Site Study Leominster: Barrett Park

About this site: The Barrett Pond Dam (1) is an earthen dam, 150 feet long by 15 feet high. The dam forms Colburn Reservoir (2). Barrett Park is the foremost park in Leominster, popular for its great playground and trails.

On September 11, 2023, the City of Leominster experienced torrential rainfall in a short period of time causing flash flooding and extensive damage to infrastructure and a threat to public safety. The aging dam overtopped causing flood waters to move through downhill neighborhoods. Residents were forced to evacuate over concerns of dam failure. The dam has been temporarily reinforced with gravel (photo on page 8).

Community concerns about Barrett Park

The dam is a high hazard dam. It experienced significant damage on Sept. 11, 2023. The dam was overtopped which caused serious flooding downhill with high speed and high volume water flow. The flooding went through Leominster neighborhoods with extensive property damage, exposing buried infrastructure (gas lines).

Residential neighborhood south of Barrett Park, Chestnut Street & Pleasant Street, sees lots of stormwater.

Big reason for no public access to swimming, lots of nutrients increasing algae problem in the pond.

Nature-based Solutions Recommended for Leominster: Barrett Park

Barrett Park

BSC Data Viewer link:
https://arcg.is/08GXSK

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

1. Border of Barrett Park

DL DW F #4 Wetland management restoration

DL DW F #1 River/pond revegetation

2. Dam at edge of Colburns Reservoir

F #16 Dam modifications/controls

B DW #18 Aquatic algae/invasive treatment

3. Open Field and Trail

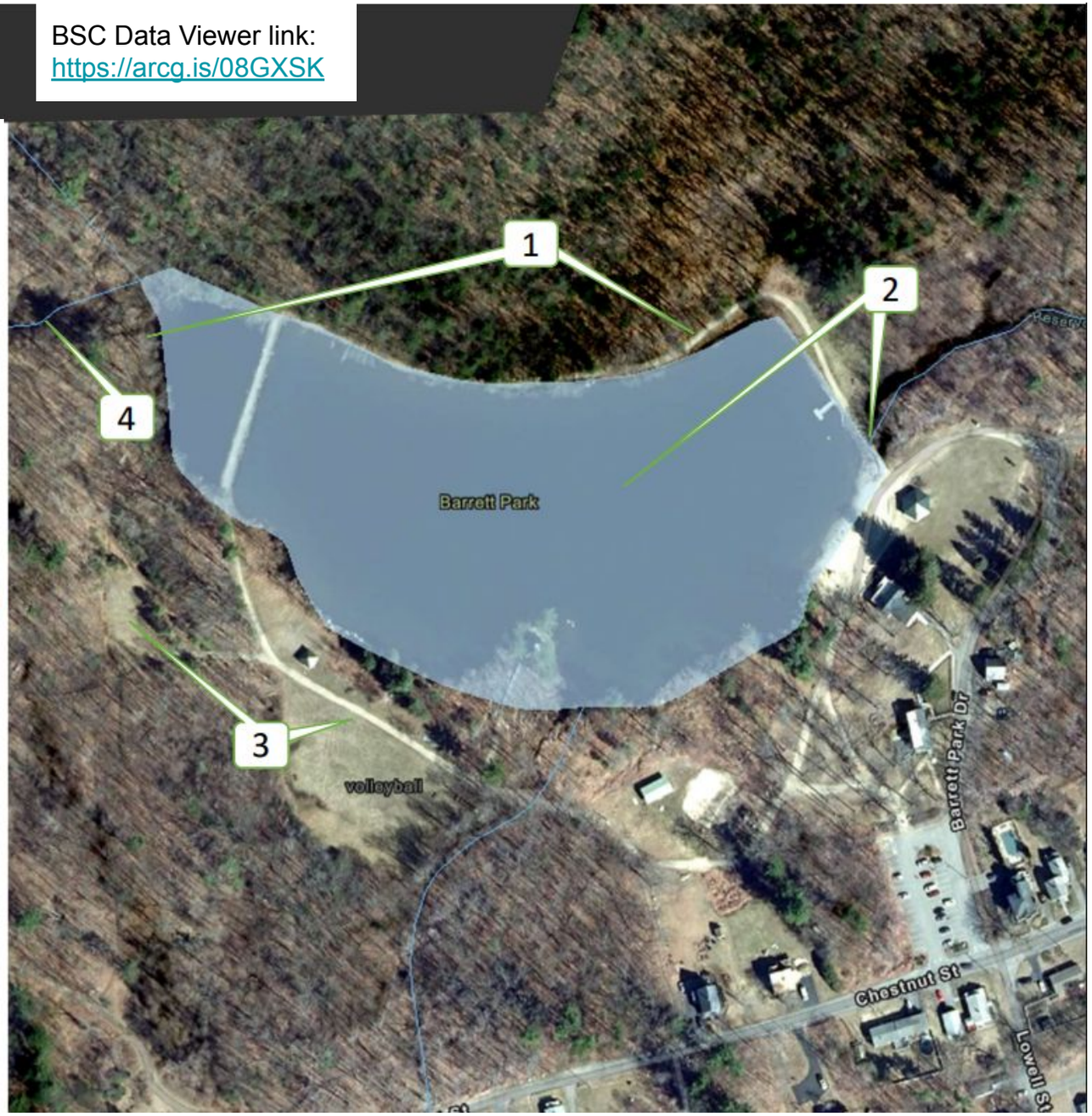
DL #8 Pollinator hedgerow buffer

- #24 Outdoor classroom/nature play
- #52 Educational Interpretation

4. Intermittent Stream

DW F #13 Upsteam BMPS rain-garden, bio-swale, etc.

B DL #58 Invasive species management



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 Leominster: Barrett Park

NbS Recommendations

- The main dam of Colburn's Reservoir needs modifications and controls.
