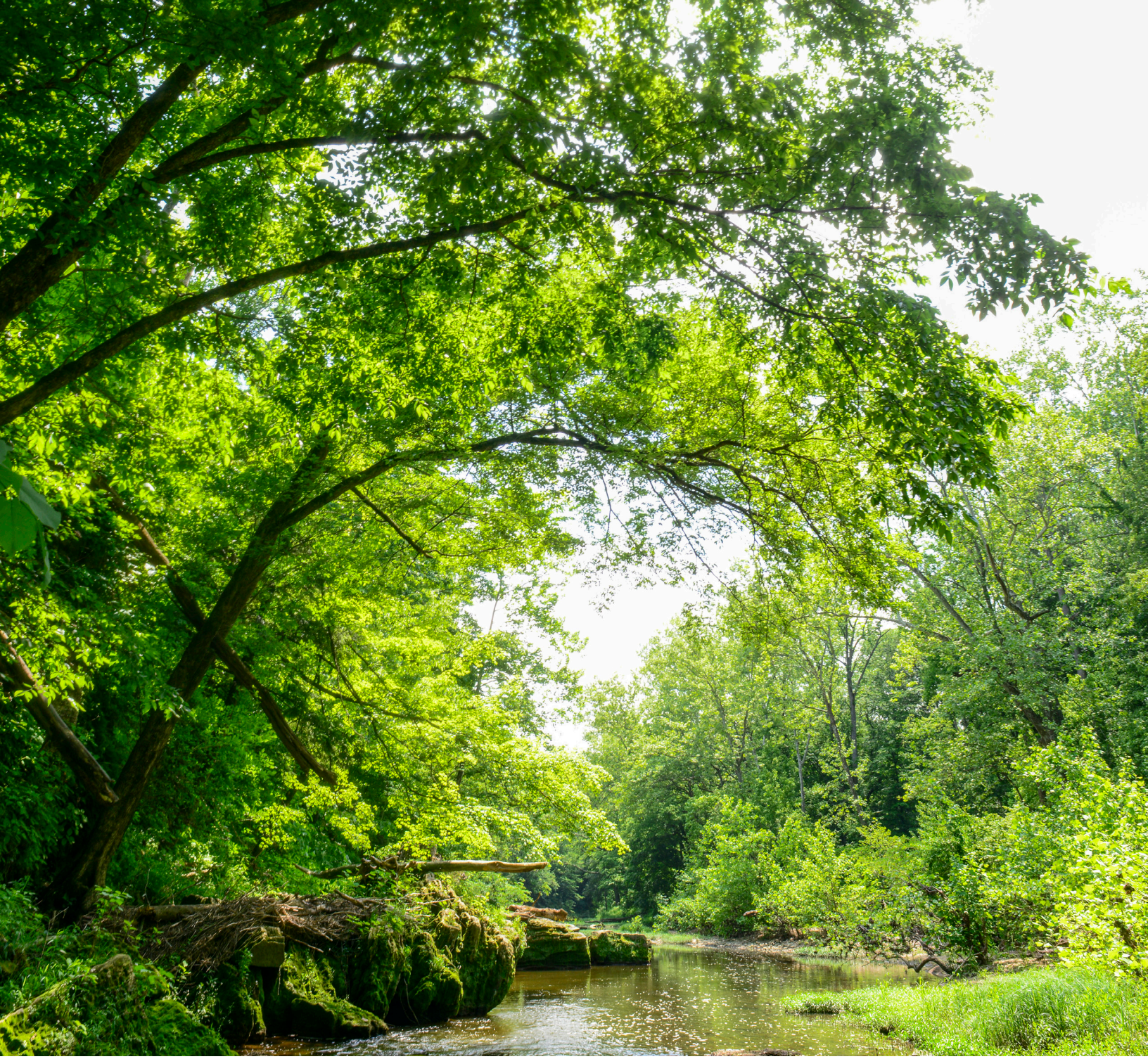


Indiana Forest Action Plan

2020 UPDATE

DNR
Indiana Department
of Natural Resources

Forestry DNR

Indiana Forest Action Plan

2020 UPDATE

Strategic Goals:

- *Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration*
- *Restore, expand and connect forests, especially in riparian areas*
- *Connect people to forests, especially children and land-use decision makers, and coordinate education training and technical assistance*
- *Maintain and expand markets for Indiana hardwoods, with special focus on secondary processors and promoting the environmental benefits of wood products to local communities and school groups*
- *Significantly increase the size of Indiana's urban forest canopy by developing community assistance programs and tools*

Executive Summary

The 2020 Indiana Forest Action Plan is an update to the 2010 Indiana Statewide Forest Assessment and Indiana Statewide Forest Strategy. The purpose remains unchanged: to address the sustainability of Indiana's statewide forests and develop a plan to ensure a desired future condition for forests in the state. This plan is distinct from the Indiana DNR Division of Forestry Strategic Direction 2020-2025. Indiana forest stakeholders participating in developing this Forest Action Plan maintained the broader perspective of all forest lands, public and private, and based recommendations on the roughly 5 million acres of forest in Indiana throughout the document.

This document includes conditions and trends of forest resources in the state, threats to forest lands and resources, areas of the state that are a priority and multi-state areas that are a regional priority. It contains a description of resources necessary for the state forester to address statewide strategy, long-term strategies to address threats to forest resources in the state and addresses State & Private Forestry National Priorities codified in the Cooperative Forestry Assistance Act of 1978:

- Conserve and Manage Working Forest Landscapes for Multiple Values and Uses
- Protect Forests from Threats
- Enhance Public Benefits from Trees and Forests

Further, this updated Forest Action Plan incorporates the Indiana State Wildlife Action Plan, existing Community Wildfire Protection Plans, and other statewide and regional planning documents relating to natural resource conservation and management. The updated Forest Action Plan includes Forest Legacy Program (FLP) requirements as an appendix.

The 2020 Indiana Forest Action Plan is a stakeholder-driven document. It was developed by the Indiana DNR Division of Forestry, through coordination with the Forest Stewardship Advisory Council, State Technical Committee, DNR Division of Fish & Wildlife, Hoosier National Forest and other partners. The hope is that this plan enables the leveraging of partner resources toward shared goals for landscape-scale forest conservation.

The Strategic Goals:

- Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration
- Restore, expand and connect forests, especially in riparian areas
- Connect people to forests, especially children and land-use decision makers, and coordinate education training and technical assistance
- Maintain and expand markets for Indiana hardwoods, with special focus on secondary processors and promoting the environmental benefits of wood products to local communities and school groups
- Significantly increase the size of Indiana's urban forest canopy by developing community assistance programs and tools focusing on local governments partnering with stakeholders, which include citizen scientists, volunteers, universities, and nonprofit organizations and private enterprise, to preserve and grow the urban canopy by policy implementation, low-impact development, maintaining existing trees, and planting new trees

Table of Contents

Introduction

The Agriculture Improvement Act of 2008, commonly referred to as the Farm Bill, was enacted in December of 2008. The legislation amended the Cooperative Forestry Assistance Act of 1978 (CFAA) and requires each state to complete a Statewide Forest Resource Assessment and a Statewide Forest Resource Strategy, or Forest Action Plan, in order to receive, or continue to receive, funds under CFAA.

CFAA funds are provided to states through the State and Private Forestry (S&PF) organization of the USDA Forest Service. Currently, Indiana receives these funds annually to assist private forest landowners, promote healthy forest practices, assist communities with their urban forests and protect communities from wildfire. A large portion of the CFAA funding received by the Indiana Division of Forestry is passed to local organizations by way of grants that provide matching funds and additional implementation resources.

The 2010 Indiana Statewide Forest Assessment https://www.IN.gov/dnr/forestry/files/fo-Assessment_6_2010.pdf was the first geospatially based assessment of all private, public, urban and rural forest resources in the state. This updated Forest Action Plan takes that Assessment and integrates its companion 2010 document, the Indiana Statewide Forest Strategy https://www.IN.gov/dnr/forestry/files/fo-Statewide_Forest_Strategy.pdf, while adding updates for 2020.

Before the 2010 Assessment, the last comprehensive assessment of Indiana's statewide forest resources was produced in August 1981. Before that time and since, Indiana's forests have continued in their constant process of change and evolution. Adding a layer of complexity, society is interacting with forests in new and different ways.

New technologies have been developed that improve 1) our understanding of complex forest ecosystem interactions, 2) the efficiency with which we harvest, create and market products derived from forests, and 3) how we communicate, learn and disseminate information about this valuable resource. Despite this progress, conflict persists around balancing a resource base with an increasing user population. Additionally, society has created new issues and new roles for forests as providers of biomass for electricity generation, feed stock for cellulosic ethanol and storehouses of carbon to mitigate a changing climate and increased concentrations of carbon dioxide in the atmosphere.

As with many others areas of society, "sustainability" is a recognized buzzword for forestry and natural resources. The word means many things to many people. This Forest Action Plan attempts to address the sustainability of Indiana's forest resources and defines sustainable forests as those that can continue to provide broad and diverse benefits, among them ecosystem services and timber production, for generations to come.

Before using this Forest Action Plan, it is important to read the following sections in this Introduction: goals and objectives, document design and acknowledgments. These sections provide an understanding of the framework, purpose, scope and perspective of the document and will provide useful context for the Forest Action Plan. The 2010 Forest Action Plan,

including both “assessment” and “strategy” components, is provided here for reference: https://www.IN.gov/dnr/forestry/5436.htm.

Goals and Objectives

The assessment portion of the Forest Action Plan attempts to show the state of affairs of Indiana’s private and public forests and analyze the sustainability of forested ecosystems on a statewide or landscape level. The assessment portion is titled Priority Areas, Forest Conditions, Trends, Threats and Priority Landscape Areas by Issue. The strategy portion of the Forest Action Plan is titled Long-term Strategies to Address Threats to Forest Resources in Indiana.

This Forest Action Plan will be used by (1) Indiana Department of Natural Resources (DNR) staff to inform management and policy making, (2) external partners and stakeholders involved in landscape conservation and stewardship who require statewide data. The information is intended to be concise while remaining accessible and understandable to the general public.

The Forest Action Plan strives to present unbiased findings and conclusions to provide a valuable source of information for others.

Document Design

The statewide scope of this document reflects the distribution of benefits and services that are produced by all forests. Forest benefits and services, like clean water, wood products, and wildlife habitat are produced by all forests, statewide. Risks to forests, like fire, insects and disease or development, can occur anywhere and often spread across large areas, affecting public and privately owned forests. The scope of this document is statewide, and it is intended to be a tool that informs landscape-level decisions. One risk of this statewide perspective is that, at times, a critical issue or threat unique to one region of the state may be masked by a stable overall condition statewide.

Indiana forest resource conditions, trends, threats and priority areas are presented according to the state’s recognized forest issues and their relative importance. Indiana’s forest issues and strategies are also consistent with the USDA Forest Service’s national priorities: conserve working-forest landscapes, protect forests from harm and enhance public benefits from trees and forests.

The relative importance of issues and their respective levels of concern were expressed by Hoosier landowners, resource professionals and other stakeholders in a 2010 Forest Action Plan survey. Significant focus is placed upon the issues of recognized importance but an effort is made to also consider items that are important but have perhaps not registered across this larger societal spectrum.

Indiana Forest Issue	Relative Importance Score
Fragmentation and/or conversion of forests to another land use	507
Conservation and maintenance of soil and water resources	425
The spread and control of invasive species	421
Conservation of biodiversity	364
Counterproductive government forest conservation-related policies	249
Availability of land for public recreation	234
High cost of forest ownership and low incentives to retain	226
Conservation of forests that protect drinking water supplies	206
Overpopulation of white-tailed deer	194
Inadequate public education about forests	166
Sustaining Indiana's forest product industry	160
Lack of active management on forests	146
Sustainable regeneration of oak woodlands	138
Inadequate youth education about forests	94
Lack of healthy woodlands and trees in urban areas	90
The control of forest fires	73
The loss of fire-dependent plant communities and habitats	67
Forests not managed for carbon storage	45

Based on meetings of the Forest Stewardship Advisory Council in 2017 and 2018, these 2010 Indiana forest issues remain of primary concern to Indiana forest stakeholders. However, it was recognized by the Indiana Forest Stewardship Advisory Council that urban forests, climate change, oak regeneration and lack of age-class diversity (specifically older and younger forests) require increased focus and strategic action.

Today forested landscapes cover about 5 million acres or 21% of Indiana’s land base. All of these forests are important for providing associated benefits and services but certain areas are prioritized to ensure that federal and state resources are being focused on important landscape areas with the greatest opportunity to address shared management priorities and achieve measurable outcomes. Strategic Target Forest Patches, described in the section titled Priority & Multi-state Areas represent priority landscape areas of greatest importance for conservation. There is also description of multi-state areas that are a regional priority.

The Forest Action Plan was not intended to duplicate or replace statewide plans that currently exist on topics addressed herein. Effort has been made to incorporate but not directly present information from existing statewide assessments, i.e., USFS Forest Inventory Analysis reports, State Comprehensive Outdoor Recreation Plan and Wildlife Action Plan. Links to the plans that were incorporated or are referenced in the Forest Action Plan are provided in the appendix.

The 2020 Forest Action Plan keeps the same framework as exists in the previous documents, combines and updates them while addressing some changes that have taken place or progress that has been made on action steps. Also, new strategies and actions steps are proposed for priority implementation.

Acknowledgments

This document was compiled by the Indiana DNR Division of Forestry through the generous assistance of the members of the Indiana Forest Stewardship Advisory Council and members of the general public who identified themselves as forest stakeholders. The following organizations took an active role in contributing material for the initial draft:

- American Tree Farm System
- City of Goshen, Parks Forestry
- Friends of Lake Monroe
- Indiana DNR Division of Entomology & Plant Pathology
- Indiana DNR Division of Fish & Wildlife
- Hoosier Mountain Bike Association
- Indiana Association of Consulting Foresters
- Indiana Backcountry Hunters and Anglers
- Indiana Forest & Woodland Owners Association
- Indiana Forest Alliance
- Indiana Hardwood Lumbermen's Association
- Indiana Land Protection Alliance
- Indiana Legislative Sportsmen's Caucus
- Indiana Society of American Foresters
- Indiana Sportsmen's Roundtable
- Indiana Wildlife Federation
- Izaak Walton League of America, Indiana Division
- Knobstone Hiking Trail Association
- La Porte County Conservation Trust, Inc.
- Mind the Gap
- National Wild Turkey Federation
- Natural Resources Conservation Service
- Owen-Putnam Friends of the Forest
- Oak Heritage Conservancy
- Purdue University, Department of Forestry & Natural Resources
- Ruffed Grouse Society
- Southern Indiana Cooperative Invasives Management
- Sierra Club, Hoosier Chapter
- The Hoosier Environmental Council
- The Nature Conservancy, Indiana Chapter
- U.S. Department of Agriculture, Natural Resources Conservation Service
- U.S. Fish and Wildlife Service
- U.S. Forest Service, Hoosier National Forest
- Wild Tecumseh Friends

The assistance of many organizations that are part of the Indiana Forest Stewardship Advisory Council as well as other groups and individuals who contributed to the review of the initial draft was appreciated. Additional information about the review process is available in the Document Review section. Thanks are also to the Sustainability & Planning Coordinator and other staff with the State and Private Forestry division of the U.S. Forest Service's Eastern Region.

Also special recognition goes to Jill Flackskam of the Division of Forestry, who created the majority of the maps in the document.

Accomplishments

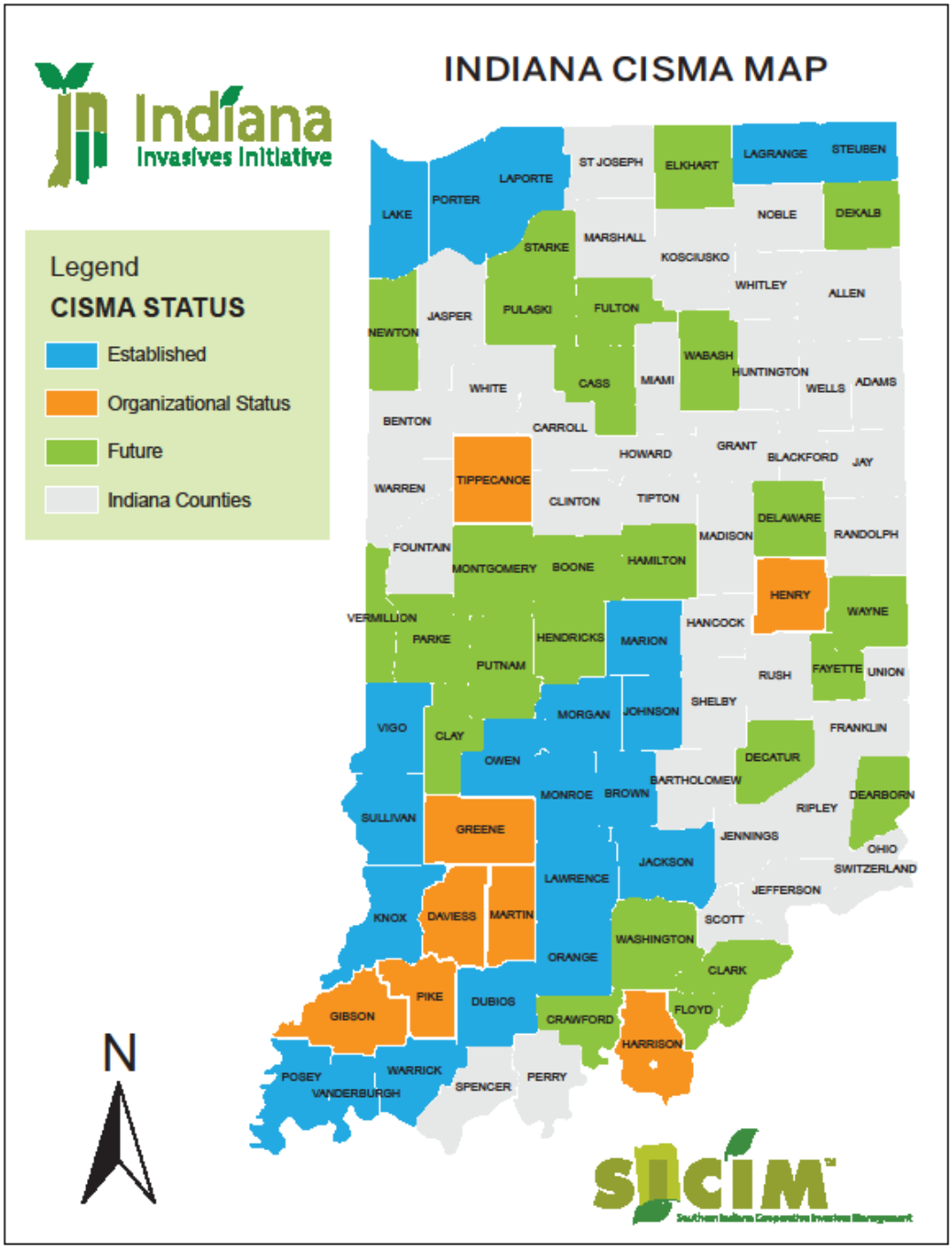
Major projects were established to directly address key forest threats. These projects include the Southern Indiana Young Forest Initiative and the Hoosier Hills and Highlands Oak Community Restoration Project and National Joint Chief's' Landscape Scale Restoration Initiative, which is a partnership between two USDA agencies, the Forest Service (USFS) and Natural Resources Conservation Service (NRCS). A Cooperative Conservation Partnership Initiative (CCPI) project used NRCS funding to direct additional incentives for forest conservation practices to private landowners. During the 10 years from 2008-2018, NRCS provided over $12 million to private forestland owners to increase the health and productivity of their forestlands, establish new trees and forests, and develop forest management plans, among other things. The State of Indiana celebrated its bicentennial anniversary and created a Bicentennial Nature Trust that leveraged community funds to conserve important forest areas. Trails and corridor projects were expanded. For example, the Next Level Trails program will invest $90 million in State trail funding in Indiana. Rules (312 IAC 18-3-23 and 312 IAC 18-3-25) went into place to prohibit the sales of first aquatic and then terrestrial invasive species.

It is beyond the scope of this document to cover the accomplishments of all forest conservation efforts or the successes of all partners. It is important, though, to mention that during the past 10 years more than 25 million new trees have been planted in Indiana, to highlight those efforts above and go into some more detail below on collaborative efforts. This listing is not meant to be comprehensive or to leave out valuable partner organization funding on-the-ground forest conservation like the Great Lakes Restoration Initiative, Clean Water Indiana, Section 319 Grants, and many other foundation and partner efforts.

Invasive species were a major focus of the 2010 Forest Action Plan, and it is worth highlighting a collaborative effort to address invasives management in forests across the state. According to Southern Indiana Cooperative Invasives Management's (SICIM) 2019-2023 Strategic Plan, "at end of 2017, SICIM and the NRCS signed an agreement to develop local Cooperative Invasive Species Management Areas (CISMAs) throughout Indiana.

SICIM then created the Indiana Invasives Initiative (III) project to implement the agreement. Through the III project, a team of five Regional Specialists employed by SICIM actively work at the county level with local conservation agencies to develop new CISMAs and provide technical assistance to landowners, surveys and public educational events." Since the inception of the project they have helped establish 10 operational CISMAs with eight more counties currently being organized. This work is resulting in increased landowner surveys, outreach events, weed wrangles, and private landowner participation to address the threat of invasive species.

Map 1: SICIM provided map showing status of CISMAs in Indiana (2019)



Forest Action Plans cumulatively represent a strategic plan for the nation's forests that can direct limited resources where they are needed most. Through Forest Action Plans, state foresters can demonstrate how federal investments can be used to leverage other resources and produce measurable outcomes that address national priorities. The following accomplishments identify how the Indiana Forest Action Plan is built around and aligns with the three national priorities in the Farm Bill.

National Priorities Accomplishments Section

National Priority 1: Conserve and Manage Working Forest Landscapes for Multiple Values and Uses

This national priority aligns with Indiana Forest Action Plan's Strategy 1: Conserve, manage and protect existing forests, especially large forest patches.

Indiana is committed to sustainably managing the forestland it owns and that is on woodlands enrolled in the Classified Forest & Wildlands Program. The State Forest system (158,000 acres) is third-party certified through Forest Stewardship Council® (FSC®-C012858) and the Sustainable Forestry Initiative® (SFI®) program. As a benefit of the Indiana Classified Forest & Wildlands Program, landowners can opt to have their lands (480,000 acres total) certified under the Forest Stewardship Council® (FSC-C071226). Audits to these rigorous certification standards are conducted annually. State Forest audit and certification documents are available here: https://www.IN.gov/dnr/forestry/7532.htm

Since the 2010 Indiana Forest Action Plan, Indiana has increased 175,258 acres enrolled in the Indiana Classified Forest & Wildlands (CFW) program, with a corresponding increase in the number of acres that have professional forest stewardship plans. As of November 2019, there are 823,258 acres enrolled in this program, and new enrollments are concentrated in targeted areas. This has enabled measurable accomplishment on Forest Action Plan action steps relating to increasing economic incentives, including cost-share and conservation payments for forestlands.

According to information provided by the NRCS Indiana forester for the Forest Action Plan, obligations for forestry practices, which include Brush Management, Forest Stand Improvement, Forest Trails and Landings, Herbaceous Weed Control, Riparian Forest Buffer, and Tree and Shrub Establishment, among others, have increased since 2010. The Indiana Division of Forestry has partnered cooperatively with the U.S. Department of Agriculture's Natural Resource Conservation Service (NRCS) to serve as a technical service provider, write plans and check installed forestry practices under the Conservation Reserve Program (CRP) and the Environmental Quality Incentives Program (EQIP).

These targeted increases in the CFW program would not have been as successful without federal funding assistance provided through Eastern Region State and Private Forestry (S&PF) Landscape Scale Restoration Request for Proposals. Two grant projects highlighted below helped achieve the successes mentioned.

Parcel Level Strategies

The Statewide Strategies at a Parcel Level project developed a statewide, private landowner contact database that was linked to geospatial data and included the ability for landowners to connect online for forestry information and update their mailing addresses with email and phone numbers. This enabled targeted outreach to ensure owners of forested acres were aware of incentive and assistance programs that help retain working forests.

Large Block Outreach & Enrollment

Expansion of the Classified Forest & Wildlands (CFW) Program was a goal in the 2010 Forest Action Plan and other statewide plans. Legislated requirements, changes in state tax policy, and limited resources for the Division of Forestry to hire additional Cooperative Forest Management (CFM) staff created challenges in targeting outreach and new enrollments to large tracts in priority areas.

The project provided funding for outreach and for foresters to enroll targeted forestland according to a prioritized parcel list developed from a geospatial forest landowner contact information database (Parcel Level Strategies project). The owners of the largest private parcels of existing forestland within Forest Action Plan target areas were contacted and received information about the CFW Program, federal programs, and other conservation options. Enrollments in the CFW Program ease the costs to maintain working forests by providing tax relief and other benefits.

National Priority 2: Protect Forests from Threats

This national priority relates to maintaining forest sustainability and aligns with many strategies in the Forest Action Plan, especially those relating to restoration and protection from pests, disease and invasive plants.

The 2010 Forest Action Plan assessment process specifically identified fragmentation, parcelization and forest invasive plants as the most important threats to forests in the state. While the 2010 Forest Action Plan addressed fragmentation and parcelization more broadly, it offered numerous specific strategies and action steps that focused on invasive species, including the development of a statewide Early Detection, Rapid Response (EDRR) program for forest invasive plants. Two specific projects relating to invasive species are highlighted below.

Invasive Species BMP Pilot Project

This was a two-year project that implemented the recommendation of the Indiana Invasive Species Council to assess and refine the Invasive Plant Advisory Committee's Invasive Species Best Management Practices (BMPs). It also provided demonstration and public outreach to encourage private landowner adoption of the new BMPs. The project directly addressed a main strategy of the 2010 Indiana Forest Action Plan: Expand Best Management Practices with special attention to Invasive Species. It was coordinated across 148,000 acres and engaged 22 professional foresters in invasive species monitoring, mapping, planning, treatment, inspection, education, documentation and other activities.

Next Steps in Early Detection, Rapid Response

This project specifically addressed the 2010 Forest Action Plan Strategy 3 component to “develop statewide Early Detection Rapid Response Program for forest invasive plants” and other action steps. It created a Strike Team to coordinate education and awareness, and to conduct control efforts for EDRR species. This project built on an established and successful U.S. Forest Service Eastern Region State & Private Forestry funded project in southern Illinois and expanded into the work detailed above by Southern Indiana Cooperative Invasives Management (SICM)

In addition to the projects above addressing this national priority, Indiana Division of Forestry provided training to loggers and forest industry professionals on an expanded suite of forest best management practices that includes invasive species, threatened and endangered species, and other specialized situations.

National Priority 3: Enhance Public Benefits from Trees and Forests

The 2010 Indiana Forest Action Plan had many strategies and action steps that address this national priority. 2010 Forest Action Plan strategy 2, to "restore and connect forests, especially in riparian areas" was meant, in part to protect and enhance water quality and quantity (objective 3.1). 2010 Forest Action Plan strategy 5, to "maintain and expand markets for Indiana hardwoods, especially those that are sustainably certified" related to maintaining and enhancing the economic benefits and values of trees and forests (objective 3.4).

Other aspects of this national priority aligned with the 2010 Forest Action Plan, such as protect, conserve, and enhance wildlife and fish habitat (objective 3.5) and connecting people to trees and forests, and engage them in environmental stewardship activities (objective 3.6). 2010 Forest Action Plan Strategy 4, "coordinate education, training, and technical assistance, especially to develop strategic partnerships" broadly related to this national priority and focuses on working with partners to promote forestry knowledge and understanding, including the coordinated delivery of forest-related programming. The broad goals of the 2010 Forest Action Plan remain relatively unchanged. One success story that highlights contribution to this national priority is listed below.

Hardwood Ecosystem Experiment

Since 2010, the Indiana Division of Forestry has continued to provide direct support to dozens of research projects investigating the ecological effects of forest management on State Forests. Most of the support went to researchers involved with the Hardwood Ecosystem Experiment (HEE), a long-term project based at Morgan-Monroe and Yellowwood state forests (https://www.heeforeststudy.org/). The Division of Forestry provided support for long-term forest monitoring and to graduate/postgraduate researchers working on questions related to forest management and ecological impacts. These efforts have resulted in more than 60 articles in peer-reviewed scientific journals and 29 completed master's theses and published dissertations since 2010. This long-term research is related to National Priority 3, the Indiana Forest Action Plan's strategy to promote forestry knowledge and understanding, and multiple 2010 action steps.

Priority Areas, Forest Conditions, Trends, Threats and Priority Landscape Areas by Issue

Indiana's unique and high-quality forests are a part of the fabric of Midwestern wealth and development. The issues that are paramount in determining the sustainability of forest resources have far-ranging impacts on Hoosier jobs, health, and quality of life, among other things.

Landscape conservation and stewardship requires information and resources to facilitate the many shared goals of organizations and partners in the field. The following analysis should inform decision-making related to forestry and land use, and it is presented so that specific issues, like water quality, economic development or public recreation can be considered separately and given a local priority weighting that may differ from any statewide priorities discussed herein. Partners are encouraged to analyze issue components independently where certain factors may be less relevant at more local scales or where initiatives have a more narrowly defined focus. Also, this section should have applications to the Indiana-relevant sections of broader-scale regional work that extends beyond the state's borders. Existing and potential multi-state priorities are discussed briefly in the following section.

Considered together, Indiana's forest issues represent an informed Hoosier perspective on forest threats, benefits and conservation priorities that are reflective of trends in the state. Forest benefits like recreation and biodiversity are recognized and evaluated in juxtaposition with threats to forests, like wildfire and conversion. Indiana forest issues form the framework for the major analysis of the Assessment and are developed consistently with the priorities of Indiana forest stakeholders. Using Indiana's forest issues in this way, to prioritize forest importance, offers an analytical opportunity that mirrors the complexity and tradeoffs involved in all economic decision making.

Over the past 200 years, Indiana's forests have shown remarkable resilience and present a case study in forest resource resilience and sustainability. The lessons that were learned by society after the cutover that followed the European settling of this state, and the response guided by eminent Hoosier conservationists like Richard Lieber and Charles Deam, among others, also have application today, as society responds to new forest threats and issues.

American ecologist Aldo Leopold wrote in "Round River" that "Conservation is a state of harmony between men and land." Such being the case, bringing harmony to society's relationship with forests has become exponentially more complicated as private individuals, who own 85% of Indiana's forests, have become more numerous and divided ownerships into smaller tracts.

Indiana's forests will never be the forests that existed at the time of European settlement. Major forest ecosystem components, like the passenger pigeon, have been erased forever and cannot be replaced. Similarly, land management practices of the past, like the free ranging of millions of hogs and widespread burning of large areas that were formative for Indiana's forests cannot be practiced on a similar scale today. Forest stewards and conservationists are key to helping society understand the history of Indiana's forests and their potential to provide benefits in the future.

According to the Northern Forest Futures Project https://www.nrs.fs.fed.us/futures/, Indiana's gains in forested acreage after the 20th century have peaked and are forecasted to decrease in coming years. It is of primary importance that forest stakeholders conserve and protect existing forests, working together to keep working forests on the landscape, and, where possible, attempt to make inroads against the projected loss.

Comprehensive analysis of all of the important issues facing Indiana's forests is beyond the scope of this document.

Fragmentation

Fragmentation and/or conversion of forests to another land use is the most important threat to the sustainability of Indiana's forests.

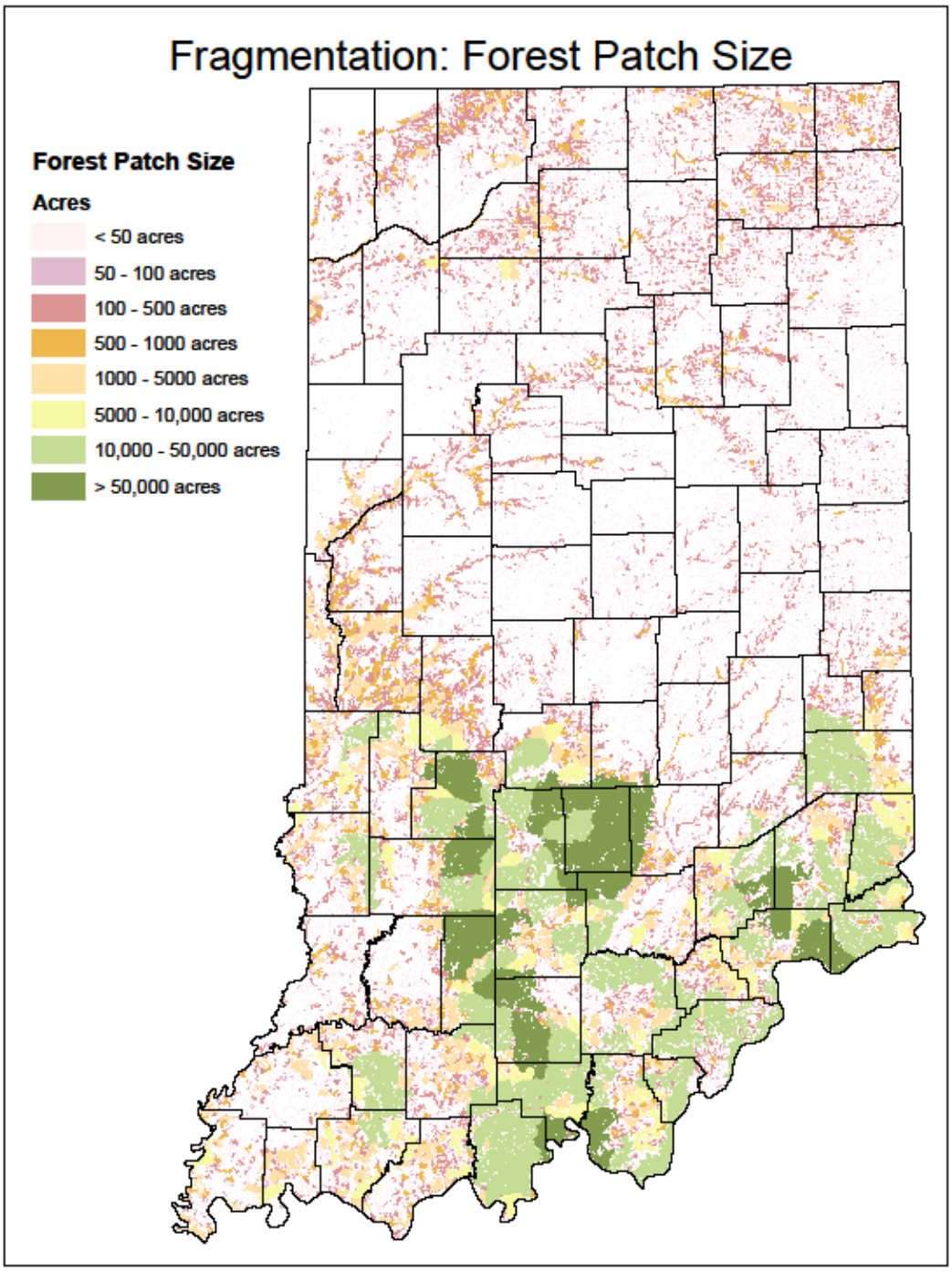
The broadly designated issue, hereafter referred to more simply as "fragmentation," can incorporate many different effects on forests. The effects of fragmentation from logging can be relatively short term and present certain ecological differentiation, whereas conversion of forestland to impervious surface presents wholly different and significantly more severe ecological effects. Likewise, the effects of a contiguous forest patch being converted to low density residential housing differ from those where conversion is to commodity agricultural production.

The long-term sustainability of forested ecosystems is affected by the ability of these systems to provide genetic response to stress, disease or disasters. Forest systems are complex, and genetic transfer is influenced by a multitude of interacting forces from climate changes to fluctuations in wildlife population. Fragmentation inhibits this transfer and weakens the overall systems' ability to adapt and respond to environmental change.

This issue considers ecological aspects of fragmentation as well as economic aspects. It considers the growth in human population density and urban areas as well as associated leading indicators, namely roads and existing metropolitan areas. Just as extensive fragmentation can impair the ability of migratory birds to find suitable nesting sites, it can also impair the ability of woodland owners to market timber due to an insufficient product base from which to profitably deduct transportation and removal costs.

How parcels are divided and the rules and enforcement of tax assessment categories and zoning categories have an important effect on the fragmentation of forests.

Map 2: 2018 Forest Patches by Size



Methodology: Forest patches were derived by converting the 2018 Forest Layer (Forest land in Indiana was derived from the 2018 National Agricultural Statistics Survey (NASS) satellite imagery. Classes 141 (Deciduous Forest), 142 (Evergreen Forest), 143 (Mixed Forest), 152 (Shrubland), and 190 (Woody Wetlands) were reclassified to forest. To remove mixed or misclassified pixels, all interstates, U.S. highways, and state highways were buffered by 15 meters per side and subtracted from the forest layer.)

Southern Indiana contains the majority of the largest forest patches. As the map above shows, there are no forest patches larger than 10,000 acres in Northern Indiana. These largest forest patches are the most able to provide forest genetic exchange requisite for healthy ecosystem functions.

Fragmentation for home building or other development is generally reliant on connection to local and non-local transportation networks. Roads also present major barriers for successful dispersal for some forest wildlife and plant species.

Research shows that areas that have very low forest cover (e.g., <15%) had high nest loss at forest edges and within interiors; at moderate levels nest loss was high at edges but not interiors; and in unfragmented areas (>90% forest cover), nest loss was low at both edges and within interiors. (Donovan et al. 1997, Hartley and Hunter 1998, Thompson et al. 2002) The proportion of forest cover across a landscape in large part determines the distribution of wildlife, including forest amphibians, bats, and birds. The ecological effects of human population density on forested areas can be magnified when development is dispersed rather than concentrated in certain areas.

Within forested habitats across Indiana, conversion of natural habitat to other land uses was viewed as the top threat facing fish and wildlife species of greatest conservation concern (Chapter 6). Specifically, development and conversion to annual cropland was seen as the most common driver of this threat. Consequently, top actions of forest conservation included protection of contiguous forest areas, limiting forestland conversion and fragmentation, reduction of development within forested communities, and maintaining appropriate habitat corridors and connectivity (Indiana SWAP, Chapter 6).

Areas at high risk for forest fragmentation, for example those with increased population density, often carry a higher economic cost, encompass a greater number of ownerships, and carry greater inherent ecological denigration. Areas at low risk for forest fragmentation generally contain more intact forest habitats and a greater ability to effectuate landscape scale stewardship and conservation efforts at a lower cost. Thus, conservation efforts to protect against fragmentation should generally be directed to areas with low risk for fragmentation.

Lands with legal limits to conversion (easements, deed restrictions, and public ownership) are more effectively protected against conversion to another land use. Indiana forest lands in public ownership run the gamut from federally owned Hoosier National Forest to small city parks. State-owned forests exist in many capacities beyond State Forests managed by the Indiana Division of Forestry, including State Nature Preserves, State Fish & Wildlife Areas, and State Department of Transportation medians, among others. There is less chance that these forests in public ownership will be converted to other land use than there is of those in private ownership being converted. Certain classes of public land have greater protections against conversion than others, with state dedicated nature preserves having the most rigorous protections.

Indiana Division of Forestry's administered Classified Forest & Wildlands program included 823,258 acres in 16,785 tracts as of November 2019. These enrollments offer tax incentives for owners, and the classification goes with the property deed when ownership is transferred.

There are fees associated with removing a property from the program but these costs are not sufficient to prevent Classified Forests from being converted to another land use where development pressure exists.

Income from working lands, farms or forests, provides economic value that is largely unable to compete with real estate values based on developed land use. As a result, even the most productive farm and forest lands is at risk of conversion to another land use when financial values are the only consideration and legal protections against conversion are not in place. Resources are available for land-use planners to address this issue, but they are not sufficient to address the full scope of the challenge.

Conservation easements are also used in Indiana to retain a forest land use. Indiana has about 24 land trusts that operate at local and regional scales to preserve land use through fee title purchase or conservation easements. According to estimates from the Land Protection Alliance, land trusts in Indiana are estimated to own or maintain easements on more than 70,000 acres of mostly forest land.

The following table shows National Land Cover Database forested acre totals by county by survey year, total change from 2001 to 2016, and corresponding percentage change organized from highest percent increase to highest percent decrease in acre change. These data were provided by the Indiana Division of Forestry and show that Indiana's forest cover over the last 15 years, where data is available, has been relatively stable.

