



## 5.21 Forest Impacts

### 5.21.1 Introduction

Forests are a large and important resource in Indiana. Indiana's forests make significant environmental and economic contributions, including: timber, employment, outdoor recreation, protection of soil and water resources, and habitat for many plant and animal species. Approximately 4.5 million acres, or 20%, of Indiana is forested. Most forests are located in the southern half of the state (Tormoehlen et al., 2000). The majority of Indiana's forests are composed of hardwood species. The primary hardwood forest types in Indiana are oak-hickory and maple-beech (Schmidt, 2000). Impacts to forests resulting from the proposed project could be significant, depending upon the alternative selected. In addition to the direct taking of forests, the project may result in fragmentation of forested land and affect core forest habitat. Forest fragmentation and core forest habitat are discussed in greater detail in Section 5.23, *Ecosystem Impacts*.

In order to mitigate for direct impacts to forest and the effects of forest fragmentation, INDOT and FHWA will mitigate upland forest losses at a 3:1 ratio. Areas adjacent to large, existing forest tracts will be the preferred sites for forest mitigation. Mitigation of forest is not required by any federal or state law or regulation. For more information on forest mitigation, see Chapter 7, *Mitigation and Commitments* and Appendix NN, *Tier 1 Forest and Wetlands Mitigation and Enhancement Plan*.

Since the completion of the DEIS, the following changes have been made to this section:

- Impact calculations have been updated to reflect the selection of variations, route shifts, and other changes as described in Section 5.1.3.
- Additional information on potential forest and wetland mitigation has been included.

### 5.21.2 Methodology

Identifying the estimated impacts to forests was accomplished using the Geographic Information System (GIS) developed for Southwest Indiana. For each of the five alternatives, a proposed working alignment was placed on top of the United States Geological Survey (USGS) Land Cover data layer in the GIS. This data layer is a subset of the National Land Cover Data (NLCD). The NLCD was developed by the USGS with the United States Environmental Protection Agency (USEPA) to produce a consistent, land-cover data layer for the continental U.S. The land-cover layer is based on 30 X 30 meter squares. It includes 21 land cover types, of which only 18 are present in Southwest Indiana. For more information on the use of the GIS and on the Methodology, see Section 4.1, *GIS Approach* and 5.1, *Methodology* respectively.

Four land cover types were aggregated to form the forest category. The four types are (1) deciduous forest, (2) evergreen forest, (3) mixed forest, and (4) woody wetlands. Both upland and bottomland forests are included in the analysis. The total acreages include the right-of-way needs for the mainline of the Interstate, as well as the potential interchanges.

Ranges are provided due to the remaining variations for Alternatives 1, 2A, 2B, and 2C. Variations are the ways an alternative may pass through or around a community. Generally, the variations that use an existing highway, such as US 41 or SR 37, through the community have lower forest impacts, while those that bypass the community will have higher forest impacts. See Section 3.3.4 for a description of the variations.



For a more detailed explanation on how the GIS was used to determine potential impacts, refer to the Section 4.1, *The GIS Approach*, and Section 5.1, *Methodology*, in this document. For a core forest habitat loss discussion, refer to Section 5.23, *Ecosystem Impacts*. For a discussion on cumulative and indirect forest impacts refer to Section 5.26, *Cumulative Impacts*.

### 5.21.3 Analysis

Table 5.21-1 shows the impacts to forests due to the proposed I-69 project. The potential impacts are shown as total impacts by alternative, and are divided by forest survey unit and by county.

Indiana was divided into four forest survey units during the first Forest Inventory Analysis completed by the U.S. Department of Agriculture (USDA) Forest Service in 1950. Forest survey units have remained consistent throughout the years in order to more accurately track changes in forests from survey to survey. Each unit contains approximately one-fourth of the state's forests (Tormehlen et al., 2000).



