



State Forest Resource Management Guide Public Comment Summary

Yellowwood State Forest	Compartment 13 Tracts 2, 3, 4	30 Day Comment Period Ending: 9/5/2017
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Overview:

The Division of Forestry (DoF) prepared and presented draft resource management guides for Compartment 13 Tract 2, 3 & 4 for public comment on August 4, 2017. The management guides provide an overview of the forest resources on the tracts, past history, and management recommendations for the time period 2017-2039. These recommendations include continued management under long established Back Country Area (BCA) guidelines. Within these guidelines specific activities have been prescribed, including a single tree selection harvest, invasive species control, access management, timber stand improvement, and management/maintenance of recreation trails.

Comments being reviewed at this time are for the proposed Compartment 13 Tracts 2, 3 & 4 resource management guides. The public comments received have been reviewed in their entirety and given due consideration and summarized in the Division of Forestry response below. Comments received that are general in nature, or non-specific to the tracts under review were appraised for context, but may not be included in the summary below.

Division of Forestry Back Country Area (BCA) Guidelines

Public Comment Summary:

- Concern the prescribed timber management portion of the management guide is in conflict with the Back Country Area purpose and guidelines which established the BCA in 1981, or will significantly alter or eliminate the primitive, wilderness-like character of the area.
- Concern on the harvests intensity that may occur on these tracts, which were reported as clearcuts and 40 trees/acre in some media outlets.

DoF Response:

The Division of Forestry remains committed to the Back Country Area (BCA) objectives and established guidelines - including the objective of providing a primitive recreation experience. The BCA guidelines were adopted in 1981 and have always allowed single tree selection harvesting consistent with the type of harvest now prescribed. Similar harvests occurred in the Morgan Monroe/Yellowwood BCA in 2011 and 2013, covering approximately 215 acres. By using only single tree selection, retaining most of the large trees, and having a much longer re-entry cycle between harvests, this area will continue to develop into late seral conditions and a primitive appearance, including an increased amount of snags and down woody debris, both of which are characteristic of older forests.

Due to Department of Natural Resources (DNR) policy that did not allow camping outside of designated areas, the BCAs were created to provide a more primitive camping experience for guests who wanted to camp in remote areas and camp while on backpacking trips. A July 30, 1981 press release from the DNR stated that the designation was "...opening up these additional lands for Hoosiers and out-of-state visitors looking for a primitive-type experience in Indiana." This designation was so that DNR could offer a



different (unique) recreational experience. The same press release stated that the BCA would be “relatively free of improved roads and trails” and “the management of timber resources within the BCA will be compatible with all other uses permitted.” In order to provide a compromise with those seeking more of a wilderness type experience, timber harvesting was restricted to single tree selection. Unlike the federal wilderness areas, timber harvesting has always been included as part of the management of state forest BCA. The article titled “New Back Country Area at Morgan-Monroe State Forest” was published in *Outdoor Indiana* December 1981-January 1982 to announce and describe the new BCA. The article was clear on the concept of this area in the following statement: “Thus it offers an opportunity for a primitive experience of hiking and camping in an area which is not a wilderness but yet which approaches the current concept of a wilderness area.” This article also stated “It is the Division’s goal to manage these eroded and fire-scarred acres professionally under the policy of *multiple use* in order to obtain maximum benefits for recreation, timber management, wildlife production and watershed protection.” The article also states “Indiana’s definition of a *Back Country Area* is a contiguous piece of State-owned property in a rectangular shape of at least 1,500 acres of land which is relatively free of improved roads and trails.” As clearly stated in this announcement, timber harvest would occur. Improved roads and trails would be minimized, but not completely eliminated. Two historical BCA maps that were available to the visiting public both reiterate the same guidelines as outlined in the *Outdoor Indiana* article. In order to remain consistent with these original guidelines, the primary and most of the secondary skid trails will use existing routes in the proposed harvests, many of these have been in place for over a century. Additionally, one log yard will be placed just outside the BCA and the other at the edge. No log yards will be constructed in the interior of the harvest area. The single tree selection harvesting will retain most of the larger trees in the forest, and no regeneration openings (including clear cuts) will be marked for harvest. These conservative management approaches will contribute to maintaining the primitive, backcountry character objective.

The prescribed light single tree selection harvest is estimated at between 5-7 trees/acre (not the clearcutting, nor the 40 trees/acre incorrectly reported in some outlets). Tree removals are expected to be lightest along the trail corridor in deference to the BCA guidelines and trail aesthetics. See also discussion on Recreation and Aesthetics.

Forest Certification Set Aside Requirement

Public Comment Summary:

- Division of Forestry has a forest certification requirement to have 10% of State Forest acreage in unharvested old growth or old forest and agreed to have the Back Country Area as part of that.
- All or some State Forest lands should be set aside and off limits to timber harvests.

DoF Response:

There is no certification requirement to set aside a percentage of the forest system as old growth, or protected ‘no-harvest’ zones. However, as described in the State Forest strategic plan DoF has established a long term goal of 10% in late seral (older forest) conditions and 10% in early successional (young forest) conditions. This is believed to be the point of confusion regarding a purported 10% set-aside requirement. While there is significant forest acreage trending towards late seral conditions (including BCAs), progress towards young forest is more limited. DoF remains committed to both aspects of this goal.



