Site Study Pepperell: Unkety Brook

About this site: Unkety Brook is aquatic core habitat as shown on MA BioMap. It is also rare species core on BioMap and is a Natural Heritage and Endangered Species Program (NHESP) site. There is a significant area of conservation property both upstream and downstream from this crossing.

Community concerns about Unkety Brook

This area is prone to flooding.

At Pepperell/Dunstable line there are beaver dams and there isn't much elevation change.

The waters aren't flowing well under the roads. Just installed a culvert on Sucker brook and it was very expensive. Would need to be raised Lowell Road.

Nature-based Solutions Recommended for Pepperell: Unkety Brook

Unkety Brook

DataViewer link:
https://arcg.is/1b0HHm0

Recommended NbS
NbS #s correspond to Project Templates referenced on pages 3, 6, & 7 of Site Study

1. Unkety Brook under Lowell Road
   - DWD F — #15 MSCS culvert improvement
   - B DL — #20 Species crossing protections
2. Unkety Brook
   - F — #21 Beaver deceiver/promoter
   - B DL — #58 Invasive species management
   - B DL — #60 Habitat enhancements
   - B DL DW — #1 River/pond revegetation
   - B DW D F — #4 Wetland management restoration
3. Lowell Rd
   - #30 Pedestrian safety and bike access

Map Key

Bright blue overlay is the FEMA 100 year floodplain

Pink overlay is FEMA 500 year floodplain

Recommended NbS Key

- F Flooding NbS
- D Drought NbS
- RT Rising temps NbS
- DW Degraded water NbS
- DL Degraded landscape NbS
- B Loss of biodiversity NbS

NbS Narrative/NbS Project Templates for Pepperell: Unkety Brook

NbS Recommendations

- At the Pepperell / Dunstable line, there are beaver dams and minor elevation changes. Verification is needed regarding the success of the installed beaver deceivers and if more are needed.
- Numerous invasive plant species are present around the waterway, especially near Herbert Drive and Lowell Road.
- Within Unkety Brook, habitat enhancements, river/pond revegetation, and wetlands restoration would be impactful interventions.
- Near Unkety Brook under Lowell Road, a culvert improvement is needed, along with species crossing protections.
- On Lowell Road, there is a need for improved pedestrian safety and bike access.

NbS Project Templates for Site Specific NbS Recommendations on previous page

Resource 1 - How to Use Templates

Resource 2 - Next Steps in Planning & Permitting

The following template numbers correspond to the NbS recommendations on the page 2 Map.

#1 River/Pond Bank Revegetation

#4 Wetland Management Restoration

#15 MSCS Culvert Improvements

#20 Species Crossing Protections

#21 Beaver Deceiver/Promoter

#30 Pedestrian Safety and Bike Access

#58 Invasive Species Management

#60 Habitat Enhancements

View Pepperell Map Atlas **for maps on land covers, soil function and storage, water resources, ecological priority sites, and more.**

Soils Information for Pepperell: Unkety Brook

Pepperell

With a position low in the watershed, Pepperell's farmland and suburban residential lands have major potential for better management for increased soil function that would mitigate stormwater issues and benefit the several towns downstream.

Of the five focus communities, Pepperell is "lowest" in the watershed and receives stormwater impact from a vast upland land area. The Nashua River runs along the town's southeastern border and then through the center of town before continuing north. The rich alluvial soils of this riverside community are home to significant acreage of farmland with interspersed residential neighborhoods that constitute a large portion of Pepperell's "degraded soils with high regeneration potential". Compared with other focus communities like Fitchburg and Leominster, Pepperell has a low amount of "highly degraded" soil that would need intensive intervention to replicate lost soil function. The town's acreage of High Functioning soil is below the watershed-wide average, but is still significant and protection of these lands is important for watershed health. These high-functioning soils are evenly mixed with "moderate-low function" soil throughout the town.