Table 1:NLCD Forest Acres

County name	2001	2006	2011	2016	Change '01-'16	% change
Ohio	30,769	30,802	30,842	31,061	292	0.9%
Dearborn	110,823	110,442	110,603	111,121	298	0.3%
Switzerland	87,507	87,339	87,365	87,716	210	0.2%
Brown	173,768	173,682	173,679	173,843	75	0.0%
Franklin	128,318	128,121	127,765	128,356	38	0.0%
Henry	25,638	25,647	25,649	25,640	2	0.0%
Posey	37,403	37,361	37,202	37,388	-15	0.0%
Benton	2,235	2,233	2,233	2,234	-1	-0.1%
Shelby	19,450	19,448	19,443	19,435	-15	-0.1%
Newton	21,571	21,563	21,568	21,553	-18	-0.1%
Owen	155,497	154,846	154,794	155,363	-134	-0.1%
Noble	26,512	26,510	26,518	26,487	-24	-0.1%
Perry	175,320	174,928	174,559	175,116	-204	-0.1%
Miami	29,803	29,776	29,758	29,763	-40	-0.1%
Clinton	11,267	11,263	11,262	11,251	-16	-0.1%
Spencer	72,567	72,367	71,707	72,464	-103	-0.1%
Wabash	38,620	38,586	38,575	38,557	-63	-0.2%
Union	23,109	23,080	23,067	23,069	-40	-0.2%
Blackford	9,591	9,591	9,575	9,573	-18	-0.2%

Fountain	44,145	44,103	44,096	44,051	-94	-0.2%
Fayette	38,999	38,887	38,697	38,914	-85	-0.2%
Morgan	113,861	113,509	113,611	113,597	-264	-0.2%
Grant	22,115	22,093	22,076	22,063	-52	-0.2%
Montgomery	33,960	33,934	33,918	33,878	-83	-0.2%
Fulton	15,006	14,987	15,003	14,967	-39	-0.3%
Wayne	44,707	44,627	44,611	44,582	-125	-0.3%
Tipton	2,286	2,288	2,279	2,279	-7	-0.3%
Kosciusko	33,098	33,086	33,083	32,996	-102	-0.3%
Huntington	31,885	31,863	31,808	31,786	-100	-0.3%
Washington	150,144	149,717	149,656	149,673	-471	-0.3%
Starke	36,326	36,304	36,295	36,203	-123	-0.3%
Jackson	119,515	119,400	119,399	119,111	-405	-0.3%
Warren	34,811	34,778	34,772	34,693	-118	-0.3%
Parke	115,324	115,166	115,077	114,926	-399	-0.3%
Crawford	143,146	142,387	142,206	142,649	-497	-0.3%
Marshall	28,901	28,848	28,867	28,797	-104	-0.4%
Decatur	43,913	43,828	43,804	43,750	-163	-0.4%
Madison	18,095	18,084	18,066	18,027	-68	-0.4%
Whitley	23,722	23,698	23,681	23,626	-96	-0.4%
Delaware	21,143	21,131	21,098	21,057	-86	-0.4%
Jay	22,338	22,319	22,271	22,247	-91	-0.4%
Pulaski	29,753	29,756	29,742	29,629	-123	-0.4%
Howard	10,006	9,992	9,974	9,961	-44	-0.4%
Cass	31,917	31,895	31,876	31,771	-146	-0.5%
Wells	14,985	14,972	14,918	14,915	-70	-0.5%
White	15,790	15,794	15,769	15,713	-77	-0.5%
Jefferson	123,753	123,341	123,518	123,134	-618	-0.5%
Adams	12,455	12,457	12,399	12,391	-64	-0.5%
Ripley	128,164	127,357	127,560	127,487	-677	-0.5%
Martin	153,499	152,910	152,643	152,671	-828	-0.5%
Carroll	25,661	25,640	25,629	25,517	-144	-0.6%
Harrison	163,125	161,849	161,669	162,168	-957	-0.6%
Jasper	32,248	32,222	32,175	32,053	-195	-0.6%
DeKalb	23,176	23,148	23,108	23,032	-143	-0.6%
Randolph	19,879	19,839	19,772	19,755	-125	-0.6%
Orange	153,675	152,663	152,701	152,702	-973	-0.6%
Greene	163,056	162,299	162,140	162,011	-1,045	-0.6%
Warrick	88,728	88,368	88,654	88,082	-646	-0.7%
LaPorte	48,854	48,685	48,651	48,498	-356	-0.7%
Putnam	111,109	110,748	110,502	110,291	-818	-0.7%

Rush	16,374	16,275	16,227	16,245	-129	-0.8%
LaGrange	8,500	8,503	8,451	8,432	-68	-0.8%
Scott	56,308	55,879	55,895	55,854	-453	-0.8%
Dubois	104,181	103,525	103,418	103,341	-840	-0.8%
Lawrence	151,154	149,918	149,956	149,907	-1,247	-0.8%
Steuben	11,781	11,750	11,741	11,675	-107	-0.9%
Jennings	113,684	113,210	113,139	112,610	-1,074	-0.9%
Hancock	11,984	11,945	11,909	11,871	-114	-0.9%
Monroe	172,071	170,859	170,662	170,403	-1,668	-1.0%
Clay	70,656	70,209	70,126	69,959	-697	-1.0%
Vermillion	39,867	39,383	39,258	39,441	-427	-1.1%
Tippecanoe	39,771	39,525	39,471	39,314	-456	-1.1%
Boone	14,451	14,362	14,300	14,279	-171	-1.2%
Bartholomew	76,833	76,049	76,007	75,796	-1,038	-1.4%
St_Joseph	31,095	30,759	30,733	30,670	-425	-1.4%
Knox	35,470	35,165	35,126	34,952	-518	-1.5%
Floyd	49,515	48,936	48,744	48,672	-843	-1.7%
Vanderburgh	34,211	33,693	33,566	33,615	-596	-1.7%
Johnson	34,197	33,841	33,742	33,583	-614	-1.8%
Sullivan	77,081	76,396	75,844	75,450	-1,632	-2.1%
Pike	95,597	93,335	91,664	93,551	-2,045	-2.1%
Elkhart	17,655	17,473	17,386	17,271	-384	-2.2%
Clark	113,305	111,604	111,204	110,754	-2,550	-2.3%
Hendricks	27,758	27,278	27,167	27,076	-682	-2.5%
Daviess	48,541	47,387	47,236	47,224	-1,318	-2.7%
Allen	36,265	35,511	35,366	35,099	-1,166	-3.2%
Vigo	75,455	74,597	74,177	72,979	-2,476	-3.3%
Gibson	42,735	41,876	41,385	41,016	-1,719	-4.0%
Porter	33,848	33,261	32,719	32,473	-1,375	-4.1%
Marion	18,034	17,451	17,289	17,270	-765	-4.2%
Hamilton	16,449	15,956	15,753	15,653	-796	-4.8%
Lake	25,142	24,244	23,464	23,195	-1,947	-7.7%
Total	**5,367,011**	**5,336,709**	**5,327,063**	**5,325,278**	**-41,734**	**-0.8%**

Soil & Water

Conservation and maintenance of soil and water resources, and the conservation of forests that protect drinking-water supplies ("soil & water") are important issues to Indiana forest stakeholders. Only seven of the 1,292 respondents to the original stakeholder survey were "not concerned" about these issues, and depending on how their importance measures are tallied, it is arguably of equal or greater importance than fragmentation.

Maintaining a forested buffer around perennial watercourses improves water quality and wildlife habitat, and protects soil resources. Undisturbed forests are unsurpassed in their ability to preserve and enhance soil resources and water quality. Forest cover, especially around creek and river bottoms, and along drainages or riparian areas, acts as a buffer for surrounding exposed soil or agricultural applications and reduces soil or other pollutants from reaching streams. Forested riparian areas are important for the maintenance of soil and water quality, and play an important role in regulating stream and river temperatures requisite for aquatic life. Because these areas are prone to flooding and less amenable to row crop agriculture, they are generally less developed and therefore heavily relied upon as wildlife dispersal corridors. Indiana's Statewide Action Plan identifies the spread of invasive species as a top statewide threat to fish and wildlife forest habitats (Indiana SWAP, Chapter 6)

Forest cover alone cannot ensure water quality in larger watersheds. Inadequately managed point-source and non-point (pollution, roadway and impervious surface runoff, sewage overflows, manure, and pesticide and herbicide applications) can negatively impact stream water quality.

Best management practices (BMPs) that protect soil and water quality during and after timber harvest are required on forestland managed by the DNR and USDA Forest Service. In general, BMPs are not required of private forests, although use of them is encouraged. Lands enrolled in the Classified Forest & Wildlands must prevent "excessive erosion," and BMPs are a tool to meet that requirement.

Public drinking water is particularly important, and there are specific human health implications in situations in which drinking water contains contaminants or toxic elements. Maintaining forests in these areas can lessen the need for expensive water treatment facilities.

Karst regions are particularly susceptible to water-quality issues, due to the fragility of subterranean ecosystems and the abrupt entry of surface water into underground watercourses through sinkholes, caves, etc. These areas are also important for the federally endangered Indiana Bat.

Toxic and hazardous materials deposited on or associated with roadways and impervious surfaces enter waterways more quickly during rains and floods because they are not filtered or slowed by soil, root, and plant dynamics.

Impervious surface areas are removed from natural ecosystem service functions and comparatively bereft of ecologically beneficial habitat for trees and wildlife. These areas can affect their own climate and create heat islands that further differentiate local ecosystems.

Purdue University maintains a State of Indiana Waters website (https://www.agry.purdue.edu/indiana-water/) that is easy to navigate and locate information on, but it is unfortunately only related to the quantity and distribution of Indiana ground and surface waters and does not include information on water quality.

Invasives

The spread and control of invasive species is an important forest issue in Indiana. According to the 2010 Forest Action Plan stakeholder survey, this is a top issue for forest stakeholders in Indiana. Invasive plants threaten forest sustainability in Indiana. Invasives can cause great harm to native ecosystems, economies, human health, and aesthetics.

Indiana's distinction as a hub of transportation and commerce also creates pathways and corridors that accentuate invasive-species problems. Humans play a large part in accelerating the introduction and spread of invasive plants in forested communities through the direct planting or seeding of non-native nursery stock. Forest management practices that are conducted without regard for invasive plants or application of BMPs can cause explosive expansions of invasive species like Japanese stiltgrass.

There are a wide variety of plant species able to invade forests. Some, like Japanese stiltgrass and garlic mustard, are shade tolerant and able to establish and spread under undisturbed forest canopies. Others, like Japanese honeysuckle and autumn olive are shade intolerant but can establish in the understory and abide until the canopy is disturbed and light reaches them, enabling their rapid spread.

Control and risk of spread is difficult precisely for these reasons. The public generally becomes aware of an invasive species' inroads only when it may be too late to eradicate it. Statewide invasive species mapping is provided through EDDMapS, Early Detection & Distribution Mapping System, Report IN website, which is available at eddmaps.org.

Different areas of Indiana will face different pressures from invasive species due to differing forest composition, climates and surrounding environments, and directional spread, among other factors. Beyond those plant species listed earlier, there are other plant species, like bush honeysuckle and multiflora rose, that affect large areas of Indiana's forestland.

The Indiana Invasive Species Council, according to its website https://www.entm.purdue.edu/iisc/, "was established by the state legislature to enhance the ability of government agencies to detect, prevent, monitor and manage new and long established invasions, as well as increase public awareness about invasive species." Its Invasive Plant Advisory Committee (IPAC) was instrumental in developing and maintaining the "Official IISC invasive Plant List" and working through the scientific evaluation of plants to determine their invasive nature and status, which is the supporting document to the aquatic and terrestrial plant rules (Indiana Administrative Code - 312 IAC 18-3-23 and 18-3-25).

Most divisions of the Indiana Department of Natural Resources are concerned with invasive species, particularly the landholding divisions, but the Division of Entomology & Plant Pathology is the only statutory representative of the agency on the Indiana Invasive Species Council. It makes sense that certain invasives issues, like feral hogs, which is being handled by the DNR Division of Fish & Wildlife, are more appropriately handled by different divisions. There is no invasive species coordinator at the DNR or elsewhere at the statewide level. Similarly, various USDA agencies have leadership on certain issues within the broader invasive species category, such as Animal and Plant Health Inspection Service (APHIS) and U.S. Fish & Wildlife Service.

Invasive species that are impacting Indiana forests include not just plants, but also animals, like feral hog mentioned above, as well as insects such as Gypsy Moth and Emerald Ash Borer, and diseases such as Oak Wilt, Chestnut Blight, Dutch Elm Disease, and Butternut Canker. Since 2010, Emerald Ash Borer has moved through Indiana, Indiana specific quarantines on ash material movement have been removed, and according to the DNR Forest Health Specialist, USDA Animal Plant Health Inspection Service (APHIS) is expected to remove the federal quarantine in early 2020.

The list of insects and diseases that are not present but present a potential future threat to Indiana forests include Thousand Cankers of Walnut, Beech Bark Disease, Beech Leaf Disease, Sudden Oak Death, Laurel Wilt, Asian Longhorned Beetle, Hemlock Woolly Adelgid and Spotted Lantern Fly. Of those, three diseases and one insect could cause significant and widespread tree mortality of the host species, thus impacting the value of Indiana's forest resources and forest industry.

Biodiversity

"To keep every cog and wheel is the first precaution of intelligent tinkering." - Aldo Leopold

Biologic diversity is perhaps the most important overall measure of ecosystem health and well-being. Forest stakeholders respond strongly to this issue because it is also a measure of our own health and the well-being of society as a whole. Remarkable genetic similarities between humans and other life indicate that the environmental stresses that threaten the existence of certain species affect us as well.

Biodiversity includes all plant and animal species, species of special concern and common species, and it exists upon a similar diversity of habitat types at various states of succession. This vast complexity is difficult to represent spatially.

Statewide survey information relating to stand age and forest type does not exist at a relevant scale to be useful for focused landscape scale initiatives. This continues to be a major data gap that, ideally, will be addressed in the near future with technological advances in the area of forestry remote sensing.

Without these data, it is difficult to address certain other identified issues that have specific relation to forest biodiversity. One example is sustainable regeneration of oak woodlands. Oak species are a great determinant of diversity in certain areas because of the large number of insect and animal species that depend upon them. Beyond the more generally recognized large game species like deer and wild turkey that depend on oak mast, research shows that the *Quercus* genus supports the greatest number of butterfly and moth species whose larvae are the most important source of protein for Neotropical migratory birds like the forest-dependent and Indiana Species of Greatest Conservation Need, cerulean warbler. (Tallamy, 2008)

The need for high-resolution stand-age class and forest-type data across the state can be highlighted by considering two statistics from the USDA Forest Service. Its Forest Inventory and Analysis program shows that the oak-hickory forest type (72%) dominates all other forest cover type groups in Indiana. FIA also shows that more than 80% of stand age classes fall between 21

and 100 years (FIA, 2013). These data point toward unsustainable characteristics that necessitate further research and understanding.

Indiana's oak-hickory component developed largely from existing seed sources maintained by Native American burning practices, regeneration and succession in full-sun, open-canopy conditions, and in the general absence of deer herbivory (extirpated from Indiana by 1900). These conditions do not and cannot exist today as they did in the past, and there is question whether shade-intolerant species like oaks, black walnut and black cherry, among others, will have a place in Indiana's forests of the future without a defined effort to maintain them in the mid- and understories of forests.

The following figures show species distribution by size class across two different ownerships and at a statewide scale.

Chart 1: Trees on Indiana State Forests in 2018

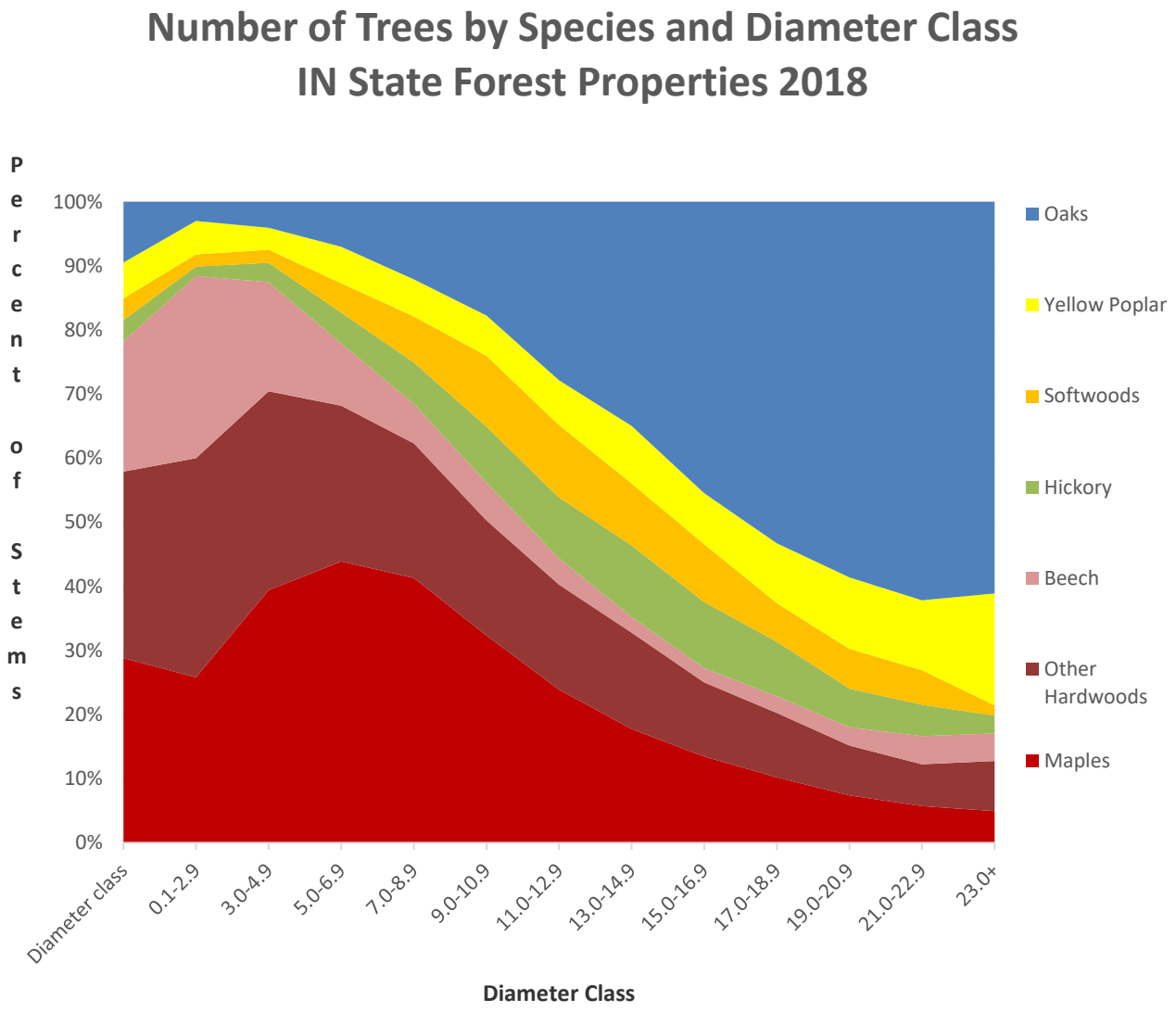


Chart 2: Trees on Classified Forests in 2018

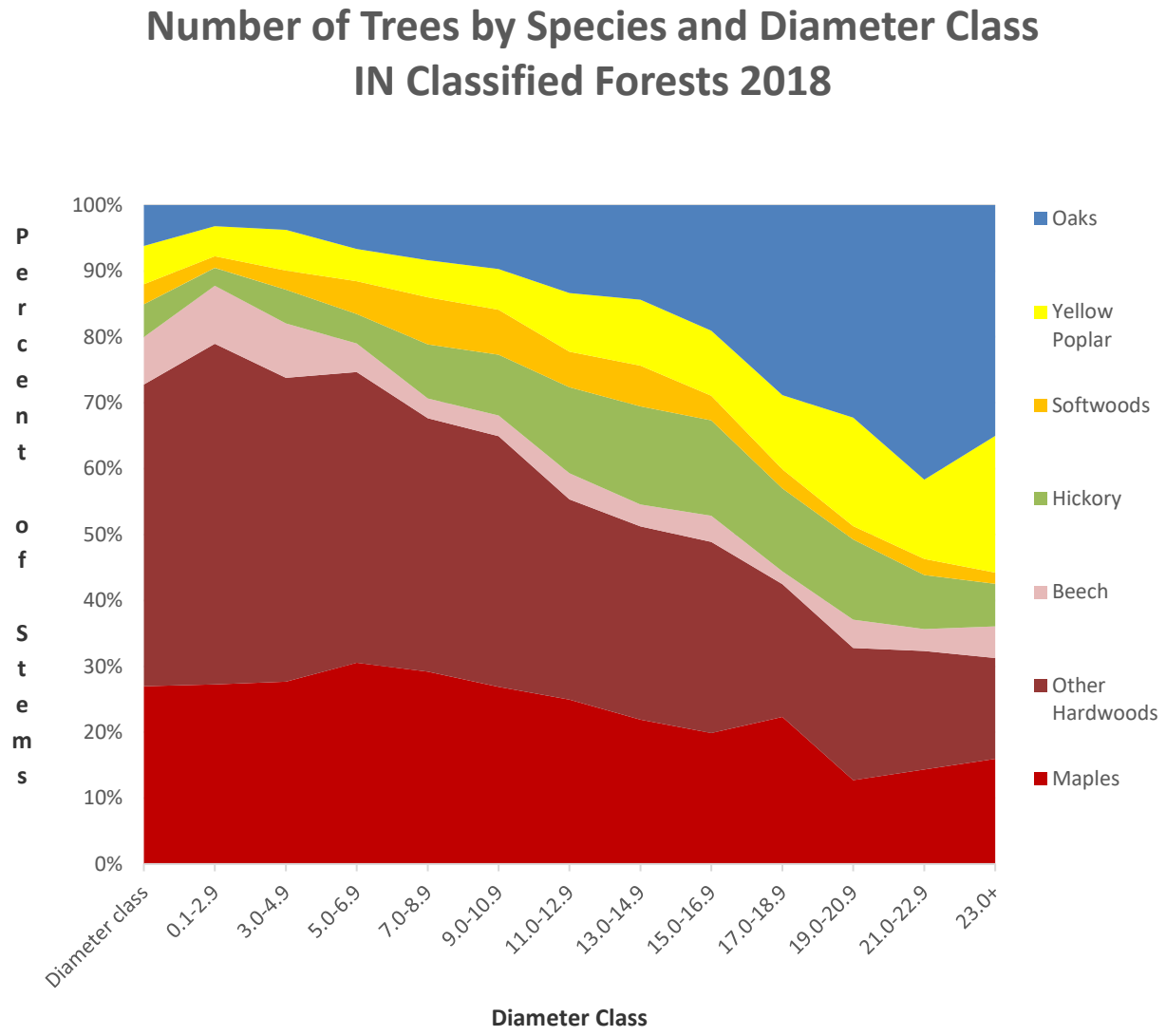
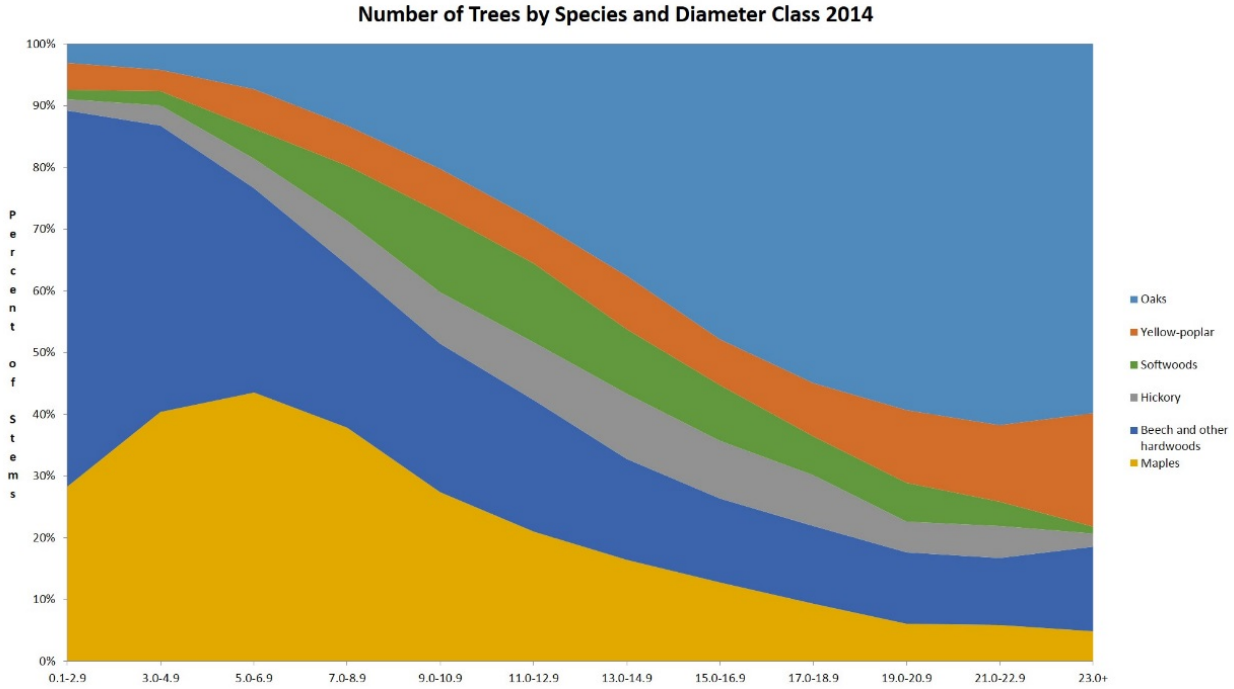


Chart #3: Trees statewide in 2014



There are some differences according to ownership, but still, without significant management changes, Indiana is going to lose its oak-hickory to shade-tolerant species mix at the canopy level. Few oak and hickory seedlings are available to maintain forest composition. Without direct intervention and more intensive management, forest composition will shift to shade-tolerant species like maples and beech that can thrive in closed-canopy forest. The majority of canopy-level trees in today's forests are oaks and hickories. Loss of oak and hickory forests will present sweeping changes to forest biological diversity and in general a significant loss of productive capacity for the greatest number of fauna.

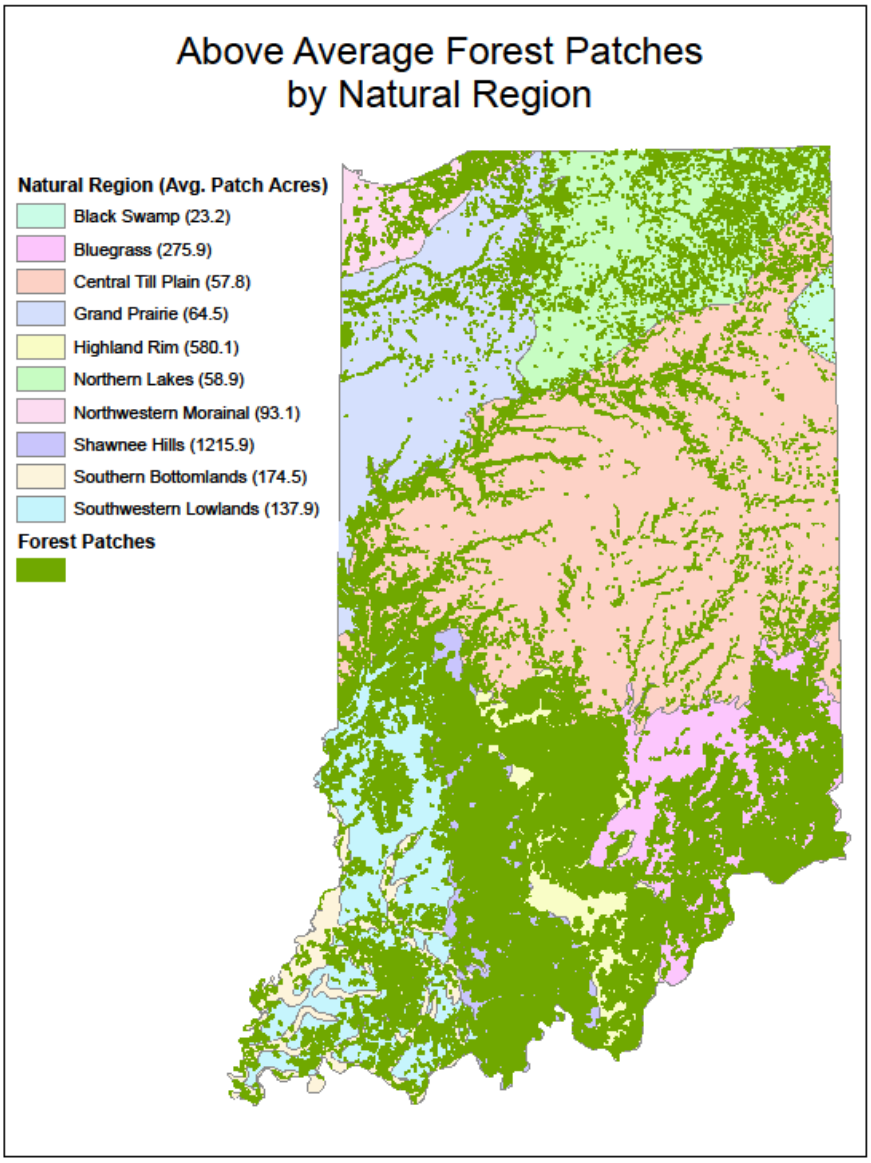
The extreme dominance of age classes between 20 and 99 years threatens ecological simplification. The loss of species diversity, especially among those species traditionally found in Indiana after the forest recovery, like ruffed grouse, depend on early successional habitat. Surveys of experts conducted during the development of Indiana's Statewide Wildlife Action Plan found that 84% of respondents thought the promotion of diversity in forest types and successional stages was at least moderately important and a clear majority (59.3%) thought it was 'very important' (Indiana SWAP, Appendix P, p.23).

The Natural Regions of Indiana were developed by Michael A. Homoya when he worked for the Indiana DNR Division of Nature Preserves. These regions represent an ecologically unique partitioning of the state based on natural geologic or climatic factors. A region's biological diversity will be reflective of these inherent elements shaping the surrounding ecosystem. Thus, each natural region can be expected to present unique characteristics that suit particular organisms and forested habitats.

This map shows above-average-size forest patches for all of Homoya's Natural Regions. Average patch size for each natural region is shown next to its name in the map legend. By this method,

natural variations should capture unique attributes that might be overlooked with a focus only on species richness. It is assumed that larger forest patches generally offer more suitable habitat for biological diversity and present a greater capacity to exist into the future.

Map: 2019 Above Average Forest Patches by Natural Region (DNR: J. Flachskam)



A link to the Indiana Natural Regions map without forest patches is located in the appendix.

The data results presented in this map have changed since 2009. Most natural regions have seen their average forest patch size increase. Natural Regions showing average patch size growth by increases: Shawnee Hills (26%), Highland Rim (20%), Bluegrass (14%), Southwestern Lowlands (14%), Southern Bottomlands (13%) and Northern Lakes (9%). Natural Regions showing average patch size decrease: Northwestern Morainal (-9%), Grand Prairie (-5%), Black Swamp (-2%) and Central Till Pain (-1%).

Generally, researchers have found that increases in the proportion of forest cover around wetlands correlates to increases in forest species richness and diversity. For instance, areas with higher proportions of forest canopy within 1 km of forested wetlands often have higher species richness of forest amphibian species (Knutson et al. 1999, Herrmann 2005).

Large forest patches within low forested areas can be considered refugia for species that remain and highly important to dispersal, migration and other ecologic functions. Connectivity and dispersal corridors are of major importance for sustainable biological diversity.

Birds are indicators of the environment, and that is why Partners in Flight Landbird Conservation Plan (2016) https://partnersinflight.org/resources/the-plan/ states that: "Forest landowners often implement management practices for biodiversity conservation such as retention of snags, downed wood, and trees with wildlife benefits. Additional practices, including vegetation buffers for water quality protection, also benefit birds. Regular forest management practices, such as clearcutting, thinning, natural regeneration and replanting, often create forest conditions that mimic natural disturbance and forest succession and support many declining species."

Oak regeneration and lack of age class diversity (specifically older and younger forests) were stressed by partners and members of the Indiana Forest Stewardship Advisory Council at its 2017 and 2018 meetings as having increased importance since the 2010 Forest Action Plan.

Recreation

The availability of land for public recreation is an important issue for Indiana's forest stakeholders. Recreation, similar to the wood products industry described below, is a significant driver of conservation, research and federal monies dedicated to forests. Both issues offer an opportunity to link economically to the values and benefits that woodlands provide.

Inherent in recreation is the opportunity to address other important and identified forest issues: inadequate public education about forests, overpopulation of white-tailed deer and inadequate youth education about forests. Public and youth education about forests is enhanced and made relevant with increased outdoor experiences. Hunting is a major component of recreation that offers perhaps the only viable method to control deer populations.

In correspondence to contribute to the Forest Action Plan, Backcountry Hunter's & Anglers provide the following information: "As fishing and hunting numbers continue to decline and the population of Indiana becomes more urban, there will be a greater demand from the public for recreation and a greater need for State Forests to use recreation to create public support. Indiana (especially the Southern regions) has a great potential for providing recreation that will improve the quality of life for Hoosiers and drive economic development through tourism."

"With approximately 4% of Indiana's land base in public ownership, we are a state that is critically conservation challenged, a factor that contributes to our consistently low national quality of life ratings relative to the nation at large. The Conservancy and our partners will address the issue by significantly increasing the protection of ecologically important land and

waters to enhance ecological services and recreational opportunities to Hoosiers across the state. We will lead by example relative to threats to public and private conservation lands."

Wood products

Sustaining Indiana's forest products industry is an issue that stakeholders are concerned about. This section is generally concerned with assessing the importance of forestlands in relation to the provision of a specific ecosystem service, timber production.

Because society demands wood and wood products for a multitude of uses, economic value is assigned to the standing timber that provides the raw material. For Indiana's forests, this is arguably the most important link to an economic system within which forests accrue annual costs of management, oversight and property taxes. Until additional markets for ecosystem services, like the provision of clean water or carbon sequestration, are developed, the harvest and sale of timber will likely continue to be the main contributor to the economic value of forestland, along with other practices, like maple sugaring and hunting leases. The ability of Indiana forests to provide renewable, biogenic carbon materials for a variety of new products and energy will be of increasing value to landowners in the 21st century.

Speculative investment in forests for associated development land values that are based on the future parcelization and conversion to another land use are not assessed in this document.

Forestry and wood product manufacturing is a $10 billion industry that employs more than 70,000 Hoosiers, and Indiana has developed a global reputation for excellence in hardwood tree production and product manufacturing; however, growing increasing substitution by plastics and other imitation products, as well as competition from wood product manufacturers in Asia, Latin America and elsewhere, threatens the viability of Indiana's hardwood industry.

Seeking to differentiate Indiana's environmentally sound, high-quality and legally sourced wood products has resulted in a branding effort called "Premium Indiana Forest Products." Also, some Indiana companies have embraced third-party certification of forest products through groups like Programme for the Endorsement of Forest Certification (PEFC), Sustainable Forestry Initiative (SFI) and Forest Stewardship Council (FSC). Third-party certified sustainable forests represent a significant but decreasing share of the managed forests in Indiana, mostly through the state-sponsored FSC certification under the group umbrella for Indiana Classified Forest & Wildlands. This decrease is largely due to the generally accepted legality and sustainability of U.S. hardwoods (Seneca Creek Study) and a lack of consumer demand for and premium price for certified hardwood products.

Indiana has ranked first nationwide in recent years in the production of wood office furniture, wood kitchen cabinets, and hardwood veneer, along with several other wood products. As small family-owned businesses, wood products companies average fewer than 50 employees and play an important role in rural communities. The Division of Forestry has fostered efforts to connect disparate groups by creating and maintaining a forest commerce website, The Indiana Forestry Exchange, which is at www.inforestryx.com.

Distance between sawmills and primary and secondary manufacturers who are the major purchasers of standing timber and delivered logs for processing is an important component of

this issue. Transportation costs for timber production and marketing and 30-90 mile radius is often used in the industry to assess costs.

Biomass can be a relative indicator of potential timber and other industrial use but is not necessarily related to an area's productive capacity. The measure of an area's productive capacity (site index) is not accurately and consistently available on a statewide basis.

Public lands are important because their larger overall areas offer greater opportunity for landscape scale continuity in management and relative economies with respect to harvesting practices.

The Classified Forest and Wildlands program, initiated in 1921 by the State of Indiana, encourages timber production, watershed protection, and wildlife habitat management on private lands in Indiana. Program landowners receive a property tax reduction in return for following a professionally written management plan. The program remains open to enrollment year-round by contacting a local State District Forester.

There are currently about 823,000 acres enrolled as Classified Forests and Wildlands, representing approximately 16.4% of forests in Indiana. These private properties reflect a commitment to the retention of forestland and the maintenance of sustainable working woodlands. These properties are a supplier of timber for the state's wood product needs. The Indiana DNR estimates that these properties annually harvest 30-35 million board feet of timber.

Lt. Governor Suzanne Crouch unveiled a new economic development strategy to grow the state's hardwoods industry on February 5, 2019. The strategy was commissioned by the Indiana Department of Natural Resources, the Indiana Hardwood Lumbermen's Association and the Indiana State Department of Agriculture, and was completed by DJ Case & Associates, Purdue Center for Regional Development, Purdue University Department of Forestry and Natural Resources, and Purdue Extension.

To grow the state's hardwoods industry, the strategy identified three key focus areas: business development, education and marketing.

Some of the specific initiatives under these areas include strengthening Indiana's existing hardwoods industry by expanding current processing, attracting new companies to the state, educating consumers and businesses on the sustainability of the hardwoods industry, reducing leakages and developing an ongoing campaign to promote the value of hardwoods.

The Indiana Hardwood Strategy also created an Indiana Hardwood Interactive Map of nearly 4,500 businesses in the hardwoods and forest products sectors, which was developed by the Purdue Center for Regional Development. Establishments are shown as dots of varying sizes, dependent on the number of jobs in the business. The usual mapping features of zoom-in, zoom-out, linear distance measurement, and exporting into various image types are available. A click on any dot (business establishment) produces a pop-up feature with various details about the establishment, including name, physical and web address, line of business, industry type, and more. The link to the map is provided in the Appendix.

High cost of forest ownership and low incentives to retain

Costs of forest ownership can be substantial, especially when owners are faced with management costs associated with invasive species. Forest establishment, seedling purchase, weed management, boundary marking, timber stand improvement, invasive control, access-road installation, harvest costs, property tax, severance tax and estate tax can all play a part and, depending on the condition of the forest land considered, in determining the cash outflow relating to forest property ownership.

As discussed in the Wood Products section earlier, in Indiana the main and most significant economic value associated with woodland ownership is derived from the management and harvest of timber. Currently, there are a number of other potential revenue streams associated with forestland, like maple syrup production, forest herbs and fruit, and hunting leases, but overall across the state, none of these is as substantial an economic opportunity compared with potential long-term timber values.

Demographic patterns in forest ownership can have particular influence when there are transfers of ownership. Often, properties are divided at this time, and estate tax assessments influence the remaining property structure, goals and forest quality.

There are a few counties in Indiana that require additional government paperwork, fees and permits prior to timber harvest and limit harvests in urban/suburban areas. Ordinances of this type can be burdensome to landowners and are sometimes barriers that prevent recommended management from occurring. Regulations of this type may also prevent reforestation efforts or tree planting projects from occurring, as suburban sprawl may occur adjacent to plantations that require 85 plus years to reach maturity.

High Population Density of White-tailed Deer

The high population density of White-tailed deer is an important issue for many forest stakeholders. The overriding concern is the preservation and maintenance of a diverse and healthy native understory of trees and vegetation that will in succeeding generations determine the composition of the dominant canopy. An overpopulation of deer will limit the biological diversity of an area, denude the understory of choice forage like oak seedlings, and favor a population of generally unpalatable exotic invasives.

Deer are also a particular concern for those landowners planting and establishing seedlings in forest regeneration or orchard settings. Next to weed pressure, deer browse can be the major factor determining success or failure in these efforts. White-tailed deer are managed by the Indiana DNR, and their populations are controlled mainly by seasonal hunting. Records and locations of deer collisions are recorded by State Police and influence the general cost of automobile insurance in the state.

As described by the Backcountry Hunters & Anglers in correspondence contributing to the Forest Action Plan: “Participating in hunting has steadily declined in Indiana for at least 10 years. In 2006, more than 550,000 hunting licenses were sold in the state. That number was

down to less than 440,000 in 2016. This presents a major issue as hunting license sales fund a large portion of conservation efforts through the Indiana DNR." It also means that there are fewer people to manage an increasing deer population, and that younger generations are increasingly not being exposed to the traditions as they were in the past.

Urban Forests

About 80% of Hoosiers live in an urban area. Urban forests include trees in city parks, as well as street and yard trees. Canopy cover is an important component of the urban forest. Leaf surface area directly correlates with the benefits of street trees. The greater the leaf surface area exhibited by a tree, the greater the benefits a particular tree is likely to provide to a community. Trees with large leaves and spreading canopies tend to produce the most benefits.

Street trees and urban forests provide ecological services that include 1) reduced air pollution, 2) storm-water control, 3) carbon storage, 4) improved water quality, and 5) reduced energy consumption. Other, harder-to-quantify benefits include increased job satisfaction, faster recovery time for hospital patients, and improved child development, among other things. Also, aesthetic values associated with increased urban canopy contribute to higher property values. (Kane, 2009)

Statewide urban forest analysis has found that the state has a large number vacant street tree planting spaces and a lack of overall street tree diversity, with the vast majority being maple. Street trees and urban forests were highly affected by the loss of ash to the Emerald Ash Borer. Three of the 11 most common urban tree species are not native to Indiana. Urban forests also are significantly affected by invasive species.

According to Purdue Forestry & Natural Resources (FNR), the most recent statewide Indiana urban forest inventory showed a high percentage of maple species (35-42%), and 58% of all trees to be in good functional condition. This survey was done before the majority of Emerald Ash Borer impact, and ash were about 15% of canopy. Total urban tree canopy was about 20% of possible urban areas, and nearly all urban forests inventoried were mature to over-mature.

The following information provided by Purdue FNR to the Forest Stewardship Advisory Council for its 2017 meeting describes further the importance of urban forests: "High intensity land use patterns and increasing pressure on water resources demands creative stormwater management. Trees dissipate the energy of falling raindrops to help prevent erosion and buffer intense rainfalls. Urban tree roots have the potential to penetrate compacted soils and increase infiltration rates in open space areas, stormwater basins and subsurface stormwater storage (structured soil). Uptake of water from trees limits the volume of runoff discharged downstream, and their canopies offer interception of rainfall and shading (cooling) in an urban environment. Trees also absorb nutrients that could otherwise run off to local receiving waters.

Incentives for implementing trees for stormwater management can include providing stormwater management credit in development or redevelopment rules. Some metro watershed districts are considering allowing credit for the interception of rainfall by trees.

In addition to regulatory tools and design detail modifications for development and redevelopment, financial incentives can encourage private landowners to plant trees on their

property. These incentives can take many forms, ranging from free or low-cost seedlings or other native tree stock to financial rebates or reduced fees offered by utilities or local governments. Tree seedling giveaways may be coupled with educational programs and may also coincide with nationally recognized days such as Arbor Day. Various utilities across the country offer incentives to preserve or plant trees in certain areas of the yard to maximize their cooling benefits."

The Indiana Urban Forest Council was dissolved after the last the Forest Action Plan, but the Indiana urban forestry community has made efforts to reorganize its collective voice, hosting an Urban Forest Symposium in September 2019.