Specific to forest certification, the Division of Forestry has been annually audited and has consistently remained in compliance with certification standards concerning old growth. This includes standards that require managing portions of the forest to enhance and/or restore old growth characteristics. The following is from pages 30 and 31 of the 2016 Forest Stewardship Council® (FSC®-C012858) audit report http://www.in.gov/dnr/forestry/files/fo-FSC_2016_Audit_Report.pdf:

“No non-conformance is warranted. The issue of 10% of forest set aside as late seral or reference forest, establishing *de facto* wilderness was considered during the 2016 audit. Extensive interviews with staff demonstrated serious consideration of logging and set-asides and their influence on landscape trajectories of forests. The document, http://www.in.gov/dnr/forestry/files/fo-State_Forest_CFI_Report_2010_2014.pdf provides results of continuous forest inventories which take detailed measurements of tree species, tree diameters, tree form, percent of sound wood, site index, regeneration, and invasive species count across the State Forests. The DoF was found in conformance with indicator 6.3.a.1 regarding late seral or older forests. (NOTE: late seral forests are late successional stands that do not meet the FSC-US definitions of old-growth).

There are areas designated for older forest condition include:

- Nature Preserves on State Forests being allowed to develop into late seral old-growth.
- Control units (no harvest) of Hardwood Ecosystem Experiment (HEE). Three units at about 200 acres each.
- ‘No harvest zone’ around active Indiana bat hibernacula on state forests.
- Back Country Areas (BCA) located on Morgan-Monroe/Yellowwood, Jackson-Washington, and Clark state forests. “

The Department of Natural Resources (DNR) has, and continues to establish, set asides across its portfolio of conserved forest lands where commercial timber harvesting does not occur. State Forests are just one part of that portfolio. At this time there are over 2,900 acres of nature preserve (no harvest) set aside areas within State Forests- including a 320 acres preserve within the BCA. Within the DNR portfolio are over 270 Nature Preserves (set asides) in excess of 50,000 acres. DNR State Parks and Reservoirs conserve an additional 100,000+ acres set aside from commercial timber production and all trending towards old growth forests. When viewing in full context, it has been estimated that over 50% of DNR lands are set aside from commercial timber production. Within DNR it is only the State Forests where long term forest and timber management is demonstrated. The Division of Forestry is duly charged with and actively manages the entrusted forests for the full range of benefits and uses provided by Indiana’s forests: sustainable/renewable timber, diverse wildlife habitats, watersheds, multi-use recreation, cultural resources, and more. Set asides are one of the strategies that will continue, along with active management to promote and insure long term forest health, conservation and sustainability of DNR lands and State Forests.

Old Growth Forest Conditions

Public Comment Summary:

- The BCA at Morgan-Monroe and Yellowwood State Forests is old growth forest and therefore should not be harvested.



DoF Response:

Some have expressed the misconception that the Morgan-Monroe/Yellowwood BCA is an old growth forest. To the contrary, historical records and inventory data show these areas have a long history of land use and human-caused disturbance and does not qualify as old growth forest. Additionally, as a consequence of these relatively recent activities (in terms of forest age), the forest itself has not reached an age associated with true old growth status.

For its definition of old growth, DoF uses the standard developed by the internationally recognized Forest Stewardship Council (<https://us.fsc.org/en-us/certification/forest-management-certification>) and characteristics found within recognized old growth forests throughout the Central Hardwood region (e.g., Parker, G.R. 1989. Old-growth forests of the Central Hardwood Region. *Natural Areas Journal*, 9(1):5-11). True old growth is an area of 3 acres or more that has a mean age of dominant canopy trees greater than 150 years on mesic sites and greater than 175 years on drier sites, no evidence of human-caused disturbance (e.g., logging or livestock grazing), and displays structural and compositional old growth characteristics. Similarly, developing old growth is an area 20 acres or more that has a mean age of dominant canopy trees greater than 150-175 years, depending on the site, no evidence of human-caused disturbance in 80-100 years (depending on site productivity), and displays structural and compositional old growth characteristics.

Based on DoF's Continuous Forest Inventory (CFI) data collected within the proposed harvest area, the mean canopy age in this area is estimated to be 98 years old. This estimate is similar to mean canopy age for the entire BCA (100 years old), which was calculated using CFI data as well. Recent 3rd party coring, targeting a non-random selection of the largest trees in a portion of the proposed harvest area, resulted in a mean tree age estimate of 119 years (of these largest trees). Across all of these sampling events, individual trees older than the mean canopy age were found – some >150 years old. While across the forest system- including the BCA- it is not uncommon to find individual holdover or older trees in an otherwise disturbed landscape. Their presence alone does not constitute, nor indicate, old growth conditions.

Historically, portions of the proposed harvest area were open fields and/or fruit orchards into the 1930's. This is clearly demonstrated by the historic aerial photographs included in the tract management guides. State Forest records indicate harvests have previously occurred in the proposed harvest area; one eight acre area had a timber harvest in 1959, and another area of approximately 90 acres was harvested in 1967. Further evidence of relatively recent land use includes remnants of fencing and historical accounts confirming livestock grazing likely occurred over the proposed harvest area. Collectively, the historical record indicates the proposed harvest area was characterized as land maintained for agriculture and livestock grazing, which is typical for acquired property that eventually became State Forest. After decades of sustainable State Forest management and conservation, these forests are now mature, similar to the vast majority of State Forest property. The management guides for the tracts within the proposed harvest area indicate the prescribed management activities are designed to maintain late seral conditions and comply with BCA objectives. Since no regeneration cuts (e.g., clearcuts or other regeneration openings) are prescribed in the proposed harvest area, the mature forest character of this area is not expected to change due to the single-tree selection harvesting.



