# Site Study Groton: James Brook

**About this site:** The section of James Brook (1) along the east side of Old Ayer Road (2), from the Old Ayer Road culvert to beyond Indian Hill Road was straightened at some point in the past. Uphill to the east of the upgradient portion of the brook lies wetlands and wildflower meadows owned by the Groton Conservation Trust (3) and to the east of the downgradient portion, owned by Groton Hill Music Center (4), are agricultural fields under an Agricultural Protection Restriction (5). This land was previously an apple orchard and is now used for haying. Both organizations are likely to be receptive to nature-based environmental improvements.

**Community concerns about James Brook**

The GHMC upland of James Brook is a large grassland that could sequester more carbon if converted to forest.

James Brook has been straightened at this site, used to meander. Two culverts downstream at Indian Hill Road and Old Ayer Road are in trouble in heavy rainstorms. Slowing the upstream flow is vital.

GHMC property across the road has extensive impervious parking area with stormwater runoff and signs of a blowout of water at the corner of Old Ayer Road and Peabody Street.

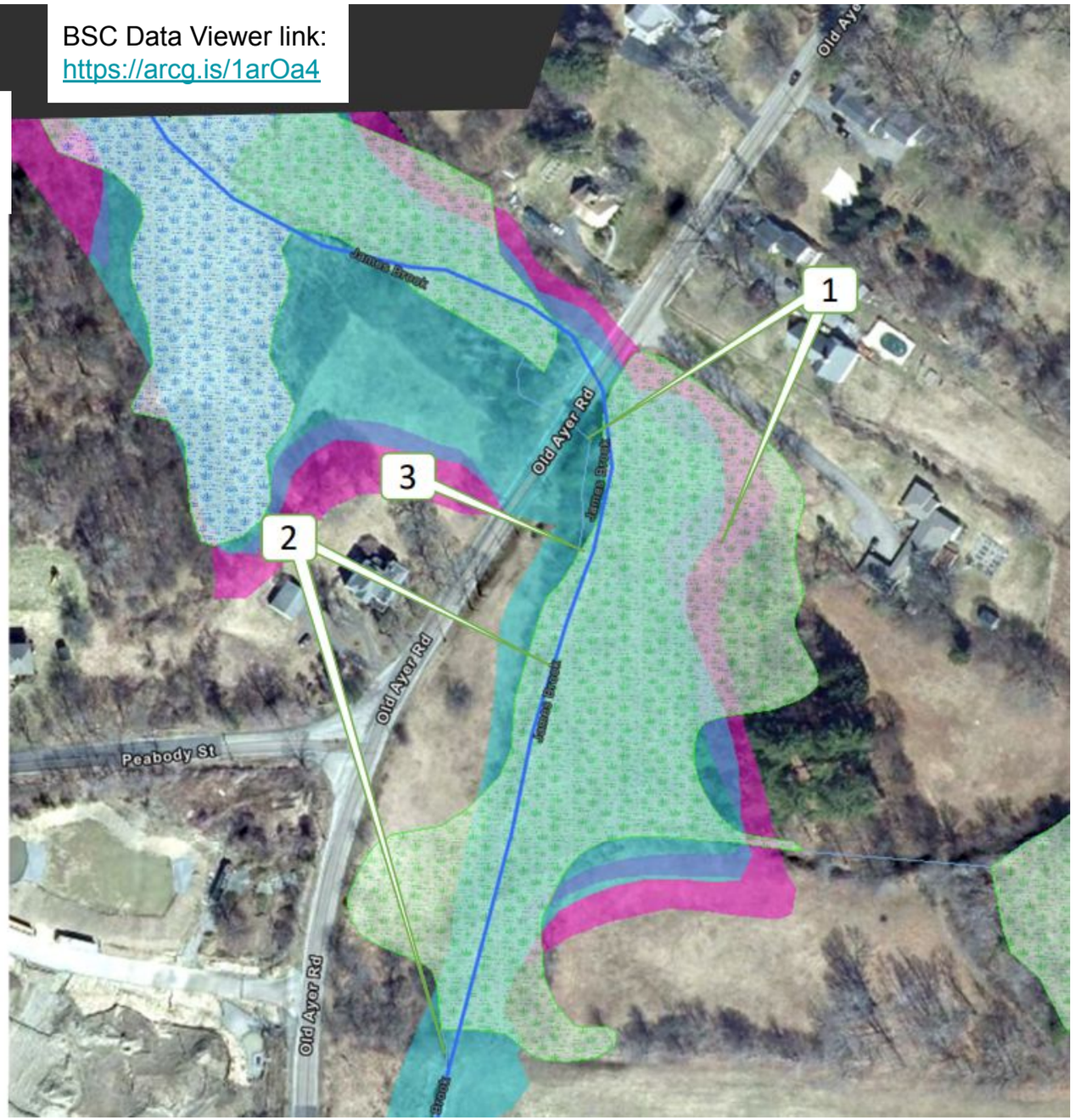
# Nature-based Solutions Recommended for Groton: James Brook

## James Brook

BSC Data Viewer link:
https://arcg.is/1arOa4

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

1. Wetland along Old Ayer Road
   - B #8 Pollinator Hedgerow Buffer
   - DL B #58 Invasive species management
   - #26 Apply indigenous knowledge
2. James Brook
   - DW F #7 Stream flow alteration
   - DW F #5 New wetland or floodplain construction/expansion
   - DL B #60 Habitat Enhancements
3. Parking and Wetland downstream of James Brook
   - #50 Analysis and study projects
   - DL B #3 Forest/shrubland health management or restoration
   - DW F #13 Upstream BMPs rain-garden, bio-swale, etc.