Climate Change

Climate change is increasingly affecting Indiana and resulting in wetter winters during which the ground does not freeze solid for long periods, longer summer droughts, and increasing numbers of days that exceed 90 degrees. It is also resulting in some warmer winters that enable certain insect populations to have increased numbers of breeding cycles, such as occurred with tulip tree scale in the 2010s. Forests thus face challenges such as the tulip tree scale epidemic that was followed by a significant summer drought during 2012, severely affecting Indiana's state tree populations in the south-central area of the state.

At the wider scale, forests play an important role in the carbon cycle and store carbon in their biomass. According to the Center for International Forestry Research website https://www.cifor.org/forests-and-climate-change/, forests are also "important for reducing [climate change's] current and future effects on people. For example, forest goods tend to be more climate-resilient than traditional agriculture crops and so when disasters strike or crops fail, forests act as safety nets protecting communities from losing all sources of food and income. They also regulate waterways, protect soil, cool cities and entire regions, and more."

A publication by Purdue University, "Indiana's Future Forests: A Report from the Indiana Climate Change Impacts Assessment", details how Indiana forests will respond to climate change over the next century. According to its summary materials, "expected changes include shifts in the distributions and abundances of trees, understory plants and wildlife, as well as changes in the environmental, economic and cultural benefits these forests provide." A link to the full report is provided in the appendix.

Continued Public Disconnect from Forests and Forestry

The general public is increasingly urban and suburban in population. Direct understanding of forests through exposure and interaction is decreasing. This trend is increasing among younger generations. People continue to value trees and forests but are not intimately connected with them in the ways that previous generations were via their collecting of firewood, milling their own lumber, and harvesting hickory nuts and butternuts in the fall, etc. A large number of Hoosier adults have grown up in areas outside cities and have seen suburban landscapes of strip malls and single family housing divisions consume the more rural aspects of the areas where they grew up. These Hoosiers are rightly concerned with protecting forests but because of the generations of disconnect they can become convinced that forest management is a problem. Indiana forests do not need protection from forest management at all compared to

how much they need protection from conversion to another land use. In fact, we know, based on experience, that even the most abused forests can recover and transition to healthy stands because more than 80% of our 5 million acres of forests have done so in the last century.

A number of partners and stakeholders expressed concern with declining public support and funding for natural resources agencies. The Indiana Division of Forestry's budget around the time of the last Forest Action Plan was about $12 million per year. It has decreased by about 27% since then. The most recently passed budget allocates about $8.7 million per year. The Division of Forestry has lost positions since 2010 and currently has 17 open staff positions which puts staffing levels at about 86%.

Community Wildfire Preparedness Plans

The Division of Forestry assumes wildland fire responsibilities on approximately 7.4 million acres of forest and associated wildlands. Due to our limited staff, roughly 95% of all wildland fires in Indiana are suppressed by rural and volunteer fire departments.

Community Wildfire Preparedness Plans (CWPPs) have been created and implemented in four counties that DNR responds to the most for wildfire suppression assistance. The four CWPP's that Indiana has in place are for Morgan, Owen, Jackson, and Brown counties.

The CWPPs main goals are: (a) To reduce the vulnerability to the people and property to injury and loss resulting from wildland fire, (b) To provide prompt and effective wildland fire suppression, (c) To enhance mutual aid capability and effectiveness among the fire departments, and (d) To educate residents regarding their responsibilities for the prevention of wildland fires in their perspective county.

The CWPP's main purpose is: (a) To safeguard the property and lives of residents from wildland fires, (b) To provide for effective warning and notification to residents in the event an evacuation becomes necessary, (c) To assign emergency actions to be taken by residents, public officials and emergency personnel in the event of a wildland fire, (d) To enhance mutual aid response and capability, and (e) To provide guidance for an effective mitigation/prevention program for residents.

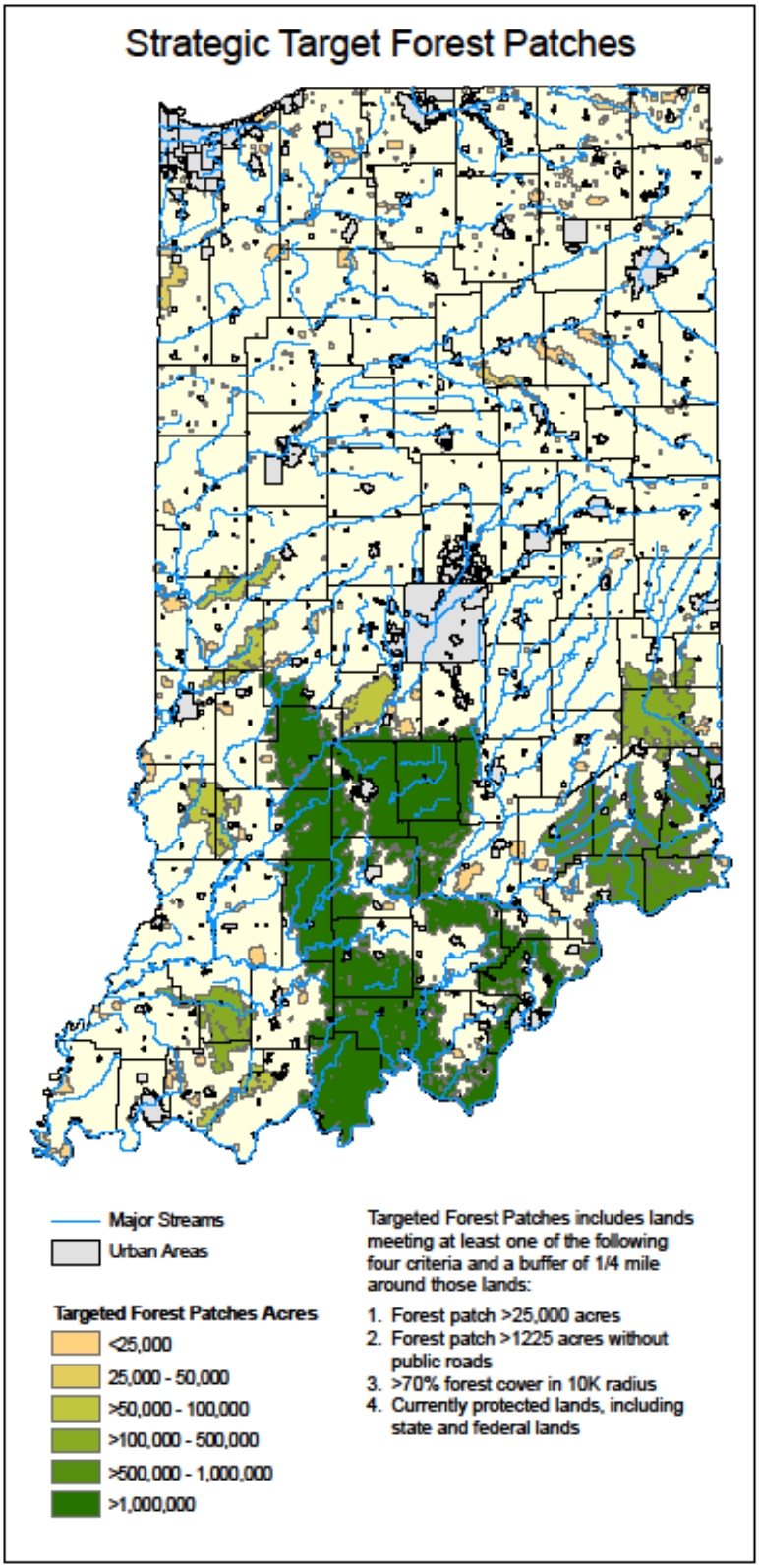
The CWPP for Morgan County was enacted on Jan. 31, 2017 in conjunction with Morgan County EMA, Morgan County Fire Chiefs, and the DNR Division of Forestry. The CWPP for Owen County was enacted on Nov. 14, 2016 in conjunction with Owen County EMA, Owen County Fire Chiefs, and the IDNR Division of Forestry. The CWPP for Jackson County was enacted on 1/16/18 in conjunction with Jackson County EMA, Jackson County Fire Chiefs, and the DNR Division of Forestry. The CWPP for Brown County was enacted on Oct. 5, 2017 in conjunction with Brown County EMA, Brown County Fire Chiefs, DNR Division of Forestry, and the USDA Forest Service.

Priority & Multi-state Areas

Strategic Target Forests

Prioritization is important for this cooperative effort. The Indiana Strategic Target Forest Patches are areas or regions of the state that are a priority for conservation and stewardship. They remain unchanged from 2010 Forest Action Plan.

Strategic Target Forest Patches were developed from the Indiana Statewide Forest Assessment's Composite Priority Landscape Areas map that was the result of a geospatial analysis compiling multiple maps or data layers on forest issues to form a series of "issue maps."



Further information explaining this process can be found in the 2010 Indiana Statewide Forest Assessment: https://www.IN.gov/dnr/forestry/files/fo-Assessment_6_2010.pdf.

Multi-state

There are many existing and potential multi-state forestry-related conservation efforts and partnerships that involve Indiana. The following list identifies certain areas and issues for existing and potential multi-state efforts.

- Central Hardwoods Region
- White Oak Initiative
- Young Forest Initiative
- Moraine Forests in Northern Indiana
- Bird Conservation Region 22: Eastern Tallgrass Prairie
- Bird Conservation Region 23: Prairie Hardwood Transition
- Bird Conservation Region 24: Central Hardwoods
- Great Lakes Regional Collaboration
- Ohio River Corridor Initiative
- Big Rivers Fire Compact
- Karst Areas
- Chicago/Gary, Chicago Wilderness
- Wabash River Valley
- Invasive Plants, Cooperative Weed Management Areas
- Invasive Insects and Diseases: Gypsy Moth, Emerald Ash Borer, Oak Wilt and others
- Oak Regeneration
- Upper Midwest and Great Lakes Landscape Conservation Cooperative
- Bird Conservation Joint Ventures, Central Hardwoods Joint Venture
- Call Before You Cut
- Upper Mississippi Watershed

Long-term strategies to address threats to forest resources in Indiana

This Forest Action Plan is the result of input from natural-resource professionals, landowners, conservationists, land stewards and forest stakeholders. It updates the *2010 Indiana Statewide Forest Assessment & Strategy* and addresses the most important issues that increasingly threaten the sustainability and ecological capacity of Indiana's forests to provide the benefits of clean air, carbon sequestration, soil protection, wildlife habitat, wood products and other values, goods and services to Hoosier citizens. None of these issues is new, and the Indiana forestry community's response continues to evolve. There are current programs in place and efforts underway that are making progress on each of these issues. It is hoped that the Forest Action Plan provides further direction and support, as well as greater coordination for these efforts underway, and facilitates partnerships and cooperative effort toward the most pressing issues.

The strategies and action steps below are consistent with the USDA Forest Service National Priorities: conserve and manage working-forest landscapes for multiple values and uses, protect forests from threats and enhance public benefits from trees and forests.

The Forest Action Plan should be considered a living document. Further effort will be needed to prioritize, assign responsibility and determine timeframe and measurement criteria for various Action Steps in order to effectively implement. Adaptation and evolution of the Forest Action Plan are considered required and appropriate responses to changing conditions described in the forest issues and trends section above. The Forest Stewardship Advisory Council shall be a leader in implementing the below strategies but individual partner organizations are encouraged to take actions on their own, if possible, and notify the committee of the effort toward our common goals. These strategies and action steps are meant as guidance and not intended to be fixed or inflexible. Their accomplishment will be the result of the Indiana forestry community's shared effort.

The DNR and Division of Forestry recognize the leadership that the Forest Stewardship Advisory Council has provided in developing this plan and the importance of a strong community of forest stakeholders in Indiana. DNR supports the overall intent of this Forest Action Plan and the action steps detailed below.

The overarching goals of the strategy are:

- Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration
- Restore, expand and connect forests, especially in riparian areas
- Connect people to forests, especially children and land-use decision makers, and coordinate education training and technical assistance
- Maintain and expand markets for Indiana hardwoods, with special focus on secondary processors and promoting the environmental benefits of wood products to local communities and school groups
- Significantly increase the size of Indiana's urban forest canopy by developing community assistance programs and tools

The following action steps were prioritized by the Indiana Forest Stewardship Advisory Council and are a means of achieving the above goals and a future desired forest condition: diverse, healthy and resilient forests that will continue to provide the ecosystem services we currently value for future generations. These are the most effective ways to address the diverse, important issues facing Indiana forests identified previous sections.

Strategy 1: Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration.

Action Steps

1.1 Increase funding for and promotion of programs that provide financial incentives for forest conservation and/or disincentives for conversion of forest to housing or subdivision:

- Increase State Division of Forestry funding to administer programs, especially increase district forester staff levels;
- Increase funding for forestry management activities under federal cost share program (CRP, EQIP, etc.).

1.2 Maintain rigorous and vigilant survey and monitoring efforts as well as slow the spread and awareness campaigns to protect trees from insect and disease outbreaks including: Gypsy Moth, Oak Wilt, Beech Bark Disease, Beech Leaf Disease, Laurel Wilt, Hemlock Woolly Adelgid, Asian Longhorned Beetle, Spotted Lanternfly, Thousand Cankers Disease, Sudden Oak Death, and others:

- Increase use of artificial intelligence and remote sensing where possible to leverage technological advances in early detection and rapid response;
- Continue the Gypsy Moth Slow the Spread Program;
- Increase the capacity of Indiana Division of Forestry's Forest Health Section to provide information, education, survey, and management assistance to the public and private sectors.

1.3 Increase the percentage of forests in the age class of <19 and >100 years old:

- For <19 year old age class, follow action steps above for young forests and early successional habitat across landscape;
- For >100 years old, increase recognition of public lands where forests are unmanaged or managed for their late successional, climax forest attributes, such as nature preserves and in state parks, and encourage private sector to develop recognition program for old forests on private forestlands.

1.4 Secure permanent and significant annual funding to an Indiana Woodland Restoration program and Forest Restoration Fund. Funds should provide cash incentives for timber stand improvement, afforestation/reforestation, forest erosion control and best management practices (BMPs), including invasive plant control and other forest restoration activities.

1.5 Work with counties, cities, planners and developers to promote retention of working forests, reduce local government tax burdens for woodlands where possible, and encourage development in areas that are already developed, and incentivize density in development and the use of existing infrastructure corridors. This includes the use of forests as urban green infrastructure.

1.6 Increase young forests and early successional habitat across landscape:

- Expand and develop Southern Indiana Young Forest Initiative;
- Partner more closely with other regional Young Forest Initiatives.

1.7 Increase use of disturbance on the forest landscape in conjunction with other efforts to facilitate oak regeneration and recruitment:

- Increase use of prescribed fire in forest management and develop cooperative prescribed fire groups (Indiana Prescribed Fire Councils) for private landowners;
- Increase the use of shelter-wood harvest, group selection openings and clear cuts where possible;
- Supplement natural regeneration with plantings of bare root seedlings and use deer protection where possible;
- Increase coordination with The White Oak Initiative https://www.whiteoakinitiative.org/;
- Develop an oak-specific sustainability assessment that addresses, among other things, if/when marketable white oak may run out.

1.8 Increase ability to pass forests to next generation without parcelization by providing successional planning information, training and resources to landowners to facilitate a smooth and sustainable transition of property to the next generation.
1.9 Promote working forest conservation easements and cooperate with and/or leverage any farmland preservation efforts where interests align, consider expanding or adopting practices used in Harrison County Land Conservation Program https://harrisoncounty.IN.gov/index.php/residents/environment/harrison-county-indiana-land-conservation-program. Collaborate with land trust community to conserve forestland with working forest conservation agreements.
1.10 Engage universities to develop detailed Indiana land-use study that highlights forests most under threat for conversion to another land use and provides guidance and methods to ensure their conservation and an increase of working forests on the landscape.
1.11 Develop, modify and promote programs that use property tax incentives to discourage parcelization of forests:

- Strengthen requirements for Classified Forests & Wildlands Program (CFW) enrollments to follow management plan;
- Reevaluate the financial penalty for withdrawal or carve outs from CFW;
- Incentivize CFW enrollments to more permanently protect their working forestlands by creating working forest conservation easements.

1.12 Develop effective and efficient techniques to support and assist small acreage landowners (<10 acres of forest).

Strategy 2: Restore, expand and connect forests, especially in riparian areas.

Action Steps
2.1 Increase forest cover as a land use by 1,000,000 acres over the next 10 years:

- Encourage counties to set local targets for expanding forest cover by 20% by 2030:
  - Provide county planners, local level economic development offices and other resources and tools to assist in identifying, retaining and expanding working forests
  - Develop recognition programs for county success;
- Increase forest land in public ownership:
  - Develop and promote programs that encourage and/or provide incentives for private landowners to beneficiary deed ownership to public agencies, especially for adjacent landowners or inholdings;
  - Expand funding from the General Assembly for the President Benjamin Harrison Conservation Trust and/or support efforts that create new sources of funding

through governments that are dedicated to spending on and investing in conservation;
    - Increase efforts that provide a third party (oftentimes a land trust) funding and eventual transfer to public ownership;
- Work with Farm Services Agency and other federal farm program providers to offer increased targeted incentives to convert marginal or unproductive farm ground to forest cover;
- Provide incentives for landowners to convert mowed areas to planted trees, especially species that do not successfully establish through natural succession (i.e., plant bottomland oaks, not sycamore and cottonwood);
- Increase number of trees available through the State Nursery System:
    - Develop and effectuate plan to ensure acquisition of required amount of local seed even in years in which seed production is affected by regional disturbance such as a late frost with efforts to ensure that seed sources are of the highest quality or improved selections. Make effort to provide seedlings for every prospective sale and not sell out of species early in order season;
    - Develop smaller count bundles (with appropriate pricing) for sale at State Tree Nursery and to target tree planting in residential and urban areas;
- Actively develop and increase private sector participation/partnership.

2.2 Reduce the impact and spread of invasive species:

- Increase coordination of invasive species efforts at the state level among DNR divisions, Board of Animal Health, Indiana Department of Transportation and other agencies to ensure that control practices are "adequately funded," prioritized, targeted and effective;
- Ensure coordination between state-level (above), Invasive Species Council, federal and other partners involved in invasive species regulation, management and funding;
- Develop or expand educational programs for landscapers, private landowners and homeowners on invasive species and promotional campaigns on the negative consequences of those invasive species in the nursery trade (like Callery Pear and Burning Bush) that did not make the Terrestrial Plant Rule (312 IAC 18-3-25) because of their importance as a revenue source to the nursery trade and/or modify or increase the rule to include those species;
- Promote and expand efforts to develop county-level invasives groups (CISMAs – Cooperative Invasive Species Management Areas) that are self-sustaining and locally led;
- Increase the use of Invasive Species BMPs prior to and in conjunction with timber harvest and add the Invasive Species BMPs to future printings of the Forestry BMP field guides.

2.3 Targeting watersheds that drain excess agricultural nutrients, create special and permanent incentives to buffer riparian corridors with forests to filter agricultural chemicals, nutrients and sediment before they enter river systems.

2.4 Increase promotion of federal programs for planting trees in agricultural areas that frequently flood while also promoting tree species for planting projects that do not readily establish themselves (as mentioned in other action steps) — beyond carbon sequestration benefits, this action will address negative climate change impacts associated with increased heavy rain events.

2.5 Support, develop and increase efforts to restore species historically more abundant in Indiana forests like American chestnut, butternut and ash:

- Begin immediate propagation program through grafting of lingering ash trees;
- Partner with SUNY ESF American Chestnut Project to introduce plantings of their blight-tolerant American chestnut trees;

- Support efforts at the Hardwood Tree Improvement & Regeneration Center to develop propagation strategies for these and other important species to the Central Hardwoods Region;
- Increase work and collaborate with others in the region on Ash species resistance/tolerance to Emerald Ash Borer through location of lingering Ash trees, develop a tree improvement program, conduct progeny test of resistant/tolerant species, collect seed from lingering Ash trees, develop seed orchards, treat forest Ash trees to maintain a seed source in state parks, state forests, and nature preserves with goal to develop resistant/tolerant Ash species for rural and urban forest restoration.

2.6 Advocate for reduced deer populations.
2.7 Develop a new program or cooperative effort with DNR Fish & Wildlife to ensure that forest landowners (especially those with a detailed forest management plan) seeking to restore oaks in their forest understory or open plantings are able to protect plantings and young seedlings from deer with lethal force and without undue processes for approval.
2.8 Encourage farmers to install and maintain native hedgerows along field margins, including through hedgerow practices in the Environmental Quality Incentives Program.
2.9 Develop study that focuses on forest conservation in northern Indiana and provides special guidance and strategies to conservation partners operating in that unique area.
2.10 Discourage the planting of species that readily establish themselves in federal funded and private sector tree planting programs and encourage planting tree species best adapted to changing climate.

Strategy 3: Connect people to forests, especially children and land-use decision makers, and coordinate education training and technical assistance.

Action Steps
3.1 Coordinate with Invasive Species Council on management of forest-related species management and awareness.
3.2 Continue to support the Hardwood Ecosystem Experiment (https://www.heeforeststudy.org/).
3.3 Improve access to forestry knowledge and technical information by continuing to use an expanded series of “demonstration forests” in cooperation with private landowners, conservation organizations, community forests and others to serve as examples of forest management techniques.
3.4 Increase tours of forest management areas and harvest sites to promote recognition that forests do not disappear with management, land use does not change, and they are not turned into parking lots.
3.5 Complete Knobstone Trail and establish sustainable, long-term support for the resource as a national class trail and hiking destination that fosters strong connections to all forest age classes and the diverse forest types in southern Indiana.
3.6 Make special effort to engage women and minorities in Forest Action Plan strategies and to develop more diversity among natural resource professionals in Indiana, especially seek to encourage connection to forests and trees among the most urban aspects of Indiana society.
3.7 Work with recreation groups to expand promotion of forest based recreational opportunities like mountain biking, multi-use trials, photography, mushroom hunting, hiking and new or non-traditional uses like forest bathing and foraging.
3.8 Develop student or school tree identification initiatives and provide awards and recognitions for school accomplishments on getting past the “green wall”, a term that means all plant life looks the same and is recognized as similarly beneficial or without unique attributes.
3.9 Promote the physical and mental health benefits of immersive forest activities.

3.10 Promote the creation of and use of outdoor labs at schools throughout Indiana with careful thought given to their placement. Labs should be located in convenient, easily accessible locations and not limited to schools because many urban children attend schools far from their neighborhoods. Other locations like community playgrounds or city-owned vacant lots should also be considered.
3.11 Continue to support the publication of the Woodland Steward magazine, expanding its distribution and improving its web accessibility.
3.12 Provide incentives or free logger education for Cutter Training at all levels as well as training on Indiana Forestry BMPs.
3.13 Connect communities and young people to forests and sustainable forestry through mobile educational unit that can visit schools, festivals and other community events (also see "Woods on Wheels" action step).
3.14 Expand and promote educational grant program at Indiana Forestry Educational Foundation and seek pass-through funding from national public and private sector sources.
3.15 Expand the use of Project Learning Tree in Indiana schools and provide dedicated full-time employee to concentrate solely on this effort.
3.16 Provide opportunities to have positive forest experiences in communities where people live.
3.17 Increase enrollment and expand the Indiana Natural Resources Teacher Institute program.
3.18 Make special effort to develop corporate and business partnerships in the implementation of these strategies and action steps but especially in this strategy—connecting people to forests. Consider programs like Walmart Acres for America and approach Indiana-based manufacturers for support, including financial support, for forest conservation and restoration efforts like tree planting and commitments to reforest their own lands.
3.19 Partner directly or through other partners with the Indianapolis Zoo, Ag education programs and National FFA Organization to engage students and teachers.
3.20 Develop an Indiana Center for Agroforestry to promote, develop and leverage agroforestry solutions for Indiana farmers and landowners, using University of Missouri's center as a model.
3.21 Develop program that gets professional foresters into Indiana elementary and high school programs to deliver engaging program that includes outdoor experiences with trees around school grounds without the need for busing/field trip.
3.22 Develop or expand programs that encourage forest natural resources education tied to state curricula that occur outdoors on forests at State DNR properties or partner properties. Consider pilot program with at least 1 full time school bus with dedicated educator that can be reserved by schools at no cost that can serve Indianapolis and doughnut county region.
3.23 Develop specific outreach programs about forestry and forest management for birders.
3.24 Use effective and proven tools to conduct landowner outreach, like TELE – Tools for Engaging Landowners Effectively.
3.25 Support the creation of "food forests" in Indiana, especially those that use primarily native species and connect large numbers of people to trees and forests. A food forest is defined by Wikipedia as "a low-maintenance, sustainable, plant-based food production and agroforestry system based on woodland ecosystems."
3.26 Encourage foresters to participate in the Project Learning Tree and Society of American Foresters online short course – Teaching Youth and Communities about Forests – to help strengthen outreach and education efforts to youth and adults.
3.27 Promote playgrounds made with hardwoods or natural products over products made from non-renewable resources (nature play spaces).
3.28 Promote the National Arbor Day Foundation's Tree Campus USA for colleges and universities and Tree Campus K-12 programs.

Strategy 4: Maintain and expand markets for Indiana hardwoods, with special focus on secondary processors and promoting the environmental benefits of wood products to local communities and school groups.

Action Steps

4.1 Engage Indiana's forest products industry to take a more active role in forest land conservation efforts.

4.2 Provide sufficient funding for phytosanitary inspections in the forest products industry so that invasive pests and diseases are not spread through soil or other contaminants.

4.3 Provide increased programs on marketing hardwood logs and trees for landowners, work in cooperation with Indiana Tree Farm and primary industry groups to provide information on forest management and log utilization, pricing, etc.

4.4 Develop and implement an Indiana "Woods on Wheels" mobile education unit similar to the Pennsylvania WoodMobile https://www.agriculture.pa.gov/Business_Industry/HardwoodDevelopmentCouncil/Woodmobile/Pages/default.aspx that would serve as a traveling exhibit providing information on Indiana's forest resource and the state's forest products industry as well as educational materials on forest management and sustainability.

4.5 Support and promote bringing the "Forests Forever" museum exhibit to the Indiana State Fair.

4.6 Promote Indiana hardwoods at domestic trade shows, actively recruit companies to locate in Indiana and tout Indiana hardwoods as being the "green material" of the 21st century, healthy for homes, etc.

4.7 Encourage the public institutions and State government of Indiana and the organizations to which it provides funding to use Indiana hardwoods wherever possible in renovations or new construction. Indiana hardwoods should be given increased credit in competitive projects due to their environmental sustainability over fossil fuel based products.

4.8 Consider developing state-level certification scheme similar to Programme for the Endorsement of Forest Certification (PEFC) in France that provides certainty of a wood product's legality and sustainability.

4.9 Promote and implement the Indiana Hardwood Strategy.

4.10 Develop programs and initiatives to foster employee recruitment and retention in the forestry and wood products industry.

4.11 Promote the use of Indiana hardwood with local architects and builders.

4.12 Increase the development of new products from hardwoods and their byproducts and promote new uses of hardwoods like in cross laminated timber applications and through thermal modification.

4.13 Ensure secondary processors are provided with a robust supply of local raw materials by connecting landowners and primary wood processors with secondary processors using online tools, database and mapping applications.

4.14 Highlight the vibrant forest products Industry and sustainable forestry and logging community in Indiana by hosting a Wood Pro Expo or some similar event in Indiana biannually, developing on ideas and lessons learned at the 2019 Hoosier Hardwood Expo in Cloverdale.

4.15 Seek out or develop new markets for mill residues (primarily chips) as less paper is being used worldwide.

4.16 Encourage the "tall wood buildings" movement and encourage the construction of demonstration in Indiana using cross laminated timber (CLT) and or hardwood cross laminated timber HCLT.

Strategy 5: Significantly increase the size of Indiana's urban forest canopy by developing community assistance programs and tools focusing on local governments partnering with stakeholders, including citizen scientists, volunteers, universities, and nonprofit organizations and private enterprise, to preserve and grow the urban canopy by policy implementation, low-impact development, maintaining existing trees, and planting new trees.

Action Steps

5.1 Promote species diversity in urban canopies to reduce susceptibility to forest pests and increase climate change and overall urban forest resilience.

5.2 Incentivize urban tree plantings that reduce areas of mowed turf grass and replace with appropriate native tree species.

5.3 Improve the resilience of urban forests by incentivizing policy improvements and funding projects that preserve, retain, and enhance existing urban tree canopy, including urban woodlots, that focus on plant diversity, limiting invasive plant species and combating heat island effects through nature-based solutions of stormwater management, CO_2 sequestration and decreased energy demands.

5.4 Increase financial support and staffing of the DNR Division of Forestry's Community and Urban Forestry program to improve capabilities for providing communities access to professional technical assistance in arboriculture and urban forestry best management practices and promote awareness of current and emerging issues affecting Indiana urban tree canopy.

5.5 Develop community programs that engage people in tree planting, care and maintenance. Also, increase awareness of effective resources, policies and ordinances that protect existing street trees and other greenspaces within local governments to prevent loss of urban tree canopy. This awareness should be targeted to a wide range of audiences including tree care professionals, homeowners and youth.

5.6 Provide community assistance with analyzing and interpreting Urban Tree Canopy (UTC) land cover data in order to better understand what is present, develop better informed forest canopy goals, strategize opportunities, create and implement action plans, and monitor improvement.

5.7 Promote the use of trees and urban forests in reducing carbon dioxide emissions, mitigating existing CO_2, and meeting CO_2/air quality goals where municipalities have set them.

5.8 Supplement workforce development through community programs that incentivize the unemployed, underemployed, and young people to participate in tree planting, care and maintenance skills that foster an interest in a forestry career path. Support the development of tree worker pre-apprenticeship programs. Encourage professional certification and facilitate professional development opportunities for tree workers and cultivate a professional network of arboriculture professionals through training and volunteer opportunities with organizations such as the Indiana Arborist Association and Saluting Branches.

5.9 Promote the benefits of native large canopy tree planting in meeting community tree canopy goals and supporting wildlife.

5.10 Promote the importance of post-planting care and maintenance in growing healthy urban forest canopies.

5.11 Promote the human mental and physical health benefits of increased tree canopy cover by organizing and encouraging hikes and outings in public forests.

5.12 Support local governments in urban tree management. Facilitate training and technical support to local government officials in the importance of tree maintenance (inventory, planting, plant health care, pruning, removal, etc.) as other infrastructure maintenance encouraging inclusion of urban forestry programs in local government budgets to maximize the functional benefits of urban trees using the best practices and proactive management of urban forests.

5.13 Work with Indiana Association of Counties, Indiana Chapter of the American Planning Association, Accelerate Indiana Municipalities (AIM), Indiana Department of Transportation (INDOT), Indiana Silver Jackets, Indiana Arborist Association, Indiana Chapter of the American Society of Landscape Architects (INASLA), Soil & Water Conservation Districts, and the Northwest Indiana Regional Planning Commission in achieving these and other action steps.
5.14 Partner with the National Arbor Day Foundation and its affiliated recognition programs Tree Cities of the World, Tree City USA, Tree Campus USA, Tree Line USA, Tree Campus K-12, Tree Campus Healthcare, and facilitate connections of these programs within communities where potential coexists.
5.15 Create and maintain an urban forestry advisory council and an Indiana Forest Stewardship Advisory Council urban forestry subcommittee, with working groups of urban forestry professionals and tree stewards to bring together a wide variety of interests in the health and future of Indiana's urban forests for providing input toward implementation of the Forest Action Plan.
5.16 Increase financial support to expand the Indiana Community Tree Steward Program to include advanced topics, such as community leadership for volunteers in efforts to increase the number of urban forestry advocates available to local governments for understanding the importance of urban forests, public funding and tree boards.
5.17 Recognize certified arborists and arboriculture as a skilled trade, improving safety, enhancing prosperity of green industry careers and improving the Indiana economy.

Necessary Resources

This section provides a description of resources necessary for the State Forester to address statewide strategies contained in the Forest Action Plan.

There will be significant resources necessary for the implementation of the Forest Action Plan beyond the approximately $8.7 million annual budget of the Indiana Division of Forestry, which is down over 25% since the 2010 Forest Assessment and Strategy. Cooperative partner resources expand capacity for achievement. The USDA Forest Service State and Private Forestry has traditionally supplemented the Division of Forestry's operating budget with about $1.5 million in grants and matched funds for cooperative programs and competitive projects. U.S. Forest Service funding levels for S&PF programs sometimes change each year based on the federal budget and the program allocation formulas. There are additional competitively funded grant programs. The Division of Forestry, strategic partners and collaborative efforts intend to actively pursue and apply for grants from federal agencies and from federal, community and private foundations that can provide additional funding for this Strategy.

Even with increased funding for the Division of Forestry and federal grants, a shortage of resources may reduce success on the strategies and actions listed herein. Limited resources include:

- Government and private foresters to manage lands and assist landowners
- Contractors to control invasive species and manage prescribed burns
- Loggers to purchase and remove timber and deliver it to the mills
- Reduction in state agency budgets
- Lack of funding for invasive species

The Indiana Forest Stewardship Advisory Council recognizes this shortage of resources and is interested in efforts to create new dedicated funding for conservation and outdoor recreation in Indiana that would benefit the strategies contained herein.

Coordination with Groups and Other Plans

This section details the efforts to develop the Forest Action Plan, coordinate with stakeholder groups and individuals, and encourage stakeholder participation.

The Division of Forestry and the Indiana Forest Stewardship Advisory Council ("IFSAC") have conducted open meetings with key stakeholders to ensure that the Forest Action Plan (1) integrates, builds upon, and complements other state natural-resource assessments and plans, and (2) identifies opportunities for program coordination and integration. Notes and presentations from these meetings are available here: https://www.IN.gov/dnr/forestry/6252.htm

A first step in the development of the Forest Action Plan was the review of relevant literature. Documents were identified and reviewed for incorporation through consultation with the Stewardship Committee and posted on the Division of Forestry webpage relating to the Forest Action Plan to facilitate stakeholder involvement and exchange.

Many of the Forest Action Plan's strategic recommendations that incorporate wildlife, species of conservation need, and priority forest areas were developed from information in the Indiana Wildlife Action Plan. For instance, as reported earlier, top conservation actions proposed in the SWAP for forests included limiting forestland conversion and fragmentation. These priorities are shared among many of the Forest Action Plan's action steps, in particular, 1.1 (promotion of financial incentives for conservation), 1.8 and 1.11 (promote programs to discourage forest parcelization), and 2.1 (increased forest cover statewide). SWAP also prioritizes invasive species control to protect fish and wildlife habitats, an issue directly addressed by action steps 2.2, 3.1, and 4.2. Needs identified in the SWAP for the promotion of forest type and age class diversity are addressed in many action steps, including: 1.3, 1.6, 1.7, 2.5, 5.1, and 5.9. The Indiana DNR Division of Fish & Wildlife, that document's author, was an active contributor throughout the Forest Stewardship Advisory Council's input sessions and contributed to this document's creation. The Indiana Wildlife Action Plan contains a wealth of information on Indiana forest species and their habitat needs. It is accessible online through the Division of Fish & Wildlife's webpage and linked below in the appendix.

Stakeholder Involvement

The Forest Stewardship Advisory Council, an established group representing a broad range of forestry interests in the state, has participated in the stakeholder process to develop this document along with Indiana DNR Divisions, USDA Natural Resource Conservation Service, Ecological Services Office for the US Fish & Wildlife Department, Hoosier National Forest and other federal land management representatives and technical committee members.

A diverse group of stakeholders and individuals who have an identified interest in forestry or forestland use was invited to participate in strategy sessions and meetings to update this document in beginning in 2017. Records of those meetings are available here: https://www.IN.gov/dnr/forestry/6252.htm. More than 50 stakeholder organizations had members participate in this process to refine important forest issues and contribute their thoughts on strategic actions. Meetings attempted to refine and clarify the most pressing issues

faced by Indiana's private, public and urban forests. Stakeholders also contributed their visions of a desired future forest condition and discussed the implications of priority landscape areas.

The Indiana Forest Stewardship Advisory Council has been a successful organizing body and platform to engage a wide range of forestry interests and enable sharing of concerns for the condition and future of diverse Indiana woodlands.

Special effort was made to engage federal military installations in the Forest Action Plan. Forests are important parts of Department of Defense land ownerships: Naval Support Activity Crane, NG Camp Atterbury, and Jefferson Proving Ground. Foresters managing these properties were contacted to engage in the creation of this plan and a draft version of the plan was provided to these military installations for review.

A detailed list of the groups that participated in the meetings of Forest Stewardship Advisory Council can be found on that committee's webpage, which is maintained by the Division of Forestry.

Document Review Process

A draft of the Forest Action Plan 2020 Update was available for public review for two months beginning January 27, 2020. The document was available online and links or PDF files were emailed to forest stakeholders who had requested to review a copy via the stakeholder outreach webpage. These were also emailed to an open list of stakeholder groups and individuals assembled for this process, including the Forest Stewardship Advisory Council. The Division of Forestry received more than 100 written responses through the document review process and incorporated suggestions where possible to improve the content. Review comments submitted through an online form available during the comment period had allowed users to indicate their desire to have their comments shared with the public. These responses will be made available on the Division of Forestry's Forest Action Plan webpage or available upon request to the Division of Forestry.

National Priorities Crosswalk

The Secretary of the U.S. Department of Agriculture, through the 2008 Farm Bill, called for a re-examination and assessment of the nation's forests, identification of priority areas for federal assistance, and a description of resources necessary to address statewide and regional strategies. The 2008 Farm Bill, under Title VIII – Forestry, (reauthorized in later Farm Bills) amended the Cooperative Forestry Assistance Act of 1978, to include the requirement that each state develop a long-term, statewide assessment and strategies for forest resources. These Forest Action Plans, including Indiana's, are focused on three national priorities:

- Conserve and manage working forest landscapes for multiple values and uses
    - Identify and conserve high priority forest ecosystems and landscapes
    - Actively and sustainably manage forests
- Protect forests from threats
    - Restore fire-adapted lands and/or reduce risk of wildfire impacts
    - Identify, manage, and reduce threats to forest and ecosystem health
- Enhance public benefits from trees and forests
    - Protect and enhance water quality and quantity

- Improve air quality and conserve energy
- Assist communities in planning for and reducing forest health risks
- Maintain and enhance the economic benefits and values of trees and forests
- Protect, conserve, and enhance wildlife and fish habitat
- Connect people to trees and forests, and engage them in environmental stewardship activities
- Manage trees and forests to mitigate and adapt to global climate change

This section demonstrates how the Forest Action Plan's strategies are tied to national priorities by using a "crosswalk" method. Related Indiana Forest Action Plan action steps are listed under the relevant National Priority (in italics).

National Priority 1: Conserve and manage working forest landscapes for multiple values and uses

This national priority is broadly aligned with Indiana Strategies: 1- Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration and 2 - Restore, expand and connect forests, especially in riparian areas.

- *Identify and conserve high priority forest ecosystems and landscapes*

Relevant associated Indiana Action Steps: 1.3 (high priority ecosystems: young and old forests), 1.6 (oak ecosystems), 2.1 (public forest ownerships), 2.3 (forested buffers), 2.4 (flood plain forests) also Indiana's Strategic Target Forest Patches.

- *Actively and sustainably manage forests*

Relevant associated Indiana Action Steps: 1.1, 1.3, 1.4, ,1.6, 1.7, 1.12, 3.2

National Priority 2: Protect forests from threats

This national priority is broadly aligned with Indiana Strategy 1: Conserve, manage and protect existing forests, especially large forest patches, with increased emphasis on oak regeneration. It is also related to Indiana Strategies: 2 & 3.

- *Restore fire-adapted lands and-or reduce risk of wildfire impacts*

Relevant associated Indiana Action Steps: 1.6 (oak ecosystem restoration with fire)

- *Identify, manage, and reduce threats to forest and ecosystem health*

Relevant associated Indiana Action Steps: 1.2, 1.5, 2.2 (invasive species impacts),2.3, 2.6 & 2.7 (deer herbivory), 3.1

National Priority 3: Enhance public benefits from trees and forests

This national priority is broadly aligned with Indiana Strategy 3: Connect people to forests, especially children and land-use decision makers, and coordinate education training and technical assistance. It also is related to Indiana Strategies: 2, 4, and 5.

- *Protect and enhance water quality and quantity*

Relevant associated Indiana Action Steps: 2.3, 2.4, 3.12

- *Improve air quality and conserve energy*

Relevant associated Indiana Action Steps: 4.16, 5.7

- *Assist communities in planning for and reducing forest health risks*

Relevant associated Indiana Action Steps: 1.2, 2.2, 2.6, 2.7, 5.4, 5.6

- *Maintain and enhance the economic benefits and values of trees and forests*

Relevant associated Indiana Action Steps: 3.12, 4.9, 4.10, 4.11, 4.12, 4.13, 4.16

- *Protect, conserve, and enhance wildlife and fish habitat*

Relevant associated Indiana Action Steps: 2.1, 2.2, 2.5, 2.6, 2.7, 2.8, 2.10, 5.9

- *Connect people to trees and forests, and engage them in environmental stewardship activities*

Relevant associated Indiana Action Steps: 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.10, 3.11, 3.12, 3.13, 3.14, 3.15, 3.16, 3.17, 3.19, 3.20, 3.21, 3.23, 3.24, 3.25, 3.26, 3.27, 3.28, 4.3, 4.4, 4.5, 5.5, 5.14, 5.16, 5.17

- *Manage trees and forests to mitigate and adapt to global climate change*

Relevant associated Indiana Action Steps: 3.18 (forest restoration), 4.1 (forest conservation), 4.7, 5.1, 5.3, 5.7

Appendix A: References

Donovan, T. M., P. W. Jones, E. M. Annand, and F. R. Thompson, III. 1997. Variation in local-scale effects: mechanisms and landscape context. Ecology: 78(7): 2064-2075.

Hartley, M. J., and M. L. Hunter. 1998. A meta-analysis of forest cover, edge effects, and artificial nest predation rates. Conservation Biology, 12(2):465-469.