Biological Diversity and Rare, Threatened, and Endangered (RTE) Species

Public Comment Summary:

- Concerns with how timber harvest will impact RTE species; federally endangered Indiana bat; wildlife and wildlife habitat; and/or the diversity of the botanical resources.
- Some partial studies have indicated that these tracts are unique and have a plant community richness of high quality which need to be protected from logging.
- Concern the prescribed timber harvest will adversely impact wildlife habitat, and plant and animal species and unique plant communities.
- Concerns on the reliability of the Indiana Natural Heritage Database and that a detailed study was not undertaken to identify the possibility that an RTE species may be present.

DoF Response:

Consideration of habitats, communities, and species is part of the management planning process. In ascertaining forest conditions and formulating management prescriptions, consultations include review of the Indiana Natural Heritage Database, the State Forest Environmental Assessment, forest certification standards, forest inventories, and site assessments. When new information is brought forward, it is considered and added to the appropriate document record.

As with any proposed management activity on State Forest, the Indiana Natural Heritage Database (<https://www.in.gov/dnr/naturepreserve/4746.htm>) was consulted during the early planning stages of this management action. A records search resulted in occurrences of the following species in the general vicinity of the proposed action (i.e. within the 3 tracts proposed for management activity and all tracts immediately adjacent to them):

- Worm-eating warbler (*Helmitheros vermivorus*)
- Broad-winged hawk (*Buteo platypterus*)
- Indiana bat (*Myotis sodalis*)
- Eastern red bat (*Lasiurus borealis*)
- Smoky shrew (*Sorex fumeus*)
- Pygmy shrew (*Sorex hoyi*)
- Timber rattlesnake (*Crotalus horridus*)
- Eastern box turtle (*Terrapene carolina*)
- Large yellow lady's slipper (*Cypripedium calceolus* var. *pubescens*)
- American ginseng (*Panax quinquefolius*)

A review of available research literature and management guidance for these species indicates the effect of single-tree selection harvesting will likely be neutral or – very possibly - beneficial, depending on the species. The **worm-eating warbler** was one of 41 forest breeding Neotropical migrants included in a recently released peer-reviewed publication on timber harvesting effects at Morgan-Monroe and Yellowwood State Forests (Kellner, K.F., P.J.Ruhl, J.B.Dunning, J.K.Riegel and R.K.Swihart. 2016. Multi-scale responses of breeding birds to experimental forest management in Indiana. *Forest Ecology and Management*, 382:64-75). This study was part of the long-term Hardwood Ecological Experiment (HEE; <https://www.heeforeststudy.org>) and is one of the longest investigations of harvesting impacts on breeding birds in the Midwest. Purdue University researchers found that single-tree selection harvesting



resulted in only neutral effects on all 41 species studied, including the worm-eating warbler. In fact, worm-eating warbler density trends in sites harvested under single-tree selection were similar to those found in unharvested controls. Information found in the Division of Forestry's State Forest Environmental Assessment (page 63; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf) also suggests the proposed single-tree selection harvests will have minimal impacts on worm-eating warbler habitat in the harvest area.

Broad-winged hawks are typically found in woodlands and forested areas, often near watercourses and canopy openings where they are known to forage (page 62; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf). Widespread loss of forest is likely a primary threat to this species; however, the small canopy gaps and high degree of residual standing canopy that results from single-tree selection harvest will likely do little to diminish nesting or foraging habitat in the management area.

Indiana bats roost in standing dead trees ("snags") and, occasionally under the exfoliating bark of certain live tree species, such as shagbark hickories (<https://www.fws.gov/midwest/endangered/mammals/inba/inbafactsht.html>). State Forest guidance limits the felling of snags to instances when visitor or employee safety or property is at risk. When known roosts occur within a timber harvest area, they are given extra protection during the harvesting to minimize the accidental risk of felling. Additionally, where Indiana bat maternity colonies are known on State Forests, timber harvest is limited to the period when bats are hibernating and not using trees for roosting. Since the proposed harvest area is within an area known to be used by an Indiana bat maternity colony, trees will only be harvested when bats are not in the area, generally October through March. Together, these proactive strategies will effectively eliminate any risk of harm to roosting bats.

The effects of timber harvesting on **Indiana bat** habitat has been the focus of numerous studies on State Forests, mostly conducted by researchers working with the HEE project (<https://www.heeforeststudy.org/>). Their findings indicate the timber harvesting techniques typically practiced on State Forests (including single-tree selection) appear to have no detrimental effect on Indiana bat habitat. In fact, researchers are finding Indiana bat maternity colony roosts are often associated with canopy gaps, openings, and forest edges where available sunlight can warm their young, developing pups. Assuming snags are retained and suitable roosting habitat is available, the US Fish and Wildlife has concluded that "forest management is considered compatible with maintenance of Indiana bat summer habitat, provided that key components of summer habitat are provided for in the management system" (page 76; https://www.fws.gov/midwest/endangered/mammals/inba/pdf/inba_fnldrftrecpln_apr07.pdf).

