

Will Restricting Timber Harvesting from State Forest “Backcountry Areas” Benefit Our Species of Greatest Conservation Concern?

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Critics of timber harvesting on state forests have claimed that wildlife habitat is threatened by forest management activities. Recently this argument has been used in support of proposed restrictions on selective timber harvesting from Morgan-Monroe and Yellowwood state forests’ “Backcountry Area”, a mature second-growth forest unit of approximately 2,700 acres. Some have said the selective harvesting traditionally practiced on state forest backcountry areas will endanger wildlife species that are of greatest conservation concern in Indiana. The Indiana Department of Natural Resources compiles a listing of the state’s ‘Species of Greatest Conservation Need’, which includes many species found on state forest properties. In this document I review published scientific literature for the effects of selection harvesting on wildlife habitat in general and the species of greatest conservation need that are currently known to use state forest backcountry areas.

The overwhelming majority of timber harvesting on state forest properties is done using selection techniques. These include single-tree selection and the creation of group regeneration openings. In the backcountry areas on Jackson-Washington, Clark, and Morgan-Monroe/Yellowwood state forests, conservative forms of single-tree selection and selective harvesting (thinning) are currently prescribed. These techniques retain the closed canopy character of the mature forest, while thinning suppressed trees and reducing tree density and crowding. Though canopy gaps in a selectively harvested forest soon close as residual trees expand their crowns, light levels typically increase after harvesting, encouraging the growth of shrubs and herbaceous plants in the groundstory. Historically, many oak-hickory forests had a characteristic “open” appearance, often with a well-developed groundstory, especially those maintained by fire (Fralish 2004). These fires maintained oak-hickory forests by periodically removing aggressive tree species that in the absence of fire would eventually out-compete the dominant species of this disturbance-dependent forest type (Fralish 2004).

A testament to the disturbance heritage of oak-hickory forests is that plant and wildlife species that occupy them have adapted to periodic disturbance, some even depend on periodic disturbance for their populations to persist (Askins 2001, Brawn et al. 2001, Fuller and DeStefano 2003, Fralish 2004, McShea et al. 2007). One such plant species, the state endangered Illinois blackberry (*Rubus centralis*), was last documented in what is today Morgan-Monroe/Yellowwood’s backcountry area in 1922 (Indiana Natural Heritage Database 2009). This species’ typical habitat is open oak-hickory woods where it responds favorably to disturbance (Olson et al. 2004, NatureServe 2009). Where disturbance is controlled or suppressed and open oak-hickory forests are allowed to be replaced by shade-tolerant overstory species, like sugar maple and American beech, disturbance-dependent species such as the Illinois blackberry will most likely be shaded-out and lost (Fralish 2004).

Selection harvesting is a common silvicultural practice that creates single- and multiple-tree gaps in the canopy. Division of Forestry foresters employ practices that

are based in 'ecological forestry' (Franklin et al. 2007) to retain and introduce into our managed second-growth forests important structural and compositional features characteristic of old forests. These activities include the retention of important "biological legacies" (Franklin et al. 2007, Bauhus 2009) such as standing dead trees, downed woody debris, mature and intact live trees, and the active protection of soil and organic litter. Selection harvest systems, when coupled with the structural and compositional retention practices routinely employed by the Indiana Division of Forestry, have been found by many researchers to effectively mimic natural tree- and gap-based disturbance regimes typically found in mature forests (Franklin et al. 2007).

State forest backcountry areas are mature second-growth forested areas that periodically receive conservative selection harvesting. These and similar silvicultural methods have been studied extensively in recent years for their effects on wildlife habitat and have been found to be compatible with mature forest species of bats (e.g., Menzel et al. 2002) and other small mammals (e.g., Sullivan and Sullivan 2001, Fantz and Renkin 2002, Sullivan et al. 2008), reptiles and amphibians (e.g., Renkin and Fantz 2002), and birds (e.g., Costello et al. 2000, Gunn and Hagen 2000, Campbell et al. 2007, Register and Islam 2008). Researchers have found this technique typically retains mature forest wildlife species while also creating suitable habitat for some early successional forest species, which explains why these managed forests often have higher species diversity and richness than similar unmanaged forests (Brawn et al. 2001, Keller et al. 2003, Sullivan et al. 2008).

Four wildlife species have been documented on Morgan-Monroe/Yellowwood's backcountry area that are also currently listed as Species of Greatest Conservation Need in Indiana. Indiana bat (federally/state endangered), timber rattlesnake (state endangered), hooded warbler (special concern), and worm-eating warbler (special concern) all use mature forests but prefer conditions where open forest and/or small openings are also available. Indiana bats often roost and forage in open woodlands and along wooded edges (USFWS 2007); timber rattlesnakes use small openings and sunny canopy gaps to search for prey and for life processes such as gestation and ecdysis (skin shedding) (IDNR 2008); hooded warblers and worm-eating warblers both nest in dense, shrubby understory that can be encouraged through small openings and selection harvesting (Robinson and Robinson 1999, Gram et al. 2003). In each case, these species of conservation need would most likely benefit from the conditions created from periodic selective harvesting and thinning of the closed canopy in Morgan-Monroe/Yellowwood's backcountry area.