Knutson, M. G., J. R. Sauer, D. A. Olsen, M. J. Mossman, L. M. Hemesath, and M. J. Lannoo. 1999. Effects of landscape composition and wetland fragmentation on frog and toad abundance and species richness in Iowa and Wisconsin. Conservation Biology, 13(6):1437-1446.

Thompson, F. R., III, T. M. Donovan, R. M. DeGraaf, J. Faaborg, and S. K. Robinson. 2002. A multi-scale perspective of the effects of forest fragmentation on birds in eastern forests. Pages 8-19 *in* T. L. George and D. S. Dobkin, eds., Effects of habitat fragmentation on birds in western landscapes: contrasts with paradigms from the eastern United States. Studies in Avian Biology, 25.

Appendix B: Links to contributing information and information resources

The Forest Action Plan focuses on the most important issues facing Indiana's forests. In an effort to provide additional information on topics that are not addressed in this Assessment or supplement the text, this section is provided with text and relevant links to other statewide plans, documents and organization websites. The information contained in this Appendix has contributed to the creation of this Assessment. These websites were last accessed in November of 2019.

Emerald Ash Borer Information Network
http://www.emeraldashborer.info/

Indiana Natural Regions Map (DNR – Homoya)
https://indiananativeplants.org/wp-content/uploads/Natural-Regions-Map2.pdf

Forever Forest Exhibit
https://northamericanforestfoundation.org/forever-forest-exhibit/

Indiana Natural Resources Teacher Institute
https://www.IN.gov/dnr/forestry/files/fo-NRTI_Information.pdf

Walmart's Acres for America
https://www.nfwf.org/acresforamerica/Pages/home.aspx

The Center for Agroforestry at the University of Missouri
http://www.centerforagroforestry.org/

Harrison County Land Conservation Program (HCC)
https://harrisoncounty.IN.gov/index.php/residents/environment/harrison-county-indiana-land-conservation-program

The White Oak Initiative
https://www.whiteoakinitiative.org/

Tools for Engaging Landowners Effectively (TELE): A Complete Guide to Designing Programs and Communications
www.engaginglandowners.org/guide

Indiana's Future Forests: A Report from the Indiana Climate Change Impacts Assessment
https://ag.purdue.edu/indianaclimate/forest-ecosystems-report/

Indiana Wildlife Action Plan (DNR)
https://www.IN.gov/dnr/fishwild/7580.htm

Hardwood Tree Improvement and Regeneration Center
https://htirc.org/

Indiana Division of Forestry
https://www.IN.gov/dnr/forestry/

The Woodland Steward newsletter
http://www.inwoodlands.org/

USDA Natural Resources Conservation Service
https://www.nrcs.usda.gov/wps/portal/nrcs/in/home/

Purdue Plant Pest Diagnostic Lab
https://ag.purdue.edu/btny/ppdl/Pages/default.aspx

Indiana Forestry BMPs (DNR)
https://www.IN.gov/dnr/forestry/2871.htm

Indiana Hardwood Strategy (ISDA, 2019)
https://www.IN.gov/isda/hardwoods.htm

Statewide Comprehensive Outdoor Recreation Plan (DNR)
https://www.IN.gov/dnr/outdoor/4201.htm

Future forests of the northern United States (USFS)
https://www.nrs.fs.fed.us/pubs/50448

National Woodland Owner Survey (USFS)
https://www.fia.fs.fed.us/nwos/

Indiana's Future Forests: Climate Change Impacts Assessment (Purdue University)
https://ag.purdue.edu/indianaclimate/forest-ecosystems-report/

Forests of Indiana, 2017 (USFS)
https://www.nrs.fs.fed.us/pubs/56667

Forests of Indiana, 2013 (USFS)
https://www.IN.gov/dnr/forestry/files/fo-IN_Forests_2013.pdf

Indiana DNR Classified Forests Report of Continuous Forest Inventory (DNR)
https://www.IN.gov/dnr/forestry/files/fo-Continuous_Forest_Inventory_Classified_Report_2013_2017.pdf

Hardwood Ecosystem Experiment publications (HEE)
https://heeforeststudy.org/publications/

Indiana Natural Heritage Database
https://www.IN.gov/dnr/naturepreserve/4746.htm

Lepidopteran Use of Native & Alien Ornamental Plants (Tallamy)
http://www.bringingnaturehome.net/

Hoosier National Forest Land Resource Management Plans
https://www.fs.usda.gov/main/hoosier/landmanagement/planning

DNR – Indiana Department of Natural Resources
http://www.IN.gov/dnr/

DNR Division of Forestry Strategic Direction 2015-2019
https://www.IN.gov/dnr/forestry/files/fo-State_Forest_Strategic_Plan_2015_2019.pdf

Indiana State Department of Agriculture – Strategic Plan
https://www.IN.gov/isda/3547.htm

Invasive Species Council
https://www.entm.purdue.edu/iisc/

Southern Indiana Cooperative Invasives Management
http://www.sicim.info/

Indiana Land Resources Council
https://www.IN.gov/isda/2357.htm

Indiana Association of Soil & Water Conservation Districts
http://iaswcd.org/

S&PF – State and Private Forestry, section of United States Forest Service
http://www.fs.fed.us/spf/

Indiana Forest Stewardship Advisory Council
https://www.IN.gov/dnr/forestry/6252.htm

2010 Statewide Forest Assessment & Strategy
http://www.IN.gov/dnr/forestry/5436.htm

DNR – Community & Urban Forestry
https://www.IN.gov/dnr/forestry/2854.htm

USFS – United States Forest Service
http://www.fs.fed.us/

Hoosier National Forest
http://www.fs.fed.us/r9/hoosier/

National Priorities – State & Private Forestry
https://www.fs.usda.gov/about-agency/state-private-forestry

Indiana's Hardwood Industry: Its Economic Impact
http://www.IN.gov/dnr/forestry/files/fo-IHI_economic-impact.pdf

Sustainable Forestry Initiative (SFI)
http://www.sfiprogram.org/

Forest Stewardship Council (FSC)
http://www.fsc.org/

Programme for the Endorsement of Forest Certification (PEFC)
https://www.pefc.org/

U.S. urban forest statistics, values and projections
https://www.fs.fed.us/nrs/pubs/jrnl/2018/nrs_2018_Nowak_003.pdf

Indiana Trails Plan
https://www.IN.gov/dnr/outdoor/files/trailsplan2006.pdf

Indiana Monarch Conservation Plan
https://www.indianawildlife.org/lib/uploads/files/Indiana%20Monarch%20Conservation%20Plan_8-10-18.pdf

Indiana Conservation Partnership Reports
https://www.IN.gov/isda/icpreports/

Indiana Fluvial Erosion Hazard Program and Mitigation Manual
https://feh.iupui.edu/

USFS Northern Forest Futures Project
https://www.nrs.fs.fed.us/futures/

Upper Mississippi River/Great Lakes Joint Venture BCR Plans for Indiana
https://umgljv.org/planning/state-by-bcr-plans/

Partners in Flight Continental Landbird Conservation Plan (2016)
http://www.partnersinflight.org/wp-content/uploads/2016/08/pif-continental-plan-final-spread-single.pdf

Community Planning for Agriculture and Natural Resources: A Guide for Local Government
https://www.cdext.purdue.edu/wp-content/uploads/2019/06/guidebook.pdf

Indiana Land Resources Council
https://www.IN.gov/isda/2357.htm

The Purdue University Land Use Team
https://cdext.purdue.edu/collaborative-projects/land-use/

Indiana Conservation Alliance (INCA)
http://indianaconservationalliance.org/

Indiana Hardwood Interactive Map

https://pcrd.maps.arcgis.com/apps/webappviewer/index.html?id=86ab79e192e94e348b638e8870844f79

Appendix C: Forest Legacy Program Requirements

This revised AON document has been previously approved by the FS Region, Area, or IITF Forest Legacy Program staff. Documentation of FS approval is available upon request to the Indiana Forest Legacy Program Coordinator. Review by the Indiana Forest Stewardship Advisory Council was conducted through the Forest Action Plan's online partner coordination, at meetings of Indiana Forest Stewardship Advisory Council, and as part of the Forest Action Plan draft review process.

USDA United States Department of Agriculture
Forest Service
Eastern Region Regional Office
626 East Wisconsin Avenue
Suite 800
Milwaukee, WI 53202
414-297-3600

File Code: 3360
Date: MAR 16 2020

Ms. Brenda Huter
Forest Stewardship Coordinator
Indiana Division of Forestry
402 W Washington St, Room W296
Indianapolis, IN 46204-2243

Dear Ms. Huter:

I am writing in response to your March 6, 2020, request for the approval of changes to the Indiana Forest Legacy Program (FLP) Assessment of Need (AON). Changes include incorporating the expansion of the Shawnee Hill/Highland Rim Forest Legacy Area that was approved in 2004, replacing the landowner application for FLP projects from Appendix B with directions to contact the Indiana Forest Legacy Program Manager for the current version of application materials, reformatting the document into Word, and correcting typographical errors.

According to FLP Implementation Guidelines, these changes are identified as "minor changes" necessitating approval from the Regional Forester or designee (FLP Implementation Guidelines May 2017, Part 6: Forest Action Plans, page 22).

The Eastern Region State and Private Forestry review of changes to the AON concluded that the request met all FLP requirements. Based on this review, I approve the changes to Indiana's AON dated January 2020.

These changes ensure the program remains strong and responsive for both State and national programmatic needs. The public involvement process, both with State Forest Stewardship Coordinating Committee (SFSCC) and the State FLP subcommittee, ensures these changes will be consistent with the FLP Eligibility Criteria and public acceptance.

The Indiana Division of Forestry, SFSCC, and FLP subcommittee are to be commended for their continued commitment to the FLP. If you have questions, please contact Legacy Program Manager Kirston Buczak Kirston.Buczak@usda.gov at (414) 297-3609.

Sincerely,

Robert Lueckel

ROBERT LUECKEL
Acting Regional Forester, Eastern Region

cc: Jack Siefert (jseifert@dnr.IN.gov), Scott Stewart, Kirston Buczak, Carleen Yocum, Mark Buccowich

DNR
Indiana Department
of Natural Resources

Indiana Forest Legacy Program

ASSESSMENT OF NEED

Final Report

December 1998

Revision

January 2020

Introduction to Indiana Forest Legacy Program AON
2020 Revision

The US Forest Service required that the Forest Legacy Assessment of Need (AON) be included in the 2020 Indiana Forest Action Plan either by integration into the document or as an addendum. The Division of Forestry chose to addendum option.

The Division of Forestry took the opportunity to revise the AON. The purpose of the revision was not to make major modification to the AON, but update the AON to reflect the program changes that have occurred since the original 1998 AON:

- In 2004, an expansion to the Shawnee Hills / Highland Rim Forest Legacy Area was approved.
- The program application and evaluation forms are modified from time to time. For this reason they have been removed from Appendix B and replaced with directions to contact the Indiana Forest Legacy Program Manager for current versions.

In addition, document was reformatted and typographical and grammatical errors were corrected.

DEPARTMENT OF AGRICULTURE
OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20250

December 1 0 1998

Honorable Frank O'Bannon
Governor
206 State House
Indianapolis, Indiana 46204

Dear Governor O'Bannon:

I am writing in response to the July 28, 1998, transmittal of the Assessment of Need (AON) document and request to join the Forest Legacy Program from Dr. Burnell C. Fischer, State Forester, Division of Forestry, Indiana Department of Natural Resources. Pursuant to our authority under Section 7 of the Cooperative Forestry Assistance Act of 1978 (16 USC 2103c), as amended, we have reviewed the Indiana AON and are pleased to welcome your State into the Forest Legacy Program.

The AON identified 12 conservation goals for the Forest Legacy Program in Indiana:

- Identify and protect environmentally important, privately-owned forest lands threatened with conversion to non-forest uses;
- Reduce forest fragmentation caused by development;
- Provide environmental benefits through restoration and protection of riparian zones, native forest plants and animals, and remnant forest types;
- Provide recreational opportunities;
- Provide watershed and water supply protection;
- Provide employment opportunities and economic stability through maintenance of traditional forest uses;
- Maintain important scenic resources of the State;
- Provide links to public and other privately-owned, protected areas;
- Protect rare, threatened or endangered species of plants and animals;
- Promote forest stewardship;
- Provide educational opportunities; and
- Provide buffer areas to already protected areas.

Six Forest Legacy Areas meeting eligibility criteria to achieve these goals and having public support were proposed. They are described and mapped in the Indiana AON. All six areas are hereby instituted as approved Forest Legacy Areas.

The staff of the Division of Forestry of the Indiana Department of Natural Resources, with the personal leadership of Burnell C. Fischer, Ben Hubbard, and Barb Tormoehlen, has worked diligently to bring Indiana into the Forest Legacy Program. Please thank them on my behalf.

Thank you again for your efforts to join the Forest Legacy Program. If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

DAN GLICKMAN
Secretary

Statement of Purpose

Of Indiana's 4.4 million acres of forest land, about 87 percent is privately owned. These private forests, valued for so many resources and different objectives, are being developed for housing, retail and manufacturing, and infrastructure, or divided into smaller parcels. Economic pressure on forest owners, such as escalating land values and property taxes, leads to the conversion of rural areas into suburbs and suburban areas into extended towns and cities. The conversion of forests to non-forest uses continues at an accelerated pace as the nation's population grows. Indiana's forests are no exception.

The Indiana Environmental Policy Act of 1972, (IC 13-1-10-2 (a)) states,

> "It is the continuing policy of the state of Indiana, in cooperation with the federal and local governments, and other concerned public and private organizations, to use all practicable means and measures...to create and maintain conditions under which man and nature can exist in productive harmony and fulfill the social, economic, and other requirements of present and future generations of Indiana's citizens."

In 1995 the governor of Indiana appointed the Indiana Department of Natural Resources' Division of Forestry as the state lead agency to develop and administer a Forest Legacy Program in Indiana. The purpose of a Forest Legacy Program is to identify and protect environmentally important forest land from conversion to non-forest uses, primarily through the use of conservation easements.

Guidelines for the Forest Legacy Program (FLP) require the state lead agency to prepare an Assessment of Need (AON) to establish a state Forest Legacy Program in consultation with the State Forest Stewardship Coordinating Committee (SFSCC). In June 1997, the Indiana SFSCC recommended that the Division of Forestry develop an AON, and elected to exercise a State Grant Option. Under the State Grant Option, all FLP acquisitions shall be transacted by the state with title vested in the state. Landowner participation is entirely voluntary.

The SFSCC identified six forested areas which have critical conversion pressure and are in need of protection and long-term forest management. The Indiana Forest Legacy Program provides landowners an opportunity to protect valuable forest resources while retaining ownership of the land. The protection afforded by the FLP will enable landowners to maintain and manage their forest resources and pass them on to future generations. As these resources are protected, many traditional values and uses of our forests will continue to be available through time. The AON for Indiana represents Indiana's commitment to the protection of one of our most valuable and valued resources -- our forests.

As appropriate, periodic review and revision of this assessment will be made to meet future needs of the citizens of the State of Indiana.

LARRY D. MACKLIN, Director
Department of Natural Resources

BURNELL C. FISCHER, State Forester
Division of Forestry

Table of Contents

List of Maps and Tables

Maps

Tables

ACKNOWLEDGEMENTS

The Indiana Forest Stewardship Coordinating Committee is grateful to the following individuals and organizations for their assistance in the development of this Forest Legacy Assessment of Need.

Members of the Forest Legacy Subcommittee and the members of the Forest Legacy staff of the USDA Forest Service, State and Private Forestry, Northeastern Area.

IDNR Executive Office and Division directors for their help in promoting Forest Legacy.

IDNR Division of Forestry, Information Section, Julie Charles and Rebecca Mauser for maps, editing, and information assistance.

J. C. Randolph and Anna Radue, Indiana University, School of Public and Environmental Affairs for GIS mapping services and consultation.

Darrel Bigham, University of Southern Indiana; Phil Houston, Columbus East High School; Jerry Dryden, Harrison County Cooperative Extension Office; Wendi Smith, Indiana Dunes State Park; Judy Mutchler, Sellersburg Library; South East Indiana Career Center, Versailles; Bill Diedrichs, Ft. Wayne Park and Recreation – for providing sites for public open houses.

INDIANA FOREST STEWARDSHIP COORDINATING COMMITTEE MEMBERS

John Bacone	IDNR Division of Nature Preserves
Warren Baird	Indiana Soil and Water Conservation Districts
Everett Ballantine	Indiana Forest & Woodland Owners Assn. (IFWOA)
Woody Barton	IFWOA
Ron Birt	USDA Farm Services Agency
Dave Bramledge	Indiana Hardwood Lumbermen's Association (IHLA)
Bonni Browning	IDNR Division of Forestry
Bill Bull	IDNR Division of Forestry
Robert D. Burke	IDNR Division of Forestry Indiana Tree Farm Committee
Vicki Carson	IHLA
Ken Collins	USDA Natural Resource Conservation Service
Jack Costello	IDNR Deputy Director
Brian Cruser	ABC Forest Management
Joe Davison	Indiana Forest Industries Council (IFIC)
Kenneth G. Day	USDA Forest Service, Hoosier National Forest
Carl Diehl	IFWOA
Gary Doxtater	IDNR Division of Fish and Wildlife
Robert Eddleman	USDA Natural Resource Conservation Service
Janet Eger	Indiana Society of American Foresters
Dan Ernst	IDNR Division of Forestry
Tom Ewbank	IFWOA
Burnell C. Fischer	IDNR Division of Forestry
Larry Frye	Fine Hardwood Veneer Association
Tony Grossman	Indiana Association of Consulting Foresters
Fred Hadley	Woodland Steward Institute
Pete Halstead	Indiana Tree Farm Committee
Bill Hayden	Upland Group Sierra Club
Jim Hochgesang	IFWOA
Bill Hoover	Purdue University
Ray Kletz	Indiana League of Rural Conservation and Development
Bob Koenig	IDNR Division of Forestry, Retired
Emily Kress	IDNR Division of Outdoor Recreation
Richard Langdon	Heartwood
Dennis LeMaster	Purdue University
Tom Lyons	IDNR Division of Forestry
John Maier	Protect Our Woods
Tim Maloney	Hoosier Environmental Council
Dennis McGrath	The Nature Conservancy
Rita McKenzie	Purdue University
Peter Meyer	IDNR Division of Fish and Wildlife
Lowell Miller	IFIC
Robert Montgomery	IDNR Division of Fish and Wildlife
Ronald Moore	US DOD, Camp Atterbury
Jack Nelson	IDNR Division of Forestry

Harry Nikides	IDNR Division of Soil Conservation
Ron Overton	USDA Forest Service, State & Private Forestry
David Petritz	Purdue University
Lane Ralph	State Director, Senators Lugar and Coats
Chuck Rush	IFWOA
Bob Schaible	IFWOA
Fr. Damien Schmelz	St. Meinrad College
John Seifert	Southeast Purdue Agriculture Center
Graham Toft	Indiana Economic Development Council, Inc.
Joe Tutterow	IDNR Division of Forestry
Jim Wichman	IDNR Division of Forestry
Kent Yeager	USDA Farm Services Agency

FOREST LEGACY SUBCOMMITTEE

Burnell C. Fischer	IDNR Division of Forestry, State Forester
Ben Hubbard	IDNR Division of Forestry
Barbara Tormoehlen	USDA Forest Service, State & Private Forestry
Warren Baird	Indiana Soil and Water Conservation Districts
Vicki Carson	Indiana Hardwood Lumbermen's Association
Brian Cruser	ABC Forest Management
Kenneth G. Day	USDA Forest Service, Hoosier National Forest
Dan Ernst	IDNR Division of Forestry
Richard Langdon	Heartwood
Tim Maloney	Hoosier Environmental Council

INTRODUCTION

Indiana's forests are richly diverse and provide many benefits. The original forests of this state were among the finest broad-leaved hardwood forests anywhere in the world (Jackson, 1997). Two hundred years ago, prior to European settlement, nearly 20 million acres of Indiana's 23 million acres were forested. Today, Indiana's forest resource totals approximately 4.4 million acres.

Both privately and publicly owned forests are vitally important to the people of Indiana and fulfill many roles in sustaining a healthy environment. Healthy forests add to biological diversity and provide needed wood, aesthetic beauty, and recreational value. They still are among the finest and most productive hardwood forests in the world, providing forest products to an international market, and contributing over $2.5 billion a year to the state's economy. In addition, these forests provide added economic value through the sale of non-timber products, tourism, and outdoor recreation.

The importance of forest land to the environment as a whole cannot be overstated. Indiana's forests play a key role in maintaining water and air quality and protecting erodible soils. Numerous species of wild- life and plants, including threatened, endangered, and sensitive species, depend on upland and bottomland forests for their habitat. These forests are home to resident wildlife species such as deer, grouse, and wild turkey, and provide critical habitat for many plant species, as well as for amphibians, bats, and migratory birds.

In addition, many people from Indiana and surrounding states recreate in the state's forests. Biking, camping, hiking, horseback riding, and hunting in the forests are increasingly popular activities.

A strong state economy and limited land base has resulted in increasing "people pressure" on our forested land base. More and more people are choosing to live in wooded environments. They not only are traveling further between home and work, they are also working differently. Increased telecommunication capabilities mean it is no longer necessary to be within a commutable distance of work, thus inviting new opportunities in residential living. This expansion necessitates infrastructure support and development and invites commercial development as well.

Natural resource values that are so important to the people of Indiana, now and in the future, are often in direct conflict with the demographic pressure that our forests face as development in forested areas continues to increase.

Prompted by concerns that land development and consumption continues to seriously break up the forest land ownership nationwide, the United States Congress established the Forest Legacy Program (FLP) as part of the Food, Agriculture, Conservation, and Trade Act of 1990 (P.L. 101-624: 104 stat. 3359) to promote long-term integrity of forest lands. The program's purpose is to identify and protect environ- mentally important privately-owned forest lands threatened by conversion to non-forest uses through purchase of conservation easements and fee-simple acquisitions. Through the Federal Agricultural Improvement and Reform Act of 1996 (P.L. 104-127: stat. 888), the Secretary of Agriculture is authorized at the request of the state to make a grant to the state to carry out the FLP in the state, including the acquisition by the state of lands and interests in lands. Indiana has requested this option.

The Assessment of Need for Indiana evaluates the potential need and use of this program in Indiana; determines eligibility criteria for areas to be considered for the program within the state; identifies and delineates the boundaries of forest areas meeting the eligibility criteria; recommends these areas for inclusion in the Forest Legacy Program to the Forest Service and the Secretary of Agriculture; and sets specific conservation goals and objectives for this program in Indiana.

Identifying the state's forest land that best meets the eligibility criteria is a multiple-step process, including assessment of the important forest natural resource values, assessment of the conversion pressures, and determination of which of these areas within the state coincide. The important natural resource values to be assessed in this evaluation are scenic resources, recreation opportunities, forested wetlands (palustrine forests), total amount of forest land, threatened and endangered plants and animals, wildlife habitat, old growth forests, and The Nature Conservancy's ecosystem focus areas. The threat of conversion will be assessed from a people pressure perspective, and includes indicators of population density, growth, and development. This Assessment of Need documents the evaluation, assessment, and recommendations for a Forest Legacy Program and Forest Legacy Areas in Indiana.

INDIANA FORESTS: Forest Resources

A. HISTORICAL PERSPECTIVE

Indiana's landscape of two hundred years ago is markedly different than the landscape of today. Although Native Americans practiced widespread agriculture, they had cultivated less than 100,000 acres of land by the late 1700s, and sustained a population of approximately 20,000 people. Active European settlement of Indiana began by 1800. At that time, it is estimated that the Indiana landscape of approximately 23.2 million acres consisted of about 82 percent forest, 6 percent water and wetland, 8 percent prairie, and 4 percent barrens, glades, savannas, and swamps.

Most of the early settlers cleared a farm from the wilderness. They first settled along forested water- ways to facilitate transportation. Forests were considered to be the best lands for farming since wet- lands were not easily drained and prairies were thought to be poor croplands. Farms expanded away from the stream valleys as the populations increased and road systems improved (Jackson, 1997).

By 1860, approximately 10 million acres of forest land were burned, cleared, cultivated, and abandoned following depletion of the soil resources. Fire was the primary tool used to clear the land. Very little of the wood was utilized. Most trees were felled, piled, and burned. So much wood was burned that sometimes the fires lasted for weeks at a time. Livestock was also free to roam the wilderness, further disturbing the land and vegetative habitat for many wild game animals. Drives were used to kill wild animals and reduce the damage to domestic livestock and crops.

The population of Indiana increased to 1.35 million people by 1860. All the land was surveyed, and all public land transferred to private ownership. The infrastructure of roads, railroads, and canals was in place, and growing. With all 92 counties established and most of the land, except for the northwestern prairie-wetland region of the state settled, Indiana was no longer a wilderness.

During the next several decades, forests continued to be converted to cropland, and what remained in forest was exploited as the lumber industry began to boom. By 1870, only seven million acres of uncut forests remained; this figure dropped to just over 1.5 million acres by 1900. In 1899, Indiana led the nation in lumber production with over 1 billion board feet produced. Forest land continued to decline in size and quality until the 1930s. In just over 100 years of European settlement, 22 animal species were extirpated from the state and many more were endangered (Jackson, 1997).

Forest clearing and abuse peaked in the 1930s, following which, a portion of the abused land was transferred from private landowners to public ownership. With a weak economy, many people could not afford the taxes and upkeep of their land, and chose to sell their land to either the state of Indiana or to the federal government. Today, these lands contribute to the public land ownership within Indiana, including 22 state parks, 13 state forests, 16 state fish and wildlife areas, 17 state historic sites, 21 state nature preserves, 9 reservoir areas, 1 national fish and wildlife refuge, 1 national forest, and 1 national park, and 1 national memorial. This, coupled with improving land management practices, began a new era of natural resource conservation. Abandoned land was reforested through the efforts of the Civilian Conservation Corps and others. In addition, livestock

and fire were removed from forest land as a result of education and improved agricultural practices, further improving forest land state-wide.

With Indiana's population currently at approximately 5.8 million people, our natural resources are in better condition than they were at the turn of the century. Today, about 4.4 million acres of land are forested in Indiana. Many public and private programs are available to reforest highly erosive farmlands and stream corridors, in an effort to restore forest land and improve water quality. The forests in the state support a diversity of plants and animals, many of which had at one time been on the brink of dis- appearance. Indiana's forests currently provide 116.5 million cubic feet of lumber and other wood products each year (Draft 1995 Timber Product Output Report).

B. OWNERSHIP PATTERNS OF INDIANA FORESTS

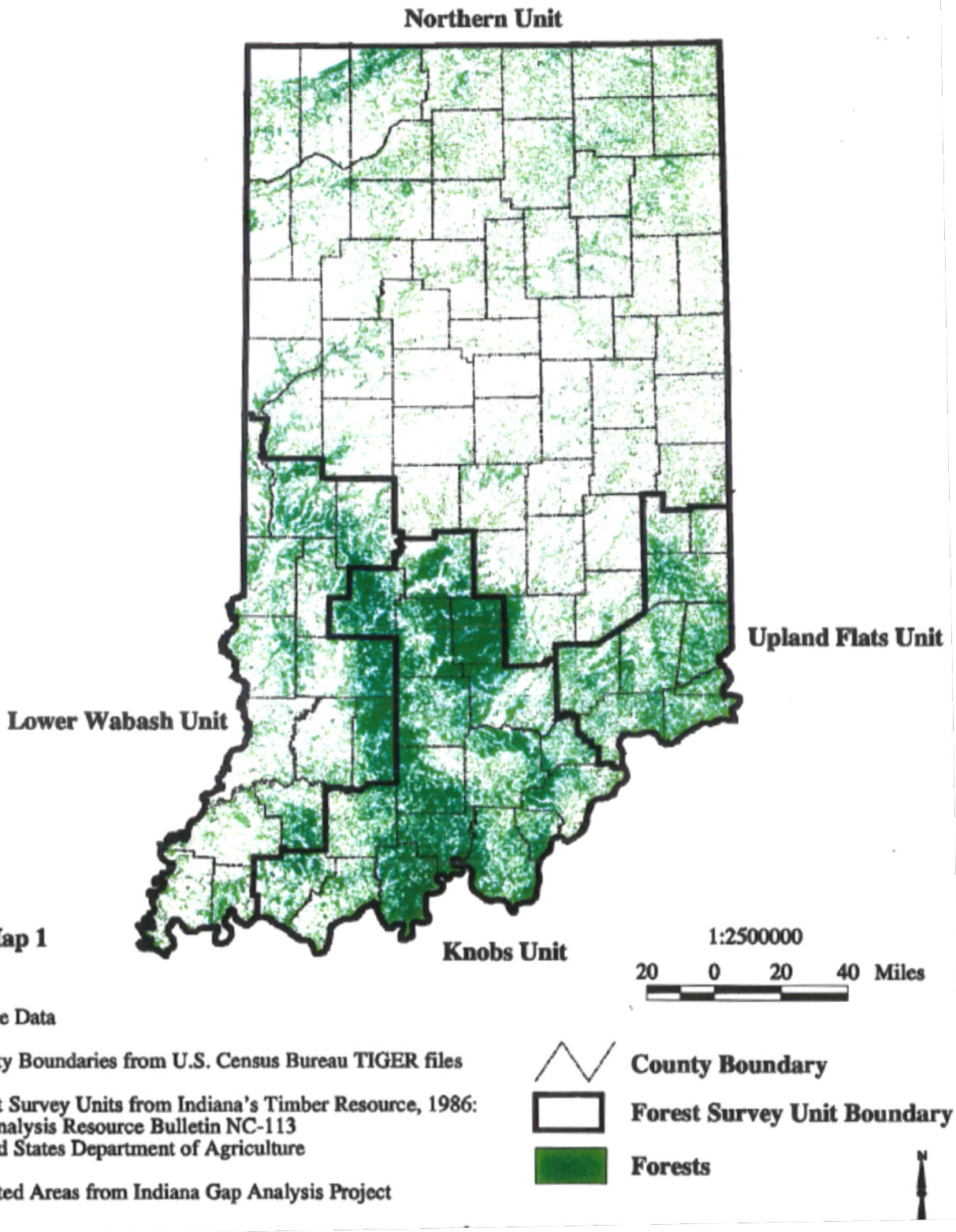
According to the 1986 Forest Inventory and Analysis (FIA), prepared by the USDA Forest Service, Indiana all forest land comprises approximately 4.4 million acres of the state's 23.2 million acres (Spencer et al., 1990). Of the total forest land, 4.3 million acres are classified as timberland, capable of producing 20 cubic feet per acre per year of wood product. About 87 percent of the forest land is privately owned. The remaining forest land is publicly owned by state, federal, or municipal governments (Table 1). Farmers own 1.7 million acres of timberland (about 40 percent of the total), and other private individuals and corporations account for another 2.0 million acres (about 47 percent).

Table 1. **Area of Timberland by Ownership Class (1986)**

Ownership	Area (thousand acres)	Percent of Total
Farmer	1,703.9	39.6
Private Individual	1,631.5	38.0
Private Corporation	407.1	9.5
Forest Industry	18.4	0.4
State	177.4	4.1
National Forest	166.0	3.9
Other Federal	162.6	3.8
County and Municipal	28.9	0.7
Total	**4,295.8**	**100.0**

In a study by Thomas Birch (1996), based on forest landowner surveys taken between 1978 and 1994, the number of forest landowners increased from an estimated 48,100 private landowners in 1978, to an estimated 151,300 private forest landowners in 1994. Private forest land increased during that same period from 3.740 million acres to 3.771 million acres. In other words, the number of Indiana's forest landowners tripled, while private forest land in the state grew by only 31,000 acres, or 0.8 percent of the total 1978 private forest land (Birch, 1996).

Indiana's Forest Land by Forest Survey Unit



Map 1

Source Data

County Boundaries from U.S. Census Bureau TIGER files

Forest Survey Units from Indiana's Timber Resource, 1986: An Analysis Resource Bulletin NC-113
United States Department of Agriculture

Forested Areas from Indiana Gap Analysis Project

Private forest landowners in Indiana have many different objectives for the use of their forest land. In general, the greatest benefit they expect from their forest land within the next ten years is aesthetic enjoyment, followed by farm and domestic use, recreation, income from timber, land value increase, fire- wood and finally other benefits not identified. Most own their forest land because it is part of their farm, and it is used for farm and domestic purposes. In addition to that, many own their land primarily for aesthetic reasons (Birch, 1996). According to Birch's study, the "new" individual private forest land- owner is younger, better educated, and earns more than the owner of a decade ago. "Retired Owners" is the other group of individual landowners that has increased. They increased both in the proportion of owners, and in the proportion of acreage owned. This may be due to people retiring earlier and living longer. However, the higher percentage of older landowners also increases the potential for subdivision and development of their forest land as their estates are settled following death. Nearly 41 percent of the forest landowners in the state have purchased land within the past thirty years, accounting for 35 percent of the entire forest land base. This indicates that the size of the individual parcels acquired is decreasing.

Forests have traditionally provided wood and other natural products for commerce; wood products for human survival; habitat for wildlife; areas for recreation, research, and education; watershed protection; for gathering roots, herbs, and human food stuffs; green space and buffers; soil stabilization and climate moderation. All of the preceding uses have been ongoing for decades and when pursued in moderation appear to be compatible with long term sustainability of the forest. There are also a number of uses which are traditional, but when uncontrolled appear to contribute to the degradation of the forest and its ultimate conversion to non-forest uses. Included in this latter list are indiscriminate domestic livestock grazing, construction sites for homes, businesses, roads, utility rights-of-way, and use of the forest as sites for refuse disposal. Only those uses compatible with the long-term sustainability of the forest will be advocated with the Forest Legacy Program.

C. FOREST DISTRIBUTION AND COMPOSITION

For monitoring purposes, Indiana's forests are grouped into four Forest Survey Units: Lower Wabash, Knobs, Upland Flats, and Northern Units (Spencer et al., 1990). Most of the forest land in Indiana is concentrated in the southern part of the state in the Lower Wabash and Knobs Units, and to a lesser ex- tent in the Upland Flats Unit. The Indiana GAP data (I 993), used in the natural resource evaluation, confirms this, as indicated in Table 2.

Table 2. **Amount of Forested Area per County by Forest Survey Unit (GAP, 1993)**

	Forest Survey Units			
Forested Area per County (acres)	**Lower Wabash Number Counties**	**Knobs Number Counties**	**Upland Flats Number Counties**	**Northern Number Counties**
> 90,000	4	13	5	---
40,000-90,000	7	4	1	10
20,000-40,000	3	---	2	18
< 20,000	---	---	1	24
Total	**14**	**17**	**9**	**52**

The Knobs, Lower Wabash, and Upland Flats units contain many large contiguous forests, providing important forest interior habitat. Forested areas in the Northern Unit are confined to scattered tracts, and to river and stream corridors. The northern Indiana forests are critical to the biological diversity of the area, providing important recreational and aesthetic resources.

More extensive forest areas are rarer than small forests. Although smaller forested areas are important and may have significance to the surrounding community, larger more contiguous forested areas tend to have more significance on a national level. They also contribute to broader ecosystems and wildlife habitat needs. For that reason, a relative measure of land area covered by forest was used to focus evaluation efforts to larger areas of forest within the state (Natural Resource Summary Matrix, Table 5).

Distribution of forest land has shifted through the years. The loss of forest land by county from 1950 to 1967 primarily took place in the north-central portion of the state, and may be attributed to increased agricultural conversion of forest lands during that period. However, from 1967 to 1986, although there was a statewide increase in forest acreage, there was a loss of forest land that occurred primarily in south- central Indiana, in the counties with both a high amount of forest land and statistical metropolitan area within close proximity (Table 3). This indicates a trend of residential and commercial expansion from the suburbs into the more rural wooded areas, yet within commuting distance of surrounding cities and towns. It is likely that this trend is ongoing and will continue with a presently robust economy and the growth of development and sprawl. It is anticipated that the completion of the 1998 FIA will confirm continued loss of forest land more associated with population pressure, rather than with conversion to agricultural land use.

Table 3. **Comparison of Timberland Area by Survey Unit – 1950 to 1967 to 1986**

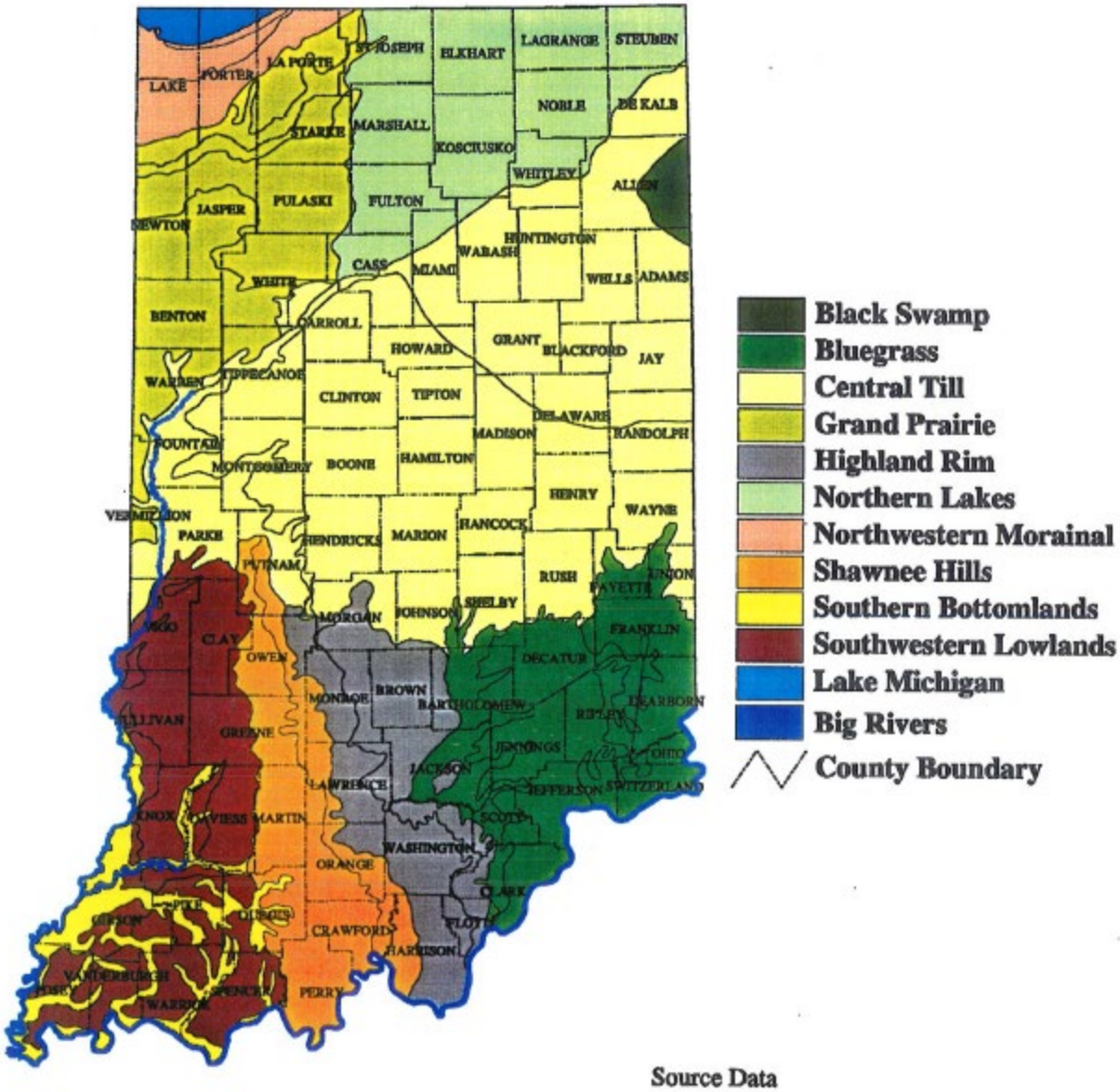
	1950		1967		1986	
Forest Survey Unit	**Area (1000 Ac)**	**Percent**	**Area (1000 Ac)**	**Percent**	**Area (1000 Ac)**	**Percent**
Lower Wabash	795.0	19.2	836.2	21.0	860.4	20.0
Knobs	1,705.0	41.2	1,769	46	1,741.1	40.5
Upland Flats	457.0	11.0	353.7	9.0	571.1	13.3
Northern	1,183.0	28.6	936.7	24.0	1,123.2	26.2
Total	4,140.0	100.0	3,895.8	100.0	4,295.8	100.0

Indiana's forests support thirteen forest types, ranging from the upland forests to cove hardwoods to lowland and wetland forests. During the past century and as recently as 1967, the oak-hickory forest type dominated Indiana's forests with 2.4 million acres of timberland, and the maple-beech type was a distant second with 0.8 million acres. By 1986, the situation had reversed and maple-beech covered the largest area with 1.6 million acres and oak-hickory, a valued and valuable forest type, moved to second place with 1.4 million acres (Spencer et al. 1990).

Most of the lost oak-hickory acreage converted to maple-beech according to analysis of plots established in 1967 and remeasured in 1986. Several factors contributed to the decline of oak-hickory and the rise of maple-beech. Maple-beech is the climax forest type for most Indiana sites,

except dry uplands and most drainages. The intervention of humans in the form of land clearing, logging, grazing, and fire changed the composition of the forest from a preponderance of maple-beech to a mix of types, especially oak-hickory. The direction of natural plant succession on these lands, however, is toward a return to maple-beech. In addition, harvesting only trees of the most desirable species or size has been practiced widely in Indiana. Most oak-hickory and other stands contain some species associated with the maple-beech type. If a disproportionate number of large oaks are removed, the resulting proportion of the maple-beech component may be high enough to change the overall type of the stand. Finally, with reduced grazing in oak-hickory stands, seedlings are better able to become established. Because maple is more shade-tolerant than oaks, and because oak reproduction is more difficult to obtain than maple, maple is more likely to regenerate these stands than oaks are. The areas of all other forest types in- creased between 1967 and 1986 (Table 4) (Spencer et al., 1990).

