

Indiana Forest Alliance
PO Box 1074
Bloomington, IN 47402

July 14, 2008

Mr. Jack Seifert
State Forester
IDNR – Division of Forestry
402 W. Washington, Room W-296
Indianapolis, IN 462

Re: Draft Environmental Assessment: Increased Emphasis on Management and Sustainability of Oak-Hickory Communities On the Indiana State Forest System

Dear Mr. Seifert:

Below please find our comments on the “Draft Environmental Assessment: Increased Emphasis on Management and Sustainability of Oak-Hickory Communities On the Indiana State Forest System.”

We send these comments on behalf of the Indiana Forest Alliance members statewide and Mick Harrison. Please call us if you have any questions or concerns.

Yours,
Karyn Moskowitz
Christine Glaser
GreenFire Consulting Group, LLC

**Commenting for
Indiana Forest Alliance and Mick Harrison
Bloomington, Indiana
(812) 332-4878**

Introduction

The Indiana State Forests are public forests owned by the people of Indiana and managed by the Division of Forestry (DoF), a division of the Department of Natural Resources (DNR). For over a decade, citizens of the State of Indiana, organized in citizens' groups such as the Indiana Forest Alliance, Heartwood, Protect Our Woods, Tree of Life Alliance and the Hoosier Environmental Council, who can count thousands of members collectively, have attempted to direct the DNR to preserve these forests for their highest public benefits. Citizens' actions have included engagement at public meetings, comments and letters written to DNR staff, phone calls to the Forest Stewardship Council, letters to the editor of area newspapers, peaceful nonviolent protests and direct action, and an ongoing lawsuit. These attempts have mostly been dismissed and ignored at best, and at worse, been met with physical force, exemptions of DoF from environmental laws due to intense lobbying efforts by top DNR officials, and multiple attempts to dismiss citizens' lawsuits.

Below is the exemption that Kyle Hufner, the previous Director of the Department of Natural Resources, pushed through different committees and eventually through the Indiana State Legislature:

“Notwithstanding subsection (a), IC 13-12-4 does not apply to forestry management practices of the division of forestry. *As added by P.L. 1-1995, SEC. 16. Amended by P.L. 66-2006, SEC. 27.*”

This provision purports to exempt the DoF from having to conduct Environmental Impact Statements required by the Indiana Environmental Policy Act (IEPA).

This exemption was passed even though the DNR and many legislators knew that there was an active and ongoing lawsuit against the DNR for violations of this law, and apparently because of this IFA lawsuit. Many citizens learned that day that, if an agency does not want to follow environmental laws or be held accountable by its citizens for violations of environmental laws, all they have to do is simply lobby the state legislature and exempt themselves from it. It was a low point for the many Indiana taxpayers who felt these actions made a mockery of our state's democratic and legal processes.

Yet even after purporting to exempt themselves from the Indiana Environmental Policy Act the DoF has issued a *Draft Environmental Assessment Increased Emphasis on Management and Sustainability of Oak-Hickory Communities On the Indiana State Forest System*, in an apparent effort to meet the requirements of the IEPA.

The Do F states in the EA, p. 1:

“The forest land management activities reviewed in this environmental assessment while comprehensive, are not a major state action that significantly affects the quality of the human environment and for which a much more detailed environmental impact statement would be required. The 20-year period outlined in this document covering forest land management

activities from 2008 through 2027 is in keeping with IC 13-12-4-5(2)(E) that requires state agencies to recognize the long range character of potential environmental problems. This documents also implements IC 13-12-4-5(2)(G) requiring the initiation and use of ecological information in the planning and development of resource oriented projects. To the fullest extent possible, state agencies are to use a systematic interdisciplinary approach in natural resource planning including appropriate consideration of unquantified environmental amenities.”

The DoF is calling this document an “EA,” and the long narrative attempts to address some of the requirements of NEPA or IEPA. This purported EA has the following parts:

- Purpose and Need for Action
- Alternatives Including the Proposed Action
- Affected Environment
- Environmental Consequences

In other words, the DoF appears to be attempting to give the public a document called an EA that DoF can later claim is an EIS, even though they claim to have exempted themselves from having to do so.

We have provided herein comments to the DoF on their apparent attempt at an EIS.

On top of the “EA”, the DoF also filled out the Environmental Assessment Form required of all state agencies by 327 IAC 11-1-5 (which the DoF also claims it was not required to fill out). DoF claims on p. 1:

“Prior to 2006, the Division of Forestry operated under one or more categorical exemptions from the requirement to perform an environmental assessment that was granted by the Environmental Management Board in 1977 to include forest land management and wildlife habitat improvement activities. Even though not legally required to do so, the Division of Forestry nevertheless voluntarily prepared an environmental assessment in May of 2001.”

IFA is not aware of any legal basis for any such alleged exemption that would have eliminated the DoF’s obligation to prepare EAs and EISs in the past regarding its forest management practices and actions.

The DoF claims in the Environmental Assessment Form, which is an Appendix to the EA, that “It was determined that the action will not cause significant adverse environmental impact. No EIS will be prepared.” This conclusion is clearly in error for the reasons stated in the comments below.

The title of the EA uses the term “sustainability” to describe what the DoF wants to do to the Indiana State Forests. What the DoF has laid out in the EA is the establishment of an oak hickory tree farm that relies on massive amounts of logging, burning, road building and herbicide spraying, with harvest levels that are maintained over long periods of time.

The DoF states in the EA, p. 1: *“Through extensive public input into the Division’s 2008-2013 strategic plan, the public indicated a desire for the Division to conduct an Environmental Assessment (EA) for the timber management program on the State Forests. The division proposes this EA as a good faith effort to satisfy the concerns of Indiana taxpayers.”*

This analysis, then, is our attempt to interact with the DoF’s “good faith effort” to satisfy the concerns of Indiana taxpayers. And while we do not propose to represent every taxpayer in the state, we do proceed with the knowledge that in surveys given to Indiana taxpayers, a majority of the citizens of Indiana consistently call for an end to logging on our state forests.

1. Extent of DoF Logging and Management

- The Indiana State Forest System currently consists of about **153,000 acres**.
- DoF properties contain **about 3 percent of the total forestland in Indiana**.
- The EA looks at a period of **20 years**.

From EA, p. 4:

*“The Division of Forestry proposes to implement a timber management program designed to **maintain the current dominance of oak-hickory forests and associated biodiversity while improving overall wildlife habitat and successional stage diversity** through a combination of forest management treatments described below.”*

*“The proposed action will utilize timber harvest as a silvicultural tool with an **annual harvest level of up to 8000 acres on all state forest properties in the State of Indiana using a variety of management treatments.**”*

With annual harvest on 8000 acres, 80,000 acres could be harvested in ten years and 160,000 acres in 20 years. The State Forest only has 153, 000 acres. The EA itself states on p. 8 that *“timber harvests would be applied on **an estimated 5 percent of the total state forest area annually.**”* That translates into 100 percent of the Forest area over 20 years.

Since many State Forest areas have steep slopes and ridges, as documented in the EA, this indicates that the more accessible areas of the forest may be logged more heavily during that time period, assuming that the DoF stays away from logging steep slopes. *“4. Avoid steep slopes and poorly drained areas,”* is one of the BMPs, but the DoF doesn’t state what slopes it considers steep enough to stay away from logging them.

The DNR states that they will attempt to avoid steep slopes. What are the DoF guidelines with regard to logging on slopes? What constitutes “too steep?”

What is the likelihood that BMP’s actually will be applied? The 1996 BMP Implementation study only found 73.4% compliance with skid trail BMPs .

This is considered a sustainable harvest by the DoF:

Maintaining “*a harvest level on state forestland at 60 % of growth, or an estimated 14 million board feet (mmbf) annually. The average annual growth on state forests estimated from the 2005 system-wide inventory is 24.8 mmbf.*” (EA, p. 8)

How did the DoF arrive at the 24.8 mmbf of annual growth? Were areas inaccessible for logging, or on steep slopes, or areas that should be set aside for Indiana bats and other endangered species, or recreation areas, included in the annual growth calculations?

There is evidence that standing timber estimates may have been inflated to create a higher allowable cut.

The first clue is that the estimates are so high. Statewide inventory of all Indiana forests by the USDA Forest Service's Forest Inventory and Analysis showed Indiana forests as productive, averaging around 4500 board feet per acre. State forests would probably be higher volume in that they are managed lands, compared to the neglect faced by many private lands, but state forest averages amazingly exceed private lands by double or more, in the range of 8, 9 or even 11 thousand board feet per acre.

It is conceivable that these estimates were inflated. The effect from inflated inventory would be excessive timber harvests exceeding annual growth. Evidence of possible number-tinkering exists. One example is that the private firm hired to conduct the state forest inventory was not audited for accuracy.

Secondly, professional field foresters have expressed doubt that the numbers represent reality on the ground. Eric Johnson, the property manager of Jackson-Washington State Forest, sent e-mails to other State Forest officials complaining that the estimates on Jackson-Washington State Forest may be inflated by as much as 25%, or 2,000 board feet to the acre.

Did DNR/DoF use the entire 150,000 acre state forest base in determining harvests? Many parts of these forests are not harvestable or are limited severely (recreation areas, steep slopes, rocky ridgetops with poorly-formed chestnut oak types, pine plantations). DNR/DoF's actual base of growth is surely limited well below the 150,000 acres. It is likely they may be over-harvesting the more productive forest on the backs of the total 150,000 acre estimate when perhaps only 90,000 real acres should be considered productive forest. Non-commercial and undersize species are also thrown into the mix, further inflating the inventory

DNR/DoF estimates 24 million board feet per year in annual growth. Their own inventory shows stand averages in most forests range 6,000 - 8,000 board feet to the acre. Yet forest managers themselves question these values as dubious. It is rare to see Indiana forests with overall averages surpassing 8,000 board feet to the acre, and these are usually special exceptions such as bottomland forests of large, low value species such as cottonwood, sweet gum, etc that have been allowed to grow to extreme sizes.

So if the standing timber estimate is at least as much as 25% more than reality, and areas with steep slopes and other restrictions are excluded, the proposed logging levels will be dramatically over the estimated removal of 60% of annual growth.

In addition to that, there could be annual timber stand improvements (TSI) on 8000 acres, and prescribed burns on 2000 acres. Invasive plant species control is planned on 1400 acres annually.

EA: p. 30,31

Management Activities	Potential Acres* Affected Annually
Timber Harvest Methods	
Hardwood and Pine Group Selection Openings (< 10 ac ea)	1400
Hardwood Single tree Improvement	5000
Pine Clearcuts	75
Pine Thinning	75
Hardwood Shelterwood	650
Hardwood Clearcuts (> 10 ac ea)	800
Total Acres Harvested	8000
Follow-up Harvest Treatments	
Prescribed Fire	2000
Timber Stand Improvement	8000
Soil and Water Improvement	300
Tree Planting	100
Natural Regeneration	2925
Total Acres Treated	10,400
Maintenance Activities	
Recreational and Operational Facility Construction and Maintenance	100
New Road Construction	50
Road Maintenance (447 mi x 15 ft ROW)	900
New Trail Construction	15
Trail Maintenance (521 mi x 10 ft ROW)	635
Total Acres of Maintenance Activities	1700
Habitat Management	
General Wildlife Habitat	300
Early Successional Habitat (created from harvests)	2925
Acquired Wildlife Habitat (purchased with sale proceeds)	490
Invasive Plant Species Control	1400
Total Acres of Habitat Management	5115

2. Salvage Logging Not Adequately Addressed in EA

The Table above does not give the whole story. Drought, flooding, wildfire, insects, diseases, snow storms, tornados – can damage large swaths of the forest.

EA, p. 12: “*On rare occasion, larger areas may require a clearcut to manage the results of unforeseen events such as damage from wildfire, insects, storms, or disease.*”

The EA gives no information about the extent of such natural disturbances in the past, and the amount of salvage logging that resulted from those disturbances. **Whether or not they are indeed “rare occasions” cannot be ascertained from the EA.**

We request that the DoF includes information about past natural disturbances and resultant salvage logging in the EA.

Severe storms, drought and flooding are likely to increase as the result of changing climate patterns. Changing climate patterns may also bring new diseases and damaging insects to Indiana forests, in addition to native organisms. All of this translates into more “natural disturbances” which then might trigger more salvage logging.

The EA contains **no information about whether any amount of salvage logging would be included in the 14 million board feet (mmbf) of annual harvest**, or would be conducted in addition to it. If salvage logging is in addition, then it would be important for the public to know how close the DoF might get to reaching the sustainable harvest level of 24 million board feet.

We request that the DoF states clearly whether salvage logging is included in the target of 14 million board feet, or would be in addition to it.

Here is an example of how extensive “natural disturbances” might be:

*“**Looper Epidemic** The Looper Epidemic involves two species – Linden Looper, *Erannis tiliaria*, and Half Wing Geometer – *Phaglia titea*. **The epidemic began in 2002** with very light defoliation observed in Clark State Forest. The loopers were also present that year in Jackson-Washington and Harrison Crawford State Forests and the Tell City Ranger District of the Hoosier National Forest. In 2003, the epidemic developed over a multi county area of south central Indiana that included these forests. Light to heavy defoliation occurred in the forests and the associated private lands totaling **89,252 acres**.*

*The epidemic continued through 2004 in these areas and **expanded to Yellowwood State Forest, Brown County State Park, the Deam Wilderness and surrounding area on the Hoosier National Forest. Light to heavy defoliation totaled 131,943 acres.** Again, Clark and Jackson-Washington State Forests sustained some of the heaviest defoliation. But the **severest defoliation occurred in 2004 in Brown County State Park and the Nebo Ridge and Houston area of the Hoosier National Forest in Jackson County.***

During the 1979 to 1983 epidemic, tree mortality occurred throughout the epidemic areas. Jackson-Washington State Forest experienced the most mortality and salvaged dead timber from eight tracts from this epidemic. Surveys of mortality on Jackson-Washington State Forest found the following (Forest Pest Informer January 1983, Forest Pest Informer January 1984):

- a. 12% of the total stand volume was killed;*
- b. the predominant mortality was to black and red oak;*
- c. other oak species and hickories also died;*
- d. 2-57% of the total volume of individual oak species were killed within tracts;*
- e. the average tree killed was 20" DBH and had 1.5 logs;*
- f. that dead trees lost 35% of their volume from decay of the sapwood;*
- g. hickories decay quickly and must be salvaged with one year of death;*
- h. oaks can be salvaged 2-3 years after death as heartwood does not rot quickly; and*
- i. mortality continued for 2-3 years after the defoliation stopped."*

(Source: "FOREST HEALTH PROBLEMS IMPACTING INDIANA FOREST RESOURCES", by Philip T. Marshall Forest Health Specialist)

3. Missing Evaluation of Ecosystem Services

According to the DoF:

"This documents also implements IC 13-12-4-5(2)(G) requiring the initiation and use of ecological information in the planning and development of resource oriented projects."

This code states that,

*"To the fullest extent possible, state agencies are to use a systematic interdisciplinary approach in natural resource planning **including appropriate consideration of unquantified environmental amenities.**"*

Appropriate consideration of unquantified environmental amenities should include a discussion of ecosystem services. They are an important aspect of positive effects (benefits) provided by forests, and, by some definitions, include the provision of ecosystem goods. Ecosystem Services, broadly defined, may include

- Provisioning services (providing forest products, goods)
- Regulating services (regulating climate, water flow)
- Cultural services (aesthetic, cultural experiences associated with forest)
- Supporting services (nutrient cycling, pollination)
- Goods or commodities include for example timber, fuelwood, game animals, medicinal plants, and other non-timber forest products.

The following more detailed list and description of Ecosystem Services, can be found in Glaser/Moskowitz, 2008¹, and is adapted from “The Economic Value of New Jersey State Parks and Forests”:²

1. Supply of Fresh, Clean Water. There is a limited amount of fresh water available on this planet. When it rains or snows water that evaporated from the oceans starts again on its journey to the oceans. How useful this water is to humans depends a great deal on services provided by forests and other natural systems (like grasslands and wetlands). When rain comes down on forest land, the leaves of trees and underbrush slow it down on its way to the ground. The underlying soil absorbs some of it, and releases some of it into groundwater. If it weren't for the trees and the forest soil, the water would quickly accumulate and run off, rapidly swelling intermittent and perennial creeks and streams. Instead, forest ecosystems release the water slowly, and therefore make it available for longer periods of time in the areas where the rain came down. The forest soil and mineral layers below it will also filter and clean the water of pathogens, nutrients, metals, and sediments that it may have picked up. Thus the water becomes drinkable, fishable and swimmable. If forests and other natural systems are not available to provide a regular, steady flow of clean water, humans have to provide these services for themselves, often at great expense.
2. Mitigation of Flooding: Because forests trap and slowly release rain water, they protect downstream human settlements from flooding that results when large amounts of stormwater run off quickly. If forests do not provide this buffering function, great damage may result downstream, or humans must invest in expensive protective measures.
3. Biodiversity and Genetic Treasures. A forest ecosystem is composed of a rich diversity of plants, animals, insects, fungi and bacteria. We have very incomplete understanding about what role each of these different elements play within the forest ecosystem, or how a forest ecosystem interacts with other natural and human-influenced systems. It may one day be very useful to us to be able to rely on natural functions and interactions that we do not now understand, and to have available to us the rich genetic treasures that may help us adapt to changing environments. Maintaining the diversity also keeps open the potential of discovering new medicines and food products.
4. Climate Regulation: Forests have major impacts on local climate by changing wind currents, rainfall patterns and local temperatures. They also have a role in global climate regulation. Carbon is stored in trees, undergrowth and forest soil.

¹ Glaser, Christine, and Karyn Moskowitz, Economic Analysis of the 2006 Wayne National Forest Plan, May 2008, p. 68
http://heartwood.org/Wayne_Economic_Analysis/Wayne+6-23-08.pdf,

² Mates, William J., M.S. and Jorge L. Reyes, M.F., *The Economic Value of New Jersey State Parks and Forests*, New Jersey Department of Environmental Protection Division of Science, Research & Technology, Issued June 2004, Revised version issued November 2006. <http://www.nj.gov/dep/dsr/economics/parks-report.pdf> - Accessed May 23, 2008.

5. Improving Air Quality: Forests improve air quality by filtering out particulates and toxic compounds from the air.
6. Biological Control: Forests have an important role in regulating species populations, including control of invasive and unwanted species, like pests, predators, weeds, disease vectors, etc.
7. Aesthetics and Recreation: Intact forest ecosystems are valued by people who fish, hunt, gather, hike, canoe, watch wildlife, or take photos. Some people contribute financially to the protection of forest ecosystems and of the treasures they provide, even though they don't intend to ever go there themselves.
8. Cultural and Spiritual Importance: Forest ecosystems, habitats, and landscapes may be highly valued by humans because of the cultural, historical, spiritual, or even religious connections they have with them.
9. Wildlife Habitat: Some plant and animal species depend for their survival on the availability of large, contiguous 'patches' of forest. This is true for example for some migratory birds. When forests become diminished in size and heavily fragmented, those species populations start to decrease. Intact forests, therefore, become critical for the survival of species that human beings value for aesthetic or even economic reasons.
10. Soil Formation and Retention: Forest ecosystems build the soil that then provides many of the services mentioned above, including water storage and filtering, and providing a medium for plant growth. Forests create and enrich soil through the processes of weathering and decomposition. They also retain the soil and prevent it from being washed away by water running off. When forest cover is removed, that leads to increased sedimentation in rivers, lakes and river deltas, which must sometimes be removed at a great expense.
11. Pollination: Forests provide pollinators essential to the reproduction of plant populations.

The EA does not include a thorough analysis of how planned DoF activities impact these various ecosystem services.

A complete analysis would look at how state forests could **increase the delivery of those valuable services** to society. Usually, increased provision of ecosystem services results from unfragmented, undisturbed, standing, older forests. The current DoF plan at best sets out to make **the damage** to those services **as small as possible** through BMPs.

Clearly, a plan that **adds any damage and pollution** to water, soil, and air, and that diminishes **the capacity of the forest to provide ecosystem services through logging and other timber management practices**, instead of allowing the forest to naturally expand that capacity, reduces net public benefits provided to the public. Net public benefits result when monetary and non-monetary benefits exceed monetary and non-monetary costs associated with a plan or activity.

Managing forests for the provision of ecosystem services would require very different management prescriptions from the ones proposed in the EA. They would NOT involve logging and burning programs, but eliminate such activities. With that, many of the dollar

costs of “managing” the forest for timber would fall away, and that alone would increase net public benefits from forest management.

What increases in staff hours devoted to enforcing BMPs have there been since harvest levels started increasing in 2005/2006?

Most federal timber operations have been shown to be money losers, as the Forest Service’s Timber Sale Plan Information Reporting System TSPIRS showed. We are not aware of any similar cost information being collected on Indiana State Forests, but it is very likely that state forests lose money on timber as well, since they, too, support timber operations with a number of costly investments and management activities, especially building, maintaining and decommissioning roads, fighting invasive species (which spread more on disturbed soils) , administering sales, monitoring private contractors, conducting burn programs and TSI’s.

IC 14-23-4-5 deals with the allocation of timber receipts. 85 percent of net receipts are to be deposited in the state forestry fund, and 15 percent go to counties where the state forest is located. IC 14-23-4-5 (c) requires that ***“all distributions under this section shall be made after deducting all costs incurred by the department relating to the operations.”***

We would like to see the department disclose detailed information about what costs were deducted from the timber receipts since the drastic increases in logging starting 2005.

