

Gulf Brook and Flat Meadow Brook Watersheds



*A Story of Land, Water, and Wildlife on the Eastern Slope
of Catamount Mountain in Pittsfield, New Hampshire*



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Above: Beaver lodges on Eaton Pond, Gulf Brook watershed, Pittsfield, NH

Front: A view of Eaton Pond with Catamount Mountain in the background.

Front, bottom: Beaver-chewed yellow birch tree; hayfield with Catamount Mountain in background; wintergreen in winter.

Written for the Pittsfield Conservation Commission

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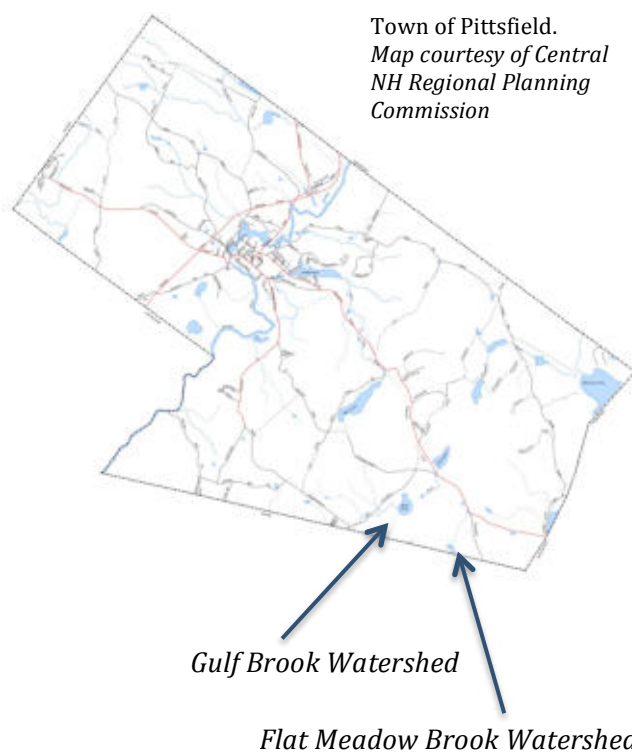


Introduction

The Town of Pittsfield, New Hampshire, population just over 4,000, is situated in the far eastern corner of Merrimack County. If you were looking for a place between Concord, the Seacoast, and the Lakes Region, your search might land you in Pittsfield. Routes 28 and 107 are the two major roads that slice through the town. State Highway 107 enters the southeast corner of Pittsfield from Northwood, climbs up to Tucker Hill, down to Eaton Pond, then a steady rise up and over the Catamount Mountain Range before a long descent into the center of Pittsfield along the Suncook River. More than 4,000 vehicles per day travel this road, most are commuters traveling to the center of Pittsfield and points north.

Driving on Route 107 through the southeast corner of Pittsfield offers a windshield view of this varied landscape of wooded hillsides, roadside hayfields, Eaton Pond ringed by shrub wetlands, distant vistas, and hilly topography. Many of these features are what keep generations of families living and working here as well as drawing new people to settle. These features also provide benefits to residents including income from the land, places to recreate, sources of clean drinking water, as well as solitude and privacy. And the ponds, streams, wetlands, fields, and large tracts of forest provide habitat for wildlife, both upland and aquatic life.

The southeastern region of Pittsfield encompasses the headwaters of two watersheds: Gulf Brook and Flat Meadow Brook. Through this story, the Conservation Commission seeks to share information and raise awareness among current and future landowners and the broader Pittsfield community about the land, water, and wildlife within these two watersheds.



Route 107 as it passes Eaton Pond on the right. Catamount Mountain—the highest point of land—is in the distance.

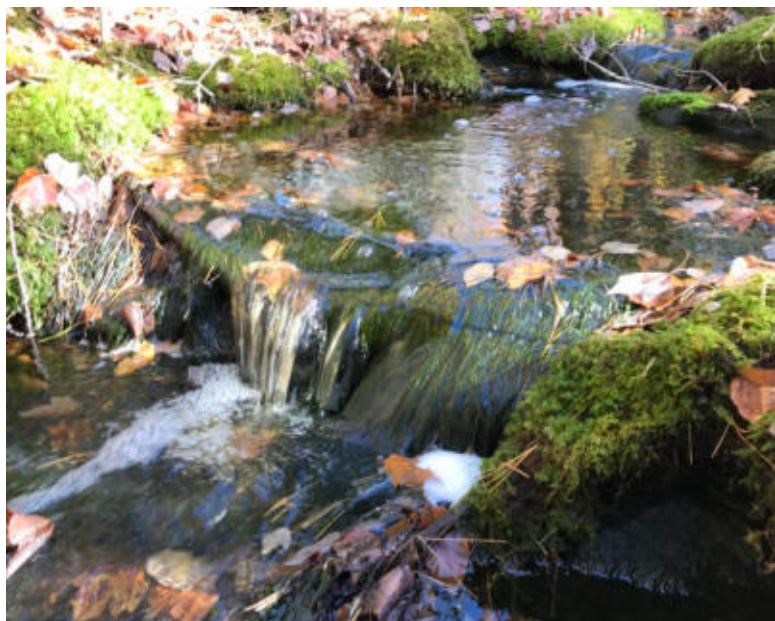
Gulf Brook Watershed

A watershed is an area of land bounded by mountains or hills (the highest points of elevation), where all the surface water within drains into the same river, lake, or pond. Watersheds can be large or small; smaller watersheds (or subwatersheds) join to become larger watersheds. The ridgeline that separates two watersheds is called the drainage divide. We all live in a watershed. Nearly all of Pittsfield is part of the Suncook River watershed, a major tributary to the Merrimack River. (Only a very tiny bit of Pittsfield on its eastern border with Northwood flows east toward the Isinglass River and on to Great Bay.)

The Gulf Brook Watershed forms the core of the focus area for this story. Gulf Brook (also called Tan Brook in some town documents) begins above Eaton Pond as a small stream that you can step across without getting your feet wet. It flows into Eaton Pond, then downstream to Blake Pond and eventually flows into the Lower Suncook River along Route 4 in Epsom, winding 4.5 miles from its beginning in the hills of Pittsfield. The entire watershed encompasses about 3,000 acres; 1,700 acres of which are in Pittsfield. The Catamount Mountain Range forms the western boundary of the Gulf Brook watershed. To the north lies the Wild Goose Pond watershed. To the east are the Jenness Pond and Flat Meadow Brook headwaters.