**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 Groton: James Brook

**NbS Recommendations**

- The channelization along this stretch of the brook should be removed and sinuosity increased. The straight section of the brook is indicated by a flag on the Data Viewer. It could be meandered with permission of the landowners.
- The culverts along Old Ayer Road also need attention. Meanders and other capacity building features would reduce flow requirements of the culverts. Just below this area is a culvert that goes under Indian Hill Road and then, traveling south, it goes back under Old Ayer Road. All actions to provide up-gradients to slow the flow would be beneficial with potential support and assistance from the Groton Conservation Trust (GCT).
- Habitat restoration is needed east of James Brook to reduce invasive plant species, increase infiltration, and slow the rate of flow in James Brook. Biodiversity could be enhanced by installation of a bog area adjacent to the brook on the GCT area.
- Located across the road is Groton Hills Music Center (GHMC), which could be another opportunity for support in this project. Water from the GHMC parking lot will need to be considered in any work related to this area.
- At Old Ayer Road, corner of Peabody Street, there have been signs of a blowout of water onto the GCT land from the GMHC land across the street. Fortunately, GCT has an open field of long, thick, heavy grass that impedes the flow of water from the GHMC land directly into James Brook.
- Examination of the culverts downstream on James Brook can provide opportunities for capacity building on this floodplain area. If the agricultural land is difficult to maintain for agricultural purposes, it may be a good place for forest reclamation and the addition of a floodplain forest.

**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.

#3 Forest Management Restoration

#5 Wetland or Floodplain Construction- Expansion

#7 Streamflow Alterations

#8 Pollinator Hedgerow Buffer

#13 Upstream BMP Raingardens and Bioswales

#26 Apply Indigenous Knowledge

#50 Analysis and Study Projects

#58 Invasive Species Management

#60 Habitat Enhancements

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

# Soils Information for Groton: James Brook

## Groton

**The significant acreage of soil with high regeneration potential that surrounds downtown Groton and drains to the close by Nashua River could act as key demonstration sites for improved soil practices.**

The Nashua River flows northward towards Pepperell on the west side of Groton. A major watershed boundary splits the town, with a large area draining to the Nashua River and another to the Merrimack River. The side of town that drains to the Nashua River contains the community's most significant acreage of farmland and residential neighborhoods as well as most of downtown Groton. These areas are where Groton's acres of "high regeneration potential" soil are found. A key objective for stewarding healthy soils in Groton should be encouraging better management of these degraded lands through education and demonstration projects. Of the five focus communities, Groton has the lowest percentage of "high function/high carbon" soils and the highest percentage of "moderate-low function" soil.

### Sites Considered for Nature-based Solutions

Several sites near downtown Groton are being considered for green infrastructure to improve stormwater management. These sites are in areas with "high regeneration potential" soils and could be key demonstration sites for better soil practices. Flooding has been identified at sites throughout the town. Regenerating water holding capacity on soils within the same sub-basins as these flood prone areas is an important planning approach to mitigate these issues.