Honest performance accounting for Indiana State Forests would most likely reveal that taxpayers are losing money on timber sales in the short and/or long run.. The EA does not provide any information on costs, therefore there is no transparency about that issue.

But even if it could be shown that timber is not a money loser on Indiana State Forests, it would not follow that timber should be given preference over ecosystem services, as is the case with the plans under consideration.

We strongly urge the DoF to revise its plans and to manage state forests in way that maximizes net public benefits.

Many studies have found that the **timber value of a forest per acre per year is much lower than the value of ecosystem services.** Providing the higher value ecosystem services would therefore provide higher public benefits than providing a higher timber output. In addition, managing the forests for ecosystem services would reduce DoF costs considerably, since all the costs associated with logging would fall away. Public benefits would increase, while public costs would decrease, therefore increasing net public benefits compared to what the current plan offers.

The table below shows the results from an ecosystem valuation study for New Jersey’s State Parks and Forests.

Per Acre Values for Ecosystem Services from New Jersey Parks and Forests Study

Ecosystem Service (2004 \$ PER ACRE PER YEAR)	Minimum	Middle*	Maximum
Waste removal-air	\$179	\$190	\$200
Stormwater control	164	174	185
Pollination	59	162	265
Carbon sequestration	83	155	222
Soil retention	60	73	88
Hydrological services (supply and filtration of water)	22	65	126
Carbon storage	16	30	43
Soil formation	3	4	5
Biological control	2	2	2
Cultural / spiritual	1	1	1
Subtotal	589	856	1,137
Habitat / refugia	820	923	1,025
Total	1,409	1,779	2,162

Source: William J. Mates, et.al, The Economic Value of New Jersey State Parks and Forests, Issued June 2004, Revised version issued November 2006, (Table 12, p. 42)

Another study on the Value of New Jersey Natural Capital³ also addresses the value of forests, breaking them down into **Forestland, Forested Freshwater , and Forested Wetland.**

³ State of New Jersey, Department of Environmental Protection, *Valuing New Jersey's Natural Capital: An Assessment of the Economic Value of the State's Natural Resources.* <http://www.state.nj.us/dep/dsr/naturalcap/>
Summary: <http://www.state.nj.us/dep/dsr/naturalcap/nat-cap-overview.pdf>

Part I: Overall Results <http://www.state.nj.us/dep/dsr/naturalcap/nat-cap-1.pdf>

Part II: Ecosystem Services <http://www.state.nj.us/dep/dsr/naturalcap/nat-cap-2.pdf>

Part III: Ecosystem Goods <http://www.state.nj.us/dep/dsr/naturalcap/nat-cap-3.pdf> Accessed May 23, 2008.

ECOSYSTEM SERVICES	(2004 \$ PER ACRE PER YEAR)	(2004 \$ PER ACRE PER YEAR)	(2004 \$ PER ACRE PER YEAR)
	FOREST	FRESHWATER WETLAND (Forested)	RIPARIAN BUFFER
Nutrient cycling			
Disturbance regulation		\$,3657	\$88
Water regulation		\$2,986	
Habitat/refugia	\$923	\$113	
Aesthetic/recreational	\$122	\$1,406	\$1,370
Waste treatment	\$44	\$838	
Water supply	\$163	\$1,544	\$1,921
Cultural/spiritual	\$1	\$890	\$4
Gas/climate regulation	\$54	\$134	
Pollination	\$162		
Biological control	\$2		
Soil formation	\$5		
	\$1,476	\$11,568	\$3,383

Source: “Valuing New Jersey’s New Jersey Natural Capital Study”, Part II, Table 5, p. 30

Clearly **riparian buffers are more valuable for ecosystem services than other areas of the forest**, except wetlands. Still the DoF insists on logging along streams, even though less than elsewhere.

The DNR’s 1996 BMP Implementation Study found that only 76% of timber sales correctly implemented BMPs on stream crossings, and Riparian Management Zone BMPs were only implemented 76.5% of the time as well. These numbers were from a time when there was not a heavy logging program on the State Forests compared to post-2005, so these percentages are probably much lower now. With the elimination of mandatory BMP checks and the massive increase in logging, there is no doubt that the implementation of stream management BMPs will decrease.

Flood control is an important aspect of ecosystem services. The massive increase in logging in the state forests has undoubtedly decreased the ability of the forest to regulate rain events. The massive flooding that occurred in southern Indiana may have been exacerbated by the increased logging of the state forest. In the Bean Blossom watershed, which includes the Morgan-Monroe and Yellowwood State Forests, there was flooding that caused millions of dollars in damage.

Table 30: Per Acre Values of Ecosystem Goods and Services for Forestland, Forested Freshwater Wetland and Forested Riparian Buffers

2004 US \$	FOREST	FRESHWATER WETLAND (Forested)	RIPARIAN BUFFER
	Per acre/year	Per acre/year	Per acre/year
ECOSYSTEM GOODS	\$238	\$244	\$118
ECO SYSTEM SERVICES	\$1,476	\$11,568	\$3,383

Source: “Valuing New Jersey’s Natural Capital Study”, Part I (Overall Results), Table 5, p. 17

We can estimate that the Indiana State Forests provide \$211,350,000 to \$324,300,000 of ecosystem services a year. The DNR DOF estimates that the total value of the standing timber in all the Indiana State Forests represents \$225,339,763. So the annual benefit of the ecosystem services provided by the Indiana State Forests is equal to or exceeds the total value of all the standing timber.

The ecosystem services benefit the entire population of the State of Indiana, yet the profit from timber sales benefits only those who work in the timber industry. The DNR DOF estimate that 56,000 people in Indiana work in the timber industry. Those people will benefit from the increased logging, while the other 6,257,520 people will have their interests damaged.

Public lands should be managed for the greatest good of the People of Indiana, therefore the Indiana State Forests should be managed to maximize the amount of ecosystem services.

4. Effects of Management on Water

From the EA, p. 4:

“The Division of Forestry proposes to implement a timber management program designed to maintain the current dominance of oak-hickory forests and associated biodiversity while improving overall wildlife habitat and successional stage diversity through a combination of forest management treatments described below. “

*“Under the proposed action, the DoF would implement actions for forest management congruent with the following list of landscape-level management goals. The DoF expects that **adherence to these goals through integrated management actions would benefit species of concern, rare, or vulnerable species that live in the plan area.** • Maintain or develop diverse species composition.*

- Maintain or develop a mosaic of size classes.*
- Provide forest-based outdoor recreation.*
- **Protect water quality.***
- Sustain growth of quality hardwood timber.*
- Conduct timber harvesting at adequate levels for regeneration and revenue.*
- Monitor habitat conditions.”*

In essence, therefore, the DoF states that the planned management actions would protect water quality.

However, the DoF gives **no information about the state of water quality**, how impaired the waters are that run through the state forests, or how impaired the waters are that state forest creeks and rivers run into. There is no information on **how many people in the region rely on the state forests for their drinking water**, and how different actions will affect the **quality and flow of water** to people and wildlife.

We don't know the condition of the waterways running in and out of the state forests before intensive logging and road building begins. Also, there is no plan as to what tests will be done to ensure that the waterways are not worse off after logging, road building, fire, chemical spraying, etc.

An adequate analysis would have included before and after scenarios describing for each specific management area (steep slopes, dry areas, riparian zones, etc), what actions are going to take place in each area, and what the effects will be of each proposed activity.

Each waterway should have been listed with an assessment of water quality, past experience with water flow, etc. This list should have included how many people rely on the waterway for drinking water, and how logging, road building, etc. affects the quality and flow of the water.

As stated above, the DoF's BMPs include "general guidelines." There is no statement of how many people will be employed to see that BMPs are implemented, no assurance that they will be implemented at all, and no real way to determine afterwards if the BMPs are enough to assure that water flow and quality has not been damaged and how the DoF will assess the costs and pay for them if there is damage.

The DoF states that the BMPs improve water quality, with no real explanation of how this is to magically take place.

The DoF is even suggesting that trees be logged in Riparian Management Zones (RMZ), while at the same time suggesting that the RMZs are natural buffers *between* logging and waterways. They state that:

"The goal is to maintain a stable forest floor to filter sediment and other pollutants before runoff enters the main watercourse."(EA, p. 20)

However they give no explanation of how logging trees that naturally filter out pollutants will help stabilize the forest floor. How is a stable forest floor promoted by logging? It is not. The forest floor is eroded and sedimentation increases after logging operations. Without trees or an alternative manmade water filtration system, there will no longer be a way to filter pollutants and sedimentation will be increased.

Why log at all in RMZs? The answer probably lies in the fact that much of the state forest land is in steep hillsides, and the bottom lands are some of the few places that are fairly accessible to logging. However, no mention is made of this in the document.

The BMPS set forth in the EA are very general and do not give any assurance that water will be protected. Words like "avoid" or "minimize," and "as practicable after construction and use," or "as practical", and "sufficient distance away," "cut few, if any trees" are not directive but rather give so much leeway to loggers that the public can be assured of nothing.

Here are the DoF's attempts at BMPs:

1. Make RMZs as wide as practical.
2. When harvesting trees in the RMZ, minimize disturbance of the forest floor, exposure of mineral soil and degradation of stream banks, and leave adequate tree stocking to shade the stream.
3. Locate roads and skid trails outside RMZs except where necessary for stream crossings.
4. Minimize mechanical disturbance to the forest floor by using directional felling away from the watercourse and winching to skid trails outside an RMZ when necessary.

5. Do not pile slash, fill, or place debris within RMZs.
6. Remove felled tops and logging debris from the channels of perennial and large intermittent streams.
7. Place felled tops and debris a sufficient distance away from the watercourse to prevent flood impediments.
8. Expose no more than 10 percent bare, mineral soil, well distributed throughout the RMZ.
9. Avoid locating equipment and material storage sites, maintenance sites and log landings within the RMZ.
10. Avoid operating wheeled or tracked equipment in the RMZ and watercourses except on designated roads and stream crossings.
11. Do not locate roads or skid trails on pond dams.
12. Divert forest road and skid trail runoff onto stable areas before it enters the RMZ.
13. Stabilize all roads, skid trails, cuts, and fills in the RMZ as soon as practicable after construction and use.
14. Avoid broadcast spray of herbicides or fertilizers within the RMZ.
15. Cut few, if any, trees within 15 feet of permanent watercourses.
16. Retain at least 50 percent well-distributed canopy cover in the primary RMZ on perennial watercourses.

Likewise, the section below on fuels, lubricants and trash does not assure the public that water will be protected. What would give assurance is a list of sensitive areas, a chart showing how many people will be assigned to watch over sensitive areas when they are being logged, how the areas will be checked after logging, and what consequences loggers will face if BMPs are not met. FSC and SFI guidelines only ask for random spot checks.

Reporting fuel and other spills requires that the spills will be noticed in the first place. But even then, the reporting doesn't undo the damage.

From EA, p. 21:

Fuel, Lubricants and Trash

“Improper handling of fuels, paints, solvents and lubricants has the potential to cause soil and water contamination and damage water potability, recreational use, and fisheries.

Report all fuel, lubricant, and hazardous material spills exceeding one pound or pint which enter the waters of the state, including ground water, and causes a sheen or creates damage to water quality to Indiana Department of Environmental Management.

Also report: 1) spills near well heads, 2) operating fluids spills exceeding 55 gallons, 3) spills which may damage water quality, 4) spills exceeding your cleanup capabilities, and 5) any spill where there is doubt or when technical clarification or assistance is needed.

Any spill not cleaned up is also reportable. (Indiana Spill Rule - 327 IAC 2-6-1&2).

General guidelines:

1. Clearly specify and use a designated area for fueling, material storage, and maintenance. This area should be away from waterways, areas prone to runoff, or sensitive areas like caves, sinkholes, springs, seeps, and RMZs.

2. Use caution when fueling all equipment, even chainsaws, to avoid spills.”

Finally, there is no information on where roads are going to be put exactly, who is going to build them, how much they are going to cost, if they will be decommissioned after use, and what the impacts of these new roads will be on water and soil quality.

We are not sure how or why the DoF labeled what occurs after logging and through BMPs “soil and water improvement.”

” Soil and water improvement associated with the proposed action is primarily implementation of the BMPs on an estimated amount of acreage. A small amount of construction-type projects are also included in these calculations. The DoF estimates that about 2 to 3 percent of the acres proposed for harvest will require soil and water improvements as a result of ground disturbance. These soil and water activities on harvest areas and trails constitute almost the entire emphasis by DoF on water quality issues.”(p. 13)

And, p. 13:

“Soil and Water Improvement

*The DoF implements soil and water improvement actions according to procedures outlined in the Best Management Practices (BMP) for Water Quality applicable to all forest management activities. **Soil and water improvements are done to minimize impacts to soils and water quality and to support rehabilitation of disturbed areas.**”*

Calling the application of BMP’s an improvement of soil and water quality seems outright deceptive. While implementing BMPs during logging operations or road building is clearly better than not doing so, an improvement of soil and water is something different altogether. It would require leaving tress standing instead of cutting them, to take out and remediate logging roads instead of building more of them, and thus allowing forest ecosystems to naturally increase their capacity to filter air pollution, purify water and control the flow of water. BMP’s do nothing like that.

5. Impact of DoF Management Plan on Introduction and Spread of Invasive Species

EA, p. 106: *“The proposed action may result in an increased risk of establishment and spread of non-native invasive species. Implementation of BMPs and mitigation measures would however minimize this impact.”*

This is all that the EA has to say about the connection between invasive species, and especially non-native invasive species, and the planned management actions that have the unavoidable effect of disturbing the forest.

In the USDA Forest Service Strategic Plan FY 2007–2012, NNIS are highlighted as one out of four serious threats to forests in the US. The Strategic Plan states on p. 4: “We will continue our commitment to reducing threats to the Nation’s forests and grasslands. These threats include... (2) the introduction and spread of invasive species.”

According to the USDA Forest Service, NNIS are the primary threat to 49 percent of all imperiled or federally listed species. (USDA, 2006 Wayne National Forest FEIS, p. 3–154).

Non-native invasive plant species tend to invade and establish themselves in areas where **disturbance** has occurred, such as **vegetation removal, canopy opening, or soil exposure**. Once they are established in an area, they can continue to **spread along areas of continued disturbance**, such as **roads, trails** (both official and illegal user-created trails), **and streams**. NNIS are transported into new areas by people, vehicles and machinery, animals, birds, wind, water, fire, and rain. (USDA, 2006 Wayne National Forest FEIS, p. 3-163/164, emphasis added).

Just a casual look at the major threats confronting **plants of greatest conservation need documented on DoF properties shows that invasive species are implicated in a large number of cases (see tables in Appendix of EA for quick review). The DoF is well aware that invasive species increasingly threaten native plant communities (and associated biodiversity).**

*“Some invasive plants are well established on DoF lands and are increasingly causing displacement of native plant communities. **Removal of invasive plants will be done with cuttings, herbicide applications, prescribed fire, hand pulling, and other mechanical means.** Two invasives active on DoF lands that are targeted for intensive surveys, mapping, and control measures are *Pueraria montana* (kudzu) and *Ailanthus altissima* (tree of heaven). DoF proposes a proactive and ongoing program to control the most aggressive invasive plants. All properties began conducting extensive searches for invasive plants during 2006.The DoF estimates that **approximately 1400 acres of invasive plant species control** could be applied on the State Forest system each year.”(p. 17)*

With the large scale introduction of vehicles and machinery and soil disturbances planned throughout the forest (TSI, group selection, single tree selection on thousands of acres, road and trail building and maintenance, and fire), the risk of introduction and spread of invasives will increase significantly overall, in spite of any BMP’s that may be employed.

The EA contains no information about how many acres of the State Forests are already infested with invasive plants, and what species of invasives are currently present. It does not show what it costs to fight invasives after they have been given more opportunities to establish themselves—in terms of staff time and volunteer efforts—and how much additional water and air pollution is created with herbicide applications and prescribed burns.

6. Roads Spread Invasives and Damage Soil, Water and Habitat

DoF plans road construction on 50 acres per year, and maintenance activities on 900 acres. All together, road and trail-related activities will disturb 1600 acres per year.

New road construction is on top of an already extensive network of roads.

“Because much of the state forestland was historically cleared and farmed prior to acquisition, there is a large preexisting system of roads and trails.”(EA, p. 14)

The regional Forest Protection Group Heartwood submitted the following comments on the Wayne National Forest DEIS in 2005, and referenced research regarding road impacts on forests that we recommend for the DoF to consider:

From Heartwood Comments:

There is extensive evidence that roads, particularly logging and related extraction roads, are a primary method for spreading invasives plants and animals into previously interior habitat. Roads increase erosion and create a long-term impairment to the soil quality and quantity.

Micro

climate changes will also occur in the immediate and local area due to new solar exposure and changed airflow patterns. Any animal community in the immediate area will be displaced, and any fixed plant community will be wiped out. This is of particular concern with rare, threatened and endangered plant species on the Wayne National Forest, especially ones located in a timber sale unit or access road.

“Undesired, negative consequences include effects on hydrology, land features such as debris slides, sedimentation, habitat fragmentation, predation, road kill, invasion by exotic species, dispersal of pathogens, water quality and chemical contamination, aquatic habitat, use conflicts, human actions (e.g., trash, litter, fires), the cost of lost solitude, local economies, soil productivity, communities, and biodiversity” (Forest Service Roads: A Synthesis of Scientific Information, pg. 3).

“Road effects on aquatic habitat and population response are well documented and overwhelmingly negative” (Ibid, pg. 40).

The Service and many others have acknowledged and documented the negative impacts from sedimentation, erosion, siltation and land slides on water quality in forests. A more extensive list of documented impacts and negative effects are included in the Appendix. Below are just a few citations from different research available on road impacts.

“In a review of CERCLA regulations, a U. S. Court of Appeals ruled in 1989 that passive-use values “. . . reflect utility derived by humans from a resource, and thus, prima facie, ought to be included in a damage assessment”. Thus, if Forest Service roads alter passive-use value, such value needs to be considered in road policy and management decisions. Forest Service roads alter the forest landscape in ways that are regarded as environmental damage by some members of the public, especially where new roads enter previously roadless landscapes with unique natural characteristics and may affect the long-term survival of species adapted to and requiring deep-woods habitats” (Ibid, pg. 35).

Accelerated surface erosion from roads is typically greatest within the first years following construction although in most situations sediment production remains elevated over the life of a road (Furniss et al. 1991; Ketcheson & Megahan 1996).

This is important, as even "temporary" roads can have enduring aquatic impacts. Similarly, major reconstruction of unused roads can increase erosion for several years and potentially reverse reductions in sediment yields that occurred with non-use (Potyondy et al. 1991). Where roads are unpaved or insufficiently surfaced with erosion resistant aggregate, sediment production typically increases with increased vehicular usage (Reid & Dunne, 1984).

This would be the case with most logging roads and many mineral access points, a point the Service noted as a problem earlier. Likewise, the impacts to other mammals and birds is problematic. New roads allow for increased mobility of animals that thrive on edge habitat and who will readily colonize new logging roads, further limiting the available acreage for interior species. The cowbird is perhaps the most widely noted of these animals, but is by no means the only one.

A 1999 Natural Resource Defense Council review of the scientific literature revealed seven general effects of roads of all kinds on the ecosystem. The key effects noted were:

- 1) Road construction resulted in the death or injury of roadside plants or slow-moving animals, compacted soils, and affected water bodies at road crossings.*
- 2) Roadkill affected the demography of numerous species.*
- 3) Animal behavior changed due to roads, with avoidance of roads, modification of movement patterns or home ranges, changes in reproductive success, escape behavior, or physiological state.*
- 4) Roads disrupted the physical environment by changing soil characteristics such as density, surface runoff, and sedimentation. They altered the hydrology of slopes and stream channels, created barriers to the movement of fish and other aquatic animals, and altered channel and shoreline development.*
- 5) Roads affected the chemical environment by contributing pollutants such as heavy metals, salts, or nutrients to roadside plant and animal communities as well as to aquatic ecosystems through runoff.*
- 6) Roads promoted the spread of exotic species.*
- 7) Roads increased access by humans, and therefore increased poaching pressure, fishing, and passive harassment of animals.*

(End of the Road: The Adverse Ecological Impacts of Roads and Logging: A Compilation of Independently Reviewed Research, NRDC, 1999).

Similar effects were reported by Noss in an article on roads and biodiversity:

“Over the last few decades, studies in a variety of terrestrial and aquatic ecosystems have demonstrated that many of the most pervasive threats to biological diversity habitat destruction and fragmentation, edge effects, exotic species invasions, pollution, and overhunting are aggravated by roads. Roads have been implicated as mortality sinks for animals ranging from snakes to wolves, as displacement factors affecting animal distribution and movement patterns,

as population fragmenting factors, as sources of sediments that clog streams and destroy fisheries, as sources of deleterious edge effects, and as access corridors that encourage development, logging, and poaching of rare plants and animals. Road-building in National Forests and other public lands threatens the existence of de facto wilderness and species that depend on wilderness” (Diamondback: Effects of Roads, Noss).