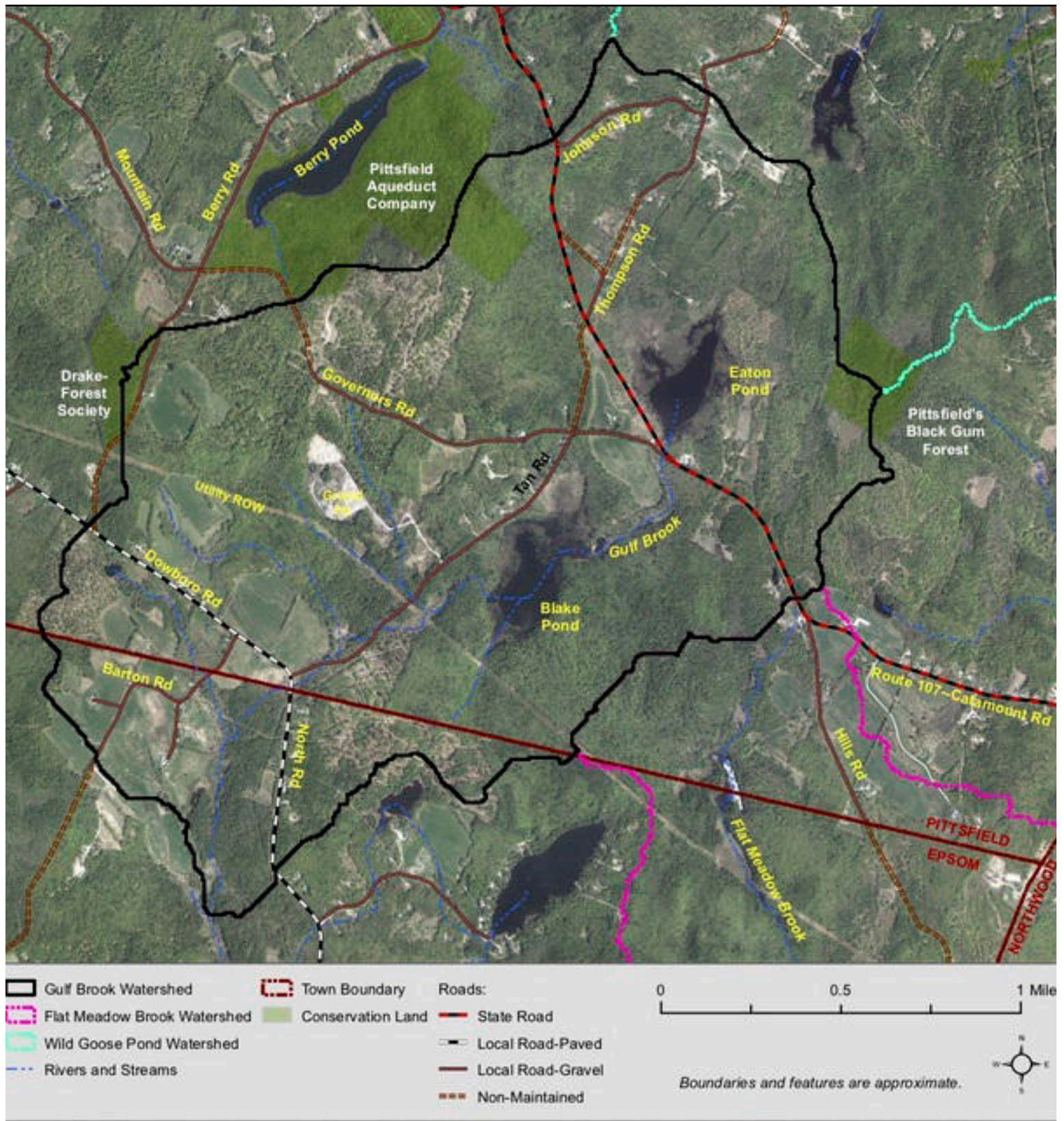
Headwater Streams

All along the length of a river, small streams gather water from higher up in a watershed and flow into what is called the main stem. These small headwater streams are often unnamed and unmapped and sometimes intermittent, drying up in summer. They may begin as trickles, seeps, small wetlands, or depressions in the hillside. The health of larger downstream rivers and streams, lakes and ponds—such as Eaton and Blake Ponds and the Suncook River—are dependent on the health of these smaller streams farther up in the headwaters of a watershed.



These small headwater streams may make up 80 percent of the stream network in a watershed. The upper reaches of the watershed store water, recharge groundwater, and reduce the intensity and frequency of downstream flooding. Small streams are a critical link between land and water. Not only are they linked to upstream and downstream portions of the watershed, but water flowing from the land into the stream carries insects, leaves, branches, and other material that are the start of a food chain. This exchange between land and water occurs in a transition zone along the edges of stream channels, called a riparian area. Connectivity between stream channels, stream bottoms and banks, and the riparian area is important to protect water quality and aquatic habitats. Maintaining a natural stream channel and associated riparian habitat of tangled roots, fallen tree limbs, shrub, trees, and herbs is key to sustaining the health of these waters.

Wood and leaves form the basis of the food chain in headwater streams, such as Gulf Brook. This material is eaten by aquatic insects, which in turn are food for fish.



Aerial image of the Gulf Brook and Flat Meadow Brook watersheds in Pittsfield, NH. Boundaries and features are approximate. Data from NH GRANIT at UNH; aerial photo is from 2015.

Eaton Pond

Eaton Pond lies on the north side of Route 107 and within the headwaters of the Gulf Brook watershed. The main open water section of the pond is about 17 acres. Channels of open water extend out into the surrounding marsh and shrub plant communities, creating a large, intact wetland system of 65 acres. It is a natural pond with an average depth of around four feet, and is 16 feet at its deepest.



Much of the wetland surrounding the pond is considered peatland (also known as a fen), where low nutrients and high acidity cause the accumulation of partially decayed plant material called peat. These spongy peat mats are suited to certain plants including *Spaghnum* mosses, sedges, dwarf shrubs such as leatherleaf, sheep laurel and sweet gale, and some trees, especially red maple.



Spaghnum moss in Eaton Pond.



Several shrubs grow around the edges of this wetland including buttonbush, highbush blueberry, winterberry, speckled alder, maleberry, spiraea, and huckleberry. Cinnamon fern and common cattail are also common around Eaton Pond. A paddle on the pond in summer would reveal several flowering wetland plants including white water lilies, yellow pond lilies, and pickerelweed, among others. An inventory of the plant community within the Eaton Pond wetland during summer would likely reveal a great diversity of plants.

Beavers are active in Eaton Pond, as evidenced by several lodges, many chewed trees, as well as the dam at the southern tip of the pond near Route 107. Beaver are an integral and important part of the Gulf Brook watershed, creating and maintaining a mix of open water/wetland habitats that support many other wildlife: turtles, frogs and salamanders, ducks, songbirds, moose, otter, mink, dragonflies, aquatic insects, and fish.



Freshly chewed trees by beaver at southern end of Eaton Pond.



