For all these reasons and more, conserving riparian areas is a vital part of conserving Lyme's natural resources. In some areas along the Connecticut River, vegetated buffers could be re-established to help prevent erosion into the River. This also applies to smaller streams flowing through open fields, particularly farmland.

Lack of vegetative buffer has probably increased erosion problems along this section of the Connecticut River in Lyme. Buffer enhancement would help to minimize erosion.

Despite a few areas noted during field work where buffers were minimal, riparian habitats as a whole throughout Lyme are relatively intact with the exception of sections where the River Road is very close to the riverbank. Though good diverse habitat, some sections of forested buffers could be widened between the riverbank and agricultural fields to improve wildlife travel corridors and water quality.

Wetlands

In Lyme, National Wetland Inventory (NWI) GIS analyses indicate there are 1,563 acres of wetlands while NRCS hydric soils data indicates there are 1,745 acres. Through the use of NWI, NRCS hydric soils data, and field observations during this project, approximately 1,793 acres of wetlands are currently documented in Lyme. This makes up approximately 5.1% of the 35,216 acres of land in Town. Despite the relatively low percentage of wetlands in Lyme, there is a significant amount of diversity within the existing wetlands. NWI data describe numerous types of ponded, emergent, scrub-shrub, forested, and riverine wetlands. Lyme contains a significant amount of upland soils and a very large amount of steep slopes reducing the Town's potential for containing high amounts of large wetlands. These conditions make Lyme's existing wetlands a very important natural resource for the Town to work towards conserving.

Wetlands are an essential habitat type for the majority of plant and animal species in New Hampshire. As a whole, wetlands are extremely diverse depending on the hydrology, soils, topography, and climate of an area. There are four general types of wetlands, marsh, swamp,

bog, and fen, and numerous sub-types within each of these categories. This diversity extends into each individual wetland where numerous plant and wildlife species and hydric regimes can co-exist. This creates numerous edge habitats within and around wetlands which are frequently used by a great deal of wildlife species. It is estimated that riparian areas and wetlands are used by over 90% of the region's wildlife species and provide preferred habitat for over 40% of local species. For these reasons wetlands provide plentiful wildlife viewing and hunting opportunities.

This forested wetland in the floodplain of a small perennial stream is a wetland type observed in Lyme. It is a relatively small part of a large wetland complex within a riparian zone, which lies along an unnamed tributary flowing off Lyme Hill into Grant Brook eventually into the Connecticut River. This wetland represents the diversity commonly found within wetland complexes. This general area contains colonies of walking fern, yellow lady-slippers, wild ginseng, and unique plants yet to be documented. These sapric[3] soils offer a unique habitat abutted by uplands for many diverse plant and wildlife species.

Vernal Pools – Unique often isolated and important wetland types are vernal pools. Vernal pools provide essential breeding habitat for certain amphibians and invertebrates such as wood frogs (*Rana sylvatica*), spring peepers (*Pseudacris crucifer*), spotted salamanders (*Ambystoma maculatum*), marbled salamanders (*A. opacum*), and fairy shrimp (*Branchinecta lynchi*). These creatures depend on vernal pools as breeding sites because they are only temporary water bodies preventing fish and other aquatic predators from taking up residency. Reptiles such as Blanding's turtles (*Emydoidea blandingi*) and spotted turtles (*Clemmys guttata*) also rely on vernal pools as an important feeding area in early spring. Vernal pools fill annually from precipitation, runoff, and rising groundwater, typically in the spring and fall. By mid-summer, however, these wetlands are typically dry, making them a dynamic system inhabitable to specifically adapted plant and wildlife species. For this reason many unique, rare, threatened, and endangered species are linked to this wetland type. They are common in New Hampshire, and the State recognizes their value as important habitat. Twelve potential vernal pools were documented in Lyme and future studies would undoubtedly document more.

[3] Organic soil material that has a fiber content after rubbing of less than one sixth (by volume), excluding live roots.