Fragmentation is an issue of particular concern for the Wayne, considering the overly fragmented nature of the forest currently. If the Wayne is ever going to be able to sustain interior forest species and provide an semblance of contiguous forested habitat then no new roads can be built, and existing roads must be removed, as stated earlier. Additional documentation from Noss is included in the Appendix.

7. EA Neglects that Natural Disturbances Create Early Successional Habitat

In analyzing the habitat needs of various species with the greatest conservation needs, the DoF repeatedly points out their need for both mature and early successional forests, or that they benefit from forest openings.

The EA repeatedly states that one of its goals is to provide for the habitat needs of a broad spectrum of species by creating a mosaic of habitats, and that the planned actions are carefully thought out and calibrated to do exactly that. *“These regenerating openings interspersed within an older forest or one managed by single tree selection provide a mosaic of size classes favorable to a wide range of wildlife species.”*(p. 16)

This creates the impression that logging and other management activities proposed in the Plan are good for biodiversity, something the public cares about.

There is, however, no acknowledgment of the fact that forests provide their own openings without any human intervention. The fact that some species will benefit from openings does in no way imply that these species need the DoF to provide these openings for them.

The DOF does not address at all that natural disturbances are perfectly capable of providing for multiple and differentiated habitat needs. There is no “need” for clearcuts or groups selection harvests to provide what nature does all by herself. Forest species do not “need” clearcuts, or any logging. Logging does not mimic natural disturbances. Nature does not log fallen or dead trees out of the forest.

The DOF’s own research details the large extent of natural disturbances just from insects and diseases, as we have documented above. (FOREST HEALTH PROBLEMS IMPACTING INDIANA FOREST RESOURCES”, by Philip T. Marshall Forest Health Specialist)

In addition to that, trees die of old age (unless they are logged before they reach that old age), and they die when damaged by storms, drought, flood or wildfire (the latter mostly caused by humans).

Natural disturbances, even though almost completely ignored by the EA, do not just stop happening because the DoF thinks they can do a more perfect job at disturbing the forest than nature does.

Natural disturbances will happen on top of what the DoF does, and only some will overlap geographically with DoF disturbances. Yet, they are not at all taken into consideration by the DoF as a factor in providing for habitat needs for various species.

To give a more complete perspective on the “need” of various species for forest openings, the EA should inform the public about how many acres of the forest have been affected over the years by these natural disturbances, and provide a rationale for why openings provided by nature are insufficient. For millions of years species have relied on naturally occurring forest openings. It is incumbent upon the DoF to explain how nature is failing these species in such a way that the DoF is now needed to help them out by large scale logging and burning programs.

As mentioned above already, natural disturbances are likely to increase with the progression of changes in climate patterns associated with the increase in average global temperatures.

The DoF does not account for the availability of early successional habitat in the region on private and other public forest land. The EA does not mention the Hoosier National Forest Long Range Management Plan which calls for logging thousands of acres to create “forest openings.” Many of these proposed units are adjacent to Indiana State Forests. No cumulative impact analysis was done to include this new information.

8) Impacts and Challenges of Global Warming Not Investigated

Global Climate Change is one of the most serious environmental, social and economic threats that the world is facing today. The warming of the atmosphere is linked to increased concentrations of so-called greenhouse gases, including carbon dioxide, methane, nitrous oxides, and chlorofluorocarbons. Global climate is influenced by changes in land cover.

Global warming can affect forests by introducing new **invasive plants, insects, and animals** that expand their range as temperatures increase. Also, the forest could be put under **increased stress** from extreme weather events, changed weather patterns and seasons (warmer winters, for example), and increased likelihood of drought and forest fires.⁴

⁴ USDA Forest Service, *Interim Update of 2000 RPA Assessment, 2007*, p. 70, 77.

The EA **does not consider or address climate change and its possible effects on Indiana State Forests**, nor does it look at how State Forests could be managed to reduce release of greenhouse gases into the atmosphere, and to increase sequestration and storage of carbon in forest ecosystems. **Carbon Storage and sequestration are valued ecosystem services**, and could, at some point in the future, even provide for forest revenues from markets for carbon credits.

Forest management influences the carbon cycle. Site preparation and timber harvest create logging slash and disturb down wood, leaf litter, duff, and other organic material in the soil. This results in increased decomposition, which releases stored carbon into the atmosphere as carbon dioxide. There is unavoidable carbon release in the processing, use and disposal of wood products also. Fuel used to run machines during logging operations also adds carbon to the atmosphere.

In addition, prescribed fire releases stored carbon into the atmosphere.

The following information is taken – with only minor modifications – from “An Economic Analysis of the 2006 Wayne National Forest Plan” by Christine Glaser and Karyn Moskowitz.⁵

The Role Of Forests in Carbon Storage and Sequestration

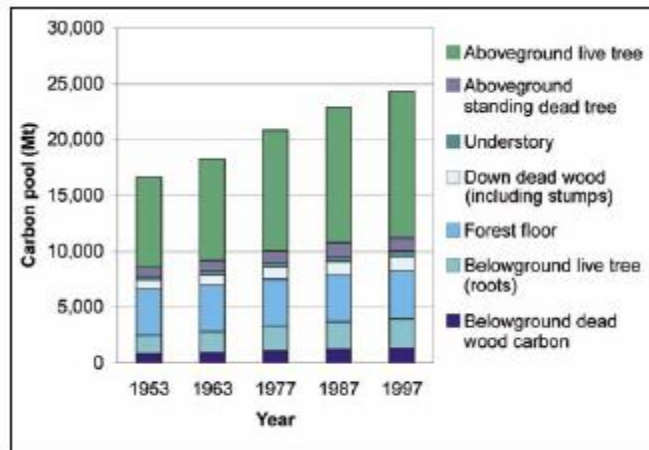
Forests in the U.S. have been carbon sinks since 1953.⁶ That means that on balance, on an aggregate level, they have absorbed rather than released carbon over the past 50 years.

Carbon can be stored above ground in live and standing dead trees, in the forest understory, in downed dead wood, on the forest floor, belowground in the roots of live trees, and belowground in dead wood carbon.

Figure 3: Carbon Pools on Forest Land

⁵ Glaser, Christine, and Karyn Moskowitz, Economic Analysis of the 2006 Wayne National Forest Plan, May 2008, pp. 109. http://heartwood.org/Wayne_Economic_Analysis/Wayne+6-23-08.pdf

⁶ USDA Forest Service, *Interim Update of 2000 RPA Assessment, 2007*, p. 83.



Source: Figure 57 in 2007 Update of 2000 RPA, p. 83

However, even though forests in the U.S. have acted as carbon sinks, the 2007 RPA reports that the size of annual additions to the sink (sequestration) appears to be declining. (2007 RPA, p. 6)

The Environmental Protection Agency lists the following forestry practices that can sequester or preserve carbon storage (See also Table 47):

- 1) Afforestation (Tree planting on lands previously not in forestry)
- 2) Reforestation (Tree plantings where trees would not regenerate without intervention)
- 3) Avoided Logging
- 4) Longer harvest-regeneration cycles

Table 47: Key Forestry Practices to Increase Carbon Storage and Sequestration⁷

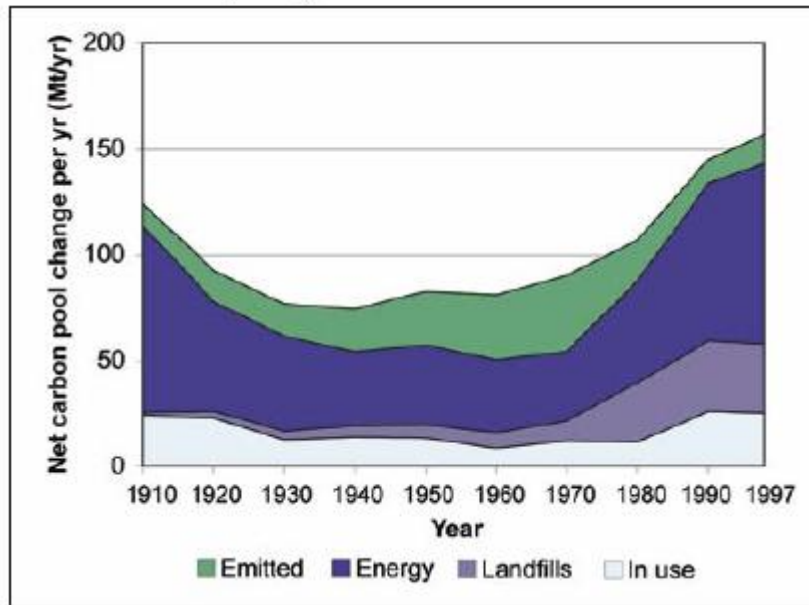
⁷ U.S. Environmental Protection Agency, Carbon Sequestration in Agriculture and Forestry: Forestry Practices that Sequester or Preserve Carbon. <http://www.epa.gov/sequestration/forestry.html> , last updated on Thursday, October 19th, 2006.

Key Forestry Practices	Typical definition and some examples	Effect on greenhouse gases
Afforestation	Tree planting on lands previously not in forestry (e.g., conversion of marginal cropland to trees).	Increases carbon storage through sequestration.
Reforestation	Tree planting on lands that in the more recent past were in forestry, excluding the planting of trees immediately after harvest (e.g., restoring trees on severely burned lands that will demonstrably not regenerate without intervention).	Increases carbon storage through sequestration.
Forest preservation or avoided deforestation	Protection of forests that are threatened by logging or clearing.	Avoids CO ₂ emissions via conservation of existing carbon stocks.
Forest management	Modification to forestry practices that produce wood products to enhance sequestration over time (e.g., lengthening the harvest-regeneration cycle, adopting low-impact logging).	Increases carbon storage by sequestration and may also avoid CO ₂ emissions by altering management. May generate some N ₂ O emissions due to fertilization practices.

Not all carbon is immediately released by logging. Decomposition takes some time, but carbon release may be sped up by burning of logging debris.

Some of the wood is made into products. The table below shows estimates of how much carbon is stored in products, how much is added to landfills, how much is emitted and how much is burnt for energy.

Figure 4: Net Changes in Carbon in Harvested Wood Products



Source: Figure 58 from 2007 Update of 2000 RPA, p. 84

According to the 2007 Interim Update of 2000 RPA, the “half-life of carbon in products varies from 1 year for paper (except free-sheet used in books) to 100 years for wood used in new single-family homes.... In 1990, some 18 percent of the carbon consumed was added to products in use and 23 percent was added to landfills. About one-half was burned for energy....” If wood is used for fuel, it can offset carbon dioxide emissions from fossil fuels, if fuel use goes along with an equivalent amount of re-growth.⁸

The loss of carbon to the atmosphere from logging is also related to the loss of organic matter from the soil. Logging may reduce soil productivity through compaction, disturbance, erosion, and removal of organic matter. This decreased soil productivity could therefore reduce tree growth and the capacity for carbon sequestration by re-growing trees.

The following information is adapted with small changes from “Notice of Appeal of the Record of Decision for the German Ridge Restoration Project on the Hoosier National Forest”, submitted by Heartwood, Protect Our Woods and others, on June 5, 2007.⁹

Carbon is sequestered when forests regrow after they are logged. However, the carbon sequestered by young trees may be much less than the carbon that could have been sequestered if older trees had been left standing. In the article entitled “Are old forests

⁸ USDA Forest Service, *Interim Update of 2000 RPA*, 2007, p. 84.

⁹ <http://www.protectourwoods.org/downloads/20070605-FSFEIS-Appeal.pdf>

underestimated as global carbon sinks?” the authors state that: “Old forests are important carbon pools, but are thought to be insignificant as current atmospheric carbon sinks. This perception is based on the assumption that changes in productivity with age in complex, multi-aged, multispecies natural forests can be modelled simply as scaled-up versions of individual trees or even-aged stands. This assumption was tested by measuring the net primary productivity (NPP) of natural subalpine forests in the Northern Rocky Mountains, where NPP is from 50 percent to 100 percent higher than predicted by a model of an even-age forest composed of a single species. If process-based terrestrial carbon models underestimate NPP by 50 percent in just one quarter of the temperate coniferous forests throughout the world, then global NPP is being underestimated by 145 Tg of carbon annually. This is equivalent to 4.3–7.6 percent of the missing atmospheric carbon sink. These results emphasize the need to account for multiple-aged, species-diverse, mature forests in models of terrestrial carbon dynamics to approximate the global carbon budget.”¹⁰

Another article, “Carbon storage and fluxes in ponderosa pine forests at different developmental stages,” finds that old (>250 years) Ponderosa Pine forests sequester twice as much carbon as recently clearcut forests.¹¹

What these global climate change scientists are telling us is that it does make a difference whether the trees are old or young. However, the Forest Service neglected to even mention these or other studies in the WNF FEIS, and didn’t compare and contrast the costs to climate change from logging versus not logging, a requirement of the Global Climate Change Prevention Act of 1990 (7 U.S.C. 6701).

One example of potential ecological impacts of climate change on our region was stated by Dr. Scott Robinson in a program in Carbondale, Illinois two years ago. An impact that is showing up that researchers believe is climate change driven and which has tremendous potential for forest health is that the plant community is responding more immediately to climate change than the deeply ingrained habits of animals. Researchers are seeing on an average trees opening their buds weeks earlier than what has been considered normal. Yet, the migratory birds, such as the warblers, whose migration has become almost perfectly synchronized with the hatching of earlier spring Lepidoptera that feed on tree leaves, are keeping their habitual time frames for migration. This could mean that the warblers could end up losing a vital source of food as they migrate – and their ability to control these insects and keep them from decimating the trees. Therefore,

¹⁰ Carey, Eileen V., Anna Sala, Robert Keane, and Ragan M. Callaway, Are old forests underestimated as global carbon sinks? *Global Change Biology*, Volume 7, Number 4, April 2001, p. 339-344.

¹¹ Law, B.E., P.E. Thornton, J. Irvine, P.M. Anthoni, and S. Van Tuyl, Carbon storage and fluxes in ponderosa pine forests at different developmental stages, *Global Change Biology*, Volume 7, Number 4, April 2001, p. 339-344.

if the climate keeps warming, we could see a serious impact to just this one aspect of our eastern forests - with many other impacts yet to show up or yet for us to understand.

Also, range expansion and shrink are other potential impacts from climate change. This and other similar effects are being studied and reported from scientific agencies. For example, the U.N is reporting findings in the report, "Migratory Species and Climate Change: Impacts of a Changing Environment on Wild Animals," that they have "documented a wide range of climate effects that are now occurring. Changes in the length, timing and location of migration routes are being documented. In extreme cases, species have abandoned migration altogether. In other cases, species now migrate to areas where they have not been recorded other than as occasional vagrants." <http://www.ens-newswire.com/ens/nov2006/2006-11-17-01.asp>

We therefore request that the EA address climate change as an issue of great urgency, and acknowledge the growing importance of the Indiana State Forests in providing carbon storage and sequestration. There is certainly great potential for State Forests to contribute to carbon sequestration by allowing trees to grow older (oaks can grow several hundreds of years old), and by refraining from reducing carbon storage in soil, roots, dead and living vegetation through logging, burning and other soil disturbing activities.

Obviously, the issue of carbon sequestration and storage through forests is getting attention in other places: **Ontario's government's recently announced that it will protect 50 percent (55 million acres/22.5 million hectares) of Ontario's vast Northern Boreal forest from industrial development.** This commitment will secure more than 50 billion tons of stored carbon, help species and ecosystems adapt to a changing climate, and provide habitat for the threatened woodland caribou. The area to be protected is half the size of California, or six times the size of Belgium. (Press Release from July 14th, 2008, by ForestEthics (415) 902-5885)

9. Impacts on Air Quality from Prescribed Burns

The EA states that approximately **2000 acres of prescribed fire could be applied on the State Forest system each year.** In addition, logging and other operations may cause dust. Both prescribed burns and dust are of concern with regard to air pollution impacts.

According to the EA, p. 12, low-intensity burns are *"for the specific purposes of management of plant communities including **hazardous fuels reduction, forest regeneration, and habitat enhancement.**"*

"Low intensity prescribed fires are described as controlled ground fires that do not burn into the crowns of mature trees. These fires mostly kill very small stems and thin barked species. Specifically, this includes control of woody vegetation on grassland habitats, support for

advance regeneration of fire tolerant tree species (oaks and hickories), maintenance of unique fire-dependent natural communities, and control of fire sensitive tree regeneration in forest openings.” (p. 12)

“Prescribed burns are usually done prior to or immediately following timber harvests to establish desirable forest regeneration. When used for maintenance of grassland habitats, prescribed fires may cover up to 300 acres, while the typical woodland fire is usually less than 50 acres.”(p. 12)

The DoF admits in the EA that: **“Prescribed burning can temporarily lower air quality in the immediate vicinity of the burn, but is short in duration. Smoke created from burning results from typical woody vegetation and not toxic pollutants from man-made materials.”** (p. 97)

*“With the proposed action, smoke from prescribed burning of activity-created fuels, dust, and vehicle emissions would temporarily degrade air quality in the Project Area. **It is, however, unlikely that these activities would create any health or safety concerns.**”* (p. 106)

The EA does not mention that areas may be burnt that have previously been treated with toxic herbicides, which may make their way into the lungs of unsuspecting recreationists, or people living or driving through the area affected by the smoke.

According to the EA, p. 97, Indiana Administrative Code 326 IAC 4-1-4, Emergency burning (Article 4), states that *“certain types of open burning are exempt from burning permits, including “DNR burning to facilitate wildlife habitat maintenance, forestry purposes, natural area management, and fire-fighting or prevention.”* Does the DoF still have to develop a burn plan?

The EA does not mention that there are several counties in the southern and central part of Indiana that do not meet particulate matter standards. The following list is from the EPA website.

Evansville, IN-KY	Dubois Gibson (P) Pike (P) Spencer (P) Vanderburgh Warrick
Indianapolis, IN	Hamilton Hendricks Johnson Marion Morgan
Louisville, KY-IN	Clark Floyd Jefferson (P)

<http://www.epa.gov/pmdesignations/1997standards/final/region5desig.htm>

Yet the EA, p. 99, states:

“No violations of applicable state or Federal air quality regulations or standards would be expected to occur as a result of direct or indirect air pollutant emissions from the burning”!!!!

The EA, p. 98, itself also states that the *“rate of smoke dispersal is mainly contingent on atmospheric stability and wind speed (Wade and Lunsford 1988). **Particulate matter remains suspended in the atmosphere for periods of a few seconds to several months. Suspended particulate matter (SPM) is that portion which, because of its small size (5 to 10 microns in diameter), is transported long distances in the atmosphere and has the greatest potential for environmental impact.**”*

Suspended particles are therefore of greatest concern in smoke management, according to the EA. But smoke from prescribed burns are not related to any violation of any federal air requirements, when several counties are not in compliance with regard to this standard? The EA points out effects of smoke on visibility, which can affect vehicle safety, as well as possible cumulative short-term degradation of air quality at localized sites.

Health effects from particulate matter are not mentioned in the EA. However, health effects even from short term accumulation of smoke can be severe.

The following information is taken from Glaser/Moskowitz, 2008, p. 81:¹²

According to the Environmental Protection Agency (EPA): “Air pollutants called particulate matter include dust, dirt, soot, smoke and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activity, fires and natural windblown dust.”¹³

EPA states the following about health and other effects from particulate matter: “Based on studies of human populations exposed to high concentrations of particles (sometimes in the presence of SO₂) and laboratory studies of animals and humans, **there are major effects of concern for human health.** These include effects on breathing and respiratory symptoms, aggravation of existing respiratory and cardiovascular disease, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogenesis and premature death. The **major subgroups of the population that appear to be most sensitive** to the effects of particulate matter include **individuals with chronic obstructive pulmonary or cardiovascular disease or influenza, asthmatics,**

¹² Glaser, Christine, and Karyn Moskowitz, Economic Analysis of the 2006 Wayne National Forest Plan, May 2008, http://heartwood.org/Wayne_Economic_Analysis/Wayne+6-23-08.pdf

¹³ U.S. Environmental Protection Agency, Criteria Pollutants. <http://www.epa.gov/oar/oaqps/greenbk/o3co.html#ParticulateMatter>

the elderly and children. Particulate matter also soils and damages materials, and is a major cause of visibility impairment in the United States.”¹⁴

“For particulate matter, monitored in many countries as PM10 (particles collected by a convention that has 50% efficiency for particles with an aerodynamic diameter of 10 m), no safe threshold for exposure has been identified. ... PM10 consists of a mixture of particle components, including traffic- and combustion-derived carbon-centered ultrafine particles (less than 100 nm in diameter), secondary particles (nitrates and sulfates), wind-blown dust of geological origin, potentially containing endotoxin, and biological particles (e.g., spores, pollen) with their associated allergens.”¹⁵

Counties that are considered "non attainment" have to develop a "State Implementation Plan (SIP)," identifying the major sources of pollution and finding ways to bring the counties into attainment. A non-attainment designation under the Clean Air Act may lead to the **loss of economic development opportunities and other drastic consequences.** According to the U.S. Chamber of Commerce:¹⁶

- “New and upgraded facilities in, or near, non-attainment areas are required to install the most effective emissions reduction controls without consideration of cost. Operators of existing facilities may also be required to install more restrictive control technologies than are otherwise required for similar units in areas that are in attainment.”
- “Prior to permitting the construction of new facilities, a state must offset any emissions increases by achieving reductions at existing facilities.”
- “The added regulatory and paperwork burdens, as well as expenses associated with constructing new facilities, or expanding existing ones, limit the amount of economic investment in non-attainment communities.”