The undeveloped uplands around Eaton Pond and its associated wetlands provide a scenic backdrop, and most importantly protect water and habitat quality. Route 107 along the southern edge of Eaton Pond presents the most likely source of potential contaminants such as road salt, sediment, and pollutants. Here too a narrow upland buffer helps intercept runoff, although a 1994 NH DES water quality report for Eaton Pond indicated elevated levels of sodium and chloride, perhaps from salt runoff. A gravel pull-off from Route 107 provides access to the pond for anglers and small boats. A sign alerts anyone launching a boat to help ensure that no invasive plants are brought in inadvertently. The Gulf Brook watershed has few invasive plants; this kind of awareness and educational sign will help keep it that way.



Eaton Pond

Blake Pond

Blake Pond lies on the east side of Tan Road. Like Eaton Pond, it is a natural lake with 14 acres of open water within a larger wetland system of 53 acres. The inlet to the pond is in the northeast corner where Gulf Brook enters. The outlet, dammed by beavers, is in the southwest corner where Gulf Brook flows out.

The plant community in and around Blake Pond is similar to Eaton Pond, with the concentric rings of open water, short and then taller shrub-dominated thickets, bordered by an upland mature forest of white pine, hemlock, and red oak. Blake Pond has somewhat less *Sphagnum*-dominated peatland.

Beavers are important in the Blake Pond system as well, creating habitat for themselves and other animals and plants. As strict vegetarians, beavers feed on a variety of aquatic plants, especially water lilies, and the shoots, twigs, leaves, roots, and bark of woody plants. The bark, particularly the inner bark of trees and shrubs, are important foods, especially in winter. Aspen, birch, alder, and willow are particularly favored foods.



Gulf Brook as it flows out of Blake Pond



A moose track near Blake Pond

Blake Pond and associated wetlands are well protected, surrounded by a large block of undeveloped private land. Both ponds are considered eutrophic: shallow water with muddy bottoms, high nutrient levels, low oxygen near bottom, and favorable to warmwater fishes such as brown bullhead and chain pickerel. A 1994 NH DES water quality study indicated elevated chloride levels in Blake Pond, perhaps from salt runoff draining into Gulf Brook from Route 107. More current water quality data would be helpful for both Eaton and Blake Ponds to assess the water quality of the ponds and brook.



“My parents were looking for a vacation home in New Hampshire and Maine in the early 1960s. They had looked at several places when they saw an ad in 1967 for a large vacant lot on Blake Pond in Pittsfield. My father sent my mother to look at the property, and when she returned, my father asked what she thought of the place. My mother said, "It's beautiful." So my father said, "Let's buy it." In addition to its border on Blake Pond, the property has magnificent oak, maple, and pine trees. Blueberries grow wild around the marsh, and I pick as many as I can every year. The Pritchard family has tried to be good neighbors and good stewards of the land, and we have allowed responsible hunting, fishing, walking and nature-watching, and harvesting hay from the field.”

Jim Pritchard

Catamount Mountain

At 1,331 feet, Catamount Mountain is the highest point in Pittsfield. The ridge runs northeast to southwest, with the steepest sections on the southeastern side. The top of the ridge has thin, nutrient poor soils and outcroppings of bedrock. Drought, fire, and severe weather can limit plant growth in these settings. In the absence of such disturbances, plants adapted to dry, windy conditions eventually persist. Atop Catamount, stunted oaks, white pine, and hemlock form an open forest canopy. Understory and ground cover plants include lowbush blueberry, huckleberry, ground juniper, sweet fern, grasses, mosses, and lichens.



Hemlock dominates the cooler west and north-facing slopes and ravines along this ridge, with white pine mixed in. The steeper east-facing slope is dominated by hardwood, such as red oak. The warmer southeast-facing slopes are often favored as den sites and sunning areas for some wildlife including porcupines, snakes, bobcats, and white-tailed deer. Ravens and turkey vultures will nest on steep, rocky ledges or outcrops.



Stunted oaks, grasses, lichens, and mosses grow on the nutrient poor soils atop the Catamount Mountain range.

The western flank of Catamount Mountain is managed by the Pittsfield Aqueduct Company to protect the Town's municipal drinking water supply that comes from Berry Pond. East of Catamount Mountain, all Pittsfield landowners have private wells where they rely on the natural processes of filtering and recharge of groundwater to maintain a source of clean drinking water. From atop the mountain looking east on a clear day you can see to Portsmouth. A radio tower sits at the top of the Catamount Mountain ridge on privately owned land.

The last confirmed eastern cougar--also known as panther, mountain lion, or catamount--in New Hampshire was in 1857. Today people are more likely to see its smaller cousin, the bobcat, although cougars may one day return on their own to roam the Catamount Mountain Range.

Black Gum Forest

In 2010, consulting forester Charlie Moreno wrote a Forest Management Plan for the Pittsfield Town Forestlands. One of the town parcels included in that management plan was the 38.5-acre Black Gum Forest, located at the height of land on the eastern boundary of the Gulf Brook watershed. The drainage divide that forms the Gulf Brook, Wild Goose Pond, and Jenness Pond watersheds runs through this property. So, not only does this property support unique plant communities, water drains in three directions.

The Black Gum Forest is landlocked and remote, situated about ½ mile from the nearest road and surrounded by private woodlands. The Watson Farm that runs all the way to Route 107 borders the property to the south. A snowmobile trail traverses the property, although access is across private lands. The lack of forest management access, the rocky and ledgy terrain, and the presence of diverse and unique wetland habitats make this property most suited to a town-owned natural area without formal trails.

As described by Moreno, the property has about 34 acres of upland forest with hemlock, red oak, and white pine as the dominant tree species. Some of the dense stands of hemlock provide excellent winter cover for white-tailed deer. The approximately 5 acres of wetlands includes several black gum swamps, vernal pools, and shrub swamps. An 8-acre black gum swamp straddles the property's eastern boundary, with three acres of this swamp on town land. The slow-growing shade-loving black gum tree survives for hundreds of years in these isolated wetland basins.

Vernal pools are ephemeral (temporary) wetlands that fill in spring from rainfall, snowmelt, or rising groundwater. Some pools also fill in the fall after autumnal rains. These pools are typically small in size, ranging from less than 1/10th acre to more than 2 acres. Size, however, is not always an indicator of the importance of a vernal pool to the animals that live there. Most vernal pools completely dry out by the end of summer and therefore can not support fish populations, which makes these pools safe for breeding amphibians.

These small wetlands typically harbor fairy shrimp, wood frogs, and spotted salamanders. Smaller organisms such as bacteria, fungi, zooplankton, caddisfly and other insect larvae, crustaceans, and insects are all food for the larger animals. Wood frogs and spotted salamanders travel to vernal pools in the spring to breed, and then spend the rest of the year (11+ months) in the uplands, typically within 1,000 feet of the pool. Canopy shade, deep leaf litter, and fallen trees and stumps are used by frogs and salamanders as cover and therefore are important habitat features in the upland surrounding a vernal pool.