Figure 5.21-1: Bottomland Woods in the Lower Wabash Unit

The proposed I-69 Study Area contains three forest survey units: the Lower Wabash Unit, the Knobs Unit, and the Northern Unit. Figure 5.21-1 shows a bottomland woods in the Lower Wabash Unit. Figure 5.21-2 shows the survey units and the proposed I-69 alternatives.

The potential impacts to forests due to the proposed I-69 project vary considerably depending on the alternative. Alternative 1 has the fewest potential impacts with 115 to 170 acres. All of the forest impacts for Alternative 1 occur in the Lower Wabash survey unit. Approximately 90 miles of Alternative 1 uses US 41. The remaining portion of Alternative 1 consists of two committed projects, the construction of SR 641 (Terre Haute bypass) and improvements to I-70 from Indianapolis to Terre Haute. Among the five alternatives, Alternative 1 impacts the least amount of forest because it will be located primarily along the existing right-of-way along US 41. Also, because this alternative follows an existing highway, forest fragmentation and effects to core forest habitat are expected to be the lowest among the five alternatives.

Alternatives 3A and 5A have the greatest potential forest impacts with 1565 acres and 1515 acres, respectively. The remaining alternative options fall somewhere between Alternative 1

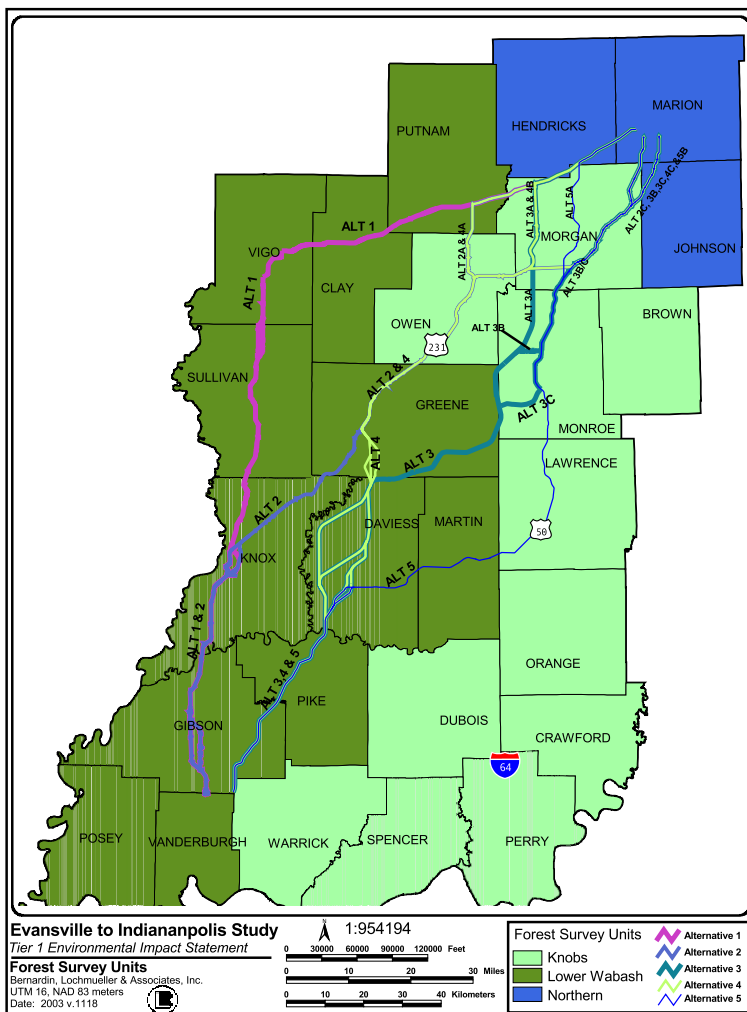


Figure 5.21-2: Forest Survey Units and Alternatives



Forests (acres)	1	2A	2B	2C	3A	3B	3C	4A	4B	4C	5A	5B
Lower Wabash Unit	115-170	220-235	200-215	200-215	950	950	705	185	165	165	620	620
Posey	-	-	-	-	-	-	-	-	-	-	-	-
Vanderburgh	<1	<1	<1	<1	-	-	-	-	-	-	-	-
Gibson	45-50	45-50	45-50	45-50	25	25	25	25	25	25	25	25
Pike	-	-	-	-	70	70	70	70	70	70	70	70
Knox	35-55	115-125	115-125	115-125	-	-	-	-	-	-	-	-
Daviess	-	-	-	-	30	30	30	25	25	25	25	25
Martin	-	-	-	-	-	-	-	-	-	-	500	500
Sullivan	15-40	-	-	-	-	-	-	-	-	-	-	-
Greene	-	40	40	40	825	825	580	45	45	45	-	-
Vigo	20-25	-	-	-	-	-	-	-	-	-	-	-
Putnam	-	20	-	-	-	-	-	20	-	-	-	-
Knobs Unit	-	680	795	640	615	330	435	685	800	645	895	650
Warrick	-	-	-	-	5	5	5	5	5	5	5	5
Lawrence	-	-	-	-	-	-	-	-	-	-	520	520
Monroe	-	-	-	-	310	270	375	-	-	-	70	70
Owen	-	680	560	560	-	-	-	680	560	560	-	-
Morgan	-	-	235	80	300	55	55	-	235	80	300	55
Northern Unit	-	-	-	10	-	10	10	-	-	10	<1	10
Hendricks	-	-	-	-	-	-	-	-	-	-	<1	-