This translates into costs to the taxpayer to prepare and execute the SIP, a potential slow down of economic expansion for existing businesses, and reluctance of new companies to locate in an area.

¹⁴U.S. Environmental Protection Agency, Criteria Pollutants. <http://www.epa.gov/oar/oaqps/greenbk/o3co.html#ParticulateMatter>; see also: AIRNow, Particle Pollution and Your Health. <http://airnow.gov/index.cfm?action=particle.airborne>

¹⁵ Strong, Vicki, Environmental Air Pollution, *Am. J. Respir. Crit. Care Med.*, Volume 162, Number 2, August 2000, S44-S47. <http://ajrccm.atsjournals.org/cgi/content/full/162/2/S1/S44>

¹⁶ U.S. Chamber of Commerce, Consequences of Non-Attainment. <http://www.uschamber.com/issues/index/environment/nonattainmentconseq.htm>

Voices for the Forest, an Ohio based group, has the following information on their website about health and other effects of smoke: ¹⁷

“The fact is that prescribed fire is detrimental to your health regardless of whether you are indoors or not. *Wildfire Smoke a Guide for Health Officials* concluded that individual effects of smoke can range from irritation of the eyes and respiratory tract to asthma, bronchitis, reduced lung function, premature death and more. Sensitive populations include individuals with asthma and other respiratory diseases, cardiovascular disease, smokers, the elderly and children.

This guide noted that smoke tends to fill valleys where people usually live. Smoke levels are hard to predict and change constantly and quickly. Additionally, it explained that being indoors does not protect you entirely from the smoke. It sometimes reduces the air pollution by about one-third. In non-conditioned homes, anywhere from 70 - 100% of fine particulate will penetrate indoors from the outside air. In leaky homes and buildings, the guidance of staying indoors may offer little protection.

Though it is recognized that wildfires generate higher levels of particulate pollution per acre than prescribed fires because of higher fuel consumption, it is also true that the cooler, smoldering fires often associated with prescribed burning can create as much as twice the smoke per unit of fuel consumed. So, the tradeoff is not always clear.

The American Lung Association's Website reads, "Particle pollution (Particulate) in the form of tiny, invisible matter is quietly but effectively killing tens of thousands of Americans every year." Particle pollution or matter is produced during prescribed fires.

USDA Forest Service Technical Report states: "Over 90 percent of the particulate emissions from prescribed burns are small enough to enter the human respiratory system. These particulates can contain hundreds of chemical compounds, some of which are toxic. The repeated, lengthy exposure to relatively low smoke concentration over many years can contribute to respiratory problems and cancer."

Additionally, the USDA report noted that the burning of poison ivy could cause immediate skin rashes that are more widespread on the body than from direct contact with the plants and if you breathe the smoke, your respiratory system can be affected!

Scioto County has a serious problem with particulate pollution. The 2004 American Lung Association grade card gave Scioto County an F. The "Sensitive Population" total in Scioto County was 27,000. This only includes persons with asthma, bronchitis,

¹⁷ Voices For the Forest, Burning Points – Part 1, Health & Safety Concerns.
<http://www.voicesfortheforest.org/burns.html> - Accessed May 23, 2008.

emphysema and cardiovascular disease. Another 15,313 were listed as under the age of 14 and 11,711 listed as over 65. Total population was 78,041. Moreover, currently Scioto County is out of compliance with the EPA's guidelines of particle pollution in the air.

Prescribed burning can pollute the water as well. The main effect on water from prescribed burns is the potential for increased runoff of rainfall. When surface runoff increases after burning, it may carry suspended soil particles, dissolved inorganic nutrients, and other materials into adjacent streams and lakes reducing water quality.”

What are the number of people living in areas that are most affected by DoF burns? How many of them are “sensitive populations”, people with asthma, bronchitis, emphysema and cardiovascular disease? How many are under the age of 14 and over 65?

We find the increased use of prescribed burns and their potential impacts on air quality of special concern, because:

- 1) The management goals by the DoF (drastically increased logging) are responsible for creating more “hazardous fuels”—logging debris that is left behind on the forest floor, and gives “justification” for prescribed burns to reduce these hazardous fuels.
- 2) There is no information in the EA on the amount of hazardous fuels already in the State Forests, or how much hazardous fuel will be created by logging.
- 3) The management goals by the DoF (drastically increased logging) are responsible for increasing the introduction and spread of invasive plants in the forest, which then also becomes a justification for prescribed burns. The burns themselves can also contribute to introduction and spread of more invasives.
- 4) The EA does not address cumulative effects, leaving out the fact that the Hoosier National Forest also plans burns on roughly 2000 acres per year, and the air pollution issues mentioned above (particulate matter standards not met in several Indiana counties).
- 5) Most importantly, the main reason for burning, which is maintaining oak hickory forests in their current composition, has no justification in ecology. Furthermore, it has not even be established that all the massive treatments proposed by the DoF actually even work to achieve the desired goals. (see below for more on these issues)
- 6) And finally, if the proposed burns only serve the purpose of providing oaks to the market, when other uses of the forest are known to create much higher values (ecosystem services), then the burns should not take place.

Where does the DoF get the money to pay for those burns?

10. Mosaic of Size Classes

The DoF justifies prescribed burns and timber operations, the biggest contributors to ecosystem service losses, as management tools to reduce hazardous fuel loads, to maintain oak hickory forest cover, and to create more early successional habitat. These are supposedly tools to enhance biodiversity in the forest.

EA, p. 4:

*“The Division of Forestry proposes to implement a timber management program designed to **maintain the current dominance of oak-hickory forests and associated biodiversity** while improving overall wildlife habitat and **successional stage diversity** through a combination of forest management treatments described below. “*

*“Under the proposed action, the DoF would implement actions for forest management congruent with the following list of landscape-level management goals. The DoF expects that adherence to these goals through integrated management actions **would benefit species of concern, rare, or vulnerable species that live in the plan area.***

- ***Maintain or develop diverse species composition.***
- ***Maintain or develop a mosaic of size classes.”***

*“Additionally, many experts in this region note that historic reforestation efforts and natural re-growth of eastern U.S. deciduous forests has produced an **abundance of mature forest** and a **declining early-successional component that threatens many species dependent on that community type** (Trani et al. 2001, Yahner 2003, Fuller and DeStefano 2003, Castrale et al. 2005). DoF suggests the proposed alternative will not only ensure long-term sustainability to its oak-hickory forests, but in the process address these reported declines in early-successional habitats and species.”(EA, p. 45)*

The DoF can rightly claim that its management for oak hickory and early successional habitat will benefit some species by providing for their habitat needs. The crucial question with regard to net public benefit, however, is not whether there are some benefits, but whether the benefits outweigh the costs, and whether net benefit is maximized.

Given limited resources, including a limited amount of land, efforts to maintain or improve habitat for biodiversity have to be economically and ecologically wise, and focus on habitat and species that are most rare.

The DoF is not making a convincing case in its planning documents that maintaining oak hickory forests is connected to any public need, and why this forest type, that can only be maintained through ongoing logging and burning, should be preferred to allowing natural processes to re-establish themselves.

Large, continuous blocks of interior old growth forest are the scarcest type of forest habitat, yet the DoF chooses to increase, rather than decrease the fragmentation of that habitat,

to provide greatly increased opportunities for the spread of NNIS, which are one of the major threats to native biodiversity, and to provide more early successional habitat which, comparatively, is in plentiful supply on private forest lands in the Eastern United States.

With regard to some species, especially the endangered Indiana bat, and several other federally listed species, the DoF claims that they will benefit from the Plan and that the admitted short term negative effects on these species will be offset by long-term benefits from improving their habitat.

But this statement is belied by the fact that the habitat modification program envisioned by the DoF will have to go on as long as the DoF upholds the maintenance of oak hickory cover and of unnaturally large areas of early successional habitat as a desirable goal.

That this is indeed a long-term goal, can be concluded from the fact that “short-term” impacts on these species will be generated over decades in different parts of the forest, as the DoF accommodates commercial timber extraction. Therefore, contrary to the claims of the DoF, there is no long term benefit from logging and burning for species dependent on rare unfragmented old growth forest habitat, since the short term negative effects will continue into the long term as long as the DoF promotes commercial timber extraction and the habitat modifications that support timber extraction.

If the DoF was really interested in conservation for enhancement of biodiversity, the EA would discuss the following activities instead of a timber program:

- **Priority Activities to Enhance Biodiversity Conservation:**
 - **Identification and protection of large core areas of forest, linkage zones, and buffer zones**, building upon existing protected sites.
 - **Protection and expansion of existing large blocks and restoration of additional blocks** distributed across the landscape is a **top priority conservation activity**.
 - **Plans to conserve larger blocks of forest for songbird conservation need to be implemented immediately before logging interests obtain concessions throughout the region as regrowing forests becomes more lucrative.**
 - Increase in **heritage inventories of the ecoregion** to identify additional areas and species populations in need of protection and conservation action.
 - **Reintroduction of cougars and gray wolves**.....would help reestablish ecological interactions that were sustainable and less damaging to the ecosystem than existing conditions.

This text was originally published in the book, *Terrestrial Ecoregions of North America: A Conservation Assessment*.¹⁸

¹⁸ Ricketts, Taylor H. et. al., *Terrestrial Ecoregions of North America: A Conservation Assessment* (World Wildlife Fund Ecoregion Assessments), Island Press 1999.

Analysis of Early Successional Habitat Goal

The EA stresses the desirability of creating “age class diversity”, or a mosaic of different age groups, without any analysis of the relative scarcity of those different habitat types in the region, and without any reference to what an age class distribution may look like in a forest that develops naturally-- if the forest was not subjected to timber industry standards.

Regarding the “scarcity” of early successional habitat, the 2007 Interim Update of the 2000 Renewable Resources Planning Act (RPA) Assessment puts into question the urgency of providing more early successional habitat.

The following information was taken from Glaser/Moskowitz, 2008, pp. 127¹⁹, as it is useful in the context of Indiana State Forests:

The 2007 Update of the 2000 RPA points out that in the East, 23 percent of all timberland is between 0-20 years old. The RPA also states that this age class is getting smaller, but then explains that this is what should be expected to occur when the forest regrows and matures after it has been heavily logged. In other words, the large expanses of early successional habitat earlier in the 20th century were solely the result of heavy logging pressure.

From the 2007 RPA Update: “Extent of Area by Forest Type and Age Class or Successional Stage” (p. 44/45):

- “In the East, about 58 percent of all timber land is classed as having an average stand age of more than 40 years, 19 percent is between 20 and 40 years in average stand age, and 23 percent has an average stand age of less than 20 years (fig. 25). In the West, the average stand age is older (80 percent of the area has timber aged 40 years or more) than for the East, reflecting the fact that more areas in the West have never been harvested.”

“The Nation’s forests are getting older in many areas of the country, **but age is a relative term. Compared to the early 20th century, eastern forests are older, but they are only a fraction of the average age of forests at the time of pre-European settlement. From an ecosystem diversity perspective, this maturation will lead to increased diversity of forest structure** but a decreased diversity of forest types because later successional stages will continue to increase at the expense of earlier successional stages.” (emphasis added)

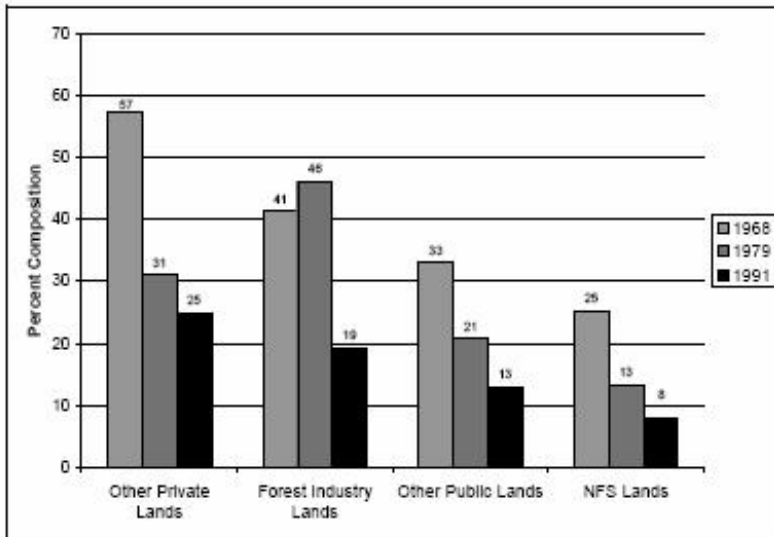
¹⁹ Glaser, Christine, and Karyn Moskowitz, Economic Analysis of the 2006 Wayne National Forest Plan, May 2008, http://heartwood.org/Wayne_Economic_Analysis/Wayne+6-23-08.pdf

Table 52: Timberland Area by Stand-Age Class in the East

0-19 years	23%
20-39	19%
40-59	23%
60-79	17%
80-99	8%
100-199	4%
200+	0%
Uneven aged	6%

Source: 2007 Interim Update of 2000 RPA

The 2006 Wayne National Forest Plan FEIS had the following graph related to early successional habitat:



Early successional forest habitat has declined on all ownerships in Ohio since the 1960s.

Even though the FEIS graph included above (Figure 6), is showing the decline since 1968 of early successional habitat on NFS land, other public land, private forests, and timber industry land, it also shows that **on all lands besides NSF land**, the percentage of **early successional habitat is still between 12 and 25 percent**. Private lands, therefore, are providing a lot of this habitat.

This is **not true for the provision of large, interior tracts of mature forests**. Those are **not currently available on private lands and cannot be expected to be provided by private landowners**.

Public land owners like the U.S. Forest Service and the Indiana DNR are the only ones in a position to respond to this need for large, continuous interior tracts of mature forest.

Instead, both agencies are pushing plans to give us more of what we already have in abundance.

The EA does not provide any information about the availability of early successional habitat in Indiana, including all public and private forests.

In pushing the provision of early successional habitat through logging, the DoF also disregards and discounts that natural disturbances will provide this habitat type naturally, and for free. The EA mentions natural disturbances created by **tornadoes, ice storms, floods, windthrow, insect and disease outbreaks, and natural death, but does not draw any conclusions from the fact that natural disturbances do create early successional habitat.**

Why is the DoF so keen on creating a “mosaic” of age classes, and especially on creating more early successional habitat, on the State Forest? The answer lies in the fact that having an even distribution of all age classes of trees on a forest is an integral part of industrial forestry.

The following more in depth explanation is taken from Glaser/Moskowitz 2008, pp. 139:

Forestry industry experts know that it is most economical to cut trees after they have reached a certain optimal age that varies for different species. Leaving trees that have reached that optimal age in the forest is, according to timber industry logic, a waste. This is why 80 year-old trees are called mature and are considered ready for harvest. Trees that get older than their optimal harvesting age are called “overmature,” even though some, like oaks, are known to be able to live another 200 years after they are labelled overmature. The words “mature” and “overmature” imply that those trees are becoming useless unless they are logged, like apples that start to rot when they are not eaten.

But those mature and overmature trees, if left standing, could be living productive lives for many years to come, providing habitat and mast and valuable ecosystem services (for example air

purification and carbon sequestration). Even after trees finally die, they do not stop playing a role in the forest ecosystem, becoming snags that provide habitat for bats, birds, lichen, and insects.

What are the imperatives of the timber industry? It is to provide a continuous supply of timber, and therefore it makes sense to plant and cut trees in such a way that every decade, there is a cohort of trees ready to be harvested. That way, at all times, there are about the same number of trees in each age class, growing towards being harvested after they have reached the optimal age. If the optimal age for cutting was 100 years, then about 1/10 of the forest would have trees in the 90-100 year age class, and 1/10 would be found in the 0-10 age range.

But is this age-class distribution something that would naturally occur in a multi-layered, highly differentiated old-growth forest? In an old-growth forest, only natural disturbances like storms, droughts, diseases and old age kill trees. When a tree falls, it creates an opening in which early successional species can thrive for a while, until the gap closes again. Because of these dynamics, old-growth forests have a fine-grained structure of different age classes and therefore provide habitat in all different successional stages.

It is obvious that if most trees in a forest live out their natural life span of possibly hundreds of years instead of being logged after they reach 80 or 100 years of age, the percentage of trees in the 0-10 and 10-20 age classes will be much smaller than in a forest where about 1/10 of the forest is logged every decade.

When the Forest Service laments the lack of early successional habitat, the standard against which the forest is judged is not the amount of early successional habitat that would occur naturally in old-growth forests. Rather, the forest is judged by the timber industry standard, which requires about 1/10 of a forest or more of a suitable timber area to be cut every decade to keep a continuous supply of timber over time.

Since timber operations are less costly when a large area of trees can be cut at once (rather than cutting a single tree here and there throughout the forest), industrial forestry is also known to favor clearcuts, which have been renamed as “even-aged management.” Clearcuts, in turn, lead to stands of trees that are all about the same age, very different from the fine-grained diversity of successional stages to be expected in an old-growth forest.

It is the timber industry rationale that calls for a certain percentage of forest to be in the early successional state, and not the “decline” of certain wildlife species that have become dependent on that disturbance. It is the timber industry rationale that calls for large continuous blocks of early successional habitat (= clear cuts, or even-aged management) instead of large continuous blocks of old-growth forest.

In conclusion, it seems obvious to us that the DoF plans presented in the EA have very little to do with the desire to protect or conserve or enhance biodiversity, and are instead inspired by the requirements of industrial forestry. Even the emphasis in the EA on single tree selection doesn't change that assessment, since the goal of that practice seems to be to prepare stands of desirable

species that can then be cut later with group selection harvests and clearcuts. Single tree selection seems to be just another form of TSI.

“Individual trees are selected and removed throughout the stand approximately every 15 to 25 years. The treatments are conducted to modify or guide the development of the existing crop of trees, but not to replace it with a new one. These activities include selective removal of some vegetation to allow the expansion of remaining tree crowns and root systems. The decision to remove a single tree under this method is based on in-field evaluation of that individual stem for condition, vigor, species, and impact to neighboring existing trees.”(EA, p. 10)

As we have pointed out above, the use of a forest for timber generates much lower values than the use of the forest to provide ecosystem services, including carbon sequestration, carbon storage, recreation, air purification, water purification and flow control, and others. We request, therefore, that the DoF reconsiders the goals it has set for Indiana State Forest, and strives to manage the forest according to what generates the highest net public benefits.

11. Old Growth Characteristics Instead of Old Growth?

If forests are not logged, they develop into old growth forests over hundreds of years. Old growth forests are nearly non-existent in Indiana, and elsewhere in the Eastern United States. Old growth forests develop a fine grained structure of different age classes, with openings provided by naturally dying trees and different natural disturbances.

Increasing the harvest cycle by 30 years, as the DoF proposes, may result in trees that are older than 80-100 years, but that does not establish an old growth forest. Clearly, the DoF has no intention of abstaining from logging in what it calls “Old Forest Areas.”

EA, p. 46:

*“Additionally, DoF has designated Old Forest Areas on nearly all state forests, which will provide **old growth forest elements, characteristics, and structure** throughout the term of this plan and beyond.”*

*“These areas are harvested **nearly exclusively using single-tree selection, with only occasional use of group selection where appropriate.** Old Forest Areas are to be managed for a condition in which the overstory canopy trees are relatively old (> 125 years on most sites) and relatively large for the species occurring on that site. **The longer management cycle of these areas (>30 years) offers additional assurance that they will be allowed to develop towards an old growth character with only limited disturbance.**”*

Vague statements like “where appropriate” or “nearly exclusively”, or “only occasionally” show that DoF is not really interested in allowing State Forests to develop naturally into old growth forests. That is why these areas are called “Old Forest” instead of old growth, and why the EA uses words like “old growth elements, characteristics, and structure.”

The DoF did not clarify in the EA where so-called Old Forest areas would be. We suspect they are probably areas that are hard to access for logging, or have steep slopes, so that it is not economical for private logging companies to extract desired tree species from those areas, even though they may be some smaller areas suitable for logging. The DoF makes sure that no such opportunities may be missed.

Old growth forests are extremely rare in Indiana, and allowing all of the State Forests to develop into old growth forests would add great value just by itself, in addition to assuring long term provision of all the ecosystem services that are provided by fully developed functioning forest ecosystems.

12. Caretaker Alternative Not Explored

The EA briefly mentions a so-called “Caretaker Alternative,” which was rejected. The EA, p. 3, states that:

“Under the “care-taker” status approach all resource management activities and developed recreation facilities would be managed at a level where DoF’s primary role would be as a care-taker. This approach is not consistent with DoF enabling legislation (IC 14-23-4-1) or IDNR policy. Habitat maintenance, development, and restoration, and invasive species control would not occur. Public recreation opportunities would be severely curtailed. The legal responsibilities associated with ownership of the state forests would not be met. Commitments to adjacent landowners, communities, and partners would be unfulfilled.”

The EA fails to examine the benefits that this alternative would provide with regard to increasing the capacity of the forest to provide ecosystem services, and the cost savings that could be achieved if intensive industrial forest management activities would be abandoned.

We would like to see a serious analysis of this alternative, pointing out public benefits and costs, as required by Indiana Code. .

IC 13-12-4-5 states:

(C) Include in every recommendation or report on proposals for legislation and other major state actions significantly affecting the quality of the human environment a detailed statement by the responsible official on the following:

(iii) Alternatives to the proposed action.

