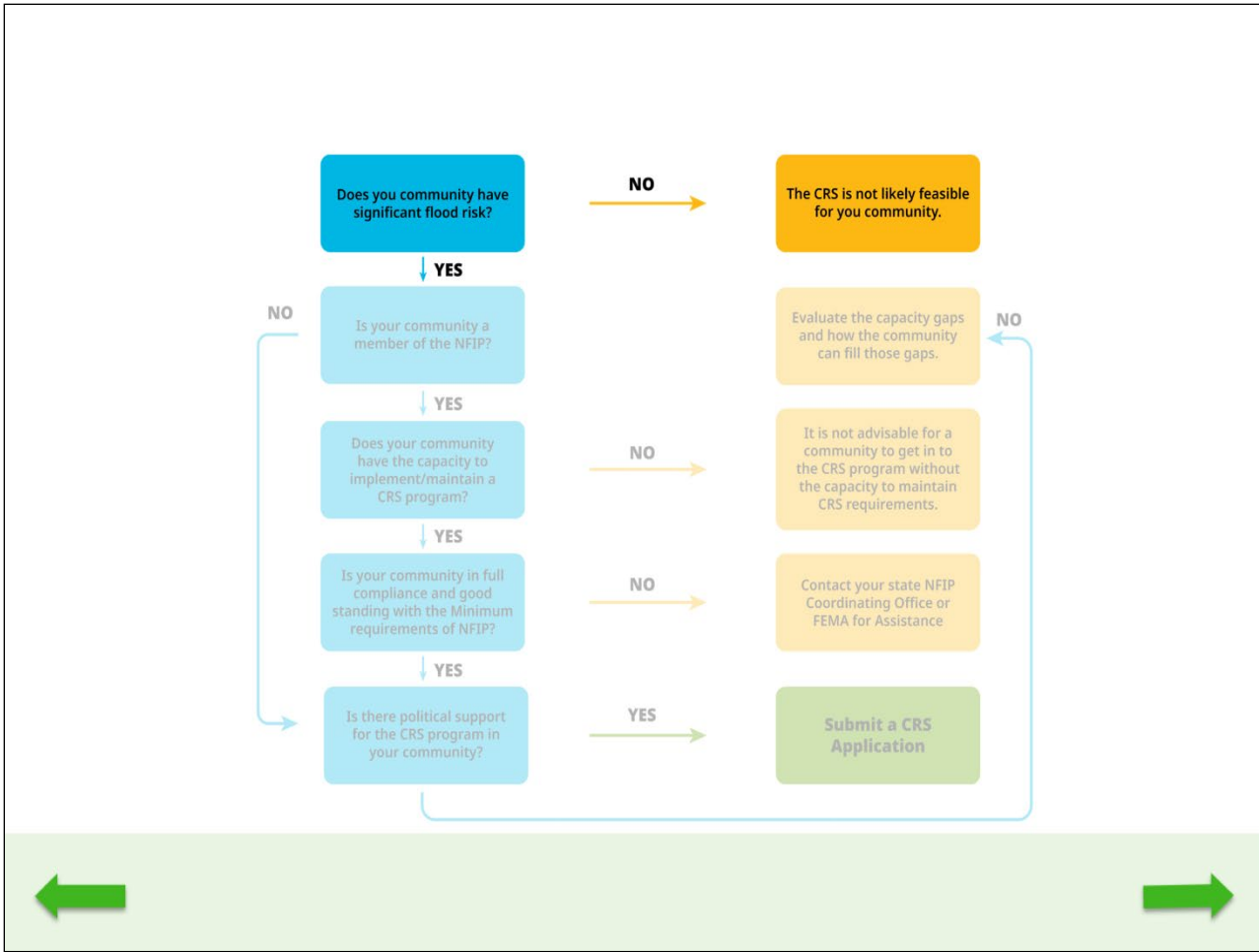
Step 1: Does Your Community Have Significant Flood Risk?

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Slide Notes

Step 1: Does Your Community Have Significant Flood Risk?

The first step in assessing the potential for mutual planning benefits is determining local flood risk. All communities have some level of flood risk, but the degree to which your community may be susceptible to flood damage is important to understand. This can be analyzed in numerous ways.

First, are there flood insurance policies in force in your community? Since the primary economic benefit of the CRS program is reductions to flood insurance premiums, it makes sense that this is a primary driver for participation in the CRS program. But more importantly, a community should ask itself, why do we have flood insurance policies in our community? The answer relates to risk. Either flooding has occurred, which resulted in people taking measures to protect their property, or hazard mapping has identified certain properties as being at risk, which triggered facets of the NFIP.

Next, a community should assess its exposure to flooding. A community should ask how many insurable structures does the community have in a mapped or identified flood hazard area? To answer this question, a community should look at what percentage of the community’s total building stock is exposed to a flood hazard.

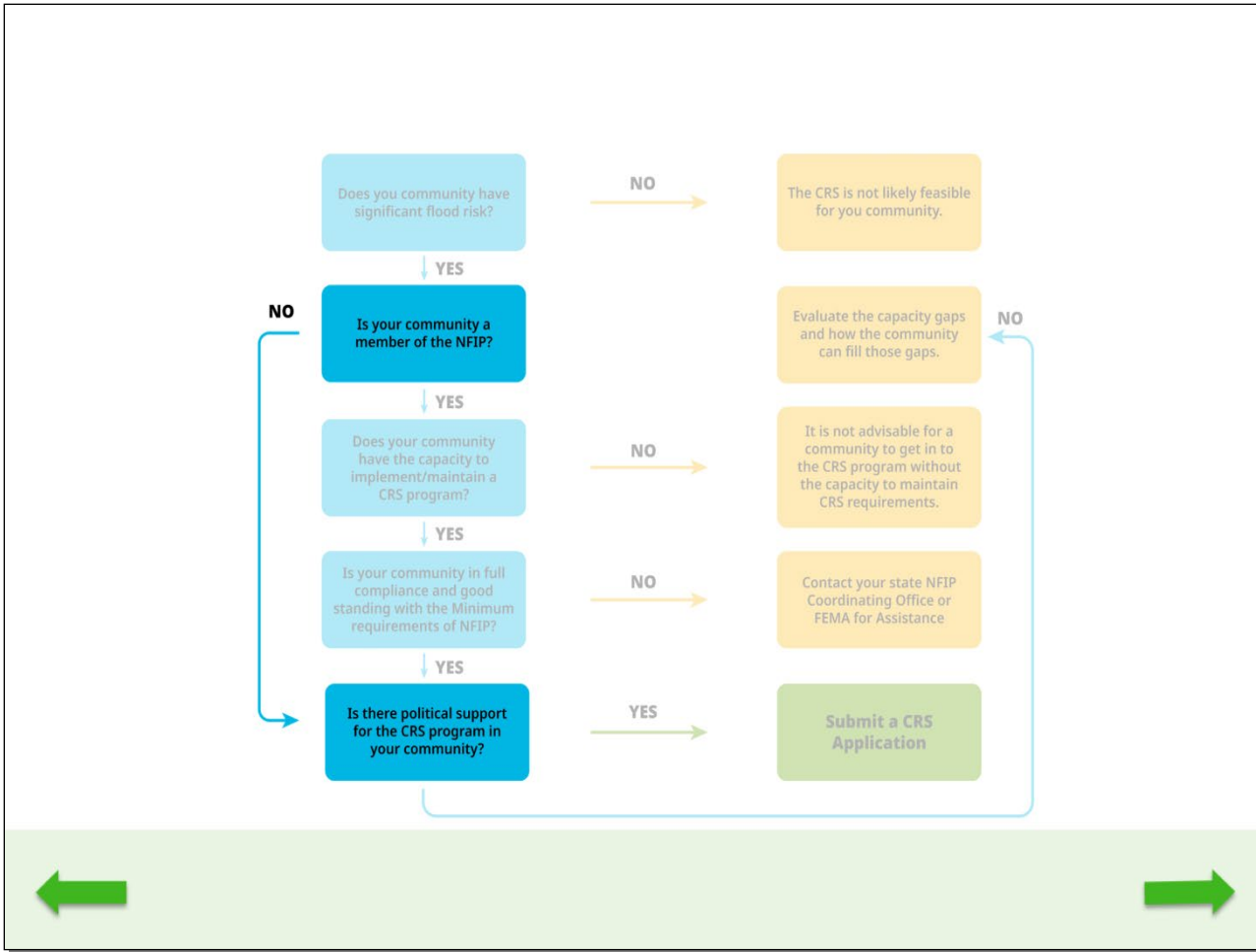
Generally, if 15 percent of a community's building stock is exposed to a hazard, that risk is considered high. However, a community could have an exposure level that is less than the 15 percent threshold but have significant flood risk due to the economic or cultural significance of the properties at risk, or because the properties at risk include critical facilities.

Understanding these subtler aspects of flood risk is necessary for a community to be an informed participant in the CRS program.

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Step 1: Does Your Community Have Significant Flood Risk?

- No: The CRS program is not likely feasible for your community.



Slide Notes

Step 2: Does Your Community Have a Defined Floodplain Management Program?

To succeed in the CRS program, floodplain management should be programmatic and deeply entrenched in a community’s administrative procedures. Programmatic means that policy is firmly established by written and enforced administrative procedures that implement the code or ordinance. It also implies consistency, regardless of who is administering the program. This aspect of the program provides an important nexus for considering water program activities that may affect flooding.

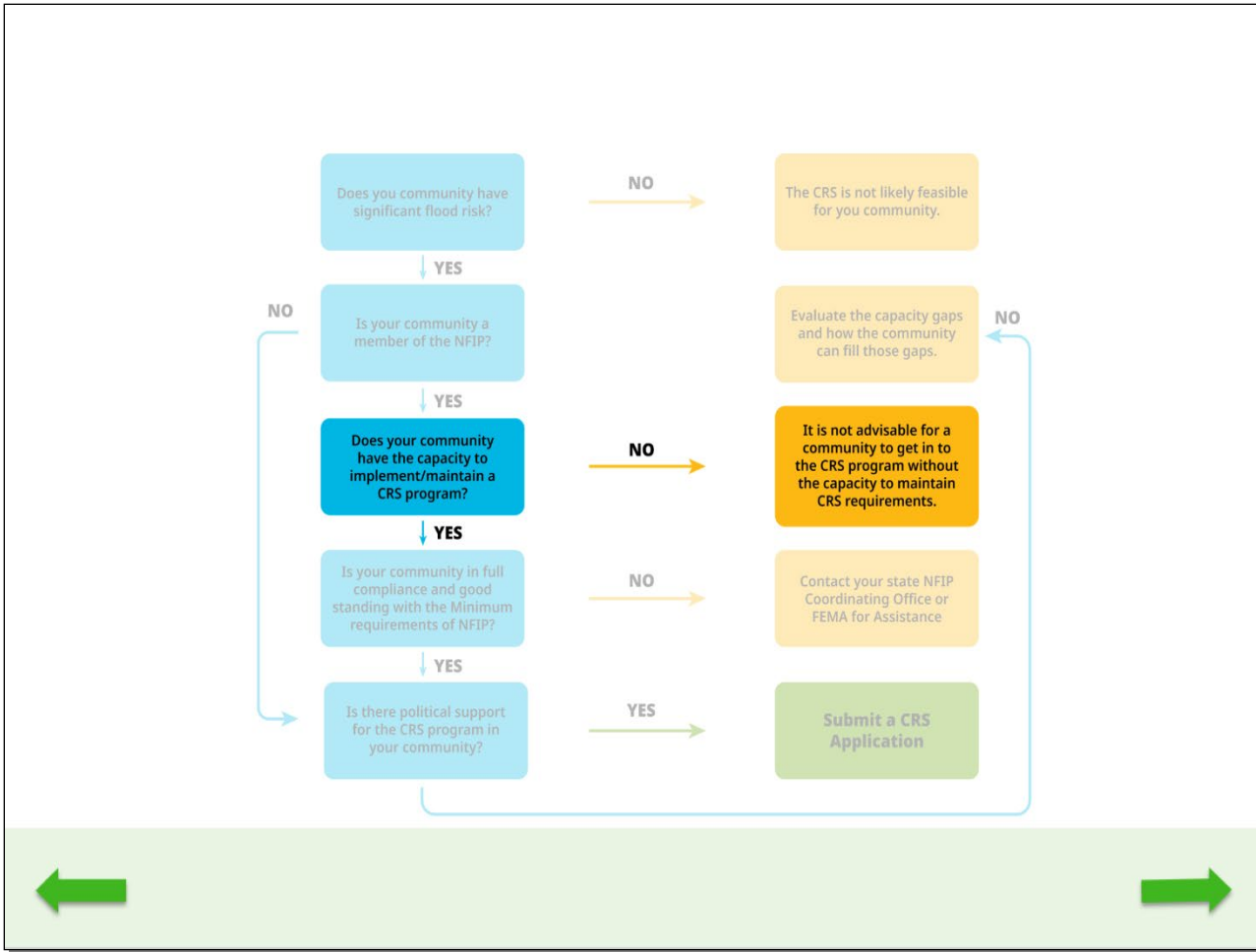
Any community that participates in the NFIP must adopt a flood damage prevention ordinance that designates a floodplain administrator. This may lead one to believe that all communities that participate in the NFIP would have programmatic floodplain management programs, but that is not always the case. Many community officials don’t know who their floodplain administrator is, which means their program is not programmatic.

This is important to CRS eligibility because the level of programmatic administration is a documentation requirement for credited activities under the CRS program and it is a key component to a community’s ability to maintain its compliance and good standing under the NFIP.

Slide Text

Is your community a member of the NFIP?

- No: Is there political support for the CRS program in your community?



Slide Notes

Step 3: Does Your Community Have the Capacity to Implement/Maintain a CRS Program?

The CRS program is performance-based, meaning that credit for CRS activities are contingent upon a community’s ability to document performance of a creditable activity. For example, a community may receive credit for conducting an outreach project targeted to all residents who live in the floodplain. The ability of the community to maintain that credit is contingent upon the community being able to document that the content of the outreach project was disseminated at least annually during a 3-5-year performance period, depending on the CRS classification.

So, while programmatic floodplain management is important, the capacity to maintain and document the implementation of that program is equally important. Again, there are opportunities for coordination between flood management and water quality programs and may result in mutually supportive activities.

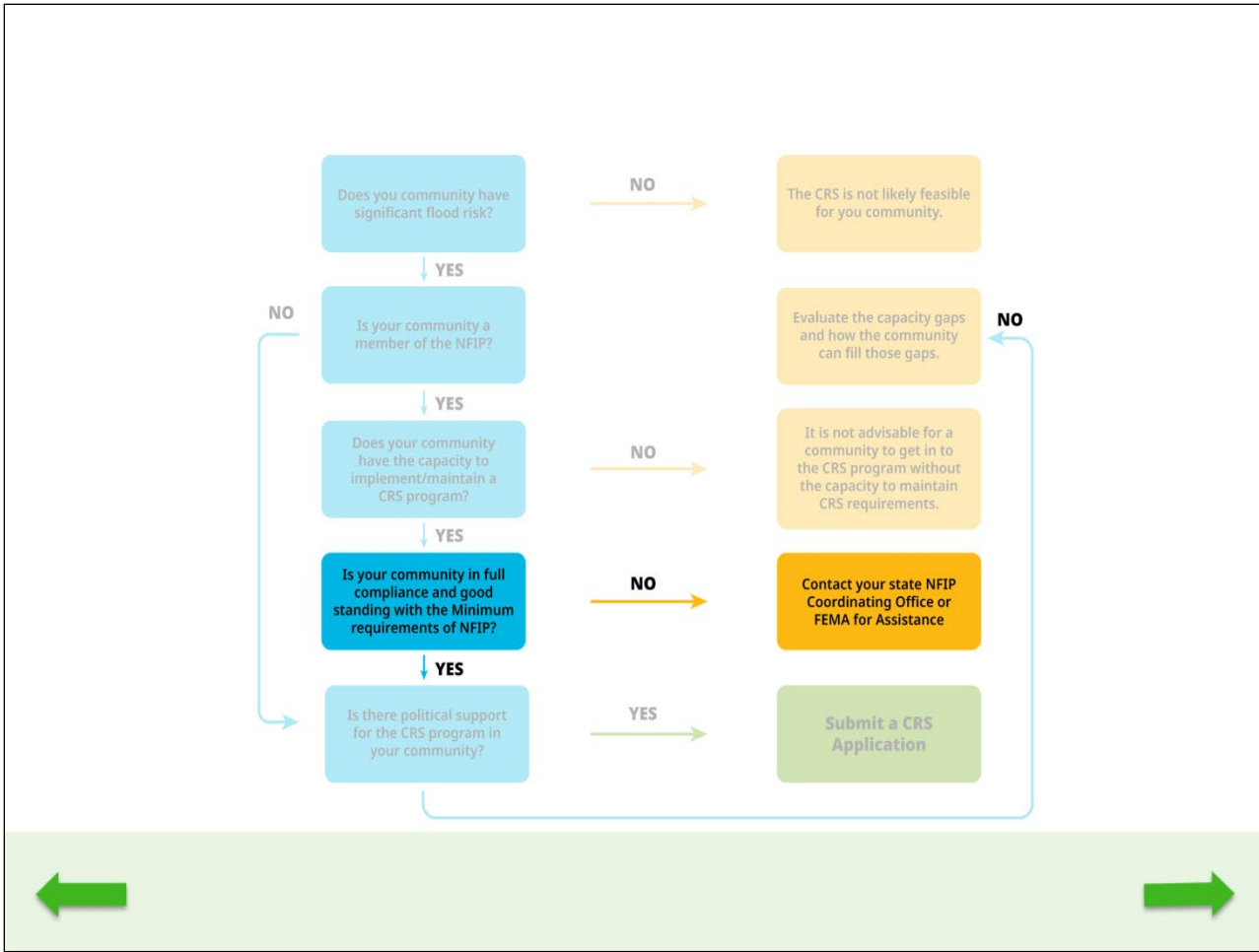
While considering participation in the CRS program, a community should ask, who will coordinate the CRS program and what resources will they need to accomplish that? The higher the CRS classification, the higher the demands on a community’s floodplain management program to document performance for continued CRS credit. Communities can often create programmatic elements just for CRS purposes. It is important to note that the CRS is a program that only credits higher standards, meaning that its credit criteria exceed standard NFIP minimum standards that are typically used at a local level.