Eastern red bats are one of the most commonly encountered bat species on State Forests (e.g., page 191; <https://www.fs.fed.us/nrs/pubs/gtr/gtr-nrs-p-108.pdf>) and statewide (page 120; Whitaker, J.O., Jr. 2010. Mammals of Indiana. Indiana Univ. Press). Red bats are found in various types of woodlands and forests, though Whitaker (2010, Ibid.) reports they "seem to favor areas of scattered deciduous trees". Studies conducted by researchers with the HEE project (<https://www.heeforeststudy.org/>) indicates red bats respond favorably to timber harvesting as they "characteristically exploit [canopy] gaps within the forest" (page 213; <https://www.fs.fed.us/nrs/pubs/gtr/gtr-nrs-p-108.pdf>). Due to this, red bats are not expected to be adversely affected by the proposed timber harvesting.



Smoky shrew is reportedly “fairly common throughout the unglaciated hill country of south central Indiana” (page 68; Whitaker, J.O., Jr. 2010. *Mammals of Indiana*. Indiana Univ. Press). In Indiana, smoky shrews have been found in oak-hickory woodlands, typically in moist microhabitats (Whitaker 2010, *Ibid.*). Important habitat elements for this species include coarse woody debris, deep leaf litter, and moist soils (Laerm, J., W.M. Ford, and B.R. Chapman. 2007. *Smoky shrew, *Sorex fumeus**. In: Trani, M.K., W.M. Ford, and B.R. Chapman, eds. *The land manager's guide to mammals of the South*. Durham, NC: The Nature Conservancy; Atlanta, GA: U.S. Forest Service: 95-98; <https://www.fs.usda.gov/treearch/pubs/38574>). Laerm et al. (2007, *Ibid.*) report this species “is tolerant of most management activities including even-aged and uneven aged silviculture...as long as moist conditions with abundant ground structure remain.” The proposed single-tree selection harvests will result in an infusion of coarse woody debris to the site as tops and large limbs (“slash”) are regularly retained on State Forests following harvesting. Since most trees will be left standing, leaf litter levels will likely be unaffected and the residual canopy will provide shade to minimize soil desiccation.

Like the smoky shrew, the **pygmy shrew** is also reported to be “fairly common throughout the unglaciated hill country of south central Indiana” (page 68; Whitaker, J.O., Jr. 2010. *Mammals of Indiana*. Indiana Univ. Press). The pygmy shrew has been found within a wide variety of forest communities, seral stages, and moisture regimes (W.M. Ford, J. Laerm, and B.R. Chapman. 2007. *Pygmy shrew, *Sorex hoyi**. In: Trani, M.K., W.M. Ford, and B.R. Chapman, eds. *The land manager's guide to mammals of the South*. Durham, NC: The Nature Conservancy; Atlanta, GA: U.S. Forest Service: 99-103; <https://www.fs.usda.gov/treearch/pubs/38575>). Similar to smoky shrew, the pygmy shrew is regarded as tolerant to forest management activities (Ford et al. 2007, *Ibid.*). Considering this species has been found within more relatively disturbed communities such as old fields and young clearcuts (Ford et al. 2007, *Ibid.*), it is unlikely that the proposed harvests will adversely affect its habitat.

The **timber rattlesnake** is found throughout Morgan-Monroe and Yellowwood State Forests (e.g., page 86; <https://www.fs.fed.us/nrs/pubs/gtr/gtr-nrs-p-108.pdf>). During the summer months, timber rattlesnakes favor dry hillsides and ridges with open deciduous woods (page 48; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf). Downed coarse woody material is an important habitat component, as it provides hiding cover for these ambush hunters. Researchers with the HEE project studied the movements of timber rattlesnakes and the effect of large canopy openings on activity and home range; they found these larger openings were compatible with timber rattlesnakes and their habitat (MacGowan, B.J., A.F.T. Currylow, and J.E. MacNeil. 2017. Short-term responses of timber rattlesnakes to even-age timber harvests in Indiana. *Forest Ecology and Management*, 387:30-36). Although single-tree selection harvests were not studied, it can be assumed that these less intensive harvests and smaller canopy openings would also be compatible with timber rattlesnake habitat. Increased levels of coarse woody debris from residual tops and large limbs (“slash”) and scattered canopy openings will likely be beneficial to this species and its habitat (page 48; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf).

The **Eastern box turtle** is another species that is found throughout Morgan-Monroe and Yellowwood State Forests (e.g., page 78; <https://www.fs.fed.us/nrs/pubs/gtr/gtr-nrs-p-108.pdf>). During the summer box turtles inhabit a variety of woodland and forest types and will also use forest edges and meadows (page 49; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf). During the winter this species hibernates under brush piles, logs, deep leaf litter, or within soft soil. Researchers with the HEE project studied the movements of box turtles in relation to harvested regeneration openings and found timber



harvesting had little effect on the behavior of the turtles they studied (<http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0040473>). Although box turtles were not studied in relation to single-tree selection harvests, it can be assumed that these less intensive harvests (in terms of smaller canopy openings) would also be compatible with box turtles and their habitat. Increased levels of coarse woody debris from residual tops and large limbs (“slash”) and scattered canopy openings will likely be beneficial to this species and its habitat, as well (page 49; http://www.in.gov/dnr/forestry/files/fo-StateForests_EA.pdf).