The EA does not adequately analyze any no-timber alternatives to the proposed action.

13. The DoF Oak Hickory Story: Sustainability = Disturbance

The EA states clearly and unmistakably that the current forest composition on state forests—with a dominance of oak and hickory trees —came about as the result of massive human disturbances.

“Today, the composition of DoF state forests is largely a legacy of disturbances that occurred around the beginning of the 20th century. The current widespread dominance of oak and hickory species is largely the result of severe disturbance by human activities during the late 1800s and early 1900s.” (p. 8)

The dominance of oak and hickory trees is therefore not the result of forest ecosystems adapting naturally to conditions of local climate and geology.

Therefore, it is not surprising that without understory disturbance in the past 50 years Indiana State Forests would naturally revert to a situation where tree species start occupying those sites to which they are best suited. For most oaks, those are drier areas, especially dry ridge tops.

Rather than supporting the State Forests in healing from the massive disturbances they endured over centuries, and allowing natural processes to slowly establish a forest composition best suited to local climate, geology, and native biodiversity, the DoF declares its own definition of “sustainability” as one that requires continuing disturbance for maintaining a forest composition geared towards satisfying logging and timber industry interests.

*“The DoF proposes that **an expanded definition of sustainability** to include maintaining a desirable species composition in the future high canopy of the forest to sustain a minimum of 44 % of oak-hickory dominated stands across the system. Proposed harvest levels, methods, timing, and understory treatments must be able to demonstrate that oaks and hickories will be sustained as a major component of the system.”* (EA, p. 5)

*“While oak seedlings can generally be found in most woodland where oak species occur as canopy dominants, **studies suggest that natural regeneration alone will not perpetuate oak regeneration in many undisturbed areas.** Because most oaks are often out-competed by more shade tolerant species they usually do not survive without canopy disturbance. Timber harvest and silvicultural treatments are viewed as the **ecological equivalent or more socially and economically acceptable mimic of natural disturbances that have historically maintained oaks on the drier sites across their range.**”* (EA, p. 5)

“If current trends continue, the oak-hickory component and shade tolerant species of state forests would continue to mature in the overstory and subcanopy layers, respectively.”(EA, p. 8)

The DoF does not give any convincing rationale for why it would be desirable to “recruit” oaks on “high quality mesic sites”, when their niche is on drier sites.

*“In the last thirty years low levels of timber harvest on public lands and partial-cutting and high-grading on private lands in conjunction with lack of fire as a disturbance have reduced oak recruitment **particularly on high quality (mesic) sites.**” (Hicks 1998). (EA, p. 6)*

Stressing the goal of maintaining early successional habitat and wildlife goals seem to be little more than smokescreens used to hide the fact that the DoF is most interested in taking advantage of the “mature oaks” that, according to the rationale of timber farm management, need to be harvested when they are “mature,” which is at an age much below their natural lifespan. The natural lifespan could be hundreds of years.

The timber industry considers oaks “mature” at age 80-100, and letting them stay in the forest for any time longer does not serve any good purpose, assuming you look at forests as tree farms, which is what the current DoF plan seems to be doing.

*“The perpetuation of the oak-hickory forest type is a primary goal of the proposed action. Lack of disturbance in the past has produced a **forest mosaic of older age cohorts and larger trees (>11 inches) statewide; 82 percent of all oak-hickory stands were considered large diameter in 2000.** Many of the second-growth forests in the Central Hardwoods are now approaching 80-100 years of age and have a heavy oak, often white oak component. (Weeks et al, 2005). Oak-hickory and beech-maple communities each account for approximately 40 percent of all forests statewide (Schmidt et al. 2002) and yellow poplar (*L. tulipifera*) is the most common tree in Indiana by volume (Woodall et al. 2005). (EA, p. 4-5)*

A very different perspective emerges, however, when one views a forest from the perspective of ecosystem services and recreation.

Trees being allowed to live out their natural lifespan become increasingly valuable in providing air and water purification services, regulating water flows, storing and sequestering carbon, and supporting native biodiversity. Even after they die, whether from “natural disturbances,” or of old age, they are useful in providing sustenance and shelter for many forest species, including such that are endangered.

While the timber industry can point to the dollar value of mature oaks, we have shown above that ecosystem services have a much higher value to society per acre per year than trees used as timber. While this value may not materialize in DoF revenues, it will materialize as real dollar savings for communities and individuals – savings in water filtration and purification investments, flood relief, health costs related to air pollution, among many benefits.

The fact is that a lot of those oak trees are now ready to be harvested. That is why all over, not just on state forests, there is a rush to justify cutting oaks, and getting back into old logging patterns, , where oaks continually regrow and a continuous harvest can be planned.

However, it is no longer the early 1900s. Today, Indiana residents have shown over and over again that they want their public forests preserved, not logged for the interest of private individuals.

*“According to the DoF definition of sustainability, the forest should be managed to maintain a desirable species composition within each size or age class to ensure continuity of forest products and other benefits. To assure that this composition and structure is maintained, periodic inventories at the stand and system level must be taken, with management treatments applied as necessary. Adequate timber harvest levels with emphasis on methods, timing, and follow-up silvicultural treatment would assist oak and hickory regeneration. Placement and size of harvest openings is critical to supporting oak and hickory seedlings in concert with sufficient understory treatment to reduce competition from other species. Because natural regeneration of oak and hickory is not likely to be successful in the long-term, some form of active management is necessary to **emulate natural disturbances** that favor regeneration and survival of the oak-hickory component.”* (EA, p. 5)

As we pointed out above, logging is not an emulation of natural disturbances, and all the disturbance that forests would need is already provided by nature without the DoF lifting a finger. Claiming that the DoF is “emulating natural disturbances” when they just stated clearly that oak hickory dominance is the result of hundreds of years of human intervention, is inconsistent at best, and disingenuous and deceptive at worst.

Contrary to the general sense of certainty with which the DoF —and other public land forest management agencies —promote the idea that maples will replace the oaks unless there is management that provides disturbance, the Forest Service actually admits in the 2006 Wayne National Forest Plan FEIS **that many scientists do not know the influence of the influx of maples on forest structure.** (2006 Wayne national Forest FEIS, p. 3-74)

The EA claims that there could be a “catastrophic effect” on the region’s native forest communities from a decline in the oak-hickory component.

*“As described in section 1.4 of this document, the oak-hickory component of DoF forestland has reached maturity system-wide and is experiencing regeneration issues that threaten the long-term stability of this essential forest type. DoF agrees with the opinion of regional experts (Abrams 2003, Dickson 2004, Fralish 2004, James 2004, McShea et al. 2007) who suggest a **decline in the oak-hickory component will have catastrophic effects on this region’s native forest communities**, as many species depend on this component for their very existence (Dickson 2004). The preferred alternative will create needed oak-hickory recruitment to help stabilize this declining trend and provide longterm sustainability to these forests and the communities they support.”*(EA, p. 45)

This statement is astounding. Oaks have just reached their timber industry maturity of about 80-100 years, and have a natural life span of 200-300 years. If they are not cut in the next twenty years, they will provide plenty of wildlife benefits like hard mast, much more so than if they were cut. The regeneration issue only and ONLY comes up because the DoF is keen on cutting these oaks as soon as they “mature” and of course that creates **an immediate catastrophic effect** on all the wildlife that depended on those oaks.

In the long run, as the Forest Service admits, scientists don't really know how forest composition will develop with an increase of maple and beech in the understory.

It is also not certain that any of the management practices planned by the DoF will indeed "regenerate" oak stands that they are willfully cutting now, with absolutely no regard for the wildlife that depends on them.

14. Management Effective to Regenerate Oaks?

The EA assumes that oaks can indeed be successfully maintained with the management activities proposed by the DoF. However, in one place even the EA states that there is no assurance this will actually happen:

"The primary objective of this treatment is to sustain oak and hickory forest in the long term. It is possible that oak and hickory will not regenerate at the expected level." (EA, p. 106)

Looking more closely at the literature reveals that there is indeed reason to doubt the agency's claims that its management activities will "regenerate" oaks. **The following is adapted from Appeal to the Hoosier National Forest ROD, FEIS, and 2006 Management Plan by Heartwood, Protect Our Woods, and others, from June 27, 2006.**²⁰

From Clark, F. Bryan. 1993. An historical perspective of oak regeneration. In: Loftis, David L.; McGee, Charles E., eds. Oak regeneration: Serious problems, practical recommendations: Symposium proceedings; 1992 September 8-10; Knoxville, TN. Gen. Tech. Rep. SE-84. Asheville, NC: U.S. Department of Agriculture, Forest Service, Southeastern Forest Experiment Station: 3-13. [23055]

"The question raised at the beginning, "How did oaks become established on good sites, and how do we keep them there?" are not finally answered. In particular, northern red oak, because of its overall value, poses quite a dilemma. While ecological requirements for northern red oak and other oaks are generally well known, no one has as yet been able to provide the environment necessary for sustained development. Many feel that fire must have played an important role in oak establishment, but the role of fire is not yet clear. Only time will tell whether oak will continue to decline or whether methods will be developed to favor its development."

And from:

²⁰ <http://www.protectourwoods.org/downloads/20060701-HNF-Appeal-ROD-EIS.pdf>

**THE FIRE AND OAK HYPOTHESIS: INCORPORATING THE INFLUENCE OF
DEER BROWSING AND CANOPY GAPS, Rachel J. Collins and Walter P.**

Carson Van Sambeek, J.W.; Dawson, J.O.; Ponder, F., Jr.; Loewenstein, E.F.; Fralish, J.S., eds. 2003.

Proceedings, 13th Central Hardwood Forest conference; 2002 April 1-3; Urbana, IL.
Gen. Tech. Rep. NC-234. St. Paul, MN: U.S. Department of Agriculture, Forest Service,
North Central Research Station. 565 p. [Peer-reviewed paper from oral presentation].

“Guyette and Dey (1996) and Abrams (1992) argued that logging, circa 1900, and subsequent fires expanded the dominance of oak into areas (e.g., Ontario and Wisconsin) that were formerly dominated by more mesic species such as beech and maple. In the last 50 years, more mesic and putatively fire intolerant species have invaded the understory of mature oak forests, where fires have been largely suppressed for a hundred years (Lorimer 1984). Although these studies provide strong support for a role of fire in oak forest dynamics, the evidence remains circumstantial and correlative.”

“Because site-specific factors likely interact with the effects of surface fire on tree species survival, it is not surprising that little consensus about the effects of fire on oak has emerged from a handful of prescribed fire experiments.”

“For example, deer browsing and canopy gaps strongly favor some species over others and the degree to which these factors operate varies greatly across forest types and landscapes (Ehrenfeld 1980, Marquis 1981, Runkle 1990, Castleberry and others 2000). How these two factors interact with fire remains little more than speculation but may be central to an understanding of forest dynamics in the eastern USA.”

Is the EA theory that suggests we must log and burn the our State Forests to bring back Oak Hickory then, based upon “little more than speculation,” and “circumstantial and correlative evidence?”

And what about the role of deer?

A professor from the University of Wisconsin, Rachel Carson, has shown :

“Extensive overbrowsing by deer can impact oak regeneration by preventing oaks from establishing or entering the sapling size class (Carson *et al.* 2005).”

She goes on to say,

“Further, deer may preferentially browse in burned areas due to an increase in forage (Masters and others 1993). For example, Gordon and others (1995) found that oak seedling growth was lower in burned sites and attributed this to intense browsing by deer. Studying fire without explicitly considering the impact of browsing could lead to spurious conclusions.”

Reading further into Dr. Carson’s paper, we not only find out that oak hickory saplings are especially delicious to the numerous deer in the Forest area, but that in fact the fires and subsequent browsing actually serves to favor beech maple, which is the very tree type the DoF is claiming that they DO NOT want to reappear on the landscape!

“Only striped maple and red maple produced large sprouts following fire in the presence of deer browsing. Because sprouting is a major mechanism of regeneration in these forests, deer browsing has the potential to alter successional pathways following fire.”

Furthermore:

“Red maple saplings were very fire tolerant and sprouted prolifically even in the presence of deer herbivory. This suggests that the increase in red maple abundance in recent decades may be due not to fire suppression but due to red maple’s ability to tolerate deer herbivory.”

“Our results demonstrate that prescribed fire can be very detrimental to sprouting of northern red oak saplings in mixed hardwood stands. Furthermore, prescribed fire in the presence of large deer populations prevented all commercial species from producing vigorous, tall sprouts, except red maple.”

“Our findings only partially support the fire and oak hypothesis. Canopy northern red oaks were fire tolerant (i.e., had 100 percent survival), however, oak saplings were not fire tolerant and did not produce tall, vigorous sprouts following fire. Further, our findings demonstrate that deer browsing following fire can dramatically reduce regeneration via sprouting leading to communities dominated by striped maple.”

So, the oak hickory fire theory continues to deteriorate as evidence mounts: That fire brings back oak-hickory forests is far from being a proven theory, and, even worse, fire actually works to select for the very species that the EA is saying we must get rid of: Maple!

Furthermore:

“There is no question that understory northern red oaks can be fire tolerant via sprouting in some conditions. However, we found that topkilled northern red oak saplings did not produce tall, vigorous sprouts. This result demonstrates that northern red oak is not a ubiquitous sprouter in all conditions.”

Now, on to the effects of logging on oak hickory:

“Unlike browsing and fire, gaps did not alter the proportion of top-killed saplings that sprouted. This was surprising considering the number of published studies on the importance of gaps for many different modes of regeneration including seed germination, seedling and sapling growth, the role of epiphytes, and effects of vines (Canham 1985, Lorimer and others 1988.” And,

“However, the role of gaps in sprouting is largely unstudied.”

“Prescribed burning, herbicides, and cutting are all potentially viable methods of favoring oak regeneration by removing competitors, but evaluation of these methods in all regions of the Eastern United States is incomplete.”

So, similar to fire prescriptions, logging prescriptions are also called into question.

The EA prescribes a combination of fire and logging to bring back oak hickory forests. However,

“Further, the effects of gaps did not interact with the effects of fire or deer browsing. Lastly, there were no significant species-specific effects of gaps on sprouting response regardless of fire treatment. This study demonstrates that gaps play little role in the initial sprouting responses of top-killed saplings in this system.”

And what about the effects of competition from poplar?

“Complete canopy removal tends to release these tolerant species and hasten the replacement of oak. Yellow-poplar (*Liriodendron tulipifera*) is also less tolerant of fire than oak and can be a significant

competitor in large openings created by harvests (Loftis 1990). Past research suggests that oak regeneration failures are more common on high-quality sites where competitors such as yellow-poplar and red maple (*A. rubrum*) have a competitive advantage over oaks (Oak 1993). Oak regeneration is often more successful on poor-quality sites, where large root systems and other adaptations to drought give oak the advantage over these competitors (Abrams 1990).”

And what about the effects of drought and global climate change on the change of forest composition over the past 50 years toward less oak hickory? A recent search of the literature shows that scientists have been doing studies and are concerned about the effect

of drought and global climate change on oak hickory declines. However, the word drought and climate change and its possible effect on oak hickory composition is never once mentioned in the entire FEIS. From the literature (Climate Change Impacts on the United States The Potential Consequences of Climate Variability and Change Overview: Forests By the National Assessment Synthesis Team, US Global Change Research Program Published in 2000.”)

“However, forests may soon be facing rapid alterations in the nature of these disturbances as a consequence of climate change.”

And,

“Potential habitats that could possibly expand in the US are oak/hickory and oak/pine in the eastern US, and Ponderosa pine and arid woodland communities in the West.

The effects of climate change on the rate and magnitude of disturbance (forest damage and destruction associated with fires, storms, droughts and pest outbreaks) will be an important factor in determining whether transitions from one forest type to another will be gradual or abrupt.”

As to the effects of drought and other environmental stresses:

(Ecology: Vol. 79, No. 1, pp. 79–93. THE ROLE OF STRESS IN THE MORTALITY OF MIDWESTERN OAKS AS INDICATED BY GROWTH PRIOR TO DEATH

Brian S. Pedersena)).

“Three-fourths of the dead trees had growth patterns prior to mortality that included growth declines indicative of inciting stress. The median intervention resulted in a 38% decline in basal-area growth rate. The interventions were more likely to occur during environmentally stressful years, with five drought years accounting for 40% of the interventions experienced by the dead trees. Prior to experiencing interventions, the now-dead trees were growing an average of 18% slower than comparable surviving trees, indicating the action of predisposing stresses.”

Even the Forest Service researchers themselves have seen the connection between drought and decline of oak hickory:

Oak Decline Philip M. Wargo,¹ David R. Houston,² and Leon A. LaMadeleine Forest Insect & Disease Leaflet 165 U.S. Department of Agriculture Forest Service

“The initiating stress factors associated most frequently with oak decline are drought, frost injury, or insect defoliation. Trees on ridge tops and in wet areas suffer most severely from drought.” Frost often affects trees growing in valleys and frost pockets. Defoliated trees that re-foliate the same season may exhibit dieback symptoms the next year. Other factors such as leaf diseases and soils that are waterlogged, compacted, or

shallow have occasionally been implicated in oak decline. Waterlogging is especially important in the heavier clay soils of the Midwest.”

“These stress factors often weaken trees so much that they succumb, sometimes suddenly, to the root killing and girdling actions of insects and diseases. The two major pests associated with oak decline are *Armillaria mellea* (Vahl: Fr.), a root disease commonly called armillaria root rot, and *Agrilus bilineatus* (Weber), the twolined chestnut borer.”

“In the forest, factors such as drought and frost cannot be controlled.”

The last point illustrates why the EA would fail to mention drought and frost as playing a role in oak hickory decline: They cannot control drought by logging, which is the real intent of this Forest Plan.

Lastly, we have searched the document for any information on the role of the decline of the American Chestnuts and its effect on forest composition, particularly, Oak Hickory. While the plan mentions chestnut as a tree species that disappeared because of a pathogen, the EA does not analyze a possible consequence of the disappearance of the chestnut:

That animals are eating more oak and hickory mast because of the disappearance of chestnuts, and that this may be a reason for oak-hickory decline.

How is it possible that the entire EA fails to properly assess the consequences of losing a tree that was dominant in the region and is now practically extinct? Probably because they would have to tell the public that the oak hickory was not the real dominant tree in the southern Indiana landscape, but rather the American Chestnut, which they cannot purport to bring back by logging, since it is virtually extinct.

15. Forest Based Recreation Sacrificed

The EA, p. 4 states that:

“The Division of Forestry proposes to implement a timber management program designed to maintain the current dominance of oak-hickory forests and associated biodiversity while improving overall wildlife habitat and successional stage diversity through a combination of forest management treatments described below.”

“Under the proposed action, the DoF would implement actions for forest management congruent with the following list of landscape-level management goals. The DoF expects that adherence to these goals through integrated management actions would benefit species of concern, rare, or vulnerable species that live in the plan area.

- *Maintain or develop diverse species composition*

- *Maintain or develop a mosaic of size classes*
- ***Provide forest-based outdoor recreation***
- *Protect water quality*
- *Sustain growth of quality hardwood timber*
- *Conduct timber harvesting at adequate levels for regeneration and revenue*
- *Monitor habitat conditions*

How the proposed management practices are supposed to provide forest based recreation is a mystery to us, since, according the EA itself, timber operations, road construction and maintenance create noise, which are not only unpleasant to humans, but also may “temporarily displace” birds and mammals that said humans may want to observe and enjoy.

Further, areas that are recently cut or burnt are not pleasant to the eye, and may have become death traps for various species that had no way to escape, as the EA itself admits. Sugar maples (the species that the DoF purports to keep under tight control so it doesn’t take over the forest) and their stunning colors is what brings many tourists to the area in the fall.

*“Proposed actions would create **some inconvenience and short-term disruption** to customary recreational activities. Until treatments were completed, **temporary road or area closures would displace recreational use to other areas**. The indirect effects (dust, smoke, noise, trucks) of these activities would have **short-term negative effects on recreational and travel experiences**. Visible landings and skid trails would be restored to characteristic contours and revegetated as required after project completion.”* (EA, p. 101)

“Minimizing negative effects to the scenery especially around recreation areas will consistently be treated as a high priority. Portions of the treatment area would initially appear as a disturbed landscape, but would blend in during subsequent growing seasons.” (EA, p. 101)

What is the time frame the DoF contemplates for that “blending in?”

*“Individually, each component of forest management activities contributes only a small portion to cumulative effects; however, the combination with all other reasonably foreseeable activities might result in a slight decrease in aesthetic value of the landscape. **Repeated treatments over time will have no cumulative effect on recreation and aesthetics, because of the rapid regrowth following forest stand treatments.**”* (EA, p. 101)

Again, what timeframe does the DoF consider when the EA talks about “rapid regrowth” that supposedly will make sure that logging has no cumulative effects over time? Twenty, thirty years?

*“**In one to three years the stands should appear less disturbed as regeneration proceeds.**”* (EA, p. 101)

This is an outrageous statement. Forests that took 80 years to develop will not recover in 3 years.

The State Forests of Indiana are a great tourist draw. The DoF estimates that between 1 and 2 million visitors come to the State Forest each year.

In a study we completed this past May²¹, we analyzed the personal income from wages in industries associated with recreation tourism, especially food and accommodation sectors, for the counties surrounding three national forests—the Wayne National Forest in Ohio, the Monongohela National Forest in West Virginia and the Hoosier National Forest in Indiana.