The Natural Regions of Indiana



Map 2

1:2500000

20 0 20 40 Miles

Source Data

County boundaries from U.S. Census Bureau TIGER files

Natural Regions of Indiana Map
by Homoya, et al.
Indiana Department of Natural Resources

Table 4. **Forest Land Classification by Forest Type in Indiana, 1967 to 1986***

(Thousand Acres)

Forest Type	1967	1986
Jack-red-white pine		54.7
Shortleaf pine	54.0	23.9
Scotch-Virginia pine		70.6
Oak-pine	46.0	104.2
Oak-hickory		1,370.8
Chestnut-scarlet oak	2,366.7	46.1
Sassafras-persimmon		19.8
Oak-gum	52.2	51.7
Lowland oak		30.9
Elm-ash-soft maple	524.3	830.5
Cottonwood		18.4
Maple-beech	771.2	984.7
Cherry-ash-yellow poplar		649.0
Aspen-birch	13.1	
Nonstocked	68.3	40.5
Total	3,895.8	4,295.8

*Forest type classification changed between 1967 and 1986. Grouped forest types identified in 1967 correlate to the new types of 1986. This table includes timberland only. It does not include reserved timberland, woodland, and non-forest land.

D. FOREST PLANT DIVERSITY

Indiana has long been characterized as the crossroads of America, with more interstates traversing its landscape than any other state in the union. Just as significant and often overlooked is the fact that Indiana is also at the crossroads of plant and animal communities. This state is one of transition, from north to south and from east to west. In general, it is easy to characterize Indiana as part of the central hard- wood region. However, a closer view of the ecosystems within the state reveals the complex transitions between natural community types. The twelve natural regions within the state illustrate these transitions.

The natural regions within Indiana were mapped by Michael Homoya et al., in the mid-1980s (Map 2). They include from north to south: Lake Michigan, Northwestern Moraine, Grand Prairie, Northern Lakes. Central Till Plain. Black Swamp, Southwestern Lowlands, Southern Bottomlands, Shawnee Hills, Highland Rim, Bluegrass, and Big Rivers. Within most of the natural regions are subregions that have individual characteristics that set them apart from one another, but have enough similar characteristics to be included within a natural region (Jackson, 1997).

The northern natural regions reflect the plant communities of the Great Lakes region. They are influenced by Lake Michigan, and the glaciation that occurred through the centuries. Northern boreal forests include paper birch, bearberry, trailing arbutus, green adder's mouth, American basswood, and white pine. In the Northern Lakes region, peat bogs and muck swamps are common,

and provide habitat for boreal species such as yellow birch, tamarack, American elm, black and green ashes, and silver maple.

The central section of Indiana was also glaciated, and was at one time the most expansive stretch of forest in the state. Today, the forest land is confined to small wooded tracts and woodlots. It is predominantly a maple-beech forest type, with a full complement of central hardwoods, including several species of oak, hickory, ash, maple, sycamore, elm, and yellow poplar. The forested land within this natural region supports a rich diversity of ferns, trout lilies, bloodroot, hepatica, wild geraniums and many other wildflowers.

The southern natural regions were predominantly not affected by glaciation, therefore are hillier, and have more extremes in topography. The uplands are characterized by several species of dry forest oaks, such as scarlet, chestnut, white, and black oak, and shagbark and pignut hickory. They also pro- vide habitat for rare plant species such as green-adder's mouth orchid, whorled pogonia, and yellow ladies'-tresses orchid. The rare tree species, yellowwood, more typical of the Ozarks and southern Appalachia is found only in the Highland Rim region of the state (Jackson, 1997).

The far southern reaches of Indiana are significantly affected by the Ohio and Wabash river systems. These areas more resemble the southern United States ecosystems along the Mississippi River to the Gulf of Mexico. The forests in the southwestern part of Indiana include cypress swamps, swamp white oak, swamp chestnut oak, shellbark hickory, and other southern species such as black gum. The drier sites support southern oak species such as post, blackjack, and southern red oak. The plant communities of the barrens and glades in this region support species more common in southern and western states such as beard grass, rose gentian, and poppy-mallow.

Indiana landscapes open the door on the grand prairie that has its eastern roots in northwest Indiana and stretches westward across the Great Plains states. The transition from the eastern deciduous forests to the tallgrass prairies provides stark contrast in plant communities and is rich in species diversity. The trees occur primarily in savannas, with sparse spacing of black and white oaks. Although most of the original landscape has been altered, small patches of prairie and wetlands, mostly in nature preserves or along railroad tracks, reveal a glimpse of the variety that was once the Grand Prairie and savannas of Indiana.

The Nature Conservancy's Indiana Chapter has identified eight special ecological systems in Indiana that are targeted for protection. Conservation biologists have determined that these areas are the best of our last great places in Indiana, and include rugged hardwood forests, prairie glades, and wetland breeding grounds for waterfowl (Richards, 1994). The natural resource values of these areas are significant, and are included in the evaluation of the state's forest land for this analysis (see Natural Resource Summary Matrix, Table 5).

E. FOREST ANIMALS AND WILDLIFE HABITAT

The present animal population of Indiana is the result of evolution, migration, interaction of species, extirpation and extinction, all in context with changing environments and activities of humans. Prior to European settlement, Indiana's extensive deciduous forests provided food and cover for many species of animals that have either been extirpated or have emigrated from

Indiana's landscapes. The black bear, mountain lion, timber wolf, river otter, beaver, white-tailed deer, and elk maintained healthy populations prior to European settlement. Both the beaver and the white-tailed deer were extirpated from Indiana by about 1900, but were later reintroduced. White-tailed deer have rebounded and adapted so well to the forest-agriculture interface that there is now a need to control their population in some areas of the state. Forest clearing was a likely factor in causing the extirpation of the wild turkey (also re-introduced), passenger pigeon, Carolina parakeet, ivory-billed woodpecker, and the common raven. Records indicate that thirty-two species have disappeared from Indiana in the past 200 years, and many others are now endangered or threatened.

However, with forest clearing, some animal habitats were improved. More than fifty species of birds were able to expand their nesting ranges. There are approximately 170 species of nesting birds in Indiana. Many depend on the forest-edge habitat for nesting and for food, while others depend primarily on the forest interior for their habitat. (Mumford and Keller, 1984)

Indiana provides habitat for approximately 57 species of mammals. The physical features of the state and its mammal habitats are relatively uniform, with no obvious important barriers to mammal distribution, other than the pocket gopher that is limited to riverine habitat. Approximately 36 mammal species probably occur in suitable habitat in all regions of the state. (Mumford and Whitaker, 1982)

Of the 25 species of birds that are listed within the Indiana Heritage Database as being either state or federally endangered or of special concern, 15 species of birds have some association with forests or trees, primarily as nesting either in trees, cavities, or in extensively forested areas (Castrale memo, 11-7- 97).

All of the mammals identified in the Indiana Heritage Database use forests at least in some capacity for their habitat. The Allegheny woodrat prefers rocky habitats in mature, deciduous hardwood forests, with mast-producing trees being an important habitat component. Bobcats use a wide variety of habitats. In forested settings, a mosaic of second growth timber and brushy fields, openings, and old fields are suit- able. The bats (evening, gray, Indiana, and southeastern) use loose or sloughing bark on large diameter dead or dying trees as roost sites during the summer months. To a limited extent, tree cavities also pro- vide suitable roost sites. All listed bat species forage in and around tree canopies of floodplain, riparian, and upland forests. River otters use riparian vegetation along streams and rivers for cover. The under- cut root cavities of mature trees such as sycamores on stream banks are used as den sites. Finally, the swamp rabbits depend upon floodplain bottomland forests along tributaries and estuaries of large rivers, streams, and marshes. Standing hollow trees are frequently used for shelter (Johnson memo, 11-25-97).

Extensive forests provide habitat for wide-ranging animal species and interior-dwelling species. The relative forest land area was used on a statewide basis in this analysis to evaluate important forests that could provide such wildlife habitat. Threatened and endangered species, on the other hand, have a broad spectrum of habitat requirements, only some of which require expanses of forest land. The Heritage database (IDNR Division of Nature Preserves and Division of Fish and Wildlife), identifying individual sites of federally or state-listed plants and animals, was used to assess the extent of these species within each county (Natural Resource Summary Matrix, Table 5).

F. RECREATION

Indiana's forest lands provide a wealth of opportunities to recreate outdoors. Most of Indiana's parks and other public land available for recreation are forested or in a wooded setting.

The IDNR Division of Outdoor Recreation conducted a survey in 1993 to determine outdoor recreation use patterns in the state, as part of the Statewide Comprehensive Outdoor Recreation Plan (IDNR, 1994). Of the 6,700 responses, 49 percent of the people felt that recreation is essential, while another 43 percent said it is desirable. Only 8 percent of the respondents indicated that outdoor recreation is undesirable or they just do not care.

The primary provider of outdoor recreation lands in Indiana is the public sector, and other private lands that provide public access and are managed to achieve conservation goals and objectives. The amount of area within these managed lands was used to determine the amount of recreation opportunities avail- able within each county of Indiana (see Natural Resource Summary Matrix, Table 5). Forest lands pro- vide opportunities to hunt, fish, hike, horseback ride, watch birds and animals, and provide quiet and solitude. These lands also provide refuges for diverse plant and wildlife communities.

A very important aspect of outdoor recreation is its contribution to the tourism industry in Indiana. Natural, cultural, or historic resources serve as an important tourism base for many communities. For example, according to a 1991 USDI Fish and Wildlife Service Survey, 2.8 million state residents aged 16 and older engaged in wildlife associated recreation (including hunting, fishing, and nonconsumptive activities). Those residents spent a total of $938 million on wildlife-associated recreation. Forty-eight percent, or $450 million, of that total was spent on trip-related expenses (IDNR, 1994).

G. AESTHETIC AND SCENIC RESOURCES

The aesthetic beauty of Indiana's landscape has been recognized through official designation of State Natural and Scenic Rivers, the Hoosier Bikeway System, and the Ohio River Scenic Route. Only three of the ten rivers studied have been designated as state natural and scenic rivers, however all ten rivers were included. Those designated are thus noted. The presence of the rivers, bikeway, and scenic transportation route was included in the evaluation of the natural resource values for this assessment.
The results for all linear routes are indicated in the Natural Resource Summary Matrix, Table 5. Unofficially, most Indiana residents hold dear their own prized scenic view, vista, woods, or waterway. The aesthetic value of forests cannot be underestimated. According to a 1993 survey of private forest landowners in Indiana, more people expected aesthetic enjoyment from their forest land as their primary expectation during the next ten years (Birch, 1996). The trend of more people moving into wooded environments confirms this appeal of forests and trees.

H. ECONOMICS

According to Table 34 of the 1986 FIA data, the net annual growth in timber growing stock volume in Indiana surpassed 153.6 million cubic feet. In 1995, the annual timber removal stood at 116.5

million cubic feet (Draft Timber Product Output Report, 1997). This indicates that we are harvesting about 75 percent of our total growth each year.

Forest products manufacturing is a $2.55 billion a year industry in Indiana, with world-wide sales of $5.777 billion. Because most harvesting occurs in rural communities in the southern half of the state, the 56,000 jobs are often overlooked on a statewide basis. For example, 80 percent of the 1994 secondary wood products income and 81 percent of secondary paper income, was earned in the northern part of the state. This northern economic activity is likely due to the proximity to Chicago and the state's mobile home, recreational vehicle, and packaging industries are located in the northern part of Indiana. Al- though the economic impact of Indiana's timber industry is felt statewide, some southern counties are heavily dependent on the jobs and income forest products manufacturers generate (Evergreen, January 1998). The amount of forest land within a county was evaluated to determine important forest areas as they relate to the forest products industry (Natural Resource Summary Matrix, Table 5).

Indiana's forest products industry has global impacts. Among the more important forest products ex- ported to other states and countries are furniture and furniture parts for residential and commercial use, lumber and plywood, millwork, flooring, veneer facing for furniture and panel products, cabinets and cabinet parts, structural and decorative members used in mobile home construction, paperboard, and cardboard boxes.

As earlier stated, however, the economic benefits from the forest land in Indiana are greater than the forest products industry alone. Tourism, much of which is forest-dependent such as sightseeing, hunting and fishing, contributes significantly to the state's economy as a whole and to individual communities dependent on visitors.

I. URBAN FORESTS

Indiana's urban forests arc very important, from not only an aesthetic perspective, but also in the role they play in moderating temperatures, helping to control pollution, and providing habitat for urban wildlife. Six Indiana communities were awarded Tree City USA status in 1996, bringing the total number of Indiana Tree Cities to thirty-two. (IDNR Annual Report, 1996).

Although not considered urban forests, many of the forests in the state most threatened by conversion are those in close proximity to urban areas. These urban-interface forests are important primarily from a human experience perspective, and are at the core of this analysis.

J. UNIQUE NATURAL AREAS

In 1967, A.A. Lindsey and his associates conducted the Indiana Natural Areas Survey to locate, describe and evaluate areas already in use as nature preserves and other natural tracts worthy of preservation by public agencies, conservation groups, or educational institutions.

This survey began at the same time as the Indiana State Legislature authorized a new Division of Nature Preserves within the Indiana Department of Natural Resources. It was becoming

increasingly evident that although the sustainable yield of wood appeared to be increasing, the natural areas within the state continued to decline in quantity and quality. (Lindsey, et al., 1969)

In the years since the survey was completed, a high percentage of the areas included in the inventory have been protected. Incredibly, of the 155 areas included in the inventory, only 11 have been destroyed or significantly degraded during the past 25 years. By reviewing the value of these lands with their owners during their field survey, they ensured that the majority of areas in private ownership would not be destroyed inadvertently. This principle is well understood today, as landowner contact or "registry" efforts are now an important part of the protection program of Indiana as well as other states. The natural areas inventory pioneered by Lindsey, et al. was only a beginning. Since their work was published, inventory efforts have continued (Jackson, 1997).

Forests with old-growth characteristics, having an overstory canopy of trees greater than 150 years old, having little human-caused disturbance during the past 80 to 100 years, and having multi-layered canopies and standing and downed trees (Spetich 1995), were among those areas identified in the Natural Area inventory. The presence of an old growth forest within a county was noted in the evaluation of natural resources values for this assessment (Natural Resource Summary Matrix, Table 5).

K. FISHERIES, RIVERS, AND STREAMS

Indiana has about 36,000 miles of streams and rivers large enough to support aquatic life. All streams share some characteristics. Given Indiana's gently undulating landscape, the low-gradient streams tend to meander. Small headwaters are generally steeper than the lower courses near their mouths (Jackson, 1997).

Stream courses have been altered through the past two centuries, primarily because of the change in vegetation cover, a result of settlement. Prior to settlement, Indiana streams drained shallow wetlands, and the entire watershed was mostly forest. Only about 10 percent, or 100,000 acres, of the original wetlands remain, mostly near the northern and southern borders of the state. Indiana's forests also have been diminished, from nearly 87 percent of the state to 19 percent. Streams once flowed more constantly be- cause of the permanent perennial vegetation of the watersheds. There were floods, but not as many or severe as today. The loss of these forests, wetlands, and prairies has affected and continues to influence the biological character of the fish community simply because the physical nature of the streams changed (Jackson, 1997).

The physical attributes of streams are of great importance to fish because species differ depending on where they can live, feed, and reproduce. Brook trout, chub, some dace, and some darters live in permanent streams throughout their lives, while many other species migrate into the headwaters to spawn in the spring and live downstream the rest of the year.

Forested riparian corridors and forested headwaters of rivers, streams, and reservoirs are critical to the health of the water, and in turn the fisheries. Approximately 62 percent of existing wetlands in Indiana are forested (Hansen, 1996). Forests moderate the temperature of the water and the rate of flow, and improve water quality by acting as filters to remove sediment and nutrients. Woody debris in rivers and streams helps to create riffles and pools, and provides much needed cover and

spawning habitat. Retaining forests along the water's edge, and most importantly, within the headwaters of a water source, is one of the simplest yet most effective ways of maintaining or improving water quality.

The palustrine (wetland-associated) forests, encompassing the riparian corridors and floodplain forests, were assessed using the National Wetlands Inventory developed by the USDI Fish and Wildlife Service (1991) and the vegetation data gathered by the GAP project (1997). The Natural Resource Summary Matrix, Table 5, indicates the ranking of amount of palustrine forest land by county.

INDIANA FORESTS: Related Resources

A. GEOLOGY, TOPOGRAPHY, AND OTHER GEOLOGIC FEATURES

People passing through Indiana on its interstates would likely, and incorrectly, surmise that the state's terrain is rather flat and non-descript. However, nothing could be further from the truth. From north to south there is great variation in the bedrock, the surface rock formations and the surface and sub-surface drainage. Topography ranges from table-top flat in northeastern Indiana to the rugged cliff formations of the west-central part of the state, to hills, knobs, cliffs, and caves throughout much of the south.

The topography is a product of millenniums of shifts in the earth's surface, climate, and the life it sup- ported. There were two major glacial occurrences: the Illinoian and the Wisconsin stages. The Illinoian glacial movement covered nearly four-fifths of the state, excluding the south-central portion, while the Wisconsin stopped well north of the first event. The natural lakes, streams, and rivers were carved out of the landscape by these glacial events. The water in the unglaciated portion of Indiana has slowly cut deep fissures, valleys, and ravines into the landscape, best exemplified by the path of the Ohio and Wabash rivers.

A portion of south-central Indiana contains karst topography, comprised of a complex arrangement of caves, subterranean drainages, springs and sinkholes. One area of Orange County has over a thousand sinkholes per square mile. Caves abound, and support rare and seldom-seen animal species.

Nearly half of Indiana's 92 counties contain at least one geologic feature of special concern; some counties containing more than ten features (Natural Resource Summary Matrix, Table 5). These constitute the best representation of a specific type of feature, such as reefs, fossils, oolites and pistolites, sand dunes, deltas, cliffs, canyons, beaches, and blowouts. They are distributed from north to south and east to west across the state's landscape, and are a good indication of the richness of Indiana's geological diversity.

B. SOILS

To a great extent, soils determine the type of forest and productivity of the site. Soils provide water, mineral nutrients, aeration for roots, and a substrate upon which to grow. There are thirteen soil regions, and forty-six major soil types in the state.

The type of soil is a factor of the extent of glaciation in an area, and whether the soils were deposited, pushed, or blown into place; and in the unglaciated portion of the state, the bedrock underlying the soil. Where glaciers did not smooth out the landscape, the soils are relatively thin and are somewhat easily erodible on sloping ground, and water does not readily penetrate the rocks, creating runoff into drain- ages, intermittent streams, and ridgetops and steep side slopes. Much of this area is forested, due to the steep topography. In the early 1900s, people tried to farm the gentler of these steep slopes, and found that erosion was a serious problem. Many of those slopes are healing through reforestation or other permanent vegetation.

The primary bedrock in Indiana is either limestone, sandstone, siltstone, or shale. The limestone soils support a diversity of plant species that is unique to more alkaline environments. Many rare species are located in this area. The sandstone, siltstone, and shale underlayment is more cosmopolitan, and sup- ports a wide variety of plant species. The unique plant communities on these soils are more factors of aspect, slope position, and water availability than they are of the soils they are growing on.

C. AGRICULTURE

In August 1997, Governor Frank O'Bannon issued an executive order (E.O. 97-27) creating the Hoosier Farmland Preservation Taskforce to examine historical trends of conversion of agricultural land to non- agricultural uses, identify voluntary methods and incentives for preserving and maintaining land for agricultural production, and provide recommendations for enhancing the continued vitality of agricultural activity and for protecting constitutional private property rights.

The Taskforce report indicates that 1.2 million acres of farmland, including forest land, have been lost between 1978 and 1992, averaging out to a loss of about 89,000 acres a year. It indicates the cause for this loss is primarily from conversion to industrial and residential development, in part because of the characteristics which make it ideal for agricultural production: flat or gently rolling topography, ad- equate drainage, and low property tax assessments. These characteristics are also ideal for development (Kernan et al., 1998). Also a part of the Taskforce's analysis, is the wildland within the state, defined as land that is not fanned, paved, or built upon. Forest land is included in this definition, and the effect of the accelerated trend to build in wooded rural settings in recent years is reflected in recent sharp price increases for wooded real estate suitable for building.

The recommendations that are forthcoming from the Farmland Preservation Taskforce are likely to complement the purpose and objectives set forth in the Forest Legacy Program. Both efforts address conversion as a result of indiscriminate development, with little regard to the natural resource potential of the land. It is possible that the two efforts may also complement one another in the implementation of the Taskforce recommendations and implementation of the Forest Legacy Program.

D. MINERAL, OIL AND GAS RESOURCES

The mineral resources in Indiana are rich and diversified, and have contributed greatly to the nation's and the world's building material, fuel supply, and many other products. Oil and gas reserves are found in several regions throughout Indiana, with a primary concentration in the east-central and southwestern parts of the state.

The limestone deposits throughout the midsection of Indiana continue to yield some of the world's finest building stone. Fourteen state capitols (including Indiana's), the Empire State Building, the Pentagon, the National Cathedral, and the New York Metropolitan Museum of Art are among the majestic buildings constructed from this valuable resource, with its beautiful and unique fine-grained texture (Jackson, 1997).

Gypsum is deep-rock mined in Martin County. The mines are at approximately 600 feet below the sur- face, and provide material that is manufactured into plaster, drywall, and a base for pharmaceutical pills, among other products.

Indiana's coal mines, located primarily in the west-central and southwestern part of the state, are now almost entirely surface mines, although that was not always the case. At one time, mine shafts were dug to remove coal, leaving gob piles and sulfuric drainage on the landscape today. The state's coal is a rich resource, producing nearly 40 million tons annually, as well as almost all the state's electricity.

Finally, crushed stone aggregate, found primarily in southeastern Indiana and throughout much of the state, provides road and highway material (nearly 80 percent of the aggregate), cement and lime, agricultural limestone, filter stone and riprap, railroad ballast, and many other uses (Carr, et al., 1971).

E. CULTURAL HERITAGE RESOURCES

Indiana is rich in historic and prehistoric cultural heritage. At the time of European settlement, Native Americans had inhabited the area that is now Indiana for hundreds of years. They established communities, hunted, fished, farmed, gathered, and processed nuts and berries, and carried out daily life, leaving behind remnants of their culture along the way. They primarily settled along the water courses, which is where many archaeological sites are found today. When plowing a field in the floodplains and flat- lands, it is not unusual to unearth implements and tools used by Native Americans.

There are over 38,000 archaeological sites in Indiana, few of which have been systematically surveyed and inventoried. The Indiana Division of Historic Preservation and Archaeology maintains a database on these sites, and can assist landowners in their protection. Unlike natural resources, historic and pre- historic resources are not renewable. Once they are destroyed or damaged, valuable scientific, educational, and cultural information is also destroyed. Conversion of forest land often results in the loss of cultural resources that are not identified in the process.

INDIANA FORESTS: Critical Issues and Environmental Impacts

It is clear that Indiana's forests play a vital role in the ecosystems within the state and in the central states, and also are important for some species that migrate thousands of miles each year. Threats of conversion of forest land to non-forest uses are many and varied. This assessment addresses those threats identified by people throughout the professional community who helped to define important forest lands, threats, and traditional uses of forest land. These threats, or critical issues, impact forests and associated natural resources differently. They are evaluated below.

A. FRAGMENTATION

In less than two centuries, Indiana's landscape has changed from 87 percent forested to 19 percent forested. More important, the timbered portion went from one large block of essentially unbroken primeval forest to tens of thousands of wooded tracts, the majority of which are now less than 40 acres in size (Jackson, 1997). As shown by Birch (1996), the number of landowners has significantly increased in the past decade as compared to the increase of forest land, nearly a 3 to 1 margin. These figures indicate the increasing acquisition of smaller wooded tracts, often isolated from one another.

The effect of creating small isolated tracts of forest land from one large contiguous tract within the state has led to habitat loss and degradation for many plant and animal species, as well as to a reduction in the biological diversity and richness.

In addition to the habitat loss from this segmented ownership pattern or "parcelization," it becomes increasingly difficult for a forest landowner to manage the forest for timber or other traditional forest uses. It becomes uneconomical to manage small wooded tracts for long-term profit, and impossible to manage on a sustainable basis. However, the tracts retain their appeal to developers and speculators who often offer comparatively high prices for their wooded land, and the landowner is faced with a decision of long-term investment or short-term profit. Many are choosing the latter. The lands are often developed into sizable home sites, thus rendering the value from a forest products perspective or from a plant and animal habitat perspective minimal at best. Or, the forest lands are cleared completely for commercial or industrial use and the natural resources lost permanently.

Parcelization, urbanization, or fragmentation of the forest land base is by far the most critical issue facing Indiana's forests. The extent of this growth was evaluated in terms of percent growth in population and rural population growth from 1990 to 1996 (Demographic Summary Matrix, Table 6). The need to link the remaining forests, thus extending their habitat potential and utility of management, has become increasingly evident. The future of Indiana's forest products industry, biological diversity, aesthetic values, and water and air quality will depend on how well we address this issue to minimize future parcelization and make efforts to link and maintain the forested land base that currently exists.

B. NON-NATIVE PLANT SPECIES

Exotic, non-native plants have been a part of the landscape for as long as people have migrated into Indiana, predominantly as a result of European settlement. Most agricultural crops are not native to Indiana, but are still very much a part of our landscape. These, as well as most of the flowers cultivated in our gardens are acceptable, even desirable, and do not threaten Indiana's forests.

However, there is a class of exotic plants that are not desired, and are considered biological pollution of the landscape. Many have the potential to reduce the productivity and diversity of the forests, and negatively affect other resource values. These plants are invasive and aggressive, and include species such as multiflora rose, Japanese honeysuckle, Russian and autumn olive, tree-of heaven, purple loosestrife, and perhaps most damaging to forested areas, garlic mustard. Most were introduced because they provide a useful function in their native environment, where checks and balances exist. But, once introduced to an area where few of their natural inhibitors are present, they literally take over their preferred habitat.

Multiflora rose, introduced to protect soil from erosion, and as suitable wildlife cover, aggressively invades old fields and has slowly worked its way into forest openings and along forest edges. Once established, it dominates a site, choking out most other plant species. Japanese honeysuckle, likewise, has the ability to choke a young stand of trees to death by blanketing the crowns. Japanese honeysuckle causes significant damage to any residual trees that are able to survive. Purple loosestrife has become a serious threat to some wetlands and marshy areas, often taking over the site. Tree-of heaven is opportunistic on suitable forest sites that have been indiscriminately harvested without site preparation for vegetative re- generation, and is capable of crowding out more desirable, native tree species on a given site. These exotics, once established, can devastate an otherwise high quality plant and animal community.

Garlic mustard is rapidly invading forests throughout the state, and poses the greatest exotic plant threat to forest wildflowers, especially spring ephemerals. Efforts are ongoing to develop a biological control for this invasive weed. The control efforts are modeled after the biological control for purple loosestrife, which has resulted in great decreases in purple loosestrife populations in areas where the biocontrol has been released.

Most of these species listed have a difficult time becoming established in mature forests, with the exception of garlic mustard, but are opportunistic if an opening is created, with seeds disseminated by birds and wind. Harvesting a stand of trees without forethought to the potential for exotic invasion, and necessary precautions in place can be disastrous for the future of the stand. With attention to spacing, remaining trees on the site, and site preparation prior to the harvest, and use of a proper seed mix after harvest, the effects can be minimized. The devastation that can be caused by exotic pests can remove any resource based economic opportunity, so that the development potential alone, remains as an economic value.

C. INAPPROPRIATE TIMBER HARVESTING

The American Forest and Paper Association describes sustainable forestry as:

> "Sustainable forestry means managing our forests to meet the needs of the present without compromising the ability of future generations to meet their own needs by practicing a land stewardship ethic which integrates the growing, nurturing and harvesting of trees for useful products with the conservation of soil, air, and water quality, wildlife and fish habitat, and aesthetics" (National Re- search Council, 1998).

In Indiana, the practice of sustainable forestry on private lands is entirely voluntary, but highly encouraged through education and economic incentives. The Forest Stewardship Program, Forestry Best Management Practice initiative, and Classified Forest Program promote sustainable forestry, while Division of Forestry district foresters, independent professional consultant foresters, industrial foresters, and other professionals are available to address the need for proper forest management on privately owned land.

However, far too many forest landowners in the state are unaware of these programs and services, or choose not to take advantage of them. Many do not know the value of their forest resource and the con- sequences of poor forest management practices. They may be unaware of the damage that can occur if proper road, trail, and log landing locations are not identified during forest management activities. Some landowners succumb to what appear to be lucrative offers for their trees, only to find the residual value, whether economical, aesthetic, or from a habitat perspective, is substantially reduced or lost.

Inappropriate timber harvesting has been identified as a threat to the sustainability, productivity and health of Indiana's forests. These woods, if left void of commercial timber value through indiscriminate harvesting, may become targets for conversion to non-forest uses. They lose their value as a continuous forest resource supply for future generations, and the loss of wildlife habitat is often significant.

D. WATER QUALITY AND QUANTITY

The earth has a finite amount of water. A sip from a water fountain may be the same drink a dinosaur took a hundred million years ago. Or it may have been locked in glacial ice for a thousand years during the Pleistocene era. Or, it may have moved through the internal plumbing of a white oak tree just last summer. Continuous recycling of water from ocean to land and back to ocean makes life possible and binds all living thing together (Jackson, 1997).

Indiana's water supply comes in two forms: surface water and ground water. Ground water is most plentiful in the northern portion of the state, and is the principle source of water for human consumption in the state. In southern Indiana, most of the drinking water supply is from surface water. Surface water includes lakes, streams and rivers, ponds, and reservoirs.

Forests can stabilize surface and ground water by filtering the water at the headwaters and other down- stream segments of a drainage or watershed. The filtering process removes minerals and soil

from the water and improves its quality. Forested shoreline and riparian areas also effectively reduce the water temperature as compared with open water. Finally, trees play an important role in the recycling the earth's finite water supply.

E. CONSERVING THE FOREST LAND BASE

The overall loss of forest land and the desirability of forest land for non-forest uses pose concerns for the future of the forest land base in the state. The residential, commercial, and infrastructure development potential of much of Indiana's forest land, especially within commuting distance of metropolitan areas, nears or exceeds its value for forestry uses. As development pressures increase, landowners are faced with the often difficult decision of whether to sell their property or keep the land and face higher property taxes. The Forest Legacy Program can help retain forest land by compensating the landowner for the development value, and allowing the landowner to retain ownership, enjoyment, and use of his or her forest land.

EXISTING MEASURES TO CONSERVE FOREST LANDS IN INDIANA

There are many efforts currently ongoing to conserve forest lands and natural resources. Public lands owned and administered by federal, state, and local governments have a common goal of natural resource conservation, although individual agency objectives and missions may differ. In 1986, approximately 14.7 percent of all forest land was in public ownership. Public land acquisition continues at a slow but steady rate.

Several federal and state programs are designed to assist private landowners in protecting and enhancing their forest resources. They include the following:

Forest Stewardship Program: The Forest Stewardship Program encourages long-term stewardship of non-industrial private forest land by assisting owners in actively managing their forest for multiple resource benefits. The program provides technical, planning, and management assistance to land- owners to enhance and protect the timber, fish and wildlife habitat, water quality, wetlands, and recreational and aesthetic values on their property. The IDNR Division of Forestry, in partnership with the USDA Forest Service, works with landowners to develop a multiple resource management plan, called a Forest Stewardship Plan, for the property and to help the landowner identify cost-share opportunities. The plans are geared toward multiple resource management and are tailored to the economic objectives of the landowner.

Stewardship Incentive Program: The Stewardship Incentive Program (SIP) provides economic assistance to landowners to implement the Landowner Forest Stewardship Plans developed under the Forest Stewardship Program. SIP is administered by the IDNR Division of Forestry, the USDA Forest Service, and the USDA Farm Services Agency. The overall goal of SIP is to enhance forest management on private lands through long term commitment to stewardship.

Forestry Incentives Program: The Forestry Incentives Program (FIP) provides financial assistance to private landowners for tree planting and timber stand improvement. The purpose is to increase the nation's supply of timber from private non-industrial forest lands. Because many landowners do not have the funds or incentive to make long-term investments to develop forest areas. FI P shares the expense with eligible landowners. FIP is administered by the USDA Natural Resources Conservation Service (NRCS), in coordination with the IDNR Division of Forestry (Environmental Law Institute, 1995).

Conservation Reserve Program: The Conservation Reserve Program (CRP) was designed to encourage farmers to place their highly erodible and other sensitive lands in conservation status in return for annual payments for a period of 10 to 15 years. The CRP is administered by the USDA Farm Services Agency, with technical assistance from the USDA NRCS. Its goal is to take environmentally sensitive cropland out of production and implement a conservation plan to reduce soil erosion and sedimentation, improve water quality, and provide fish and wildlife habitat. The plans are approved by the local soil and water conservation districts.

Wetland Reserve Program: The Wetland Reserve Program (WRP) is administered by the USDA NRCS, and is a voluntary program offering agricultural landowners a chance to restore and protect wetlands on their property through conservation easements. In return for federal payments, landowners must agree to a restoration plan for croplands and place the restored wetlands in an easement reserve where they cannot be drained or plowed. Easements are authorized for 30 years, permanently, or for the maximum allowed by state law. The WRP also provides 50 to 100 percent

federal cost-sharing for reestablishment of wetlands vegetation and hydrology and subsequent maintenance. The program gives priority to wetlands that enhance habitat for migratory birds and other wildlife.

Other Natural Resource Incentive Programs: Other incentive programs, also providing economic assistance to landowners, have the potential to benefit forest land in Indiana, but to a lesser extent than those identified, since the objectives of these programs are broader. The other programs include the Wildlife Habitat Incentive Program (WHIP) and the Environmental Quality Incentive Program (EQIP).

Classified Forest Program: The Classified Forest Program, in place since 1924, has been a strong incentive to owners of private forest land to protect and manage their forest land according to recommended forestry practices. Property tax reductions on Classified Forest lands (a minimum of ten acres per tract), which can yield periodic and long-term economic return to their owners, encourage forest land holders to participate. Some of the best remaining natural areas have been protected as Classified Forests since the 1920s or 1930s (Jackson 1997). Currently, there are nearly 8,000 tracts in the program, totaling nearly 400,000 acres state-wide. Each county has at least one Classified Forest.

Classified Wildlife Habitat Program: The Classified Wildlife Habitat Program is administered by the State Division of Fish and Wildlife, and is similar to the Classified Forest Program. Its tax incentives are the same. The only differences are the minimum tract size for this program is 15 acres, the overall objectives of the program, the amount of open land in relation to forest land, and the types of plant species planted and maintained.

Indiana Heritage Trust Fund: The Indiana Heritage Trust Fund is for the purchase of natural lands from willing sellers for the purpose of conservation and preservation. It is funded by the sale of environmental license plates. The trust fund buys land for new and existing state parks, forests, nature preserves, fish and wildlife areas, trails, and other areas for the Indiana Department of Natural Re- sources and cooperating organizations.

LAND TRUSTS IN INDIANA

Land Trusts are non-profit corporations whose general objectives are to preserve and protect land to achieve conservation objectives. They often operate by acquiring land and interests in land. The guide- lines established for the Forest Legacy Program state, "Land trusts have an important and appropriate role to play in the Forest Legacy Program." Land trusts have been involved for more than 100 years in preservation activities throughout the country. In some cases, land trusts purchase or receive donations of fee interest in land; in other cases, they hold easements. The greatest addition to trust-held acreages has occurred over the past 20 years as development pressure on lands has increased. There are several land trusts in Indiana covering essentially the entire state.

The Nature Conservancy (TNC), Indiana Chapter began in 1959. TNC works extensively with private landowners to protect natural areas using acquisitions, conservation easements, and voluntary agreements. All TNC land is managed under a stewardship program designed to maintain the pre- serves for biological diversity. In Indiana, TNC runs a Natural Areas Registry to honor private owners of outstanding natural areas for their commitment to the survival of the land's natural heritage. The voluntary program is designed to make public and private landowners throughout the state aware of the natural features on their land, and to recognize those owners for their voluntary protection efforts. Participation is non-binding, but owners commit to preserving and protecting the area to the best of their abilities.

In addition, the Indiana TNC has established "Saving Our Last Great Places," a program which plans to raise $7 million in private funds to begin to protect eight special ecosystem focus areas throughout the state. The program will leverage additional public resources, generate new conservation partnerships, and build upon existing public/private conservation partnerships (Richards,
I 994).

ACRES Inc. Land Trust is based in Fort Wayne. It is dedicated to the preservation of natural areas in northeastern Indiana. It was founded in 1960, with a goal to acquire and protect nature preserves for environmental education, scientific study, and public enjoyment. It currently manages twenty-eight preserves.

LaPorte County Natural Resource League and **Shirley Heinze Environmental Fund** are located in northwestern Indiana. Their goals and objectives are to protect land for habitat, greenspace, scenic and cultural assets and for watershed preservation.

NICHES Land Trust, of Lafayette, and **Central Indiana Land Trust (CILTI**), of Indianapolis, are active in the central portions of Indiana. They, too, work toward protecting and preserving natural areas and habitat.

Sycamore Land Trust, based in Bloomington, and Riverfield, based in Louisville, Kentucky, are active in the southern third of Indiana. Their goals and objectives are aligned with those of the other land trusts throughout the state.

The Land Trusts of Indiana have been involved with the review and development of the Assessment of Need for the Forest Legacy Program. This program will continue to encourage participation by the land trusts as the program is implemented.

PUBLIC PARTICIPATION PROCESS

The public participation process for the Indiana Forest Legacy Program Assessment of Need (AON), was conducted in two phases. The first phase was issue oriented, statewide in scope and conducted early in the assessment process. The second phase was oriented at the individual potential Forest Legacy Area level and concentrated on local issues or concerns and input on boundaries of the potential Forest Legacy Areas.

Phase One

October 1997 -- Letters were sent to over 100 agencies, organizations, and individuals who had exhibited interest in Indiana forest issues (mailing list on file) (Appendix D-1 and D-2). The letters provided an overview of the program and asked the recipients to assist in identifying all issues they felt may be pertinent to the program. Each recipient was asked to prioritize the issues identified as to importance and applicability to the program. Each recipient was also asked for ideas to help craft an Indiana definition for these terms: environmentally important forests, traditional forest uses, and threats to Indiana forests.

October 1997 -- Indiana Department of Natural Resources Director Larry Macklin sent a letter introducing the Forest Legacy Program to each state and federal legislator representing Indiana and to various state officials (Appendix D-3). Senator Richard Lugar's supportive response is shown as Appendix D-4.

November 1997 -- Responses to issues letters were analyzed and clarified as needed. High priority issues were identified and used to determine criteria for Forest Legacy Area delineation and to define terms for the Forest Legacy Subcommittee. Each recipient of an issues letter also received a compilation of the results from all respondents (Appendix D-5).

January 1998 -- Two input-gathering meetings were held by Indiana Forest Legacy staff with representatives of the Indiana Department of Natural Resources, land-holding divisions and with representatives of the land trusts operating in Indiana. These meetings were used to clarify issues, gather suggestions for specific Forest Legacy Areas, and discuss the structure of the partnerships needed to facilitate the Forest Legacy Program in Indiana.

Phase Two

February 1998 -- Potentially affected interests in each of the proposed legacy areas were identified. An effort was made to make sure that all significantly affected interests were directly contacted regarding upcoming informational meetings. Over 200 individuals and agencies were sent notices by mail (mailing list on file).

March 1998 -- Newspaper and electronic media releases were distributed in each area prior to conducting an open-house type informational meeting in each proposed Forest Legacy Area.

Informational meetings were used to gauge support, receive input on possible adjustments to area boundaries, and explain local impacts of the program (Appendix D-6)

April 1998-- Open house meetings were held in eight locations (Appendix D-6) between April 1, 1998 and April 9, 1998. Available for all participants at each open house were an information sheet and map for that area's potential FLA (see Appendix D-7 for example), question and answer sheets

(Appendix D-8), an Indiana Forest Legacy Program brochure (Appendix D-9), and copies of the FLP guidelines. Written comments received at the open house sessions were positive toward the establishment of the program (see Appendix D-10). Specific comments about FLA boundaries were considered when the proposed area boundaries were adjusted. There was extensive media coverage of the open house sessions in most locations.

Attendees at the open house sessions represented a wide variety of stakeholders including: forest landowners, land trusts, forest products industry, environmental groups, elected and appointed state and local officials, natural resource professionals and most members of the Forest Legacy Subcommittee.

May/June 1998 -- Draft Assessment of Need documents were distributed for comment to all members of the State Forest Stewardship Coordinating Committee (SFSCC), and others who expressed desire to review the draft document. Copies of the Draft Assessment of Need were available for review on request from the Indiana DNR, Division of Forestry, 402 W. Washington St. Rm. W296, Indianapolis. IN 46204.

June 1998-- Assessment of Need document was amended by Subcommittee to reflect review comments and presented to SFSCC for approval.

July 1998 -- A copy of the draft Assessment of Need document was forwarded to the County Commissioners of each county containing a Forest Legacy Area. A cover letter explained the assessment of need development process, local public input and asked for their review and comments on the document and program (Appendix D-11).

Other Public Involvement

The Forest Legacy Coordinator also received a number of letters and phone calls of support from various groups and individuals. Appropriate informational material was sent to each of these individuals. Two comments were also received voicing concern about the potential impact of the program on Indiana's coal mining industry. Information was exchanged and clarified on this issue with the Indiana Coal Council, Inc. (Appendix D-12).

Letters of support were received from numerous individuals, agencies, and organizations (Appendix D-13).

The Indiana Forest Legacy Coordinator and Assistant Coordinator made formal presentations about the program to the following groups: Indiana Biodiversity Steering Committee, Indiana Division of Forestry Annual Meeting, Winter/Spring Forestry Workshop Series in Corydon, IN, Governor's Farmland Preservation Task Force, State Forest Stewardship Coordinating Committee 1997 Winter Meeting, Historic Southern Indiana Workshop on Balancing Preservation and Economic Development, Forest Stewardship Workshops in Jasper and Crawfordsville, IN, Indiana Society of American Foresters Winter Meeting, Forestry and Natural Resources Research Symposium at Purdue University and the Hoosier National Forest staff meeting. Informational articles on the Indiana Forest Legacy Program appeared in various local newspapers, The Indiana Woodland Steward, Indiana Classified Forest Newsletter, the Division of Nature Preserves Newsletter, Indiana Forest and Woodland Owners Association Newsletter, and other local organization newsletters (example shown in Appendix 0-14).