Although four wildlife species of conservation concern have been documented in Morgan-Monroe/Yellowwood's backcountry area, it is possible other listed species use this area and have yet to be detected during surveys. For example, recent research and surveys have found that the cerulean warbler is widely distributed throughout Morgan-Monroe and Yellowwood state forests and typically nests in mature forest habitats, such as that found in the backcountry area (Basile 2002, Register and Islam 2008, Islam 2009). The cerulean warbler – a state endangered species – is associated with large blocks of mature contiguous deciduous forest, preferring to nest in tall, large-diameter trees (Hamel 2000). Additionally, researchers have noted that an open understory and nearby canopy gaps may also be important to this species (Oliarnyk and Robertson 1996, Hamel 2000, Roth and Islam 2008). Register and Islam (2008)

studied the effects of selection silviculture on this mature forest bird at both Morgan-Monroe and Yellowwood state forests, comparing breeding season abundance at these managed forests with that in unharvested sites at Hoosier National Forest's Deam Wilderness Area. They found no difference in abundance between selectively harvested and unharvested sites, concluding, "sustainable forestry practices (i.e. uneven-age management), such as those currently conducted in Yellowwood and Morgan-Monroe state forests, can and do provide cerulean warblers with suitable breeding habitat" (Register and Islam 2008). A study of cerulean warblers in managed forests of West Virginia found similar results (Wood et al. 2005), supporting Register and Islam's (2008) conclusion that selective harvesting is compatible with this species' preference for mature, contiguous forest.

A fundamental characteristic of selection harvests is retention of mature forest species even after years of timber harvesting. An example of this may be found in the current abundance and distribution of other mature forest breeding birds across Morgan-Monroe state forest. Here, selection harvesting has been practiced for decades, and among the species most often currently detected by researchers are mature forest birds such as red-eyed vireo, Acadian flycatcher, Eastern wood-peewee, wood thrush, and ovenbird. A recent survey found that ovenbirds and Acadian flycatchers occur across 90% and 86% of Morgan-Monroe's monitoring area, respectively; while species dependent on elements of early successional, young forest habitat - yellow-breasted chat and blue-winged warbler- were found in only 2% and 13% of sites surveyed. Clearly, mature forest species enjoy a wide distribution across this state forest, especially when compared to that of early successional species, despite the fact that timber harvesting has occurred here for decades.

Some have suggested creating early successional and single- and multiple-tree gap habitats through forest management is not necessary since these habitats can be created by natural disturbances. While it is true that natural disturbance creates these habitat types, it is important to note that natural disturbance regimes have changed dramatically over the years, which has effected how our forests now develop. Two of the major disturbance events that once affected central hardwood forests – wildfires and floods – have been suppressed and controlled, thus altering disturbance patterns (i.e. size and frequency) throughout the state. Even with some natural disturbance events still affecting our forests, the availability of early successional forest has dropped considerably in recent years. In Indiana, acreage of early successional forest habitat has dropped nearly 70% in the last 20 years (USFS FIA 2009). On Indiana's public lands this decrease has been even more dramatic; early successional forest habitat declined over 75% during the same 20 year period (USFS FIA 2009). Today, early successional forest occurs on approximately 2% of our managed state forests, far short of the 10% goal stated in the Division of Forestry's 2008-2013 Strategic Plan. Experts agree large public lands provide critical opportunities for species conservation (e.g., Thompson et al. 1996), though fewer of Indiana's public forests are providing the necessary habitat needed by some of the most imperiled species in the region, largely due to extensive reductions in timber harvesting over the last two decades (Brawn et al. 2001, Dessecker and McAuley 2001, Trani et al. 2001, Backs 2009). Clearly, substantial reductions in these unique habitats has important consequences to a great number of species; for example, it has been estimated that as many as 50% of

neotropical migratory birds in central hardwood forests prefer the type of disturbed forest stands that are created by timber harvesting (Dickson et al. 1995).

In conclusion, simply restricting selective harvesting from Morgan-Monroe/Yellowwood's backcountry area will do little to improve habitat for wildlife species beyond its current mature forest condition. In fact, given the unique habitats created within mature forests using selection systems, restricting harvest from this second-growth mature forest will most likely reduce or eliminate habitat for many species, including some that are of high conservation concern in Indiana. Sustainable timber harvesting has been recognized as an important tool in forest wildlife habitat management by the mainstream ecological community (The Wildlife Society 2005, McShea et al. 2007, ConserveOnline 2009, NatureServe 2009); restricting it from public land would undoubtedly limit our ability to provide high-quality habitat for many native forest species. Regrettably, restricting harvesting, though well-intentioned, will do little to abate the real threats to Indiana's forest wildlife species, which include habitat loss, fragmentation, and degradation due to land conversion, invasive non-native species, and overabundance of white-tailed deer populations. Collectively these are recognized as the greatest threats to our forests, endangering our native plants and wildlife even in the absence of timber harvesting.

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