Floodplain forest

Southern Blue Ridge Mountains

Floodplain forests of the Southern Blue Ridge physiographic province are ecologically rich and diverse. Montane floodplain forests are relatively narrow and do not contain well-developed levees, sloughs and ridges. They are generally restricted to larger streams and rivers with relatively low gradients, since smaller, high gradient streams often do not have representative floodplains, but instead have riparian zones embedded within other habitat types. They are subject to sporadic high-intensity flood events of short duration. The most common ecological communities associated with floodplain forest in the mountain region are montane alluvial forest and piedmont/low mountain alluvial forest. However, floodplain forests of the mountains often contain small amounts or isolated patches of swamp forest, swamp forest-bog, floodplain pools and semipermanent impoundments (Schafale and Weakley 1990).

In these floodplains, the forest canopy contains a mixture of bottomland and mesophytic (moderately moisture tolerant) species including eastern hemlock, yellow poplar, yellow birch red maple, and others. In areas where floodplain landforms *are* apparent, levees may contain sycamore, river birch and box elder. Common shrub layer components include rhododendron, dog-hobble and alder. Herb layers can be quite different from site to site. Floodplain pools that occur in small depressions and are flooded for a portion of the year are important sites for breeding amphibians. A list of priority species of conservation concern that use floodplain forest habitat is provided in Table 1.

Table 1. Priority species associated with montane floodplain forest.

Group	Scientific name	Common name	State status* (Federal status)
Birds	*Coccyzus americanus*	Yellow-billed Cuckoo	
	Limnothlypis swainsonii	Swainson's Warbler	
	Oporornis formosus	Kentucky Warbler	
	Wilsonia citrina	Hooded Warbler	
Mammals	*Myotis sodalis*	Indiana Bat	E (E)
	Sorex fumeus	Smoky Shrew	
Amphibians	*Ambystoma maculatum*	Spotted Salamander	
	Ambystoma opacum	Marbled Salamander	
	Ambystoma talpoideum	Mole Salamander	SC
	Desmognathus aeneus	Seepage Salamander	SR
	Eurycea guttolineata	Three-lined Salamander	
	Eurycea junaluska	Junaluska Salamander	T
	Eurycea longicauda	Longtail Salamander	SC
	Hemidactylium scutatum	Four-toed Salamander	SC
	Plethodon glutinosus sensustricto	Northern Slimy Salamander	
	Pseudacris brachyphona	Mountain Chorus Frog	SC
Reptiles	*Clemmys muhlenbergii*	Bog Turtle	T (T)

Table 1. Priority species associated with montane floodplain forest.

Group	Scientific name	Common name	State status* (Federal status)
	Crotalus horridus	Timber Rattlesnake	SC
	Heterodon platirhinos	Eastern Hog-nosed Snake	
	Lampropeltis getula getula	Eastern Kingsnake	
	Terrapene carolina	Eastern Box Turtle	

*Abbreviations
T Threatened
E Endangered
SC Special Concern
SR Significantly Rare

