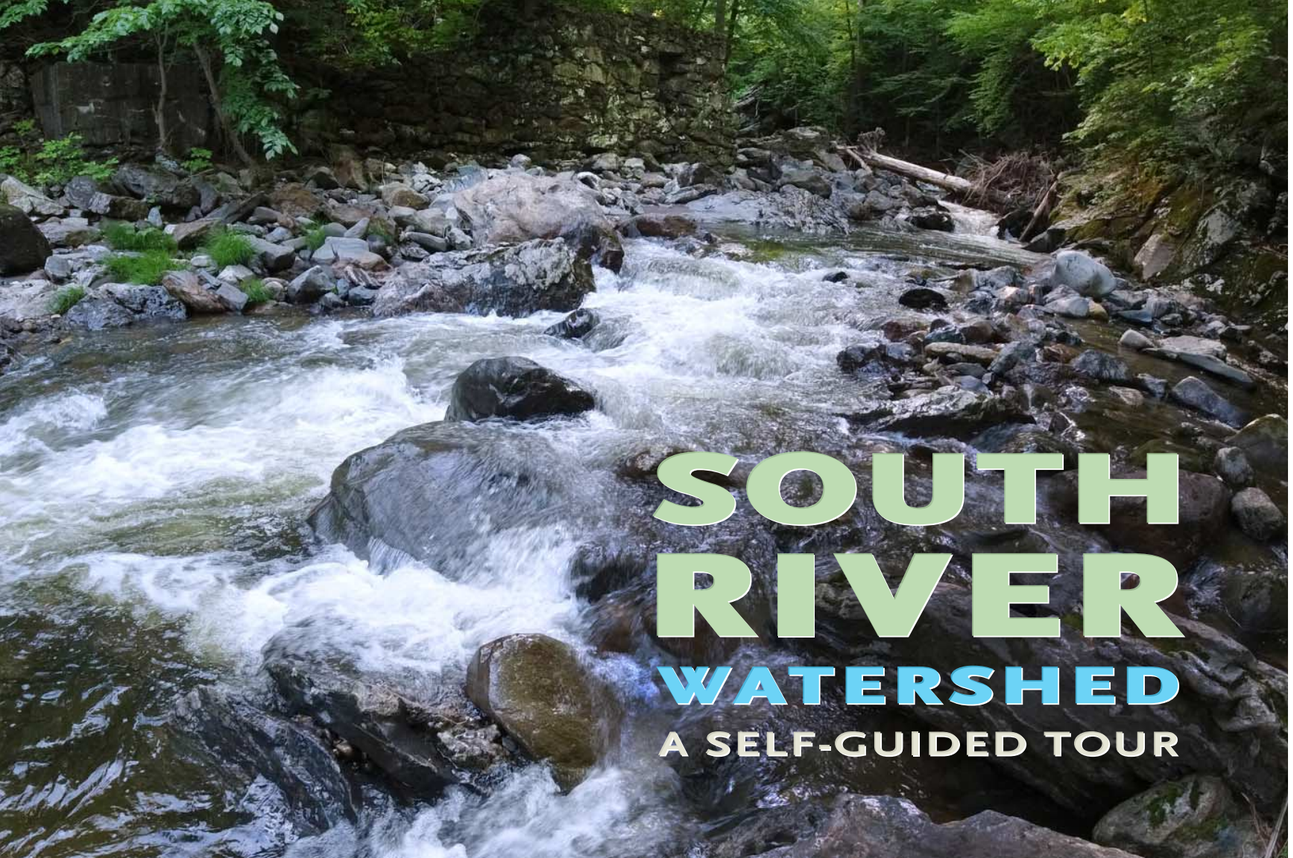
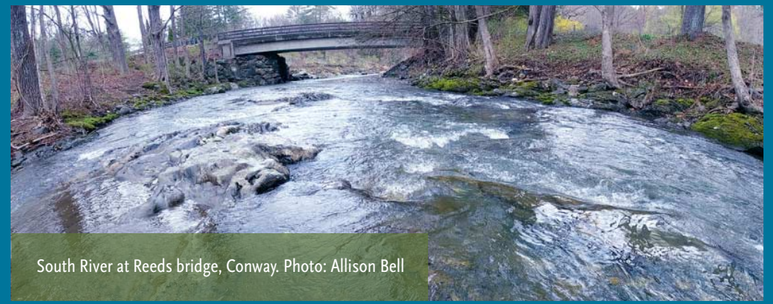

SOUTH
RIVER
WATERSHED
A SELF-GUIDED TOUR

The South River, located in southwest Franklin County, begins in Ashfield at the spring-fed Ashfield Lake and flows east for 17 miles, dropping 1,000 feet, before joining the Deerfield River, which flows into the Connecticut River. The South River Watershed consists of 26.3 square miles. The Town of Conway has been working for over a decade on flood mitigation planning, since Tropical Storm Irene in August 2011 made clear the vulnerability of the center of town to major flooding events. During the storm, flood waters came streaming down Route 116, and the Pumpkin Hollow Brook and South River confluence bottlenecked, overtook and destroyed the recently installed retaining wall next to the bridge. Flooding also occurred on Academy Hill Road, endangering buildings, wells and septic systems in the area, including the Town Hall and Field Memorial Library.