We noticed that the Wayne National Forest, which has allowed OHVs and heavy logging and mining, had the least amount of earnings from tourism compared to the Hoosier and the Monongohela National Forests. The Hoosier National Forest has banned OHVs and has allowed only one logging sale—in Perry County—over the past 15 years. The highest earning counties associated with the Hoosier and the Monongohela received 8 to 19 percent from the food and accommodations sectors, compared to the WNF counties that received a high of 3 percent for Hocking County. The highest was Brown County with 8.5 percent of total wage income from food and accommodations. Brown County’s tourism is very strongly dependent on nature-based tourism, particularly in the fall when people come from all over to view the fall leaves change color.

INDIANA HNF counties

Crawford 1.5

Martin <1

Orange 3%

Perry 2.3

Dubois 1.6

Monroe 3.2

Brown 8.5

Jackson 2

Lawrence 2.4

²¹ Glaser, Christine, and Karyn Moskowitz, Economic Analysis of the 2006 Wayne National Forest Plan, May 2008, p. 200, http://heartwood.org/Wayne_Economic_Analysis/Wayne+6-23-08.pdf.

“Sightseeing and enjoyment of aesthetic scenery are primary uses of Indiana state forests and recreation areas.” (EA, p. 100)

The DoF Plan is basically a slap in the face of these millions of people, and the DOF is well aware of that:

“It is the policy of state forests to identify a Visual Enhancement Area (VEA) within 200 feet of public roads, high-use recreational facilities and trails. Timber harvest within a VEA consists of removal of dead or hazard trees or select removal of trees at high risk of death or loss of value during the next cutting cycle. However, placement of a 200-foot visual buffer does not imply the aesthetics of an area will not be impacted from DoF management actions. Activities within and beyond a VEA are impacted by topography, timber (timber type, number of trees, density), and season.” (EA, p. 100)

With the goal of cutting on 5 percent of the forest each year, and in many different places scattered all over the forest (through group selection and single tree selection), there will not be very many places where visitors can be safe from the noise, dust, trucks and shock value of intruding logging operations and from their more long lasting effects on the aesthetics of the forest.

While the DoF is now stressing single tree selection, they also make clear that the purpose of that management activity is to make room for desired species to grow more easily, so this form of logging, which seems to be more benign than clearcutting in its visual impacts, is most likely only a preparatory step to eventually being able to have larger stands of desired trees that then can be clearcut or cut through groups selection (which is basically a small clearcut).

There also seems to be an implicit assumption in the EA that visitors to the State Forests can easily trade one area of the forest for another. There is a sense in the EA that if one area of the forest gets logged or burnt, people who used to visit that area for spiritual enrichment, wildlife viewing, heritage tourism, etc., can easily shift to visiting another area, and make this trade off without any problem. It turns out that this is typically not the case, and is a very important consideration that the DoF has omitted.

It turns out that people—individuals and communities—create a sense of place, and a sense of themselves as belonging to a particular place. When this shift occurs, people become protective of what they consider “their” place.

There are numerous studies that go into detail about how public lands can become a place to which people feel such connections; and how public lands are increasingly the only landscapes remaining to which we can form such connections. When this occurs there is less need for agencies to enforce regulations. The users become protective of the place and less tolerant of damage, littering, and other environmentally destructive practices. This allows the agency to

operate with less expense and people to feel increasingly empowered, which increases the connection to the specific place.

Cultural geographers make much of the qualitative difference between a mere location and a “place.” Places are imbued with socially constructed meanings accumulated over many generations. It is possible that the management directions the EA has developed actually erode any potential for those kinds of connection to the landscape as a “place” of emotional engagement. The DoF is transforming public lands into a commodity—a collection of fungible products.

In a time where most people live in cities, the special places in our public lands become even more valuable.²²

The EA states:

“Properly designed harvest areas can have positive impacts on visual quality by opening views and creating vistas in an otherwise heavily forested landscape” (EA, p. 101)

It seems to us that forest visitors have plenty of “open space” where they live, in the form of suburban and rural lawns and recreational parks and agricultural areas. They come to the forest because they want to visit a forest, not “vistas” of sacrifice zones.

There are also plenty of “naturally disturbed” areas because of natural causes, as the DoF is also aware of:

“In addition, changes to the environment as a result of natural causes (wildfire, wind events such as tornadoes, insect and disease outbreaks, and landslides), may cause substantial changes in aesthetics, but are not a result of implementing the alternatives.” (EA, p. 101)

Recreation is considered as an ecosystem service provided by forests. Logging and burning create conflicts with the use of the forest for recreation. Conflicts can come from noise pollution, smoke, and visual degradation. Again, the question arises: Does the DoF Plan under consideration maximize net public benefits by sacrificing the use of the State Forest as a recreation area for the sake of increasing timber outputs?

The value of the forest as a recreational area can be measured, and contrasted with the value of the forest in producing timber (see for example “the Economic Value of New Jersey State Parks and Forests”²³). None of that has happened in the EA.

²² Nickells, David L., May 2008, personal communication.

²³ Mates, William J., M.S. and Jorge L. Reyes, M.F., *The Economic Value of New Jersey State Parks and Forests*, New Jersey Department of Environmental Protection Division of Science, Research & Technology, Issued June 2004, Revised version issued November 2006. <http://www.nj.gov/dep/dsr/economics/parks-report.pdf> - Accessed May 23, 2008.

Also, all forms of recreation may have more or less severe environmental impacts. Which forms of recreation will provide the highest net benefit to society? They are the ones that attract the most users and create the highest consumer surplus, while having low impact on the environment and other uses of the forest and while being inexpensive to provide. Nature viewing, hiking sightseeing, and picnicking are the most popular outdoor recreation activities. This is in line with what is most in demand in the region and the rest of the nation. These activities have comparatively low costs and low environmental impact. Other activities, like horseback riding, may have more severe consequences with regard to soil and water impacts.

The EA does not consider any of these issues. A proper assessment would have included the real impacts of proposed logging and burning on recreation areas and recreationists.

16. Complete Absence of Cost Information

One of the major things missing from the EA is cost information and the sources of funding (other than timber receipts) for the different management activities planned by the DoF.

What does it cost to do TSI's, road building and maintenance, fighting invasive plant species, planning for sales, monitoring contractors, trail building and maintenance, planning and conducting prescribed burns?

Do all the activities the State conducts around timber operations create a financial loss or surplus for the taxpayer (considering both state and federal taxes)?

The absence of this information precludes a comprehensive analysis of the public benefits and costs (which include both monetary and non-monetary components) associated with the DoF Plan.

IC 14-23-4-5 deals with the allocation of timber receipts. 85 percent of net receipts are to be deposited in the state forestry fund, and 15 percent go to counties where the state forest is located. IC 14-23-4-5 (c) requires that ***“all distributions under this section shall be made after deducting all costs incurred by the department relating to the operations.”***

We would like to see the department disclose detailed information about what costs were deducted from the timber receipts since the drastic increases in logging starting 2005, and how these costs compare to costs before these increases.

If timber operations create losses, as they do with most national forests, then the public needs to know that timber operations are subsidized.

It would then be a bargain for the State to buy up new forest land with tax payer money, rather than subsidizing timber operations.

Also, what types of land is the DOF planning on buying? If it is land that immediately gets integrated into the timber cycle, what good does that do the taxpayer if timber operations are actually generating losses?

17. Economic Analysis Has Huge Gaps

The EA reports that:

“Indiana forest products industry is the 6th largest employer in Indiana (Purdue University through data from Census of Manufacturers). Indiana forest products industries employ more than 56,000 people with most of the industry concentrated in the southern half of the state (Petersen 1998).” (EA, p. 103)

“Forest products manufacturing is a \$2.55 billion a year industry in Indiana (Petersen 1998).” (EA, p. 103)

“Indiana’s economy is diverse and growing rapidly; but many southern counties are more than 50 percent dependent on revenues and wages generated by forest products manufacturers (Petersen 1998). The 1997 Economic Census data determined there were 205 primary mills and 926 secondary manufacturing.” (EA, p. 103)

With rapid changes in Indiana’s economy, why does the EA report 10-year-old data?

The Bureau of Economic Analysis makes available data as recent as 2006 on a county basis, for example “CA05N - Personal income by major source and earnings by NAICS industry.”

It would be good to know whether the statement that “*southern counties are more than 50 percent dependent on revenues and wages generated by forest products manufacturers*” is still correct today.

The EA does not show how much of yearly harvests is from private land compared to public land, and what difference the increased timber harvest on State Forests makes in total harvest levels.

The EA does not report about Indiana exports of timber, or about imports.

How much of their needed inputs do wood-based manufacturers get from Indiana, how much comes from elsewhere? **Do increases in State Forest timber harvests have any appreciable effect on the availability and price for wood as input into the manufacturing process?**

If there is an impact on price, how does that affect private forest land owners? May they respond by reducing their harvests, or face reduced incomes?

The EA reports about the increases in revenue to the DoF from logging on State Forests, and how a portion of this money is returned to the counties where the harvests happened.

“From 2003 to 2004, nearly 2500 acres of forest were harvested with over 3.4 million board feet sold, generating revenue of \$897,313 (IDNR 2005). In 2005 (the last year before implementation of the 2005-2007 Strategic Plan), total sales were 3.6 million board feet generating \$975,388. Fifteen percent of state forest timber sale revenue is returned to the counties in which the harvest occurred. The DoF Strategic Plan 2005-2007 proposed to increase revenue from state forest timber sales to \$3 – 5 million annually by increasing harvest on state forest lands to 10 – 17 million board feet (IDNR 2005). Volume sold and revenue received since implementation of the 2005-2007 strategic plan have increased. In 2005-06 (first year following implementation of the plan) the volume sold was 7.7 million board feet generating \$1,979,459; the 2006-07 volume sold was 10.3 million board feet generating \$2,669,179. The goals for 2007-08 call for a volume sold of 12.0 million board feet which is expected to generate \$3.2 million in total revenue.” (EA, p. 104)

“The 2005-2007 Division of Forestry Strategic Plan was replaced by the IDNR Division of Forestry Strategic Plan 2008-2013, released April 1, 2008, and is available on the Division of Forestry web page (<http://www.in.gov/dnr/forestry/index.htm>) This plan calls for an annual harvest limit of 60% of growth which is estimated to be 14 million board feet. This volume harvested is expected to generate \$3.6 million in total revenue annually.”(EA, p. 104)

The DoF also states that:

“Income from timber sales on state forest lands represents a small but growing portion of annual revenues for the Division of Forestry.” (EA, p. 104)

Stating that the DoF receives a growing portion of its revenue from timber sales does not by itself constitute success. The DoF does not divulge any information about what portion of the total budget comes from timber receipts, and, more importantly, what the costs (short and long term) are for the DoF to support these levels of harvesting. It is possible, and actually very likely based on data made available on national forests (see above), that extracting timber from a forest is a losing business in the long run, in other words, that the taxpayer subsidizes these activities by paying for maintaining, building, and decommissioning roads, plantings, etc.

Also, it is not very informative to state figures on how much an industry contributes to the economy of Indiana if those figures are not set in relationship to Indiana income and employment as a whole.

Furthermore, the economic rationality of timber extraction from State Forests is in question when considering what may be sacrificed as the DoF pursues its plan, namely the delivery of important ecosystem services that could benefit the very residents and counties in which the timber harvests are happening. Benefits could come from cleaner water, a more steady flow, reduced flooding, better air quality and therefore health, among others.

Managing state and other public forests for the highest values that these forests provide (ecosystem services, including recreation), could bring economic benefits to State Forest Counties from recreation-related industries like lodging and food.

Using the State Forests instead for extracting timber, with its negative impacts on recreation, very likely has opportunity costs. While increasing employment of logging companies and possibly local sawmills, tourism and recreation-related industries may suffer, or their growth may be stifled. There are several population centers close to the public forests of southern Indiana, and with oil prices increasing, more and more people will likely seek out destinations for recreation much closer to home than in the past, creating opportunities for local communities to develop themselves into attractive destinations. Vistas of recently logged and burnt forests certainly are not helpful to communities seeking to provide attractive recreation opportunities to residents of nearby population centers.

Besides employment or income data related to logging and wood processing, the EA must also report about the recreation-related employment and income in the counties of Southern Indiana.

The DoF wants to use some of the timber money to buy up additional forest land. There is no information showing how much was spent on acquisition on additional forest land in previous years, what kind of land was acquired, and what were/are the criteria for acquiring the land.

And again, we need to question the economic significance of stating revenues from timber receipts as a measure of economic success. Usually economic data provided to show macroeconomic impact would be data on employment, wages and income, not revenue.

*“The average revenue generated by sale of timber between 1994 and 2004 was \$736,372 per year. The DNR increased timber sale volume on state forests by 50 percent in 2006, 150 percent in 2007, and a proposed 300 percent in 2008. Every dollar of timber value sold generates approximately \$10.25 in additional direct revenue into the Indiana economy. Before 2005, DoF sold approximately \$1,000,000 of standing timber. Increasing that to \$4,000,000 **added an additional \$30,750,000 annually into Indiana’s economy (IDNR 2005).**”*(EA, p. 105)

What are the \$30,750,000 that are added annually into the economy? Are they additional revenues? Are they additional income (personal income, Indiana gross domestic product)?

How was that figure determined, what models were used?

Because of huge gaps in the analysis (no consideration of ecosystem services and their value, lack of cost information, lack of recent economic data, disregard of industries that

may be negatively affected by logging of the state forests) we do not agree with the following statement in the EA:

“Direct and Indirect Effects on the Socioeconomic Environment

The DoF anticipates that no negative impacts to Indiana’s economic environment will occur as a result of this proposed action. Maintaining a sustainable, healthy forest will have a long-term positive impact on the state’s economy.

Cumulative Effects on the Economic Environment

Maintenance of a sustainable flow of timber products will have a positive impact on the wood using industry. The continuance of a healthy wood using industry is expected to have a positive impact on the economics of private land forest management. The maintenance of oak-hickory dominated forests will have a long-term positive impact on the economic environment.”

We therefore request that the DoF reworks this section, taking into consideration available macro-economic data, providing the proper context for data provided (setting them into relation to budget totals, and Indiana income and employment), taking into consideration opportunity costs for industries that may be harmed by pursuing the current plan, providing both revenue and cost information for the DoF related to all management activities, and analyzing the value created by the Indiana State Forest from managing for ecosystem services instead of for timber.

18. Protection of Indiana Bats Not Assured

The EA announces that a Habitat Conservation Plan for the Federally Endangered Indiana and Gray Bat was submitted to the **U.S. Fish and Wildlife Service in October, 2007, and obviously has not been approved yet.** Therefore, the IDNR cannot claim that they have adequately addressed the management of Indiana bats. Furthermore, we have serious concerns about how our comments today can be meaningful in regards to Indiana bats in State Forests if the HCP has not been approved, and we have not been given opportunity to read it in its draft form. Finally, the DoF has essentially ignored the State ESA and is acting without a State HCP for the Indiana bat and the other endangered species that occur on State Forests. The IDNR is not complying with the Indiana Endangered Species Act, by its failure to conduct surveys of species, create habitat conservation plans, or to get permits to “take” endangered species. Therefore, approving this plan without first taking care of meeting both State and Federal ESA laws, is premature.

Records of the Indiana bats’ existence in many of the State forest areas, according to the EA.

“Indiana Bat (Myotis sodalis)

In Indiana winter hibernacula occur in the south-central counties of the state, while summer records exist for the species throughout the entire state (USFWS 2007a). Records for this species exist at Clark, Harrison-Crawford, Jackson-Washington, Morgan-Monroe, and Yellowwood State Forests (USFWS 2007a, Indiana Natural Heritage Database 2008).” (EA, p. 47)

Recent studies of the route for the proposed I-69 Highway have indicated that wherever the scientists have looked for Indiana bats along the route, they were found. If this is the case along the route, it is probably safe to surmise that Indiana bats, if looked for, will be found further away from the proposed routes. Yet, none of this was mentioned in the EA.

From our investigations into the Hoosier National Forest Plan, we know that neither the DoF nor the Forest Service really knows where the summer habitat for the Indiana bat is. Neither agency has identified it, and doesn't seem to want to know. But the DoF has to know where the Indiana bats are residing in the summer in order to not do inadvertent taking.

It has been shown that the population of **Indiana bats increased on the Hoosier and Shawnee national Forests when the Forest Service had not been logging much.** In other words, forest preservation, not “management,” favored Indiana bats and furthered their existence. On the other hand, **in forests with more extensive logging, the populations are decreasing.**

Recent court cases have ruled that **recovery habitat** has the **same legal force as habitat that is for the survival of the species.** Habitat for recovery is supposed to have the same force of law for protection as habitat for survival. **The Indiana bat's population has never reached the population numbers of 1967 when it was first listed.**

Timber sales, such as the ones proposed for Indiana State Forests, where foraging, roosting, and swarming habitat will be removed, will have a negative effect on the Indiana bat. **Any negative effect is significant when the species is already endangered.**

The EA states the following about preferred summer habitats of the Indiana Bat:

*“**Summer habitat** for both genders include forested areas offering roost trees, either live or dead. Indiana bats roost within tree cracks, crevices, hollows, or beneath loose exfoliating bark. Roost trees occur on both upland sites and bottomlands, often along **forest edges where they receive abundant solar exposure and are near openings that support favorable foraging opportunities** (Kurta 2004).” (EA, p. 48)*

*“**Indiana bats frequent (and presumably forage in) areas with both an open canopy and an open understory, sometimes in woodlands with a savanna-like setting (Brack 1983, Gardner et al. 1991b, Callahan 1993).** Studies suggest the Indiana bat may **preferentially forage in agricultural areas (e.g., grazed woodlots), riparian corridors, and thinned, open forest (Brack 1983, Gardner et al. 1991a, Kiser and Elliott 1996, Menzel et al. 2001).** **Woodlands with open canopies provide more favorable foraging habitat than dense, closed canopy forests.** Bats have also been found to frequent recently logged areas (Gumbert 2001). (EA, p. 48)*

An internet site called NatureServe Explorer,²⁴ which the EA references regarding other species of concern, offers a somewhat different perspective on the foraging habitat needs of Indiana bats:

²⁴ <http://www.natureserve.org/explorer/servlet/NatureServe?searchName=MYOTIS+SODALIS>, accessed July 10, 2008

- Forages along river and lake shorelines, in the crowns of trees in floodplains (Humphrey et al. 1977), and in upland forest (Brack and LaVal 1985). **In Indiana**, reproductively active females showed a preference for **foraging in floodplain forests with closed canopies and impounded water** (farm ponds; Garner and Gardner 1992).
- Flying insects are the typical prey items; diet reflects prey present in available foraging habitat. **Forages along river and lake shorelines, in the crowns of trees in floodplains**

When it comes to favorable **roosting sites**, NatureServe Explorer offers the following information:

- **In summer, habitat consists of wooded or semiwooded areas**, often but not always along streams.”
- **In Missouri, primary maternity roosts were in standing dead trees exposed to direct sunlight**; there were 1-3 primary roosts per colony; **alternate roosts** were in living and dead trees that **typically were within the shaded forest interior** (Callahan et al. 1997).
- Though maternity sites have been reported as occurring mainly in riparian and floodplain forests (Humphrey et al. 1977, Garner and Gardner 1992), recent studies indicate that upland habitats are used by maternity colonies much more extensively than previously reported. Garner and Gardner (1992) **reported that 38 of 51 roost trees in Illinois occurred in uplands and 13 trees were in floodplains.**
- **Of the 47 trees in forested habitat, 27 were in areas having a closed (80-100%) canopy, and 15 were in areas having an intermediate (30-80%) canopy.**
- A **single roost tree** was found in the following types of habitat: a **heavily grazed ridgetop pasture with a few scattered dead trees**, a partially wooded swine feedlot, a palustrine wetland with emergent vegetation, a forested island in the Mississippi river, **and a clearcut around a segment of an intermittent stream where dead trees were retained for wildlife.**
- **Roosts were not found in forests with open canopies (10-30%) or in old fields with less than or equal to 10% canopy cover.**

The EA has the following to report about the impacts of its preferred alternative on Indiana bat habitat: “*The DoF expects the preferred alternative will create forest conditions that are beneficial to Indiana bats as well as evening bats, which use similar forest habitats during the summer. Openings will increase foraging opportunities and improve solar exposure on roosting trees.*” (EA, p. 50)

- EA, p. 51: “*Opening the understory around potential roost trees would improve foraging conditions and remove possible obstructions for easier flight.*”

NatureServe states: Flying insects are the typical prey items; diet reflects prey present in available foraging habitat. **Forages along river and lake shorelines, in the crowns of trees in floodplains.**

There is no mentioning of foraging in the understory on the NatureServe site, or that opening up the understory would be beneficial to Indiana bats. Indiana bats are consistently found foraging over a full canopy. They will incidentally forage open lands and get drinks from ponds as they go from one forest to another, but **they overwhelmingly prefer a full canopy forest.** (See for more information about this below)

- *EA, p. 51: “ Burning will encourage oak and hickory recruitment which provides long-term habitat suitability.”*

NatureServe states: Known roost tree species include elm, oak, beech, hickory, maple, ash, sassafras, birch, sycamore, locust, aspen, cottonwood, pine, and hemlock (Cope et al. 1974, Humphrey et al. 1977, Garner and Gardner 1992, Britzke et al. 2003, Britzke et al. 2006), especially trees with exfoliating bark.