### Priority Actions for Protecting/Enhancing Soil Health in Groton

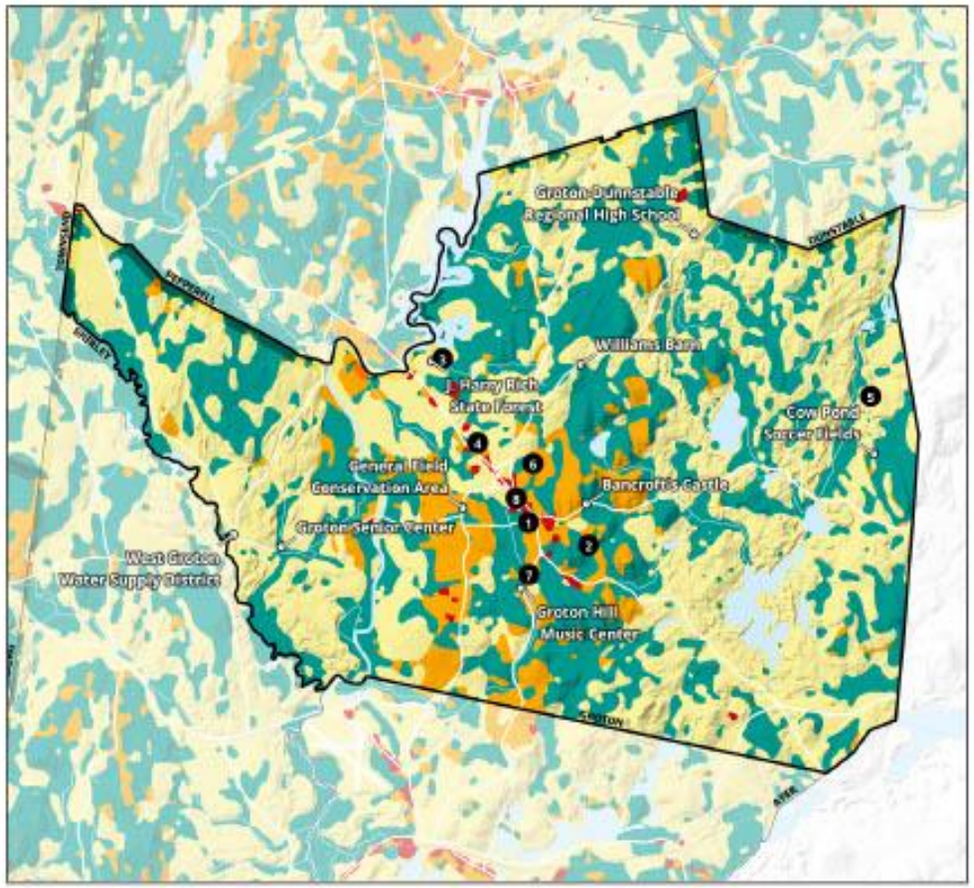
**Better management of turf, lawns, gardens, and farms.**

*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 | Broad Meadow | | ◆ | ◆ | |
| 2 | Groton Country Club | ◆ | ◆ | ◆ | |
| 3 | Nod Road | | | ◆ | |
| 4 | Middle School Parking | ◆ | | | |
| 5 | Cow Pond Brook/Playing Fields & Highway Dept. | | | ◆ | |
| 6 | Willowdale | | ◆ | ◆ | ◆ |
| 7 | James Brook | | | | ◆ |
| 8 | Groton Town Hall | ◆ | | | |

## Soil Functions for Resilience




| | Groton |
|---|---|
| High Performance Soils & High Carbon Soils | 8,314 ac (38.5%) |
| Average Function Soils | 11,315 ac (52.3%) |
| Degraded Soils with High Regeneration Potential | 1,849 ac (8.6%) |
| Highly Degraded Soils | 138 ac (0.6%) |

○ Landmarks

1 Sites Considered for Nature-based Solutions

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

# Nature-based Solutions Opportunity Table Groton: James Brook

| 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# | Nature-based Solution Description | James Brook |
|---|---|---|
| | **Natural Environment Restructuring** | |
| 1 | River / pond bank revegetation | **high** |
| 2 | Grassland meadow management restoration | |
| 3 | Forest / shrubland heath management or restoration | **high** |
| 4 | Wetland management restoration | |
| 5 | New wetland or floodplain construction / expansion | **high** |
| 6 | Pond creation/ elimination / alteration | |
| 7 | Stream flow alteration | **mid** |
| 8 | Pollinator hedgerow buffer | **high** |
| 10 | Soil management or restoration | **low*** |

* see Healthy Soils Report

| NbS Template# | Nature-based Solution Description | James Brook |
|---|---|---|
| | **Built Environment Restructuring** | |
| 11 | Stormwater treatment wetlands | |
| 12 | Daylighting of streams | |
| 13 | Upstream BMPs rain-garden, bio-swale, etc. | **mid** |
| 14 | Shade-habitat/ Infiltration tree plantings | |
| 15 | MSCS culvert improvement | **low** |
| 16 | Dam modification / controls | |
| 17 | Pervious parking walking areas | |
| 19 | Lighting modifications / upgrades | **low** |
| 20 | Species crossing protections | |
| 22 | High-performance soil specifications | |
| 23 | PV Parking Awnings + Rooftops | |

# Nature-based Solutions Opportunity Table: James Brook, 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

**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 | James Brook |
|---|---|---|
| | **Ecological Awareness & Access Projects** | |
| 24 | Outdoor classroom/ Nature-play | |
| 25 | Food production and forage | |
| 26 | Apply Indigenous knowledge | **mid** |
| 27 | Soft trail | |
| 29 | Soil protection-puncheon-boardwalk | |
| 30 | Pedestrian safety and bike access | |
| | **Architectural Projects to Consider** | |
| 49 | Nature-based recreational opportunities | |

| NbS Template# | Nature-based Solution Description | James Brook |
|---|---|---|
| | **Value Added Features on Projects** | |
| 50 | Analysis and study projects | **high** |
| 52 | Educational interpretation | |
| 56 | Volunteer opportunities | **mid** |
| 58 | Invasive species management | **high** |
| 59 | Species monitoring protocol | **mid** |
| 60 | Habitat enhancements | **mid** |

James Brook MVP site visit

*Photos by Nancy Lebedzinski*

*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