Today, the flood and erosion hazards the residents of the watershed are experiencing have a legacy in historic land use, channel manipulation due to historic mills and dams, settlement patterns, and culverts and bridges that cannot accommodate the larger flood flows we are experiencing due to climate change. For more informaon about the history of the watershed, please see the "Riverwalk" put together by the Friends of the South River: bit.ly/riverwalkconway.



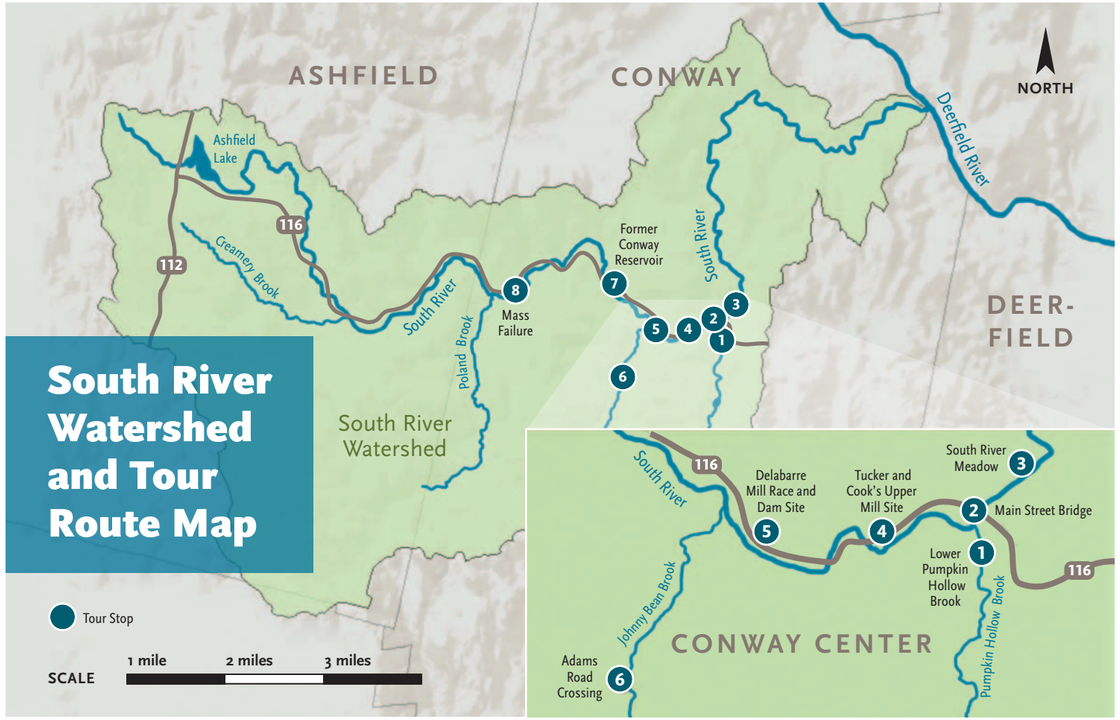
South River at Reeds bridge, Conway. Photo: Allison Bell

Local officials in Conway and Ashfield, planners, and consultants are working on identifying and implementing solutions to mitigate flooding and erosion through the South River watershed.

The South River Watershed Tour was originally led by Fluvial Geomorphologist Nicolas Miller on November 18, 2023. This guidebook replicates the tour for anyone who is interested in learning more about current conditions of the watershed. Three of the stops can be seen by walking around Conway Center, and the rest will require driving or biking a bit farther.

Please take caution when vising these sites, and be courteous of sites that are located near private property. There are travel instructions and caution notices in the description of each site.

Enjoy your tour!



STOP 1 Lower Pumpkin Hollow Brook

Arrival: Walk down Academy Hill Road and look north over the small bridge (the Town Fields will be behind you).

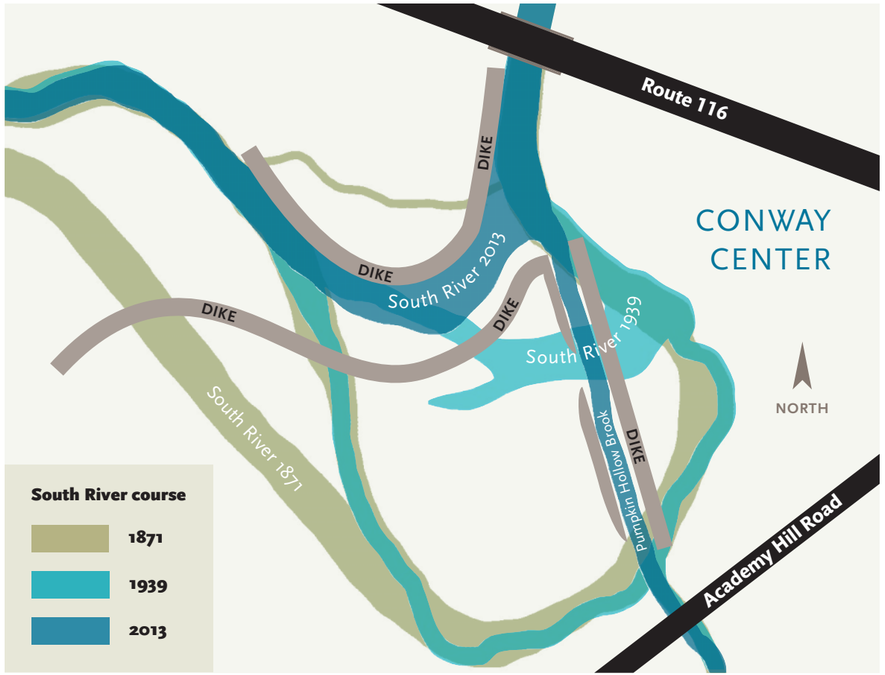
View straightened channelized reach of Pumpkin Hollow Brook. Note low forested floodplain that is location of previous South River stream channel and is now blocked by a boulder berm. Note athletic fields and residential development on floodplain. This area was inundated in the July 2023 floods with water flowing down Academy Hill Road and in front of the library, which gives us clues to the likely historic path of Pumpkin Hollow Brook. *Optional:* Walk down onto the forested floodplain and see the old swales of the historic South River and the boulder berm.