Any other elements apart from the Class 9 prerequisites should be considered part because they are beneficial to the community. The prerequisites are targeted to ensure the development of well-rounded comprehensive programs. Understanding this should guide a community in asking if they have the capacity to implement and maintain a CRS program.

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Does your community have the capacity to implement/maintain a CRS program?

- No: It is not advisable for a community to get in to the CRS program without the capacity to maintain CRS requirements.



Slide Notes

Step 4: Is Your Community in Full Compliance and Good Standing with the Minimum Requirements of the NFIP?

To be eligible to participate in the CRS program, a community must be in full compliance with the minimum requirements of the NFIP. There must be correspondence from the Regional FEMA Office stating that the community is in full compliance, and this correspondence must have been sent within six months of the initial CRS verification visit.

The FEMA Regional Office or State NFIP Coordinator may need to conduct a Community Assistance Visit (CAV) if neither has been in the community recently. Additionally, a Letter of Good Standing dated within 6 months of the CRS application is required. If a community is determined at any time to be in less-than-full compliance, it will revert by default to a CRS Class 10, the lowest classification.

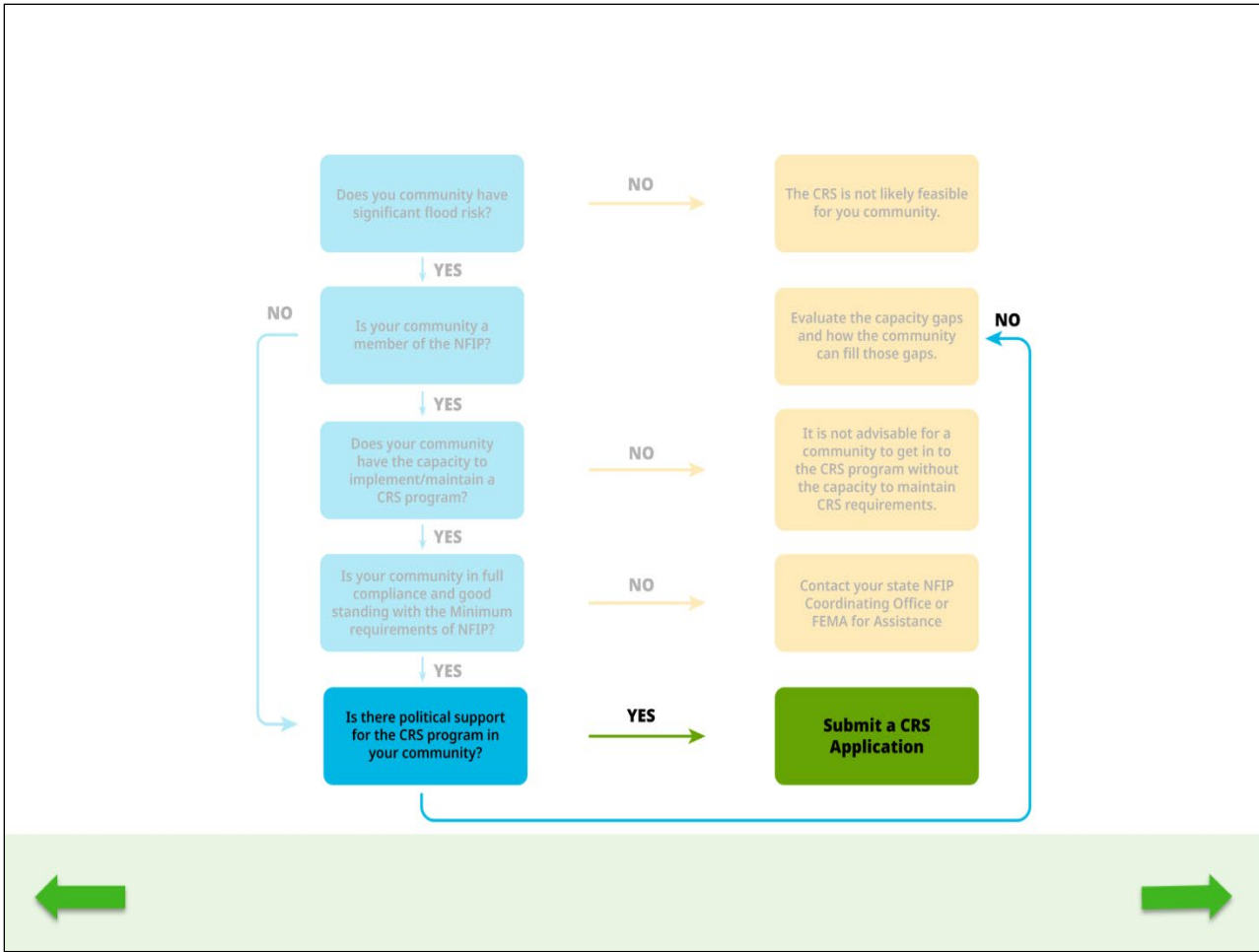
If you do not know the compliance status of your community, contact your State NFIP Coordinating Office. Please be advised that your community will likely need a CAV prior to being allowed to participate in the CRS program. The purpose of the CAV is to ensure that the community is meeting their minimum obligations under the NFIP.

This is a helpful requirement because if any issues are identified, you can find out early in the process that your community is not ready for participation in the CRS. Additionally, this process can provide the resources to help you address any deficiencies and position you to succeed in the CRS program.

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Is your community in full compliance and good standing with the Minimum requirements of the NFIP?

- No: Contact your State NFIP Coordinating Office or FEMA for Assistance.



Slide Notes

Step 5: Is There Political Support for the CRS Program in Your Community?

This step is likely the most important caveat to consider in getting into the CRS program. Every application, modification, or recertification process in the CRS program must be authorized by a community’s chief executive officer. If a community’s floodplain management program is not fully endorsed and supported by senior elected officials, it is not likely that the community is a candidate for the CRS program. Local officials are usually very supportive of programs like the CRS because it allows them to pass on direct benefits in the form of insurance premium reductions to their constituents.

Because CRS discussions often begin at the political level, it is important that all components of government are aware of the CRS program requirements and resource commitments. Floodplain administrators should clearly communicate the resource needs to senior managers, who should be prepared to provide the resources needed. There should always be an open and continuous line of communication between all parties.

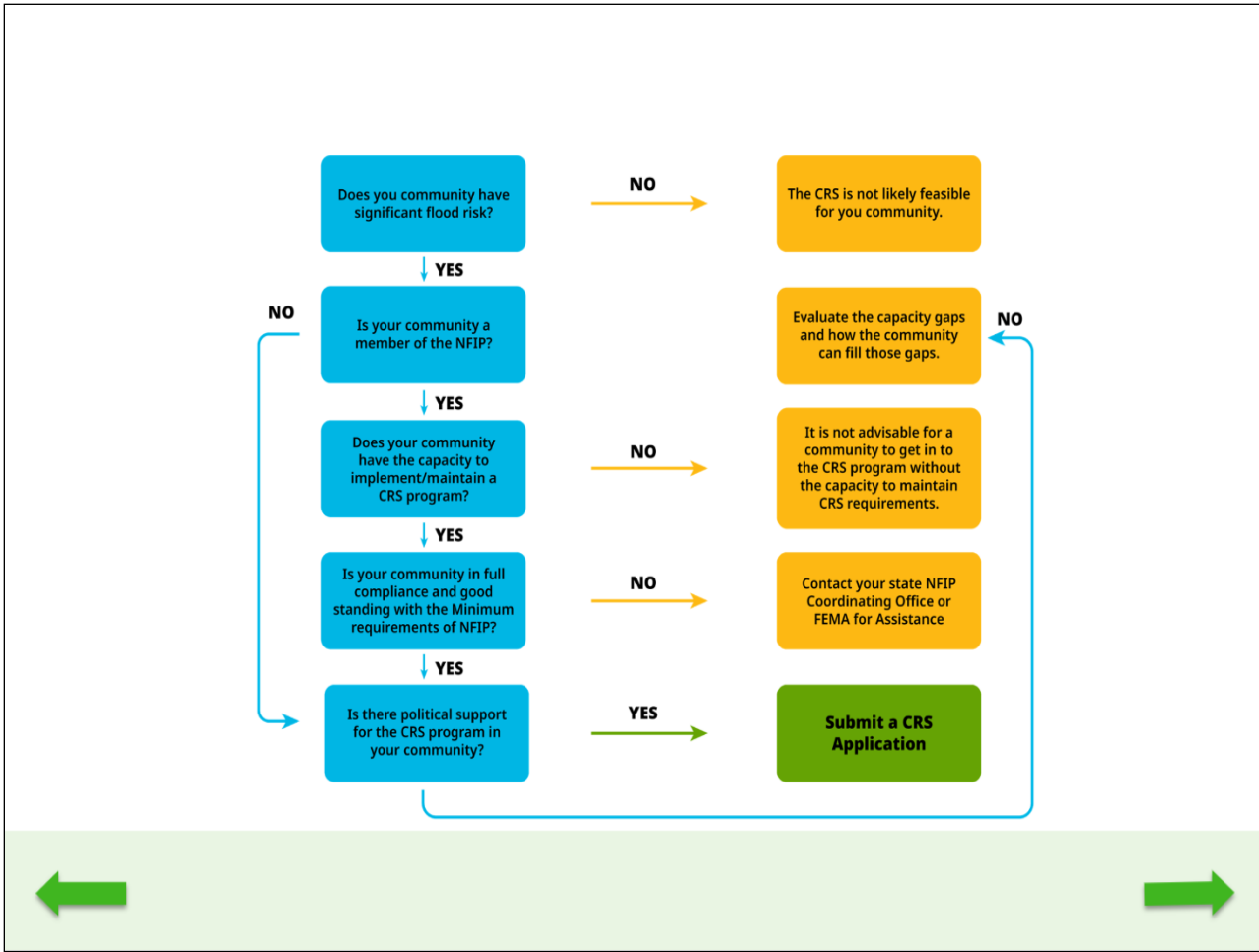
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Step 5: Is There Political Support for the CRS Program in Your Community?

- Yes: Contact your State NFIP Coordinating Office or FEMA for Assistance.

Submit a CRS Application

- No: Evaluate the capacity gaps and how the community can fill those gaps.



Slide Notes

If, after following this decision chart, a community determines they may be interested in submitting a CRS application, they should also be aware that they must meet both of the following requirements:

1. The community is eligible for at least 500 points (enough to become a Class 9)
2. The community can meet all Class 9 prerequisites under Addendum 2021

More information on CRS eligibility and the application process can be found on FEMA's CRS resources page.

Slide Text

Does your community have significant flood risk?

- Yes: Is your community a member of the NFIP?
- No: The CRS program is not likely feasible for your community.

Is your community a member of the NFIP?

- Yes: Does your community have the capacity to implement/maintain a CRS program?
- No: Is there political support for the CRS program in your community?

Does your community have the capacity to implement/maintain a CRS program?

- Yes: Is your community in full compliance and good standing with the Minimum requirements of the NFIP?
- No: It is not advisable for a community to get in to the CRS program without the capacity to maintain CRS requirements.

Is your community in full compliance and good standing with the Minimum requirements of the NFIP?

- Yes: Is there political support for the CRS program in your community?
- No: Contact your State NFIP Coordinating Office or FEMA for Assistance.

Is there political support for the CRS program in your community?

- Yes: Submit a CRS Application
- No: Evaluate the capacity gaps and how the community can fill those gaps.

Successfully Engaging with Local CRS Coordinators

- Understand where CRS credits may come from
- Integration of CRS with other, existing programs is a strategy for identifying CRS-creditable activities that a community may already be doing
- Questions to identify potential opportunities for program integration
 - Do I have water quality programs (e.g., stormwater, TMDLs, source water protection)?
 - Do I have a hazard mitigation program?
 - How can those programs be leveraged to support success in the CRS program?
 - How can CRS program guidance help me to improve these program capabilities?
- [Crosswalk of CRS activities](#) that may coordinate with source water protection, stormwater management, and watershed planning and management programs

Source: Goran Safarek <https://medwet.org/2017/02/floodplains-and-flooding-risk-prevention/>

Slide Notes

Successfully Engaging with Local CRS Coordinators

To succeed in the CRS program, it is imperative that a community has a thorough understanding of where its CRS credit is coming from, or more importantly, where its CRS credit can come from. Many communities implement programs that can be creditable under CRS, but don't know that these programs can be credited. The fundamental principle of integration is to have a sound understanding of the programs to be integrated. The CRS program is a great platform for integrating a variety of programs with mutual or overlapping activities.

The tables linked in this slide provide a crosswalk of CRS activities with major activities for source water protection, stormwater management, and watershed planning and management. The tables expand upon information provided in this module and describe individual steps of various water quality planning efforts, cross walking those with applicable CRS credits.

Use these tables to see how to leverage water quality planning activities into CRS credits and if you are a water quality professional, reach out to your floodplain management office with this information. This will help professionals integrate water quality planning and hazard mitigation planning, through the elements of the CRS program.

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Successfully Engaging with Local CRS Coordinators

Understand where CRS credits may come from

Integration of CRS with other, existing programs is a strategy for identifying CRS-creditable activities that a community may already be doing

Questions to identify potential opportunities for program integration

- Do I have water quality programs (e.g., stormwater, TMDLs, source water protection)?
- Do I have a hazard mitigation program?
- How can those programs be leveraged to support success in the CRS program?
- How can CRS program guidance help me to improve these program capabilities?

[Crosswalk of CRS activities](#) that may coordinate with source water protection, stormwater management, and watershed planning and management programs

Source: Goran Safarek <https://medwet.org/2017/02/floodplains-and-flooding-risk-prevention/>

Additional Federal Funding Opportunities for Nature-Based Solutions

Agency	Program
NOAA	<i>Community-based Restoration Program:</i> Funds habitat-based coastal and marine restoration projects. Projects include wetland reconnection, coral reef restoration, and shellfish habitat restoration.
	<i>National Coastal Resilience Fund:</i> Funds natural infrastructure that protects coastal areas from extreme weather and flood events. Projects include programmatic planning/capacity building as well as on-the-ground work like living shoreline construction, floodplain-habitat restoration design, marsh and wetland habitat restoration, and natural channel design.
HUD	<i>Community Development Block Grant (CDBG) Program:</i> Supports areas in rebuilding housing and infrastructure following a presidentially-declared disaster. Includes the CDBG-Mitigation funds, which can be used for activities that mitigation future disasters. CDBG-Mitigation projects include administrative projects aimed at reducing barriers to nature-based solution implementation.

[This document](#) provides more information on federal and non-federal funding and financing strategies for nature-based solution driven resilience projects



Slide Notes

Additional Federal Funding Opportunities for Nature-Based Solutions

In addition to the FEMA programs covered in this module, other federal programs are available to support NBS/GI based resilience efforts. A few of these programs include: the NOAA Community-based Restoration Program, the NOAA National Coastal Resilience Fund, and the HUD Community Development Block Grant (CDBG) Program.

