

# Buffers for Habitat

for the Connecticut River Watershed

Down by the river exist habitats unlike any other in the Valley. Blanketed against killing cold by shrouds of fog, this riparian region is the last to freeze in the fall and the first to green up in spring. Soils fertilized by spring freshets drink in the moisture that hovers over even the smallest brook. Life is simply richer along rivers and streams.

More species of wildlife use the delicate edge between land and water than any other habitat in Vermont and New Hampshire. Because the riparian zone is a transition between upland and water, it supports plants and animals from both.

This is an area in high demand, however: trout, herons, and turtles face stiff competition from bulldozers, Holsteins, and chainsaws. Landowners who encourage riparian buffers are good hosts to native wildlife.

**Stream corridors are prime real estate for birds and other wildlife.**

## CONTE NATIONAL FISH & WILDLIFE REFUGE

The Connecticut River Watershed's remarkable natural wealth prompted Congress to designate the entire 7.2 million acre basin as the selection area for the Silvio O. Conte National Fish and Wildlife Refuge in 1991. No ordinary refuge, its work depends substantially upon the participation of private property owners in protecting and improving the fish and wildlife habitat under their care. Restoring riparian buffers may be the single most effective means of achieving this goal.

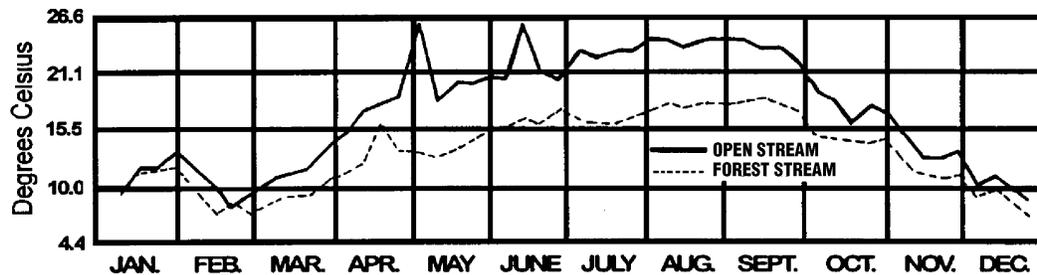
## HOW LAND USE AFFECTS AQUATIC HABITAT

Trout and other aquatic life don't always take well to changes on the land around their home. Trading naturally vegetated riparian buffers for open, managed landscapes such as lawns, golf courses, and cropland can harm water quality when chemical pesticides and fertilizers wash into the stream. Some stream life is more tolerant of this pollution than others, but caddis and mayflies, the favorite food of trout, are usually the first to go.

The shade which keeps the water cool also helps it store oxygen. Aquatic weed growth from excess nutrients also reduces oxygen, causing a shift to carp, catfish, suckers, and other rough fish more tolerant of poor oxygen supplies. Sediment eroding off construction sites abrades fish gills and covers spawning areas. The human instinct to tidy up a yard steals the woody debris that provided food and hiding places for fish and their prey.



**Weekly Maximum Temperature for Open and Forested Streams**



**Forested buffers keep streams cool.**

## BUFFER BENEFITS

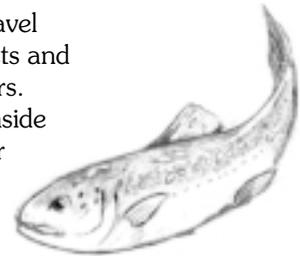
### *To Life in the Stream*

Keeping a forested buffer along a stream is the single most important thing landowners can do to improve or maintain fish habitat both at home and in the river beyond. Even tiny brooks not big enough to hold trout can benefit, because shade keeps the water cool and rich in oxygen for trout habitat downstream. Small brooks are actually more vulnerable since they have less water to flush pollutants, and since they are shallower, they can dry out, heat up, or freeze more easily.

A good trout stream first needs to be a good insect stream. Insects, the favorite food of trout, are abundant in waters kept cool by streamside forests. Streams flowing through older, more complex forests receive the biggest buffet. Leaves, twigs, and other organic matter from streamside vegetation are both lunch and breeding ground for instream invertebrates which then in turn feed many others in the food chain. This means that a brook trout is as dependent upon trees as a squirrel. Studies show that the wider the buffer, the more kinds of aquatic insects appear on the menu, at least in streams with buffers up to 100' wide.

Woody debris stabilizes the stream, and helps create plunge pools, riffles, and gravel beds. Fallen logs deflect current, exposing more of the rocky substrate used by insects and many fish to lay their eggs, and provide cover for fish to rest and hide from predators. Debris dams keep natural organic litter and food from washing downstream. Streamside forests capture rainfall better than any other kind of land use, and keep groundwater recharged so that their streams don't dry out in summer.