Large yellow lady’s slipper is found in a variety of forest and woodland types and grows in partial to full shade. It has been reported that this species responds favorably to some disturbance in the canopy (e.g., windfall) and understory (e.g. fire; http://www.illinoiswildflowers.info/woodland/plants/yl_ladyslipper.htm). Due to this and its tolerance for partial shade, it is unlikely this species will be impacted by the proposed harvests.

American ginseng is found in closed canopy deciduous forests, a habitat that is compatible with BCA management objectives. Recent research on the effects of various types of timber harvesting on ginseng concluded that single-tree selection was compatible with the conservation of the populations occurring within harvested sites (Chandler, J.L., and J.B. McGraw. 2015. Variable effects of timber harvest on the survival, growth, and reproduction of American ginseng. *Forest Ecology and Management*, 344:1-9).

On the question of the prescribed single-tree selection harvests affecting botanical diversity, it has been repeatedly reported that this type of low-intensity harvesting does little to change species composition or diversity among ground-story flora. Purdue University researchers studying this question on State Forests found that timber harvesting (including single-tree selection) did not result in a compositional shift in ground-layer plant communities (Jenkins, M.A., and G.R. Parker. 1999. Composition and diversity of ground-layer vegetation in silvicultural openings of Southern Indiana forests. *The American Midland Naturalist*, 142(1):1-16). They found that ground-layer plant communities in stands harvested using single-tree selection were similar to those in unharvested controls and this was likely due to the small size of the canopy gaps created using this harvesting technique. These results are supported by a recent meta-analysis of a large collection of research literature (Duguid, M.C., and M.S. Ashton. 2013. A meta-analysis of the effect of forest management for timber on understory plant species diversity in temperate forests. *Forest Ecology and Management*, 303:81-90). These authors concluded that “[g]eneral impacts from timber harvesting and silvicultural treatments are not necessarily inconsistent with maintaining understory plant diversity in temperate forested systems.” In fact, following their comprehensive review of the literature, the authors stated: “We argue that maintaining a diverse silvicultural portfolio, including even-aged, uneven-aged, and hybrid models (e.g. irregular even-aged systems) within a managed landscape is the best way to enhance diversity.”

One common thread throughout the previous RTE and plant community review is how the species and communities are able to tolerate (and in some cases benefit by) periodic forest disturbance. The forests of the Midwest have always been diverse and dynamic, having been continually shaped by a variety of natural and human-caused disturbance events. Fires, windstorms, insects, floods, and droughts have all played a significant role in how our forests have naturally developed. Plant and animal communities that rely on forest habitats have also been affected by these events and have developed a resiliency to change and disturbance that has allowed their populations to endure over time. On Indiana’s State Forests, managers prescribe forest management activities to mimic the effects of natural disturbance events that



have historically affected our forests, knowing that native wildlife populations have adapted to, and in many cases benefit from, forest disturbance. While this management philosophy alone is appropriate in most cases to maintain suitable habitats for resident flora and fauna, some rare or threatened species require special consideration when planning forest management activities. Therefore, State Forest managers take a comprehensive approach to forest management planning by maintaining an overall healthy, sustainable forest environment while giving special consideration to species of greatest conservation need. Wildlife habitat management has always been an integral part of State Forest management, and the review of important habitat components and unique natural communities is part of each forest resource and timber harvest plan. State-wide natural heritage databases and other species occurrence records are analyzed during the management decision-making process to determine if such species or communities exist on tracts where management may occur. Management activities are planned to protect or promote special habitats, communities, or populations that are thought to occur on managed tracts. Important wildlife habitat elements, such as dead trees (snags) and cavity/den trees, are regularly inventoried on State Forests, providing essential information that is directly used to plan forest management activities.

This approach is reinforced by the findings of the Hardwood Ecosystem Experiment (HEE; <https://www.heeforeststudy.org/>) – where over a decade of comprehensive inventories and research has produced the most extensive record of State Forest species and harvesting impacts ever made available. The results of this study have broadly indicated that the various harvesting techniques most commonly used on State Forests maintain habitats and community composition among commonly encountered residents, as well as State and Federally listed species of conservation concern.

Taken as a whole, the various database reviews, inventories, and research findings give the Division of Forestry confidence that the floral & faunal impacts to the areas of the prescribed single-tree selection will be minimal and largely neutral, if not beneficial, to these forested communities and habitats.

Invasive Species Impacts

Public Comment Summary:

- Concerned that harvesting will proliferate or introduce invasive species.

DoF Response:

Most invasive species are the unfortunate by-product of well-intentioned plantings and landscaping efforts on developed lands. In most cases, wildlife spread the seeds through eating the berries or seeds adhering to their bodies. In some cases, such as Japanese stilt grass, the avenues for introduction and spread have been manifold. Wildlife, water, people on foot, equipment, and even horses have all contributed to the spread of this invasive grass. Stilt grass has been treated in the BCA uplands for multiple growing seasons; however, stilt grass is pervasively growing throughout Brown and surrounding Counties- up and down county roadsides, field edges, residential lawns, managed areas and un-managed areas. On these tracts, invasive species treatments will continue and acknowledged in the management guides. As an additional preventative measure, forestry and logging equipment brought into these areas will be required to be power washed to minimize the potential of invasive seed introduction and spread. This extra precaution undertaken by DoF is over and above the norm for the harvesting of timber in Indiana.