The deeply furrowed bark of a centuries old black gum tree. Black gums are some of the oldest living trees in New Hampshire.



Wood frog, Photo courtesy of Mike Marchand, NHFG

Gulf Brook Watershed Woods

Central New Hampshire, including the Town of Pittsfield, sits at the northern edge of the Eastern Deciduous Forest, a vast region that covers eastern North America south of the St. Lawrence River. This is the domain of white pine and hemlock and various hardwoods, including maples, birches, oaks, and beech trees. Mixed in with these dominant trees you will also find black cherry, white ash, ironwood, hop hornbeam, bigtooth aspen, red spruce, and red pine.



Hardwood forest above Eatpn Pond

At a finer scale, within the Gulf Brook watershed, the distribution of trees and other plants reflect local variations in topography, soil types, and land use history. For example, steep, rocky southern slopes tend to have lots of red oak, which excels where conditions are relatively dry and warm. In contrast, hemlock prevails on steep northerly slopes or on rocky, more poorly drained soils such as along streams or rocky ridges. Land use history, including farming, farm abandonment, and logging, as well as major storms, affect forest composition as much or more than the physical traits of the land itself. For example, white pine is common on recently abandoned farm fields, and in areas where logging and site features favor pine regeneration.



Hemlock and pine forest near Blake Pond

The forests in this watershed are multi-aged, ranging from recently logged regenerating trees to oaks older than 150 years. Many woods are in the 65 to 100 year old range (considered “mid-successional”) as noted in the 2010 Forest Management Plan by Charlie Moreno. The tree canopy is typically fully closed and trees reach 65 to 80 feet tall.

Often there are few, if any, plants growing in the understory or forest floor of a dense hemlock stand. Mixed forests of pine and oak or other hardwoods support many interesting, if common plants. Some of the most commonly seen shrubs and herbaceous plants on a woodland walk in the Gulf Brook watershed include witch-hazel, wild sarsaparilla, Canada mayflower, partridgeberry, wintergreen, goldthread, trailing arbutus,

and clubmosses. Christmas fern and polypody fern are common in the rocky terrain of a hemlock forest, while bracken fern, sweet fern, and black huckleberry are often present in drier forest openings.

The predominantly hemlock-hardwood-pine forest of this region supports a suite of forest wildlife, many of which have increased in numbers in recent years as forests have re-occupied lands once cleared for agriculture. Wandering the woods you might see, hear, or observe signs of moose, bear, deer, coyote, bobcat, fisher, weasels, porcupine, pileated woodpecker, barred owl, ruffed grouse, and many songbirds, among other wildlife.

Wildlife Habitat Features

Wildlife need food, water, cover, and space to live and reproduce--collectively known as their *habitat*. Each species has unique habitat requirements, and the presence of a given species in an area varies depending on the availability of the habitat that they depend on. Wildlife depend on elements of *habitat structure* such as plant diversity, cavity trees, woody debris, and a variety of food resources. These are features that a landowner can assess and maintain on their own property.

Plant diversity: A variety of plant communities result in greater wildlife diversity, such as a mix of hemlock-pine-oak forest, fields, shrubby areas, wetlands, ponds, streams. Vertical layering within a forest or other habitat includes the arrangement of ground cover (lichens, moss, ferns, herbaceous plants), vines and shrubs, and trees (including sizes and ages). More vertical layers create a greater diversity of habitats. A varied and “messy” forest is a boon to wildlife. Forests with little ground cover, dead wood, shrubs, and understory have fewer wildlife species.

Cavity and other nest trees: Many birds and mammals depend on tree cavities for nesting, roosting, or denning. They require a range of cavity tree size classes and rely on a mix of dead or partially dead standing trees (called “snags”) as well as live trees with cavities. A mix of softwood and hardwood cavity trees will benefit more species. Woodpeckers, chickadees, and nuthatches are primary excavators (i.e., they make the holes), while others use existing holes. One species, the brown creeper, nests under loose bark and some bats roost beneath loose bark. Hawks and owls require large trees for nesting and roosting.



Pileated woodpecker holes in a hemlock

Dead and down woody material: Dead and down woody material on the forest floor is important to wildlife, and serve as nurse logs for regenerating plants, and contribute to nutrient cycling. Woody material in various stages of decay includes logs, stumps, branches, upturned roots, and tree falls. The larger the fallen log or stump the greater the biological diversity. Decaying wood supports many insects and other invertebrates, which are food for shrews, woodpeckers, and black bears. Snakes, fishers, and weasels hunt among the woody debris. Many species including mice, voles, salamanders, snakes, chipmunks, red squirrels, weasels, and black bear use downed wood for cover, den sites, or escape areas. Fallen logs and other woody debris are also important in aquatic environments, for turtles, fish, and other aquatic organisms.

Hard and soft mast and other food: For many wildlife species the foods consumed vary seasonally. Breeding birds depend on a flush of insects to feed their young nestlings, while later in summer and into fall and winter they switch to berries, nuts, and seeds. Deer, moose, and other browsers rely on herbaceous plants during the growing season and woody growth in winter. Other mammals such as coyote, fox, and fisher prey on other animals and eat fruits when available. Fruits, nuts, and seeds from woody plants that are food for wildlife are collectively known as “mast.” *Hard mast* includes nuts and seeds, which are typically high in fat, carbohydrates, and protein, a food source that is both high in energy content and available into the winter. *Soft mast* includes fruits and berries such as cherries, raspberries, blueberries, winterberry, grapes, apples, and the fleshy fruits of other trees, shrubs, and vines. Soft mast is more perishable and is often high in sugar, vitamins, and carbohydrates. These fruits are a source of moisture for wildlife during drought years, and are a crucial energy source for some migrating songbirds.

Roads and Culverts

Two paved roads pass through the upper Gulf Brook watershed in Pittsfield: Route 107 and Dowboro Road. The remaining roads are gravel, a combination of maintained and unmaintained town roads (See Table 1). Gulf Brook flows out of Eaton Pond at its southern end, then flows through a culvert under Route 107 and then almost immediately through another culvert under Governors Road. The brook flows through Blake Pond then winds along Tan Road passing through several culverts as it makes its way downstream, flowing through another culvert under North Road just before entering the Town of Epsom.