**A brook trout is as dependent upon trees as a squirrel.**



### *On the Land and in the Air*

The Connecticut River and its tributaries conveyed European settlers on their migration into the valley. So it has been every spring with migrating songbirds and waterfowl, who depend upon the early-greening riparian habitat along the larger rivers for food and cover until upland areas are ready to receive them.

Streamside buffers provide wildlife foods, such as seeds, buds, fruits, berries, and nuts, in addition to cover and nesting places. Birds, mammals, and amphibians use streams as travel corridors and breed or hunt along them. Continuous travel corridors for wildlife are key to genetically healthy populations.

Riparian land tends to have an abundance of cavity trees and woody debris that is useful to many kinds of wildlife. Osprey, kingfishers, flycatchers, and other birds use snags along the water as feeding perches. Bats roost under the loose bark of dying trees when they're not out catching insects. The microclimate and moist soils near streams also offer the right conditions for delicate ferns and wildflowers such as water lilies, orchids, and gentians, as well as others less celebrated.

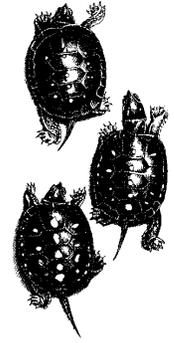
## ROUNDUP OF RIPARIAN LIFE

**Mammals** dependent upon water habitat include mink, muskrat, otter, water shrew, beaver, and moose. Those using mixed upland and lowlands include raccoon and deer. Bats forage on insects above water. All use river corridors as travel routes.

**Birds** that use rivers for breeding and migrating include shorebirds, ducks, teal, mergansers, grebes and geese, belted kingfishers, osprey (not nesting in the Upper Connecticut River Valley yet but often seen), eagles (nesting as of 2000), herons, bittern, water thrushes, cormorants, and gulls. Woodcock prefer wet meadows as their primary feeding and nesting habitat.

The Connecticut River is a major migration route for many species of songbirds, such as vireos, flycatchers, thrushes, tanagers, and wood warblers, and also larger birds such as northern harrier and peregrine falcons. A recent study of spring bird migration on the Connecticut, Ashuelot, and White rivers by the Silvio O. Conte National Fish & Wildlife Refuge, in partnership with Smith College and the Audubon Society of New Hampshire, found that this is especially true for insect-eating birds early in the season, and on the first leg of their return to NH and VT.

**Amphibians and reptiles:** salamanders, frogs, turtles, and their kin require water or damp habitats to reproduce and disperse, although many then leave for upland habitats. Much less mobile than birds and mammals, they require unbroken riparian corridors of natural habitat because they may be unable to cross even small areas of unsuitable habitat, such as parking lots. Stormwater catch drains are insidious amphibian traps, and to a salamander whose life history revolves around its river, a granite curb might as well be the Great Wall of China.



**Insects:** cobblestone tiger beetles, damselflies, butterflies, dragonflies...the parade of insect life in and near rivers and streams is the number one attraction for birds, amphibians, and other creatures of the wild and wet.

**Rare and endangered species:** The riparian zone of the Connecticut River Valley is home to a significant concentration of rare, threatened, and endangered plant and animal species. The mainstem from the mouth of the White River to Weathersfield Bow is especially rich, and has caught the attention of biologists who refer to it as the “Connecticut River Rapids Macrosite.”