The Wood frog, such as this mature adult observed in uplands abutting a wetland complex north of Cole Hill, is a vernal pool obligate species that can be documented during the early spring breeding season by observation of its unique 'quacking' call, egg masses, or small black tadpoles as well as 'morphed stage' adults.

Along with providing important plant, wildlife, and fish habitat, wetlands are also an important protector of water sources. Because they often contain hydrophytic vegetation and mucky hydric soils, wetlands are able to store significant amounts flood/run-off water, minimizing serious damage in times of high water. They are also important contributors to groundwater recharge. This ability to retain water allows wetlands to act as a filtration source. As moving water is slowed and stored in wetlands, suspended sediments and particles settle to the mucky substrate and plant roots are given a chance to absorb excess nutrients, toxicants, pollutants, and contaminants. These functions make wetlands an important source in maintaining the health of aquatic systems.

This vernal pool is located within a large area of uplands and it would be valuable to document species during the spring in the future. This site also contains deep organic histosol soil.

Wetland areas are dynamic and constantly changing. The general trend without severe weather or other outside influences is for wetlands to slowly fill in over time. The process begins with open water and as time passes, submerged plants appear. Floating-leafed plants, such as water lilies, eventually follow. Then further emergent plants such as reeds, sedges, and wetland grasses begin to flourish. Shrubs such as high bush cranberry (*Viburnum trilobum*), sweet gale (*Myrica gale*), and bog rosemary (*Andromeda glaucophylla*) begin to appear and heaths such as leatherleaf (*Chamaedaphne calyculata*) and labrador tea (*Ledum groenlandicum*) surface among the shrubs. Trees such as red maple (*Acer rubrum*) and gray birch (*Betula populifolia*) subsequently emerge. This natural successional process is often referred to as lakefill.

On the other hand, there are several environmental and human-induced reasons for wetlands to actually increase in size. Some examples of these follow:

- Human development including damming or excavation such as the mining of gravel and sand could increase wetland sizes and often create new wetlands
- Severe weather changes – an increase in rain will increase the wetland area, whereas a drought may diminish the area
- The cyclic movements of beaver as hardwood saplings regenerate in early succession. In Lyme there is abundant sign of beaver activities in most of the wetland complexes, large waterbodies, and streams, especially in the Connecticut River.
- Human activities such as logging and landscape alteration can dredge out wetland areas or increase the amount of runoff into wetlands

Though beavers are not currently active in this section of this large wetland complex located in the southeastern portion of Lyme, their impact is long lasting. The amount of open water is now less than when the beavers where living in this pond, and lakefill is beginning to occur, which is allowing plant communities common to wet meadows to become dominant. Moose, deer, muskrat, bear, turtle, fox, coyote, and duck activity was observed in and around this area. There is an active beaver pond just downstream of this site offering new open water habitat but impacting the town road.

This high elevation (1,420') forested wetland contains a pit and mound sphagnum mat providing unique habitat and important functions of water retention/filtration to the surrounding area. Adjacent to this wetland on three sides is an abrupt conversion to large upland forest. Forested wetlands such as this one can be overlooked by NWI data and field observation is needed for their documentation.

The 1,793 acres of wetlands still may be a conservative number, under representing the actual amount of wetlands. This project was not designed to focus solely on wetlands; therefore complete field delineation of all the wetlands present in Lyme was not conducted. Twelve potential wetlands, some new areas and other extensions of existing NWI areas, were observed in the field where at least two of the required New Hampshire wetland parameters were met, but could not be included in the Town's wetlands acreage because they were not field delineated. Their locations are provided to the Town through map and GPS locations in order that future field verification and/or wetland delineation can be conducted if desired. Most of these potential wetlands are forested wetlands making them difficult to verify and delineate through mapping techniques alone. Hillside wetlands play an important ecological role because of the functions they provide for the waterbodies, wetlands, and communities that exist in the adjacent valleys below. They are important wetlands for Lyme to be aware of due to the potential of residential development occurring on the Town's hillsides. Future field determinations would be necessary to comprehensively delineate all wetlands in the town. These can be incorporated over time with additional field verification.