Terrestrial Habitat(s): Forest - Hardwood, Forest - Mixed, Forest/Woodland, Woodland – Hardwood.

There is no confirmation that oak hickory trees are the preferred or most favorable habitat for Indiana bats.

- *EA, p. 50: “ Prescribed fire will also benefit Indiana and evening bat habitat. Burning leaf litter trapped within the buttressed roots of large trees creates scars that eventually accelerate butt- and heart-rot, contributing to the availability of hollow snags for roosting.”*

There could be negative effects on endangered Indiana bats from smoke related to prescribed burns, especially if smoke drifts into caves.

- *EA, p. 48: Possible threats to summer habitat include habitat loss due to deforestation, agricultural conversion, development, and subsequent loss of roosting or foraging sites (USFWS 2007a).*

Foraging and roosting sites can also be lost when the DoF logs in summer habitat, and cuts down unknown roost trees, or trees that could become future roost trees.

Removing a roost tree would harm an individual or individuals of Indiana bats, because they are loyal to their habitat and return with a level of expectation of the habitat being essentially the same.

NatureServe: In Illinois, Indiana bats **used the same, evidently traditional, roost sites in successive summers.** Recapture of the same individuals within traditional roost sites during subsequent summers suggests site fidelity (Garner and Gardner 1992, Gardner et

al. 1996).

- ***EA, p. 50: “To exceed the guidelines of the Best Management Practices, DoF routinely establishes >100-foot wide limited-management buffers on either side of all perennial streams and rivers to protect the integrity of forested riparian corridors many species of bats use for foraging. Only minimal cutting is allowed inside riparian management zones and the integrity of the forested corridor will be maintained.”***

Since bats are so active in riparian areas, it is very likely that harvesting will lead to the killing of some bats.

- ***EA, p. 50: “Guidelines for management within the harvest restriction zone” include a seasonal prohibition on timber harvesting from April 1 through November 15 within five miles of hibernacula given the USFWS-designation of either Priority 1 or 2. Additionally, forested buffers of 20 acres are established around all entrances of such hibernacula where there is no timber harvesting at any time of the year nor use of heavy, ground-disturbing machinery.”***

NatureServe: Females begin hibernation soon after mating, whereas males often remain active through mid-October to November (Cope and Humphrey 1977). **Most individuals are in hibernation by late November although some are still active until December** (Barbour and Davis 1969)

Even if the DoF refrains from anything that could adversely affect the bat between April 15 and September 15, and instead log and burn and conduct other related activities only in the fall and winter, that would not be sufficient to protect the Indiana bat:

- **Bats fly in and out of hibernation in the fall and winter**, after the date that the DoF is planning to log and burn. In other words, on warm fall and winter days, bats have been seen leaving their hibernacula and flying into the forest. Consequently they could be harmed from logging and burning operations after Nov. 15 and before April 15.
- With **temperatures increasing in the winter months over the past few years**, the likelihood of bats being outside of their hibernacula will increase.
- The EA states that bat colonies like large dead trees. However, the issue is much more complicated. While bats might occupy large dead trees at times, at other times the colonies bust up and go to other trees due to microclimate conditions, such as shade in the hot months and sun in the cooler months. With **opening up the canopy the trees’ level of “shadiness and sunlight” will change**. By **leaving only a few large dead trees that offer appropriate microclimates only at some times, but not at others**, the DoF diminishes suitable habitat for bats.

The following information is adapted with small changes from “Notice of Appeal of the Record of Decision for the German Ridge Restoration Project on the Hoosier National Forest”, submitted by Heartwood, Protect Our Woods and others, on June 5, 2007.²⁵

- **Bats Prefer Closed Canopies**

In addition, as stated before, the DoF is overemphasizing **openings in the forest as a benefit to Indiana bats in regard to their foraging preference**. The whole analysis of the roosting habitat is shallow and with only handpicked references which seem to support the agency contention that they can log, burn, build roads, etc. and that there won't be any kind of adverse impact to the bat or any other species.

Reliance on tree nurseries, as described here, makes *M. sodalis* much more dependent on the vagaries of weather than if they occupied cave domes or buildings, although they still have the metabolic advantages of clustering. Accordingly, weather and roost temperature have important roles in the summer ecology of the species.

The EA does provide the fundamental requirements of the species regarding roost trees, but again, downplays the importance of closed canopy forests in favor of open forests, in spite of contradictory scientific evidence, and underestimates the importance of large trees and ignores specific data on microclimate aspects which have been well documented.

For example, the research is clearly indicating different roost sites for different seasons and for different weather conditions. The species obviously needs warmer sites in the fall and cooler sites in the summer. Yet, the plan attempts to paint a broad brush picture that the bats like roost trees that are scattered, or in the open. This, according to the logic of the plan, means that logging is good for the bats. Yet, in Gardner, Garner, and Hofmann, “Summary of Summer Habitat Studies in Illinois: with recommendations for impact assessment” they documented that out of 32 1/10 ha plots encircling Indiana bat roost trees, 22 were in closed canopy forests (80% or greater canopy closure)! Of those plots surrounded by closed canopy forest, the 14 plots in upland forest averaged 47 trees/acre greater than 11", and 125 trees/acre greater than 4". The 8 plots in floodplain forest averaged 61 trees/acre greater than 11", and 136 trees/acre greater than 4". Even those 10 roosts surrounded by “intermediate canopy closure,” 30 - 80% averaged 27 trees/acre greater than 11", and 145 trees/acre greater than 4".

Clearly, this is not evidence that supports a finding that the species is a “savannah” species, or likes or requires an open forest.

As Rommé *et al* found in their **literature review, in total**, Gardner and Garner found that 73% of 44 maternity roosts in areas with over 80% canopy, and 27% in areas 30-80% canopy. Rommé *et al*, in their habitat suitability model published in the same document, assumed that sites with **60 - 80% canopy cover were optimal for Indiana bat**.

²⁵ <http://www.protectourwoods.org/downloads/20070605-FSFEIS-Appeal.pdf>

According to Hobson in West Virginia, Bat #458 roosted and foraged in George Washington National Forest until 20 May when the transmitter battery failed. For 19 nights, bat #458 roosted on a north facing slope (00 to 5" east of north) at 700 m elevation, beneath the bark of a mature shagbark hickory (ca. 30 in in height, 61 cm DBH). The bat roosted at a height >8 m in the shagbark hickory. Other tree species within a 10-in radius of the roost tree included basswood (*Tilia spp.*), red maple (*Acer rubrum*), eastern hophornbeam (*Ostrya virginiana*), tulip poplar (*Liriodendron fulipifera*), and pignut hickory (*Carya glabra*).” Clearly this is not an “open canopy” situation either.

When you add in the fact that the **species prefers large trees, and requires a substantial number of larger snags, it is clear that the presence of scattered older, dead trees, is sufficient in and of itself to bring the canopy closure of a forest within the optimal range.** It is only when no large trees are present, and the trees are densely packed would you ever have a 100% canopy cover, and that habitat is not preferred by the species.

But any correlation between the habitat remaining after a commercial logging—be it even or uneven aged, and that habitat which has naturally evolved and created its own canopy gaps thru attrition, isn’t and cannot be based upon the best available science regarding the needs of the species. The DoF, the U.S. Fish and Wildlife Service and the Forest Service are all obviously ignoring the best science to further their goal to prevent the Indiana bat from becoming the spotted owl of the eastern United States.

In fact, even Callahan’s paper, which did find a slight reduction in canopy closure between known roost sites and randomly chosen non-roost sites, still found that for primary snag roosts, which by nature exist in a reduced canopy due to their own loss of leaves, still existed in a 60% canopy cover, while live interior alternative roost trees existed in nearly a 70% canopy cover. These are not percentages that justify heavy handed logging to reduce significantly canopy cover! **This was in a highly fragmented area of northern Missouri where most of the forest land were riparian strips along streams. This is also an area where the populations are in the sharpest declines** (i.e., Missouri Priority I hibernaculum) are likely summering. Clawson *et al*, in Indiana Bat Summer Habitat Patterns, 1996, found that canopy cover was not more dense or closed (nor any more open either) at sites where Indiana bats have been captured than at unsuccessful netting sites. However, the actual canopy cover figures were not supplied in the final paper. However, it is noteworthy that this paper did find a correlation between the presence of large trees and the netting of Indiana bats. Again, larger numbers of larger trees in a forest by nature indicates a denser canopy cover. Likewise, logging decreases the number of large trees.

Even the courts have recognized the importance of closed canopy forests: *M. sodalis* is generally believed to require forest habitat with relatively complete canopy closure (Humphrey et al. 1977, Brack 1983). Capture data collected from 33 sites in Indiana (3D/ESI 1993) indicate that *M. sodalis* preferentially utilizes areas that include forest patches with relatively complete canopy closure (62.2 +/-7.1%). *House v. United States Forest Service*, 974 F.Supp. 1022, 1031 (E.D.Ky. 1997).

“Anecdotal evidence suggests that the Indiana bat may, in fact, respond positively to habitat disturbance. Indiana bats have been found roosting in shelterwood cuts in Kentucky (MacGregor, pers. observ. June 1997.”

We would first point out that this work was done in the fall, not the summer. It is much cooler in the fall than the summer, so bats would need warmer roosts in the fall. Additionally, there are many problems with the analysis. We would argue that finding the bats in the shelterwood cuts provide anecdotal evidence that logging harms the bats. Loyalty to habitat and roost trees can explain the bats roosting in the shelterwood cuts. MacGregor has acknowledged this. It is difficult to entirely dismiss this interpretation since we have no data on where many of these bats roosted prior to timber harvest (such data would be impossible to obtain, of course).

Report to the Daniel Boone National Forest Management Team; Indiana Bat Roost Tree Use Monitoring - 1996-97 Summary, March 1999.

The unpublished analysis MacGregor has done which shows the Indiana bat using shelterwood cuts more than expected is fatally flawed. First, as mentioned above, loyalty to habitat can explain the results (and he has documented loyalty to trees and the area). More importantly, his analysis fails to take into account the fact that all the logging was in the areas the bats prefer for roosting. All but one of the bats was roosting on or near the ridge tops. And all the logging was on the ridge tops. MacGregor’s analysis assumed that the probability of the bats roosting on ridge top was the same as it roosting in a valley. Since the bats were not roosting in the valleys and all the logging was on the ridge tops, it significantly skews the analysis and makes the results inaccurate. MacGregor needs to either exclude the valleys from his analysis or statistically take into account the fact that they do not roost in the valleys.

MacGregor’s data also found that half the bat roosts days were in forests with 80% or more canopy closure. His results for 1997 were as follows:

Canopy Closure Bat Days <60% 34 60-80% 27 >80% 61 More specifically: Habitat Canopy Closure Bat Days Percent use 2-age Shelterwood Cuts/Highgrades 20-81% 36 28.8% Red-cockaded Woodpecker Rx Burns 24-71% 6 4.8%

Natural Canopy Gaps (Storm Damage) 24-88% 23 18.4%

Edges of Woods Roads and Gravel Roads 80-90% 5 4.0%

General Closed Gap Canopy Forest 79-93% 55 44.0%

In spite of this being in the fall, **most of the bats days were in a closed canopy forest or natural canopy gap.** But a study in the Shawnee by Feldhamer and Carter indicated that there was no statistical difference in canopy cover between roost trees and randomly selected non roost trees in the territory of a maternity colony. Therefore it is likely that the alteration of microhabitats around roost trees will cause degradation of used habitat.

- **No Continued Supply of Roost Trees**

Another problem is what will happen to the logged areas in the future. While the bats are now using them, what about in 5 or 10 years? What happens when the understories grow up? Will that interfere with the use of roosts? **What impact does removing most of the big trees have on the site's ability to produce a continual supply of roosts trees?** Any large tree removed will never die and become a potential roost tree. What impact does this have on the bats?

- **MacGregor's Data Demonstrate that the Bats avoid Clearcuts**

General forest was used by roosting Indiana bats at 1.5 to 2 times expected levels based on availability, making this a preferred roosting habitat for the bats. All roost trees that were found in general forest were in stands 50 years old or older, and most roosts were fairly large snags that once formed part of the overstory, in live overstory white oaks, or in natural canopy gaps created by ice, wind, or fire damage. **This indicates that it may often take 50 years or longer for an even-aged stand to acquire characteristics (snags of suitable size, natural gaps and irregularities in the canopy, etc.) that provide good roosting habitat for Indiana bats.** Clearcuts less than 35 years old made up a substantial part of the Indiana bat monitoring area (about 17%) during both years but received no roosting use by transmitters Indiana bats. The fact that **young clearcuts were avoided as roosting habitat** for Indiana bats was not surprising since there were virtually no snags available in these areas. Yet the draft claims, without any reference to a study, "even-aged management that includes provisions for snag retention may be used." Draft at 31. Even-aged management is either clear cuts or two step clear cuts. When the snags blow over, the area is no longer suitable, **as even-aged management does not provide a continual supply of roosts trees.**

It is interesting to note that when one looks at MacGregor's results a pattern emerges. The **higher the number of big trees in an area, the more the bats used it. Clear-cuts had no use, old style shelterwood cuts had almost no use, new style shelterwood had the next most use, and closed canopy forest had the most use.** When you think about this, it makes sense to say that the more trees in the area, the more likely there will be suitable roosts. The plan should state "the more the big trees the better."

One recent scientific paper recognizes that even temporal disturbance in a forest can be a significant impact on the Indiana bat due to the fact forested areas are rare in the Midwest as a whole. *See*. Menzel, Jennifer M. et al., "Summer Habitat Use and Home-Range Analysis of the Endangered Indiana bat." *J. Wildl. Manage.* 69(1):2005.

- **Canopy Closure Readings Are Misused**

We would also point out that many of the canopy closure readings are misused. To the bats, it is not how much sun reaches the forest floor where the canopy closure readings are taken. What matters is how much sun reaches the part of the tree that they are roosting in. Trees in a closed canopy forest can have more than enough sun for the bats. When a tree dies, it is exposed to the sun. Many trees that are taller than the surrounding trees die. When they die, they have 100% exposure to the sun. Likewise, sometimes trees die in groups, or a storm will come through and open areas. We often see claims that mature forests have 100% canopy

closure. This is simply not true. Trees die and create canopy openings. Storms and other natural disturbances also create openings in the canopy.

- **Lethal Temperatures for Bats**

The EA also needs to address lethal temperatures for the bats. In southern Illinois, lethal temperatures have been measured in roost trees. Thus, cutting trees to provide more sun on a tree could make the tree unsuitable for roosting.”

- **Importance of Reproductive Success**

This brings up the issue of reproductive success. **Many times claims are made that since the bats are using an area, it is good habitat for them.** This conclusion cannot be drawn without looking at reproductive success and survival. This is particularly true for a species in a population collapse. As has been documented in numerous studies on birds, the mere presence of individuals in a habitat does not automatically mean that the population is stable or increasing. In fact, areas can function as ecological traps - luring individuals into the area, but then subjecting them and their reproductive habits to the many dangers of parasitism and predation. For example, bats could be found in an area where they are not successfully reproducing or surviving the season. What happens if someone concludes that since the bats are present, it must be good habitat, and then manages other areas bats could be in to be like the ecological trap?

The EA doesn't even mention reproductive success of Indiana bats, and does not propose or devise any ways to attempt to identify existing colonies and to determine what the reproductive success of the individual colonies are.

What the plan needs to focus on, and which is totally deficient from the plan, is a method which will result in the identification and delineation of the existing colonies. Once those colonies are identified, comprehensive studies need to be undertaken to determine which maternity colonies are stable or increasing and which are ecological traps.

- **Roosting Habits of Male Bats**

There have been some findings regarding the roosting habits of males. While some males stay near the caves and even roost in the caves, some males leave the caves and roost in the forest during the summer. For example, the Hoosier National Forest, in mist netting in Indiana, actually **found males roosting in unthinned pine plantations.** This information, regarding the use of pine trees, which reinforces the data of Kiser and MacGregor, makes dead pines within a dense forest very important roosting habitat, at least for males.

MacGregor has found about half the roost used by the bats where shortleaf pine.

Other researchers have found that males roost in the forest. For example, Hobson found that: This (male) bat used a mature, live, shagbark hickory (*Carya ovata*) tree as a diurnal roost; up to 10 other bats roosted in the same tree. The bat primarily foraged among tree canopies within 625-ha area of an 80-year-old, oak-hickory forest. Our study suggests that male *M. sodalis* use foraging areas and tree roosts found in the area of hibernacula. Thus, we recommend that conservation efforts protect and manage foraging and tree roosting habitat in the vicinity of *M. sodalis* hibernacula. Kiser *et al* found that males, as well as a female, in the

fall swarming period within the vicinity of a cave, all roosted in “forested areas with a high density of trees.” While some of the roosts recorded by Kiser occurred in small openings in the forest, some were in forest interior, even considering the fact that his studies occurred in the fall, a time where the bats obviously would be seeking trees which would pick up some sun for warming. Even humans tend to stay in the shade during the summer and get in the sun during the fall and spring. This is not rocket science. **But there is no indication that the species prefers trees standing alone in the middle of an opening. When they do chose a site with sun exposure, it is within a forest setting, and often the death of the tree itself which is chosen for roosting, is sufficient to create the opening preferred by the species.** Laval *et al* found that “Our bats, mostly adult males, foraged in densely forested situations, most of them on hillsides and ridges.” Clearly, males as well as females are forest species. They prefer forested habitat for roosting and foraging.

While there is some data to suggest that Indiana bats will utilize roosts in non-shaded areas, this data is very season specific or the exception. It is not consistent with the preponderance of the data, especially regarding maternity colonies, which are critical to the recovery of the species, to suggest that the species avoids closed canopy forests. As a matter of fact, the evidence is clear that the species requires forests. It needs a variety of roosts to survive the variety of natural events that can occur, but clearly forest interior habitat is the critical habitat to protect.”

- **Seasonal Cutting Restrictions Aren’t Protective and Don’t Promote Recovery of the Indiana Bat**

The EA relies on “seasonal cutting restrictions” as the main protection by which the agency avoids taking the Indiana bat, although that avoidance, even by their own standards, isn’t total. We contend that seasonal cutting restrictions do not adequately deal with the well settled science that indicates that Indiana bats are loyal to their summer habitat. Not only does it damage habitat that will be used by colonies, but it doesn’t account for the increasing warmer days in the winter when bats are observed foraging. Global warming will stimulate more of these days in the future. **In addition, seasonal cutting restrictions, (as well as not designating summer critical habitat) does not conserve the species according to the ESA in that it doesn’t promote the recovery.** Without identifying and protecting known occupied habitat, the agency can’t purport to be aiming toward the recovery of the species, because it won’t know what that is. Failure to consider this and plan for it is a violation of the ESA.

The EA Fails to Comply with ESA

The ESA operates to prohibit federal agencies from authorizing, funding, or otherwise carrying out any action that is likely to "jeopardize" the continued existence of an endangered species. 16 U.S.C. § 1536(a)(2). An action will cause jeopardy if it "reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed

species in the wild by reducing the reproduction, numbers, or distribution of that species." 50 C.F.R. § 402.02.

The FWS defines recovery as follows: "improvement in the status of listed species to the point at which listing is no longer appropriate under the criteria set out in section 4(a)(1) of the Act. [50 CFR §402.02]" FWS Consultation Handbook, p. xvii. Section 7(a)(1) of the ESA requires that agencies "shall, in consultation with and with the assistance of the Secretary, utilize their authorities in furtherance of the purposes of this chapter by carrying out programs for the *conservation* of endangered and threatened species." 16 U.S.C. § 1536(a) (2003) (emphasis added). The ESA defines "conserve" as "to use and the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this chapter are no longer necessary." 16 U.S.C. §1532(3) (2003).

Nothing in the EA explains how this project will aid in the recovery of the Indiana bat.

Instead of leaving habitat necessary for the Indiana bat's survival, the DoF is cutting it down trees that may be good habitat in decades to come.

The EA also does not adequately address cumulative effects on bats from logging and burning in the region (on both private and public lands), or from other causes, including global warming, pollution, and development.

The Indiana bat needs to be protected now. But instead of explaining to the public how this will occur, the DoF instead is destroying the very habitat the species depends upon for its survival and recovery.

19. Forest Birds, Species of Concern, and Forest Fragmentation

It was impossible for us to address all the species considered in the EA in detail. Our remarks will therefore mainly focus on forest birds and the box turtle. Indiana bats have been addressed separately.

The EA contains statements claiming that the goals pursued by the DoF benefits rare and vulnerable species and species of concern. For example, *the EA states that:*

"Under the proposed action, the DoF would implement actions for forest management congruent with the following list of landscape-level management goals. The DoF expects that adherence to these goals through integrated management actions would benefit species of concern, rare, or vulnerable species that live in the plan area." (EA, p. 4)

But the IDNR has failed to conduct adequate surveys on the Indiana State Forests for endangered and threatened species. The IDNR is not complying with the Indiana Endangered Species Act, by its failure to conduct surveys of species, create habitat conservation plans, or to get permits to “take” endangered species.

The blanket statement in the EA that management activities will benefit species of concern, rare, or vulnerable species that live in the plan area, has absolutely no basis in fact. There is no way such a blanket statement could possibly be true.

