Early successional habitats

Southern Blue Ridge Mountains

Early successional mountain habitats may range from relatively ancient grassy balds on or adjacent to broad ridgetops (containing a variety of unique grass and herb species) to shrub-dominated heath balds (alder, rhododendron and mountain laurel are common dominant species) to lower elevation fields, meadows, pastures, and clear cuts resulting from agriculture or forestry activities. Human influences, herbivore grazing, and environmental factors such as topographic position, climate, and natural fires have all played a role in the creation and maintenance of montane early successional areas.

Grassy balds seem to have arisen in response to climatic and animal influences in the late Pleistocene and have been maintained by wild herbivores and, since the 1840s, by domestic livestock (Weigl and Knowles 1999). The balds support unique plant species and communities and many rare animal species (often with northern affinities) found nowhere else in the Southeast. They are also important stop-over habitats for migrating birds. Heath balds, resulting from fire, cutting, or other disturbances, are often invaded by forest and support only a few specialized vertebrates (e.g., alder flycatcher).

The remaining open grassy areas are basically montane 'old fields' which have occasionally been invaded by bald species but generally are either in agricultural use or have been abandoned to forest. All of these habitats have been modified by human activity and all are subject to natural succession once controlling mechanisms - such as grazing or cutting - have been eliminated. Without management - the return of the management factors - natural succession will limit the longevity of these habitats and their dependent plant and animal species.

Though many montane early successional habitat types support species uniquely dependent on them, other types provide little benefit to plant and animal species, especially those patches of small size, and thus could only be considered marginal wildlife habitat at best. These kinds of places generally reflect human use and activity as the primary goals of their management and include a number of places such as large lawns, monoculture hayfields, golf courses, residential development and even urban development. While each of these areas may support a limited amount of food and other habitat requirements of certain wildlife species, the array of both plant and animal species utilizing them is quite limited, and therefore they are not considered high quality early successional wildlife habitats. They may, however, play a role in the overall landscape scale habitat selection process of certain early successional species, provide transitional habitats, or provide habitat for a limited number of other species. Therefore, in a general sense or at a large scale, they can be included as part of the overall early successional habitat matrix, though most of the priority early successional species require a more diverse plant community than is often provided at these kinds of sites. A list of priority species associated with montane early successional and grass bald habitats, and for which there is conservation concern, is provided in Table 1

Table 1. Priority species associated with montane early successional/ grass bald habitat.

Group	Scientific name	Common name	State status* (Federal status)
Birds	*Ammodramus savannarum*	Grasshopper Sparrow	
	Caprimulgus vociferus	Whip-poor-will	
	Chordeiles minor	Common Nighthawk	
	Colinus virginianus	Northern Bobwhite	
	Dendroica discolor	Prairie Warbler	
	Dendroica pensylvanica	Chestnut-sided Warbler	
	Dolichonyx oryzivorus	Bobolink	
	Empidonax alnorum	Alder Flycatcher	SR
	Empidonax traillii	Willow Flycatcher	
	Eremophila alpestris	Horned Lark	
	Falco sparverius	American Kestrel	
	Icterus spurius	Orchard Oriole	
	Passerculus sandwichensis	Savannah Sparrow	SR
	Pooecetes gramineus	Vesper Sparrow	SR
	Scolopax minor	American Woodcock	
	Spizella pusilla	Field Sparrow	
	Sturnella magna	Eastern Meadowlark	
	Tyrannus tyrannus	Eastern Kingbird	
	Tyto alba	Barn Owl	
	Vermivora chrysoptera	Golden-winged Warbler	SR
	Vermivora pinus	Blue-winged Warbler	SR
Mammals	*Microtus chrotorrhinus*	Rock Vole	SC
	Microtus pennsylvanicus	Meadow Vole	
	Mustela nivalis	Least Weasel	SR
	Sylvilagus obscurus	Appalachian Cottontail	SR
	Zapus hudsonius	Meadow Jumping Mouse	
Reptiles	*Crotalus horridus*	Timber Rattlesnake	SC
	Eumeces anthracinus	Coal Skink	
	Opheodrys vernalis	Smooth Greensnake	SC
	Terrapene carolina	Eastern Box Turtle	