At a landscape level effective invasive species control will also require the collaborative assistance of private landowners in treating and managing invasive species on their properties.

Recreation and Aesthetics

Public Comment Summary:

Harvesting will negatively impact aesthetics, recreation, Tecumseh Trail, and/or the wilderness character of the area.

DoF Response:

Recreation and aesthetics are important considerations when undertaking projects within this area- and in particular in those portions along the State Forest's Tecumseh Trail. We appreciate that aesthetics are highly subjective and varies greatly by one's interests and observations. The prescription and its implementation will incorporate visual considerations.

For example, effects will be minimized by the light single tree selection nature of the prescribed harvest which is estimated at between 5-7 trees/acre (not the clearcutting, nor the 40 trees/acre reported in some outlets). Tree removals are expected to be lightest along the trail corridor, where many of the trees selected for removal are declining and may present trail hazards and maintenance issues.

The area along the Tecumseh trail will have a full stocking of mature trees as no regeneration openings will be marked in this harvest. Some tree tops and skid trails may be visible from the trail following a harvest, but consideration will be given to planning and layout of the harvest operation in order to minimize the visual impacts of the harvest that some visitors find less appealing. It is important to keep in mind that tops and large limbs are not left behind because the loggers are "lazy", "messy", or "uncaring", but instead purposefully retained for the benefit of site. Downed woody debris provides cover for wildlife, stabilizes surface conditions on slopes, and retains nutrients that will eventually be incorporated into the forest soil.

Removing tops in the trail and re-use of the existing old network of roads and skid trails will greatly minimize or eliminate the new road disturbances, and further conserve the primitive character already present. Log yards will intentionally be placed at the edges of the harvest and away from the Tecumseh Trail rather than the interior. Log cutoffs will be dispersed and seed mixes used to establish ground cover incorporating visual, wildlife and pollinator habitat benefits.

The temporary reroute of the trail will be designed for easy interpretation and to minimize impact on trail users. Additionally timber harvest oversight, planning and activity sequencing will shorten the duration of trail rerouting and enable reopening of the trail on its current tread sooner. While operations are weather dependent, the expected disruption is 6 months or less, not the 3 years reported in some outlets. While trail use survey data has shown the Tecumseh Trail section here is one of the least used segments, trail use and impact considerations are important and will be incorporated into site management as noted.



Soil and Water Conservation

Public Comment Summary:

- Soil and/or water resources will be negatively impacted through erosion and sedimentation, including Lake Lemon.

DoF Response:

Forestry best management practices (BMPs) for water quality will be required of harvest operators and included in timber sales contracts to address the soil erosion and sedimentation concerns. These widely endorsed BMPs are designed to minimize impacts on soils and water quality. While, harvesting does cause some level of disturbance, which is to be expected, we have not seen any irreversible damage to the soils on State Forest managed harvests. Further, under the BCA guidelines the harvest levels in these tracts will be significantly less than average single tree harvests undertaken on the Forest. It is expected that soil disturbance will correspondingly also be less and recovery accelerated. The contractually required BMPs will be monitored by the administering forester, and audited after the timber harvest is completed. BMP audits look specifically at the application of the practices and the impact on water quality. Audits have documented a 92.39% effectiveness rating on State Forest harvests in preventing stream sedimentation. BMP guidance can be found at: www.in.gov/dnr/forestry/files/fo-2005_Forestry_BMP_Field_Guide.pdf

With the use of BMPs and given the hydrology of the watershed the potential for sedimentation impacts to Lake Lemon are effectually diminished. Additionally, a significant portion of these tract are not in the Lake Lemon watershed and the remainder are effectively filtered by upstream structures to prevent significant sediment from reaching Lake Lemon. While, poorly managed timber harvests without BMPs can impact water quality, natural stream bank erosion, road, residential and agricultural runoff remain the primary contributors of sediment in the watershed.

General Opposition to Harvesting of Timber

Public Comment Summary:

- Opposed to timber harvesting in general, harvesting on State Forests, and/or harvesting in this portion of the state forest specifically, due to concerns over environmental or other impacts.
- Generally opposed to active forest management that uses timber harvesting as a tool.
- Concern on general State Forest harvest levels.

DoF Response:

Comments being reviewed at this time are for the proposed Compartment 13 Tracts 2, 3 & 4 resource management guides. Comments received that are general in nature, or non-specific to the tracts under review were appraised for context, but may not be included in the response below.

Within DNR it is only the State Forests where long term forest and timber management is demonstrated as the Division of Forestry is duly charged with and actively manages the entrusted forests for the full range of benefits and uses provided by Indiana's forests: sustainable/renewable timber, diverse wildlife



habitats, watersheds, and more. The enabling legislation behind state forests recognizes timber growth and allows for timber harvesting.