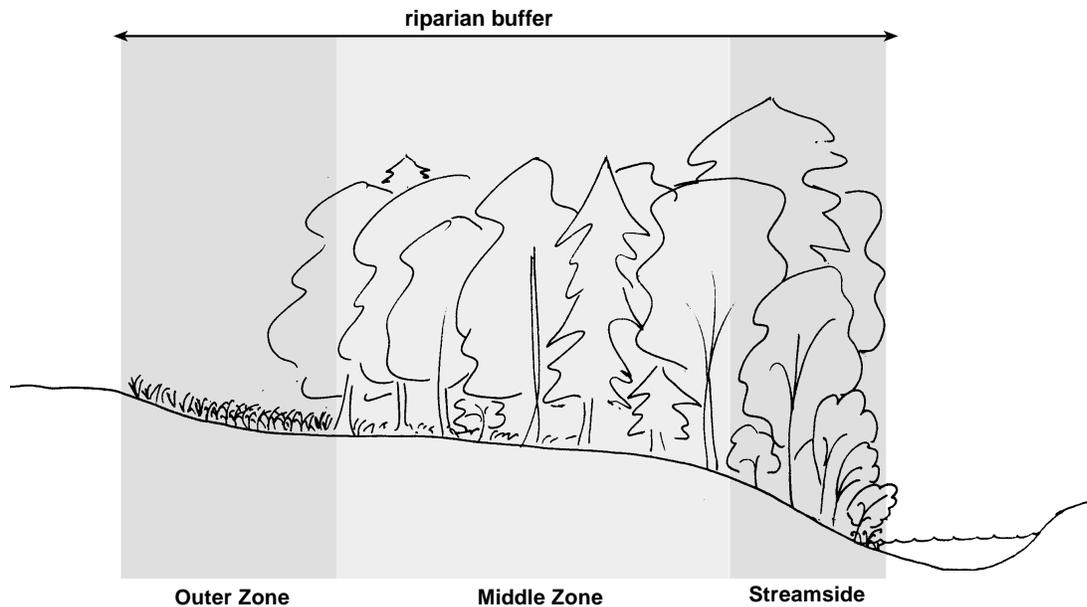


## ANATOMY OF A RIPARIAN BUFFER

### **The Three-Zone Buffer System**

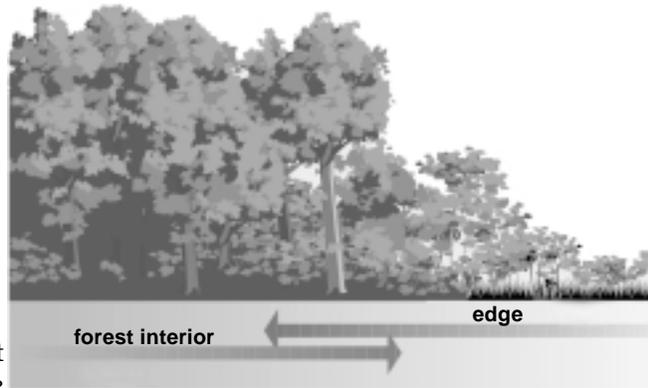
The most effective buffers for fish and wildlife have three zones:

1. **Streamside:** protects the stream bank from erosion and offers habitat. The best buffer has mature forest for shade and erosion protection. Large shrubs may be a better choice where large trees have collapsed a bank.
2. **Middle Zone:** protects water quality and offers habitat. Slows flow, catches sediment. Width depends on size of stream and the slope and use of nearby land. The best buffer has trees, shrubs, and ground plants, and may allow some clearing for recreational use, depending on the species it is intended to accommodate.
3. **Outer Zone:** yard or woods between the nearest permanent structure and the rest of the buffer; play areas, gardens, compost piles, and other common residential activities are suitable here.



### **A Word on Width**

A buffer that will truly benefit wildlife often means a much larger streamside forested buffer than for water quality purposes alone. A generally accepted minimum width is 300', but it depends upon how much land is available, and what species the landowner hopes to accommodate (see chart below). Narrow buffers are often edge type habitat which can attract disproportionate



numbers of predators such as blue jays, crows, raccoons, skunks, foxes, and domestic cats and dogs, as well as parasites like the brown-headed cowbird. However, because small or isolated patches of habitat can be so important to migrating birds, even patches are better than no buffer at all.

### **Recommended Minimum Buffer Widths for Wildlife**

A buffer must not only provide enough room for an animal to take shelter, find food, successfully raise young, and hide from predators, but must also provide the right conditions, such as water that is clean and cool enough, suitable vegetation, and freedom from disturbance the animal cannot tolerate. For instance, while we often observe wildlife such as mink moving along a riverbank, there is more to a mink's life that requires other habitat space. Here are some other examples:

<b>SPECIES</b>	<b>DESIRED WIDTH (in feet)</b>
<b>Wildlife dependent on wetlands or watercourses</b>	<b>30-600'</b>
Bald eagle, nesting heron, cavity nesting ducks	600
Pileated woodpecker	450
Beaver, dabbling ducks, mink	300
Bobcat, red fox, fisher, otter, muskrat	330
Amphibians and reptiles	100-330
Belted kingfisher	100-200
<b>Songbirds</b>	<b>40-660</b>
Scarlet tanager, American redstart, rufous-sided towhee	660
Brown thrasher, hairy woodpecker, red-eyed vireo	130
Blue jay, black capped chickadee, downy woodpecker	50
Cardinal	40
<b>Cold water fisheries</b>	<b>100-300</b>

## **A GOOD BEGINNING**

On small streams, the streamside zone 1 may be all that is needed if the sole purpose is to safeguard aquatic habitat. On larger streams, locate new buffers to connect existing natural patches of vegetation to create corridors. Surround spring seeps, wetlands, brooks, and wet or highly erodible soils with a minimum of 100' of native vegetation. Cross streams with the narrowest possible bridge, rather than a culvert, to present less of a barrier to fish movement. For streams less than 60' wide, measure the width and add or encourage trees on at least the south and west sides which will grow tall enough to shade the stream. On larger rivers, a shaded bank won't have much influence on water temperature, but it can provide cooler cover. Select native plants for the buffer based on requirements of desired wildlife or insects (see No. 8 in this series).