- There is a waterfall is a steep ravine that discharges untreated stormwater from Elm Street down into the pond; we recommend exploring multiple options for stormwater retention areas here. Creating a swale would improve water retention. Several intermittent streams could be enhanced through upstream best management practices (rain gardens, bioswales).
- We recommend a culvert/retention pond where Elm Street crosses the stream; the retention pond will fill up quickly with sediment and gravel. The streams are clogged with sediments. The stream in Barrett Park Extension drains into the pond and needs attention. We recommend studying Barrett Pond's watershed boundaries, and focusing on the stream where Elm Street crosses the stream to the west of the pond.
- Erosion on the north side of the main loop trail is contributing to sedimentation; it can be corrected through revegetating the banks of Colburn's Pond.
- Invasive milfoil and aquatic algae are present in the pond; removal and treatment are needed. Invasive plants have also accumulated on the western edge near the waterfall.
- A pollinator meadow could be created in an open patch southwest of the pond. We also recommend lightly vegetating the edge of the volleyball field, while leaving space for the trailhead. Around the open field and trail, we recommend adding pollinator hedgerow buffers and nature play opportunities. Interpretive signage would contribute to increasing public understanding of NbS and the park's ecological value.

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

#8 Pollinator Hedgerow Buffer

#13 Upstream BMPs, Raingardens & Bioswales

#16 Dam Modifications and Controls

#18 Aquatic Algae/Invasive Treatment

#24 Outdoor Classroom- Nature Play

#52 Educational Interpretation

#58 Invasive Species Management

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

Soils Information for Leominster: Barrett Park

Leominster

Leominster's soils of high regeneration potential form a belt around the downtown area and are more clustered together than neighboring Fitchburg's. Regeneration or replication of the degraded soil function can mitigate negative impacts to Leominster's downtown and to the communities downstream.