IC 14-23-4-1 It is the declared public policy of this state to protect and conserve the timber, water resources, wildlife and top soil in the state forests for the equal enjoyment and guaranteed use of future generations. It is recognized, however, that by the employment of good husbandry, timber which has a substantial commercial value may be removed in such manner as to benefit the growth of saplings and other trees by thinnings, improvement cuttings, and harvest process and at the same time provide a source of revenue to the state and local counties and provide local markets with a further source of building material.

Managed timber harvests are not new to the State Forest system as some respondents appear to believe. Using science and silvicultural systems applicable to Indiana's Central Hardwood Forest Type, the state forests have been undertaking managed timber harvests for decades, with many sites having repeat entries of two to four times over the past 60 years to restore, thin, selectively harvest and promote the healthy, productive high quality forests seen today. The Forest Stewardship Council and the Sustainable Forestry Initiative® (SFI) program are two independent organizations that have continually given their seal of approval to DoF audit after audit for its use of sustainable forest management. A continuous forest inventory (CFI) monitors forest resource attributes including tree growth across a system-wide sampling grid consisting of thousands of plots. Foresters measure each plot every five years, doing 20 percent of the plots each year. This continued monitoring tracks and ensures sustainability. Indiana State Forests contain approximately 1.15 billion board feet of timber. Harvest levels on State Forests are set at a level to insure long term sustainability. These levels are periodically reviewed as new inventory data is collected. See http://www.in.gov/dnr/forestry/files/fo-State_Forest_CFI_Report_2010_2014.pdf

DNR foresters with degrees from universities accredited by the Society of American Foresters select the trees to be harvested. Timber sales consist of selling only those marked trees in a sealed bid process to a licensed timber buyer. Foresters then oversee the harvest of the timber to ensure adherence to contract requirements, including Best Management Practices.

Harvest levels for BCA are guided by forest conditions and the BCA management guidelines established in 1981 when the Morgan-Monroe/Yellowwood State Forest BCA was established. These harvest levels are much lower than the remainder of the forest to meet back BCA goals of larger diameter trees and forests of older conditions. Some respondents commented that this light harvesting is too conservative, and not sustainable due to the fact the light touch will result in a significant tree mortality increases due to tree age, biological limitations and age related vectors. The proposed management strives to balance these concerns within the established BCA guidelines.

Economics and Division of Forestry Funding Considerations

Public Comment Summary:

- Timber harvesting is done only/primarily for revenue, short term profit, and/or to fund a budget, rather than science.
- Expressions that DoF funding should be improved/restored so timber revenues are not relied upon.



- Expressions that the projected revenues generated do not outweigh impacts, including impacts to ecosystem services.

DoF Response:

Revenue from timber harvesting has never been and is still not the driving factor behind timber harvesting decisions. In this particular harvest, declining ash and tulip-poplar are expected to be among the biggest contributors of volume. Of the oaks, black, and scarlet oaks are likely to be the highest volume species selected for removal, again, due to tree health concerns inherent to these relatively shorter-lived oak species. These tracts do contain a great deal of white oak and northern red oak trees that are considerably more valuable. If money were the driving factor, far more of those more valuable white and northern red oaks would be targeted for removal, rather than the selection harvest outlined.

The Division of Forestry has not, nor has ever been pressured by industry or any administration to sell or harvest trees in any particular fashion. As previously noted, if the DoF wanted to maximize income, we would only choose the largest and most valuable tree species to sell. This is simply not what we do. Tree selection is determined by the managing forester who inspects the individual trees and the forest as a whole, assessing forest stressors and long term sustainability factors. The forester looks at how this tract fits in overall and weighs tree health, expected longevity, wildlife value as just a few of the variables involved.

The Division of Forestry has been utilizing timber harvests, through timber sales, as forest management tools almost since its inception, over 100 years ago. There have been numerous managed harvests in this BCA, a total of 15 since 1959, and additional harvests occurring before that time. Over 6,000 trees have been removed during that period and yet the forest is continuing to grow and evolve. Prescribed harvests within BCAs are designed to capture declining, diseased, over mature trees and thin the residual stand allowing remaining trees to maintain/improve vigor and resilience to defend against future insect, disease and climate stressors. Today's State Forests, and the their BCAs, are a testament and result of the continued management prescribed and implemented by professional foresters since acquiring these worn out lands many decades ago.

The Division of Forestry is 61.70% self-funded. Other DNR Divisions are as much as 100% self-funded. DoF annual revenue comes from tree and shrub seedling sales, recreation revenue, grants and managed timber sales. The remaining funding comes from general funds or appropriations from the general assembly.

At the very heart of the profession of forestry is a strong desire to manage the forest long term sustainability. That has been, and remains our guiding principle since the inception of the Division of Forestry. In 2006 the DoF established the 100 year Hardwood Ecosystem Experiment (HEE) with a number of leading universities conducting independent research to better understand the dynamics of forest management. The ongoing work is delivering a great wealth of scientific research and results which can be viewed at <https://heeforeststudy.org/>.

The reality of a well-managed forest is that there is no loss of ecosystem services. Prior to State acquisition, most of the 299 acres was once over harvested woods, old fields, or used for agriculture in the early 1930's. The ecosystem services now being provided are resultant of the professional forest management and the inherent promotion of natural forest resiliency since DNR acquisition. The



presented plans continue this management, including light single tree selection harvests, invasive species management and a back country recreation experience.