Downstream view of Pumpkin Hollow Brook

Boulder berm blocking the South River from accessing its floodplain as seen from the Main Street Bridge. Photo: Michele Turre.

Historical Context

Sometime after 1939, in response to flooding during hurricanes in 1936 and 1938, the Town constructed a system of dikes and berms to keep the South River out of the lowlands and prevent the flooding of buildings along Main Street. The South River was forced into a sharp turn just upstream of the Main Street Bridge, and a new straight channel was dug for Pumpkin Hollow Brook. This map shows the original course of the South River, compared to how the South River and the Pumpkin Hollow Brook flow today.



Map overlays by Michele Turre based on period maps. Text adapted from "Riverwalk" by the Friends of the South River.

STOP 2 Main Street Bridge

Arrival: Walk back down Academy Hill Road towards Route 116 and take a left. Walk ~500 feet until you arrive at the bridge.

View the confluence of Pumpkin Hollow Brook and South River from Main Street bridge. The Main Street bridge recently underwent minor repairs and concrete work meant to extend its lifespan, which is likely nearing its end. Note the boulder berm (shown in bottom photo, page 2) blocking floodplain and former mill channel locations. The riprap retaining wall just upstream of the bridge is at least the fourth wall to stand here. It was most recently replaced following Tropical Storm Irene in 2011. Note the artificially straightened channel downstream of the bridge (across the street) and the many houses in the stream corridor at risk of fluvial erosion.

A GeoCell retaining wall that was installed only a couple of weeks before Tropical Storm Irene hit Conway in August 2011.

After the retaining wall washed out emergency rip-rap repairs were made that narrowed the river channel. Photos: Nicolas Miller.

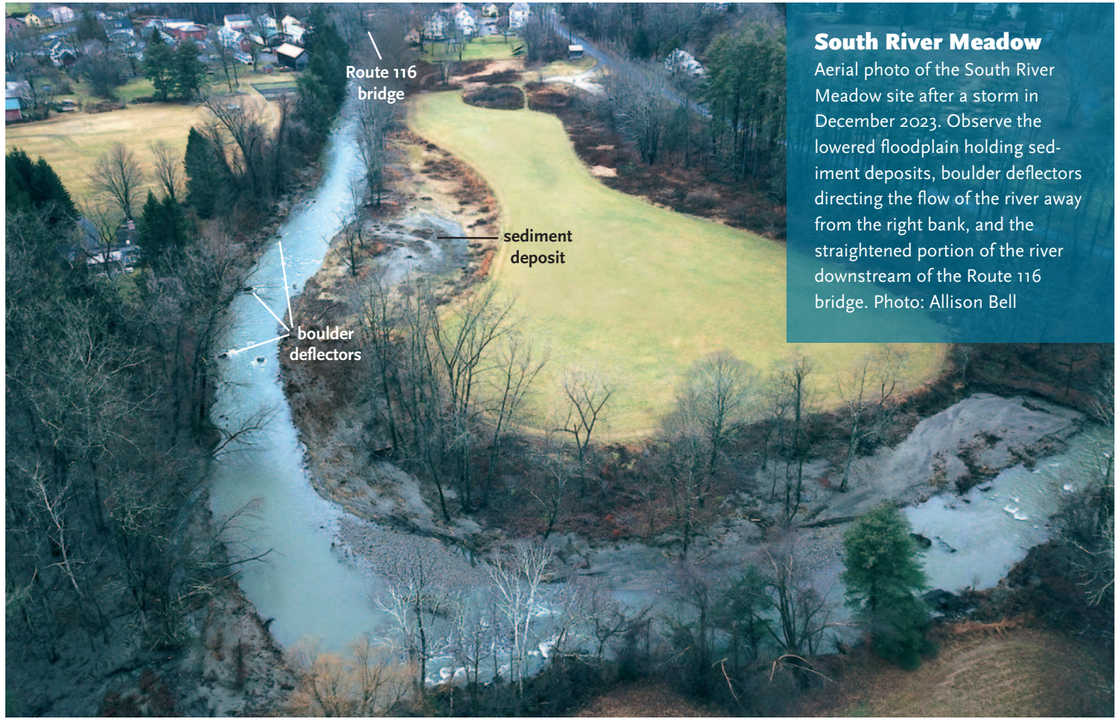
STOP 3 South River Meadow

Arrival: Continue walking down 116 and take a right on Shelburne Falls Road. Walk ~500 ft. until you see a sign for the "South River Meadow" on your right. Walk down the short path to the River.

