

Building Climate Resiliency in the Clesson Brook Watershed



Community Open House
January 26, 2022

Project Partners:



Town of Buckland



Franklin Regional Council of Governments



GZA GeoEnvironmental



Funding provided by:



MVP
Municipal Vulnerability Preparedness



Massachusetts Department of Environmental Protection

Community Open House Agenda

- **Opening Presentation**
 - Climate Change Context
 - Project Background
 - Project Goals & Outcomes
 - Nature-Based Solutions
- **Public Discussion**
 - Interactive mapping activity
- **Wrap Up & Next Steps**
 - Project Updates
 - Continued Community Engagement



Clesson Brook winds its way south toward Buckland's Four Corners.

Climate Change Context



Downed trees, power outages result from fast-moving storm 10/8/2020

Microburst wreaks havoc in Deerfield, Montague 7/31/2019

Quabbin Reservoir has lost 10 billion gallons of water due to drought 8/31/2016

Wet and wild: Heavy rains cause localized flooding headaches 2/26/2016

Utilities warn that power could be out for days in Northeast 10/30/2017

Heavy weekend rainfall leads to flooding, road closures throughout Franklin County

Climate Change Context

Extreme weather events are anticipated to increase due to climate change. Scientists predict the following factors will all **increase** over time:



Frequency



Intensity



Duration



Geographic extent



The Deerfield River during Tropical Storm Irene, as seen from the Buckland side.