Governors Road

Table 1. Roads in the upper Gulf Brook watershed in Pittsfield, NH.

| Road Type | Road Name | Culverts |
|-----------------------|----------------|----------|
| State Road | Route 107 | 1 |
| Local Road-Paved | Dowboro Road | |
| | North Road | 1 |
| Local Road-Gravel | Governors Road | 1 |
| | Tan Road | 3 |
| | Thompson Road | |
| | Johnson Road | |
| Unmaintained/Class VI | Governors Road | |
| | Thompson Road | |



Pittsfield's 2017 Hazard Mitigation Draft Plan recommended upgrading culverts to protect against flooding that lead to costly road washouts and damage to infrastructure. Several culverts listed in the Plan as being undersized and needing to be upgraded are along Tan Road and near the intersection of Tan Road and Dowboro Road.

In addition to causing excessive flooding, road washouts and expensive maintenance, undersized culverts affect water quality and the health of aquatic habitats. Aquatic life, such as fish, move upstream and downstream throughout their life cycles to access spawning habitat, feeding areas, and shelter. They sometimes search for these resources over a wide area in a watershed. And juvenile fish need to disperse to new habitats to maintain a healthy population. A road stream crossing (i.e., a culvert) can potentially block access to these areas.

Top: Gulf Brook flows through a culvert under Route 107 below Eaton Pond.

Bottom: Gulf Brook flows through a culvert under Tan Road below Blake Pond.

Culverts that are undersized relative to the natural width and depth of a stream tend to cause higher velocity stream flows that can prevent fish and other aquatic life from passing through. High water flows can also cause scouring immediately downstream of the culvert, which leads to “perching,” where the culvert ends up higher than the streambed, preventing passage by many fish and wildlife. Small culverts also restrict the natural flow of woody material that is important structure for aquatic life in a stream. Instead, material clogs at the stream crossing and is removed during road maintenance.

Fortunately, new designs for stream crossings are available that are safe, stable, reduce expensive erosion and washouts, and are fish and wildlife friendly. The ideal stream crossings are bridges and open arches rather than box and pipe culverts. Whichever system is used the following features make for a well-designed stream crossing:

- Use natural streambed for the bottom. If using a box or pipe culvert, bury it into the streambed
- Install a structure that is wide and high relative to its length. A structure should be a little wider than the natural stream bank width.

Invasive plants are often first detected in a watershed around wetlands and along streams, trails, and roads. Once these plants take hold they often spread, are difficult to control, and begin to degrade the natural habitats. Invasive Japanese plants are growing along Tan Road and Gulf Brook near the junction with Dowboro Road.



Much of the upper Gulf Brook as it flows through Pittsfield has intact riparian areas that help maintain a healthy stream and absorb floodwaters during rainy periods or from snowmelt.

Flat Meadow Brook

The Flat Meadow Brook watershed encompasses 1,500 acres in the towns of Pittsfield, Epsom, and Northwood, with 260 acres of that in Pittsfield forming the headwaters. Flat Meadow Brook begins near the junctions of Route 107 and Hills Road and flows 3.5 miles to its outlet at Northwood Lake just west of The Narrows. Most of the 0.5 miles of Flat Meadow Brook in Pittsfield flows through fields and woods on the Hill property.



There are no paved roads in the entire Flat Meadows Brook watershed; only a few gravel roads cross the brook and those are at the far southern end. This wetland is thus largely unfragmented by roads, houses, or other development. This is valuable for protecting water quality, as well as significant as wildlife habitat.



Beaver pond on Flat Meadow Brook

In their 2006 Wildlife Action Plan, the New Hampshire Fish and Game Department identified development (residential, commercial, or industrial) as one of the most significant risk factors to the State's wildlife and habitats. Development causes the fragmentation of habitat into small, unconnected parcels. Songbirds, small mammals, and other wildlife are more susceptible to mid-sized predators such as fox, raccoon, and skunk in small blocks of habitat. These "generalist" predators adapt better than other species to a fragmented landscape. Habitat blocks crisscrossed with residential roads and houses expose wildlife to high rates of road mortality, increase conflicts with humans and pets, result in increased contaminated runoff, and offer more opportunities for invasive plants to spread to natural areas.

A large unfragmented block of habitat—like the 1,500 acre Flat Meadow watershed—typically has greater capacity to support wide-ranging wildlife such as bear, moose, bobcat, hawks and owls, is more resilient to natural disturbances, and often encompasses a diversity of habitats in close proximity to each other.

In addition, the amount of impervious surfaces—pavement, buildings, concrete, severely compacted soils, and other hard structures—is very low in the Flat Meadow Brook watershed. Studies from around the country show that streams and water quality become degraded as impervious surfaces increase beyond ten percent. Impervious surface increases the volume of stormwater runoff and reduces groundwater recharge—the amount of water that seeps into the ground. This results in more frequent flooding, higher flood peaks, lower base flow in streams, and lower water tables. This watershed has far less than ten percent impervious surface, an indication of a healthy watershed.