Periodic informal meetings were also held with the Indiana DNR Director and Deputy Director, various Division Directors within the Indiana DNR, and representatives of several Indiana land trusts. The Indiana Forest Legacy subcommittee met several times during the preparation of the Assessment of Need.

THE FOREST LEGACY PROGRAM IN INDIANA - ADDRESSING THE PROBLEM

Indiana's forests are among the most productive in the central hardwoods region of the United States. Just as importantly, they are valued for their aesthetic beauty, recreation resources, important habitat for a wide variety of plants and animals, for the water quality and quantity they help provide and protect, and for their contributions to maintaining air quality. Indiana's forests, both rural and urban, add greatly to the quality of life of Indiana residents and of visitors to the state. However, the state's forests are increasingly under people pressure. Urbanization and indiscriminate development have become the greatest threats to Indiana's forest land. As the state plans for the future, threatened forested areas need to be managed to protect the integrity and the values of the forest base for future generations.

The Forest Legacy Program in Indiana addresses forest lands in Indiana that are currently under the most threat of urbanization and other conversion pressures, by offering to purchase conservation easements from willing owners to protect in perpetuity their valuable forest land. Lands becoming part of the Forest Legacy Program will require the preparation and implementation of a Forest Stewardship Plan or multi-resource management plan. These plans consider all the values of forest land from the timber resource to aesthetics, important habitat, and recreation resources.

The goals of Indiana's Forest Legacy Program include:

- identify and protect environmentally important, privately-owned forest lands threatened with conversion to non-forest uses;
- reduce forest fragmentation caused by development;
- provide environmental benefits through the restoration and protection of riparian zones, native forest plants and animals, and remnant forest types;
- provide recreational opportunities;
- provide watershed and water supply protection;
- provide employment opportunities and economic stability through maintenance of traditional forest uses;
- maintain important scenic resources of the state;
- provide links to public and other privately owned protected areas;
- protect rare, threatened or endangered species of plants and animals;
- promote forest stewardship;
- provide educational opportunities;
- provide buffer areas to already protected areas.

A. ELIGIBILITY CRITERIA FOR FOREST LEGACY AREAS

To be eligible as an Indiana Forest Legacy Area, an area's forest land must meet all of the following criteria:

- be threatened by present or future conversion to non-forest uses;
- be threatened with conversion by encroaching development or be subject to subdivision into small non-contiguous forest tracts, separated by non-forest land;
- contain one or more of the following important public values:
    - scenic resources;
    - public recreation opportunities;
    - major rivers, streams, or lakes recognized as impo11ant to the State;
    - wetlands, riparian areas, or floodplains;
    - important public water supplies;
    - habitat for forest-dependent birds (resident and migratory species), mammals, reptiles, amphibians, inve11ebrates and fish;
    - habitat for rare, threatened, or endangered plant or animal species;
    - important cultural resources;
    - large blocks of contiguous forest land.
- provide opportunities for continuation of traditional forest uses (forest product extraction, watershed protection and recreational activities such as hiking, hunting, and fishing);
- reflect important regional values.

B. ASSESSMENT OF FORESTED AREAS

The assessment and evaluation of Indiana's forests was a multiple step process designed to identify forest areas that best fit the Forest Legacy Program criteria. The steps included:

1. Define important forest lands, traditional forest uses, and threats to forest land, within Indiana;
2. Determine the amount, location, and type of forest land on a statewide basis;
3. Evaluate the forested lands by natural resource values to determine the level of quality or quantity of an individual natural resource;
4. Develop a matrix by county for Indiana that combined natural resource values, leading to an overall natural resource assessment for the state's forest land;
5. Evaluate the demographics within the state, using current and trending information, to deter- mine the level of present and future growth, both overall and in rural areas throughout the state.
6. Develop a matrix of the demographic information.
7. Combine the natural resource and demographic matrices to determine which of the forested lands with the highest natural resource values also are experiencing the most demographic pressure, and thus are most threatened by conversion to non-forest uses.

This information was presented to representatives from the land trusts in the state, as well as to representatives of various divisions within the Indiana Department of Natural Resources and to the Indiana Society of American Foresters. They were asked to identify additional information, either site-specific or in general, that would be important to consider in delineating proposed Forest Legacy Areas in the state.

The Forest Legacy Subcommittee then assimilated all of the above to develop the proposed areas, which were then presented at open houses in each of the areas identified. The public was asked to provide local knowledge, and to identify concerns or additional information that would lead to optimizing the boundary for each area. Local support for each of the areas was expressed, and minor changes in the boundaries resulted from the open house input.

1. Environmentally Important Forest Land:

   Forest will be considered environmentally important if it contains one or more of the following public values:

   a. Scenic resources - contains or contributes to scenic vistas or landscapes;

   b. Public recreation opportunities - provides significant forest-based recreation opportunities for the public;

   c. Riparian areas - provides watershed and groundwater recharge protection, assuring water quality and quantity;

   d. Fish and wildlife habitat - provides habitat for forest-dependent animal species;

   e. Known threatened and endangered species - provides habitat for state or federally listed threatened, endangered, or special concern species of plants of animals;

f. Known cultural resources - contains or protects historic or prehistoric archaeological sites or resources;

g. Other ecological values - contains or protects forested wetlands (palustrine forests) or old- growth forest, contains woody vegetation in a variety of species and size classes, protects fragile soils or significant topographic or geologic features, provides connectivity between otherwise isolated forest areas, contains uncommon or diminishing native forest cover types;

h. Provides opportunities for the continuation of traditional forest uses, such as forest management, timber harvesting, other commodity use, and outdoor recreation - must be a minimum size to be sustainable as a forest, must be at least 90 percent covered with woody vegetation or be scheduled for reforestation within a five year period, site quality must be adequate for the production of a wide variety of forest values.

Traditional Forest Uses:

Forests in Indiana have traditionally provided wood and other natural products for commerce, wood products for human survival, habitat for wildlife, areas for recreation, research and education, watershed protection, gathering of roots, herbs and human food stuffs, green space and buffers, soil stabilization, and climate moderation. All of the preceding uses have been ongoing for decades and when pursued in moderation appear to be compatible with long term sustainability of the forest. There are also a number of uses of Indiana's forests which are traditional but when uncontrolled appear to contribute to the degradation of the forest and its ultimate conversion to non-forest uses. Included in this latter list are domestic livestock grazing, construction of homes, and businesses and use of the forests as sites for refuse disposal. Only those uses compatible with the long-term sustainability of the forest will be advocated in the Forest Legacy Program.

Conversion Threats to Indiana's Forests:

In Indiana, the primary threats driving the conversion of forest land to non-forest uses can be broadly divided into three categories; economic factors, public policy factors and those threats driven by both economics and public policy. The conversion pressure that results from each of these factors varied from area to area. Intense conversion pressure in some rapidly developing areas may not be obvious from statewide data. Respondents to our inquiries identified the following list as the most pressing conversion threats:

Economic factors identified were:

- economic pressures on forest owners to convert forest to non-forest uses (opportunity cost);
- lack of adequate tax incentives to offset the cost of long-term forest investment;
- the introduction of aggressive non-native plant and animal species;
- inappropriate timber harvesting, leading to conversion to non-forest uses;
- development pressure in some areas caused by lower cost of forest land compared to already cleared land.

Public policy factors identified were:

- zoning and development rules that require large minimum lot size in some forested areas;
- the propensity of new home owners and builders to choose large wooded acreages as individual home sites and subdivisions as quality of life issue;
- lack of public policy protecting open space and wildland attributes near some urban areas;
- lack of appreciation by landowners and planners of the forest's overall value and the impact of certain land use activities on forest values;
- accelerated expansion of public utilities into sparsely developed forested areas.

Both economic and public policy factors includes:

- rapid population growth in limited areas;
- fragmentation - dividing and isolating of forest into pieces too small to be a viable forest system;
- the pressure to use forested areas as a choice for infrastructure development and expansion (transportation corridors, utilities, and public buildings);
- the proliferation of developments in forested areas which require large acreage such as golf courses, strip malls, and industrial use.

2. The amount, location, and type of forest land was determined on a state-wide basis using Gap Analysis Project (GAP) data, and geographic information systems (GIS) capabilities as much as possible. The vegetation layer for the GAP project was completed in December 1997, and was based on Land- sat Thematic Mapper (TM) satellite imagery (1989-1993). GAP data is classified into 14 categories. Only the forested categories (9-14) were used in this analysis. The forest land, and all other criteria, was evaluated on a county basis, because most information, both natural resource and demographic can be accumulated by county. The amount of forested land, and the percentage per county, were analyzed and displayed.

3. The important public natural resource values evaluated to the extent possible and practical on a county basis (Natural Resource Summary Matrix, Table 5). The source of each natural resource value is identified below.

   Scenic resources: There is no landscape or scenic assessment available for the state of Indiana. Scenic routes for roads, bikeways, trails, and State Natural and Scenic Rivers (studied and designated) were identified as being either present or not present within each county.

   Public recreation resources: Recreation available on forested lands within Indiana was evaluated from a managed land perspective, and included those lands that are publicly or privately owned for the purpose of natural resource conservation. Most of these lands

provide public access and are available for a wide variety of recreational opportunities. Each county was placed in one of four categories based on the amount of managed land in that county.

Riparian areas: Because the forested area associated with riparian areas was of utmost interest with this criterion, the amount and extent of the palustrine forest and woodland area was evaluated to address riparian areas. GAP data was used for this analysis, and each county was assigned one of four categories based on the amount of palustrine forest land within its borders.

Wildlife habitat: The total forest land in each county determined the amount of wildlife habitat associated with forests. Each county was assigned a value of 1-4 depending on the amount its forest land.

Threatened or endangered plants or animals: The IDNR Division of Nature Preserves Heritage Database was used for this analysis. The sites of either state or federally listed plants or animals were displayed by county in tabular and mapped format. The counties were assigned a value of 1 to 4 depending on the number of occurrences of total plant and animal sites, regardless of whether it was state or federally listed.

Cultural Resources: After discussion with the IDNR, Division of Historic Preservation and Archaeology, it was determined that a cursory state-wide evaluation of heritage resources was not critical to the delineation of the Forest Legacy Areas, but once established, the extent of cultural resources on a nominated tract will be very important. Therefore, the information was not used in the natural resource matrix, but will be evaluated during individual parcel evaluation.

Other ecological values: Whether a county is part of a The Nature Conservancy ecosystem focus is important and included in the overall evaluation of the natural resources. In addition, the number of geological features of special concern was assessed. The county was assigned a value of 1 to 4 depending on the number of special geologic features it contained. Evaluated, but not included in the matrix, was the amount of Classified Forest present within a county.

4. The natural resource matrix was developed using the assigned values of 1 to 4 for each of the eligibility criteria. Although the units of measure and the parameters varied by criterion, the numerical value assigned was consistent, lending to an equitable comparison of all factors by county.

5. As with the natural resource values, the factors used to evaluate the threat of conversion of forest land were evaluated and displayed in matrix format using assigned values of 1 to 4, by county (Demographic Summary Matrix, Table 6). Because Indiana does not have standard land use planning or zoning throughout the state, the types and extent of the information available were not necessarily consistent or comparable. This made the amount of land consumption that has occurred in the past ten years or is likely to occur in the future difficult to determine. The demographic information used in the analysis was generally available for all counties in

Indiana. The primary source of demo- graphic information in this analysis was the Indiana Business Research Center. They compile U.S. Census data and issue annual estimated updates on various demographic statistics.

The information evaluated in the demographic analysis included:

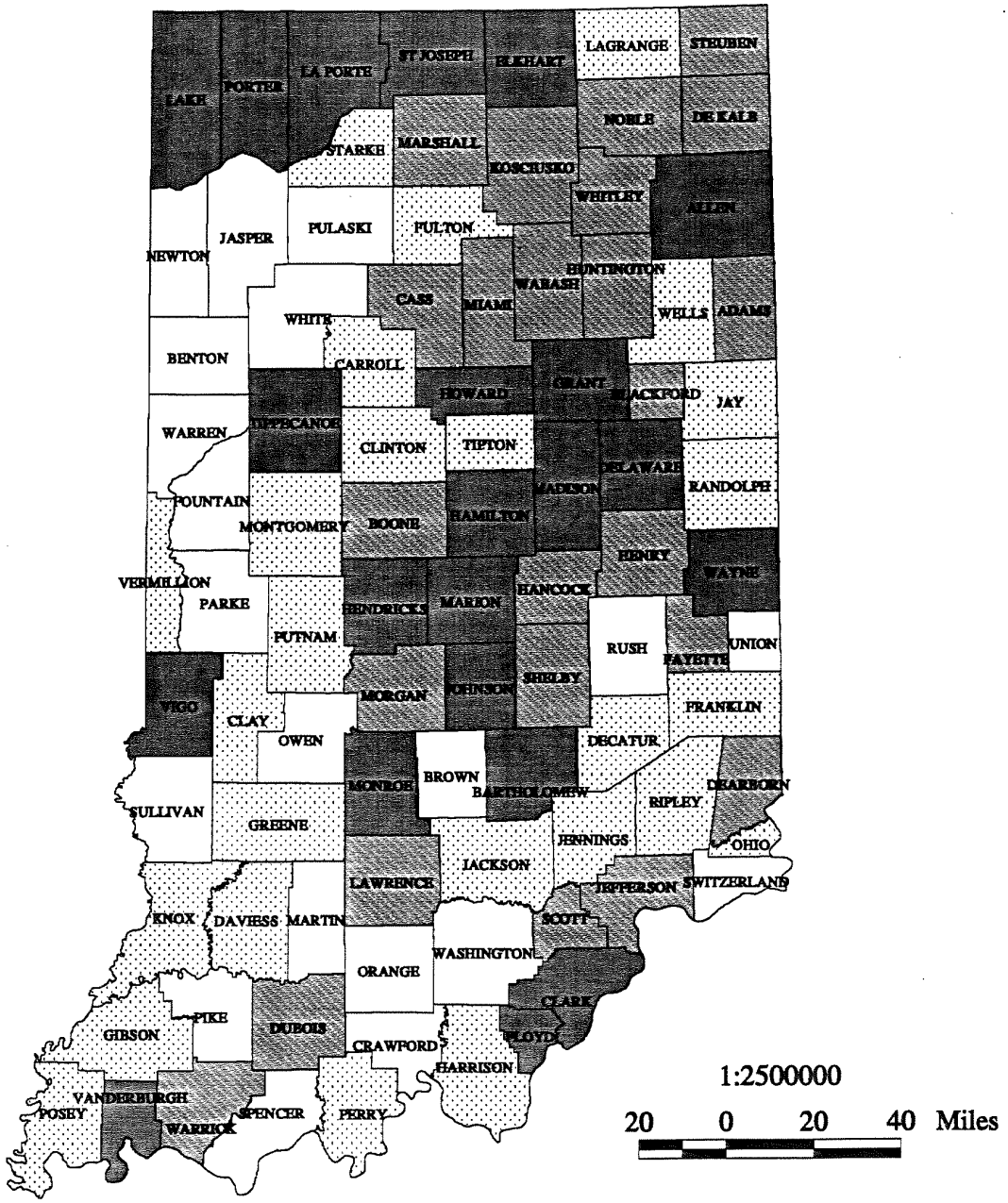
- Population density per square mile;
- Percent change in population between the period of 1990 to 1996;
- New residential buildings (information not available for all counties);
- Rural population growth between 1990 and 1996;
- Septic system density (septic system application is required in all Indiana counties);
- Percent housing units built between 1980 and 1990.

6. The demographic matrix, Table 6, was developed using the assigned values of 1 to 4 for each of the factors evaluated. Although the units of measure and the parameters varied by factor, the numerical value assigned was consistent, thus lending to an equitable comparison of all factors by county. Maps 3 and 4 illustrate two factors that were evaluated, population density per square mile, and percent change in population from 1990 to 1996.

7. The combined demographic and natural resource matrix resulted in a numerical and visual display (Map 5) of the forested areas with the highest natural resource values that currently face the greatest people pressure. Not surprisingly, most of the areas are within commuting distance of metropolitan areas in or surrounding the state of Indiana.

Based on the outcome of the combined matrices, input from land trusts, and from other forest land managers, the Forest Legacy Subcommittee identified and proposed Forest Legacy Areas.

Indiana Population Density Per Square Mile
1990



Map 3

N

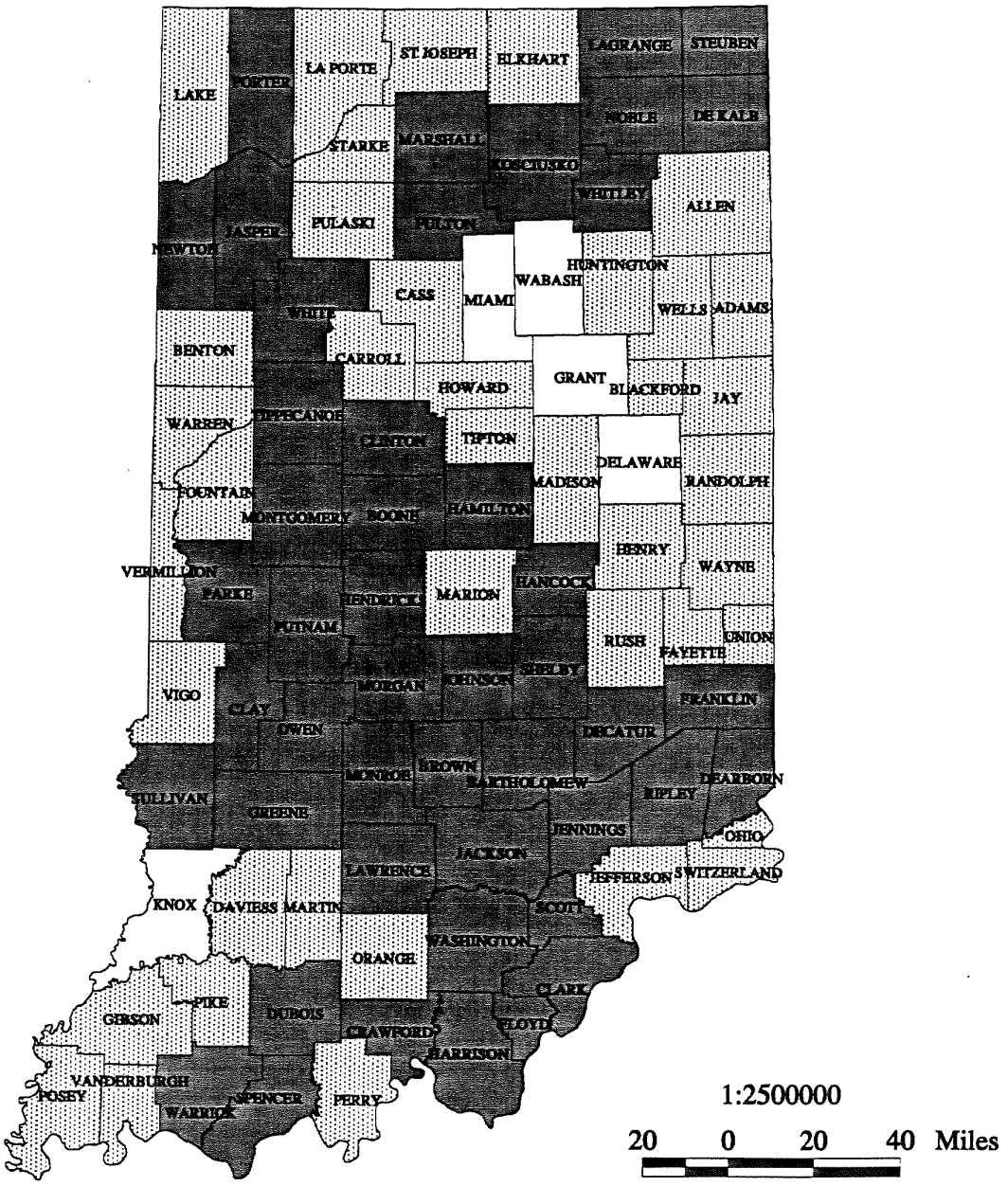
Source Data

County boundaries from U.S. Census Bureau TIGER files

Population Density from the Indiana Fact Book 1994-95, p. 97a

Indiana County Population

Percent Change 1990 - 1996



Map 4

Statewide Change = 5.35 %

Growing faster than the state
Growing slower than the state
Declining

Source Data

County boundaries from U.S. Census Bureau TIGER files

Population Change from the Indiana Research Center (Indiana Business Review, Summer 1997)

Table 5. Natural Resources Summary Matrix

County	Natrl/Scne Rvr S=Study D=Desig	Managed Area (ac)	Hoosier Bikeway	Palustrine Forest Land	Total Forest Area (ac)	Heritage Data Base (sites)	Old Growth Forest Present	TNC Focus Area Present	Spec. Geolog. Features	Sum of NR Values
Adams	-	1	-	1	1	1	1	-	-	6
Allen	D	2	1	3	3	3	-	-	3	16
Bartholomew	-	4	-	4	3	3	-	-	2	16
Benton	-	2	-	1	1	2	-	-	2	8
Blackford	-	1	-	1	1	1	-	-	-	4
Boone	-	1	-	2	1	2	-	-	-	6
Brown	-	4	1	1	4	3	-	-	3	16
Carroll	D	1	1	2	1	3	-	-	-	9
Cass	-	1	1	2	1	3	-	-	-	8
Clark	-	3	-	2	4	4	-	1	2	16
Clay	-	1	-	2	3	1	-	-	1	8
Clinton	-	1	-	2	1	1	-	-	1	6
Crawford	D	4	1	1	4	4	-	1	3	19
Daviess	-	2	-	4	3	2	-	-	-	11
DeKalb	-	1	-	3	2	3	-	1	-	10
Dearborn	-	1	-	1	4	2	1	-	-	9
Decatur	-	1	-	1	2	1	-	-	-	5
Delaware	-	1	-	2	1	2	-	-	2	8
Dubois	-	3	-	4	4	3	-	-	1	15
Elkhart	-	2	-	3	3	4	-	-	-	12
Fayette	-	1	1	1	2	1	-	-	-	6
Floyd	-	2	-	1	3	2	-	1	-	9
Fountain	-	1	-	3	3	2	-	-	1	10
Franklin	S	2	1	1	4	2	-	-	-	11
Fulton	-	1	-	2	1	4	-	-	-	8
Gibson	-	1	1	4	3	4	1	-	-	14
Grant	-	2	-	1	1	1	-	-	-	5
Greene	-	2	-	3	4	2	-	-	-	11
Hamilton	-	1	-	3	1	2	-	-	-	7
Hancock	-	1	-	1	1	3	-	-	-	6
Harrison	D	3	-	1	4	4	-	1	3	17
Hendricks	-	1	1	1	1	1	-	1	-	6
Henry	-	2	-	1	1	2	-	-	-	6
Howard	-	1	-	2	1	1	-	-	-	5
Huntington	-	3	1	1	2	2	-	-	-	9
Jackson	-	4	1	4	4	3	-	-	3	19
Jasper	-	2	-	2	2	4	-	1	-	11

Jay	-	1	-	2	1	1	-	-	-	5
Jefferson	-	4	1	3	4	3	-	-	2	17
Jennings	S	3	-	3	4	3	-	-	-	14
Johnson	-	3	1	2	2	3	-	-	2	13
Knox	-	1	-	4	2	4	-	-	-	11
Kosciusko	S	2	-	4	3	4	-	-	-	14
LaGrange	-	3	-	4	2	4	-	1	-	14
Lake	-	2	-	3	3	4	-	1	2	15
Laporte	-	2	-	4	3	4	-	1	2	16
Lawrence	-	3	1	2	4	4	1	-	4	19
Madison	-	1	-	2	1	1	-	-	2	7
Marion	-	2	1	1	2	3	-	-	1	10
Marshall	S	2	-	4	2	3	-	-	-	12
Martin	-	4	-	2	4	3	-	-	2	15
Miami	-	2	1	1	1	2	-	-	-	7
Monroe	-	4	-	1	4	3	-	-	4	16
Montgomery	S	2	1	2	2	3	1	1	2	15
Morgan	-	2	-	3	4	2	-	-	2	13
Newton	-	4	-	3	2	4	-	1	1	15
Noble	S	2	-	4	3	4	-	-	-	14
Owen	-	3	-	2	4	2	1	-	-	12
Parke	S	2	-	2	4	3	-	1	2	15
Pike	-	3	-	4	3	3	-	-	-	13
Porter	-	3	-	4	3	4	-	1	3	18
Posey	-	3	1	4	3	4	-	-	1	16
Pulaski	-	3	-	3	2	4	-	1	-	13
Putnam	-	2	-	2	4	2	1	1	3	15
Randolph	-	1	-	3	1	2	1	-	-	8
Ripley	-	4	-	2	4	2	1	-	-	13
Rush	-	-	-	2	1	2	-	-	-	5
Scott	-	2	1	3	3	1	-	1	-	11
Shelby	-	1	-	3	1	4	-	-	-	9
Spencer	-	2	1	4	3	3	-	-	-	13
St. Joseph	-	2	-	3	3	4	1	-	1	14
Starke	-	2	-	3	2	3	-	-	-	10
Steuben	-	2	-	3	2	4	1	1	1	14
Sullivan	-	3	-	4	3	3	-	-	1	14
Switzerland	-	1	-	1	3	2	-	-	-	7
Tippecanoe	D	1	1	3	2	4	-	-	2	14
Tipton	-	1	-	2	1	1	-	-	1	6
Union	-	2	1	1	1	1	-	-	-	6

Vanderburgh	-	2	-	2	2	2	-	-	-	8
Vermillion	-	2	-	2	2	2	-	-	1	9
Vigo	-	2	-	4	3	3	-	-	1	13
Wabash	-	3	1	1	2	2	-	-	2	11
Warren	S	1	-	2	2	2	-	-	2	10
Warrick	-	2	1	4	3	3	-	-	-	13
Washington	D	3	-	3	4	2	-	1	1	15
Wayne	-	1	1	3	2	2	-	-	1	10
Wells	-	2	-	1	1	1	-	-	2	7
White	-	1	-	1	1	2	-	-	-	5
Whitley	-	1	-	2	2	2	-	-	-	7

Table 6. Demographic Summary Matrix

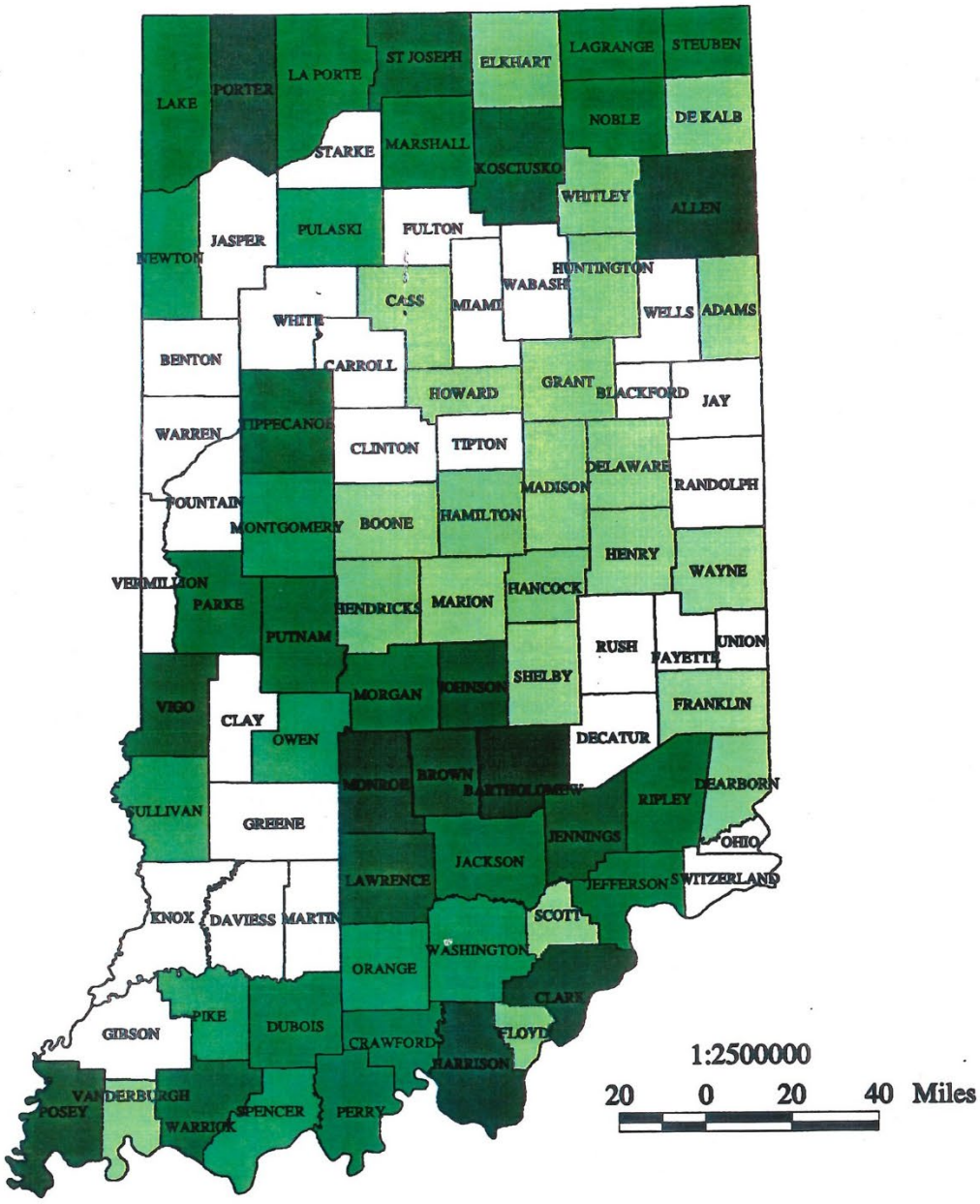
County	Population Density	% Change in Pop. (90-96)	New Resid. Bldg Permits	Rural Pop. Growth (90-96)	Septic Sys. Density (90)	% Housing Built (80-90)	Sum Demog. Values
Adams	3	3	3	1	2	2	14
Allen	4	2	4	4	3	2	19
Bartholomew	4	4	4	4	3	1	20
Benton	1	2	1	1	1	-	6
Blackford	3	2	1	1	1	-	8
Boone	3	4	4	1	2	2	16
Brown	1	4	3	1	3	2	14
Carroll	2	3	2	1	2	-	10
Cass	3	2	2	3	3	-	13
Clark	4	3	4	2	3	1	17
Clay	2	3	1	1	2	1	10
Clinton	2	3	2	1	1	-	9
Crawford	1	3	1	2	1	3	11
Daviess	2	3	2	2	1	2	12
DeKalb	3	4	3	2	2	2	16
Dearborn	3	4	4	4	3	3	21
Decatur	2	3	3	-	3	1	12
Delaware	4	1	4	2	3	-	14
Dubois	3	3	4	1	2	3	16
Elkhart	4	4	4	3	4	2	21
Fayette	3	2	2	1	2	-	10
Floyd	4	4	4	3	4	2	21
Fountain	1	2	1	2	1	1	8
Franklin	2	4	2	1	2	2	13
Fulton	2	3	1	1	2	1	10
Gibson	2	2	1	2	2	2	11
Grant	4	1	3	3	3	1	15
Greene	2	4	N/A	2	2	1	11
Hamilton	4	4	4	-	3	3	18
Hancock	3	4	4	1	3	2	17
Harrison	2	4	3	2	3	3	17
Hendricks	4	4	4	-	4	3	19
Henry	3	2	3	2	3	-	13
Howard	4	3	4	2	3	-	16
Huntington	3	3	3	3	2	1	15
Jackson	2	3	3	1	1	2	12

Jasper	1	4	3	-	1	1	10
Jay	2	2	1	2	1	-	8
Jefferson	3	3	2	1	2	1	12
Jennings	2	4	4	1	3	3	17
Johnson	4	4	4	1	3	3	19
Knox	2	1	3	2	2	1	11
Kosciusko	3	3	4	3	4	2	19
LaGrange	2	4	3	1	3	2	15
Lake	4	2	4	1	3	-	14
Laporte	4	2	4	3	3	-	16
Lawrence	3	3	2	-	3	2	13
Marion	4	2	4	-	4	2	16
Marshall	3	3	3	-	3	2	14
Martin	1	2	N/A	1	1	1	6
Miami	3	1	2	1	3	1	11
Monroe	4	3	4	-	3	3	17
Montgomery	2	3	3	1	2	1	12
Morgan	3	4	4	-	3	2	16
Newton	1	3	1	3	1	-	9
Noble	3	4	3	-	3	2	15
Ohio	2	2	2	4	2	2	14
Orange	1	3	1	2	1	2	10
Owen	1	4	N/A	1	3	2	11
Parke	1	3	2	3	2	2	13
Perry	2	2	2	2	1	1	10
Pike	1	2	1	2	2	1	9
Porter	4	4	4	1	3	2	18
Posey	2	2	2	3	2	2	13
Pulaski	1	2	1	1	1	-	6
Putnam	2	4	2	1	2	2	13
Randolph	2	2	2	1	2	-	9
Ripley	2	4	3	-	2	2	13
Rush	1	2	2	2	1	-	8
Scott	3	3	2	2	3	2	15
Shelby	3	3	3	-	3	1	13
Spencer	1	3	2	1	2	3	12
St. Joseph	4	3	4	3	4	1	19
Starke	2	2	2	-	3	1	10
Steuben	3	4	3	-	3	3	16
Sullivan	1	3	1	2	1	-	8
Switzerland	1	4	1	1	2	1	10

Tippecanoe	4	3	4	3	3	2	19
Tipton	2	2	2	2	2	1	11
Union	1	3	1	1	1	1	8
Vanderburgh	4	2	4	3	4	1	18
Vermillion	2	2	1	3	3	-	11
Vigo	4	2	4	3	3	1	17
Wabash	3	1	2	2	2	-	10
Warren	1	2	1	1	1	1	7
Warrick	3	4	4	3	2	3	19
Washington	1	4	1	1	2	3	12
Wayne	4	2	3	1	3	-	13
Wells	2	2	3	-	2	1	10
White	1	3	2	1	2	1	10
Whitley	3	4	3	1	3	2	16

Combined Natural Resource / Demographic Summary

Indiana Forest Legacy



Map 5

Source Data

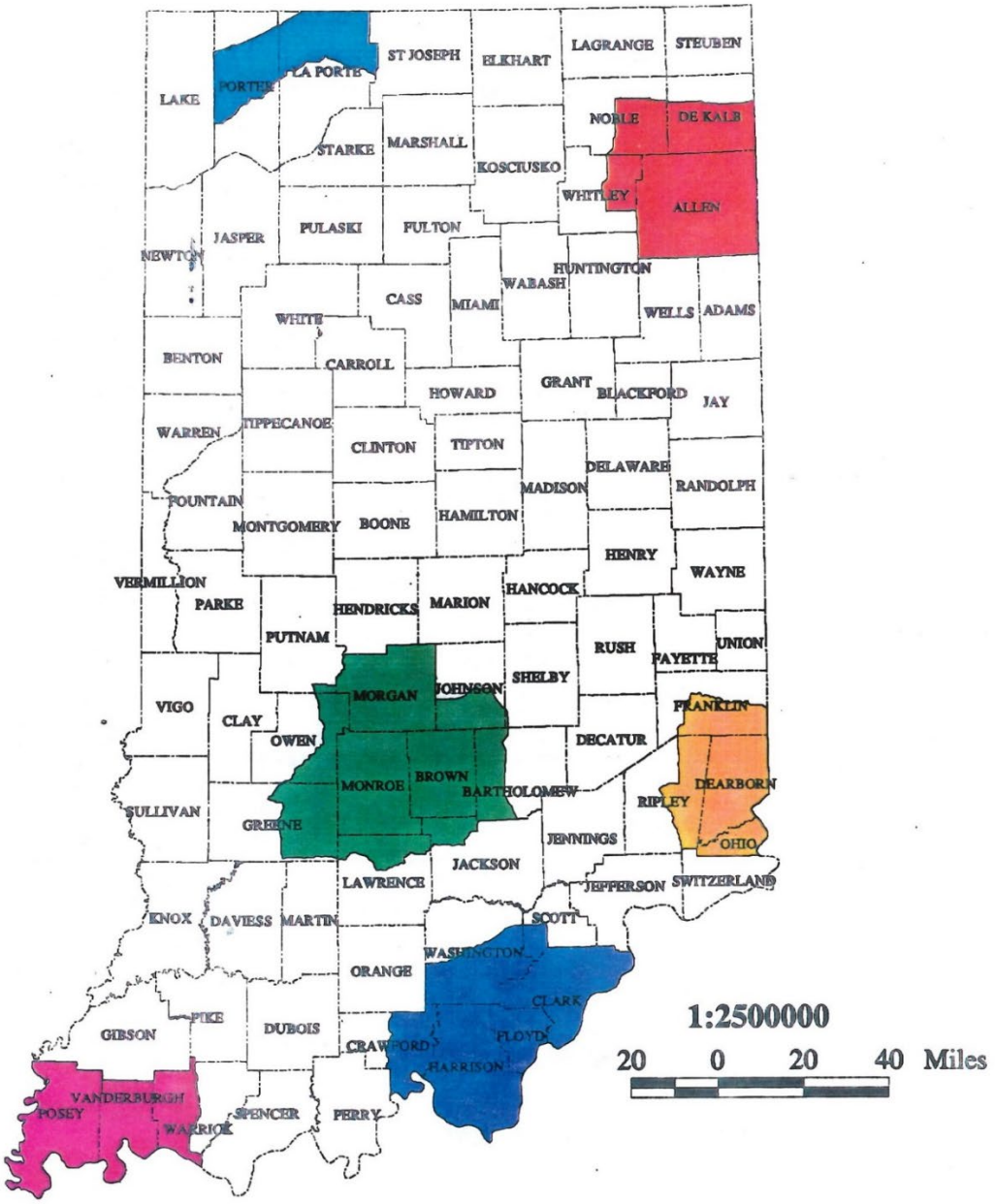
County boundaries from U.S. Census Bureau TIGER files

N

- High Natural Resource - High Demographic
- High Natural Resource - Medium Demographic
- Medium Natural Resource - High Demographic
- Medium Natural Resource - Medium Demographic
- High Natural Resource - Low Demographic
- Medium Natural Resouce - Low Demographic
- Low Natural Resouce - High Demographic
- Low Natural Resource - Medium Demographic
- Low Natural Resouce - Low Demographic

Indiana Forest Legacy Areas

Proximity Map



Map 6

Source Data

County boundaries from U.S. Census Bureau TIGER files

Forest Legacy Boundaries from U.S. Census Bureau TIGER file county boundaries and U.S. Geological Survey 100:000 DLG roads

County Boundary

Blue River Basin / Knobstone Escarpment
Northwest Moraine
Maumee Basin
Bluegrass Area
Shawnee Hill / Highland Rim
Southwest Bottomland Forests

N

C. RECOMMENDED FOREST LEGACY AREAS

The Forest Legacy Subcommittee recommends the creation of six (6) Forest Legacy Areas (Map 6):

1. Southwest Bottomland Forests -- an area in the southwestern portion of Indiana, bordering the Ohio and Wabash Rivers, including Posey, Vanderburgh and a portion of Warrick Counties;

2. Blue River/ Knobstone Escarpment -- an area in southcentral Indiana, bordering the Ohio River and including all of Harrison, Clark, and Floyd Counties, and a portion of Crawford, Washington, and Scott Counties;

3. Bluegrass Area -- an area in southeastern Indiana, bordering the Ohio River and the state of Ohio, and including all of Dearborn and Ohio Counties, and a portion of Franklin and Ripley Counties;

4. Maumee Basin -- an area in northeastern Indiana, bordering the state of Ohio, and including all of Allen County and a portion of Dekalb, Noble, and Whitley Counties;

5. Northwest Moraine -- an area in northwestern Indiana, bordering Lake Michigan and the state of Michigan, and including a portion of Porter and LaPorte Counties.

6. Shawnee Hills/ Highland Rim -- the largest of the Forest Legacy Areas, this is an area in central Indiana, south of Indianapolis. It includes all of Brown, Monroe, and Morgan Counties, and a portion of Greene, Owen, Putnam, Johnson, Bartholomew, Jackson, and Lawrence Counties.

The following is a summary of a few of the many benefits that will be provided by implementation of the Forest Legacy Program in the six areas:

Southwest Bottomland Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the southern lowland forest and its associated high quality plant and animal communities, particularly influenced by the Wabash and Ohio Rivers;
- Protect the riparian corridors and floodplains that are important to migratory birds along the Mississippi Flyway;
- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Ohio River Scenic Route and the Hoosier Bikeway System traversing this FLA.
- Protect historic and archaeological sites;
- Maintain contiguous forest land by linking to managed public and private lands.

Blue River/ Knobstone Escarpment Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the forests within the Blue River basin and their associated plant and animal communities, particularly those with federally or state-listed plants or animals;
- Maintain and enhance the dry upland forests of the knobstone escarpment that support federally or state-listed plants or animals, or which support high quality plant and animal communities;
- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Ohio River Scenic Route, the Hoosier Bikeway System, and the Blue River, a designated State Natural and Scenic River, traversing this FLA;
- Protect lands along and adjacent to the Knobstone Trail;
- Protect historic and archaeological sites;
- Maintain contiguous forest land by linking to managed public and private lands.

Bluegrass Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the forests within the Bluegrass area, particularly those in close proximity to old growth forests and those with rich diversity of plant and animal species within a given tract;
- Maintain and enhance forests that support federally or state-listed plants or animals;
- Protect the riparian corridors to maintain water quality, and riparian-dependent plants and animals;
- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Ohio River Scenic Route, and the Whitewater River, a studied (not designated) State Natural and Scenic River, traversing this FLA;
- Protect historic and archaeological sites;
- Maintain contiguous forest land by linking to managed public and private lands.