Photo courtesy of the Greenfield Recorder/Paul Franz

Climate Change Context



Changing
precipitation



Higher
temperatures

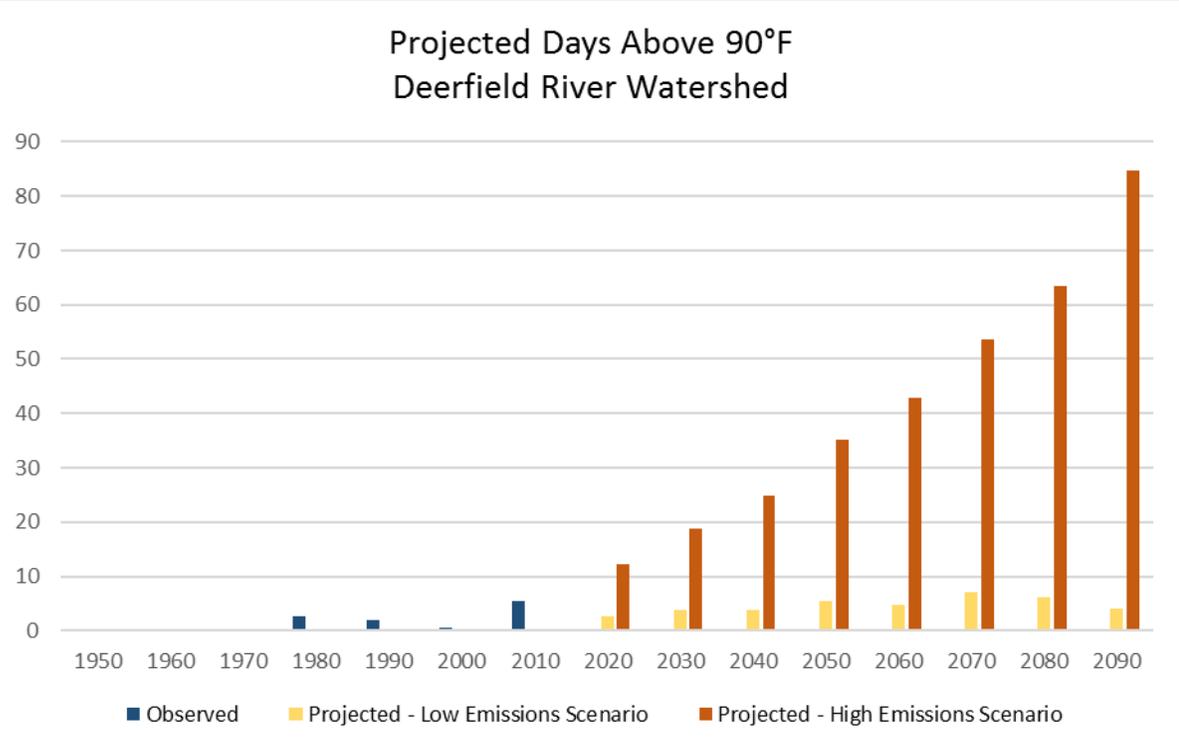


More frequent &
intense storms

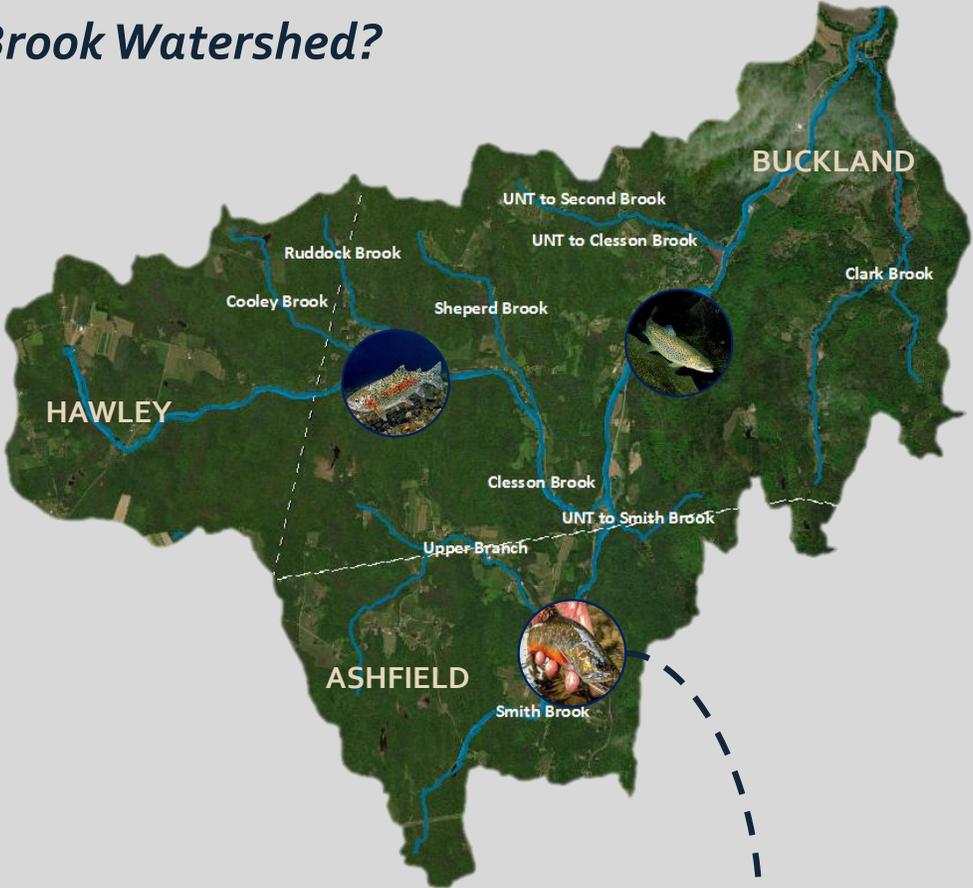
Climate change **increases** existing risks already present in
the Clesson Brook Watershed

Project Background

Why are we concerned about climate change in the Clesson Brook Watershed?