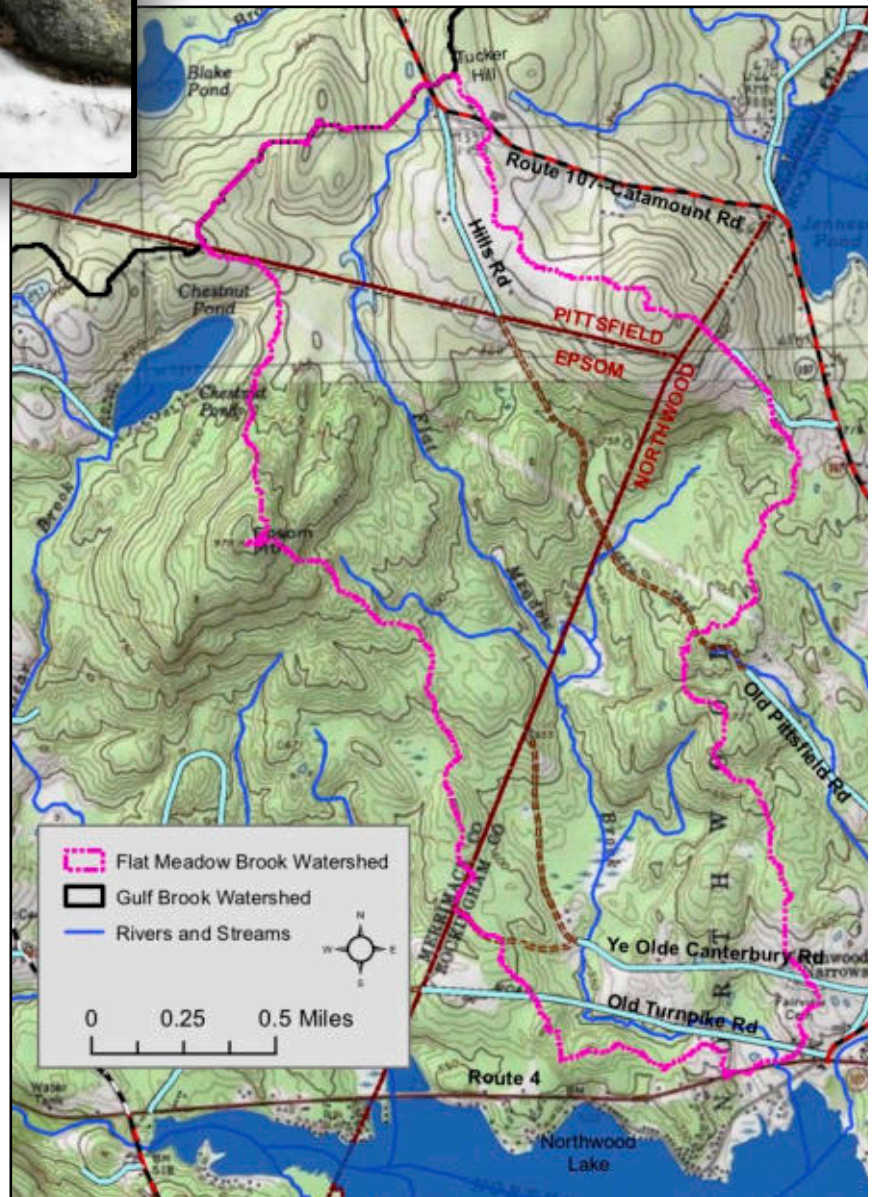


A rocky ridge of moss and lichen covered rocks and hemlock-pine forest serves as the drainage divide between the Gulf Brook and Flat Meadow Brook watersheds.

Topographic map of the Flat Meadow Brook watershed. Data from NH GRANIT; boundaries and features are approximate.

"This is rural Pittsfield where my grandfather bought a dairy farm and where I grew up. Although no longer a dairy farm, the land provides firewood for our house, a local farmer hays the fields that we continue to reclaim, the woods offer homes for wildlife and places for people to hike, hunt and snowmobile. It's a nice area with little light pollution."

Chris Hill



Farms and Fields

About nine percent of the land area of Pittsfield today is farmland. Stonewalls that border gravel roads and stretch through woodlands and up forested hillsides indicate that these lands once had more cleared farmland, especially as pasture for dairy farms. Although dairy farms have mostly disappeared from this vicinity, many landowners in the Gulf Brook and Flat Meadow Brook watersheds still maintain open fields. Many of the fields are kept open by local farmers as hayfields, such as this one at the corner of Tan Road and Dowboro Road in the Gulf Brook watershed.



Other Open Lands

In addition to hayfields, some lands are kept open for other purposes. Fields are maintained to encourage wild blueberries. A utility right-of-way runs east-west through both watersheds and is maintained in a shrubby-herbaceous condition (photo, left). These shrubland habitats are beneficial to wildlife too, especially amidst a mostly forested landscape. Many songbirds such as song sparrow, common yellowthroat, indigo bunting, and prairie warbler are some of the 36 species of birds in New Hampshire that depend on shrub habitats.

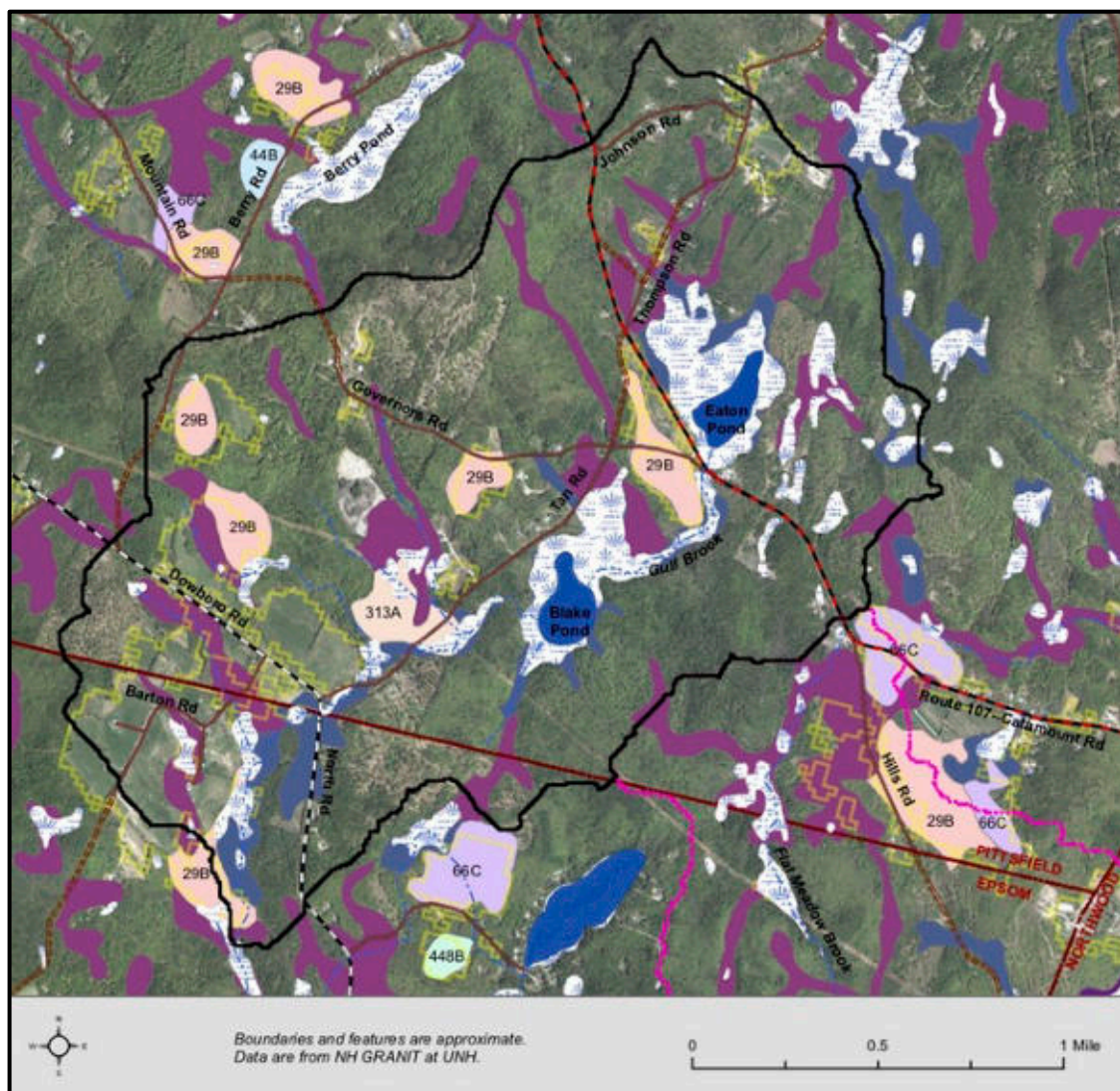
Shrublands can include beaver wetlands, overgrown or shrubby fields, rights-of-way, regenerating clearcuts, and even gravel pits. Often when gravel pits are completed they are reclaimed to prevent erosion and protect water quality. This is important, however, the strategies used can be tailored to benefit turtles, snakes, beetles, and other wildlife that prefer disturbed, sandy, open areas.