## THE BETTER BUFFER

Maintain or restore as much space as possible in an undisturbed, naturally vegetated state. Identify and safeguard natural features valuable to wildlife, such as:

- large dead standing trees (hawks, osprey, and eagles use for nesting and roosting)
- large cavity trees (nesting by owls, wood ducks, hooded mergansers & others)
- large dying trees (bats roost under loose bark)
- seasonal and vernal pools (used by amphibians for breeding)
- understory tangles (cover for many wildlife species)
- large woody debris in streams (basking areas for turtles; cover for fish)
- streambank burrows (homes of weasels, otters, muskrats)
- sandy soils with good sun exposure (used by turtles as nesting areas)
- stone walls and rock piles (snakes and small mammals)
- large trees overhanging the water (flycatchers, kingfishers, osprey, and other birds use for feeding perches)
- large stands of conifer trees (used by deer as wintering areas)
- hollow trees and logs (suitable as dens for some mammals)
- fallen shaded logs (preferred habitat for some salamanders)



## BUFFER MANAGEMENT

To aim for maximum wildlife diversity, manage for maximum vegetation diversity. Timber harvesting in zones 2 and 3 is compatible with buffers for habitat, although trees within 25' of the stream should be left undisturbed. Remove large trees on the riverbank only if they threaten to fall and open the bank to erosion; leave the root system intact. Allow natural woody debris to remain in a stream unless it causes flooding. Elsewhere, use small scale harvesting, cutting single trees or small groups. Use long rotations, allowing older, uneven-aged stands to develop. Operate timber harvests in late summer or during frozen ground to minimize disturbance to forest floor and understory vegetation. This also avoids conflicts with wildlife breeding periods (April–June). Locate log landings or haul roads outside the riparian area, or at least 200' from the stream. Exclude vehicles and livestock from the buffer during the nesting season of desired species. For grassland birds, wait to mow until their nesting cycle is complete in July. Encourage runoff to spread rather than enter the buffer as concentrated flow, and remove sediment if it accumulates in zone 3.

**Plant diversity  
means animal  
diversity**

### **Buffer Plants to Please Everyone**

Grouse, engineers, and gardeners agree: grey dogwood—*Cornus racemosa*—is a great choice for the riparian buffer. This native deciduous shrub provides excellent riverbank protection, forming a handsome hedge or barrier, and grows in both wet and dry soils and in sun or part shade. The plant's striking red stems are especially attractive in winter against the snow. Pale flower clusters are followed by distinctive white fruits beloved by grouse, turkey, thrushes, bluebirds, grosbeaks, woodpeckers, vireos, catbirds, and more.

Another native equally valuable around the home and in the buffer is American cranberry bush—*Viburnum trilobum*—an outstanding plant with year-round interest. Showy white flowers in a halo arrangement are followed by scarlet fruits which persist into winter to offer food much appreciated by wildlife when the cupboard is otherwise bare. Its handsome foliage turns deep red and purple in fall. This very hardy deciduous shrub tolerates dry soil or wet feet and grows in sun or part shade. Grouse, pheasant, and small birds use the plant for cover, and bluebirds, finches, thrushes, cedar waxwings, cardinals, flickers, and robins eat the fruit.

For more information on native plants for wildlife, see No. 8 in this series.

## FURTHER READING

*Buffers for Wetlands and Surface Waters: A Guidebook for NH Municipalities*, Chase, Deming, & Latawiec. ASNH, NH Office of State Planning, NRCS, UNH Cooperative Extension, 1997

*Stream Buffers in Urban Landscapes*, USDA, EPA, Norwalk River Watershed Initiative, Fairfield County Conservation District, CT DEP, Oct 1998

Information provided by the Connecticut River Conservation District Coalition for the Wildlife Habitat Incentives Program (WHIP).



Turtle illustration courtesy of NH author and naturalist David M. Carroll; fish and eagle illustrations courtesy of VT artist Angela Faeth; final drawing by Susan Berry Langsten, NH artist.

### **Fact sheets in the series *Riparian Buffers for the Connecticut River Watershed***

- No. 1 Introduction to Riparian Buffers
- No. 2 Backyard Buffers
- No. 3 Forestland Buffers
- No. 4 Buffers for Habitat
- No. 5 Buffers for Agricultural Land
- No. 6 Urban Buffers
- No. 7 Guidance for Communities
- No. 8 Planting Riparian Buffers (& plant list)
- No. 9 Field Assessment
- No. 10 Sources of Assistance

See also the companion series for land owners:

**The Challenge of Erosion in the Connecticut River Valley**, Connecticut River Joint Commissions, 1998.

Part of the **Living with the River** series. May be reprinted without permission.

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