The number of days per year with daily maximum temperatures over 90°F is projected to **continually increase through the end of the century under a high emissions scenario.**

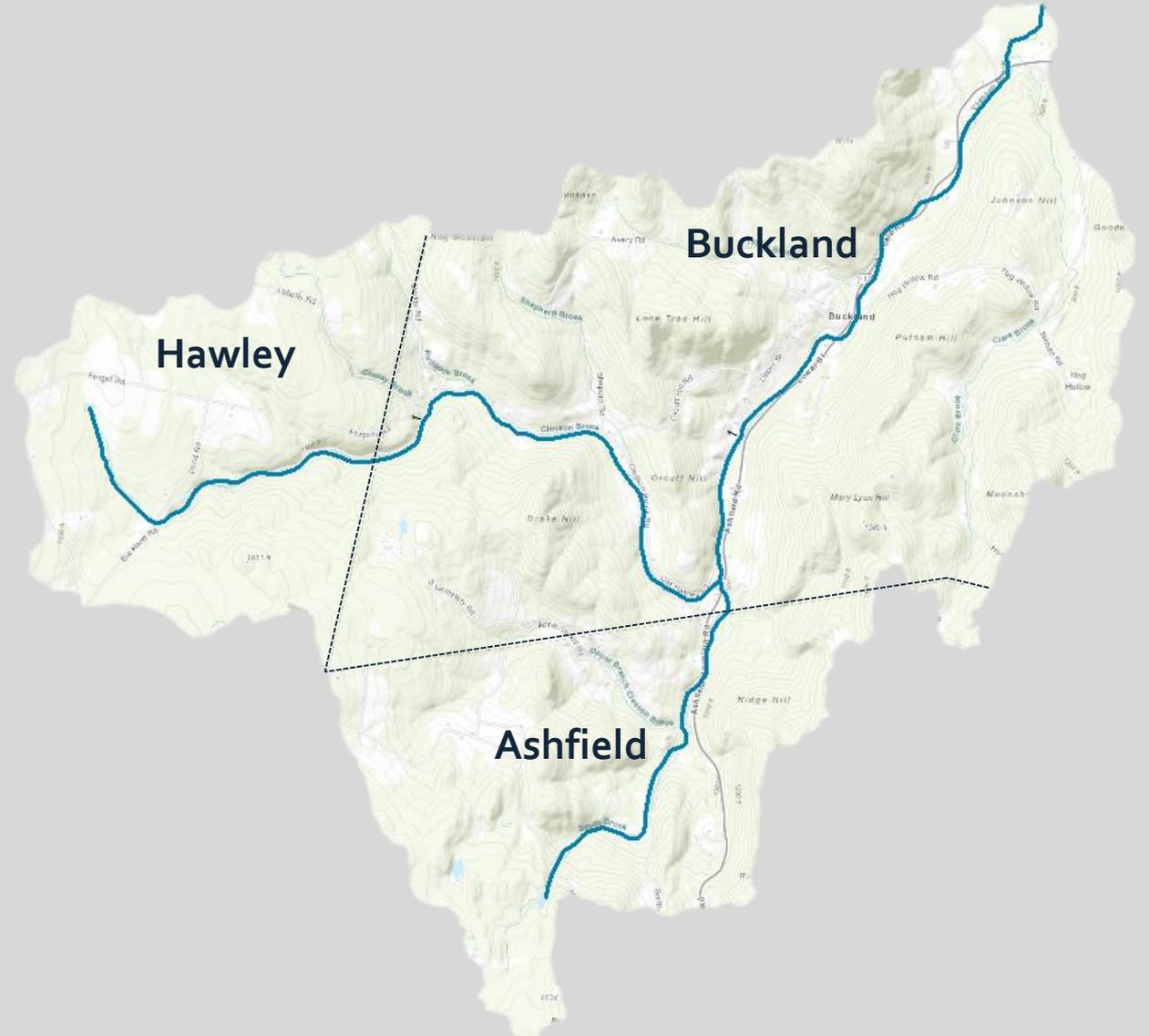


Coldwater fish resources (CFRs) are habitats particularly **sensitive to the impacts of climate change.** 10 streams in the Clesson Brook watershed are CFRs.

Thinking Like a Watershed

Watersheds don't conform to our local boundaries.

By working at the watershed scale with the neighboring towns of Ashfield and Hawley, Buckland can **build a framework of actions that not only improve the climate resiliency of each town**, but over time, create a more resilient Clesson Brook Watershed.