*Abbreviations
SC Special Concern
SR Significantly Rare

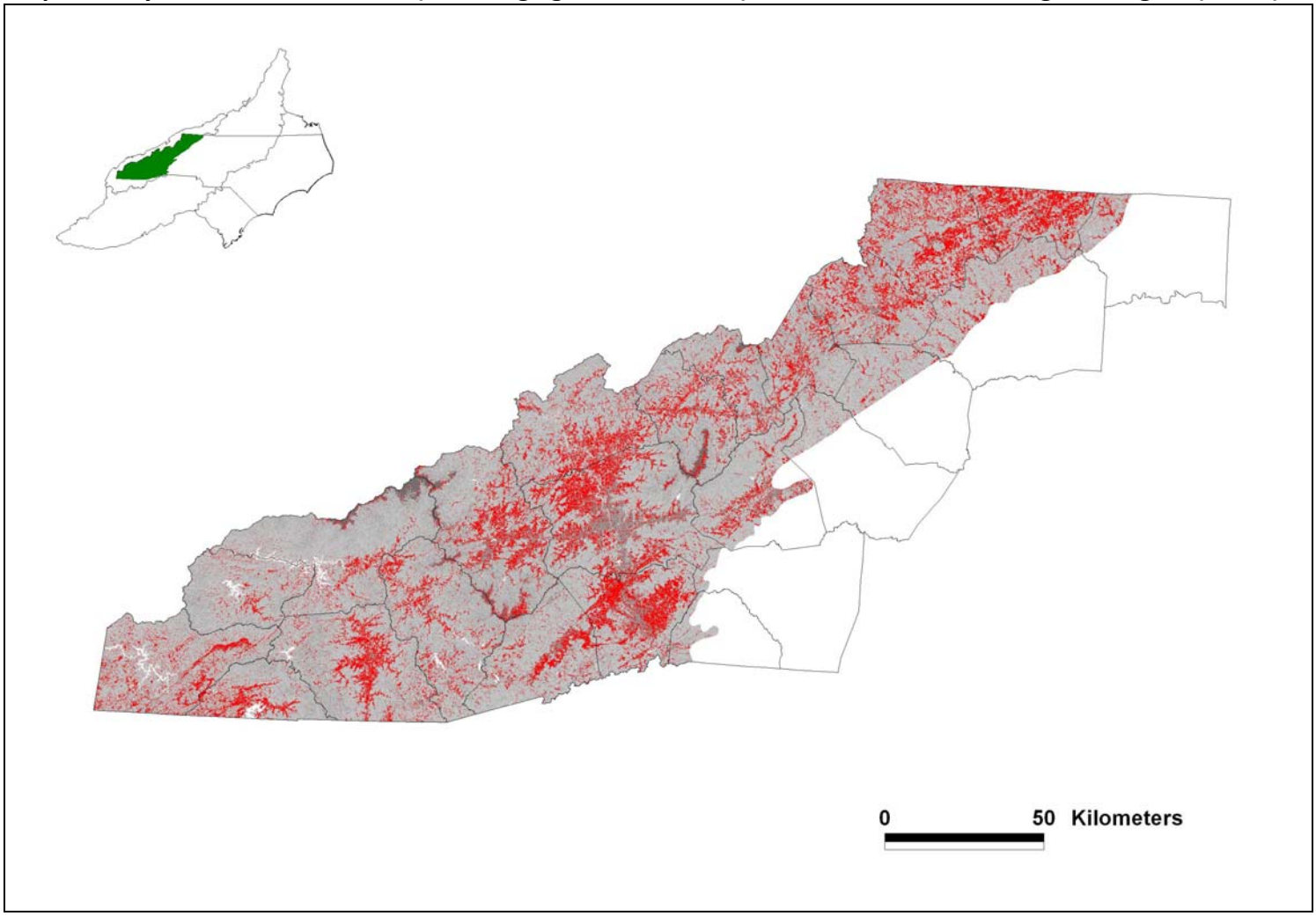
Location And Condition Of Habitat

Because early successional habitat can include many different kinds of areas, from grassy balds to agricultural areas and recently harvested forest stands, the amount and distribution of it is constantly changing. Estimates from Southern Appalachian Assessment data (SAMAB 1996) indicate that roughly 70% of the southern Appalachian landscape is covered in forest. The remaining non-forested habitat includes semi-permanent early successional habitat such as grassy balds, heath balds, and old fields. The majority of early successional habitat was

