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Viability Assessment Report
For
Dry-Xeric Cedar-Oak Forest Habitat Association

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I. Description of Habitat Association:

Eastern redcedar is among the first woody species to invade abandoned fields and areas cleared. Eastern redcedar grows best on deep, moist, well-drained bottomland alluvial sites, but rarely becomes dominant because it is quickly superseded by such species as persimmon, sassafras and other species. On drier sites, succession to hardwoods slowly occurs, often over a few hundred years. Overall, eastern redcedar is considered temporary and is eventually succeeded by various hardwood types (Eyre, 1980). The Dry-Xeric Cedar-Oak Habitat Association is identified by the occurrence of eastern redcedar and associates, which occur on level to gently rolling valley topography over limestone or dolomite parent material at low elevations over much of the range of the species (SAMAB, 1996). On the Daniel Boone National Forest (DBNF) and the Cumberland Plateau, eastern redcedar occurs in similar places, but also occurs on dry to xeric, rocky, limestone, dolomite, or calcareous siltstone cliffs, slopes, and flats. These sites may occur at higher elevations and are more natural than the widespread old field eastern redcedar thickets, and are the subject of this report. The dry-xeric eastern redcedar communities grade into xeric oak communities on many sites.
The DBNF occurs in three ecological sections: Interior Low Plateau and Highland Rim (222E), Cumberland Mountains (M221C) and Northern Cumberland Plateau (221H). On the DBNF, dry-xeric cedar-oak habitat occurs in the following landtype associations (LTAs) (see USDA Forest Service, 1997a; 1996):

- Southern Knobstone Escarpment (221Hc001)
- Central Cliff (221Hb002)
- Northern Escarpment (221Hb004).

On the DBNF, eastern redcedar appears to be a stable climax dominant only in a narrow zone above dry limestone cliffs, on Fredonia soils mixed with outcrops. Water on these sites is primarily from surface sources (rainfall). On some sites, limited amounts of ground water help maintain the sites. Sunlight, which drives photosynthesis, is the major source of energy. Decay of vegetation and byproducts of fires, which may pass through the Dry-Xeric Cedar-Oak Habitat Association, also provides energy sources. Frequently associated small trees and shrubs include persimmon, hackberry, Carolina buckthorn, hoptree, shrubby St. John's wort, Carolina rose, downy juneberry, and rusty blackhaw. Typical herbaceous species include purple cliffbrake, wall rue, golden alexanders, houstonia, false goldenrod and smooth aster. Eastern redcedar habitat transitions into oak forest types above the steepest slopes, either on

more deeply weathered limestone, on old sandy terraces, or on less calcareous bedrock. Dominants include white oak, chinquapin oak, black oak and shumard oak. Hornbeam is often dominant in the understory, with occurrences of redbud. Other woody species that have been observed on dry-xeric cedar-oak sites are sugar maple, blue ash, slippery elm and shagbark hickory. Herbaceous species include woolly blue violet, smooth rock cress, alum root, downy wood mint, mullein foxglove, round leaved ragwort, elm leaved goldenrod and Short's aster (USDA Forest Service et al., 1988).

II. Current Status of the Habitat Association on the Daniel Boone National Forest

The dry-xeric cedar-oak forest types on the Daniel Boone National Forest are tracked in the Continuous Inventory of Stand Conditions (CISC) and are represented as eastern redcedar (35), eastern redcedar/ hardwood (11), and oak/ eastern redcedar (43). The management codes in this forest type, dry-xeric cedar-oak, are defined as follows (USDA Forest Service, 1992)

(35) = 70+ percent of the dominant and co-dominant basal area is softwood, and 50+ percent is eastern redcedar;

(11) = 50 to 69 percent of the dominant and co-dominant basal area is softwood, the plurality of with is eastern redcedar;

(43) = 30 to 49 percent of the dominant and co-dominant basal area is softwood, the plurality of which is eastern redcedar.

On the DBNF, approximately 665,000 acres are in forested land. Of this acreage, approximately less than 1 percent or 88 acres have been identified as the dry-xeric cedar-oak forest type as described. Utilizing the CISC database, the dry-xeric cedar-oak forest type on the Daniel Boone National Forest was further divided by age and acres (USDA Forest Service, 1998).

Table 1. Dry-xeric cedar-oak forest types by age and acres.

AGE	ACRES
0-40	0
41-50	10
51-60	31
61-70	10
71-80	10
81-90	6
91-100	21
TOTAL	88

III. Management Needs: Recommendations for the Conservation of Habitat to Ensure Species Viability

The desired future condition for this habitat association would be to provide amounts of suitable habitat in the proper stages of succession to ensure that the species dependant on the association have a high probability of persistence on the forest. This would involve maintaining a structured age class distribution with emphasis on maintaining a significant component of habitat that contains the habitat modifiers required by various species.