Supportive of Division of Forestry Programs

Public Comment Summary:

- Supports the overall management prescription within the posted forest resource management guides for these tracts. Including the recommended single tree harvests outlined in the guides and overseen by professional foresters.
- Supports the proposed management strategy, but given the current increasing tree mortality, high stocking and volumes in the tracts feels the prescription does not call for enough volume to be harvested to benefit forest health or wildlife habitat.
- Supports the proposed harvests but also encourages retention of the biggest and oldest trees.

DoF Response:

Under the prescribed light thinning, the stocking levels following the harvest will be left at higher levels than in a typical selection harvest. More could be harvested to benefit the residual trees, but a compromise has been made by Division of Forestry to use only light single tree selection harvesting in the BCA. This will inevitably lead to higher mortality than other areas receiving higher intensity thinnings. However, the increased mortality will have the benefit of creating additional snags and large down woody debris, and fosters the BCA primitive character objectives.

Public Comment Summary

- Broad support for the professional foresters and science being the guiding force for forest resources management. Urges the management of the state forest resources be left to the professional foresters and resources managers employed by the Department of Natural Resources, rather than special interests.
- Supports an active science based timber management and harvest program on the state forests and these tracts to benefit wildlife, biodiversity, recreation, timber utilization, revenue generation and forest sustainability.

DoF Response:

The DNR and the Division of Forestry have a commitment to manage the entrusted natural resource in a manner of high integrity, using sound science and carried out by well trained and qualified natural resource professionals for the use and enjoyment of present and future generations. This includes a Division of Forestry staffed by professional foresters and other scientists with a combined 500-plus years of field experience. Further oversight is provided by DoF choosing to follow the rigorous, internationally recognized SFI and FSC forest certification standards to insure long term health and sustainability of these multiple use forestlands.

A description of the current independent, peer-reviewed HEE research being done at Yellowwood and Morgan-Monroe State Forests can be viewed at www.heeforeststudy.org/



Additional Study

Public Comment Summary:

- The Division of Forestry should be protecting the preserve and should slow down and do more studies of the area and potential impacts of the proposed resource management prior to undertaking that management. Including an assessment of rare and endangered species potentially present.
- Expressions that a broader discussion is needed with interested publics to take input and finalize plans.

DoF Response:

The prescribed resource management is not unlike management undertaken broadly across the State Forest system except that the prescribed single tree selection is of significantly lower intensity and the extent of disturbance also correspondingly lighter in keeping with the BCA management guidelines adopted in 1981. The intent of this lighter touch management, and the prescribed implementation of these guidelines is to maintain and promote conditions consistent with the BCA guidelines.

Since 2006 the Division of Forestry has committed to investing heavily in both short and long term research with the formation of the Hardwood Ecosystem Experiment (HEE) <https://heeforeststudy.org/>. Research findings and listing of all species and threatened and endangered species found on the HEE at <https://heeforeststudy.org/publications/>. As described earlier in the section related to comments on perceived impacts to flora and fauna, the findings from the HEE project provide valuable information related to the effects of the proposed management activities. Data from this extensive study of unprecedented scope in Indiana and other research studies guide our forest management program.

In 2008 the Division of Forestry undertook, with considerable public participation and input, an environmental assessment of State Forest timber management program.

http://www.in.gov/dnr/forestry/files/fo-State_Forest_Strategic_Plan_2015_2019.pdf

In 2015, after extensive public input the DoF developed and released its 2015-2019 Strategic Plan, including State Forest resource management. http://www.in.gov/dnr/forestry/files/fo-State_Forest_Strategic_Plan_2015_2019.pdf

The development of the current management guides for Tracts 2, 3, 4 included a public input component that yielded 400+ public comments. The concerns expressed have been considered, and/or incorporated as noted above, and may be further addressed during plan implementation.

The State Forest resource management programs are subject to 3rd party annual audits comprehensive and internationally recognized forest management standards. These audits include assessments of how well DoF is utilizing science and research to guide forest management decision making. Audit findings consistently find DoF in compliance with these standards- including management of BCAs.

http://www.in.gov/dnr/forestry/files/fo-FSC_2016_Audit_Report.pdf

Other:



Public Comment Summary:

- Harvesting timber will not allow this area to sequester as much carbon to combat climate change and global warming.

DoF Response:

Left unutilized, the dead and dying ash as well as other salvaged trees would be releasing stored carbon as they decompose. Lumber turned into long-lasting durable wood products will on the other hand continue to keep carbon locked up for a long time. Additionally, most of the trees targeted for removal are those that have slowed in growth for a variety of reasons. The resulting forest conditions will promote tree health and these healthier trees will tend to be longer lived, have improved vigor and sequester more carbon. The longest-term storage of carbon in a forest is in the soil, and by maintaining this area as forested over the long term, the benefit of carbon storage will continue in the soil. The Division of Forestry is committed to managing for long term forest health, productivity and resiliency. By actively employing scientific principles of sustainable forestry these forests are better positioned to the effects of climate and the continued capture of carbon.

Conclusion:

The prescribed management activities are consistent with the policies and guidelines established for State Forest BCAs and, are consistent with silvicultural principles, promotes habitat diversity, old forest conditions and are supported by inventory data and field assessments. The concerns expressed have been considered, and/or incorporated as noted above, and may be further addressed during plan implementation.