Marion	-	-	-	5	-	5	5	-	-	5	-	5
Johnson	-	-	-	5	-	5	5	-	-	5	-	5
Total	115-170	900-915	995-1010	850-865	1565	1290	1150	870	965	820	1515	1280

Note: Clay, Spencer, Perry, Dubois, Crawford, Orange, and Brown Counties are also included in the study area, but are not shown in this table because none of the proposed alternatives pass through these counties

and Alternatives 3A and 5A in terms of potential forest impacts. The majority of the impacts for all Alternative 3 options occur in the Lower Wabash unit, specifically in Greene County. However there are also considerable forest impacts in the Knobs unit for this alternative, particularly in Monroe County, and in Morgan County for Alternative 3A. The majority of impacts for Alternative 5A occur in the Knobs unit, specifically in Lawrence and Morgan Counties, and in Martin County in the Lower Wabash unit. The forest impacts from Alternative 5B occur primarily in Martin County in the Lower Wabash unit and in Lawrence County in the Knobs unit. The majority of the forest impacts to forests from Alternatives 2 and 4 occur in the Knobs unit, particularly in Owen County. The No Build Alternative will have no impacts on forest resources.

The Preferred Alternative 3C will directly impact an estimated 1150 acres of forest. Most of these impacts are in Greene and Monroe counties. Upland forest impacted by the proposed project will be mitigated at a 3:1 ratio.

The higher forest impacts in counties such as Greene and Martin in the Lower Wabash unit, and Owen, Monroe, Morgan, and Lawrence in the Knobs unit, are expected due to the physiographic regions they comprise. These physiographic regions are the Crawford Upland, the Martinsville Hills, the Mitchell Plateau, and the Norman Upland, and are characterized by hilly topography and forested land use.



The majority of the forest impacts for the alternatives occur in the Lower Wabash and Knobs units. The total forest area within these units is approximately 2,637,700 acres (Schmidt et al., 2000). Alternative 1 has the lowest forest impacts with < 0.01% of this total forest area, while Alternatives 3A and 5A have the highest with 0.06% of the total forest area.

In addition to the direct taking of forested land, some proposed alternatives pass through forested lands that are specially managed by federal or state agencies.