The town-owned South River Meadow is the site of a river restoration project completed in September 2016. The project was a collaborative effort between the Town of Conway, Franklin Regional Council of Governments, Field Geology Services, New England Environmental, and Weston & Sampson. A portion of the floodplain was lowered to reconnect the channel to its floodplain and provide flood storage and a site for sediment deposition. Note the recently deposited sand sheets and rafted debris; the river inundated this floodplain three times in July 2023, and at least 14 times since the project was completed in 2016. A series of boulder deflectors along the right bank deflect flow from a home along the previously eroding bank. Note the sediment deposition along the right bank between the structures. Large wood and boulders used in the restoration provide many habitat benefits including carving and maintaining pools, providing cover, increasing flow complexity, sorting and storing sediment and narrowing the stream channel.

In 2022, the Friends of the South River planted nearly 80 trees and shrubs at the South River Meadow to enhance climate resiliency by providing more canopy to shade and cool the river, and by stabilizing the river bank, which will help prevent further erosion. Planted tree species include: Black Willow, Eastern Cottonwood, Blackgum, Tulip, Basswood, Red Maple, Silver Maple, Sycamore and Tupelo. Shrubs are Chokeberry, Silky Willow, Speckled Adler, Serviceberry, Spicebush, Steeplebush, Sweetgale, Peaked Hazelnut, White Meadowsweet and Winterberry. The planting was funded by a USDA Forest Service grant.

The South River provides habitat for fish and other wildlife, including the longnose sucker, marbled salamander, northern parula, riffle snaketail, and the wood turtle. All of these species are either listed as Threatened or species of Special Concern under Mass Wildlife's Natural Heritage & Endangered Species Program, making habitat restoration efforts along the South River all the more important. Photos: Allison Bell



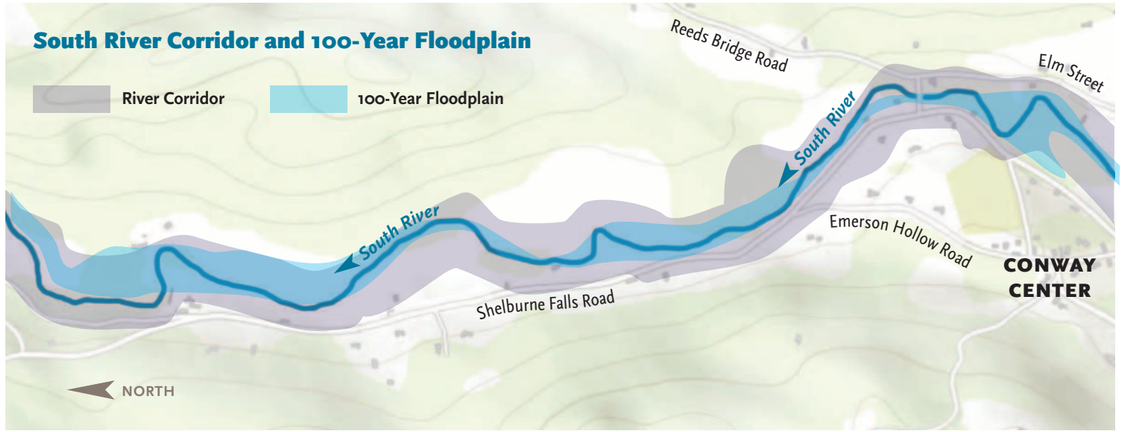
South River Meadow
Aerial photo of the South River Meadow site after a storm in December 2023. Observe the lowered floodplain holding sediment deposits, boulder deflectors directing the flow of the river away from the right bank, and the straightened portion of the river downstream of the Route 116 bridge. Photo: Allison Bell

South River Meadow
Allowing rivers to access their floodplains is an important component of river restoration projects in Franklin County. Rivers are dynamic systems that "work" to carry water and sediment. When rivers have access to both their floodplain and a corridor free of hard impediments, high-volume flows are dissipated and sediment is eroded and deposited, changing the shape of the river channel slowly over many decades. Photo: Allison Bell

Floodplains, River Corridors, Stream Buffers, oh my!

How can we protect and enhance the areas along the South River? The South River Meadow project is also known as a "floodplain reconnection" project because it allows the South River to access its floodplain. Before this project, during a storm event the river would rush by, causing erosion and carrying sediment downstream. There are many areas along the South River where the river can, and does access its floodplain. What are some options we have to preserve those critical connections?

One option is to protect and manage the River Corridor. The South River's Corridor was mapped by Field Geology Services in 2016. A river corridor includes the active river channel, associated bars and wetlands, and a portion of riparian area, floodplain, terrace or adjacent slope. The river is expected to migrate within the river corridor over time. River corridor access allows for the dissipation of high flows and sediment deposition, reducing conflicts with existing infrastructure and improving water quality. A river corridor varies in width throughout the stream system, depending on stream size, valley conditions (slope and confinement), sediment load and other factors.