comprised of plant communities that may, but most often do not , provide quality wildlife habitat such as developed areas, agricultural areas, and water. In fact, Hunter et al. (1999) estimated the amount of semi-permanent early successional bird habitat in the Southern Blue Ridge region (which is mostly western North Carolina) is probably much less than in other parts of the Southern Appalachian Assessment area. Their estimate was that approximately 1% of the Southern Blue Ridge is comprised of semi-permanent early successional habitat like balds and old fields. Furthermore they estimate that less than 10% of the forests in the region are in early successional stages.

Regardless of how it is measured, high quality early successional wildlife habitat in the mountains of western North Carolina is limited and may be declining as a percentage of the landscape due to numerous factors. The declines of grassland bird species for example is attributed to not only actual loss of habitat but also degradation of remaining tracts because of improper or inadequate management, encroachment of exotic vegetation, and fragmentation of habitat patches into small isolated units (Johnson and Igl 2001). Map 1 depicts locations of early successional habitats in the Southern Blue Ridge ecoregion. Due to the ephemeral nature of these habitats, this coverage may not be entirely accurate as of 2005. However, it should still give readers an indication of the extent of these habitats across the region.

Map 1. Early successional habitats (including agricultural areas) in the Southern Blue Ridge ecoregion (in red).



Data source: NC GAP, 1992.

Problems Affecting Species And Habitats

There are a number of situations and conditions that have had, and continue to have, a significant impact upon the availability, distribution, and quality of early successional habitat in the region. Some of them are natural processes such as succession, grazing (by native herbivores historically) and wildfire. Others have been the result of gradual changes in human activities through history such as the progression from native American agriculture and land use practices, through early agricultural practices to modern agricultural practices. Some of the conditions are the result of relatively rapid and large scale changes due to urban and rural development. Depending upon how the question is framed, each of these things can be a problem or challenge to the continued existence of quality early successional habitat in the region.

At least some grassy balds and heath balds are shrinking due to the effects of succession brought on by a lack of disturbance activities (NCNHP 2001). Agricultural practices have changed over time to favor “clean farming” practices including monoculture fields and

pastures, limiting fallow field management, and minimal field borders and stream buffers. Invasive and exotic plant species like tree of heaven, princess tree, Japanese stilt grass, oriental bittersweet, kudzu, and privet also pose a major threat to early successional habitats, especially in riparian areas. These species are often more successful than native flora and ultimately reduce the quality and quantity of available early successional habitat. Development in the region, primarily residential and urban construction, is essentially consuming and permanently removing wildlife habitat of all kinds. These and other political, social, and economic factors combine to pose a significant threat to the continued existence of early successional wildlife habitat in the region.

Besides problems associated with maintaining an adequate supply of quality early successional habitat in the region, there are a number of other problems faced by individual priority wildlife species, including:

- Cowbirds present at low elevations (< 2500 feet) in disturbed areas (urban/suburban/ agricultural) and potential impacts on songbird productivity
- Small isolated populations of some species (e.g. golden -winged warbler, alder flycatcher, rock vole), with greater potential for demographic, stochastic, and genetic impacts
- Appalachian cottontail displacement or dilution by eastern cottontails (Bunch, pers. comm.)

Many of the priority wildlife species are associated with particular landscape contexts, in addition to early successional habitats. In other words it is not enough to provide a small patch of early successional habitat surrounded by significant forested or developed areas. Populations of most bird species associated with grassland, shrub-scrub habitats, and disturbed areas in forested habitats have declined steeply (Hunter et al. 2001). Most of the priority species of early successional habitat, such as grasshopper sparrow, vesper sparrow, orchard, prairie warbler, eastern meadowlark, meadow vole, and meadow jumping mouse, are found in relatively open landscapes, or must have minimum amounts of early successional habitat in the area. This adds a level of complexity to the problem of maintaining an adequate supply of early successional habitat, not only in the amount of habitat that must be provided but also in the proper sized patches and within the proper landscape context for it to be utilized by certain species.

