

Forestry Effects on Vertebrate Species Habitats in the Riparian Zone

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Three factors influence a coarse-filter approach to the providing wildlife habitat in riparian areas in the northeastern United States. These are: 1) degree of riparian-upland forest connectivity; 2) water regime; and 3) key vegetation structures present in riparian areas that are important to terrestrial vertebrate species.

Nearly eighty vertebrate species in the northeastern US have a strong preference for riparian habitats (DeGraaf and Yamasaki 2000; Pauley et al. 2000). The degree of forest cover across a watershed influences amphibian species richness in permanent wetlands in southern New Hampshire (Givens 2000). As adjacent upland conditions and riparian habitats become more similar (e.g., forest-forest edges as opposed to forest-nonforest edges) as in much of the state of Maine (Hooper 1991), avian communities also become more similar to adjacent habitats. Higher avian abundance and species richness occurs in boreal riparian conifer stands than stands farther from water due to the presence of aquatic-dependent species and others associated with the shrub and grass wetland habitat in boreal riparian forests (Larue et al. 1995).

Lacustrine, palustrine, and riverine habitats are important commuting, foraging, and roosting habitats for northeastern bats (Krusic et al. 1996; Krusic and Neefus 1996; Sasse and Pekins 1996). Most small mammal species use a broad range of forest and nonforest types, stand conditions, and stand ages (Miller and Getz 1977; DeGraaf et al. 1991; DeGraaf and Yamasaki (in press)). Small mammal communities in extensive forests generally respond more dramatically to changes in annual food availability and weather than silvicultural treatment (Healy and Brooks 1988). Riparian habitats are recognized as important to many furbearer species such as beaver (*Castor canadensis*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), fisher (*Martes pennanti*), weasels (*Mustela frenata* and *M. erminea*), mink (*M. vison*), and river otter (*Lontra canadensis*) (Novak et al. 1987). Black bear (*Ursus americanus*), white-tailed deer (*Odocoileus virginianus*) and moose (*Alces alces*) find important seasonal habitat requirements in riparian habitats (Schooley 1990; Banasiak 1961; Leptich and Gilbert 1989).

Timber harvesting effects in riparian areas influence the spatial presentation and duration of elements of forest structure. Key considerations are: 1) effects on cavity trees (Leak 1982; DeGraaf and Shigo 1985; Tubbs et al. 1987); 2) nesting and perching sites (DeGraaf et al. 1992; Elliott 1988); 3) dead/down woody debris (Rabon 1994); 4) shrub and herbaceous wetland inclusions (Elowe 1984; Larue et al. 1995); and 5) softwood composition (Banasiak 1961; Kelly 1977; Weber et al. 1983; Reay et al. 1990; Thomasma 1996).

Buffer zones are commonly used to protect riparian area values (Naiman et al. 1993; Small 1986; Johnson and Brown 1990; Darveau et al 1995; 1998; Noble 1993; Vander Haegen and DeGraaf 1996; Meiklejohn and Hughes 1999). Criteria used vary greatly depending on agency or company needs, riparian type, topography, slope, and soils. Common considerations in buffer-zone design generally include a no-cut or lightly cut area of variable width that minimizes soil erosion and maintains streambank stability (Small and Johnson 1985; NH Div. Forests and Lands, DRED and SPNHF 1997) and an adjacent zone where some of the overstory remains over time. There are many questions still to be investigated whether or not riparian management areas serve as vertebrate species' travel corridors, refugia, sources or sinks, and critical wildlife habitats.

RECOMMENDATIONS

There are no one-size-fits-all recommendations to guide habitat management guidelines in riparian areas at present. Variety in buffer widths, disturbance regimes, adjacent land uses, and vegetative structure is an important consideration. Habitat management of riparian areas includes landscape-level, stand-level and within-stand or structure considerations.

Landscape-Level Considerations

At this scale, several items need consideration in developing habitat management plans:

- a) Consider variable riparian area management widths with some regard to stream order hierarchy or stream width.
- b) Limit new roads in riparian areas; consider the reducing the traffic on existing roads in riparian zones at certain times of the year (e.g. bear hunting season).
- c) Avoid patterns of long linear clearcuts adjacent to riparian areas, especially if the other side of the drainage was recently cut or soon-to-be cut.
- d) Consider tree species composition potential -- are long-term changes in composition warranted, possible, or necessary?
- e) Consider using wider riparian management zones than those normally prescribed to protect streambank stability, provide brook shading, and limit sedimentation where agricultural or urban landscapes predominate.
- f) Consider: 1) limiting grazing activities at the water's edge with fencing when necessary; and 2) limiting borrow pit development and reclaiming existing borrow pits with native species.

Stand-level Considerations

Vertebrate species composition benefits from a variety and diversity of vegetative conditions, forest types, sizes, and age-classes (DeGraaf et al. 1992). Again, there are no one-size-fits all solutions. Site, slope, aspect, soil types, and seasonal limitations (e.g. raptor nesting concerns) all bear on potential stand-level prescriptions. Opportunities are normally present with both even-

age and uneven-age management systems to meet wildlife habitat landscape goals; consider how one might implement landscape goals at the individual stand level.

Within-Stand or Structure Considerations

The vegetation structures to be maintained or developed need to be based on the site specific potential. For example, in seasonally flooded drainages, it might be very difficult to establish and maintain a dense shrub zone or dense herbaceous ground cover; yet in other less frequently disturbed drainages, the likelihood of success is much greater. To provide an array of structural components over time:

- a) Consider higher densities of cavity trees and snags, especially larger diameter trees; think hard before immediately prescribing salvage harvests.
- b) Consider a variety of canopy closures; raptor nesting and perching tree potential, softwood-to-hardwood or mast-to-non-mast basal area ratios.
- c) Consider the opportunity to increase the dead and down woody debris component in drainages not only for stream channel modifications but also for terrestrial wildlife.
- c) Encourage the development or maintenance of distinct shrub layers, thickets, and grass/sedge and herbaceous ground cover. These add important habitat elements to any riparian area.

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