Project Background

Concerns Raised in the 2017 Watershed-Based Plan to Maintain the Health and Improve the Resiliency of the Deerfield River Watershed

- Very little protected land in the upland tributary areas and the watershed as a whole
- Agricultural uses along the stream corridors
- Stormwater runoff from Route 112 and other roads that are adjacent to Clesson Brook and its tributaries



Project Background

Concerns Raised in Buckland's 2018 Municipal Vulnerability Preparedness Plan

- **Undersized and failing culverts** in the Clesson Brook Watershed
 - These pose a current and future risk to transportation and emergency response
- **Flooding and fluvial erosion** along Clesson Brook
 - Areas damaged by TS Irene are still experiencing severe erosion that threatens roads and bridges
- The Buckland Recreation Area is plagued by **chronic flooding and erosion**



Town of Buckland

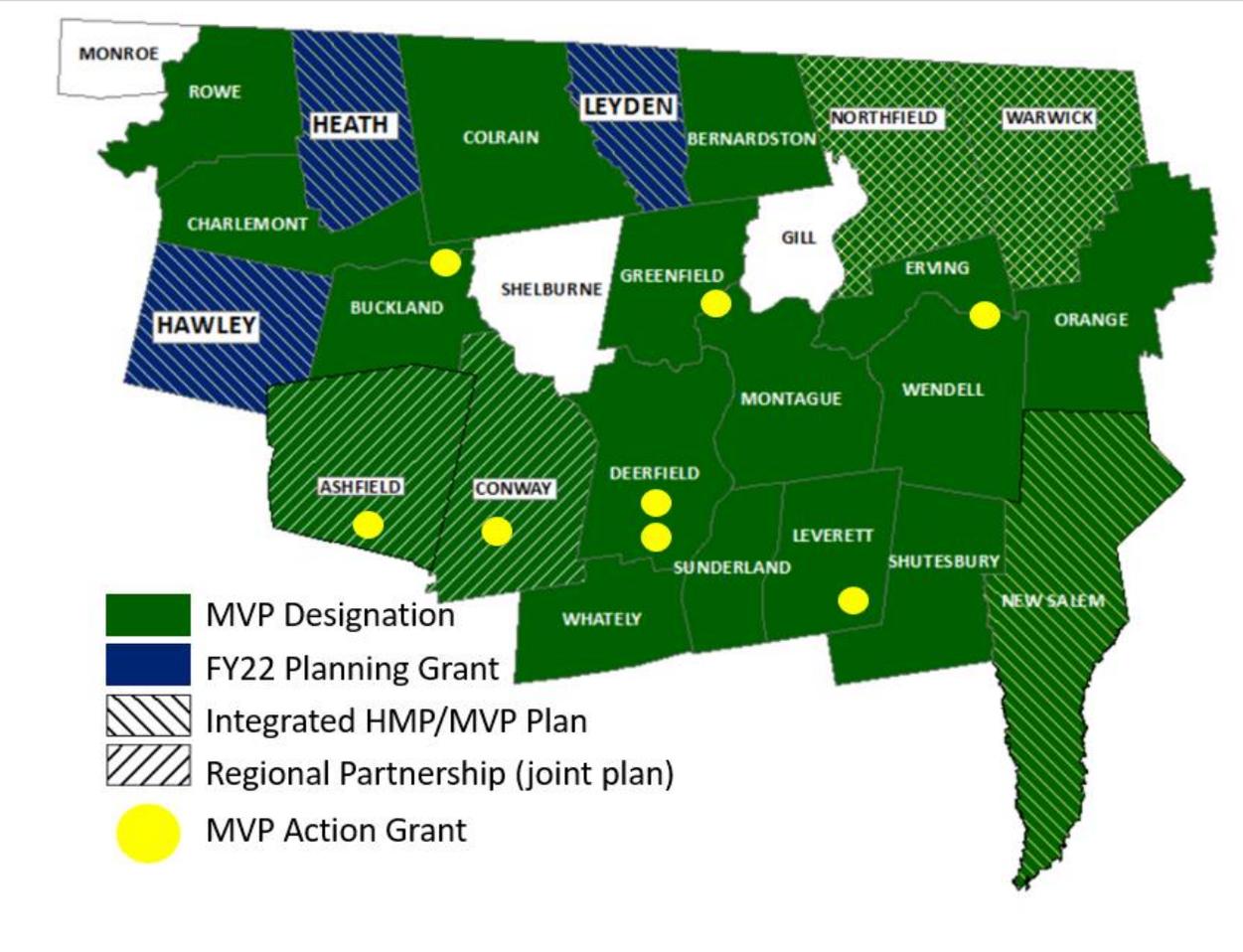


Municipal Vulnerability Preparedness (MVP) Program
MVP Resiliency Plan
June 2018

Facilitated by the
Franklin Regional Council of Governments
A State-Certified MVP Provider



Project Background



Buckland received a \$100,117 grant from the state’s **Municipal Vulnerability Preparedness (MVP)** program for a project to develop a *Watershed-Based Assessment and Climate Resiliency Plan for the Clesson Brook Watershed*.

An additional \$38,500 grant awarded to the Franklin Regional Council of Governments by the **MassDEP’s 604b Water Quality Management Grant Program** will be used to develop this comprehensive plan.

Project Goals & Outcomes

1. **Fluvial geomorphic assessment** of the Clesson Brook watershed to provide information on the causes of erosion, channel instability, and habitat degradation
2. **Prepare a Hydrologic and Hydraulic Model** of the Clesson Brook to estimate peak flow rates and evaluate flood water surface elevations and flow paths under current conditions and projected future conditions considering climate change
3. **Develop a database of road-stream crossings** along the Clesson Brook to be used for prioritizing replacements