Species And Habitat Conservation Actions and Priorities For Implementation

The highest priority conservation action for early successional habitats is to protect the sensitive grassy bald and heath bald habitat that are critical to numerous plant and animal species. However, most of those areas are now located upon conservation lands of state or federal agencies or conservation groups. Protection of those sites requires active management of them to ensure that they retain the characteristics necessary to sustain both the plants and animals they currently support.

Secondarily, we must ensure an adequate sustained supply of quality early successional habitat through a combination of management strategies and appropriate practices including prescribed burning, timber harvest, grazing, herbicide use, or other practices) upon both public

and private lands. Other important conservation measures to consider for early successional habitat include:

- Acquisition of conservation lands by management agencies/organizations (we need more *quality* early successional habitat, e.g., grass balds).
- Consider increasing the size of timber harvest areas where appropriate to support greater variety and density of early successional "area sensitive" species.
- Control of exotic species (e.g., red cedar, fescue, miscanthus, japanese spirea, tree of heaven, princess tree).
- Continue and enhance efforts to implement conservation measures upon private lands, through various programs and initiatives (e.g., Farm Bill programs, CURE, stewardship program, etc.).
- Additional monitoring of balds and bald edges, and increased management of balds (as is now going on in the Great Smoky Mountains, Roan Mountain, and Whitetop, Virginia).
- Protection of known rattlesnake dens.

Priority Research, Survey, And Monitoring

The following are examples of the priority research, survey, and monitoring efforts needed to Identify factors to assist In the restoration and conservation of wildlife species.

- **Surveys**
  - Immediate efforts should be directed towards determination of the distribution and status of rare species or those believed to be declining (e.g., alder flycatcher, loggerhead shrike, savannah sparrow, vesper sparrow, golden-winged warbler, blue- winged warbler, rock vole, Appalachian cottontail, timber rattlesnake, and smooth greensnake).
  - We currently lack baseline information on the distribution and status of most remaining priority species including whip-poor-will, willow flycatcher, American kestrel, common nighthawk, bobolink, horned lark (*breeding distribution*), dickcissel, least weasel, meadow jumping mouse, coal skink, and box turtle. Efforts to establish their current distribution and status are necessary to determine whether additional conservation measures will be necessary.
- **Monitoring**
  - After we have determined current distribution and baseline information on populations of the priority species, we must develop, adapt, or enhance long-term monitoring efforts for the entire suite of priority species associated with early successional habitats. For some taxonomic groups, monitoring efforts need to be expanded or enhanced.
  - Additional Breeding Bird Survey routes or point counts may need to be established in selected areas or habitats and more attention paid to the migration period and wintering ecology of early succesional birds.

- Additional MAPS stations could also be beneficial, as well as migration banding stations. Monitoring protocols and procedures do not currently exist for mammals or reptiles on the priority list, so they will need to be developed.

- **Research**
  - Potential research questions abound regarding the numerous priority species in this habitat. Priority research includes the need to study golden-winged warbler population response to timber harvests of varying sizes and landscape contexts.
  - For many bird species associated with early succession habitats (e.g., whip-poor-will, common nighthawk, prairie warbler, bobolink, willow flycatcher, loggerhead shrike, horned lark, vesper sparrow, dickcissel), we lack information about life history, breeding habits, and micro-habitat needs.
  - Further research regarding the genetic status of Appalachian cottontails relative to eastern cottontails would also be important to shape conservation strategies for the species into the future.
  - Research into the most effective and efficient measures to create, restore, and maintain quality early successional habitat (e.g., timber harvest, prescribed burning, mowing, herbicides, intermittent farming, grazing, etc.) needs to be emphasized, as well as understanding the differential impact that these strategies may have upon the wildlife species associated with early successional habitat.
  - Research concerning rivercane (*Arundinaria gigantea*) in terms of its function and importance to wildlife as early successional habitat along floodplain areas.

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