- Alternatives 3A and 3B pass through the Keisler Forest Legacy Property in Monroe County. The Forest Legacy Program is a Federal program that attempts to identify and protect environmentally important forest lands that are threatened by present or future conversion to non-forest use. This program is managed by the IDNR Division of Forestry. The Keisler Forest Legacy Property was the first Legacy acquisition property in Indiana. The program began in Indiana in 1999. The easement for the property is owned by the State of Indiana, but there is no recreational use accompanying it.
- Alternatives 3B and 3C pass through a portion of the Morgan-Monroe State Forest in northern Monroe County, while using the existing SR 37.
- Alternative 5 passes through Martin State Forest in Martin County and the Hoosier National Forest in Lawrence County. The federally owned area of the Hoosier National Forest to be impacted is a special management area called the Tincher Special Area. The Tincher Special Area is the largest special area in the Hoosier National Forest. The majority of the area is subterranean drained and consisting of active and extensive karst, including caves, pits, sinkholes, swallow holes, cave springs, and the longest free-drop pit in Indiana. This area also provides habitat for a number of troglobitic (cave) species. It may provide foraging and roosting habitat for the Indiana Bat (*Myotis sodalis*), a federal and state endangered species. For more information on the Tincher Special Area, see Section 8.2.2
- In addition to the direct taking of forested land in Martin State and the Hoosier National Forests, Alternative 5 would result in additional fragmentation of these two resources. This alternative also passes through Morgan-Monroe State Forest while using the existing SR 37.

## 5.21.4 Mitigation

A Tier 1 Forest and Wetland Mitigation and Enhancement Plan detailing sites of potential wetland and forest mitigation for this project can be found in Appendix NN. Although not required by law or regulation, upland forests will be mitigated at a 3:1 ratio. Mitigation may be in the form of planting unforested areas or protecting existing forests by fee simple purchase, permanent protective easement, or a combination of both.

Some of the potential locations for identified mitigation sites include Pigeon Creek, Patoka River Bottoms, East Fork of the White River, Plainville Sand Dune Region, White River (Elnora), First Creek, American Bottoms, Sexton Springs Cave, Lake Monroe, Garrison Chapel Valley, Beanblossom Bottoms, White River (Gosport), Bradford Woods, White River (Blue Bluff), Pioneer Mother's Forest, and the Lost River (Orangeville). These sites were identified as potential mitigation sites because they offer opportunities for habitat restoration and/or preservation. They were identified based on a wide variety of factors including: existing wetlands, karst features, existing contiguous forest tracts or protected areas, and unique habitat for Threatened and Endangered Species (TES). Large, existing forest and wetland complexes were identified as potential mitigation sites with the goal of increasing core forest and reducing fragmentation. Different mitigation sites may be identified during the remaining stages of project development.



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FHWA and INDOT will continue consultation with appropriate resource agencies in Tier 2 regarding forest mitigation. For a more detailed listing of proposed mitigation measures, see Chapter 7, *Mitigation and Commitments*.

#### **5.21.5 Summary**

Indiana's forests are an important resource which provide a number of important values such as timber, wildlife habitat, protection of soil and water, and outdoor recreation. The potential impacts to forests vary depending on the particular alternative. For a discussion on cumulative and indirect forest impacts refer to Section 5.26, *Cumulative Impacts*.

The Preferred Alternative 3C will directly impact an estimated 1150 acres of forest. The majority of these impacts is in Greene and Monroe counties. Upland forest impacted by the proposed project will be mitigated at a 3:1 ratio.

Alternative 1 would have the fewest forest impacts among the five alternatives with 115 to 170 acres. Because Alternative 1 uses the existing US 41 and includes two committed projects, SR 641 and improvements to the existing I-70, it will result also in the least amount of forest fragmentation and impacts to core forest habitat. Alternative 3A and Alternative 5A have the greatest forest impacts among the five alternatives, with 1565 acres and 1515, acres respectively. Alternative 5 has the greatest impacts to state and federally owned forest lands because it passes through the Martin State Forest, the Tincher Special Area of the Hoosier National Forest, and the Morgan-Monroe State Forest. However, Alternative 5, as with Alternative 3, is on the existing SR 37 while passing through the Morgan-Monroe State Forest. Alternatives 3A and 3B will impact the Keisler Forest Legacy Property in Monroe County. The No Build Alternative will have no impacts on forest resources.



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