- Dry-xeric cedar-oak types need to be represented on the DBNF.
    - *Rationale: Dry-xeric cedar-oak makes up less than 1 percent of the forest type on the DBNF. The species identified in this habitat association require a variety of attributes. A range of age classes, along with their accompanying attributes, is a necessary component of this habitat association. Age distribution management along with implementation of best management practices should ensure continued persistence of the species identified in this habitat association.*
- Where applicable, leave project unit boundaries with irregular and feathered edges.
    - *Rationale: Abrupt habitat changes can create barriers to wildlife passing through the unit.*

IV. Management Needs: Monitoring and Inventory to Ensure Species Viability

Monitoring and inventory of the Dry-Xeric Cedar-Oak Habitat Association will need to be implemented at a level sufficient to provide data to track the current condition of the habitat. The following items are considered necessary to ensure that the association can be properly evaluated and decisions supported.

- Inventory should be conducted in each stand (or analysis unit) at least once every 10 years. Stand (or analysis unit) inventory should also be conducted in response to events that have potential to alter the landscape i.e., windstorms, winter storms, insect and/or disease infestations (high priority).
    - *Rationale: Inventory to identify and update baseline data or assess changed conditions after non-prescribed major disturbances. Inventory may be at the stand level or larger units may be used (such as ecological or habitat units) as long as the data is sufficient to assess the required parameters. Current data from past inventory work may need to be supplemented to include additional habitat modifier data. This inventory may be part of the prescription process but should not be limited to project planning efforts.*
- Employ GIS and vegetation management databases to track the condition and composition of the Dry-Xeric Cedar-Oak Habitat Association (high priority).

- *Rationale: The use of FSVeg (CISC or best available science) in concert with our GIS coverage of stands should be adequate to assess the composition, age class and spatial distribution of the pine habitat and habitat modifiers. This makes the assumption that the inventory data collects the necessary information regarding habitat modifiers.*

- Continue to implement R8 landbird monitoring program (high priority).

  - *Rationale: This monitoring program will help track the persistence of the avian species in this habitat association. This may be a critical element in documenting avian species trends in this association. This monitoring program contains points linked to this association it would be considered an excellent tool for both species-specific and association monitoring.*

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Attachment A.

Species List: Dry-Xeric Cedar-Oak Habitat Association

Class	Common Name/ Species
ANIMALS	
Bird	Eastern Wood Pewee/ *Contopus virens*
	Cerulean Warbler/ *Dendroica caerulea*
	Least Flycatcher/ *Empidonax minimus*
	Red-headed Woodpecker/ *Melanerpes erythrocephalus*
	Summer Tanager/ *Piranga rubra*
	Ovenbird/ *Seiurus aurocapillus*
Gastropods	Pupillids/ Pupillidae
PLANTS	
Dicots	Mountain-lover/ *Paxistima canbyi*
	Nettle-leaf Sage/ *Salvia urticifolia*
	Cutleaf Meadow Parsnip/ *Thaspium pinnatifidum*
Gymnosperms	Eastern Redcedar/ *Juniperus virginiana* var. *virginiana*
Monocots	Juniper Sedge/ *Carex juniperorum*
	Purple Caric Sedge/ *Carex purpurifera*

Attachment B.

Dry-Xeric Cedar-Oak Forest Species/Habitat Relationships with References

ANIMALS

Birds

Eastern Wood Pewee – *Contopus virens* – This species preferred habitat is rather open mature woodland in a rather dry situation (Hamel, 1992). This species may be absent from younger, second growth forest where an open midstory has not yet developed. In such habitat they often frequent edges and road or stream corridors (Palmer-Ball, 1996). They typically utilize large deciduous trees for the nest site but may use conifers in mixed forest types. This species may be found in numbers in most major forest types examined in Kentucky (Mengel, 1965). Eastern wood pewees would be primarily attracted to the open character frequently associated with dry-xeric cedar-oak stands and would be particularly attracted by the hardwood (oak) component of these forests.