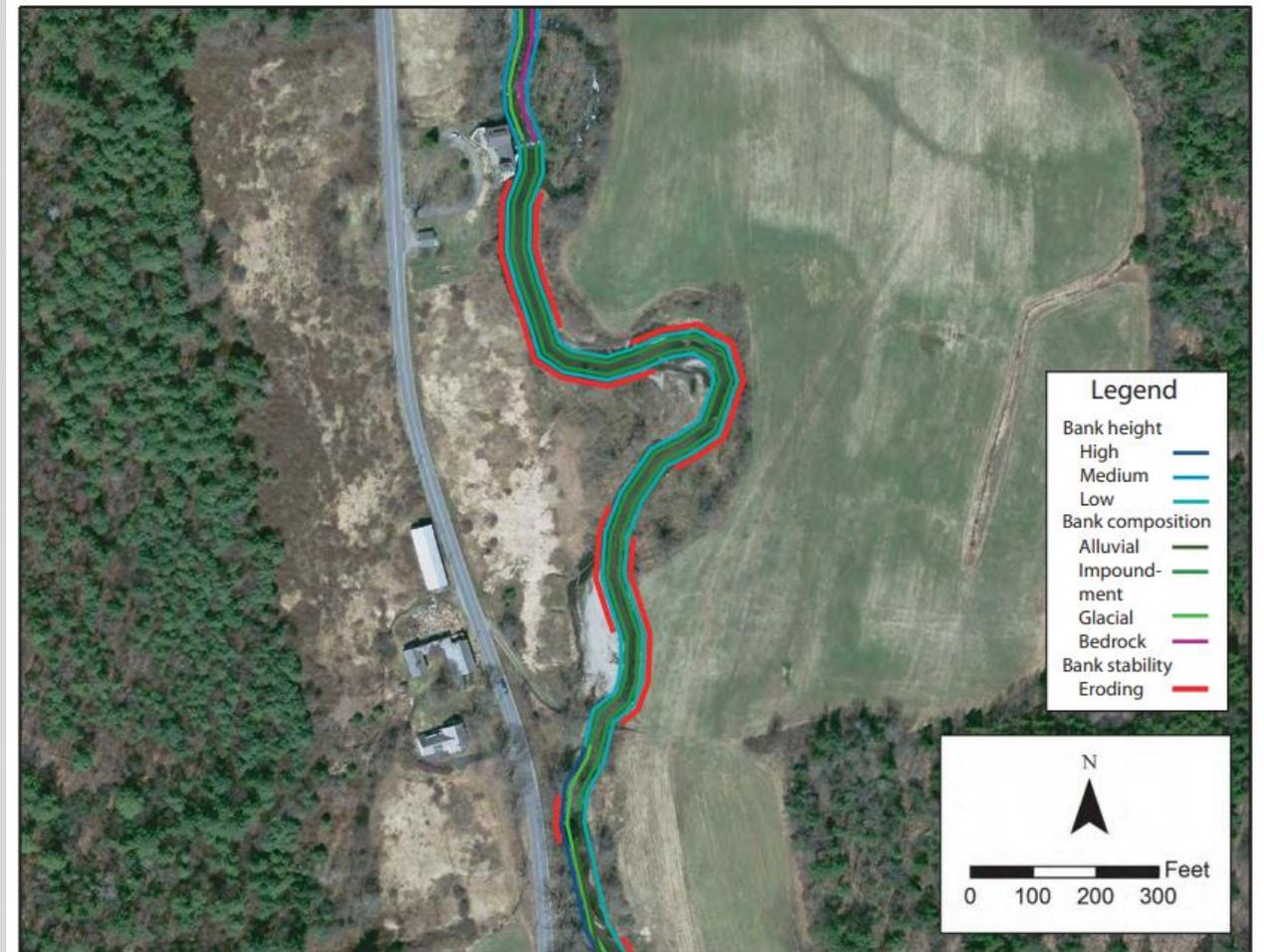


Figure 11. Comparison of bank composition (inner line), height (middle line), and stability (outer line) along a portion of South River.

Example of a fluvial geomorphic assessment completed for the South River Watershed in Ashfield and Conway

Project Goals & Outcomes (cont.)

4. Prioritize parcels within the Clesson Brook watershed for conservation
5. Identify restoration projects and prepare proposed conceptual designs
6. Complete Watershed-Based Plan for Clesson Brook
7. Community engagement!



Site assessments will be conducted throughout the watershed to assess areas for conservation & restoration



Example of a completed restoration project: boulder deflectors positioned in stream to help slow the flow

Nature-Based Solutions

Defined by the International Union for Conservation of Nature as "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits"



Riverbank restoration on the North River, Colrain MA



Low impact development project, Greenfield MA



Nature-Based Solutions

South River Meadow Restoration Project

In this example, a reconnected floodplain absorbs higher flows during a storm affecting the South River in Conway.

Ultimately the project resulted in:

- Reduced flooding and erosion on the Town's property as well as the adjacent property
- Reduced downstream sediment loading
- Improved habitat
- Improved recreation resources



Construction during floodplain reconnection



Reconnected floodplain absorbing higher flows during a storm event

Nature-Based Solutions

Why focus on NBS projects?



Enhanced public safety by reducing risks from flooding, erosion, drought, and heat risks to vulnerable populations and community assets.



Avoided infrastructure costs of short- and long-term maintenance, unplanned repairs and safety improvements due to flooding and failure from intense rain events.



Promotes biodiversity, important for environmental health and safeguarding natural resources like water, food, and shelter.

And other **ecosystem services**, such as improving air and water quality, flood protection, groundwater recharge, carbon sequestration, human health and well-being

We want to hear from you!

1. How has climate change impacted the Clesson Brook watershed?
2. What are your concerns with regard to the increasing frequency of heavy precipitation events in the watershed?
3. Do you know of areas that are frequently impacted by flooding or erosion?

Wrap Up & Next Steps

Project StoryMap

- [Bit.ly/clessonbrookmap](https://bit.ly/clessonbrookmap)

Continued Community Engagement

- Site visits in the Clesson Brook Watershed
- Two field trips or activities with local students
- Newsletter postings
- Second Community Open House next summer