Soils

The map below of the Gulf Brook and Flat Meadow watersheds depicts several soil characteristics, including how they correspond with existing open fields. The solid blue-gray and purple polygons are poorly and very poorly drained soils. These mostly correspond with the tributaries, wetlands, and stream corridors of Gulf Brook and Flat Meadow Brook. Poorly drained soils are the least suited to development and correspondingly are most important in protecting water quality and wetland habitats.

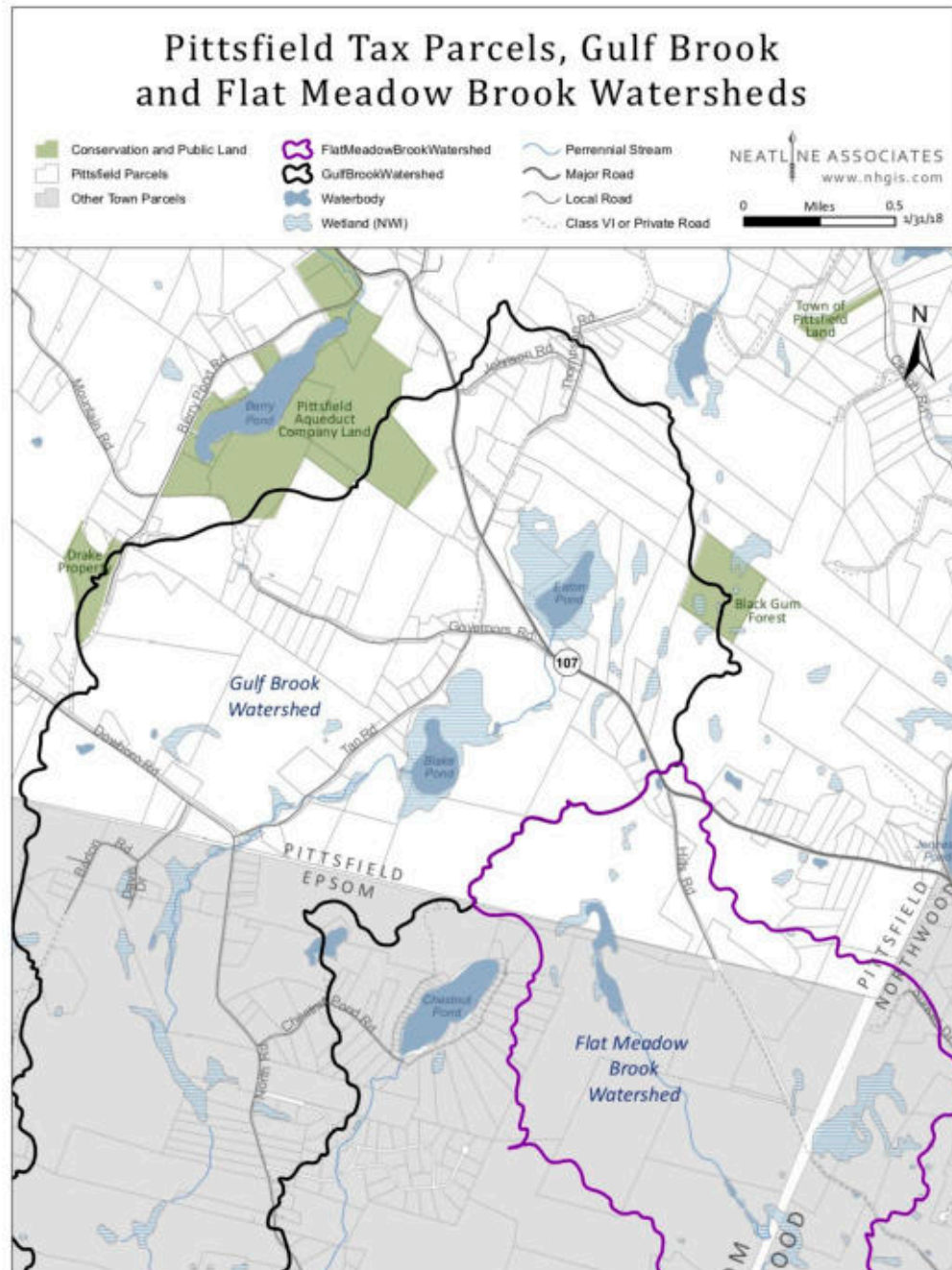
The numbered polygons—beige, blue, purple—indicate prime farmland soils or farm soils of statewide importance. These are Woodbridge (29B), Paxton (66C), and Deerfield (313A) fine sandy loam soils.

Existing fields are outlined in yellow, several of which correspond with the Woodbridge prime farmland soils and the well-drained Paxton soils.



Tax Parcels

This tax parcel map helps landowners living within the Gulf Brook and Flat Meadow Brook Watersheds find their place. Some parcels lie entirely within a watershed, while a ridge divides some parcels causing the water to drain into two or more watersheds. For example, the Pittsfield Aqueduct Company land drains mostly into Berry Pond to the west, but the eastern reach of that land drains into Gulf Brook. The old Watson Farm near the intersection of Hills Road and Route 107 drains into three different watersheds: Gulf Brook, Flat Meadow, and Jenness Pond.



Summary and Recommendations

This story describes the lands and waters, and some of the wildlife within two watersheds in southeastern Pittsfield, New Hampshire. The information was gathered by looking at existing documents and reports, visiting with some of the larger landowners within these watersheds, mapping known information from statewide data, and bringing it all together to raise awareness, and perhaps inspire action.

In 2013, Pittsfield Historical Society's Larry Berkson wrote about the historical sites along Route 107 in the Suncook Valley News, with the following in reference to the area east of Catamount Mountain: *"Passing over the crest of the mountain and down the far slope to Eaton Pond, remnants of Eighteenth Century life have long since disappeared."* Many of the historical structures are gone, but the landscape features that drew early families to this rural region of southeastern Pittsfield remain. A new farmer has taken over the Watson Farm on Tucker Hill. Many landowners within the Gulf Brook and Flat Meadow Brook watersheds have some combination of fields or small openings, woodlands, and wetlands. Many gather resources from the land such as firewood, lumber, wild blueberries, maple sap, sand and gravel, or hay. It is important to people here that fields are tended. Some land here is posted and some is not. Most land not posted is open for people to hunt and explore, while respecting the land and the landowner. The local snowmobile club partners with landowners to maintain routes through this region.