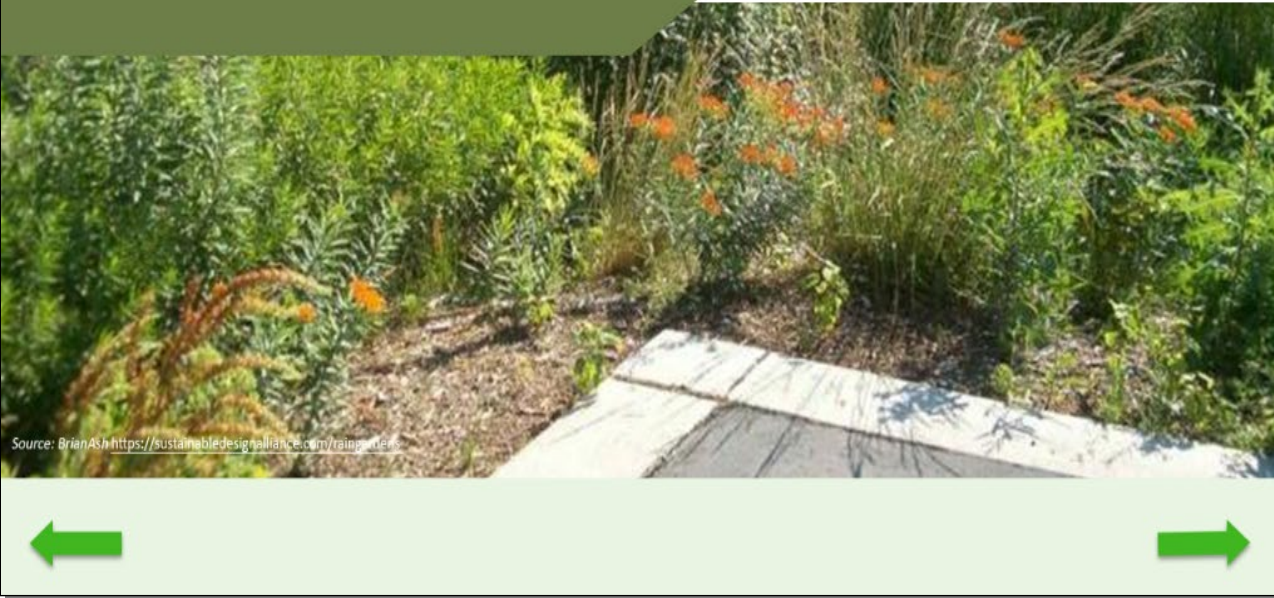
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Additional Federal Funding Opportunities for Nature-Based Solutions

Agency: NOAA, Program: Community-based Restoration Program: Funds habitat-based coastal and marine restoration projects. Projects include wetland reconnection, coral reef restoration, and shellfish habitat restoration. Also, National Coastal Resilience Fund: Funds natural infrastructure that protects coastal areas from extreme weather and flood events. Projects include programmatic planning/capacity building as well as on-the-ground work like living shoreline construction, floodplain-habitat restoration design, marsh and wetland habitat restoration, and natural channel design.

HUD: Community Development Block Grant (CDBG) Program: Supports areas in rebuilding housing and infrastructure following a presidentially-declared disaster. Includes the CDBG-Mitigation funds, which can be used for activities that mitigation future disasters. CDBG-Mitigation projects include administrative projects aimed at reducing barriers to nature-based solution implementation.

*Module 4: Overview of EPA/FEMA
Pilot Projects and Lessons Learned*



Slide Notes

Module 4: Overview of EPA/FEMA Pilot Projects and Lessons Learned

Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>

Module Three Recap:

- Introduce the Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs.
- Describe how both programs may align with water quality program goals through the use of nature-based practices.
- Outline the benefits and incentives for communities to apply for/participate in these programs.
- Understand program eligibility and provide examples of how water quality planning and practices may achieve BRIC and CRS goals.

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

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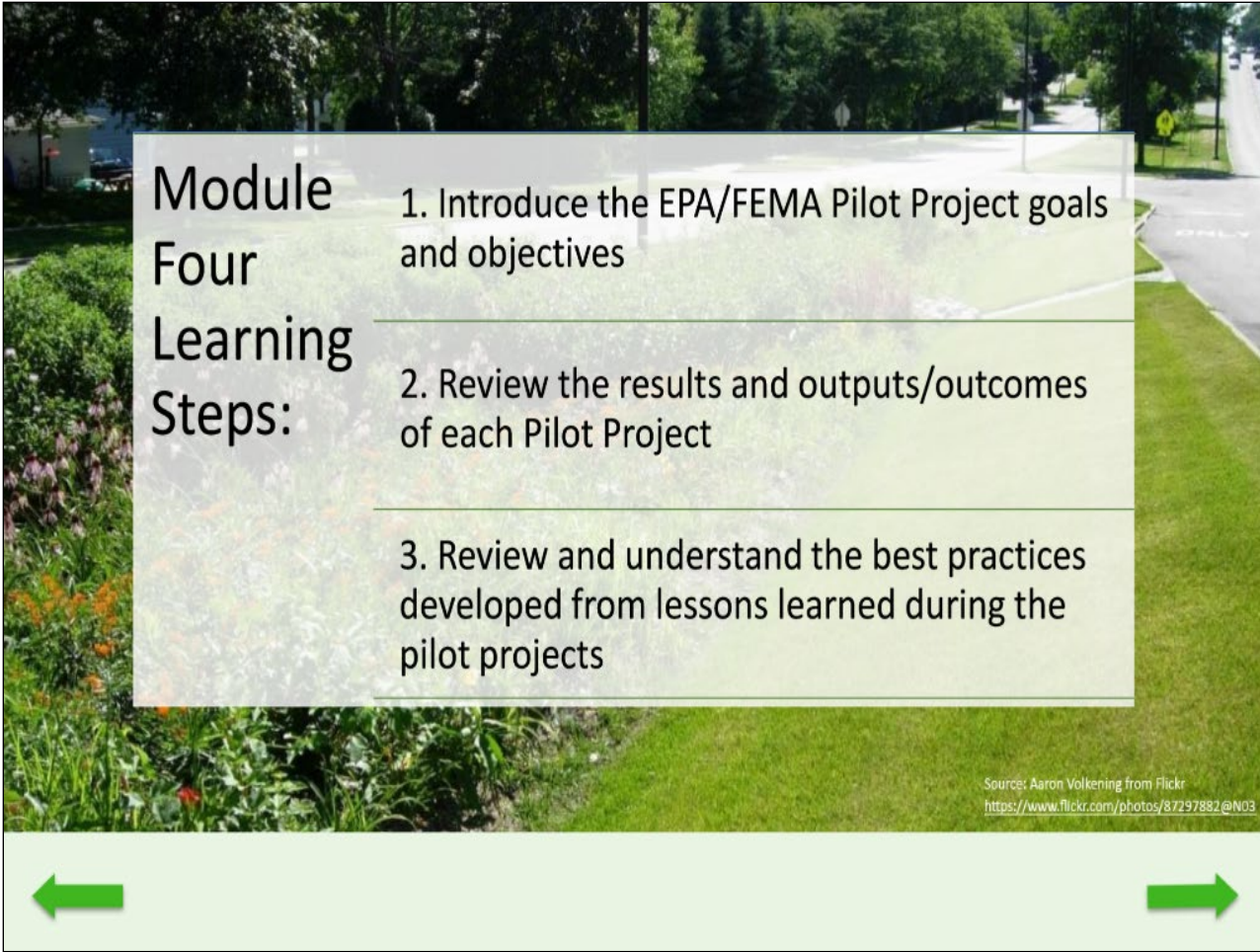
Module Three Recap

Module Three of this training covered FEMA's Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs. Module three also described how water quality program goals may align with BRIC and CRS objectives through nature-based solutions.

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Module Three Recap: Introduce the Building Resilient Infrastructure and Communities (BRIC), and Community Rating System (CRS) programs. Describe how both programs may align with water quality program goals through the use of nature-based practices. Outline the benefits and incentives for communities to apply for/participate in these programs. Understand program eligibility and provide examples of how water quality planning and practices may achieve BRIC and CRS goals.

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Module Four Learning Steps:

1. Introduce the EPA/FEMA Pilot Project goals and objectives
2. Review the results and outputs/outcomes of each Pilot Project
3. Review and understand the best practices developed from lessons learned during the pilot projects

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

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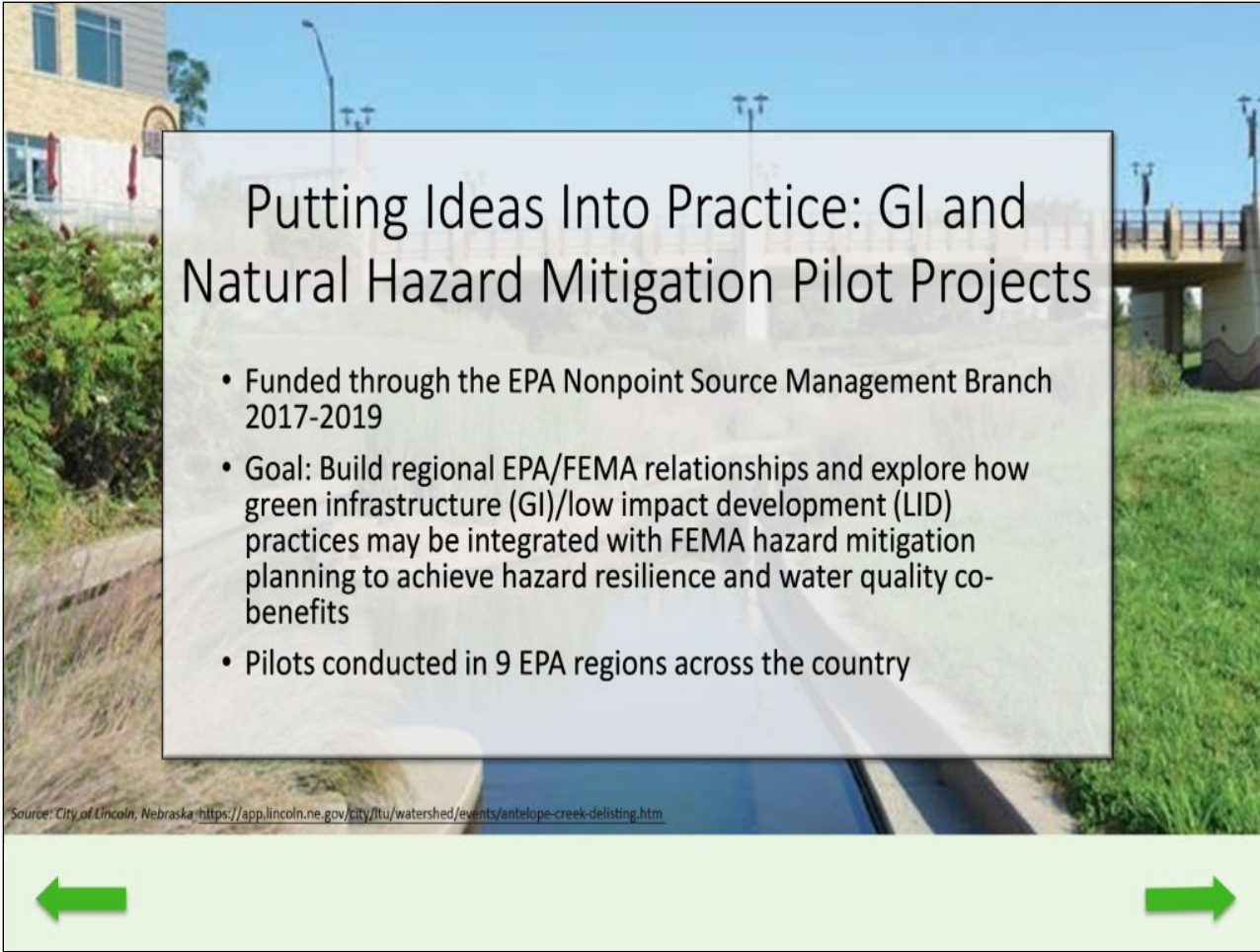
Module Four Learning Steps

The fourth module of this training will focus on a series of EPA-funded pilot projects that worked to build regional EPA/FEMA relationships and explore how green infrastructure (GI)/low impact development (LID) practices and other nature-based practices may be integrated into FEMA hazard mitigation planning to achieve hazard resilience and water quality co-benefits. This will be accomplished in three learning steps.

1. Introduce the EPA pilot project goals and objectives
2. Review the results and outputs/outcomes of each pilot project
3. Review and understand the best practices developed from lessons learned during the pilot projects

Slide Text

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Putting Ideas Into Practice: GI and Natural Hazard Mitigation Pilot Projects

- Funded through the EPA Nonpoint Source Management Branch 2017-2019
- Goal: Build regional EPA/FEMA relationships and explore how green infrastructure (GI)/low impact development (LID) practices may be integrated with FEMA hazard mitigation planning to achieve hazard resilience and water quality co-benefits
- Pilots conducted in 9 EPA regions across the country

Source: City of Lincoln, Nebraska <https://app.lincoln.ne.gov/city/itu/watershed/events/antelope-creek-delisting.htm>

Slide Notes

Putting Ideas Into Practice: GI and Natural Hazard Mitigation Pilot Projects

Incorporating holistic, integrated nature-based approaches such as GI and water quality planning into hazard mitigation planning provides for a more complete, proactive, and sustainable approach to mitigating multiple hazards. Although GI and water quality planning are not new ideas, including them in larger planning efforts, such as hazard mitigation planning, represents a different way of thinking.

A series of pilot projects were conducted in nine EPA regions across the country. These pilots provided opportunities for learning about successes and challenges associated with plan integration, and highlight how communities identify, address, and overcome these challenges. The pilots demonstrate that local stakeholders and communities can use FEMA's hazard mitigation planning process to educate partners and build support for adopting measures that mitigate hazards while also bettering the environment.

The planning process can identify risks that may be mitigated by nature-based solutions (NBS), provide opportunities for stakeholders to consider and prioritize the implementation of NBS, and outline a mechanism by which communities can integrate the approach into their overall mitigation strategy. While not every pilot resulted in incorporating action items into hazard mitigation plans, a new framework was introduced, and perspectives were changed. The lessons learned should be used to aid continued plan integration efforts.

Slide Text

Putting Ideas Into Practice: GI and Natural Hazard Mitigation Pilot Projects

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Goal: Build regional EPA/FEMA relationships and explore how green infrastructure (GI)/low impact development (LID) practices may be integrated with FEMA hazard mitigation planning to achieve hazard resilience and water quality co-benefits

Pilots conducted in 9 EPA regions across the country

Source: City of Lincoln, Nebraska <https://app.lincoln.ne.gov/city/ltu/watershed/events/antelope-creek-delisting.htm>



Region 1 Pilot Project One: State of MA

- Goal: Promote nature-based practices to comply with state stormwater performance standards and develop methods of identifying areas where GI can be used for drought mitigation.
- Multiple GIS analyses were performed to identify potential sites for GI practices to enhance or protect infiltration in the landscape.
- Final Product: [Using Green Infrastructure to Improve Drought Resilience in the Commonwealth of Massachusetts](#). Includes recommendations now included in MA State hazard mitigation plan (HMP).
- Featured in [EPA Green Infrastructure Webcast Series](#).



Slide Notes

Region 1 Pilot Project One: State of Massachusetts

The EPA Region 1 pilot project focused on reducing drought impacts at the state level. This project built upon existing work in Massachusetts to promote low-impact development and GI practices to comply with state stormwater performance standards and the National Pollutant Discharge Elimination System (NPDES) Phase II permit requirements, and was intended develop approaches to identifying areas where GI could be used for drought mitigation efforts.

Assessment methodologies were developed for siting GI and performing site suitability analysis using GIS. Multiple GIS analyses were performed to identify potential sites for the implementation of GI practices to enhance or protect infiltration in the landscape.

Final outputs from the project include a report titled, "[Using Green Infrastructure to Improve Drought Resilience in the Commonwealth of Massachusetts](#)," which includes a set of recommendations developed in a planning workshop with federal, state, local, and non-government organizations for integrating GI into the state hazard mitigation plan.

Slide Text

Region 1 Pilot Project One: State of MA

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Multiple GIS analyses were performed to identify potential sites for GI practices to enhance or protect infiltration in the landscape.

Final Product: [Using Green Infrastructure to Improve Drought Resilience in the Commonwealth of Massachusetts](#). Includes recommendations now included in MA State hazard mitigation plan (HMP).

Featured in [EPA Green Infrastructure Webcast Series](#).



Region 2 Pilot Project: Albany, NY

- Goal: Address water quantity and quality issues posed by flood and severe winter storm impacts on city combined sewer overflow (CSO) system.
- Used third party to convene stakeholders, conduct research, and identify potential GI projects to address flood risk.
- Workgroup discussions were valuable and covered topics including: GI work that was already underway, flood-related priorities that had already identified, each involved organization's current plans, and how current local plans or laws may help or hinder nature-based efforts.
- Final report: [Albany Green Infrastructure/Hazard Mitigation Planning Project](#). These materials are included in City of Albany HMP.



Slide Notes

Region 2 Pilot Project: Albany, New York

The City of Albany is impacted by a variety of natural hazards, primarily flooding and severe winter storms. A large part of the City of Albany is also served by a combined sewer system, so during heavy rains and flood events, raw sewage can flow directly onto streets and into receiving streams such as the Hudson River. As a result, water quality and quantity are significant concerns during flood events.

To help ensure that the city was taking a comprehensive and collaborative approach to identifying and implementing green infrastructure flood hazard mitigation projects, the City secured facilitation and analytical consulting support to help convene relevant parties, conduct research, and identify potential green infrastructure projects. Project outputs include the report on the City's collaborative planning process, GI site identification, as well as a set of potential GI projects. These materials are now included in the City of Albany HMP.

Slide Text


Region 2 Pilot Project: Albany, NY

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Used third party to convene stakeholders, conduct research, and identify potential GI projects to address flood risk.


Workgroup discussions were valuable and covered topics including: GI work that was already underway, flood-related priorities that had already identified, each involved organization's current plans, and how current local plans or laws may help or hinder nature-based efforts.

Final report: [Albany Green Infrastructure/Hazard Mitigation Planning Project](#). These materials are included in City of Albany HMP.


 United States
Environmental Protection
Agency

EPA 903-K-18-001
March 2018

STORM SMART CITIES
Integrating Green Infrastructure into Local Hazard Mitigation Plans



Region 3: Huntington, WV

- Historic flooding concerns in Huntington, WV were exacerbated by increased urbanization.
- EPA Region 3 Water Protection Division, Office of State and Watershed Partnerships and FEMA Region 3 organized a group of local, regional, state, and federal agencies to explore using GI to address localized flooding issues.
- Goal: Better align plans and resources toward reducing the impact of flooding while helping to protect and improve local water quality.
- Project partners worked with state watershed planners, stormwater, MS4, and green infrastructure experts to produce the [Storm Smart Cities Guide: Integrating Green Infrastructure into Local Hazard Mitigation Plans](#).
- Guide has been adopted as a city-wide plan.