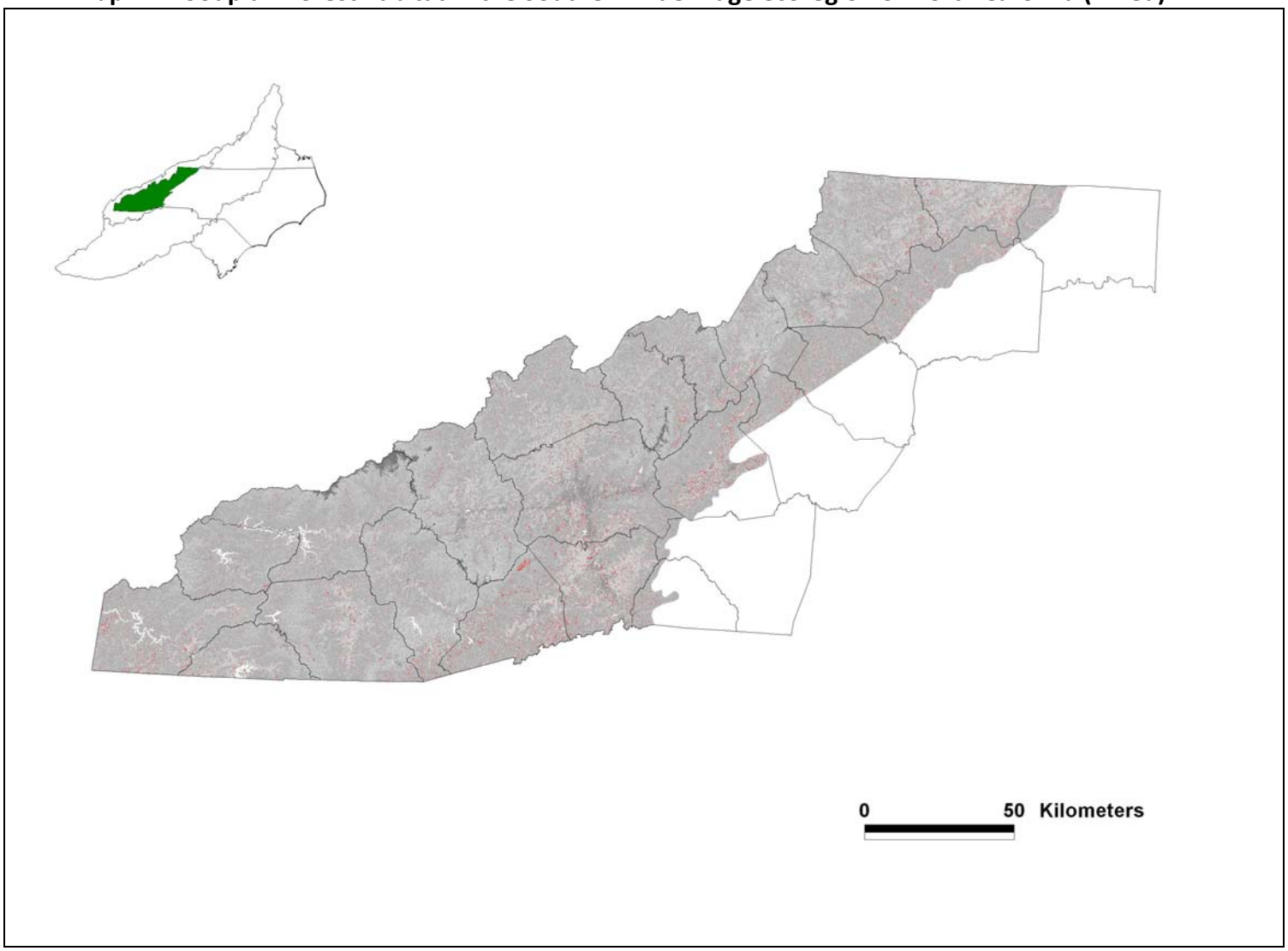
Location And Condition Of Habitat

Floodplain forest is a difficult habitat to characterize and quantify, owing to the terminology used by different individuals to identify this habitat type. Often, floodplain forest, riparian forest, and bottomland forest are used interchangeably to describe habitats associated with mountain waterways. While they can refer to the same habitat, they do not necessarily refer to the same habitat. Furthermore, many of the wildlife species associated with mountain floodplain forest are not restricted to floodplains, but will utilize them and a variety of other mountain habitats. Therefore, floodplain forest habitat for the purposes of this plan should be broadly interpreted to include a range of ecological communities defined by Schafale and Weakley (1990), but generally occurring on floodplains or immediately adjacent to waterways. Map 1 represents locations of floodplain forest in the Southern Blue Ridge ecoregion.

There is no single estimate of the amount, nor an assessment of the condition of floodplain forest condition in the mountains. Estimates of bottomland hardwood forest for the Southern Appalachian Assessment exceed 450,000 acres (SAMAB 1996), and Partners in Flight estimates 65,000 acres of lowland riparian woodlands in the southern blue ridge (Hunter *et al*. 1999). However, these estimates were for habitats defined differently, that encompassed different regions of the Southern Appalachians. The fact is, we do not know how much floodplain forest we truly have in western North Carolina. What we do know is that historic development patterns and land uses have taken a disproportionate toll on the availability of floodplain forest in the region, for the simple fact that it is the flattest land around, and therefore most amenable to both agricultural uses as well as development for transportation, housing, and urban development.

No matter how it is characterized, floodplain forest is currently in short supply in western North Carolina. There remain a few examples of functional floodplain forest along major rivers in the region primarily upon private lands, and a greater amount of more generalized riparian forest associated with smaller streams upon conservation lands, such as those owned by state and federal government agencies.

Map 1. Floodplain forest habitat in the Southern Blue Ridge ecoregion of North Carolina (in red).



Data source: NC GAP, 1992.

Problems Affecting Species And Habitats

In a word, the biggest factor that has had a negative impact upon floodplain forest habitat and consequently the wildlife associated with it is development. There is no question that the river and stream valleys of the mountain region have historically supported the bulk of agricultural activities, transportation development, hydroelectric facility development, commerce, and urban development. That has led to a number of different effects upon the habitat that include direct loss, habit fragmentation, altered hydrology, and others. Each of these has affected the entire assemblage of species that utilize floodplain forest to one degree or another. However, most of the species associated with floodplain forest will utilize other habitat types, and have been able to survive even in the face of dramatic loss of habitat.

Floodplain forests, are particularly important habitats for breeding amphibians in the region, mainly due to the inclusion of floodplain pools, and semi-permanent impoundments (i.e. beaver ponds), in our definition of the habitat. These temporarily flooded areas are critical breeding habitat for species such as marbled, mole, four-toed, and spotted salamanders. Likewise they can be critical for breeding to other amphibians such as chorus frogs, wood frogs, etc. Floodplain pools within floodplain forests have been directly impacted by conversion to other land uses, but also indirectly lost due to our development of water control structures (mostly combined with hydroelectric facilities) which have reduced the frequency, duration, and magnitude of flood events. That, in turn has had a number of direct impacts upon the habitat: pools don't get filled or get filled less frequently, vegetation structure and composition changes as a result of lost flood events as well. All of these have impacts upon the entire suite of species which formerly occupied or used floodplain forests.