Leominster, like neighboring Fitchburg, contains significant areas of developed and impervious landscapes compared with other communities in the Nashua River Watershed. Much of the most developed and degraded landscapes are found along the North Nashua River that flows in from northern neighbor Fitchburg. Pockets of "Highly Degraded" soils that have the potential for restored function with intensive intervention strategies are found throughout this central corridor along the river. Of the five focus communities, Leominster contains the most acreage of "degraded soil with high regeneration potential" primarily found in the suburban belt that surrounds the more urbanized downtown. The forested upland western side of town is home to the highest functioning soils in Leominster.

Sites Considered for Nature-based Solutions

Several sites in downtown Leominster near the North Nashua river have been identified as flood prone. Efforts to improve soil function in the suburban belt that surrounds the downtown can slow stormwater flows mitigate flooding. Potential sites for this kind of Nature-based Solution are Smith St. and Pierce Pond. Educational projects could be implemented there to encourage better soil management practices on the lawns and gardens of these suburban yards. Notably, there are several sites flagged for potential stormwater catchment projects that are in the same subbasin of the identified flood sites in Ashburnham and upstream of those sites. Sites in the forested uplands should be conserved/reinforced.

Priority Actions for Protecting/Enhancing Soil Health in Leominster

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

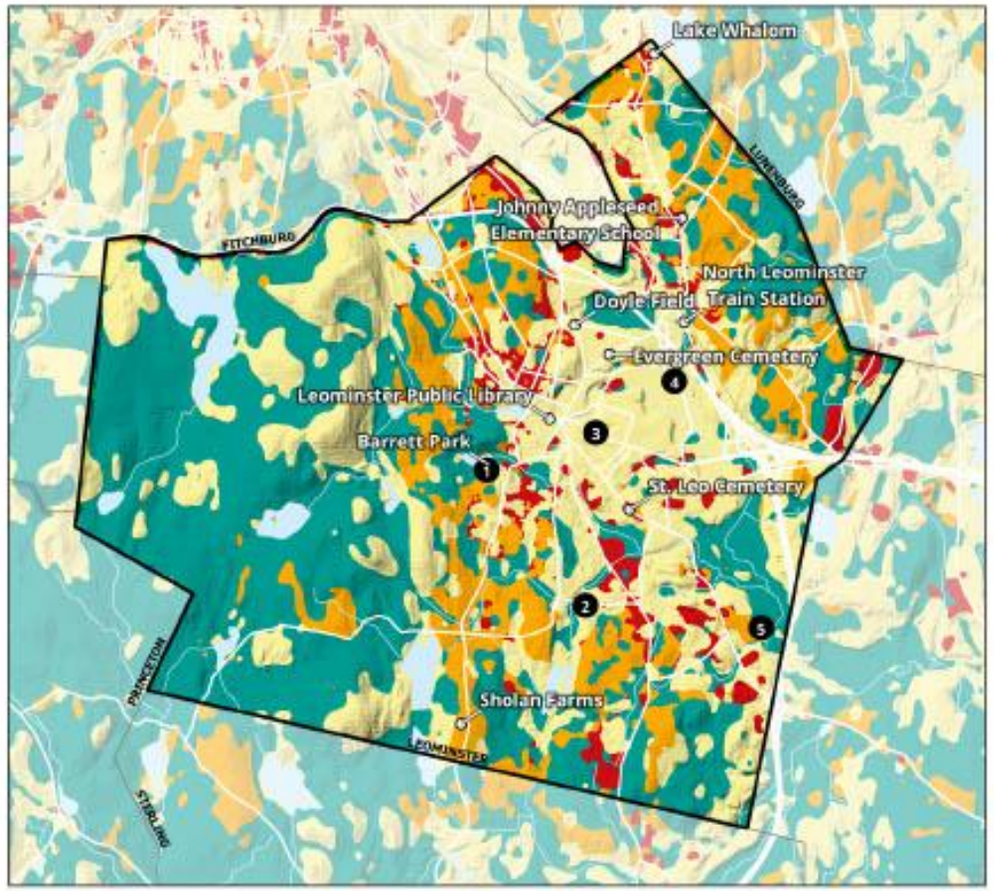
Regenerate or replicate lost soil function in highly degraded urbanized landscapes.