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Slide Notes

Region 3: Huntington, West Virginia

Huntington has experienced historic flooding, which has been exacerbated by increases in urbanization. In response to these flooding issues, floodwalls were constructed and helped to reduce long-term floods from the Ohio River. However, this action did not reduce the impacts from localized flooding. For example, low-lying underpass flood during rain events and restrict vital emergency services to local hospitals.

In the summer of 2016, the EPA Region 3 Water Protection Division, Office of State and Watershed Partnerships began organizing a group of local, regional, state, and federal agencies with the intent of understanding how to better integrate green infrastructure into local hazard mitigation planning.

The effort focused on Huntington, WV and the surrounding area. While the initial focus of the group was to explore how to incorporate green infrastructure into the WV Region Local Hazard Mitigation Plan, their overall goal was to better align plans and resources toward reducing the impact of flooding while helping to protect and improve local water quality.

Pilot members worked with state watershed planners, stormwater, MS4, and green infrastructure experts to produce the “Storm Smart Cities Guide,” which includes a Hazard Mitigation Plan/Green Infrastructure Crosswalk. This guide has since been adopted as a city-wide plan in Huntington.

Current efforts include design assistance to implement some of the solutions identified. The pilot found that when projects are linked to multiple outcomes-flood reduction, water quality, public safety, and property loss prevention-communities can seek funding from multiple agencies and organizations to realize project goals.

Slide Text

Region 3: Huntington, WV

Historic flooding concerns in Huntington, WV were exacerbated by increased urbanization.

EPA Region 3 Water Protection Division, Office of State and Watershed Partnerships and FEMA Region 3 organized a group of local, regional, state, and federal agencies to explore using GI to address localized flooding issues.

Goal: Better align plans and resources toward reducing the impact of flooding while helping to protect and improve local water quality.

Project partners worked with state watershed planners, stormwater, MS4, and green infrastructure experts to produce the [*Storm Smart Cities Guide: Integrating Green Infrastructure into Local Hazard Mitigation Plans.*](#)

Guide has been adopted as a city-wide plan.



Region 5: Brown County, WI

- EPA Region 5, Wisconsin Emergency Management, and FEMA worked with Brown County, WI to examine options for integrating nature-based solutions to address flood risk into the county's HMP.
- Project team conducted a series of virtual workshops:
 - Workshop 1 provided a review of flooding issues within Brown County which may be addressed by the HMP.
 - Workshop 2 focused on identifying GI solutions applicable to Brown County flooding issues.
 - Workshop 3 focused on building a set of action plan items that would lead to the integration of GI Brown County's HMP.
- Final report included in [Brown County HMP as Appendix](#).



Slide Notes

Region 5: Brown County, Wisconsin

This pilot brought together representatives from EPA Region 5, Wisconsin Emergency Management, and FEMA to work with Brown County, Wisconsin and its local partners. The project team participated in a series of virtual workshops with the goal of identifying opportunities to include GI/LID into the Brown County hazard mitigation plan.

Workshop 1 provided a review of flooding issues in Brown County that may be addressed by the hazard mitigation planning process. Workshop 2 focused on identifying GI solutions applicable to Brown County flooding issues. Workshop 3 focused on building a set of action plan items to include GI in Brown County's HMP.

The final report documents findings from the workshops, gages the county's current capacity/capability to address the flood and stormwater issues identified, and provides recommendations for developing high quality mitigation projects.

The final report documents findings from the workshops. The set of recommended action plan items outlined in the final report are now included as an appendix in the Brown County HMP. In 2020, Brown County applied for a FEMA Building Resilient Infrastructure and Communities (BRIC) grant to implement HMP recommendations.

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Region 5: Brown County, WI

EPA Region 5, Wisconsin Emergency Management, and FEMA worked with Brown County, WI to examine options for integrating nature-based solutions to address flood risk into the county's HMP.

Project team conducted a series of virtual workshops.

Workshop 1 provided a review of flooding issues within Brown County which may be addressed by the HMP.

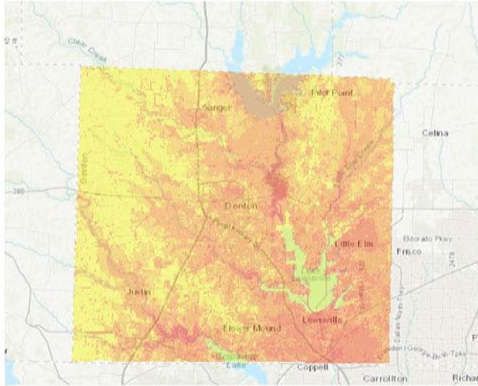
Workshop 2 focused on identifying GI solutions applicable to Brown County flooding issues.

Workshop 3 focused on building a set of action plan items that would lead to the integration of GI Brown County's HMP.

Final report included in [Brown County HMP as Appendix](#).

Incorporating GI/LID and Nature Based Systems into the Denton County Hazard Mitigation Plan

Region 6: Denton, TX



[ESRI STORYMAP GIS FLOOD PRIORITIZATION TOOL](#)

- EPA Region 6 partnered with Texas A&M AgriLife Extension Service to assist the city of Denton in identifying a co-planning management process of local and regional water quality and hazard mitigation efforts
- Scope of work includes:
 - Stakeholder identification assessment
 - Literature review
 - [Flood risk prioritization tool and recommendations](#) for GI/LID integration in Denton HMP.



Slide Notes

Region 6: Denton, Texas

EPA Region 6 partnered with Texas A&M AgriLife Extension Service to assist the city of Denton, TX in identifying a co-planning management process of local and regional water quality and hazard mitigation efforts, and explore integration of nature-based solutions in the local HMP.

The scope of work includes: performing a stakeholder identification assessment in the Denton-area to identify key parties and decision makers; a literature review to identify plans, reports, maps, ordinances and other information related to hazard mitigation planning and Denton’s current work in stormwater management and watershed protection; stakeholder engagement efforts; and, development of data visualization tool(s) and recommendations incorporating GI/LID into the Denton HMP.

Slide Text

Region 6: Denton, TX

EPA Region 6 partnered with Texas A&M AgriLife Extension Service to assist the city of Denton in identifying a co-planning management process of local and regional water quality and hazard mitigation efforts

Scope of work includes: Stakeholder identification assessment, Literature review, and [Flood risk prioritization tool and recommendations](#) for GI/LID integration in Denton HMP.

Incorporating GI/LID and Nature Based Systems into the Denton County Hazard Mitigation Plan

ESRI Storymap GIS Flood Prioritization Tool

Region 7: Meramec River Watershed, MO

- United States Army Corps of Engineers (USACE) Silver Jackets initiated a Floodplain Management Plan for the flood-prone Meramec River watershed.
- EPA Region 7 partnered with the Wichita State University (WSU) Environmental Finance Center (EFC) to produce the [Healthy Watershed Options for the Meramec River](#) report.
- The [Online funding search tool](#) was developed to support community partners in identifying potential funding opportunities for nature-based projects.

Slide Notes

Region 7: Meramec River Watershed, Missouri

The United States Army Corps of Engineers (USACE) Silver Jackets initiated a Floodplain Management Plan for the flood-prone Meramec River watershed that brought together local, state and federal organizations to reduce risk and other disasters. EPA Region 7 partnered with the Wichita State University (WSU) Environmental Finance Center (EFC) to produce the “Healthy Watershed Options for the Meramec River” report, which was developed as a piece of the area’s ongoing flood risk mitigation efforts.

This report provides communities in the Lower Meramec Watershed with information on the role GI/LID and other nature-based practices can play in flood risk mitigation; case studies on communities that have successfully implemented nature-based practices in hazard mitigation efforts; and, a cost/benefit analysis of floodplain acquisition, restoration, and protection that is unique to each of the seven communities in the watershed. The WSU EFC also developed an online funding search tool to support community partners in identifying potential funding opportunities for the GI/LID projects described in the report.

Slide Text

Region 7: Meramec River Watershed, MO

United States Army Corps of Engineers (USACE) Silver Jackets initiated a Floodplain Management Plan for the flood-prone Meramec River watershed.

EPA Region 7 partnered with the Wichita State University (WSU) Environmental finance Center (EFC) to produce the [Healthy Watershed Options for the Meramec River](#) report.

The [Online funding search tool](#) was developed to support community partners in identifying potential funding opportunities for nature-based projects.

Wichita State University: Healthy Watershed Options for Floodplain Management, Lower Meramec Watershed



Region 9: Maricopa County, AZ

- EPA Region 9 and FEMA partnered to provide technical assistance to the cities of Phoenix and Tempe in Maricopa County, AZ to integrate GI/LID suitable to an arid and semi-arid climate into their 2020 HMPs and flood control documents.
- Hosted 1.5-day workshop with facilitated stakeholder discussions. Resulted in recommendations for GI/LID integration in the Maricopa County HMP.
- Final project report summarizes benefits of GI/LID technologies, strategies for building regional capacity to implement GI/LID practices, recommendations for organizations seeking to participate in the HMP process, and sample mitigation actions for potential inclusion in the [2020 Maricopa County MHMP](#).




Slide Notes

Region 9: Maricopa County, Arizona



EPA Region 9 and FEMA partnered to provide technical assistance to the cities of Phoenix and Tempe in Maricopa County, Arizona, to integrate GI/LID suitable to an arid or semi-arid climate into their 2020 HMPs and flood control documents. The project team provided a 1.5-day workshop to facilitate stakeholder discussion and develop recommendations on how GI/LID can be integrated into the Maricopa County HMP process.

The final project report summarizes research findings and workshop outcomes, including: benefits of GI/LID technologies, strategies for building regional capacity to implement GI/LID practices, recommendations for organizations seeking to participate in the HMP process, and sample mitigation actions for potential inclusion into the [2021 Maricopa County HMP](#).



Region 10: Ashland, OR

- EPA Region 10 and FEMA Region 10 partnered with the University of Oregon's Community Service Center (CSC), the City of Ashland and other state and regional partners to develop proposed HMP action items that utilize GI/LID practices.
- Aspects of the project included:
 - [GIS-based GI suitability assessment](#) identified opportunities for GI/LID projects that could achieve co-benefits.
 - Ecosystem services assessment method of quantifying co-benefits associated with GI/LID.
 - Review of Ashland codes and ordinances related to GI/LID and water quality.
- Recommendations now included in the [Jackson County Multi-Jurisdictional HMP](#).



Slide Notes

Region 10: Ashland, Oregon

EPA Region 10 and FEMA Region 10 partnered with the University of Oregon's Community Service Center (CSC), Ashland, OR stakeholders, and other state and regional partners to develop proposed HMP action items that utilize GI/LID practices.

The project team, led by University of Oregon graduate students, conducted a GIS-based GI suitability assessment to identify opportunities for GI/LID projects that could achieve co-benefits; an ecosystem services assessment as a method of quantifying co-benefits associated with GI/LID; and, a review of Ashland codes and ordinances related to GI/LID and water quality.

The final project report describes research findings, provides a set of recommendations for incorporating GI/LID practices in the Ashland HMP, and lists best practices for facilitating a collaborative planning process between water quality and hazard mitigation professionals.

The final set of recommendations is now included in the Jackson County Multi-Jurisdictional Natural Hazard Mitigation Plan.

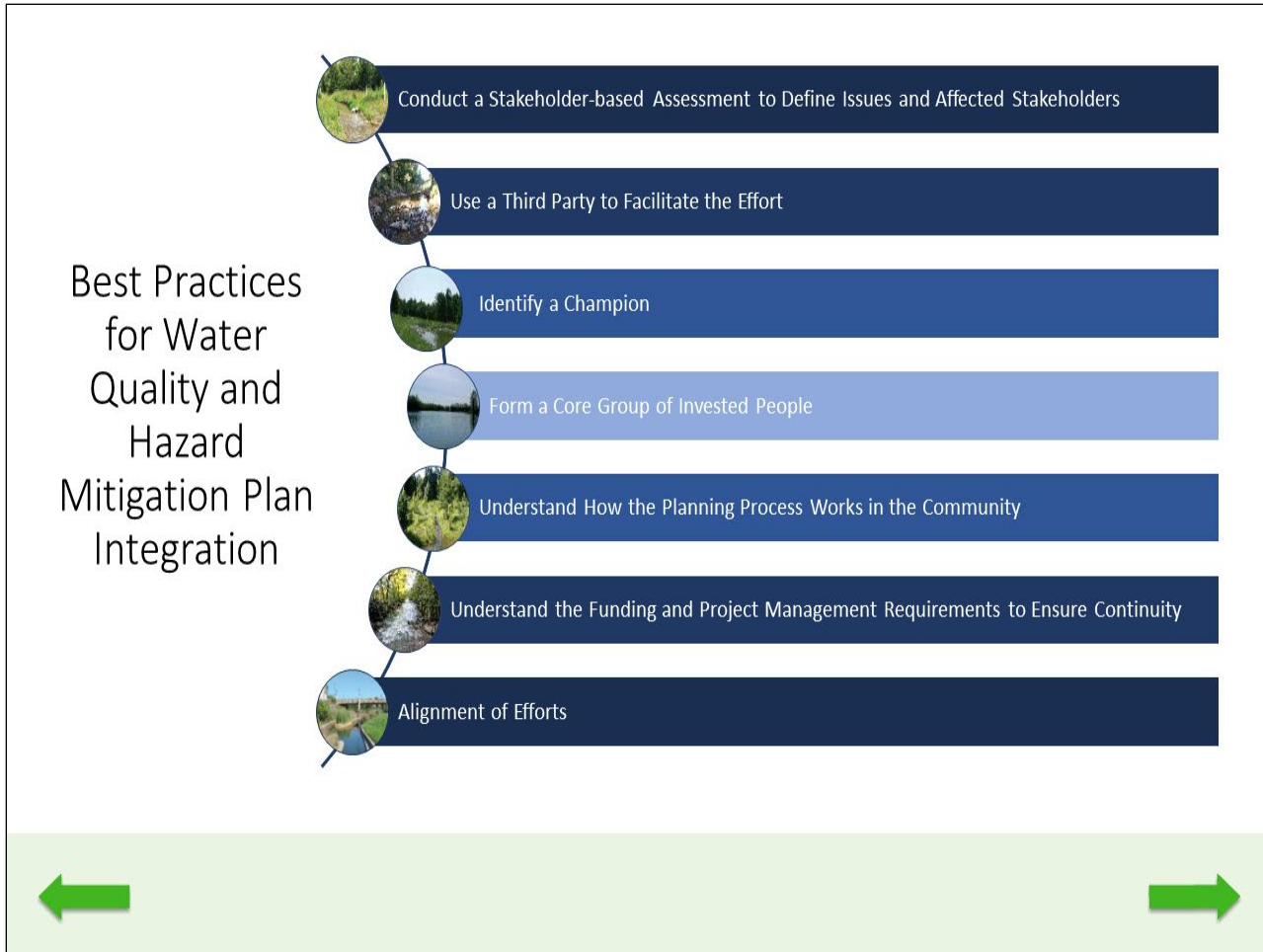
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Recommendations now included in the [Jackson County Multi-Jurisdictional HMP](#).