Another option is to enhance stream buffers, which are the streamside trees, shrubs, and vegetation that protect the stream. Stream buffers (also called riparian areas) can:

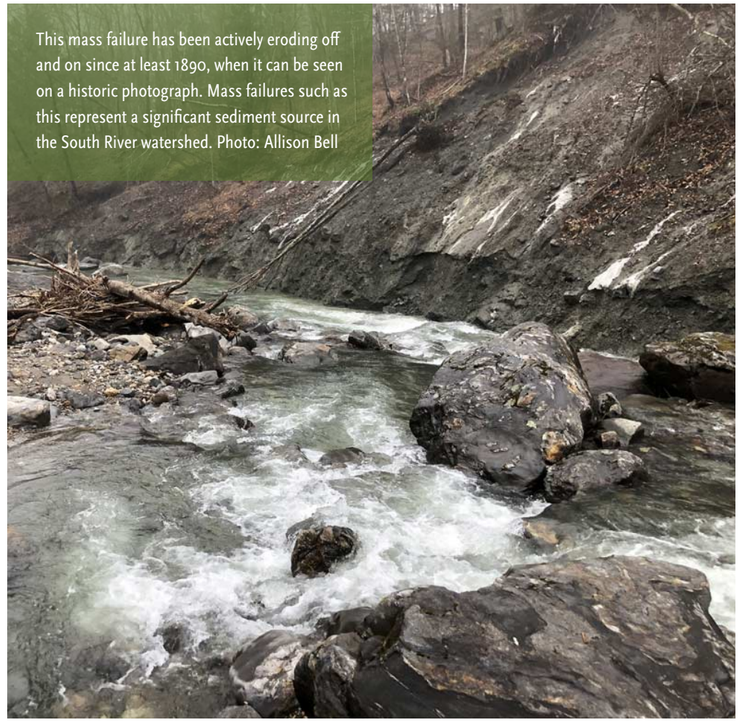
- Protect water quality by reducing runoff from entering a stream, stabilizing stream banks, and keeping streams cool during hot weather.
- Enhance wildlife habitat by providing food, water, shelter, and creating connected corridors that allow wildlife to move along the landscape.
- Provide flood mitigation by absorbing and slowing water, allowing it to infiltrate into the soil.
- Assist nutrient cycling by taking up nutrients from the soil and water, which helps maintain nutrient balance and prevent excessive nutrient loading.

An example of a section along the South River without a stream buffer, leaving this section exposed. Planting along the riverbank with trees that prefer sunny, wet conditions could help to absorb and slow down flood waters. A planting could also help to stabilize the streambank and limit erosion.

STOP 4 Site of Tucker and Cook's Upper Mill

Arrival: Drive from the South River Meadow to River Street/Route 116. This site is a little past Baker's Store, but please note viewing it requires going on private property. For that reason, it's best viewed from the road or through the following historic images.

This is the site of Tucker and Cook's Upper Mill, established in 1857. The mill prospered into the 1890s, but ended in foreclosure in 1911. It was one of two large cotton mills operated by Tucker and Cook along the South River at this time. In 1866, in an effort to control the water supply they built a dam and reservoir upstream (near Eldridge Road). From the edge of the terrace along River Road, you can see the ruined foundations of several mill buildings and a portion of the penstock used to bring water from the impoundments into the mill to power water turbines. Also note the active mass failure on the steep glacial slope across the river.

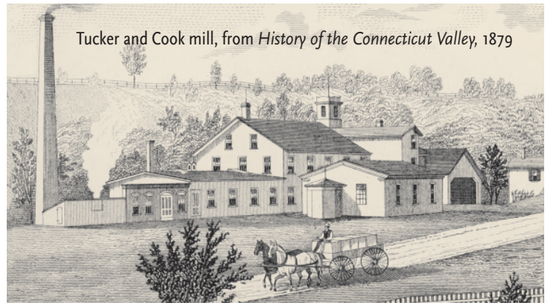


This mass failure has been actively eroding off and on since at least 1890, when it can be seen on a historic photograph. Mass failures such as this represent a significant sediment source in the South River watershed. Photo: Allison Bell

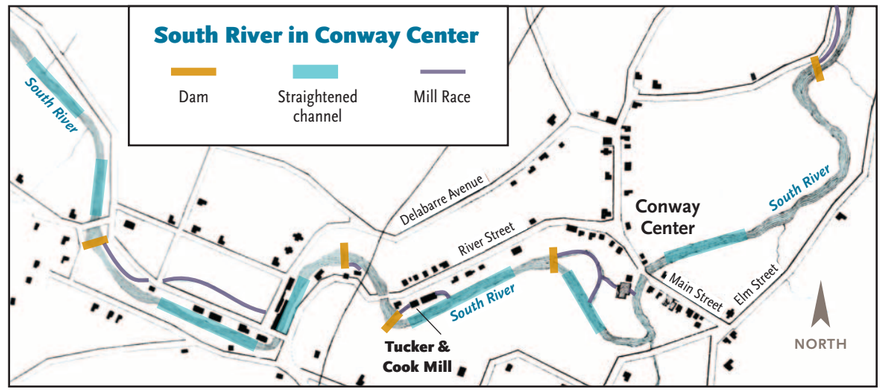
More than 30 mills were active in the watershed during the 18th and 19th centuries with each associated with a dam built across the river to provide water for powering the structures. Though many of the dams were small, timber and cribbed structures, there were between three and five major dams built on the Conway section of the South River to meet the demand for more sustained power, including generating electric power for the trolley and some town residents. The image on the right is of the Tucker and Cook Upper Mill. The large cotton mill was fed by penstocks whose remains can be seen amidst the ruined mill foundation.