Only a few places show some degree of negligence, mainly along ungated Class VI roads where people have dumped household waste, tires, and furniture. One of the recommendations in the Town's 2010 Master Plan was to assess the status of the town's 9 miles of class VI roads to determine whether any should be gated and barred in entirety or particular sections to minimize littering and vandalism. Water quality studies from the mid-90s show some degree of impact to Gulf Brook, likely from road run-off. In addition, a town hazard report highlights the need to replace culverts feeding Gulf Brook.

Groundwater feeds the private drinking wells, from water filtered through and recharged from the land and wetlands above ground. The streams, ponds and wetlands within these watersheds are the "life blood" of the land, carrying the water that all life depends on. Although wetlands—marshes, swamps, peatlands, and open water—occur on a smaller portion of the watershed, they host a disproportionately high number of plants and animals, compared to the drier, upland forests. Along a stream or pond shore or wetland edge, you will discover a richness of plant life: mosses, grasses, sedges and rushes, a profusion of ferns, wildflowers, shrubs, and floating and submerged aquatic plants. Among this plant-life lives a huge assortment of animals from microscopic aquatic animals to the much larger deer, otter, and other creatures.

Coyotes howl at night, deer graze in the fields, moose wander the watershed, beaver are busy building dams, and the dark night sky is full of stars. People have come here for the land and the privacy, and individually and collectively they share all the beauty and benefits of this hilly and pleasantly remote place. However, this corner of Pittsfield is not far from more developed areas and pressures on the land and water will creep in from more suburban areas. The following recommendations offer some ideas on how landowners and community leaders can plan and guide future changes and protect shared values and resources within these watersheds.

Recommendations

Protecting Ponds, Streams, Wetlands, and Water Quality

This region of Pittsfield forms the headwaters of two streams—Gulf Brook and Flat Meadow Brook—that flow into the Suncook River drainage. It is here, on the slopes above Eaton and Blake Ponds and other beaver wetlands, that the water begins flowing on a long, meandering journey. As you drive along Route 4 in Epsom and see the Little Suncook River flowing alongside, think about how these waters began as small seeps and trickles up in your watershed. The value of working together on protecting water quality in the headwaters becomes clear. Here are some ideas that could help toward that goal:

- Engage volunteers in the watershed to join the NH Volunteer River Assessment Program (VRAP) to gather water samples in the brooks, which will help in assessing water quality, identifying any issues, and guiding future planning. Contact: Ted Walsh, NH DES, 603-271-2083, ted.walsh@des.nh.gov.
- Work with the Town Road Agent and NH DOT to assess use of road salt within the watershed and consider steps to prevent or reduce runoff into the waterways. Assess other disturbed areas that may be contributing contaminants, sediment, or other pollutants into streams.
- Review the Town's 2017 Hazard Mitigation Plan as it relates to improving road culverts that affect water quality. Host a joint site visit/walk of the town boards to see the culverts under Route 107/Governors Road and along Tan Road and discuss need and opportunity to replace culverts.
- Invite NH Fish and Game biologists to look at and discuss water quality, culverts, fisheries, and fishing in the Gulf Brook watershed. Contact John Magee, NHFG Fish Habitat Biologist, at 603-271-2744, john.magee@wildlife.nh.gov. Ask about grants to help replace culverts.
- Invite NH DES watershed staff and UNH Cooperative Extension field staff to also discuss water quality in the brooks and ponds and opportunities for grant assistance if specific projects are identified, such as culverts.
- Monitor for invasive plants throughout the watershed. These often appear first in disturbed areas, along roads, trails and waterways, around ponds and fields. The invasive Japanese barberry was detected along Tan Road and in the woods in the Flat Meadow Brook watershed. For more information on invasive plants, visit the NH Department of Agriculture at <https://www.agriculture.nh.gov/divisions/plant-industry/invasive-plants.htm>
- Check out the story about Wild Goose Pond and its Watershed available on the Pittsfield website at: http://pittsfieldnh.gov/wp-content/uploads/2016/04/Wild-Goose-Pond_Final.pdf. Out of that story grew a collaboration among neighboring landowners, most recently resulting in the conservation of several properties.

Maintaining Healthy Forests, Diverse Wildlife Habitats, and Family Farms

New Hampshire has a strong tradition of integrating forest and wildlife habitat management, generating income for landowners and maintaining that state's diversity of plants and animals. As such, there are many resources available to landowners and communities to learn about and implement best practices. Likewise, the State has a robust agricultural community with many resources to aid farmers.

- UNH Cooperative Extension provides technical assistance to landowners and communities through site visits, workshops, and publications. Here are a few specific resource professionals and programs at Extension:
 - Tim Fleury, Merrimack County Forester, tim.fleury@unh.edu, 603-796-2151
 - Dot Perkins, Merrimack County Agricultural Specialist, dorothy.perkins@unh.edu 603-796-2151
 - Matt Tarr, Wildlife Specialist, Durham, matt.tarr@unh.edu, 603-862-359
 - Haley Andreozzi, Wildlife Outreach Program Coordinator, haley.andreozzi@unh.edu, 603-862-5327
 - UNH Cooperative Extension Natural Resources website: <https://extension.unh.edu/Natural-Resources>
 - NH Coverts Project: trains volunteers to promote wildlife habitat conservation and forest stewardship: <https://extension.unh.edu/Volunteer/New-Hampshire-Coverts-Project>
 - Taking Action for Wildlife: stories and guidance on managing for wildlife: <https://takingactionforwildlife.org/>; an email newsletter is available
- In New Hampshire, private licensed foresters provide forest management guidance to landowners. They write management plans and oversee logging operations, while following best management practices to protect water quality, soils, and habitats. UNH Cooperative Extension maintains a list of licensed foresters. Contact Tim Fleury for more information.
- NH Fish and Game (NHFG) and the Natural Resources Conservation Service (NRCS) have grant programs available to landowners, including farmers, to manage forests and wildlife habitats:
 - NHFG Small Grants Program: <http://www.wildlife.state.nh.us/habitat/small-grants.html>
 - NRCS landowner assistance: Heather Foley, District Conservationist, Concord, heather.foley@nh.usda.gov
- Host a volunteer cleanup day to remove tires and other household waste dumped along the Class VI portion of Governors Road. Work with the Selectboard to assess feasibility to add gates on these roads to prevent future dumping. Review the 1999 Pittsfield Open Space Trail Plan to evaluate opportunities for trails in the watershed, including feasibility and desirability of changing some sections of the Class VI Roads to Class A Trails.
- Invite water, wildlife, soils, forestry, agricultural, or other resource professionals in to lead a walk or give a talk about a particular topic relevant to these watersheds.

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