Example Nature-based Solutions:

- Green infrastructure (high performance tree pits, bio-swales, rain gardens)
- Parking lot renovations

#	SITE	PREDOMINANT SOIL FUNCTIONS FOR RESILIENCE			
		Highly Degraded	High Regeneration Potential	Moderate-Low Function	High Function
1	Barrett Park			◆	◆
2	Fournier Ballfields			◆	
3	Mechanic St.			◆	
4	Mall Area			◆	
5	Johnny Appleseed SP (DCR)		◆		◆

Soil Functions for Resilience



	Leominster
High Performance Soils & High Carbon Soils	7,821 ac (41.2%)
Average Function Soils	7,489 ac (39.4%)
Degraded Soils with High Regeneration Potential	2,628 ac (13.8%)
Highly Degraded Soils	1,055 ac (5.6%)

○ Landmarks

① Sites Considered for Nature-based Solutions

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

Nature-based Solutions Opportunity Table Leominster: Barrett Park

Value	BEST	BETTER	GOOD
Feasibility	high	mid	low
Ownership	Municipal		

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#	Site Map Reference & Individual Site Map #s	Barrett Park
	Natural Environment Restructuring	
1	River / pond bank revegetation	**mid**
3	Forest / shrubland heath management or restoration	
4	Wetland management restoration	**high**
5	New wetland or floodplain construction / expansion	
7	Stream flow alteration	
8	Pollinator hedgerow buffer	**high**
9	Pocket forest	
10	Soil management or restoration	
	** see Healthy Soils Report	

NbS Template #	Site Map Reference & Individual Site Map #s	Barrett Park
	Built Environment Restructuring	
11	Stormwater treatment wetlands	**high**
13	Upstream BMPs rain-garden, bio-swale	**low**
14	Shade-habitat/ Infiltration tree plantings	
16	Dam modification / controls	**mid**
17	Pervious/ hi-SRI parking/walking areas	
18	Aquatic algae / invasive treatment	**mid**
19	Lighting modifications / upgrades	
22	High-performance soil specifications**	**mid***
23	PV Parking Awnings + Rooftops	

Nature-based Solutions Opportunity Table Leominster: Barrett Park, cont'd.

Value	BEST	BETTER	GOOD
Feasibility	high	mid	low
Ownership	Municipal		

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

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Feasibility is based on property ownership or technical access

NbS Template#	Nature-based Solution Description	Barrett Park
24	Outdoor classroom/ Nature-play	high
25	Food production and forage	
27	Soft trail	
28	Paved pervious trail UANT	
29	Soil protection-puncheon-boardwalk	
30	Pedestrian safety and bike access	
	Architectural Projects to Consider	
49	Nature-based recreational opportunities	mid

NbS Template #	Nature-based Solution Description	Barrett Park
	Value Added Features on Projects	high
52	Educational Interpretation	high
53	Furnishings / gathering space	high
56	Volunteer opportunities	high
58	Invasive species management	
59	Species monitoring protocol	high
60	Habitat enhancements	high

Top row: MVP site walk at Barrett Park

Photos by Ralph Baker and Sherry Anders

Photo left: Reinforcement of Barrett Park Dam after extensive damage caused by extreme rainfall Sept. 11, 2023

Photo by Ralph Baker

This "Building Community Climate Resilience: Nashua River Watershed-wide Nature-based Solutions Plan" is funded by a Municipal Vulnerability Preparedness grant awarded to the City of Fitchburg by the Healey-Driscoll Administration's Municipal Vulnerability Preparedness (MVP) program, which is administered by the Executive Office of Energy and Environmental Affairs (EEA). NRWA was the lead coordinator for this project.

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