Straightening and damming the South River to support mills and the development of roads, bridges, and buildings in the early 20th century was a common practice. However, this further channelized the river and disconnected it from its floodplain.

This map highlights straightened reaches of the South River in Conway Center. Note the location of Tucker and Cook's Upper Mill on River Road.



Tucker and Cook mill, from *History of the Connecticut Valley*, 1879



Map graphic is based on the 1871 Beers map of Conway, Massachusetts

STOP 5

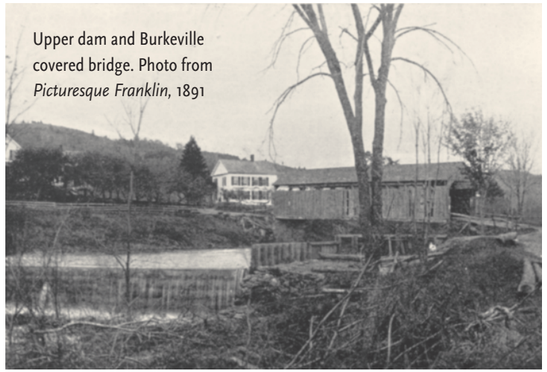
Delabarre Mill Race and Dam Site

Arrival: Continue driving down Route 116 for 1/2 a mile, then take a right on Ives Road. Take the next left on Delabarre Avenue. You can park in the lot for St. Mark's Church.

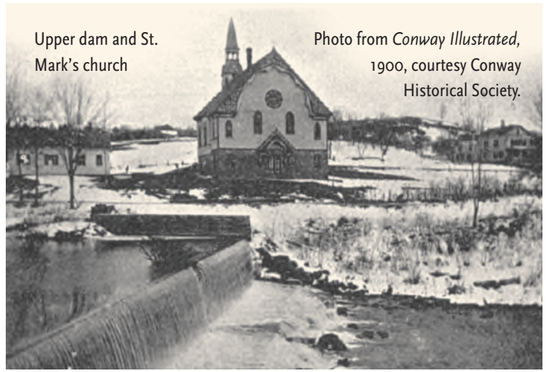
From the parking lot at St. Mark's Church, walk down the hill to view the mill race that once carried water to the Delabarre Woolen Mill, where Orchard Equipment Supply Co. (OESCO) stands today. Across Route 116 a channel-spanning log is all that can be seen of the historic mill dam that once fed this canal.

Take note of the historic Burkeville covered bridge, built in 1869.

Mill race

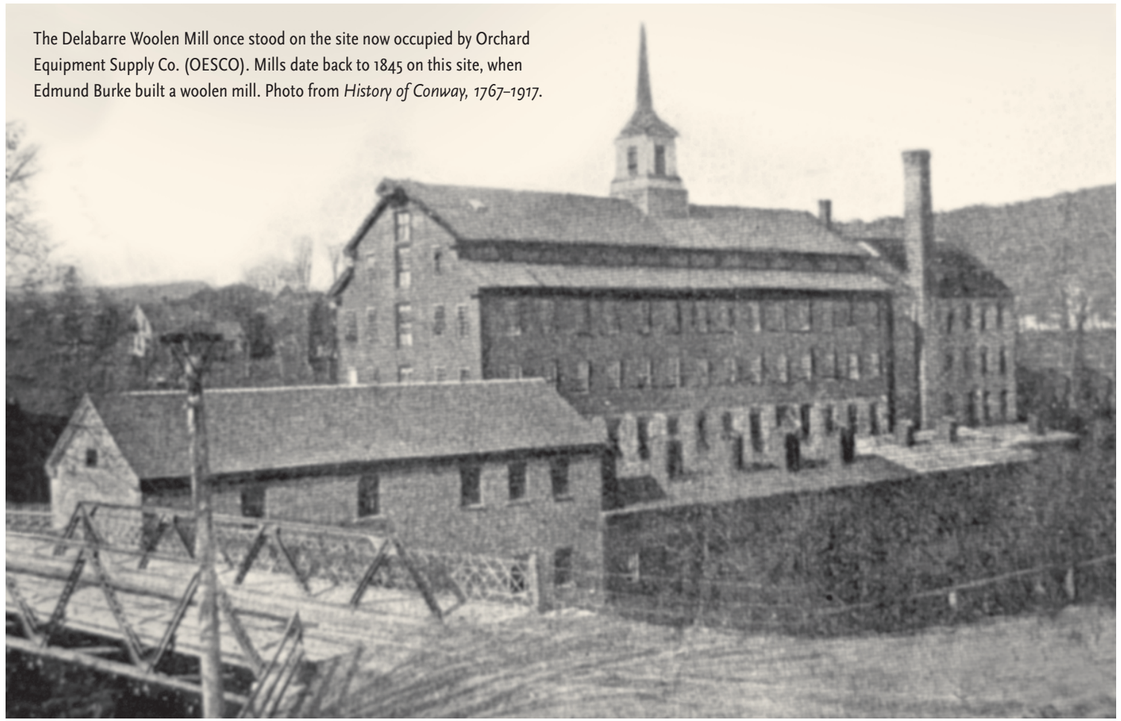


Upper dam and Burkeville covered bridge. Photo from *Picturesque Franklin,* 1891



Upper dam and St. Mark's church

Photo from *Conway Illustrated,* 1900, courtesy Conway Historical Society.