Sites Considered for Nature-based Solutions

At least two of the sites being considered for stormwater mitigation are on soils with "high regeneration potential" and these sites could be priorities for implementing and tracking the performance of soil-regeneration measures. The Unkety Brook site has been identified as prone to flooding but is within a subbasin that is mostly in neighboring Dunstable.

Priority Actions for Protecting/Enhancing Soil Health in Pepperell

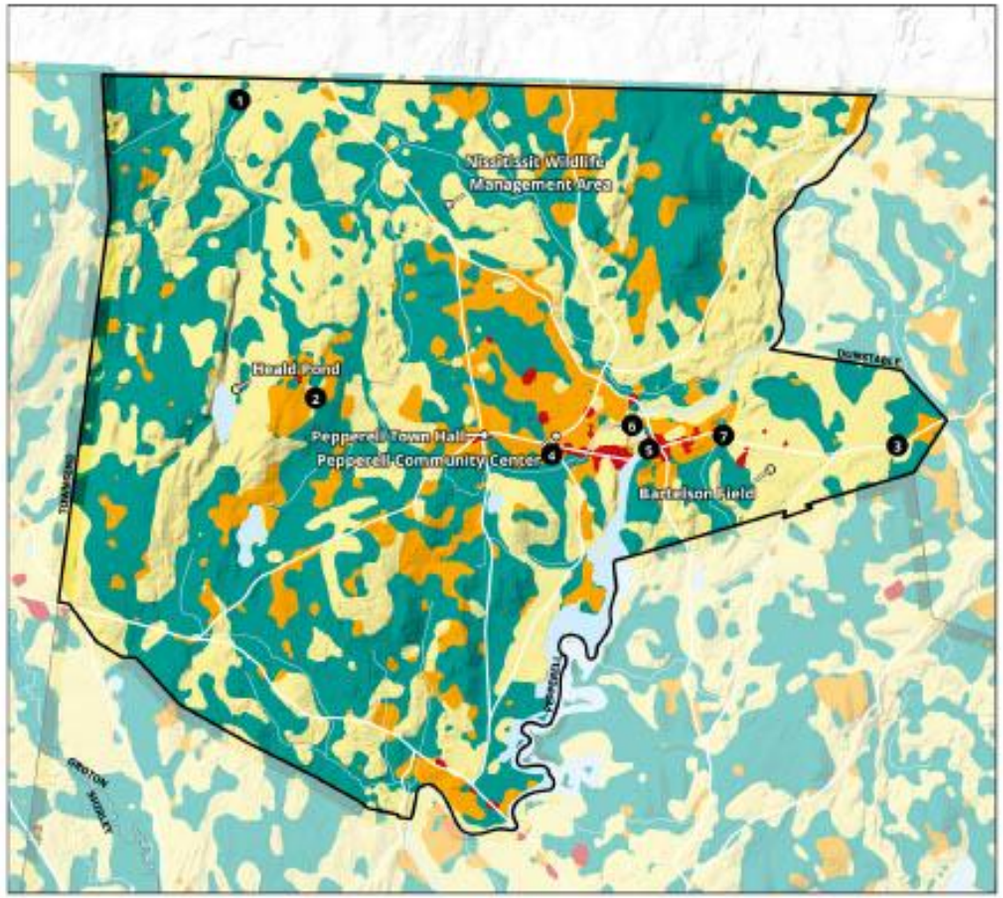
Better management of turf, lawns, gardens, and farms.