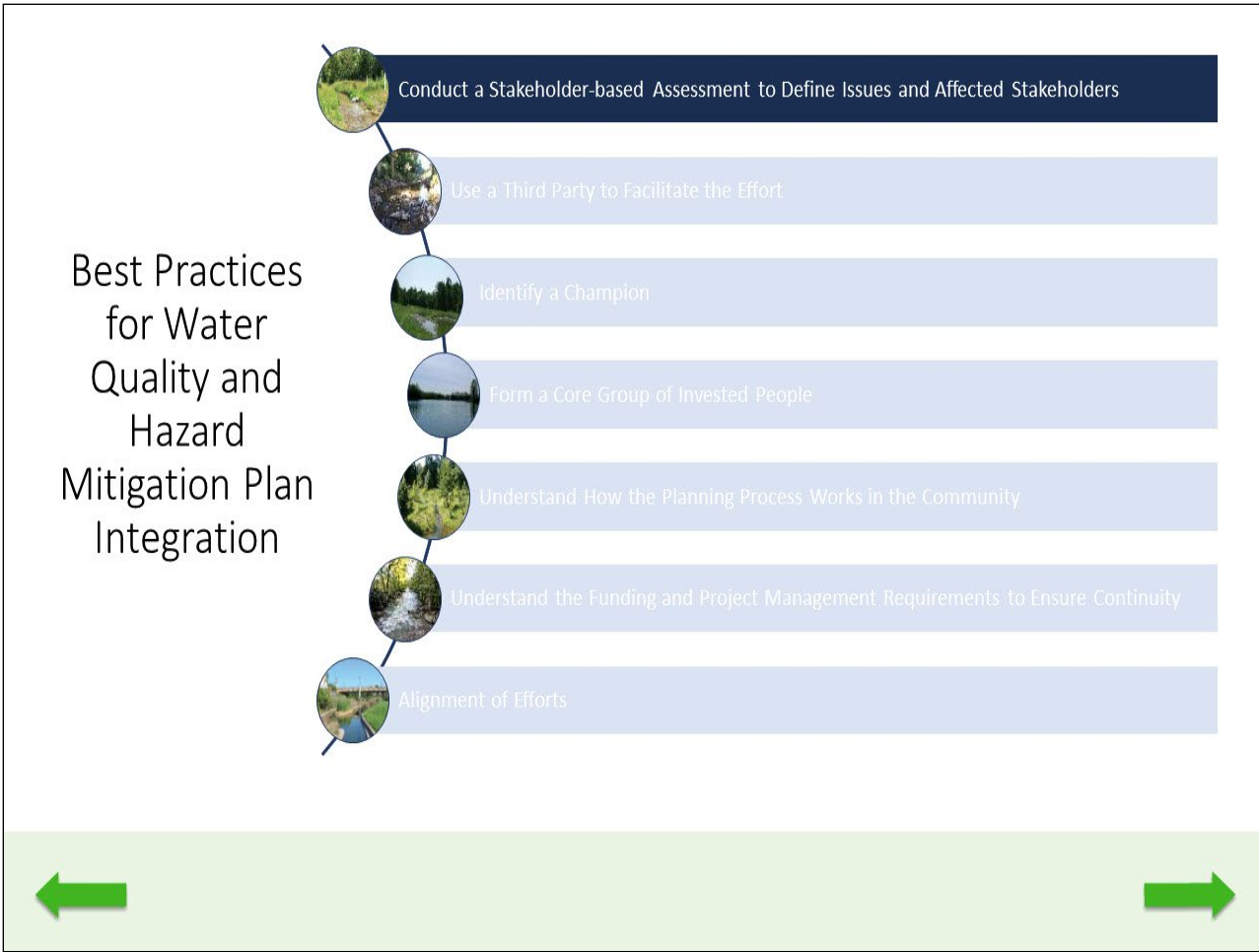


Slide Notes

Best Practices for Water Quality and Hazard Mitigation Plan Integration

An analysis of the pilot projects, final reports, and discussions with team members resulted in a unique perspective on seven best practices recommended for communities looking to integrate the worlds of water quality protection and hazard mitigation planning. The seven best practices are as follows:

1. Conduct a Stakeholder-based Assessment to Define Issues and Affected Stakeholders
2. Use a Third Party to Facilitate the Effort
3. Identify a Champion
4. Form a core group of invested people
5. Understand How the Planning Process Works in the Community
6. Understand the Funding and Project Management Requirements to Ensure Continuity
7. Alignment of Efforts



Slide Text

Best Practices for Water Quality and Hazard Mitigation Plan Integration

Conduct a Stakeholder-based Assessment to Define Issues and Affected Stakeholders

1. Conduct a Stakeholder-based Assessment to Define Issues and Affected Stakeholders



- Each SLTT is unique – Take time to conduct a stakeholder-based assessment to define scope, issues, and affected stakeholders
- Typically completed by a third party
- Massachusetts pilot:
 - Large statewide effort, critical to get relevant parties involved.
 - ~40 representatives from across MA convened to discuss a mapping methodology to identify the most appropriate places to site NBS for drought resilience. This group also provided recommendations to address the limitations, challenges, and opportunities in Massachusetts' laws, policies, and programs to advance NBS practices for drought resilience.

Slide Notes

At the beginning of the process, it is helpful to conduct a stakeholder-based assessment to define scope, issues, and affected stakeholders. Each state, locality, tribe, or territory (SLTT) is unique and taking the time at the beginning of a project to understand how to approach the effort is helpful. This initial step helps to define the context in which you will be conducting your effort, including any potential challenges you may have to overcome.

A stakeholder-based assessment is typically done by a third party, but it can also be done by the project sponsor. The benefits of this approach include engaging partners who do not typically engage in GI/LID or natural hazard mitigation planning activities. Broadening participation expands funding opportunities, engages potential project partners early in the process, and provides for complimentary partnerships that allow for the leveraging and extension of specific skills and expertise.

Most pilots benefited from the involvement of their state-led USACE Silver Jackets teams, a state level federal partnership that focuses on assisting the state with meeting its needs for reducing flood risk. The Silver Jackets team structure provided an immediate forum of potential interested parties. In Massachusetts, the effort focused on GI's stormwater infiltration characteristics for drought resilience across the entire Commonwealth. Stakeholder-based assessment and convening of groups was key to getting the right people engaged.

Approximately 40 representatives of federal and SLTT governments and non-profit organizations attended a workshop to discuss a mapping methodology to identify the most appropriate places to site GI for drought resilience, and to prioritize recommendations to address the limitations, challenges, and opportunities in Massachusetts' laws, policies, and programs to advance GI practices.

Slide Text

1. Conduct a Stakeholder-based Assessment to Define Issues and Affected Stakeholders

Each SLTT is unique – Take time to conduct a stakeholder-based assessment to define scope, issues, and affected stakeholders

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Potential Stakeholders to Include

- Local utility/authority responsible for managing stormwater, parks and recreation, and public works departments with oversight of construction and capital projects
- Organization responsible for local hazard mitigation planning
- City, county, and regional planning organizations
- Local floodplain managers
- Local watershed association managers
- County or regional conservation districts and/or agricultural offices
- Community or neighborhood associations
- Local universities or other large institutions
- State, tribal, or local hazard mitigation officer/mitigation planner
- State Environmental Protection Agency (MS4/stormwater, GSI, and watershed planning contacts)
- FEMA Regional Mitigation Planning Office
- EPA regional GSI or nonpoint source pollution management and watershed planning contact
- Local watershed/wetland organizations and local environmental foundations
- State Silver Jackets group

[EPA Public Participation Guide: Situation Assessments](#)

Slide Notes

Potential Stakeholders to Include

This slide lists a variety of potential stakeholders that can add value to integrated water quality and hazard mitigation planning efforts. Steps on how to conduct a stakeholder assessment may be found in EPA's Public Participation Guide: Situation Assessments.

Potential Stakeholders to Include

Local utility/authority responsible for managing stormwater, parks and recreation, and public works departments with oversight of construction and capital projects

Organization responsible for local hazard mitigation planning

City, county, and regional planning organizations.

Local floodplain managers

Local watershed association managers

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Community or neighborhood associations

Local universities or other large institutions

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State Environmental Protection Agency (MS4/stormwater, GSI, and watershed planning contacts)

FEMA Regional Mitigation Planning Office

EPA regional GSI or nonpoint source pollution management and watershed planning contact.

Local watershed/wetland organizations and local environmental foundations

State Silver Jackets group

[EPA Public Participation Guide: Situation Assessments](#)

Assessing Stakeholder Goals, Priorities and Expertise

Once convened, it will be important to assess involved parties' interests, capacity and expertise, and determine what (if any) additional stakeholders should be at the table.

Consider the following questions to understand local capacity:

- Will the use of NBS for hazard mitigation require new technical expertise to get practices in the ground?
- What's the scale? Is this a plan that will incorporate nature-based infrastructure, such as wetlands, stream valleys, floodplains, forests, greenways and open space? Or is it site-level GI, such as rain gardens, pervious pavement, and bio swales? Or is it all of the above?
- What is the capacity of existing organizations to take on these new approaches?
- Can existing approaches to stormwater management or flood mitigation be modified or expanded?
- Will new or different organizations need to be engaged to add capacity?
- How may you need to change the way that you are working to integrate NBS?
- Do you have the right partners and stakeholders engaged in the process?
- Is there sufficient local capacity to maintain practices following construction?

Slide Notes

Assessing Stakeholder Goals, Priorities, and Expertise

When conducting the stakeholder-based assessment, it is important to assess parties' interests and expertise. You need to have a sense of where the community is starting from and what they care about. Once the workgroup is formed, the workgroup should consider other interested parties that are not at the table but might have an interest. The facilitator can reach out to these other organizations to assess their interest in participating in the process, either as a workgroup member or as a potential resource during the process. In conducting formal stakeholder-based assessments, typical practice includes talking with each potential workgroup member in a tiered approach.

For example, first speak with the department heads with direct responsibility for hazards and environmental services and ask them who else should be engaged. Then reach out to this next tier and synthesize all responses to form the stakeholder-based assessment.

Slide Text

Assessing Stakeholder Goals, Priorities and Expertise

Once convened, it will be important to assess involved parties' interests, capacity and expertise, and determine what (if any) additional stakeholders should be at the table.

Consider the following questions to understand local capacity:

- Will the use of NBS for hazard mitigation require new technical expertise to get practices in the ground?
- What's the scale? Is this a plan that will incorporate nature-based infrastructure, such as wetlands, stream valleys, floodplains, forests, greenways and open space? Or is it site-level GI, such as rain gardens, pervious pavement, and bio swales? Or is it all of the above?
- What is the capacity of existing organizations to take on these new approaches?
- Can existing approaches to stormwater management or flood mitigation be modified or expanded?
- Will new or different organizations need to be engaged to add capacity?
- How may you need to change the way that you are working to integrate NBS?
- Do you have the right partners and stakeholders engaged in the process?
- Is there sufficient local capacity to maintain practices following construction?

Define the Key Parameters of the Project

Questions to ask in determining project goals and scope:

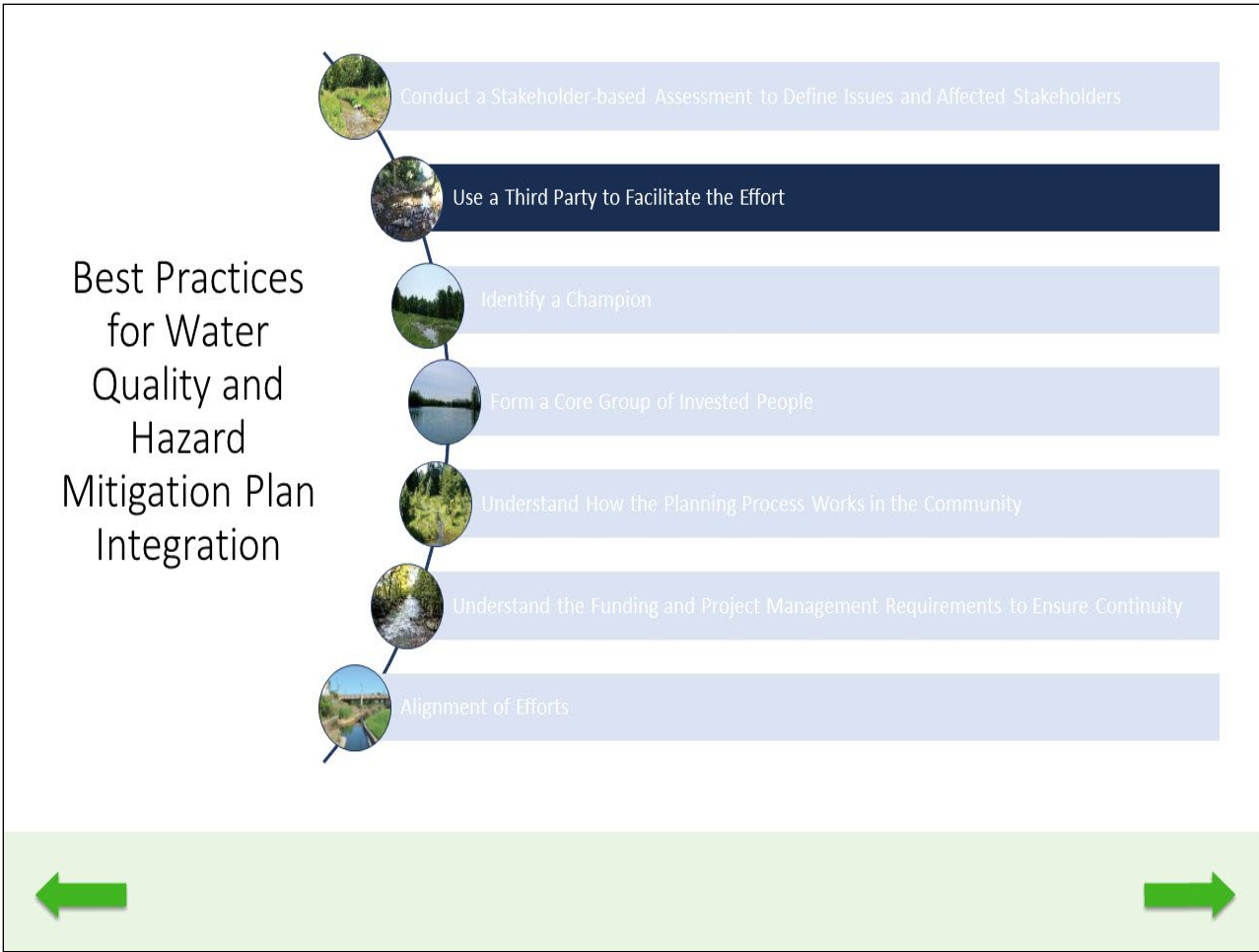
- What is the geographic boundary for the project? It may not coincide with jurisdictional boundaries. Keep in mind hazard mitigation plans are often done on a regional scale. The best approach, if possible, is to plan at the watershed scale, addressing the sources of potential hazards starting from the top of the watershed.
- Do stakeholders understand the multiple benefits that NBS can provide? This is a critical element, as there could be a lack of understanding of the benefits and limitations of NBS in mitigating hazards.
- What templates will be used to collect data and information, including when it is time to make the case for funding, or prepare applications for funding? (Example: FEMA has specific requirements for funding projects under Hazard Mitigation Assistance grants)

Slide Notes

Define the Key Parameters of the Project

Another important step is to define the key parameters of the project. This is a critical first step in any project, but especially important for nature based/hazard mitigation projects because this work can go in a variety of directions. Questions to ask in determining project goals and scope include:

- What is the geographic boundary for the project? It may not coincide with jurisdictional boundaries. Keep in mind hazard mitigation plans are often done at a regional scale. The best approach, if possible, is to plan at the watershed scale, addressing the sources of potential hazards starting from the top of the watershed.
- Do stakeholders understand the multiple benefits that NBS can provide? This is a critical element, as there could be a lack of understanding of the benefits and limitations of NBS in mitigating hazards.
- What templates will be used to collect data and information, including when it is time to make a case for funding, or prepare applications for funding? (Example: FEMA has specific requirements for funding projects under Hazard Mitigation Assistance grants)



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Best Practices for Water Quality and Hazard Mitigation Plan Integration

2. Use a Third Party to Facilitate the Effort

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- Third Party: someone outside of the agencies/organizations directly involved in the planning process that can support, facilitate, and manage the process so it keeps moving smoothly
- Federal, state, and local agencies/organizations may not have capacity to manage a collaborative process with many different stakeholders and groups, so third parties can be of great value
- EPA pilot projects included third parties like:
 - Mediators
 - Facilitators
 - Consultants
 - University partners

Slide Notes

A third party is someone who can devote their effort to the group process. Process and analytical support are critical for this type of effort. Agencies/organizations including FEMA, EPA, state water quality, and emergency response staff will likely not have the time to establish a firm foundation of stakeholders or be able to keep the process moving, and this may be the case when any SLTT government conducts this type of integrated planning effort.

When bringing together multiple parties, it is important to have support that helps move the project forward without overburdening participants. In this case, support includes facilitation to convene and manage conference calls/meetings; research support to investigate background information and explore project details; and support to document results of discussions, research, and input from workgroup members.

For the pilot projects, the third parties included mediators or hazard mitigation planning consultants, some “in-house” facilitators such as federal mediators, and a university graduate school instructor working on updating the community’s hazard mitigation plan as a FEMA Cooperating Technical Partner. Any third party with familiarity of both hazard mitigation and water quality/nature-based solutions is likely qualified.

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- EPA pilot projects included third parties like:
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Slide Text

Best Practices for Water Quality and Hazard Mitigation Plan Integration

Identify a Champion

3. Identify a Champion



- Champion: A well-respected individual in a position of authority that can lead the project
- Important for place-based efforts
- Champions will:
 - Want a positive outcome for the community
 - Understand drivers to keep stakeholders engaged
 - Be devoted to achieving successful, tangible outcomes and are willing to stay engaged to attain progress
- Huntington, WV pilot: Multiple champions
 - Huntington Stormwater Utility (champion for stormwater management and GI), Huntington City Planning Office (champion for a livable city), and the Regional Planning and Development Council (champion for engaged planning that leads to tangible results for the region)

Slide Notes

Identify one or more champions, preferably well-respected individuals in a position of authority to lead the project. The pilots used different methods to identify champions, with some identified as part of the initial request for funds and others emerging after the initial assessment. Local champions are important for place-based efforts.

They want a positive outcome for their community, and they understand the drivers, sometimes regulatory, to keep stakeholders engaged. A champion is different from a third party because they are not just devoted to creating a good process, but also to achieving successful, tangible outcomes and are willing to stay engaged to attain progress.

During the Huntington, West Virginia pilot, there were numerous champions, including the Huntington Stormwater Utility (a champion for stormwater management and GI), the Huntington City Planning Office (a champion for a livable city), and the Regional Planning and Development Council (a champion for engaged planning that leads to tangible results for the region). Each of these champions was important to understanding local needs, involving local stakeholders, and keeping the project moving forward.

They are invested in both the process and the outcomes for their community. In addition to a champion, finding a collaborative partner or organization that can be leveraged is a best practice for this kind of decision-making process. Multiple other pilots were successful in leveraging a local university. In all cases, there was a partner or organization that benefited from the pilot and continued to cultivate the initiative.