In the EA Assessment Form, the DoF itself contradicts this blanket statement, by showing how some species may benefit and others be harmed, saying that “manipulations to habitats result in trade-offs between species that favor particular habitats. An attempt is made to strike a balance between species needs in order to maintain biodiversity. For example, a habitat project that provides openings that **benefit the reintroduction of the wild turkey may also benefit the rare bobcat, but may have a negative impact on the wood thrush.**”

As Dawn Hewitt stated in an HT article from June 29th, the wood thrush is on the Audubon Watch List. Its population is declining at a rate of 1.7 percent per year, a decline of 43 percent since 1966.

In the Environmental Assessment Form, the IDNR DoF had to answer the question: “5. Have any fish, mammals or plant species on the rare or endangered list been sighted in the affected area(s)?” and “Will those sighted be adversely affected?”

Regarding the second part, “Will those sighted be adversely affected?” the **DoF declared that there will be neither long-term nor short-term adverse effects.**

Again, there is no scientific, factual or logical basis for a statement like this.

The EA, p. 61, states with regard to Forest Warblers:

*“Many forest passerines are **known to benefit from the harvesting activities** DoF regularly uses; for instance, the **small canopy gaps created by single-tree selection** favors hooded warblers (Robinson and Robinson 1999). Additionally, the **small openings that result from group selection create unique patches of early successional habitat within otherwise mature forest communities**, which have been found to benefit both hooded and worm-eating warblers (Annand and Thompson 1997, Gram et al. 2003, Campbell et al. 2007). “*

While it may be true that even interior forest birds and other species benefit from forest openings, this does in no way imply that the DoF has to provide these openings by cutting timber. As we stated above in more detail, nature provides forest openings all by itself with old trees dying or being affected by diseases, insects, storms, droughts and floods. These “natural disturbances” are very different from the disturbances (openings) provided by the DoF. They don’t require a network of roads and trails. The trees coming down because of natural disturbances stay where they are. Even after they start decaying, they fulfill useful functions in

the ecology of the forest, providing shelter and food for various species, and eventually adding organic matter to the soil that feeds the growth of young trees developing in the opening.

Nowhere in the EA has the DoF given any evidence that the natural disturbances provided by nature are insufficient, or acknowledged the fact that natural disturbances will happen in addition to all the unnatural disturbances planned by the DoF.

Disturbances by the DoF do not “emulate” natural disturbances. Nature does not log healthy oaks out of the forest at age 80, or at any age, regardless of whether they are clearcut, or have been cut as single trees or groups. Nature doesn’t spill chemicals needed to run machinery. Nature doesn’t use noisy, heavy machinery that disrupts wildlife. Nature doesn’t build forest roads and log landings and do stream crossings to take out trees that have been cut in clearcuts, single tree or group selection. Nature doesn’t spray herbicides. The DoF does. **And these very activities can have negative impacts on “species of concern, rare, or vulnerable species that live in the plan area.”**

It is along the timber infrastructure of roads, trails and landings that invasive species spread most vigorously. Invasives, according to the EA itself, are implicated as threats to a large number of native species. The EA suggests more roads. Roads and other logging infrastructure fragment the forest, as do “openings” created by logging.

While the EA stresses that most of the cuts will be single tree selection, implying that this is a way of harvesting that is not very intrusive, it also states that these trees are taken out to improve conditions for other trees.

EA, p. 10: *“Individual trees are selected and removed throughout the stand approximately every 15 to 25 years. **The treatments are conducted to modify or guide the development of the existing crop of trees, but not to replace it with a new one. These activities include selective removal of some vegetation to allow the expansion of remaining tree crowns and root systems. The decision to remove a single tree under this method is based on in-field evaluation of that individual stem for condition, vigor, species, and impact to neighboring existing trees.**”*

What that indicates is that single tree selection is only the precursor for group selection or clearcuts once the desired tree ‘crops’ have grown to a point where they are ready to be harvested.

Also, even with single tree selection, the trees still have to be logged out of the forest. The infrastructure for that has to be in place. If single tree selection happens all over the forest (in comparison to having more trees cut from fewer spots), the need for roads and other logging infrastructure, and the possibilities for disturbing and damaging soil and wildlife during these operations, will be multiplied.

The attempt of the DoF to downplay the effects of logging by saying it will be mostly single tree selection is therefore not convincing.

EA, p. 62: *“Since the preferred harvesting alternative is expected **to annually affect***

approximately 5.3% of DoF managed acreage, it is anticipated that there will be considerable uncut forest available for the nesting and foraging needs of these species. The vast majority of this acreage (81%) will be harvested using selection methods, primarily single-tree selection (63%).

And:

*“Under the preferred alternative even-age harvests will annually occur on < 1% of DoF acreage system-wide. Given this infrequency it is anticipated that **even-age harvests would have little affect on the ability for these forest species to find suitable nesting habitat in the remaining expanse of uncut forest.**” (EA, p. 62)*

As we have stated above, cutting large trees in 5 percent of the forest every year basically means that the **whole forest could be affected by logging in a period of 20 years.** This is on top of any natural disturbances that may happen. Even after only ten years, there may not be a *“considerable uncut forest available for the nesting and foraging needs of these species,”* and there won’t be a huge *“remaining expanse of uncut forest,”* especially not for species that prefer large unfragmented forest and mature trees..

Fragmentation, therefore, will come up as an issue even with single tree selection!

It may be instructive to see what other public agencies say about fragmentation:

1) The urgency of addressing fragmentation of forestland is evident in the 2000 RPA (Renewable Resources Planning Act) Assessment of Forest and Range Lands²⁶ and in the 2007 Update to this document.²⁷ The 2000 RPA Assessment of Forest and Range Lands states on p. 28:

- Fragmentation of a forest type into smaller pieces disrupts ecological processes, reduces the availability of habitats for some wildlife species, and puts stress on forest health.
- “The distances between and among forest fragments can interfere with pollination, seed dispersal, wildlife movement, and breeding.”
- “Ultimately, excessive fragmentation can contribute to the loss of plant and animal species that are unable to recolonize after an area is disturbed.”
- “While detrimental to some wildlife species, fragmentation will improve the habitat for other species; especially those that prefer forest edges.”

2) The USDA Forest Service Strategic Plan FY 2007–2012 states: “We will continue our commitment to reducing threats to the Nation’s forests and grasslands. These threats include

²⁶ USDA Forest Service, *2000 RPA Assessment of Forest and Range Lands*. <http://www.fs.fed.us/pl/rpa/rpaasses.pdf>

²⁷ USDA Forest Service, *Interim Update of the 2000 Renewable Resources Planning Act Assessment*, April 2007. http://www.fs.fed.us/research/rpa/2005rpa/RPA_Interim_Update_April2007_low_resolution.pdf

- (1) the risk of loss from catastrophic wildland fire caused by hazardous fuel buildup;
- (2) the introduction and spread of invasive species;**
- (3) the loss of open space and resulting fragmentation of forests and grasslands that impairs ecosystem function; and**
- (4) unmanaged recreation, particularly the unmanaged use of off-highway vehicles.”²⁸

The EA expresses doubts that fragmentation affects late-successional bird species negatively.

“Many studies report that forests managed using selection silviculture retain the mature forest’s late-successional species around and between gaps and openings, while also attracting early-successional species to the nesting and/or foraging habitat created within openings (Annand and Thompson 1997, Germaine et al. 1997, Robinson and Robinson 1999, Costello et al. 2000, Gram et al. 2003, Campbell et al. 2007, Holmes and Pitt 2007). Because selection silviculture creates early-successional habitat and attracts new species while still retaining many late-successional species, many researchers report that the number of forest passerine species either increased or remained unchanged in their studies following timber harvesting (Annand and Thompson 1997, Robinson and Robinson 1999, Costello et al. 2000, Campbell et al. 2007).” (EA, p. 61)

But just counting the number of birds present in an area says nothing about their population dynamics. The area could be a population sink. They may increase in an area because of lack of other places to go to.

Dawn Hewitt, in an article in the Herald Times, “Will increased logging in state forests affect birds? From June 29, 2008, states that the DoF “does not cite the 1995 study, published in the journal Science, titled “Regional Forest Fragmentation and the Nesting Success of Migratory Birds” — part of the research was conducted on local forests — that found that **“nest predation and parasitism by cowbirds increased with forest fragmentation,” and recommends that “conservation strategies should consider preservation and restoration of large, unfragmented ‘core’ areas.”**

The same article contains the following information: “The assessment notes that the American Bird Conservancy lists early-successional Eastern deciduous forests as one of the “Top 20 most threatened bird habitats in the U.S.” But it fails to add that the same ABC document also lists **“deforestation/timber extraction” as one of the Top 12 “Threats to the Top 20 bird habitats.”**

*EA: “While each of the four forest warbler species reviewed for this document are associated with mature forests and require varying amounts of late-successional forest habitat during the breeding season, it is also true **that each of these species do not***

²⁸ USDA Forest Service, *Strategic Plan for Fiscal Years 2007–2012*, p. 4.

necessarily avoid openings, gaps, or the presence of early successional habitat. In fact, most ornithologists and researchers conclude there are no bird species using the disturbance-dependent forests of this region that require undisturbed, old growth forest for their existence (Lorimer 1994). Given this, it is expected that even species that typically nest in large forest tracts, such as cerulean warbler, tolerate some level of disturbance.” (EA, p. 61)

Again, the fact that interior forest birds “do not avoid” openings, or “tolerate” some level of disturbance, says nothing about their population dynamics. That they can “exist” in other than undisturbed old-growth environments is not surprising because old growth is an almost completely extinct habitat type, and is itself subject to natural disturbances (having a fine grained structure of various successional stages). Again, the crucial question is not whether these birds “exist,” but how their populations are affected by changing available habitats over time, and any habitats we might study and compare are all more or less fragmented by human “disturbances” of various kinds. The question is whether we can add another manmade disturbance – increased logging – and expect that it doesn’t have any negative effects.

The EA, p. 62 states that research results are inconclusive when it comes to “edge effects“:

*“A major concern of Midwest bird populations is the effect forest fragmentation may have on breeding success and productivity. While habitat loss and fragmentation are often used interchangeably, habitat loss refers to the detracting of habitat available to a species, while fragmentation refers to the simultaneous effects of habitat loss and a change in the configuration of a particular habitat type (Villard et al. 1999, Villard 2002). **Fragmentation concerns center on the perception that increasing the amount of edge within and around forested tracts increases the vulnerability of forest-nesting bird species to nest predators (e.g., raccoons, canids, corvids) and brood parasites (e.g., brown-headed cowbird) that frequent these edge habitats. While many studies found evidence to support these “edge effects” (King et al. 1996, Manolis et al. 2000, Manolis et al. 2002), many other studies found no such effects (Annand and Thompson 1997, Germaine et al. 1997, Hanski et al. 1996, King and DeGraaf 2000, King et al. 2001, Robinson and Robinson 2001, Moorman et al. 2002, Gram et al. 2003), and in recent years some have even suggested that concerns for widespread population declines due to fragmentation may be misplaced and overexaggerated (Villard 2002).”***

But rather than taking a precautionary approach, the EA assumes that if there is controversy regarding the impacts of creating more forest edge, it is safe to ignore warnings and go ahead with the program of increasing logging.

*EA, p. 62: While much remains to be learned about the population-level effects of fragmentation on breeding birds, there do seem to be some consistencies among studies. **Many agree edge effects are most pronounced in forest tracts and fragments situated within predominantly agricultural landscapes (Donovan et al. 1997, Rodewald and Yahner 2001) or adjacent to agricultural corridors (Ford et al. 2001). Here, at the interface between forest and agricultural areas, the diversity and abundance of nest predators and brood parasites may be higher than in forest-dominated landscapes***

(Rodewald and Yahner 2001). **While the overall impact of timber harvesting on edge effects is unclear, many researchers report selection harvesting systems do not significantly affect the incidence of nest predation or brood parasitism on forest birds** (Annand and Thompson 1997, Germaine et al. 1997, King et al. 2001, Robinson and Robinson 2001, Moorman et al. 2002, Gram et al. 2003). In studies examining the occurrence of edge effects associated with **even-age openings, some studies observed edge effects** (King et al. 1996, Manolis et al. 2000, Manolis et al. 2002) while **others report no such effects** (Hanski et al. 1996, King and DeGraaf 2000, Gram et al. 2003).
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From the fact that **many** researchers report no edge effects from selection harvests, we conclude there must be some others that do. The EA does not tell us about those.

Even if it could be shown that selection harvests do not create negative edge effects, could there be other impacts on these birds from taking out “mature” trees practically all over the forest over a period of 20 years? Are those trees of any value to these birds, for example for nesting, or because they host insects that these birds eat?

“Single tree improvements on state forests usually harvest 7 to 10 trees per acre (or about 20 percent of the sawtimber sized trees.)” (EA, p. 10)

*“The DoF would implement uneven-aged management on a **management tract basis**, with tracts generally between **40 and 150 acres in size**. Initially a tract may be comprised of several different types, ages, conditions, and sizes of timber. Uneven-aged timber management methods are used to regenerate a stand by removal of one tree or a small group of trees at any one time. **Within a tract, areas will be identified for group selection openings less than 10 acres each in which all stems are removed** to encourage regeneration and the creation of small patches of early successional habitat. **The remainder of the tract between openings is treated with an improvement harvest**. The improvement harvest will selectively remove some mature, damaged, or competing trees to allow remaining desirable stems the conditions to grow more vigorously.” (EA, p. 29)*

Does a forest thus diminished provide habitat for the same or (hopefully) a growing number of birds as one that is left standing? Do these birds stake out their territory and protect it from intruders from their own species? How are populations affected that are crowded into fewer trees? Does overcrowding have an effect on breeding success? Feeding success? Does it make a difference that after cutting large numbers of mature trees, that the average age of the forest is much reduced? The EA does not answer any of these questions.

The Eastern Box Turtle is a species of special concern in Indiana.

*EA, p. 43: “Major threats to this species include **habitat loss and fragmentation**. Habitat is often lost through deforestation and forest conversion to agriculture (Luensmann 2006). Fragmented habitat isolates populations and makes box turtles vulnerable to predators (Luensmann 2006). Other barriers to movement include **roads and train tracks**. Box turtle populations are also threatened by collection for the pet trade (Luensmann 2006).”*

“Though burns conducted while individuals are hibernating may affect those close to the ground surface or within dry litter, those that are less exposed should not be affected by the low intensity fires characteristic of forest prescribed burns. Since fire is prescribed as a follow-up treatment in and around regeneration openings and is not typically repeated periodically over the same area, it is very likely that fire will only rarely affect individuals or populations, particularly since box turtles are known to range over localized areas < 20 acres throughout much of their life (Luensmann 2006). For these reasons the DoF anticipates prescribed fire will minimally affect box turtles.” (EA, p. 45)

“Furthermore, any negative affects from prescribed burning should be at least partially mitigated by the habitat benefits these activities provide.” (EA, p. 45)

This assessment is telling us that turtles may well be killed by prescribed burns. Obviously their habitat can also be affected by logging, and they have a fairly limited range of movement. They cannot be expected to move to other areas of the forest that are not cut yet.

How are they going to benefit from a new oak hickory forest having grown up 30 or 50 or 80 years later?

The argument that a species may suffer minimal harm now, but benefits from habitat improvements (maintained oak hickory) in the long run, is also not convincing for another reason: The extent of oak hickory cover today is, according to the EA, the result of hundreds of years of heavy disturbances by humans. Without them, the forest will likely revert to a somewhat different species composition. If the DoF is determined to halt that process, and manage the forest for a larger component of oaks and hickory trees than would naturally occur, intervention has to be continuous, and there will never be a point where there would not be new “short-term” disturbances. The idea that a little harm now to some species could be made up by better conditions for them later could only have any validity at all if the harm really was only short-term. But that is not the plan. The plan is to keep on creating “disturbances,” not for habitat conservation, but to “get the cut out.”

According to “A Citizen’s Call,” ecological integrity can be thought of as the “ability of an ecosystem to support and maintain a **balanced, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitats within a region.**” Effective forest restoration should have as its primary objective the reestablishment of fully functioning ecosystems.

This can be achieved either by passive or by active restoration, with **priority being given to passive restoration.**

Passive Restoration means **halting activities that cause degradation or prevent ecosystem or species recovery.** This is considered the first and most critical step in restoration of ecological integrity.

In is obvious that protection of habitat entails abstention from logging “disturbances.” According to the DoF’s own statements in the EA Form, areas where endangered species are discovered get special protections and restrictions on cutting and burning. It would be even better not to log and burn there at all.

Passive restoration should take precedence “where it is vital to eliminate or reduce the root causes of ecosystem degradation, including stopping destructive logging, road building, livestock grazing, mining, building of dams and water diversions, off-road vehicle use, and alteration of fire regimes.”²⁹

Certainly the **DoF is not practicing passive restoration by restoring oak hickory forests through logging and burning.** To the contrary, the DoF proposes not to stop, but to **re-introduce heavy-handed practices that prevent the forest from recovering** from the massive human interventions that took place over hundreds of years. The goal of the DoF clearly is not to move the forest as close as possible to what could be considered a natural habitat.

Active Restoration means: “Reintroduce natural processes or species through direct intervention. Direct human intervention is needed in cases where it is necessary to reintroduce (or secure) natural processes, at-risk species, or regionally extirpated species, and in cases where ecosystem composition, structure, and function are degraded or hindered by factors such as compacted soils, channelized streams, invasive species, or fire suppression.”

“Active restoration methods include, but are not limited to, planting, prescribed burning, road obliteration, removal of barriers to fish passage and water diversions, invasive species control, fuel treatment, and riparian restoration.”³⁰

The DoF cannot claim to be practicing active restoration when it practices logging and burning to regenerate oak hickory forests, since active restoration has the same goal as does passive restoration: to restore the forest’s ecological integrity and move it towards a state where it can heal and maintain itself. Indiana State Forest are on their way to a more natural forest composition, and the manipulations by the DoF interrupt and reverse that process.

Active restoration is aimed at supporting the forest in resuming natural processes that have been so damaged by human intervention that it is unlikely that the forest will heal itself without some **obstacles being removed.** On the Indiana State Forests, this may be done for example through road closings, or through buying land to create larger patches of continuous forest habitat.

But intervening to **“restore” a land cover type that only came about because of massive human disturbances** in the first place has **nothing to do with active restoration,** i.e. helping the forest to achieve ecological integrity, defined above as the “ability of an ecosystem to support

²⁹ DellaSala, et. al., A Citizen’s Call for Ecological Forest Restoration, p. 17-18.

³⁰ DellaSala, et. al., A Citizen’s Call for Ecological Forest Restoration, p. 18.

and maintain a balanced, adaptive community of organisms having a species composition, diversity, and functional organization comparable to that of natural habitats within a region.”

We strongly urge that the DoF commits to a strategy of ecological restoration as outlined in “A Citizen’s Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria.”³¹

20. List of Desired Remedies

1. Immediately stop all plans to log and burn in the State Forests.
2. Since it can be expected that there will be significant environmental impacts from the activities outlined in this EA, the DoF should submit an EIS.
3. This EIS should thoroughly analyze alternatives that involve managing the forest for provision of ecosystem services instead of timber. The EIS should establish the value of these ecosystem services as part of a net public benefit analysis.
4. The EIS should fully disclose environmental impacts and the current state of the environment in areas that would be impacted by a timber and burning program. This would include for example issues of air and water pollution, invasive species, and endangered species.
5. A complete EIS should disclose cumulative impacts by addressing developments on private and public land, as well as the cumulative impacts from different activities on state forest land.
6. Any alternative involving timber should provide a full disclosure of short- and long term costs to the taxpayer of implementing timber and burn programs. Disclose costs that are subtracted from timber receipts. According to IC 14-23-4-5 (c) “*all distributions under this section shall be made after deducting all costs incurred by the department relating to the operations.*”
7. For any alternative involving timber, disclose which areas on the State Forest are considered suitable for timber harvests, and the basis for determining per acre estimates of timber output for suitable areas.

³¹ DellaSala, Dominick A., Anne Martin, Randi Spivak, Todd Schulke, Bryan Bird, Marnie Criley, Chris van Daalen, Jake Kreilick, Rick Brown, and Greg Aplet, A Citizen’s Call for Ecological Forest Restoration: Forest Restoration Principles and Criteria, *Ecological Restoration*, Vol. 21, No. 1, 2003.
<http://www.wildwestinstitute.org/pdf/Restoration%20Principles.pdf>

8. For any alternative involving timber, disclose whether salvage logging is included in maximum harvests per year.
9. IDNR should make available for public review the draft HCP for Indiana bat.
10. IDNR should fully implement State and Federal regulations regarding rare, threatened and endangered species before adopting a state forest plan.
11. The EIS needs to consider effect on global warming from DoF Plan, and effects of global warming on the forest, including for example impacts on endangered and threatened species, invasive species, and the extent of natural disturbances.
12. Allow state forests to develop into true old growth forests.
13. Disclose relative scarcity of early successional habitat, unfragmented interior forest habitat, and true old growth forest in Indiana.
14. Disclose extent of natural disturbances on state forests, including damage from insects, diseases, floods, droughts, fire, ice storms, and wind throw.
15. Include recreation-related industries in economic analysis.
16. Compare alternatives with regard to impacts on high value, low impact recreation.