Cerulean Warbler – *Dendroica caerulea* – Cerulean warblers depend primarily on extensive tracts of mature, relatively undisturbed, deciduous forest. These birds occur in floodplains and upland sites that have large trees (> 20" dbh) in which to nest. Both nesting and foraging take place in the canopies of hardwoods. Stands are usually somewhat open, with little understory; however, according to Buehler and Nicholson, monitoring data suggest that breeding territories in the Cumberland Mountains tend to have fewer canopy trees and greater shrub coverage than those elsewhere (1997). The birds are rarely found in tracts less than 250 hectares, whereas maximum population densities occur in tracts greater than 3000 ha (Buehler and Nicholson 1997). Hamel gives a minimum tract size of 1750 ha (1992). Cerulean warblers would be primarily attracted to the open character frequently associated with dry-xeric cedar-oak stands and would be particularly attracted by the hardwood component of these forests.

Least Flycatcher – *Empidonax minimus* – This is a species of open conditions; it is rarely encountered deep in the forest. Open, deciduous woods (particularly those that have been disturbed by burning or logging), forest edge, fields with scattered large trees, and other habitats that provide early successional conditions are utilized. During spring migration, Mengel observed male birds in alders and willows in a marshy, Laurel County meadow (1965). Most of the breeding population frequents elevations above 2500 feet. Least flycatchers would be primarily attracted to the open character frequently associated with dry-xeric cedar-oak stands and would be particularly attracted by the hardwood component of these forests.

Red-headed Woodpecker – *Melanerpes erythrocephalus* – Semi-open to open habitat with an abundance of large (> 14"dbh), dead trees is preferred for both breeding and wintering purposes. Relatively open, mature woods, swamps, clearings within mixed woodland, forest edges, and places where groves of trees are present, such as park-like settings, are commonly used. On the DBNF, the birds are often observed in pine-dominated stands that have been frequently burned (L. Perry, pers. obs.). Nesting is in dead trees, or in dead limbs of live trees (Mengel 1965). This species generally avoids mature closed canopy forest during the breeding season (Palmer-Ball 1996). Red-headed woodpeckers would be primarily attracted to the open character frequently

associated with dry-xeric cedar-oak stands and would also utilize the oak component of these forests for food.

Summer Tanager – *Piranga rubra* – Relatively dry sites, which tend to produce stands of a semi-open condition, are frequented by this species. Uplands are commonly used, but the birds may occur in a variety of habitats, including bottomlands and wooded residential areas. Forest types range from hardwood to pine-hardwood stands of open to medium density. On the DBNF, the birds are frequently found in mature, mixed pine stands that have been burned and undergone midstory removal (L. Perry, pers. obs.). Oaks are often chosen for nesting, in open woodland or forest edge and often over open spaces such as roads and clearings (Mengel 1965) and therefore, summer tanagers would be primarily attracted to the oak component of this habitat association.

Ovenbird – *Seiurus aurocapillus* – Mature and second growth forest conditions are utilized, on dry to moderately moist sites with light to moderate understory. Birds are more common in stands with closed canopies and open ground—This is a ground nesting species that forages in the leaf litter or on the soil. Mengel observed nests on logging roads and under small logs, sheltered by ferns, on steep, mesophytic slopes (1965); however, Baker and Lacki note that birds are more abundant in non-harvested than in harvested areas (1997). Upland stands and sloping terrain are preferred, but a variety of deciduous and mixed (e.g., pine-oak) forest types are used. This is a forest interior species having a minimum necessary tract size of 15 ha (Hamel 1992). Ovenbirds would be primarily attracted to the oak component of this habitat association as well as the dry-xeric conditions and sapling understory that is often found in cedar-oak stands.

Gastropods

Pupillids- The family Pupillidae contains a group of small (less than ¼ in.) snails. On the Daniel Boone, these snails are most often found in open limestone areas such as cedar glades. This group appears to require sunlight and individuals can often be found in thin leaf litter, the bare areas at the base of cedar trees, on bare rock, or within the fine soil or moss mats that covers these exposed areas.

PLANTS

Dicots

Mountain-lover -*Paxistima canbyi* – This plant is an Appalachian provinces species that occurs on thin soils associated with limestone (or other calcareous) cliffs. These sites are usually with a hundred feet or so from the cliff edge, are dry, and tend to have a southerly (SE to NW) aspect. The sites often have a closed canopy, but the midstory and shrub layers are thin and open. It rarely is found in old fields. At one site observed on private land, the cutting of the overstory (usually eastern red cedar, *Juniperus virginiana* and oak species, *Quercus* spp.) resulted in a thick coppice of tree and shrub species. Over a two-year period, the *Paxistima* population was nearly eliminated. The species is probably not tolerant of fire.

Nettle-leaf Sage – *Salvia urticifolia* – The nettle-leaf sage is a species of the central and southern Appalachians. It grows in dry-mesic forest or shrubby areas. The DBNF sites are in open, dry oak woods on limestone.