Slide Text

3. Identify a Champion

Champion: A well-respected individual in a position of authority that can lead the project. Important for place-based efforts

Champions will:

- Want a positive outcome for the community
- Understand drivers to keep stakeholders engaged
- Be devoted to achieving successful, tangible outcomes and are willing to stay engaged to attain progress
- Huntington, WV pilot: Multiple champions
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Slide Text

Best Practices for Water Quality and Hazard Mitigation Plan Integration

Form a Core Group of Invested People

4. Form a Core Group of Invested People



- Gathering and maintaining a core workgroup is necessary to maintain momentum
- Core workgroup should be broad and diverse
- Engage workgroup strategically to maximize members' time and energy
 - From Albany pilot project: Structure agendas to focus on specific topics and ensure that relevant participants will be present to speak to those topics
- After the initial meeting(s), you may need to approach stakeholders to encourage participation, as opposed to assuming they will come to you

Slide Notes

The pilot projects started by gathering a diverse group of federal and SLTT stakeholders. Each stakeholder brought a unique perspective that helped the group to better understand challenges and opportunities. A core workgroup is necessary to maintain momentum. Because nature-based projects can be aligned with, or of interest to, various programs, it is important to have broad representation on the workgroup. Workgroup membership could build over time or ebb and flow based on the work being done.

For this type of process, where some workgroup members bring specific expertise or resources, they can be engaged strategically to maximize their time and energy. It may be helpful to structure agendas to focus on specific topics and ensure that relevant participants will be present to speak to those topics.

This was successfully used in the Albany pilot. The facilitator made discussion topics clear on the agenda so that members could determine whether to participate. Keep in mind that after the initial meeting(s), you may sometimes need to approach stakeholders to encourage participation, as opposed to assuming they will come to you.

Empower the workgroup members to reach out to interested parties throughout the life of the project. This will ensure that there are a variety of perspectives involved. It can also help to ensure that no important related efforts or opportunities for funding are overlooked. This outreach can be done through one-on-one calls, inviting stakeholders to participate in workgroup calls/meetings, or by convening informal meetings with interested stakeholders as needed.

Slide Text

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Engage workgroup strategically to maximize members' time and energy. From Albany pilot project: Structure agendas to focus on specific topics and ensure that relevant participants will be present to speak to those topics

After the initial meeting(s), you may need to approach stakeholders to encourage participation, as opposed to assuming they will come to you



Core Workgroup Members

A core workgroup could include the following:

- Stormwater, other public works, and flood hazard mitigation personnel
- Environmental offices, such as water quality programs (federal and SLTT)
- Local/Municipal Parks Department
- Emergency management/hazard mitigation (federal and SLTT)
- Local infrastructure departments (water/utilities, transportation/public works)
- Local planning departments
- Conservation districts
- Non-governmental organizations that have interests related to water quality, stormwater, watershed management, and property/land development

Slide Notes

Core Workgroup Members

A core workgroup should include the following: stormwater, other public works, and flood hazard mitigation personnel, environmental offices, such as water quality programs (federal and SLTT), local/municipal parks department, emergency management/hazard mitigation (federal and SLTT), local infrastructure departments (water/utilities, transportation/public works), local planning departments, conservation districts, non-governmental organizations that have interests related to water quality, stormwater, watershed management, and property/land development.

Slide Text

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- Non-governmental organizations that have interests related to water quality, stormwater, watershed management, and property/land development

Engage Partners Strategically

Parties to engage strategically may include:

- **Civil engineers** should be engaged early in the process for their awareness and buy-in. Their time may be better spent toward the end of the process when potential projects are being vetted.
- **GI/LID Professionals** - can assess the feasibility, costs, and benefits of different nature-based risk reduction approaches (consultants, engineers, watershed councils, etc.).
- **Academic institutions** - often valuable as a source of information and mapping.
- **State Silver Jackets Teams** - specifically available to assist in these types of efforts. In some cases, USACE can provide direct support - done in the Huntington, WV pilot.
- **Representatives from the development community**, - can provide input on how planning objectives and future projects might be perceived and how to coordinate infrastructure issues with future development and land use changes.
- **Elected officials** - can be effective at creating momentum for the group overall, especially for the first meeting.

Slide Notes

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Slide Text

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Slide Text

Best Practices for Water Quality and Hazard Mitigation Plan Integration

5. Understand How the Planning Process Works in the Community

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- Planning processes, policies, and priorities will vary widely across communities
- Engage the community to understand their level of knowledge and comfort with NBS, how it works, and the benefits it can provide
- Communicate in terms that are relevant to and understood by the stakeholders involved
- Example: Ashland, OR pilot
 - High existing understanding of GI, but communicating in terms of economic benefits brought more stakeholders to the table
- Common understanding of nature-based solutions is key

Slide Notes

Integrated planning processes can look different based on the community. Different knowledge levels, experience with, and/or perceptions of nature-based solutions may vary across the country. It is also essential to understand how water quality planning has been done in the community in the past, both to meet regulatory requirements and to voluntarily protect local waterways.

Many problems can be avoided by focusing communication on benefits the community cares most about. As partners build support for their efforts, they need to find a way to connect the effort to something of value for communities. Providing scientific studies may not be the most effective tactic. Though effective for some, numbers and graphs might not convey the culture of a community, or what makes that community unique for its residents.

Ashland, for example, had a high degree of awareness about GI/LID, but still concluded that if they had described GI/LID in social and economic benefits for the city, they could have potentially had more buy-in earlier in the process. Be ready to connect GI benefits with community needs, preserving and supporting the unique characteristics of a community, and a community's cultural diversity and history.

Bolstering the local economy by attracting new residents and businesses may be a local priority, and GI can play a role in that. Consider using a full cost accounting model that quantifies long-term social and ecological benefits to capture this.

Particularly for these efforts, a common understanding of nature-based solutions is key. Although a community may have some experience with GI/LID approaches, the pilot project leads found that application in this context was new and required education. Each community among the pilots had a different level of understanding and capacity for GI.

Engaging the community to understand their level of knowledge and comfort with GI, how it works, and the benefits it can provide is a key first step. The mechanics of stormwater management, absorption and infiltration, stormwater treatment, and the science behind GI are technical concepts that can be difficult to understand.

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Understand How the Planning Process Works in the Community

Planning processes, policies, and priorities will vary widely across communities

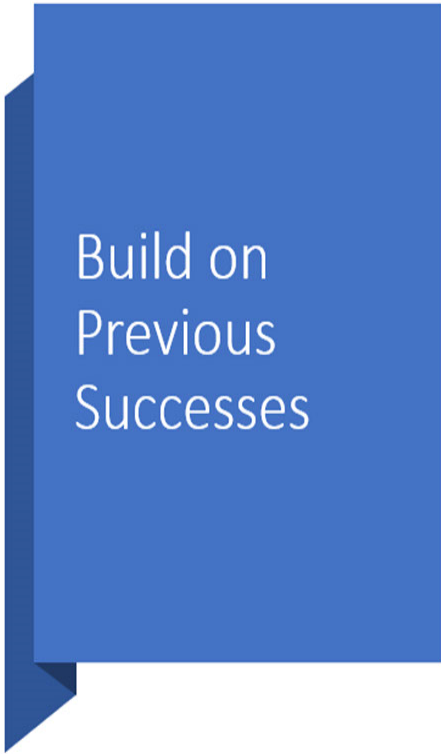
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Example: Ashland, OR pilot

High existing understanding of GI, but communicating in terms of economic benefits brought more stakeholders to the table

Common understanding of nature-based solutions is key



Build on Previous Successes

- If possible, build on past successes and partnerships
- Example: Huntington, WV pilot
 - EPA's *Making a Visible Difference* initiative, Brownfields revitalization efforts, stormwater management efforts, and other locally driven projects were in place prior to the pilot project. Relationships formed during previous engagement helped build momentum and interest in the planning effort
- Important to gather and review existing programs and resources to identify what work may already be underway. Nature-based projects can emerge from flood hazard mitigation plans, watershed management plans, stormwater and combined sewer overflow (CSO) control plans, redevelopment initiatives, and infrastructure plans.



Slide Notes

Build on Previous Successes

In some cases, it's possible to build on previous successes. In Huntington, West Virginia, efforts such as EPA's Making a Visible Difference initiative, Brownfields revitalization efforts, stormwater management efforts, and other locally driven projects to promote a livable and economically successful city were all in place prior to the pilot project. The relationships formed during previous engagement helped build momentum and interest in the planning effort. Such engagement can help to reframe problems and keep stakeholders engaged in the process.

GI projects can emerge from flood hazard mitigation plans, watershed management plans, stormwater and combined sewer overflow control plans, redevelopment initiatives, and infrastructure plans. It is important to gather and review these existing resources to identify what work may already be underway, what hazard-related priorities have been identified, what is being planned and by what organization, and how current plans or laws may help or hinder efforts.

Slide Text

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Slide Text

Best Practices for Water Quality and Hazard Mitigation Plan Integration

6. Understand the Funding and Project Management Requirements to Ensure Continuity

6. Understand the Funding and Project Management Requirements to Ensure Continuity



- Pilot project funding was determined to be sufficient for convening stakeholders and initiating the planning process BUT a broad range of funding sources is necessary for long-term project success
- Engaging a wider range of funding partners at the front-end of hazard mitigation planning efforts will help provide funders and stakeholders alike with education and training on the range of funding products available
- Hazard mitigation plans identify the need and then match the funding sources available to that need
- Value in exploring diverse and creative funding sources

Slide Notes

In all the pilots, the funding was sufficient to bring the parties together. The funding also served as leverage for obtaining other funds to keep making progress. Engaging a wider range of funding partners at the front-end of hazard mitigation planning efforts will help provide funders and stakeholders alike with education and training on the range of funding products available so there is a broad range of funding sources.

Hazard mitigation plans identify the need and then match the funding sources available to that need. Funding can be anything from traditional federal grants to a stormwater fee or development fee. Although FEMA's Hazard Mitigation Grant Program funding may be a logical resource, the information requirements for the grant funding application may be difficult to collect.

During FEMA application review, individual projects, particularly smaller projects, might not be considered significant from a cost-benefit perspective. However, if there is a range of funding options, chances are better that the funding will be forthcoming.

Slide Text

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Hazard mitigation plans identify the need and then match the funding sources available to that need

Value in exploring diverse and creative funding sources

Understand Jurisdictional Requirements and Timing to Improve Eligibility for Funding

- Be aware of timing and jurisdictional issues for hazard mitigation planning and assistance
- Applicants for FEMA grants must have a FEMA-approved multi-hazard mitigation plan prior to requesting project implementation funds. These plans can be prepared by a single jurisdiction or multiple jurisdictions.
- The work of a joint water quality/hazard mitigation workgroup should be done before this plan is due so that projects identified through this process can be incorporated into the appropriate level of the HMP.

Slide Notes

Understanding Jurisdictional Requirements and Timing to Improve Eligibility for Funding

Integrating water resource and hazard mitigation planning is a vital first step in creating a seamless approach to reducing health, property, and environmental risks, but much more needs to be done to get projects funded, implemented, and completed. The requirements to secure funding of hazard mitigation projects need to be understood so that stakeholders can avoid process fatigue and see a clear outcome.

Part of making the connection to longer-term planning efforts is being aware of the timing and jurisdictional requirements associated with local hazard mitigation planning. This will help ensure that project teams time and their efforts align with available funding opportunities for project planning and implementation-and that projects occur in eligible places.

Note that all local governments that would like to request funding through the BRIC and Flood Mitigation Assistance Programs for mitigation projects must have a FEMA-approved hazard mitigation plan prior to requesting project implementation funds. The work of the GI/hazard mitigation workgroup should ideally be done before this plan is due so that projects identified through this process can be incorporated into the appropriate level of hazard mitigation plan.

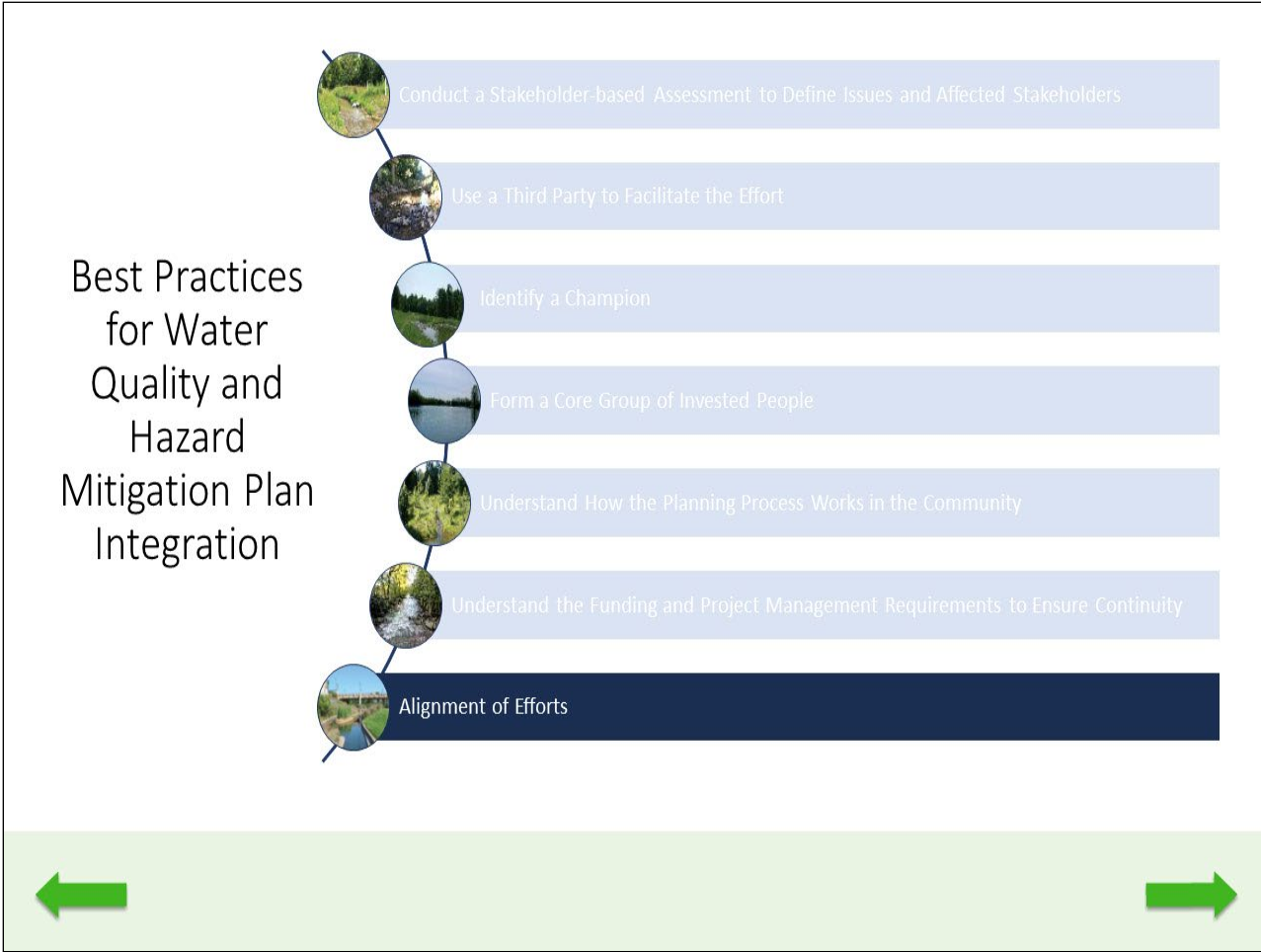
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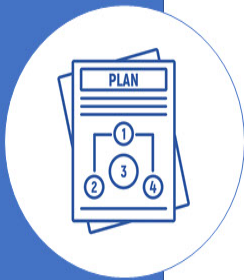


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Best Practices for Water Quality and Hazard Mitigation Plan Integration

7. Alignment of Efforts

7. Keep the Focus on Plan Integration and Alignment



- Hazard Mitigation Plans can be a tool to achieve multi-objective outcomes
- Pilots focused on plan integration - a systems framework that promotes interdisciplinary thinking
- Some useful resources for identifying disconnects in planning documents and/or opportunities for integration:
 - EPA's Flood Resilience Checklist
 - The UN Disaster Resilience Scorecard for Cities

Slide Notes

The hazard mitigation plan can be a tool to achieve multi-objective outcomes, rather than a plan focused solely on reducing hazards. Ultimately, the process undertaken by these pilots was plan integration. A systems framework that promotes interdisciplinary thinking is key. Move from department-by-department decision making to a more integrated decision-making model. All the pilots used some form of self-generated method to cross-walk plans. Although the pilots achieved plan integration, it may be helpful to use a hazard resiliency scorecard for an initial screening.

EPA's Flood Resilience Checklist and the UN Disaster Resilience Scorecard for Cities are good at pinpointing obvious disconnects in planning documents, such as high-density housing planned in flood-prone areas. The scorecard approaches can help with the "hump" that stakeholders may need to get over to see multiple benefits. It's important to allot time in the planning phase to emphasize all benefits to stakeholders.