The Delabarre Woolen Mill once stood on the site now occupied by Orchard Equipment Supply Co. (OESCO). Mills date back to 1845 on this site, when Edmund Burke built a woolen mill. Photo from *History of Conway, 1767–1917.*

STOP 6 Adams Road Crossing

Arrival: Drive across the Burkeville Covered Bridge, and drive up Main Poland Road 8/10ths of a mile until you see Adams Road on your left. Walk down Adams Road until you see the Johnny Bean Brook crossing.

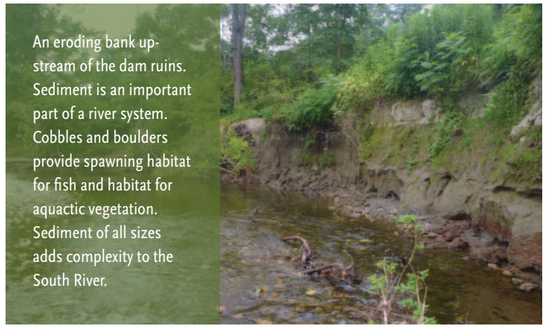
The Adams Road culvert washed out during the July 2023 floods. As of November 2023, the failed culvert can still be seen in sections, downstream of the repaired crossing. The previous seven-foot-wide culvert was replaced by two smaller culverts as funding has not been made available to upsize this crossing with a more appropriate culvert or bridge. The undersized culverts are not geomorphically or hydraulically compatible with the water and sediment load of Johnny Bean Brook and represent a fluvial erosion hazard. There are two crossings along Johnny Bean Brook, the other is located downstream on Main Poland Road, and is also significantly undersized.

Top: Adams Road culvert, before the July 2023 storms. Bottom: Adams Road culvert washed out into three pieces, after the July 2023 storms.

STOP 7 Former Conway Reservoir

Arrival: Drive back down Main Poland Road and take a left back on Route 116. Drive for 7/10ths of a mile and pull on to Eldridge Road. You'll see the dam ruins on your left.

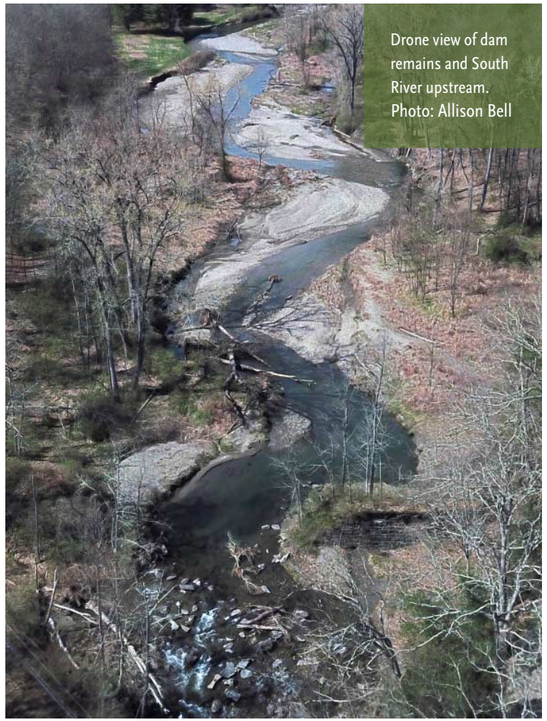
This dam was originally constructed by Tucker and Cook in 1866 to power downstream mills. Sediment sources and storage are a major story in the South River watershed, and this historic dam site continues to store a large volume of legacy sediments in its former impoundment. Readily erodible stream banks up to 10 feet high are composed of fine- grained silt and clay. The dam is gone, but its ruins and these deposits continue to influence the stream's morphology, habitat, and water quality.



An eroding bank upstream of the dam ruins. Sediment is an important part of a river system. Cobbles and boulders provide spawning habitat for fish and habitat for aquactic vegetation. Sediment of all sizes adds complexity to the South River.

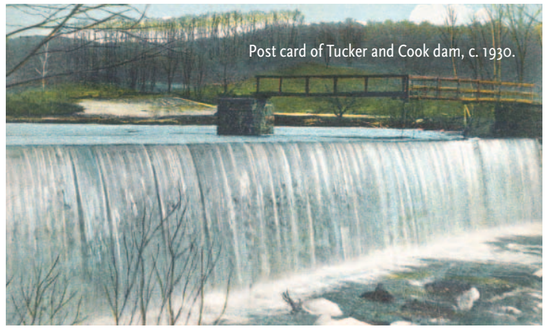
Dam remains beside Eldridge Road. Photo: Michele Turre.

View upstream from top of the dam. Photo: Allison Bell



Drone view of dam remains and South River upstream. Photo: Allison Bell

Repairing the Tucker and Cook dam, c. 1870. Photo: Conway Historical Society



Post card of Tucker and Cook dam, c. 1930.

However, too much sediment in a river system can negatively affect water quality. Sediment absorbs heat, which means water temperatures may increase. The South River is home to several species of coldwater-reproducing fish (such as the longnose sucker, brown trout, and brook trout) because the river stays cold enough throughout the year.