Example Nature-based Solutions:

- Education and outreach to key landowners and farmers about smart soil practices
- Pocket forests to transform biodiversity
- Planting and earthworks to restore connectivity and hydrology
- Front yard pollinator meadows
- Dual use solar
- Planning and zoning to preserve and enhance ecosystem function

#	SITE	PREDOMINANT SOIL FUNCTIONS FOR RESILIENCE			
		Highly Degraded	High Regeneration Potential	Moderate-Low Function	High Function
1	Bemis Wellhead Protection Zone/Gulf Brook		◆	◆	◆
2	Heald Orchard/Heald Pond		◆		◆
3	Unkety Brook		◆	◆	◆
4	Fitzpatrick School Parking	◆	◆		
5	Railroad Square	◆	◆		
6	Mill Street/Varnum Brook			◆	
7	Reedy Meadow off Lowell Rd.		◆	◆	◆

Soil Functions for Resilience



	Pepperell
High Performance Soils & High Carbon Soils	6,811 ac (45.9%)
Average Function Soils	6,039 ac (40.7%)
Degraded Soils with High Regeneration Potential	1,893 ac (12.8%)
Highly Degraded Soils	101 ac (0.7%)

○ Landmarks

❶ Sites Considered for Nature-based Solutions

[Read full Nashua River Watershed-wide Healthy Soils Report](#) (PDF 25MB)

Nature-based Solutions Opportunity Table Pepperell: Unkety Brook

Value	BEST	BETTER	GOOD
Feasibility	high	mid	low
Ownership	Municipal/Residential		

Best Value = An improvement to a resource that provides significant lasting resiliency and strengthens or serves related resources

Better Value = Makes significant improvements to resiliency with long lasting effect

Good Value= Improves the habitat value, or resiliency of a site or feature

Feasibility is based on property ownership or technical access

NbS Template#	Nature-based Solution Description	Unkety Brook
	Natural Environment Restructuring	
1	River / pond bank revegetation	**low**
2	Grassland meadow management restoration	
3	Forest / shrubland heath management or restoration	
4	Wetland management restoration	**mid**
5	New wetland or floodplain construction / expansion	**low**
7	Stream flow alteration	
8	Pollinator hedgerow buffer	
10	Soil management or restoration	
	** see Healthy Soils Report	

NbS Templat #	Nature-based Solution Description	Unkety Brook
	Built Environment Restructuring	
11	Stormwater treatment wetlands	
12	Daylighting of streams	
13	Upstream BMPs rain-garden, bio-swale, etc.	
14	Shade-habitat/ Infiltration tree plantings	
15	MSCS culvert improvement	**high**
17	Pervious parking walking areas	**mid**
19	Lighting modifications / upgrades	
20	Species crossing protections	**high**
21	Beaver deceiver / promoter	**high**
22	High-performance soil specifications	**low***
23	PV Parking Awnings + Rooftops	

Nature-based Solutions Opportunity Table Pepperell: Unkety Brook , cont'd.

Value	BEST	BETTER	GOOD
Feasibility	high	mid	low
Ownership	Municipal/Residential		

Best Value = An improvement to a resource that provides significant lasting resiliency and strengthens or serves related resources

Better Value = Makes significant improvements to resiliency with long lasting effect

Good Value= Improves the habitat value, or resiliency of a site or feature

Feasibility is based on property ownership or technical access

NbS #Template	Nature-based Solution Description	Unkety Brook
	Ecological Awareness & Access Projects	
24	Outdoor classroom/ Nature-play	
25	Food production and forage	
26	Apply Indigenous knowledge	**mid**
27	Soft trail	
28	Paved pervious trail UANT	
29	Soil protection-puncheon-boardwalk	
30	Pedestrian safety and bike access	**low**
	Architectural Projects to Consider	
49	Nature-based recreational opportunities	

NbS Template#	Nature-based Solution Description	Unkety Brook
	Value Added Features on Projects	
50	Analysis and study projects	
52	Educational Interpretation	
53	Furnishings / gathering space	
55	Advocacy group/ Stewards	
56	Volunteer opportunities	
58	Invasive species management	**high**
59	Species monitoring protocol	**mid**
60	Habitat enhancements	**mid**

MVP site walk at Unkety Brook in Pepperell

Photo by Sherry Anders

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To view the interactive online Plan, please visit nashuariverwatershed.org/Climate Resilience