Often, our approach to managing habitats within floodplains or riparian zones is dictated by other factors which are critically important, such as water quality considerations. However, this combination of management strategies can lead to such situations as floodplain forests becoming homogenous in structure/and composition, partly due to a lack of water quality protection, partly due to historic land use/clearing, and partly due to the diminution of flood regimes. The result can be a lessening of microhabitat diversity within floodplains, and the concomitant impact on the assemblage of species utilizing floodplain forests.

Other problems affecting particular species that utilize floodplain forests include geographic and genetic isolation (e.g., mole and four-toed salamanders, bog turtles) and small ranges of particular species such as Junaluska and longtail salamanders and mountain chorus frogs. These factors, the limited availability of existing floodplain forest, and others constitute a significant conservation concern for many floodplain forest species.

Species And Habitat Conservation Actions and Priorities For Implementation

Conservation actions that are necessary for both the species and the habitat include more detailed study of status, trends and species specific habitat use, as well as general protection and management measures for floodplain forest habitats. As with most wildlife habitats today, the level of threat to remaining floodplain forests from development or conversion to other land uses remains a significant factor in the future sustainability of wildlife species and populations. Contiguous, unfragmented gradients between floodplain forest and adjacent upland sites are essential to many amphibian and reptile species in providing foraging habitat, hibernation sites, and refugia during high water events (Bailey *et al*. 2004).

Protection and restoration of the remaining floodplain forest in the region needs to be a high priority for conservation agencies and organizations from numerous perspectives, including both maintenance of water quality, as well as aquatic and floodplain forest wildlife. These priority protection measures include, but are not limited to acquisition of floodplains (through purchase, easement, or other legal means such as management contracts), restoration of floodplain systems, or other legal measures (e.g., buffer rules). The Little Tennessee River valley has good restoration potential in the region, especially with the recent protection of the Needmore Tract (an acquisition made possible through a partnership of the Ecosystem Enhancement Program, the Clean Water Management Trust Fund, the Natural Heritage Trust

Fund, the US Fish and Wildlife Service, The Nature Conservancy, the Land Trust for the Little Tennessee, and the Commission).

In addition, we need to place a high priority upon understanding the habitat relationships of floodplain wildlife, such that an active role can be pursued by conservation agencies and organizations in provision of technical guidance related to management of floodplain systems over space and time. We need to better understand the relationships such that we can develop and implement management strategies to mimic natural processes of flooding, which have been altered due to human activities or land use. For example, in the absence of periodic flooding, due to upstream water control, coupled with historic land use and current water quality regulations and recommendations, are we developing homogenous floodplain forests that are not as diverse floristically or spatially to accommodate use by the full array of wildlife that once occurred across the landscape. We need to study both the situation, and the potential remedies, including both our management of the water and surrounding forest to ensure that floodplain forests of the future do in fact provide the full range of requirements to conserve floodplain forest wildlife.

Priority Research, Survey, And Monitoring

The first priority towards developing conservation strategies for floodplain forest wildlife is to enhance our current understanding of the distribution and status of the species which utilize this habitat, as well as the availability of the habitat itself.

- **Surveys**
  - Status surveys are needed to gather current baseline information on all species, though priority should be given to species that are considered rare, or thought to be declining (e.g. Indiana bat, mole salamander, seepage salamander, Junaluska salamander, longtail salamander, four-toed salamander, mountain chorus frog, bog turtle, timber rattlesnake).
  - Secondary priority for surveys should be concentrated upon species for which we have little current information about status and distribution, though they are thought to be more common (e.g., Swainson's warbler, Kentucky warbler, hooded warbler, Louisiana waterthrush, Baltimore oriole, warbling vireo, smoky shrew, spotted salamander, marbled salamander, three-lined salamander, slimy salamander, eastern hognose snake, eastern kingsnake).
- **Monitoring**
  - We must begin gathering information about population trends for all priority species associated with floodplain forests (considering new techniques for those that are not adequately sampled through existing methods).
  - We must initially concentrate on perceived rare or declining species, but eventually include all priority species. These forests are often heavily used by migrant birds and should be targeted for establishment of both MAPS and migration banding stations, as well as regular monitoring efforts (e.g., cover boards, egg mass counts, etc) for other priority species groups, such as amphibians.

- **Research**
  - Research priorities include many potential topics/questions related to the species themselves, as well as species-habitat relationships.
  - There remain many questions about the genetic status of species ascribed to floodplain forest habitats that need to be addressed such as degree of isolation of populations (e.g., longtail salamanders, mountain chorus frogs, mole and four-toed salamanders).
  - For most of the priority species we do not have a clear understanding of species/habitat relationships to determine how critical maintenance of floodplain forest habitat or its management is to population or species sustainability.
  - The relative importance of floodplain forest habitat compared to other habitats is generally lacking for many of the priority species and needs to be studied, such that conservation measures can be targeted for the species with the most specific requirements for floodplain forest habitat, as opposed to more generalized habitats.
  - Investigations of the impacts and effects of beaver ponds on various floodplain forest species may also be warranted.

Supporting References

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