Cutleaf Meadow Parsnip – *Thaspium pinnatifidum* – Throughout its range, this plant is associated with calcareous bedrock including limestone, siltstone, and dolomite. It is a species of moderately shaded forestland. On the DBNF, it is found in open oak or oak-cedar forest on limestone and calcareous siltstone on the Morehead District.

Gymnosperms

Eastern Redcedar – *Juniperus virginiana* var. *virginiana*– This tree is known from eastern and central North America. It is abundant in some areas, and often dominant on old fields, especially those on basic substrates. In Kentucky, it is widespread and not rare, but in most cases, it occurs as a pioneer species following extensive, and often long-term disturbance. On the Forest, most eastern redcedar occurs in more natural situations along dry limestone cliffs and flats, and rocky flats, and on dry, rocky siltstone flats. In this habitat, the species is uncommon to rare on the DBNF, and it is here that concerns for the species exist.

Monocots

Juniper Sedge – *Carex juniperorum* – Juniper sedge is known only from a few areas, but in a range extending from Ontario, Canada to Kentucky. In the US, it is found on calcareous sites, limestone or siltstone, usually associated with eastern red cedar and hence its name. It is not known from the DBNF, but occurs nearby in habitat that is found on the forest. It can form dense patches or occur in scattered plants in grasses and forbs. It occurs in the open areas between cedar trees and appears to require moderate to high light. Light fire might be of benefit.

Purple Caric Sedge – *Carex purpurifera* – This sedge has a narrow range in the Central Hardwoods area. It grows in mesic forests, primarily hardwood. On the DBNF, it is known from several scattered locations all in dry-mesic oak or mixed mesophytic forest. Shade is moderate to light.

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Attachment C.

Dry-Xeric Cedar-Oak Habitat Association Matrix

Association	Habitat	Modifier	Class	Common/Species
6-Dry-Xeric Cedar-Oak	Dry-Xeric Cedar-Oak Forest	(blank)	BIRD	Eastern Wood Pewee/ Contopus virens
		Basic Substrate	GASTR	Pupilids/ Pupillidae
			P-DIC	Mountain Lover/ Paxistima canbyi
				Cutleaf Meadow-parsnip/ Thaspium pinnatifidum
		Drainage Good	P-DIC	Mountain Lover/ Paxistima canbyi
		Dry	BIRD	Summer Tanager/ Piranga rubra
			GASTR	Pupilids/ Pupillidae
			P-GYM	Eastern Redcedar/ Juniperus virginiana var. virginiana
		Elevation (above 2300 ft)	BIRD	Least Flycatcher/ Empidonax minimus
		Fire Tolerant/Enhanced		Least Flycatcher/ Empidonax minimus
				Red-headed Woodpecker/ Melanerpes erythrocephalus
		Forb/Grass Condition	P-MON	Juniper Sedge/ Carex juniperinum
		Large Decadent Trees	BIRD	Eastern Wood Pewee/ Contopus virens
		Mature forest		Eastern Wood Pewee/ Contopus virens
				Red-headed Woodpecker/ Melanerpes erythrocephalus
				Ovenbird/ Seiurus aurocapillus
		Mid-age Forest	BIRD	Eastern Wood Pewee/ Contopus virens
				Ovenbird/ Seiurus aurocapillus
		Open (Little or No Shade)		Summer Tanager/ Piranga rubra
			GASTR	Pupilids/ Pupillidae
			P-DIC	Nettle-leaf Sage/ Tragia urticifolia
			P-MON	Purple Caric Sedge/ Carex purpurifera
		Open Forest Canopy	BIRD	Least Flycatcher/ Empidonax minimus
				Red-headed Woodpecker/ Melanerpes erythrocephalus
				Summer Tanager/ Piranga rubra
			P-DIC	Cutleaf Meadow-parsnip/ Thaspium pinnatifidum
			P-MON	Juniper Sedge/ Carex juniperinum
		Open Midstory/Understory	BIRD	Eastern Wood Pewee/ Contopus virens
				Summer Tanager/ Piranga rubra
				Ovenbird/ Seiurus aurocapillus
		Rocky/Rocks	P-GYM	Eastern Redcedar/ Juniperus virginiana var. virginiana
		Shrub/Sapling Condition	BIRD	Least Flycatcher/ Empidonax minimus
		Snags > 6" dbh		Red-headed Woodpecker/ Melanerpes erythrocephalus
		Tree and Snags (Cavity Nesters)		Red-headed Woodpecker/ Melanerpes erythrocephalus