Maumee Basin Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the forests within the Maumee Basin area, particularly those in close proximity to other forested land;
- Maintain and enhance forests that support federally or state-listed plants or animals.
- Protect the riparian corridors to maintain water quality, and riparian-dependent plants and animals;

- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Hoosier Bikeway System and Cedar Creek, a designated State Natural and Scenic River;
- Protect historic and archaeological sites, and geologic features of special concern;
- Maintain contiguous forest land by linking to managed public and private lands.

Northwest Moraine Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the forests within the Northwest Moraine area, particularly those in close proximity to other forested land;
- Maintain and enhance forests of high quality plant and animal communities representing the varied forest types within the area;
- Protect forests that support federally or state-listed plants or animals;
- Protect the riparian corridors to maintain water quality and to support riparian-dependent plants and animals;
- Protect the scenic landscapes within the area;
- Maintain contiguous forest land by linking to managed public and private lands. Look for opportunities to increase and maintain public access to forest resources.

Shawnee Hills/ Highland Rim Forest Legacy Area

Forest Legacy will provide protection to:

- Maintain and enhance the forests within the Shawnee Hills area, particularly those of high quality hardwoods and those associated with the karst topography of the area;
- Maintain, protect, and enhance the forest land within the Lake Monroe watershed to ensure quality and quantity of the drinking water for Bloomington and the surrounding area;
- Protect forests that support high quality communities, particularly those with federally or state-listed plants or animals;
- Protect the riparian corridors to maintain water quality and to support riparian-dependent plants and animals;
- Protect the scenic landscapes within the area;
- Maintain contiguous forest land by linking to managed public and private lands. Look for opportunities to increase and maintain public access to forest resources.

As with any new program, changes in programmatic issues and policies may be necessary from time to time to address changing conservation issues and funding levels. It is the intent of the State Forest Stewardship Coordinating Committee to treat this Assessment of Need as a "living document" and, as needed, make revisions to the Assessment or Forest Legacy Areas to address program demands.

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Appendix A

Forest Legacy Area Descriptions

Forest Legacy Area Descriptions

Detailed descriptions of each of the six Forest Legacy Areas recommended by the Forest Legacy Sub-committee follow. The areas are distributed throughout Indiana and cover several of the Natural Regions of the state. The individual discussions of the Forest Legacy Areas include specific information about the given FLA, including:

- Description;
- Special Values of the Forest Land in this Area;
- Managed Lands within the FLA*;
- Current Conversion Pressures;
- Potential Future Conversion Pressures;
- Goals and Objectives for the Specific Forest Legacy Area.

*Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. They include, but are not limited to State Forests, Parks, Nature Preserves, and Fish and Wildlife Areas; National Forest, Parks, Wildlife Refuges, Reservoirs, or Military lands; University lands and land trust lands. Although management objectives differ by ownership and mission, they each have an overall land conservation objective.

Those items common to all Forest Legacy Areas are the government entities that may be assigned management responsibility, and the Means for Protection, addressed below.

Identification of governmental entity or entities that may be assigned management responsibility:

The Forest Legacy Program in Indiana will be implemented through a State Grant Option, by which the State of Indiana will hold title to all conservation easements or deeds for acquired tracts of forest land entered into this program. The Indiana Department of Natural Resources (IDNR), Division of Forestry is the lead agency for this program, with consultation by the State Forest Stewardship Coordinating Committee (SFSCC).

The State of Indiana, IDNR, Division of Forestry will hold title to all acquisitions made through the Forest Legacy Program in Indiana, in coordination with the IDNR Division of Land Acquisition and the Indiana State Land Office. The IDNR Division of Forestry may elect to delegate management and administration of individual tracts of land within the program to another division within the IDNR, or to another organization or government entity, including land trust or other conservation groups.

Means for Protection of Forest Legacy Area Tracts:

A. Acquisition of tracts of forest land will primarily be accomplished through conservation easements, as the preferred method. However, in some situations, on a case by case basis, acquisition of full-fee may be considered as an appropriate method of acquisition.
B. Acquire development rights on all tracts. Those rights include, but are not limited to the right to construct buildings and other improvements, remove forest cover for non-forest uses, and control utility right-of-way locations (all future utility installations shall be placed underground, if feasible).
C. Timber rights retained by the landowner shall follow guidelines set forth in the Stewardship Plan, and include the use of Best Management Practices, applicable laws and regulations, and with the following provisions:
    a. 1. All timber harvesting for a tract or tracts shall be in consultation with a professional forester. Departures from sustained yield are permitted only in limited response to forest diseases and insect infestations and salvage in the event of fire or natural catastrophe.
    b. 2. Timber harvesting or cutting is according to Best Management Practices guidelines and within the guidelines of the individual Stewardship Management Plan.
    c. 3. Stewardship Plans shall be reviewed and updated as needed at least once every five years.
D. Consider acquisition of public access rights on each tract. Determine on a case by case basis the need for public access. Final determination and decision will be made by the SFSCC prior to the start of negotiations.
E. Restrict development of mineral or oil and gas rights to allow no more than 10 percent of the surface occupancy of the Forest Legacy tract, with total area of all non-forest uses not exceeding 10 percent of the total tract area. Upon landowner completion of operations, the land shall be reclaimed as much as practical to its original contour and reforested.
F. No disposal of waste or hazardous material will be allowed on properties in the Forest legacy Program.
G. Prohibit the use of signs and billboards on all properties, except to state the name and address of the property owner and/or provide Forest Legacy or other forest land incentive program (such as Classified Forest, Tree Farm, Conservation Reserve Program) information and Forest Legacy Boundary information.
H. Existing dams or water impoundments or similar structures may be allowed to remain and be maintained. Exceptions or new impoundments will be agreed upon prior to negotiations with the landowner.
I. Any revision to the easement regarding existing structures may be made only upon approval by the unit of government holding title to the easement.
J. Industrial, commercial, and residential activities, except traditional forest uses, are prohibited.
K. A parcel must have a stewardship plan or a multi-resource management plan completed by a professional forester and approved by the Forest Legacy Committee before entering the Forest Legacy Program. The plan must be current and updated as needed.
L. Each conservation easement will contain appropriate clauses to address the goals and objectives of the individual Forest Legacy Area. Such clauses may include, but are not limited to the following:

- Scenic Resources -Where local, state, or nationally designated scenic routes or areas would be impacted, limit the size and location of clear cuts and other regeneration openings during timber harvests, limit location and design of access roads and log yards, and design timber stand improvement projects to minimize aesthetic impacts.
- Public Recreation - Where appropriate, acquire public recreation access easements for Knobstone Trail and other trail management and to managed lands where access currently limited.
- Lakes, Streams, Wetlands, and Riparian Areas - Limit plant and animal stocking (particularly exotic species) and species control measures in aquatic communities to minimize negative impacts on native aquatic communities. Such stocking and species control measures should be addressed in the stewardship plan.
- Rare, Threatened or Endangered Species of Plants or Animals - Require that if rare, threatened or endangered species of plants or animals are identified within the easement area, the stewardship plan for the area must address their protection. Seek fee simple acquisition if appropriate for protection.
- Known Cultural Resources - If a parcel contains known cultural resources, historic or prehistoric, the stewardship plan for the area must address their protection.
- Other Ecological Values - Limit terrestrial plant and animal stocking activities (particularly exotic species) and species control measures to minimize negative impacts on native communities. Such stocking and species control measures should be addressed in the stewardship plan.

SOUTHWEST BOTTOMLAND FORESTS

Description:

Bounded on the south by the Ohio River and on the west by the Wabash River, this Forest Legacy Area includes all of Posey and Vanderburgh Counties (excluding the city of Evansville). It also includes that portion of Warrick County west of State Road (S.R.) 61, south to Yankeetown, east along S.R. 66 to the Warrick-Spencer County line, and follows that county line to the Ohio River.

Special Values of the Forest Land in this Area:

This area is among The Nature Conservancy's ecosystem focus areas. Unique high quality forested communities that are located within the FLA are found nowhere else in Indiana, and many reflect more southern United States forest types, such as bald cypress swamps, cottonwood forests, and stands of predominantly southern oak species. This area boasts the highest average temperatures and the longest growing season of any part of Indiana, giving it a more southern climate and ecosystems. The Wabash and Ohio Rivers have influenced most of the habitat in this FLA, and are along the Mississippi Flyway, providing important breeding grounds and stopping sites for migratory birds. More than one-third of the forestland in Posey County is bottomland forest, the third highest amount of bottomland forest in the state. Nearly one-fifth of the forest land in Warrick County is bottomland forest, and nearly one-tenth of Vanderburgh County forest is bottomland forest. These are among the most productive forest areas in the state.

Posey and Warrick Counties have high amounts of state-listed rare plants and federally-listed animals. The yellow crowned night heron and swamp rabbit breed in this FLA, and nowhere else in Indiana. This area supports a complement of southern flowering plant species, as well as tree species. And, this is one of only two areas within the state that supports a cottonmouth moccasin snake population.

This area is rich in cultural heritage, both historic and prehistoric, with the Ohio and Wabash Rivers being primary trade routes for Native Americans and early settlers.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. This FLA includes scattered tracts of managed land featuring fish and wildlife resources, archaeological resources, and recreational resources, including Harmonie State Park; New Harmony Opera House State Historic Site; Angel Mounds State Historic Site; Hovey Lake State Fish and Wildlife Area; five dedicated nature preserves; and small tracts of land-trust lands.

Current Conversion Pressures:

Several townships within the three counties are growing in population at a significantly faster rate than the **state average of 5.3 percent**, between 1990 and 1996. The townships within this FLA growing faster than the state average are shown in the below table:

Table 7. Indiana Population Change (Percent) from 1990 to 1996, by County/Township

Posey County		Vanderburgh County		Warrick County	
Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Center	5.8	Armstrong	14.5	Greer	9.4
Lynn	5.8	Center	5.5	Campbell	16.6
Marrs	5.9	German	14.4	Ohio	12.9
Point	5.9				
Robinson	5.9				
Smith	5.8				

* Source: Indiana Business Research Center

The percentage rural population growth in each of the three counties is greater than the state average, indicating the conversion of rural land to other uses.

Potential Future Pressures:

Southwestern Indiana has experienced steady growth throughout the past decade. However, the next decade will likely result in significantly faster growth than in the past few years. Several large employment industries have recently located within commuting distance of this FLA, and an interstate extension (I-69) is anticipated to be constructed within the next ten years, connecting Evansville to Indianapolis. Interstate interchanges invite residential and commercial development, and provide high-speed transportation corridors for commuters. In addition, a riverboat casino is located along the Ohio River near Evansville, employing a large number of people, and increasing development pressure on the area.

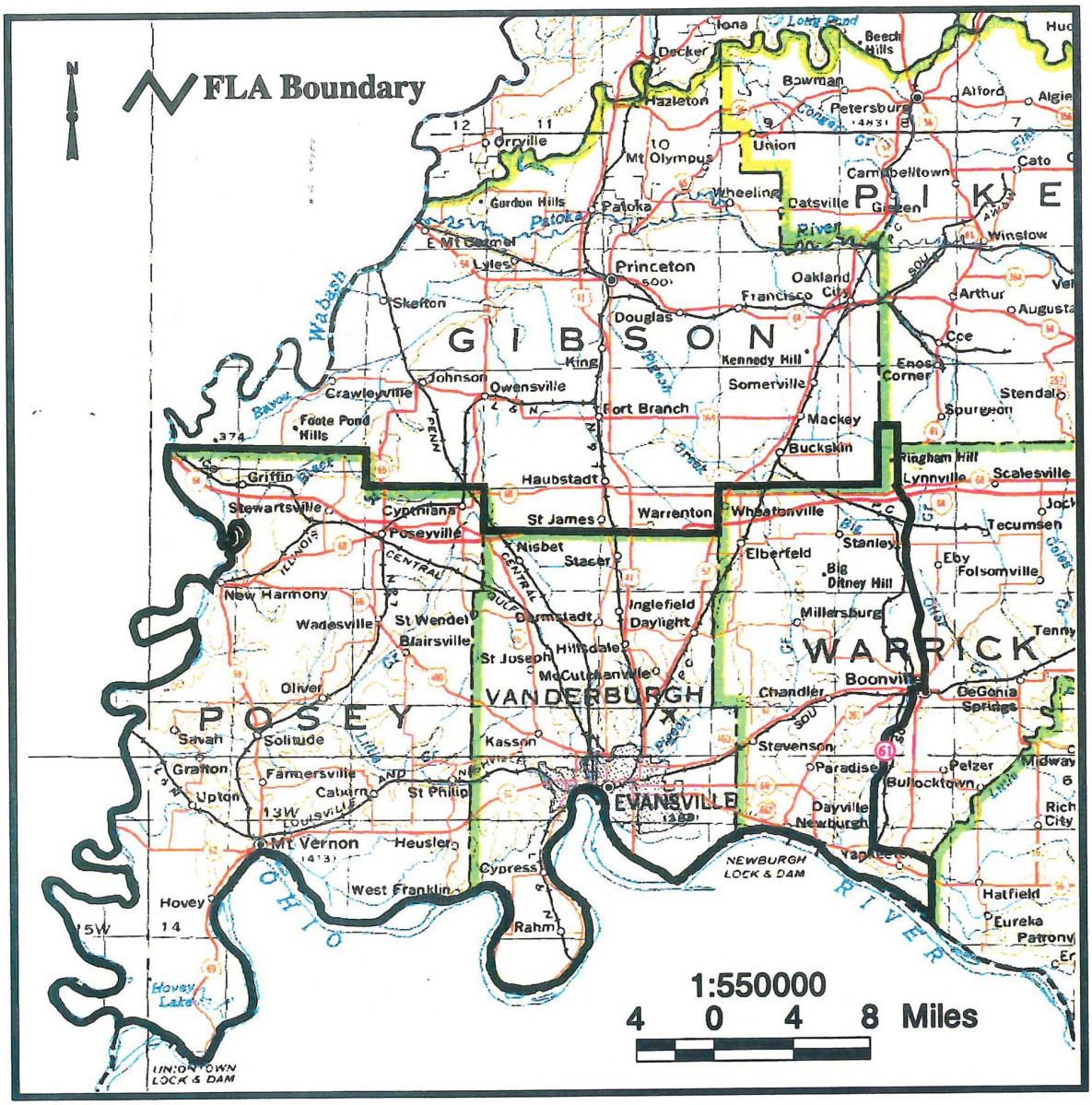
Goals and Objectives for the Southwest Bottomland Forest Legacy Area:

- Maintain and enhance the southern lowland forest and their associated high quality plant and animal communities, particularly influenced by the Wabash and Ohio Rivers.
- Protect the riparian corridors and floodplains that are important to migratory birds along the Mississippi Flyway.
- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Ohio River Scenic Route and the Hoosier Bikeway System traversing this FLA.

- Protect historic and archaeological sites.
- Maintain contiguous forest land by linking to managed public and private lands.

Southwest Bottomland Forests

Indiana Forest Legacy Area



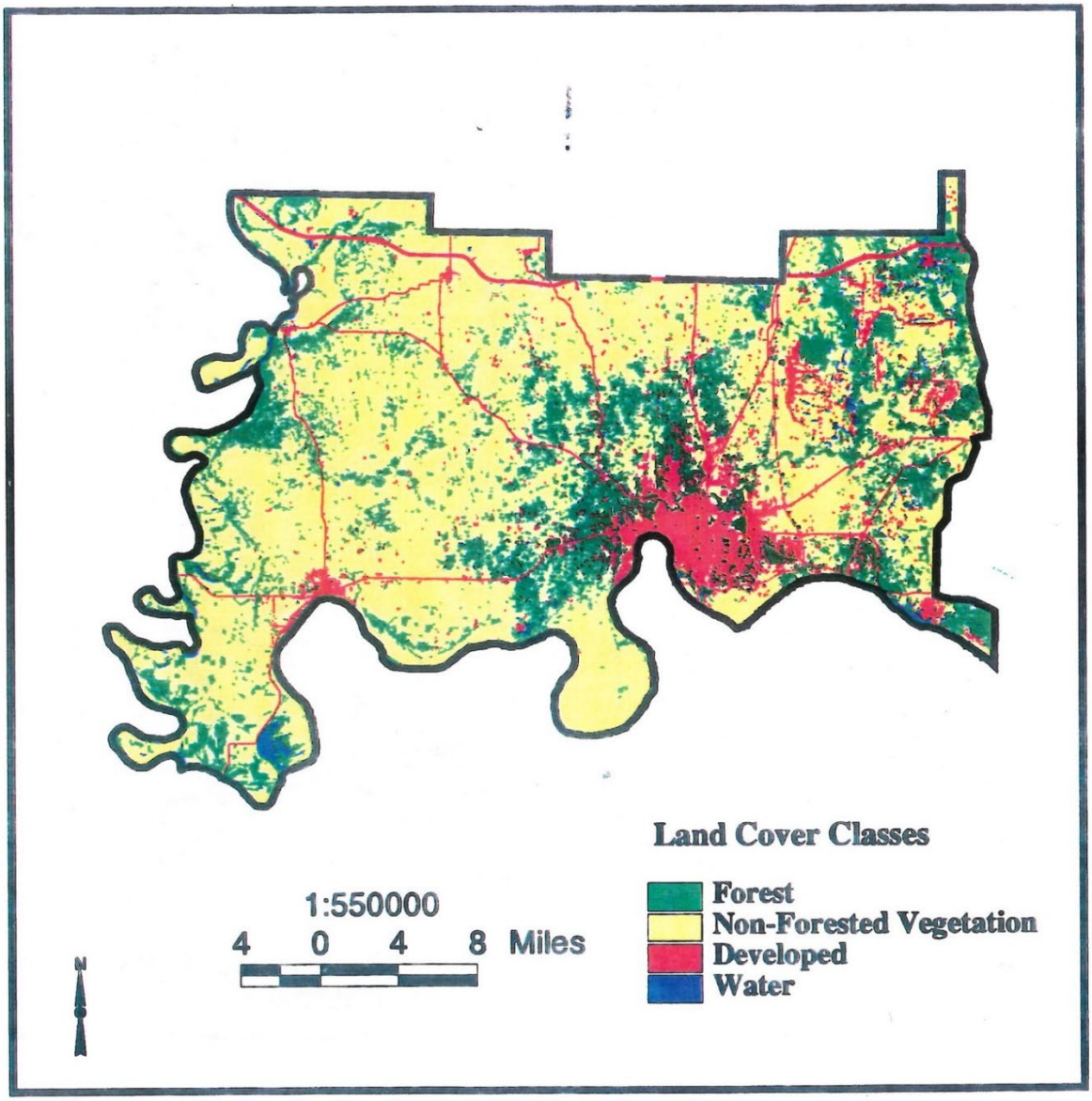
Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973, projected to UTM NAD 27. State Road 61 has been relocated since the publication of this base map. The correct location of State Road 61 is indicated by the Forest Legacy Area boundary.

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads.

Southwest Bottomland Forests

Land Cover



Source Data

Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

BLUE RIVER BASIN/ KNOBSTONE ESCARPMENT

Description:

Bounded by the Ohio River on the southern and eastern edges, this Forest Legacy Area (FLA) encompasses all of Harrison, Floyd, and Clark Counties, as well as portions of Crawford, Washington, and Scott Counties. It excludes the cities of New Albany, Jeffersonville, and Clarksville. This FLA follows the northern Clark County line from the Ohio River to Interstate-65 (I-65). It follows I-65 to State Road (S.R.) 56 at Scottsburg. It then proceeds west on S.R. 56 through Salem to the Washington-Orange County line. It follows that county line south to the Crawford- Orange County line, and west to S.R. 37. The southwest boundary of the FLA follows S.R. 37 south to Sulphur, becoming S.R. 66, then proceeds on S.R. 66 south to the Ohio River at Derby.

Special Values of the Forest Land in this Area:

This FLA includes extensive high quality forests providing valuable timber resources and, with unique and outstanding features from west to east across the area, which is logically divided into two areas within its borders:

The **western area** encompasses the Blue River watershed, one of The Nature Conservancy's (TNC) ecosystem focus areas. Three features make it unique in Indiana: a high quality river which has little pollution and which is fed by pure underground springs; large tracts of forest which are relatively contiguous and support many globally rare and endangered species; and an underlayment of limestone bedrock which dissolves easily, creating sinkholes, caves, and a full complement of unique karst topographically features. This area has the largest concentration of Classified Forest in the state. The Blue River natural system encompasses one of the most complex landscapes in Indiana. It includes extensive forests, major recreation opportunities and facilities, a portion of the only scenic highway in Indiana (along the Ohio River), and contains a complex network of underground caves and rivers.

The **eastern area** of this FLA includes much of the Knobstone Escarpment, the most prominent physiological feature in Indiana, and is also a TNC ecosystem focus area. Rising 600 feet above the Ohio River at New Albany, it extends northward into Scott County, and then onward to the west (Gray-Jackson p.32). The dry forests here are draped with Virginia pine in addition to oaks and hickories. While Virginia pine makes up many plantations, and is often planted on the most erosive soils, it is only native in Indiana along the Knobstone Escarpment. Other trees of significance in this area, and relatively rare elsewhere in the state include post and blackjack oak, cucumber magnolia, and American chestnut. This area provides habitat for several rare plants and some animal at the northern edge of their range. The siltstone glades, natural forest openings with siltstone substrate, in this area are more plentiful and larger than anywhere else in the state. (Homoya-Jackson p.170).

Both portions of this FLA provide breathtaking scenic views, and are very rich in historic and prehistoric cultural heritage. They also are rich in pedological resources, dating back thousands of years.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. The managed land in this FLA includes a portion of Hoosier National Forest; Harrison-Crawford State Forest and Wyandotte Woods complex; Clark State Forest; Charlestown State Park; ten dedicated nature preserves, including lands owned and managed by The Nature Conservancy; Falls of the Ohio State Park; Corydon Old State Capitol Historic Site, Army Corps of Engineers land and military land.

Current Conversion Pressures:

Many of the townships within the FLA are growing in population at a significantly faster rate, two or three times as fast, than the **state average of 5.3 percent**, between 1990 and 1996, due to the expansion of Louisville, Kentucky metropolitan area, improving transportation systems, and the increasing desire and economic ability to live in wooded areas. These townships are shown in the Table 8.

Clark and Floyd Counties have experienced a high growth of new residential buildings in the past ten years, and Floyd County shows a high percentage of rural population growth, greater than the state average, indicating conversion or rural land to other uses. Crawford County currently has low demographic pressure, however a small area of the county was included because it completes the Blue River drainage basin (watershed), and meets the purchase unit boundary of the Hoosier National Forest.

Table 8. Indiana Population Change (Percent) from 1990 to 1996, by County/Township

Crawford County		Scott County		Floyd County	
Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Ohio	7.2	Finley	10.9	Franklin	16.5
Sterling	9.6	Vienna	8.4	Georgetown	13.8
Whiskey Run	5.4			Greenville	16.4
				Lafayette	16.5
				New Albany	7.4

Indiana Population Change (Percent) from 1990 to 1996, by County/Township

Washington County		Clark County		Harrison County	
Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Howard	13.7	Bethlehem	8.8	Blue River	10.1
Jackson	13.8	Carr	8.8	Boone	12.8
Madison	13.3	Monroe	9.9	Franklin	12.5
Pierce	13.5	Oregon	8.8	Harrison	8.8
Polk	13.6	Owen	8.8	Heth	13.2
Posey	11.6	Union	8.8	Jackson	13.1
Washington	11.4	Utica	7.3	Morgan	12.6
		Washington	8.9	Posey	13.0
		Wood	8.7	Spencer	13.2
				Taylor	13.2
				Washington	13.0
				Webster	13.0

*Source: Indiana Business Research Center

Future Conversion Pressures:

The people pressure to the FLA is likely to continue from both the east and the west. The Louisville metropolitan area continues to expand, and while the economy remains strong, housing and commercial development will continue along the 1-64 corridor, and into the expansive wooded areas of the FLA. Often people do not recognize the fragile habitats and natural drainages upon which they choose to build, thus threatening many of the globally or regionally rare species identified above.

Industrial development to the west of this FLA will likely push development into the areas that are currently not experiencing significant people pressure. In addition, a riverboat casino is nearing completion in southern Harrison County. That enterprise will employ many people with a need for residential commercial, utilities, and infrastructure support. Economic development is extremely healthy for areas such as this. Therefore, the intent for this FLA would be to complement development rather than discourage it.

Goals and Objectives for the Blue River Basin/ Knobstone Escarpment Forest Legacy Area:

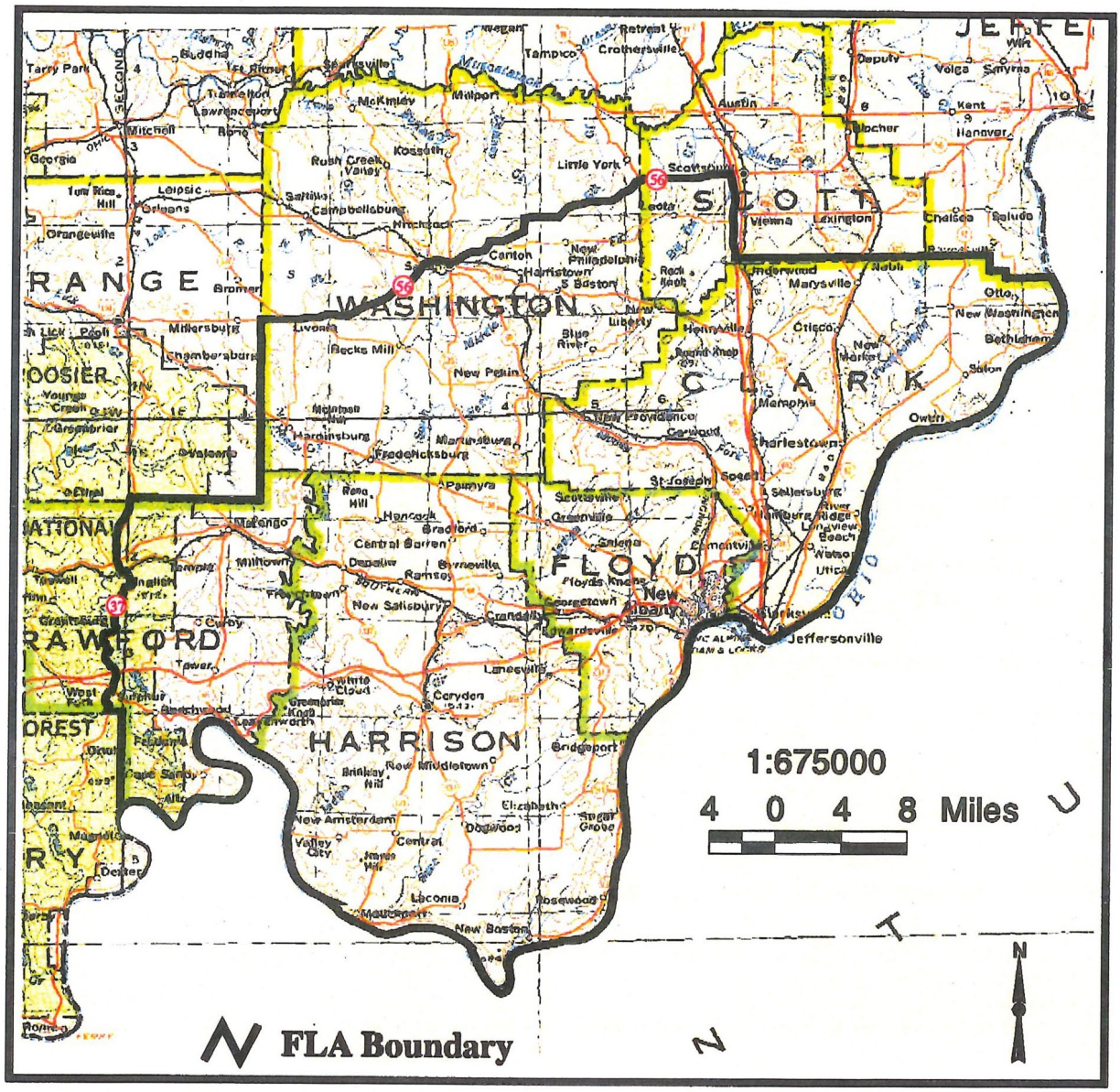
- Maintain and enhance the forests within the Blue River Basin and their associated plant and animal communities, particularly those with federally or state-listed plants or animals.
- Maintain and enhance the dry upland forests of the knobstone escarpment that support federally or state-listed plants or animals, or which support high quality plant and animal com- munities.
- Protect the scenic landscapes within the area. Look for opportunities to protect

lands along the Ohio River Scenic Route, the Hoosier Bikeway System, and the Blue River, a designated State Natural and Scenic River, traversing this FLA.

- Protect lands along and adjacent to the Knobstone Trail, which traverses a section of this FLA.
- Protect historic and archaeological sites.
- Maintain contiguous forest land by linking to managed public and private lands.

Blue River Basin / Knobstone Escarpment

Indiana Forest Legacy Area

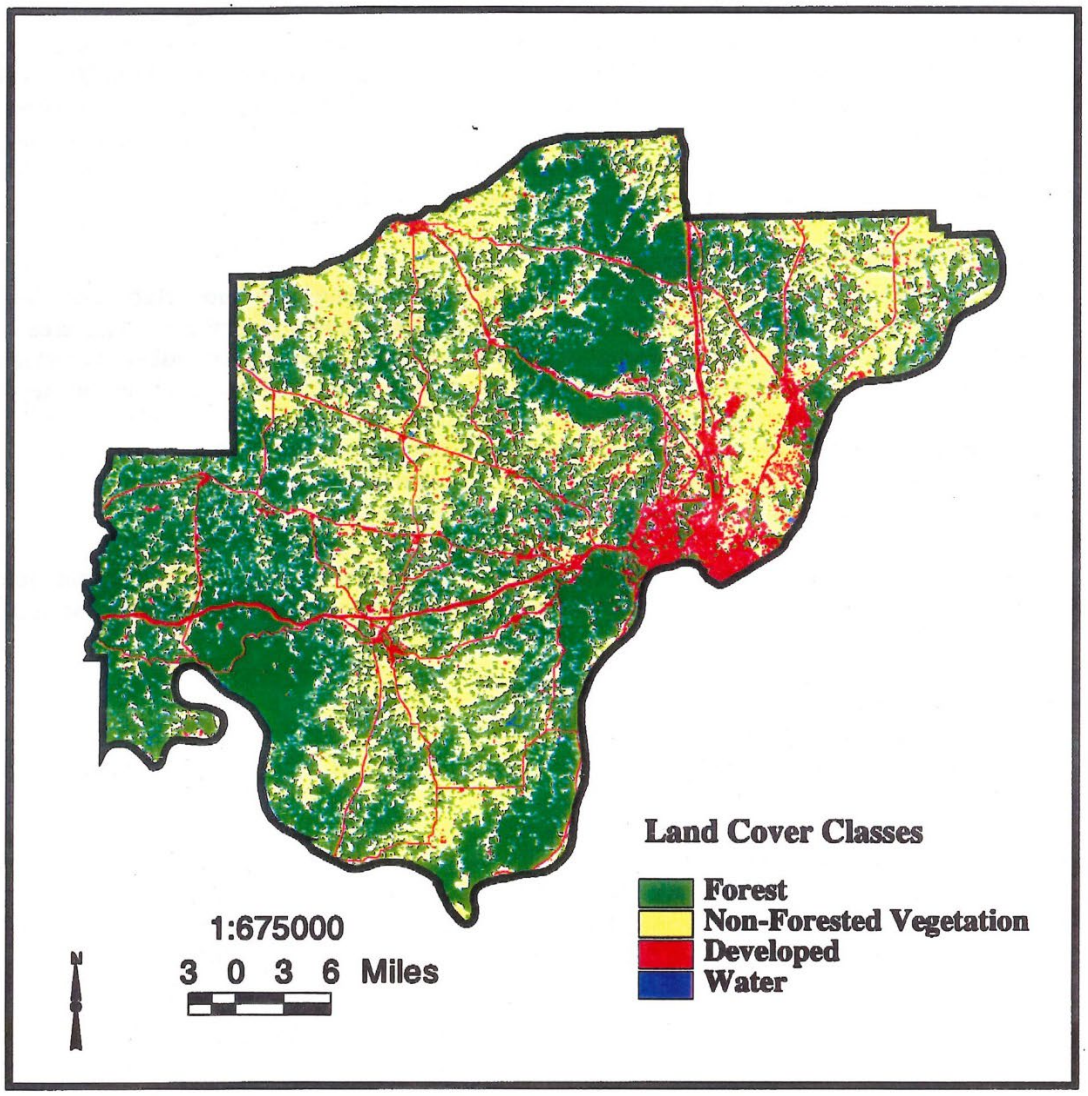


Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973 projected to UTM NAD 27

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Blue River Basin / Knobstone Escarpment
Land Cover



Source Data

Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

BLUEGRASS AREA

Description:

This area includes all of Dearborn and Ohio Counties, the southern portion of Franklin County, and the eastern portion of Ripley County. It is bounded by the state of Ohio and the Ohio River on the east. At Scipio, it traverses west along State Road (S.R.) 252 to Brookville, then continues west on U.S. Highway 52 to Metamora. It then proceeds south on S.R. 229 to Batesville, and follows the county road due south from Batesville through Lookout to Delaware. At Delaware, it follows S.R. 350 west to Osgood, then south on U.S. Highway 421 from Osgood to Versailles and south on S.R. 129 from Versailles to the northern Switzerland County line. Finally, it follows the entire northern Switzerland County line east to the Ohio River.

Special Values of the Forest Land in this Area:

This FLA includes extensive high quality forests providing valuable timber resources, consisting primarily of mixed-mesophytic tree species associated with coves and ravines. This area is un- usual for Indiana forests in that several tree species may dominate a given tract of forest land, including black walnut, hickories, red and chinquapin oak, white and blue ash, Ohio buckeye, sugar maple, and American beech. Some Appalachian tree species such as yellow basswood and white basswood are also present. This area has a moderate amount of state and federally-listed rare plants and animals, with two animals virtually restricted to this natural region. This FLA contains two of only twelve recognized old-growth forests within the state of Indiana.

With a portion of the area bordering the Ohio River, there are many spectacular scenic views. The area contains a portion of the Ohio River Scenic Route, a nationally designated scenic by- way.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. This FLA includes a portion of Versailles State Park, and five dedicated Nature Preserves.

Current Conversion Pressures:

Several townships within the four counties are growing in population at a significantly faster rate than the **state average of 5.3 percent**, between 1990 and 1996. Those townships within the FLA and growing faster in population than the rest of the state are identified below.

Table 9. **Indiana Population Change (Percent) from 1990 to 1996, by County/Township**

Dearborn County

Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Ceasar Creek	25.5	Jackson	25.4	Miller	25.5
Center	6.3	Kelso	25.5	Sparta	25.8
Clay	14.1	Logan	25.4	Washington	25.5
Harrison	25.3	Manchester	25.3	York	25.5
Hogan	25.4				

Ohio County		**Dearborn County**		**Ripley County**	
Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Cass	13.6	Brookville	8.4	Adams	9.7
Pike	13.5	Butler	10.3	Brown	9.5
Union	13.8	Highland	8.7	Center	9.0
		Metamora	10.2	Delaware	9.5
		Ray	12.6	Franklin	9.1
		Salt Creek	10.1	Johnson	8.5
		Springfield	9.6	Laughery	10.2
		Whitewater	10.2	Washington	9.3

*Source: Indiana Business Research Center

As indicated in the above table, Dearborn County is rapidly growing in population. Dearborn County has among the highest number of new residential building permits issued within the past ten years, statewide. This trend is ongoing, primarily due to expansion from the Cincinnati metropolitan area continues. Ripley, Franklin, and Ohio Counties also have experienced a continued population increase, although at a somewhat slower rate.

Future Conversion Pressures:

The primary future threat of conversion will continue to be expansion or sprawl of the Cincinnati metropolitan area, and development along Interstate 74. Commercial, utility, and other infrastructure growth normally accompanies residential growth, and this area is no exception. Riverboat casino development along the Ohio River, immediately adjacent to this FLA, will continue to attract new development and associated services.

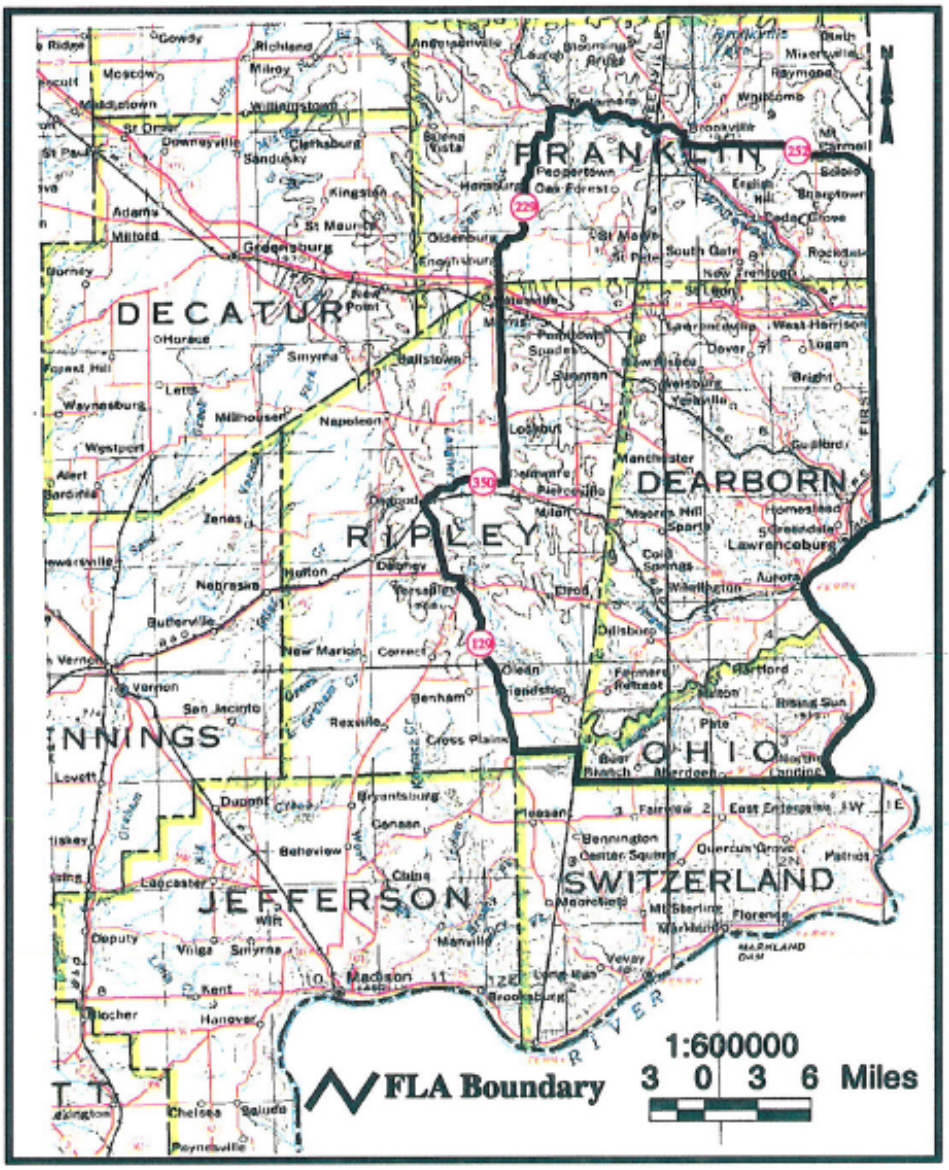
Goals and Objectives for the Bluegrass Forest Legacy Area:

- Maintain and enhance the forests within the Bluegrass area. Particularly those in close proximity to old growth forests and those with rich diversity of plant and animal species within given tract.
- Maintain and enhance forests that support federally or state-listed plants or animals.
- Protect the riparian corridors to maintain water quality, and riparian-dependent plants and animals.

- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Ohio River Scenic River, traversing this FLA.
- Protect historic and archaeological sites.
- Maintain contiguous forest land by linking to managed public and private lands.

Bluegrass Area

Indiana Forest Legacy Area



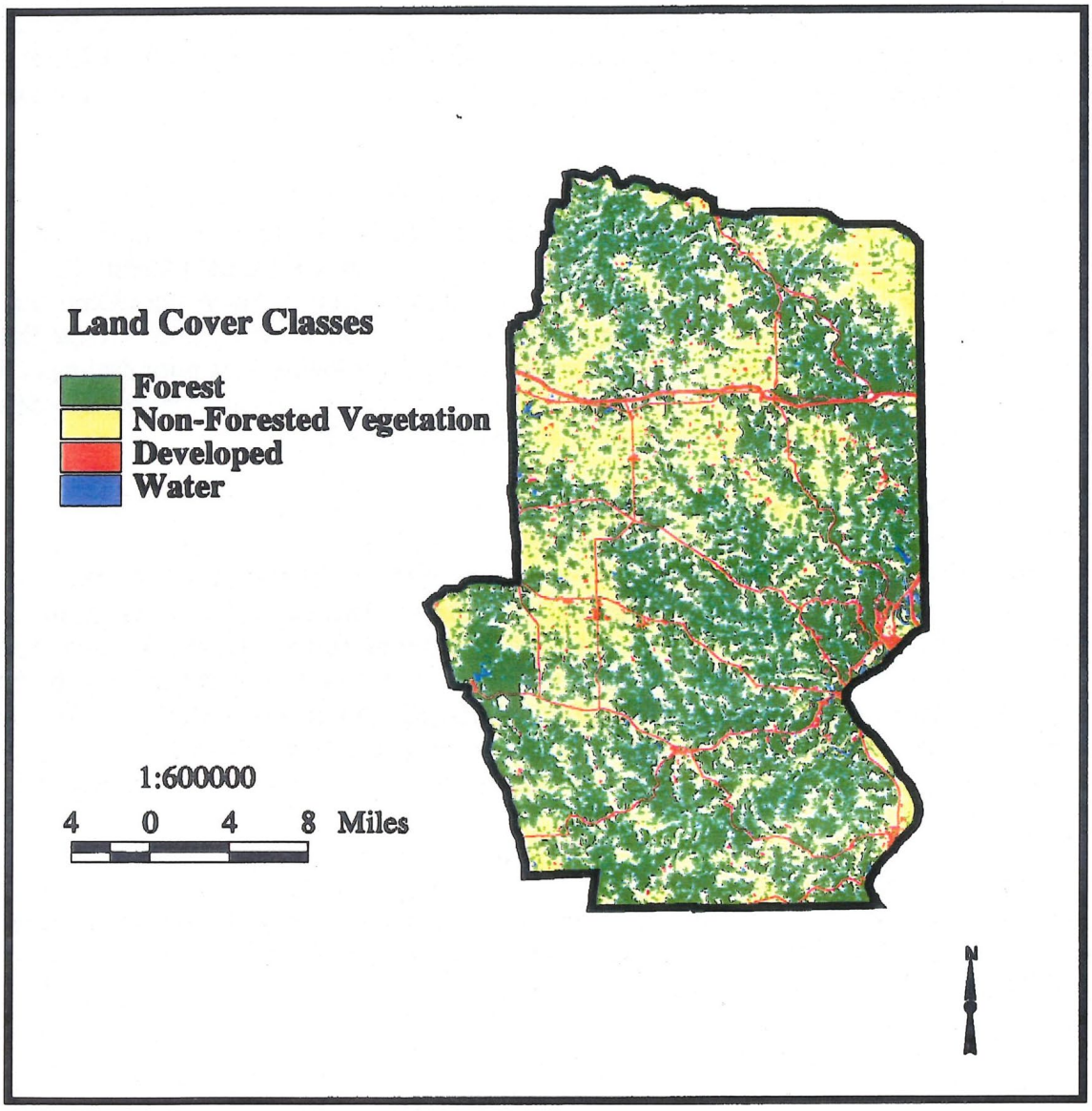
Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973 projected to UTM NAD 27

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Bluegrass Area

Land Cover



Source Data

Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

MAUMEE BASIN

Description:

This Forest Legacy Area (FLA) encompasses all of Allen County, the southern portion of Dekalb County, the southeast quarter of Noble County, and the eastern third of Whitley County. Its east- ern boundary is the Ohio state line. It is bounded on the north by U.S. Highway 6, to State Road (S.R.) 9 near Brimfield. The boundary then follows S.R. 9 south to S.R. 14 near Peabody; at the junction, traversing eastward on State Road 14 to the Allen County line, near Dunfee. The FLA follows the Allen County line from that point south and east until it meets the Ohio state line.