Slide Text

7. Keep the Focus on Plan Integration and Alignment

Hazard Mitigation Plans can be a tool to achieve multi-objective outcomes

Pilots focused on plan integration - a systems framework that promotes interdisciplinary thinking

Some useful resources for identifying disconnects in planning documents and/or opportunities for integration: EPA's Flood Resilience Checklist, The UN Disaster Resilience Scorecard for Cities

Expand the Scope Beyond Hazard Mitigation Plans

- When considering plan integration with the goal of implementing nature-based projects, expand the range of plans being targeted for mitigation actions.
- Example: Albany, NY Pilot
 - Other plans referenced during the project included: State Climate Vulnerability and Adaptation Plan, the draft Multijurisdictional Hazard Mitigation Plan, the Albany Pool CSO Long-term Control Strategy, and Rezone Albany.
- Connecting to other, longer-term planning efforts can provide several benefits including ensuring efficient use of funds, avoiding duplication of effort, getting broader awareness or support for nature-based approaches, and raising the profile of smaller projects.

Slide Notes

Expand the Scope Beyond Hazard Mitigation Plans

It is important to understand what broader planning efforts (hazard mitigation or otherwise) are underway that could connect to the nature-based work. Given that nature-based projects have a variety of benefits, they can have a connection to a variety of other types of planning efforts. Expand the range of plans being targeted for mitigation actions, understanding that hazard mitigation plans alone may not be a silver bullet for collaboration.

Some of the plans that were referenced during the Albany project included the State Climate Vulnerability and Adaptation Plan, the draft Multijurisdictional Hazard Mitigation Plan, the Albany Pool CSO Long-term Control Strategy, and Rezone Albany. Connecting to these longer-term planning efforts can provide several benefits including ensuring efficient use of funds, avoiding duplication of effort, getting broader awareness or support for nature-based approaches, and raising the profile of smaller projects.

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Connecting to other, longer-term planning efforts can provide several benefits including ensuring efficient use of funds, avoiding duplication of effort, getting broader awareness or support for nature-based approaches, and raising the profile of smaller projects.

Expand the Scope Beyond Hazard Mitigation Plans

- Know what new approaches, training, or education are necessary to expand local capacity to implement and maintain nature-based practices
- Examples include: changes to the planning and implementation process for infrastructure maintenance and replacement (road repaving, water/sewer upgrades, etc.), adopting new policies or ordinances, establishing new partnerships, and creating new funding strategies
- Generally, consider regional, multi-jurisdictional hazard mitigation plan actions that encourage goal alignment between departments and jurisdictions.

Slide Notes

As important as it is to understand how mitigation strategies might align with processes already in place, there is also a need to know what new approaches are necessary to expand local capacity.

New approaches might include changes to the planning and implementation process for infrastructure maintenance and replacement (road repaving, water/sewer upgrades, etc.), adopting new policies or ordinances, establishing new partnerships, and creating new funding strategies.

These considerations are important from both a planning and implementation perspective. Generally, consider regional, multi-jurisdictional hazard mitigation plan actions that encourage goal alignment between departments and plans.

In the Ashland pilot, one recommendation was to consider partnering with the Rogue Valley Sewer Services district on regional water quality and floodwater management projects.

Slide Text

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Module 5: Examples of Water Quality and Hazard Mitigation Plan Integration



Source: BrianAsh <https://sustainabledesignalliance.com/raingardens>



Slide Notes

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Module Four Recap:

- Introduce the EPA and FEMA pilot project goals and objectives
- Review the results and outputs/outcomes of each pilot project
- Review and understand the best practices developed from lessons learned during the pilot projects

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>

Slide Notes

Module Four Recap

Module four of this training introduced the EPA and FEMA pilot project goals and objectives, reviewed the results and outputs/outcomes of each pilot project, and described best practices developed from lessons learned during the pilot projects.

Source: Aaron Volkening from Flickr <https://www.flickr.com/photos/87297882@N03>



Module Five Learning Steps:

1. Highlight hazard mitigation plans that incorporate nature-based solutions
2. Present three real-life examples of how integrated planning efforts can be initiated to satisfy aspects of hazard mitigation planning and watershed planning for local communities

Source: Aaron Volkening from Flickr
<https://www.flickr.com/photos/87297882@N03>

Slide Notes

Module Five Learning Steps

The fifth and final module in this training highlights hazard mitigation plans that incorporate nature-based solutions. The three case studies presented in this module will analyze the following plans: the City of Milwaukee, Wisconsin's Local Hazard Mitigation Plan, Minnesota's State-wide Hazard Mitigation Plan, Vermont's State-wide Hazard Mitigation Plan.

Each of the case studies provide a background on the planning effort, including those parties involved; the overlap between hazard mitigation strategies and the implementation of low impact development projects; elements of successful program implementation; and resources where local communities can find more information about each community or state's approach.

Slide Text

Module Five Learning Steps

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Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

Integrated watershed planning and floodplain management are key components of Milwaukee's HMP

Planning team members

- **All Hazards Mitigation Plan Local Planning Team:** Provided updated plan (e.g., types of hazards, mitigation strategies)
- **Southeastern Wisconsin Regional Planning Commission (SEWRPC):** Provided information and planning initiatives to help solve regional public works and environmental issues; wrote the plan and held meetings with the local planning team
- **Milwaukee Metropolitan Sewerage District (MMSD):** Provided water reclamation and flood management services; recommended mitigation strategies
- **University of Wisconsin-Madison's Nelson Institute for Environmental Studies:** Provided climate projections

Slide Notes

Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

The City of Milwaukee's Hazard Mitigation Plan (HMP) proposes long-term, permanent solutions designed to reduce the exposure to, probability of, or potential risk to human life and property. The 2019 "all hazard" mitigation plan sets forth an appropriate, feasible, and effective hazard mitigation strategy through 2024.

Integrated watershed planning and floodplain management are key components of Milwaukee's HMP due to shared objectives and input from the Southeastern Wisconsin Regional Planning Commission. The Plan identifies several mitigation strategies, with associated elements that contribute to the strategy.

The Milwaukee HMP planning process included four core planning team members: All Hazards Mitigation Plan Local Planning Team: Provided updated plan (e.g., the types of hazards and mitigation strategies); Southeastern Wisconsin Regional Planning Commission (SEWRPC): Provided information and planning initiatives to help solve regional public works and environmental issues. They also wrote the plan and held meetings with the local planning team;

Milwaukee Metropolitan Sewerage District (MMSD): Provided water reclamation and flood management services and recommended mitigation strategies; Finally, the University of Wisconsin-Madison's Nelson Institute for Environmental Studies: Provided climate projections.

Slide Text

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University of Wisconsin-Madison's Nelson Institute for Environmental Studies: Provided climate projections

Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

Keys to Successful Implementation

1. City of Milwaukee (CoM) has extensive experience in urban sustainability and created a sustainability advisory group in 2004 that subsequently prepared and implemented HMPs.
2. MMSD is a national leader in urban flooding issues and watershed management. Its vision encompasses two key elements: (1) integrated watershed management; and (2) climate change mitigation/adaptation.
3. SEWRPC has developed or assisted with HMPs for various counties and local governments throughout the region. Stormwater and floodplain management planning was an initial focus of SEWRPC when it was established in the 1960s.

Slide Notes

Common interests in advancing integrated, comprehensive watershed planning and a long history of environmental sustainability among contributing organizations were critical for successful implementation of Milwaukee's HMP. The planning group cited the performance and cost-effectiveness of nature-based practices, and advocated for their inclusion in the HMP and other municipal planning approaches.

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Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

Elements of the Mitigation Strategy to Reduce Flooding and Stormwater Drainage Problems

Milwaukee's HMP Components

- Analysis of hazardous events
- Community vulnerability assessments
- Hazard mitigation strategies

Milwaukee's HMP Flooding/ Stormwater Mitigation Elements

- Floodplain management
- Stormwater management
- Preservation of sensitive land
- Public education/outreach
- Secondary planning

Slide Notes

The HMP suggests an approach that is based on three components to mitigate potential hazards associated with flooding: an analysis of hazardous events, community vulnerability assessments, and hazard mitigation strategies.

The Mitigation effort focuses on five main elements related to land/building development, education, and reducing vulnerability of an identified hazard area, including: floodplain management, stormwater management, preservation of sensitive land, public education/outreach, and secondary planning. Each element is an important component of the overall strategy for reducing flood risk and damage.

Slide Text

Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

Elements of the Mitigation Strategy to Reduce Flooding and Stormwater Drainage Problems

Milwaukee's HMP Components: Analysis of hazardous events, Community vulnerability assessments, Hazard mitigation strategies

Milwaukee's HMP Flooding/ Stormwater Mitigation Elements: Floodplain management, Stormwater management, Preservation of sensitive land, Public education/outreach, Secondary planning

Case Study: Milwaukee's Local Hazard Mitigation Plan (2019 Update)

Elements of the Mitigation Strategy to Reduce Flooding and Stormwater Drainage Problems

The city's stormwater management ordinances cite several provisions related to GI/LID, including those that:

- Reduce adverse impacts from stormwater runoff
- Attain and maintain water quality standards
- Reduce the effects of development on erosion
- Minimize damage to public and private property
- Minimize impervious cover to reduce nonpoint source pollution
- Promote the co-benefits of GI/LID
- Provide adaptation and resilience to climate change

Slide Notes

Existing city regulations and ongoing programs for floodplain and stormwater management are critical to the implementation of the HMP and the five floodplain and stormwater mitigation elements that are considered in the plan. The city's stormwater management ordinances cite several provisions related to GI/LID, including those that:

Reduce adverse impacts from stormwater runoff, attain and maintain water quality standards, reduce the effects of development on erosion, minimize damage to public and private property, minimize impervious cover to reduce nonpoint source pollution, promote the co-benefits of GI/LID, and provide adaptation and resilience to climate change.

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- Promote the co-benefits of GI/LID
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Case Study: Milwaukee’s Local Hazard Mitigation Plan (2019 Update)

Approach	Key Inputs Related to Environmental Protection
Stormwater Management	MMSD GI Plan MMSD GI Plan for the Kinnickinnic River Watershed MMSD Stormwater Ordinance CoM Baseline Green Infrastructure Inventory CoM Green Infrastructure Plan CoM Green Streets Stormwater Management Plan
Integrated Watershed Planning	CoM Sustainability Plan MMSD Watercourse Management Plans SEWRPC Park and Open Space Regional Land Use Plan
Preservation of Environmentally Sensitive Land	CoM Sustainability Plan CoM BaseTern Feasibility Milwaukee Greenway Master Plan MMSD Greenseams

Slide Notes

This table lists Milwaukee’s HMP strategies using nature-based solutions and watershed planning. The hazard mitigation approaches are listed on the left-hand side, and the community resources/capabilities that support the approach are listed on the right.

Slide Text

Case Study: Milwaukee’s Local Hazard Mitigation Plan (2019 Update)

Approach: Storm Water Management, Key Inputs Related to Environmental Protection: [MMSD GI Plan](#), [MMSD GI Plan for the Kinnickinnic River Watershed](#), [MMSD Stormwater Ordinance](#), [CoM Baseline Green Infrastructure Inventory](#), [CoM Green Infrastructure Plan](#), [CoM Green Streets Stormwater Management Plan](#)

Approach: Integrated Watershed Planning, Key Inputs Related to Environmental Protection: [CoM Sustainability Plan](#), [MMSD Watercourse Management Plans](#), [SEWRPC Park and Open Space Regional Land Use Plan](#)

Approach: Preservation of Environmentally Sensitive Land, Key Inputs Related to Environmental Protection: [CoM Sustainability Plan](#), [CoM BaseTern Feasibility](#), [Milwaukee Greenway Master Plan](#), [MMSD Greenseams](#)

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

Minnesota Department of Public Safety, Division of Homeland Security and Emergency Management: Lead agency for preparing, monitoring, evaluating, and updating the state HMP.

The Silver Jackets Interagency Group: Interagency team composed of the U.S. Army Corps of Engineers, FEMA, NOAA, U.S. Geological Survey, and various state agencies. Serves as the state’s natural hazards risk management team.

Interagency Climate Adaptation Team (ICAT): Aims to increase collaborative efforts among state agencies and focus attention on actions to assist Minnesota with adapting to climate change.

University of Minnesota Duluth Geospatial Analysis Center (GAC): updates the state profile, natural hazard risk assessment, vulnerability assessments, and other sections of the plan, including mapping. GAC also aids in updating many of the state’s county multi-jurisdictional HMPs.

Minnesota Pollution Control Agency (MPCA): directs many of the environmental programs that create co-benefits of increasing resilience, mitigating hazards, and improving environmental conditions.

Natural Hazards Addressed in MN’s HMP

- Riverine and flash flooding
- Wildfires
- Blizzards, tornados, and wind
- Extreme temperatures
- Bluff and coastal erosion
- Hailstorms, ice, and severe storms
- Drought

Slide Notes

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

The Minnesota Hazard Mitigation Plan evaluates, profiles, and ranks natural and human-caused hazards affecting the state as determined by frequency of event, economic impact, deaths, and injuries. This HMP was updated in 2019 by incorporating statewide risk assessments, local and tribal risk assessments and mitigation strategies, and additional recommendations from various mitigation stakeholders. This slide details the types of hazards included in the plan, and planning team members.

Slide Text

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

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Minnesota Pollution Control Agency (MPCA): directs many of the environmental programs that create co-benefits of increasing resilience, mitigating hazards, and improving environmental conditions.

Natural Hazards Addressed in MN's HMP:

Riverine and flash flooding, Wildfires, Blizzards, tornados, and wind Extreme temperatures, Bluff and coastal erosion, Hailstorms, ice, and severe storms, Drought

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

Local Planning and Regulations Strategy: guides and influences the way land and buildings are developed and built, including capital improvement programs, open space protection, and stormwater management.

Natural Systems Protection Strategy: aims to minimize hazard losses and preserve or restore the functions of natural systems.

- Includes GI/LID practices, such as sediment control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration/preservation.
- Acquisition of flood prone homes to create stream buffers, parkland, and open space is a high priority in the HMP due to frequent flooding and property damage/loss.

Minnesota’s Mitigation Action Strategy Types

- Data
- Local Planning and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Education and Awareness Programs
- Mitigation Preparedness and Response Support

Slide Notes

Mitigation action strategies for natural hazards are grouped into six categories, shown in the green box. Nature-based solutions, and other water quality-related strategies/actions are included in two categories: Local Planning and Regulations and the Natural Systems Protection categories.

Local Planning and Regulations Strategy: guides and influences the way land and buildings are developed and built, including capital improvement projects, open space protection, and stormwater management.

Natural Systems Protection Strategy: aims to minimize hazard losses and preserve or restore the functions of natural systems. This strategy includes GI/LID practices, such as sediment control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration/preservation. It also includes acquisition of flood prone homes to create stream buffers, parkland, and open space which is a high priority in the HMP due to frequent flooding and property damage/loss.

Slide Text

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

Local Planning and Regulations Strategy: guides and influences the way land and buildings are developed and built, including capital improvement programs, open space protection, and stormwater management.

Natural Systems Protection Strategy: aims to minimize hazard losses and preserve or restore the functions of natural systems.

Includes GI/LID practices, such as sediment control, stream corridor restoration, watershed management, forest and vegetation management, and wetland restoration/preservation.

Acquisition of flood prone homes to create stream buffers, parkland, and open space is a high priority in the HMP due to frequent flooding and property damage/loss.

Case Study: Minnesota's Statewide Hazard Mitigation Plan

Minnesota's Specific Action Items with Nature-based Mitigation

- Water-sensitive infrastructure required in all comprehensive and watershed plans
- Habitat preservation/restoration focus
- Agricultural water management
- Urban heat island reduction strategies
- Conservation partnerships with NGOs
- Education and outreach support

Slide Notes

Minnesota's Specific Action Items with Nature-based Mitigation

The following action items are included in the Minnesota HMP and may relate to or include water quality themes and nature-based solutions: water-sensitive infrastructure is required in all comprehensive and watershed plans, habitat preservation/restoration is a focus in hazard mitigation projects, agricultural water management, urban heat island reduction strategies, conservation partnerships with NGOs, and education and outreach support.

Slide Text

Case Study: Minnesota's Statewide Hazard Mitigation Plan

Minnesota's Specific Action Items with Nature-based Mitigation

- Water-sensitive infrastructure required in all comprehensive and watershed plans
- Habitat preservation/restoration focus
- Agricultural water management

- Urban heat island reduction strategies
- Conservation partnerships with NGOs
- Education and outreach support

Case Study: Minnesota’s Statewide Hazard Mitigation Plan

Approach	Key Inputs Related to Environmental Protection
Stormwater Management	Stormwater Financial Assistance Minimal Impact Design Standards Metropolitan Council’s One Water Grant Program
Agricultural Water Management	Agriculture BMP Loan Program Agricultural Water Quality Certification Program
Conservation and Restoration	Reinvest in MN Wetlands Conservation easements and the Wetlands Reserve Program Wetland Tax Exemption Program Forest Stewardship
Drinking Water Source Protection	MN Clean Water, Land and Legacy Amendment Drinking Water Protection Program
Integrated Watershed Planning	One Watershed, One Plan
Water Quality Protection Programs	Great Lakes Restoration Initiative Funding Surface Water Monitoring MN Mandatory Buffer Law

Slide Notes

The Minnesota HMP lists six specific action items related to mitigation, resilience, and climate adaptation with nature-based systems. In addition, the plan includes many existing programs that use nature-based approaches to support the resilience component of hazard mitigation. This list summarizes these resilience strategies and outlines associated programs. The hazard mitigation approaches are listed on the left-hand side, and the community resources/capabilities that support the approach are listed on the right.