A large sediment load may also reduce the amount of light available to organisms they need to grow. Depending on where the erosion occurs, sediment loads can also carry pathogens and/or pollutants, which are detrimental to aquatic life and human health. The South River has many points where erosion is occurring, and the straightened reaches allow the river to wash sediment quickly through the system. One potential solution to catch sediment from eroding banks is to install "chop and drop" (also known as wood addition) projects.

Chop and drop projects are a part of the engineering designs. Adding more wood to the upland, forested tributary streams in the South River watershed will slow and spread stormwater, recharge the aquifer, and help protect downstream infrastructure (roads, culverts, etc.) from excessive amounts of stormwater runoff, sediment loading and flooding. These projects have been successful in providing flood resiliency and habitat enhancement in forested reaches, including H.O. Cooke State Forest in Heath and throughout New England.

Completed chop and drop project in the Green Mountain National Forest.

Sediment trapped upstream of a chop and drop project.

STOP 8

Large Mass Failure

Arrival: Pull back onto Routh 116 and drive west for 1.4 miles. Park in the large gravel pull-off along the right side of Route 116. You will need to cross the road and step over a guard rail to see the mass failure. Please use caution when crossing the road—cars may come quickly around the corner.

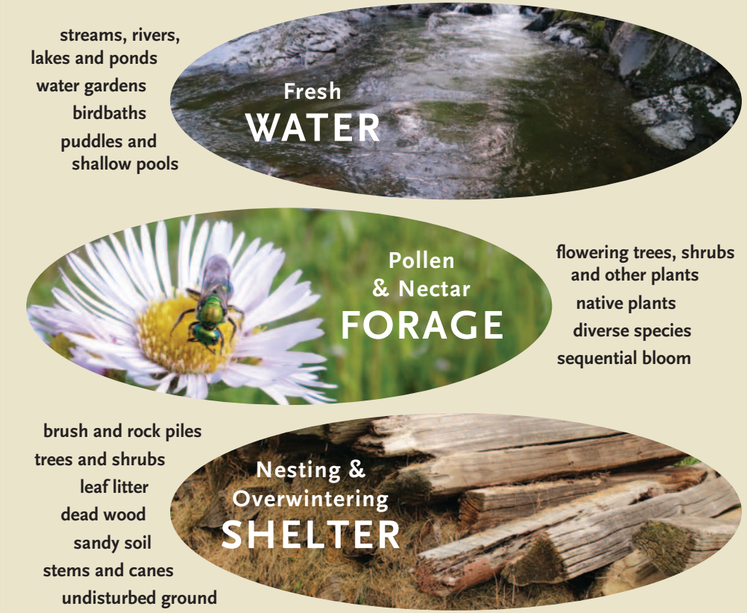
This photo is from pre-Tropical Storm Irene in 2011. Large mass failures often occur where the artificially straightened channel impinges upon high banks of glacial sediment leading the unstable slopes. These failures can remain active for many years, acting as a source for sediment loading and water quality impairments.

Enhancing the Health of the South River Watershed

Native pollinators are integral to local and regional biodiversity, climate resilience and food system security. Native pollinators, including bees, butterflies, moths, flies, beetles, wasps, and hummingbirds, are critical to the healthy functioning of the ecosystems that surround us.

Water resources, including the riparian areas along the South River, are critically important to pollinators. Riparian areas also include wetlands, wet meadows, and large stormwater catchment areas. Within riparian streambanks there is often good nesting substrate, such as exposed sand and clay, for ground-nesting bees. When considering restoration projects in the South River watershed, or projects in your own yard, it's important to incorporate the needs of pollinators to sustain diverse and healthy ecosystems.

What makes good pollinator habitat?



References & Resources

A Climate Resilient South River StoryMap: bit.ly/southrivermap

Town of Conway Municipal Vulnerability Preparedness webpage, which includes links to the reports listed below: https://conwayma.gov/p/39/South-River-Flood-Mitigation

- 2013 Fluvial Geomorphic Assessment and River Corrido Planning for the South River Watershed, completed by Field Geology Services
- 2017 Sediment Management BMPs for the South River in Conway, completed by the Franklin Regional Council of Governments
- 2018 Municipal Vulnerability Preparedness Plan for the Towns of Ashfield & Conway
- 2018 High Risk Stream Crossings in Conway, MA: A Resource of Assessing Risk and Improving Resiliency
- 2024 Community Talk on the South River Watershed Recording, hosted by Field Geology Services and GZA GeoEnvironmental, Inc.

Friends of the South River: https://friendsofthesouthriver.org/

MassWildlife's Natural Heritage & Endangered Species Program List of Endangered, Threatened, and Special Concern species: https://www.mass.gov/info-details/list-of-endangered-threatened-and-special-concern-species

A Climate Resilient South River StoryMap webpage

Conway Municipal Vulnerability Preparedness webpage

Friends of the South River webpage

South River Watershed: A Self-Guided Tour was published in June 2024.

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Conway's MVP Project Team:
Field Geology Services
Franklin Regional Council of Governments
GZA GeoEnvironmental, Inc.

Design: Allison W. Bell

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Front and back cover photos of the South River by Allison Bell

Fluvial Geomorphologist Nicolas Miller explains the South River Meadow and Adams Road sites to parcipants of the South River watershed tour in November 2023.