Slide Text

Case Study: Stormwater Management, Minnesota’s Statewide Hazard Mitigation Plan

Approach: Stormwater Management, Key Inputs Related to Environmental Protection: [Stormwater Financial Assistance](#)
[Minimal Impact Design Standards](#), [Metropolitan Council’s One Water Grant Program](#)

Approach: Agricultural Water Management, Key Inputs Related to Environmental Protection: [Agriculture BMP Loan Program](#)
[Agricultural Water Quality Certification Program](#)

Approach: Conservation and Restoration, Key Inputs Related to Environmental Protection: [Reinvest in MN Wetlands Conservation easements and the Wetlands Reserve Program](#), [Wetland Tax Exemption Program](#), [Forest Stewardship](#)

Approach: Drinking Water Source Protection, Key Inputs Related to Environmental Protection: [MN Clean Water, Land and Legacy Amendment](#), [Drinking Water Protection Program](#)

Approach: Integrated Watershed Planning, Key Inputs Related to Environmental Protection: [One Watershed, One Plan](#)

Approach: Water Quality Protection Programs, Key Inputs Related to Environmental Protection: [Great Lakes Restoration Initiative Funding](#), [Surface Water Monitoring](#), [MN Mandatory Buffer Law](#)

Case Study: Vermont's Statewide Hazard Mitigation Plan

The Vermont Emergency Management (VEM) agency in the Department of Public Safety developed and coordinated the HMP

State Agency of Natural Resource's, Department of Environmental Conservation, and The Nature Conservancy along with ~70 distinct organizations participated in meetings to support the 2018 HMP

The 16-person steering committee included representatives from the Agency of Natural Resources, The Nature Conservancy, the Vermont River Conservancy, the Agency of Agriculture, Food and Markets, and the High Meadows Fund, a local conservation non-profit.

Natural Hazards Addressed in Vermont's HMP

- Fluvial erosion
- Inundation flooding
- Ice
- Snow
- Drought
- Wind
- Heat
- Landslides
- Cold
- Wildfires

Slide Notes

Case Study: Vermont's Statewide Hazard Mitigation Plan

Vermont's Hazard Mitigation Plan (HMP) aims to protect life, property, natural resources, and quality of life by reducing vulnerability to climate change and natural disasters. The 2018 HMP is a rewrite of the state's 2013 plan and focuses on lessons learned in the aftermath of Tropical Storm Irene, which caused devastating damage across the state.

The Vermont Emergency Management (VEM) agency in the Department of Public Safety developed and coordinated the HMP. Approximately 70 distinct organizations participated in meetings to support the 2018 HMP; however, the plan only specifically acknowledges the contributions of the State Agency of Natural Resources, Department of Environmental Conservation, and The Nature Conservancy.

The 16-person steering committee included representatives from the Agency of Natural Resources, The Nature Conservancy, the Vermont River Conservancy, the Agency of Agriculture, Food and Markets, and the High Meadows Fund, a local conservation non-profit.

Slide Text

Case Study: Vermont's Statewide Hazard Mitigation Plan

The Vermont Emergency Management (VEM) agency in the Department of Public Safety developed and coordinated the HMP.

State Agency of Natural Resource's, Department of Environmental Conservation, and The Nature Conservancy along with ~70 distinct organizations participated in meetings to support the 2018 HMP.

The 16-person steering committee included representatives from the Agency of Natural Resources, The Nature Conservancy, the Vermont River Conservancy, the Agency of Agriculture, Food and Markets, and the High Meadows Fund, a local conservation non-profit.

Natural Hazards Addressed in Vermont's HMP: fluvial erosion, inundation flooding, ice, snow, drought, wind, heat, landslides, cold, wildfire.

Case Study: Vermont's Statewide Hazard Mitigation Plan

Vermont's HMP Goals Encompassing Environmental Protection

- Protect, restore, and enhance Vermont's natural resources to promote healthy, resilient ecosystems
- Develop and implement plans and policies that create resilient natural systems, built environments, and communities
- Create a common understanding of—and coordinated approach to—mitigation planning and action

Slide Notes

It is noteworthy that three of the four Vermont HMP's "Goals" cover environmental protection—a current rarity in state and local HMPs. The fourth goal was to enhance the resilience of the state's built assets, a focus of all HMPs.

The planning process aimed to better integrate the work of state agencies with regional and local governments, as well as nonprofit and private partners. A key objective was also to improve local leaders' understanding of hazard mitigation strategies (including protecting water quality) and aid in the development of local HMPs. Several of the mitigation actions in the state plan are intended to simplify the local HMP development process.

Within the HMP, VEM conducted a vulnerability assessment to identify potential threats to people, property, the environment, and the economy that could result from a hazard event. Flood damages from storms, which are increasing in frequency and intensity, were identified as a significant natural hazard. Flood mitigation thus drives a significant portion of the broad strategies and specific actions in the HMP.

Slide Text

Case Study: Vermont's Statewide Hazard Mitigation Plan

Vermont's HMP Goals Encompassing Environmental Protection

Protect, restore, and enhance Vermont's natural resources to promote healthy, resilient ecosystems

Develop and implement plans and policies that create resilient natural systems, built environments, and communities

Create a common understanding of—and coordinated approach to—mitigation planning and action

Case Study: Vermont’s Statewide Hazard Mitigation Plan

Priority	Specific Actions Related to Environmental Protection
Develop a Cross-Sector Buyout Program	<ul style="list-style-type: none"> • Design a cross-sector program considering funding, ownership, use restrictions, incentives, stewardship, and prioritization. • Create a dedicated state fund to support the purchase or local match of hazard-prone properties and purchase of easements to conserve river corridors, floodplains, and wetlands identified as key flood attenuation areas. • Fund the Emergency Relief and Assistance Program for non-federal disasters and towns with adopted floodplain/river bylaws and to support the 25% non-federal match for buyouts. • Create and maintain a database of tax-sale/foreclosed properties located within the flood risk and river meandering maps to identify flood-vulnerable structures for acquisition. • Develop a benefit-cost methodology to facilitate buyouts in areas at risk from flood related erosion and outside of FEMA mapped Special Flood Hazard Areas.

Slide Notes

Using the goals described on the previous slide, the steering committee developed five specific priorities, four of which have a significant potential for environmental protection. The next several slides detail these priorities.

Vermont clearly recognizes the potential risk to communities, the built environment, and natural resources from climate change and associated extreme events. Vermont’s HMP includes environmentally-based goals and aims to build resilience using GI and nature-based mitigation practices where possible. The result is a strategy devoted to a whole systems approach for flood mitigation. Measures that connect flood resilience, water quality, and natural habitat provide substantial co-benefits and are key components in the HMP.

The first goal is: Develop a Cross-Sector Buyout Program, which includes several specific actions related to environmental protection, including:

Design a cross-sector program considering funding, ownership, use restrictions, incentives, stewardship, and prioritization (of flood prone areas).

Create a dedicated state fund to support the purchase or local match of hazard-prone properties and purchase of easements to conserve river corridors, floodplains, and wetlands identified as key flood attenuation areas.

Fund the Emergency Relief and Assistance Program for non-federal disasters and towns with adopted floodplain/river bylaws and to support the 25% non-federal match for buyouts.

Create and maintain a database of tax-sale/foreclosed properties located within the flood risk and river meandering maps to identify flood-vulnerable structures for acquisition.

Develop a benefit-cost methodology to facilitate buyouts in areas at risk from flood related erosion and outside of FEMA mapped Special Flood Hazard Areas.

Slide Text

Case Study: Vermont's Statewide Hazard Mitigation Plan

Priority: Develop a cross-sector buyout program

Specific Actions Related to Environmental Protection:

- Design a cross-sector program considering funding, ownership, use restrictions, incentives, stewardship, and prioritization.
- Create a dedicated state fund to support the purchase or local match of hazard-prone properties and purchase of easements to conserve river corridors, floodplains, and wetlands identified as key flood attenuation areas.
- Fund the Emergency Relief and Assistance Program for non-federal disasters and towns with adopted floodplain/river bylaws and to support the 25% non-federal match for buyouts.
- Create and maintain a database of tax-sale/foreclosed properties located within the flood risk and river meandering maps to identify flood-vulnerable structures for acquisition.
- Develop a benefit-cost methodology to facilitate buyouts in areas at risk from flood related erosion and outside of FEMA mapped Special Flood Hazard Areas.

Case Study: Vermont's Statewide Hazard Mitigation Plan

Priority	Specific Actions Related to Environmental Protection
Inventory and Protect Critical Headwater and Floodplain Storage Areas	<ul style="list-style-type: none"> • Work with land conservation organizations to include river corridor and floodplain protection provisions, and/or headwater storage in conservation easements. This includes the Nature Conservancy's <i>Water Quality Blueprint Tool</i>. • Develop an inventory of critical headwater and floodplain storage areas that would result in a measurable abatement of flooding. • Complete a pilot project in a strategic watershed, using the developed inventory, to prioritize land conservation and determine the cost of avoided damage. • Identify stormwater impaired headwater storage areas where stormwater treatment and stream restoration would result in hazard mitigation co-benefits.

Slide Notes

The second goal is Inventory and Protect Critical Headwater and Floodplain Storage Areas

Specific actions related to environmental protection in this goal include:

Work with land conservation organizations to include river corridor and floodplain protection provisions, and/or headwater storage in conservation easements. This includes the Nature Conservancy's Water Quality Blueprint Tool.

Develop an inventory of critical headwater and floodplain storage areas that would result in a measurable abatement of flooding.

Complete a pilot project in a strategic watershed, using the developed inventory, to prioritize land conservation and determine the cost of avoided damage.

Identify stormwater impaired headwater storage areas where stormwater treatment and stream restoration could result in hazard mitigation co-benefits.

Slide Text

Case Study: Vermont's Statewide Hazard Mitigation Plan

Priority: Inventory and Protect Critical Headwater and Floodplain Storage Areas

Specific Actions Related to Environmental Protection:

- Work with land conservation organizations to include river corridor and floodplain protection provisions, and/or headwater storage in conservation easements. This includes the Nature Conservancy's *Water Quality Blueprint Tool*.
- Develop an inventory of critical headwater and floodplain storage areas that would result in a measurable abatement of flooding.
- Complete a pilot project in a strategic watershed, using the developed inventory, to prioritize land conservation and determine the cost of avoided damage.
- Identify stormwater impaired headwater storage areas where stormwater treatment and stream restoration would result in hazard mitigation co-benefits.

Case Study: Vermont’s Statewide Hazard Mitigation Plan

Priority	Specific Actions Related to Environmental Protection
Collaborate Across Flood Resilience, Water Quality, and Habitat Connectivity Programs and Funding	<ul style="list-style-type: none"> • Create a “Reconnect Vermont Rivers” initiative (or similar state planning, prioritization, and tracking mechanism) to enhance the funding eligibility and incentives for flood resilience, water quality, and habitat projects as co-benefits. • Develop hydraulic and stream power models to analyze and define valley areas and river corridor functions that would increase the storage of flood flows, sediments, and nutrients. • Promote the use of Vermont’s Fish and Wildlife’s Conservation Design Plan to achieve and maintain habitat connectivity and havens for Vermont rare, threatened, and endangered species.
Audit State Programs to Improve Support of Mitigation	<ul style="list-style-type: none"> • One stated outcome is to create resilient natural systems, built environments, and communities.



Slide Notes

The third goal is: Collaborate Across Flood Resilience, Water Quality, and Habitat Connectivity Programs and Funding

Specific actions related to environmental protection in this goal include:

Create a “Reconnect Vermont Rivers” initiative (or similar state planning, prioritization, and tracking mechanism) to enhance the funding eligibility and incentives for flood resilience, water quality, and habitat projects as co-benefits.

Develop hydraulic and stream power models to analyze and define valley areas and river corridor functions that would increase the storage of flood flows, sediments, and nutrients.

Promote the use of Vermont’s Fish and Wildlife’s Conservation Design Plan to achieve and maintain habitat connectivity and havens for Vermont rare, threatened, and endangered species.

The fourth goal is: Audit State Programs to Improve Support of Mitigation. One stated outcome of this goal is to create resilient natural systems, built environments, and communities.

Slide Text

Priority: Collaborate Across Flood Resilience, Water Quality, and Habitat Connectivity Programs and Funding

Specific Actions Related to Environmental Protection:

- Create a “Reconnect Vermont Rivers” initiative (or similar state planning, prioritization, and tracking mechanism) to enhance the funding eligibility and incentives for flood resilience, water quality, and habitat projects as co-benefits.
- Develop hydraulic and stream power models to analyze and define valley areas and river corridor functions that would increase the storage of flood flows, sediments, and nutrients.
- Promote the use of Vermont’s Fish and Wildlife’s Conservation Design Plan to achieve and maintain habitat connectivity and havens for Vermont rare, threatened, and endangered species.

Priority: Audit State Programs to Improve Support of Mitigation

Specific Actions Related to Environmental Protection: One stated outcome is to create resilient natural systems, built environments, and communities.

Case Study: Vermont's Statewide Hazard Mitigation Plan

Priority	Specific Actions Related to Environmental Protection
Improve Local Leaders' Understanding of Hazard Mitigation	<ul style="list-style-type: none"> • Complete avoided loss studies to better understand the positive impact of completed mitigation work, including the value of open space, forested, and conserved land. • Develop strategic capital budgeting training and materials to incorporate mitigation and water quality projects, explain the cost of no action, and include municipal liability concerns. • Promote and maintain technical support to communities to adopt river corridor bylaws, limit development in floodplains and river corridors, and participate in the Community Rating System.

Slide Notes

The fifth goal is: Improve Local Leaders' Understanding of Hazard Mitigation

Specific actions related to environmental protection under this goal include:

Complete avoided loss studies to better understand the positive impact of completed mitigation work, including the value of open space, forested, and conserved land.

Develop strategic capital budgeting training and materials to incorporate mitigation and water quality projects, explain the cost of no action, and include municipal liability concerns.

Promote and maintain technical support to communities to adopt river corridor bylaws, limit development in floodplains and river corridors, and participate in the Community Rating System.

Slide Text

Case Study: Vermont's Statewide Hazard Mitigation Plan

Priority: Improve Local Leaders' Understanding of Hazard Mitigation

Specific Actions Related to Environmental Protection:

- Complete avoided loss studies to better understand the positive impact of completed mitigation work, including the value of open space, forested, and conserved land.
- Develop strategic capital budgeting training and materials to incorporate mitigation and water quality projects, explain the cost of no action, and include municipal liability concerns.
- Promote and maintain technical support to communities to adopt river corridor bylaws, limit development in floodplains and river corridors, and participate in the Community Rating System.

Case Study: Vermont’s Statewide Hazard Mitigation Plan

Approach	Key Inputs Related to Environmental Protection
Stormwater Management	VT DEC Green Infrastructure VT Better Roads Program VT DEC Clean Water State Revolving Fund
Agricultural/ Forestry Water Management	UVM Extension - Center for Sustainable Agriculture VT AAFM - Required Agricultural Practices VT DFPR AMPs for Maintaining Water Quality on Logging Jobs
Conservation and Restoration	VT DEC River Corridor Easement Program Statewide River Corridors Risk Analysis & Hazard Mitigation Prioritization Tool VT Dam Screening Tool
Integrated Watershed Planning and Nonpoint Source Pollution	VT Watersheds Grants VT DEC Water Initiative Program VT DEC Ecosystem Restoration Grant Program VT Standard River Management Principles and Practices VT Shoreland Protection Act & Permitting High Meadows Fund - Watershed Collaboration Grant Program Lake Champlain Basin Program - Grants

Slide Notes

Several state and local grant programs are expanded and leveraged to support the co-benefits described in the previous slides. This helps support new projects on flood resilience, fluvial erosion mitigation, and water quality. The current realignment of Vermont’s HMP strategies and actions provides a strong vision for the state to integrate water resource planning and hazard mitigation and fully realize associated co-benefits.

Slide Text

Case Study: Vermont’s Statewide Hazard Mitigation Plan

Approach: Stormwater Management, Key Inputs Related to Environmental Protection: [VT DEC Green Infrastructure](#), [VT Better Roads Program](#), [VT DEC Clean Water State Revolving Fund](#)

Approach: Agricultural/ Forestry Water Management, Key Inputs Related to Environmental Protection: [UVM Extension - Center for Sustainable Agriculture](#), [VT AAFM - Required Agricultural Practices](#), [VT DFPR AMPs for Maintaining Water Quality on Logging Jobs](#)

Approach: Conservation and Restoration, Key Inputs Related to Environmental Protection: [VT DEC River Corridor Easement Program](#), [Statewide River Corridors Risk Analysis & Hazard Mitigation Prioritization Tool](#), [VT Dam Screening Tool](#)

Approach: Integrated Watershed Planning and Nonpoint Source Pollution, Key Inputs Related to Environmental Protection: [VT Watersheds Grants](#), [VT DEC Water Initiative Program](#), [VT DEC Ecosystem Restoration Grant Program](#), [VT Standard River Management Principles and Practices](#), [VT Shoreland Protection Act & Permitting](#), [High Meadows Fund - Watershed Collaboration Grant Program](#), [Lake Champlain Basin Program - Grants](#)

*Congratulations!
You Finished!*

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Slide Notes

Congratulations! You have completed all five modules of the Creating Co-Benefits Through Hazard Mitigation Planning and Water Resource Management training.

Note: Any image not directly credited in these modules are from EPA products or projects.

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