Special Values of the Forest Land in this Area:

The wooded landscape in this area today is predominantly confined to small wooded tracts of land, often surrounded by agricultural cropland. This region has likely changed the most since settlement. East of New Haven (east of Fort Wayne), the land is almost tabletop flat. This area was once a part of the great Black Swamp that covered much of northwestern Ohio and extended westward into Indiana as a broad triangle with its apex at Fort Wayne. The extreme flatness exemplifies the work of glaciers. The soils are clays and silt loams with poor drainage. Upon settlement, most of the forest land was cleared, and largescale drainage programs undertaken to make the land suitable for agricultural uses (Hedge-Jackson, p.195-6).

Even with the extensive amount of agricultural land use in this area, there is a significant amount of forested land, generally throughout portions of this FLA. Allen County alone, has over 51,000 acres of forest land, or about twelve percent of the entire county. Much of it is lowland hardwoods, providing valuable plant and animal habitat. The area contains a high number of federally- and state-listed rare animals and state-listed rare plants. The FLA includes several geologic features of special concern, indicating some of the best examples of specific geologic or physiologic features in the state. The cultural heritage in this area is rich, with remnants of historic and prehistoric artifacts plentiful. The forests in this area provide recreational opportunities and natural landscapes that are valued for the aesthetics, in an otherwise primarily agricultural and urban area.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. The managed lands within this FLA are scattered and small in size. They include primarily State Nature Preserves, land owned and managed by The Nature Conservancy, and ACRES Inc..

Current Conversion Pressures:

The entire FLA has a tremendous amount of people pressure, as it contains most of the greater Fort Wayne metropolitan area. Allen County has more people per square mile than most of the other areas of the state. Noble, Dekalb, and Whitley Counties' populations are growing at rates nearly twice as fast as the **state average of 5.3 percent**, between 1990 and 1996. Allen County, as a whole is growing less rapidly than the state average, however individual townships within the county have accelerated population growth rates of more than three times the state average. Those are the areas of concern. Townships throughout the FLA growing at a rate faster than the state average are shown on the table below.

Table 10. **Indiana Population Change (Percent) from 1990 to 1996, by County/Township**

Allen County

Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Aboite	18.0	Lafayette	18.0	Milan	18.0
Cedar Creek	18.4	Lake	18.0	Monroe	18.7
Eel River	18.1	Madison	18.0	Perry	15.8
Jackson	18.0	Marion	18.0	Pleasant	17.8
Jefferson	17.4	Maumee	19.2	Scipio	18.1
				Springfield	18.0

Whitley County		**Noble County**		**Dekalb County**	
Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Columbia	11.0	Albion	6.9	Butler	12.7
Smith	5.7	Allen	14.5	Concord	11.5
Thorncreek	8.3	Green	7.1	Jackson	12.8
Union	8.4	Jefferson	8.9	Richland	10.7
		Swan	9.0	Union	12.3

*Source: Indiana Business Research Center

Future Conversion Pressure:

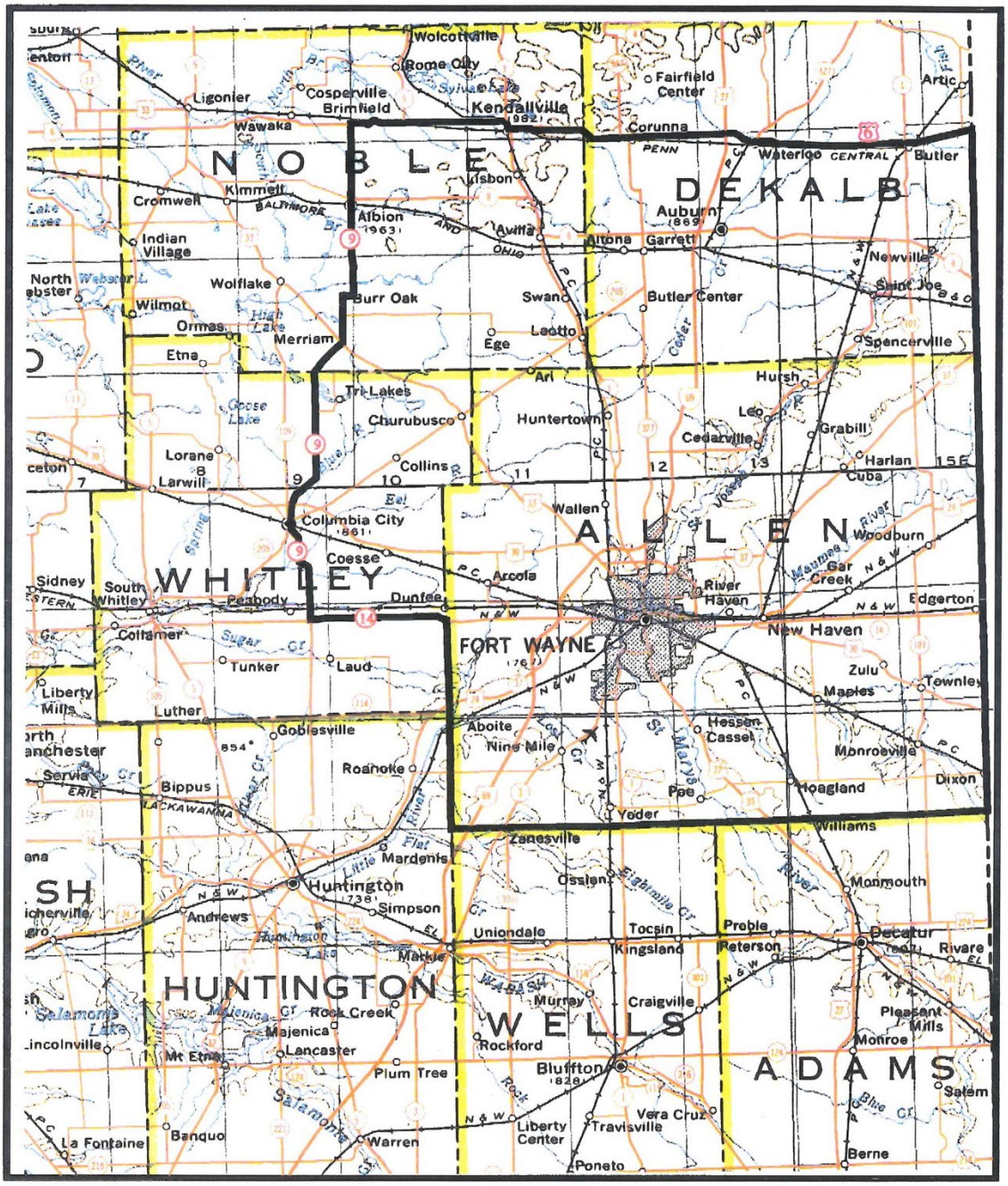
A trend of expansion and sprawl from the Fort Wayne metropolitan area will likely continue. As transportation systems are improved and maintained, and people choose to commute further and live in wooded environments, the threat of conversion of forested areas will exist. In addition, commercial and industrial development associated with the interstate corridor (I-69) is likely to continue.

Goals and Objectives for the Maumee Basin Forest Legacy Area:

- Maintain and enhance the forests within the Maumee Basin area, particularly those in close proximity to other forester land.
- Maintain and enhance forests that support federally or state-listed plants or animals.

- Protect the scenic landscapes within the area. Look for opportunities to protect lands along the Hoosier Bikeway System and Cedar Creek, a designated State Natural and Scenic River traversing this FLA.
- Protect historic and archaeological sites, and geologic features of special concern.
- Maintain contiguous forest land by linking to managed public and private lands.

Maumee Basin
Indiana Forest Legacy Area



Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973 projected to UTM NAD 27

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

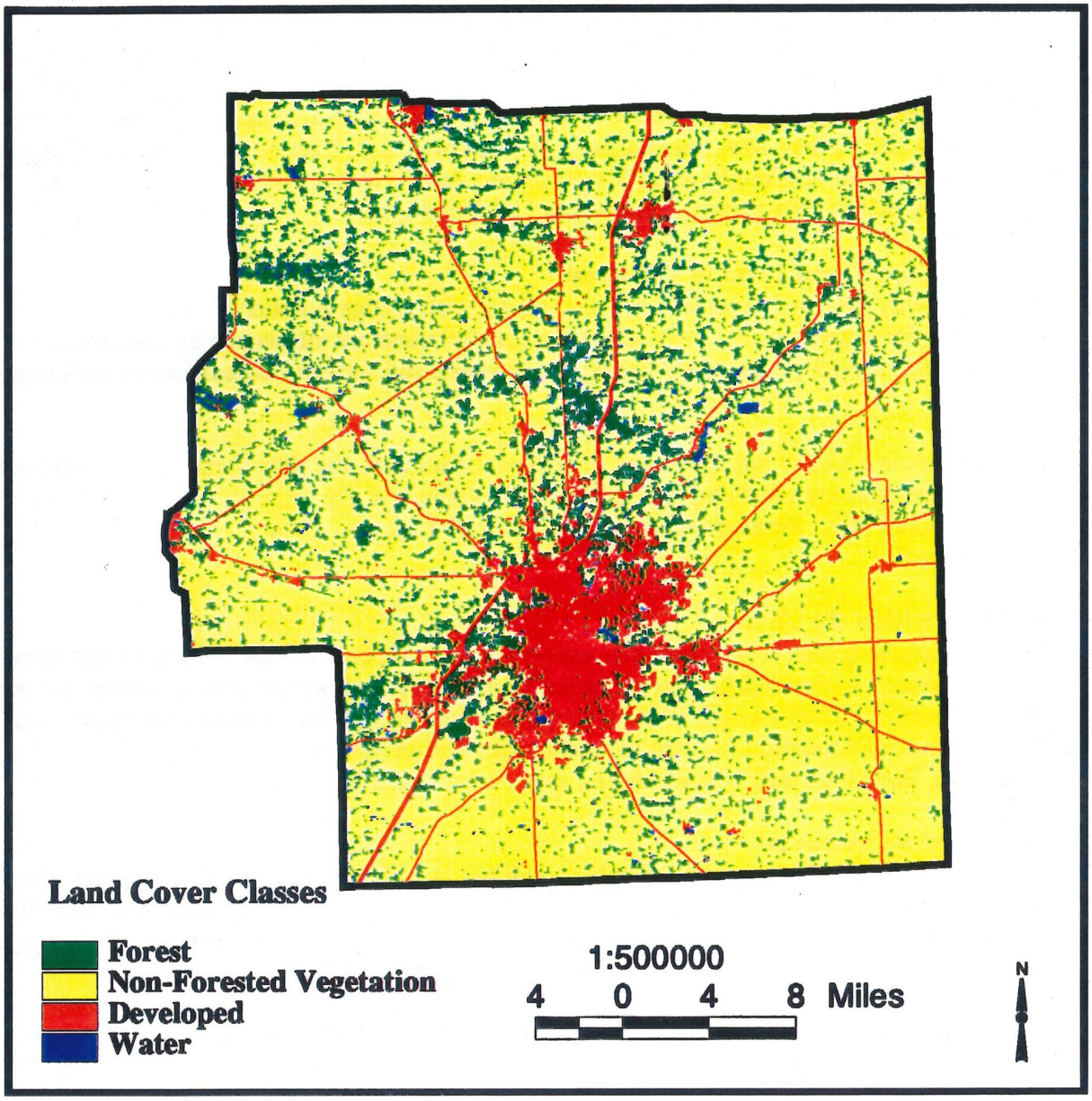
1:500000

4 0 4 8 Miles

FLA Boundary

Maumee Basin

Land Cover



Source Data

Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

NORTHWEST MORAINE

Description:

This Forest Legacy Area (FLA) is located in the northern portions of Porter and LaPorte Counties. It is bounded by Lake Michigan on the northwest and the Indiana-Michigan state line on the north. It follows the LaPorte-St. Joseph County line south to State Road (S.R.) 4, near Fish Lake. It then proceeds west on S.R. 4 to the city of LaPorte, then southwest along S.R. 2 to near the Porter-Lake County line, near Palmer. A that point, S.R. 2 turns south, and the FLA boundary continues west on County Road 350 S. toward Palmer to the Porter-Lake County line. From that point, it follows the county line north to Lake Michigan.

Special Values of the Forest Land in this Area:

This is a richly diverse Forest legacy Area (FLA), with a large number of federally and state-listed rare plant species. The soils, vegetation, and climate are influenced by their proximity to Lake Michigan, with prairie, eastern deciduous forest, and northern boreal forests each represented.

Because this is a highly populated and urban area of Indiana, the forest land and natural landscapes it provides are treasured for their aesthetic value, and the recreational opportunities that occur on much of it. Remnant forested tracts are rare in and of themselves in this area, and highly valued.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. The managed lands in this area protect critical habitat and ecosystems in the FLA. They include lands owned and managed by The Nature Conservancy and the Shirley Heinze Foundation land trusts, and Indiana Dunes State Park and Indiana Dunes National Lakeshore, State Fish and Wildlife Areas, and State Nature Preserves.

Current Conversion Pressures:

This FLA is located in the region of Indiana that has been highly industrialized and has the associated commercial, utility, and residential development to support the industries. Increasing pressures of residential development in the remaining wooded areas is ongoing in the area, as suburban and exurban expansion form Chicago and South Bend converge in this FLA. Population growth (1990 to 1996) in Porter County is increasing at nearly double the **state average of 5.3 percent**. And, although LaPorte County, as a whole is growing less rapidly than the state average, almost all of the townships within the FLA are growing at nearly double the rate of the state average. The townships within the FLA that are growing in population faster than the state average are indicated on the table below.

Table 11. **Indiana Population Change (Percent) from 1990 to 1996, by County/Township**

LaPorte County		Porter County	
Township	% Pop Change	Township	% Pop Change
Galena	10.4	Center	7.3
Hudson	10.4	Jackson	12.2
Kankakee	6.2	Liberty	12.0
Lincoln	10.4	Pine	6.6
New Durham	6.6	Portage	11.1
Springfield	10.4	Porter	12.2
Wills	10.5	Union	12.1
		Washington	12.1
		Westchester	14.0

*Source: Indiana Business Research Center

Potential Future Conversion Pressure:

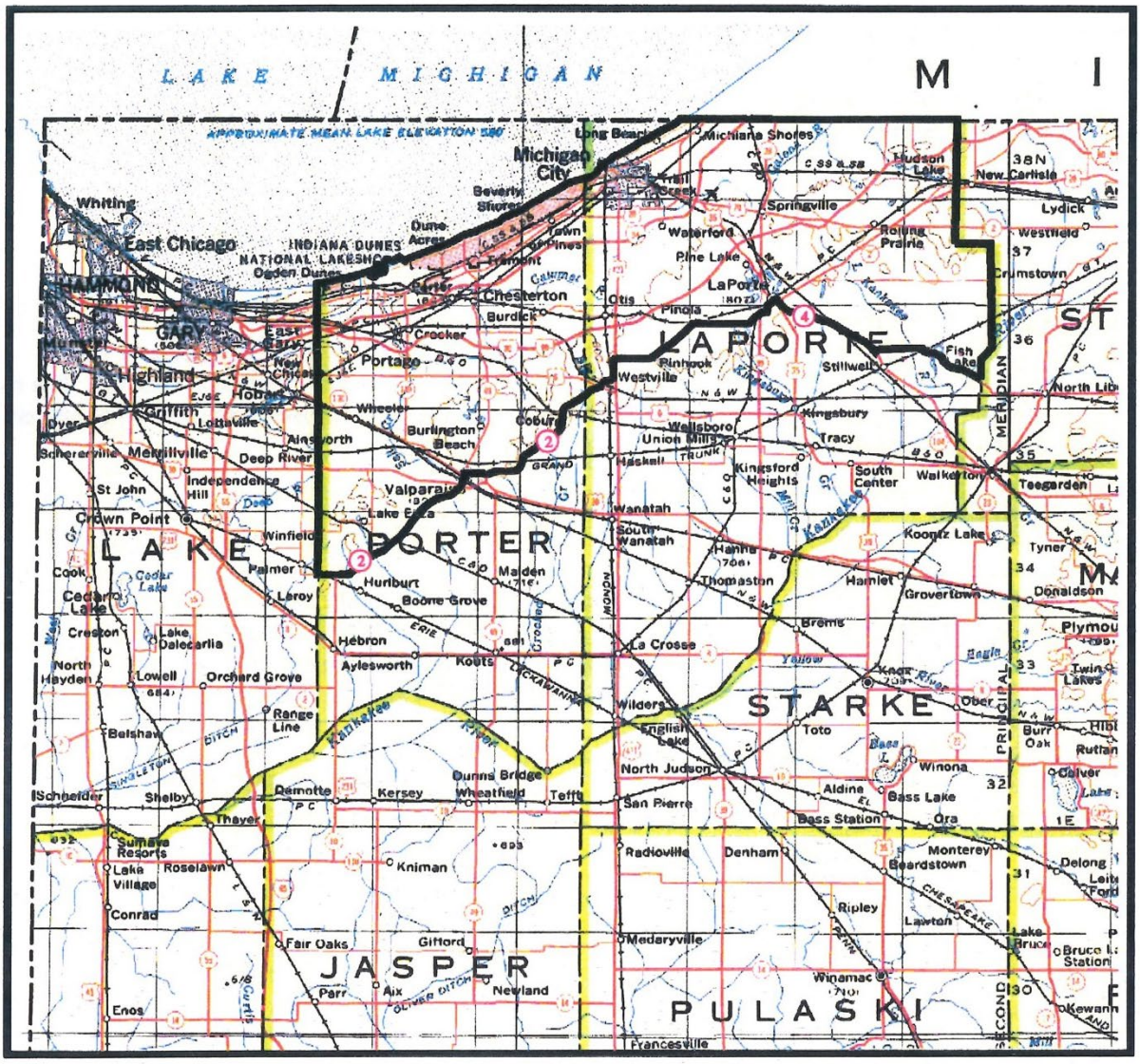
It is likely that the present people pressure within this FLA will continue, particularly with a healthy economy and the continued trend of people seeking wooded residential settings. The remaining forests suitable for development in this FLA, unless otherwise protected will be under constant pressure to be subdivided and developed for housing.

Goals and Objectives for the Northwest Moraine Forest Legacy Area:

- Maintain and enhance the forests within the Northwest Moraine area, particularly those in close proximity to other forested land.
- Maintain and enhance forests of forests of high quality plant and animal communities representing the varied forest types within the area.
- Protect forests the support federally or state-listed plants or animals.
- Protect the riparian corridors to maintain water quality, and riparian-dependent plants and animals.
- Protect the scenic landscapes within the area.
- Maintain contiguous forest land by linking to managed public and private lands. Look for opportunities to increase and maintain public access to forest resources.

Northwest Moraine

Indiana Forest Legacy Area



Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973 projected to UTM NAD 27

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

1:600000

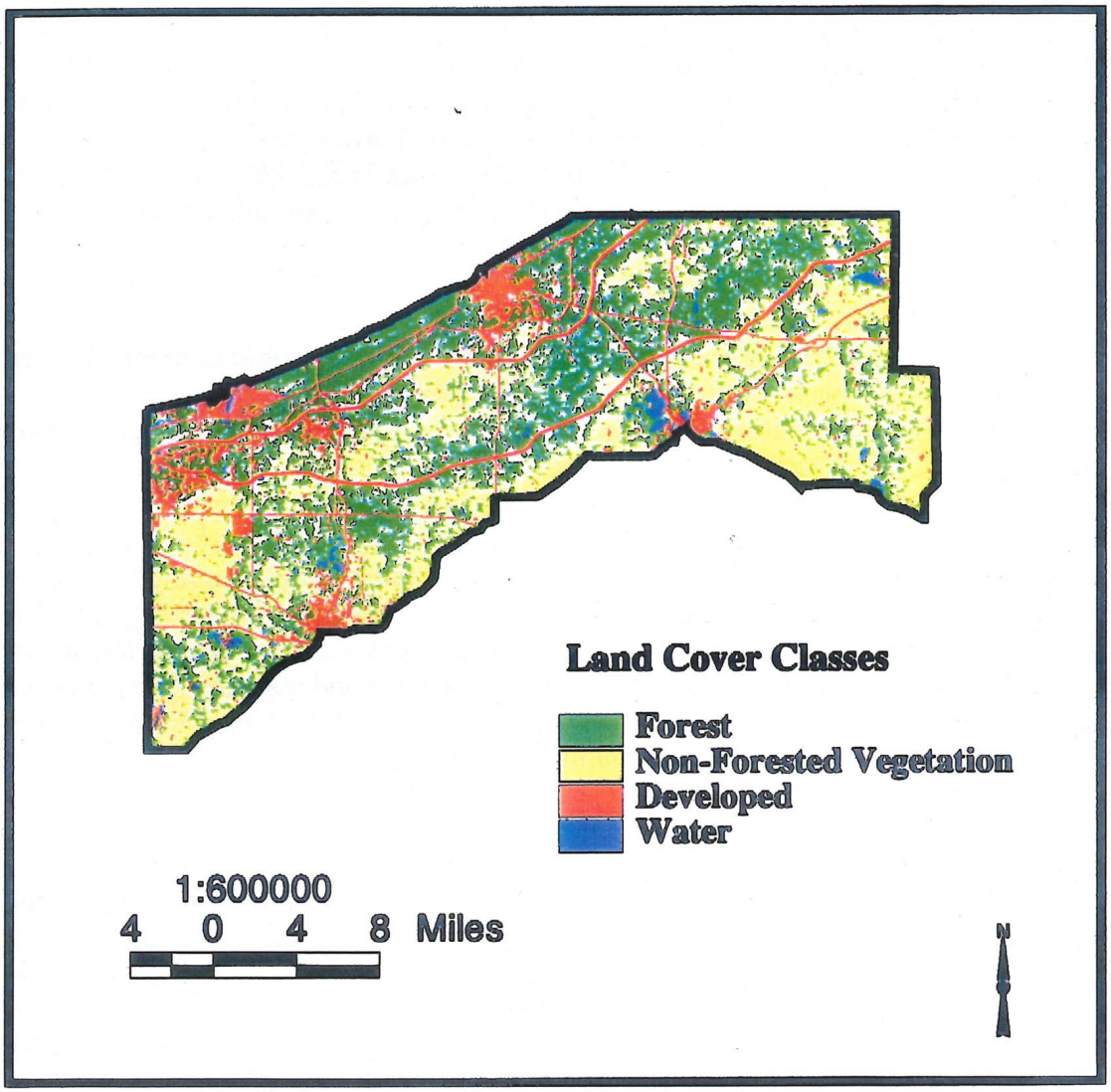
5 0 5 10 Miles

FLA Boundary

N

Northwest Moraine

Land Cover



Source Data

Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

SHAWNEE HILLS/ HIGHLAND RIM

Description:

This Forest Legacy Area (FLA) is bounded on the east by Interstate 65 (I-65), from the Jackson- Bartholomew County line, north to State Road (S.R.) 44, near Franklin. It then proceeds west along S.R. 44 to the Johnson-Morgan County line, and follows the Morgan County line north to the Marion County line, west along the Hendricks County line, and south along the Putnam County line to S.R. 42. It then follows S.R. 42 west to U.S. Highway 231, near Cloverdale. It proceeds south and west along U.S. Highway 231 to Worthington, follows S.R. 157 south to Bloomfield, then again follows U.S. Highway 231 south to S.R. 58, near Scotland. It then follows S.R. 58 east to the Jackson-Bartholomew County line, and follows that county line east to I-65.

Special Values of the Forest Land in this Area:

This FLA includes extensive high quality forests providing valuable timber resources and, with unique and outstanding features from west to east across the area.

The **western portion** of the FLA is underlain with limestone bedrock, and contains a concentration of karst (cave and sinkhole) topography, and other geologic features of special concern. The forest and plant communities in this area are those associated with limestone, and many of the rare plants are alkaline dependent. This area boasts many Classified Forests.

The **eastern portion** of this FLA has sandstone and shale bedrock, leading to deeply eroded landscapes, with steep valleys and ravines throughout. Because of these ridges and valleys, the vegetation might be described as consistently inconsistent, with dry upland forests on the west and southern slopes, and more mesic and cove hardwoods and associated vegetation on the north and east slopes. This portion of the FLA comprises most of the Lake Monroe watershed, including the headwaters, which provides drinking water to the city of Bloomington and surrounding communities.

Managed Lands within the FLA:

Managed lands include those lands that are publicly owned or privately owned for the purpose of natural resource conservation. This FLA contains a wide variety of managed lands. They include Hoosier National Forest, Yellowwood-Morgan-Monroe State Forest, portions of Martin State Forest in Greene County, Brown County and McCormick's Creek State Parks, T.C. Steele Historic Site, Army Corps of Engineer land associated with Lake Monroe, portions of Crane Naval Base, Avoca Fish Hatchery, and eight dedicated Nature Preserves.

Current Conversion Pressures:

This FLA is surrounded by growing population centers, including Bloomington, Columbus, Franklin, Mooresville, Martinsville, and the exurban Indianapolis area. All nine counties are growing in population at a faster rate than the **state average of 5.3 percent**, between 1990 and 1996. Several townships throughout the FLA are growing at least twice as fast as the state population growth average. They are shown on the table below.

Table 12. **Indiana Population Change (Percent) from 1990 to 1996, by County/Township**

Morgan County

Township	% Pop Change	Township	% Pop Change	Township	% Pop Change
Adams	13.1	Green	13.1	Madison	13.1
Ashland	13.1	Green	13.1	Monroe	12.9
Baker	13.1	Harrison	13.1	Ray	7.9
Brown	25.9	Jackson	9.2	Washington	6.5
Clay	12.0	Jefferson	13.1		

Bartholomew County

Township	% Pop Change
German	19.7
Harrison	20.9
Jackson	21.1
Ohio	21.1
Wayne	20.3

Brown County

Township	% Pop Change
Hamblen	9.9
Jackson	9.9
Van Buren	9.9
Washington	10.1

Monroe County

Township	% Pop Change
Bloomington	6.6
Perry	6.5
Richland	11.1
Van Buren	5.4

Greene County

Township	% Pop Change
Beech Creek	11.8
Center	11.8
Highland	11.8
Jackson	11.8
Richland	6.2
Taylor	11.9

Johnson County

Township	% Pop Change
Franklin	25.1
Hensley	17.4
Needham	22.9
Nineveh	12.6
Union	18.9

Lawrence County

Township	% Pop Change
Indian Creek	5.9
Marshall	5.8
Perry	5.9
Pleasant Run	5.9
Shawswick	5.9

Owen County

Township	% Pop Change
Clay	17.0
Franklin	17.2
Harrison	17.2
Montgomery	16.7
Taylor	17.2
Washington	16.4
Wayne	13.8

Jackson County

Township	% Pop Change
Pershing	8.8
Salt Creek	9.1

Putnam County

Township	% Pop Change
Cloverdale	23.7
Jefferson	13.0

*Source: Indiana Business Research Center

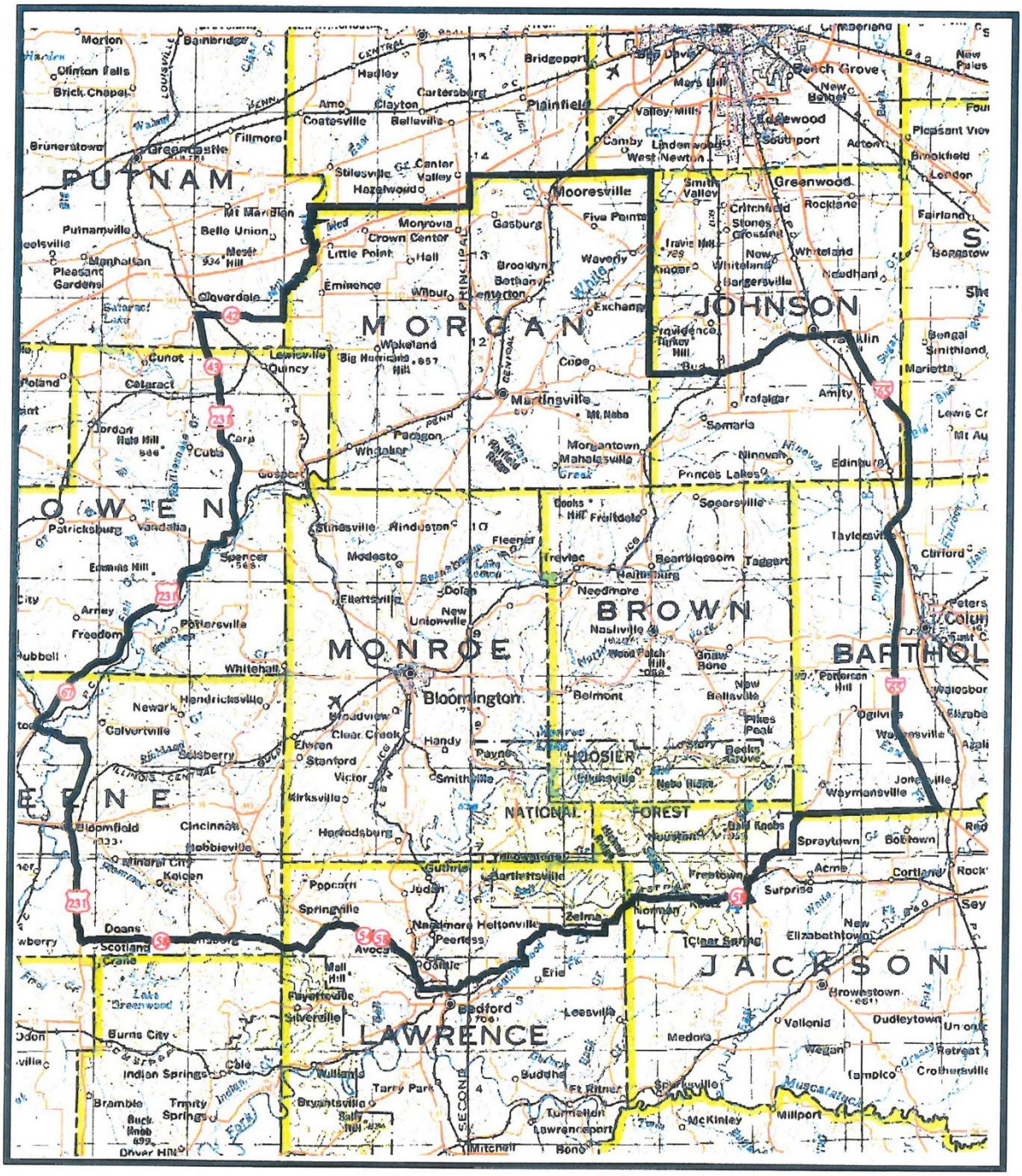
Potential Future Conversion Pressure:

Continued residential development and expansion from Bloomington, Columbus, and the greater Indianapolis metropolitan area are likely. The current trend of subdividing sizable forested tracts of land for home and commercial sites show no indication of slowing down. With these new developments come the infrastructure and utility needs for a given area, thus further impacting the forest land. The east portion of this FLA has experienced significant development growth related to the interstate highway I-69 corridor would cross the FLA. While development may be viewed in a positive light, it would best be accomplished with the thought of maintaining forest land in the landscape, not only from a visual perspective, but for all the traditional forest uses.

Goals and Objectives for the Shawnee Hills/ Highland Rim Forest Legacy Area:

- Maintain and enhance the forests within the Shawnee Hills area, particularly those of high quality hardwoods and those associated with the karst topography of the area.
- Maintain, protect, and enhance the forest land within the Lake Monroe watershed to ensure quality and quantity of the drinking water for Bloomington and the surrounding area.
- Protect forests that support high quality communities, particularly those with federally or state-listed plants or animals.
- Protect the riparian corridors to maintain water quality, and riparian-dependent plants and animals.
- Protect the scenic landscapes within the area.
- Maintain contiguous forest land by linking to managed public and private lands. Look for opportunities to increase and maintain public access to forest resources.

Shawnee Hills / Highland Rim
Indiana Forest Legacy Area



Source Data

U. S. Geological Survey 1:500,000 Base Map with Highways and Contours compiled 1970, edition 1973 projected to UTM NAD 27

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

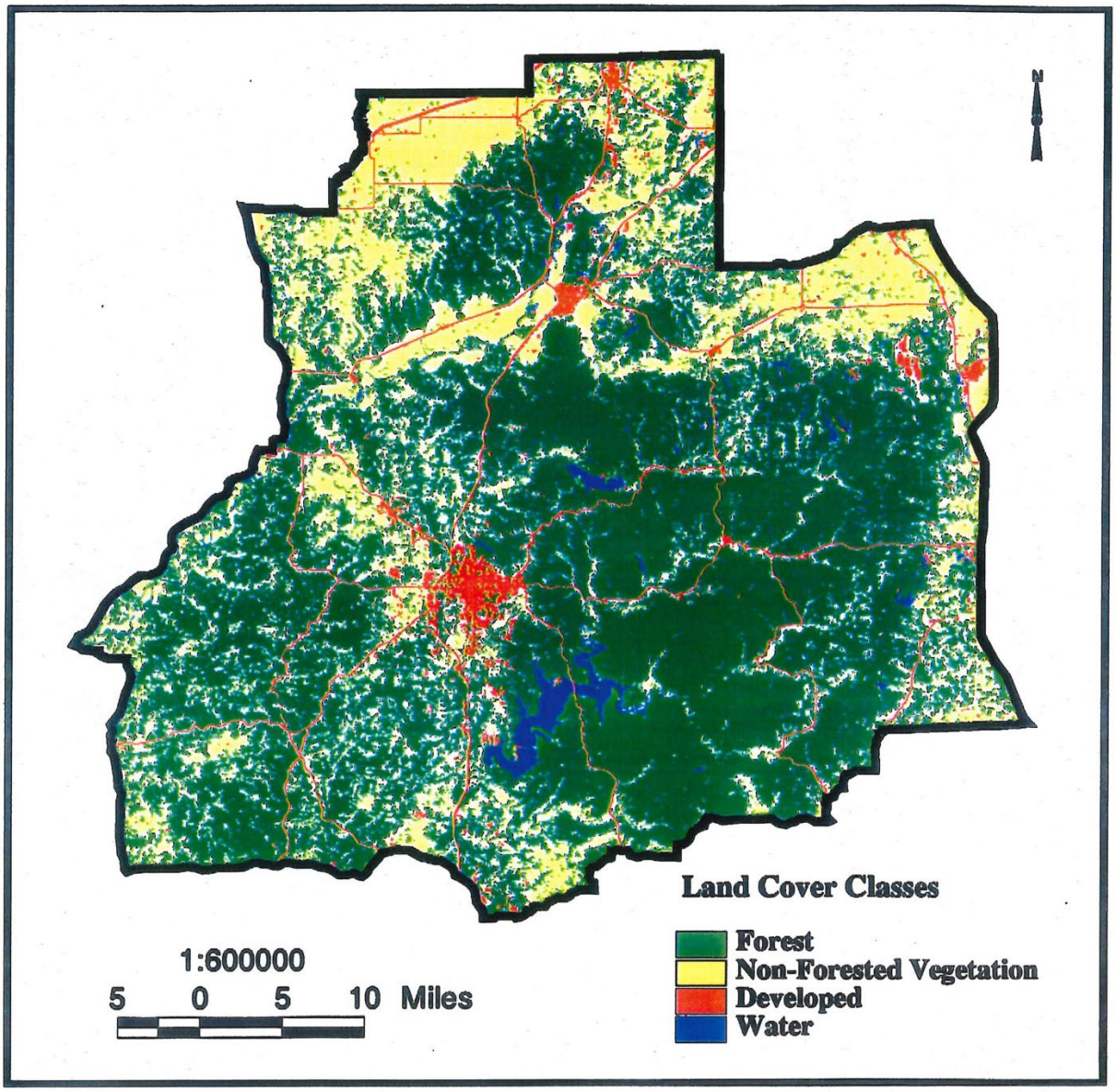
1:600000

5 0 5 10 Miles

FLA Boundary

Shawnee Hills / Highland Rim

Land Cover



Source Data

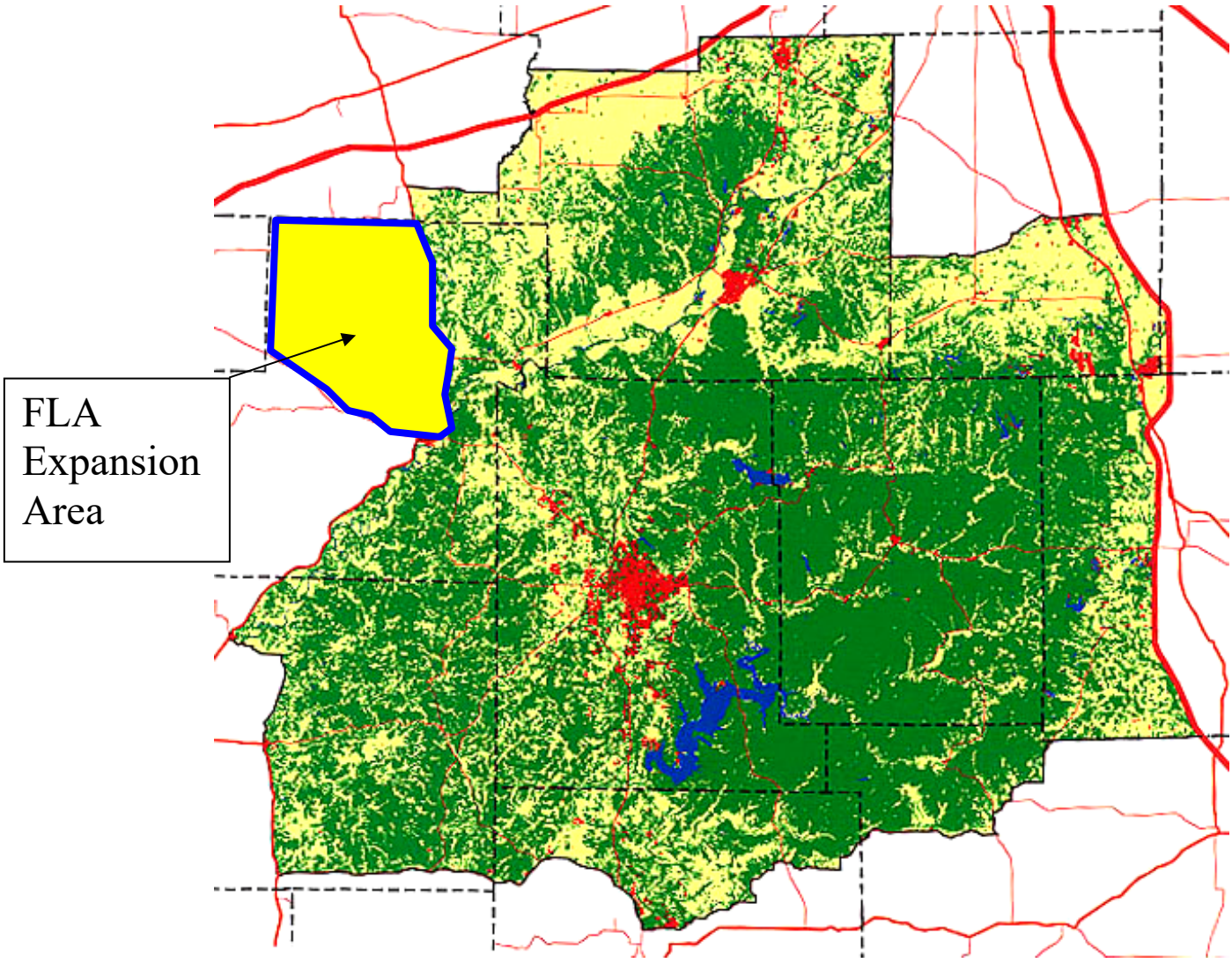
Vegetation Cover from Indiana Gap Analysis Project

Forest Legacy Boundary from U. S. Census Bureau TIGER file county boundaries and U. S. Geological Survey 100:000 DLG roads

Major Roads from U.S. Geological Survey 1:100,000 DLG

SHAWNEE HILLS/ HIGHLAND RIM

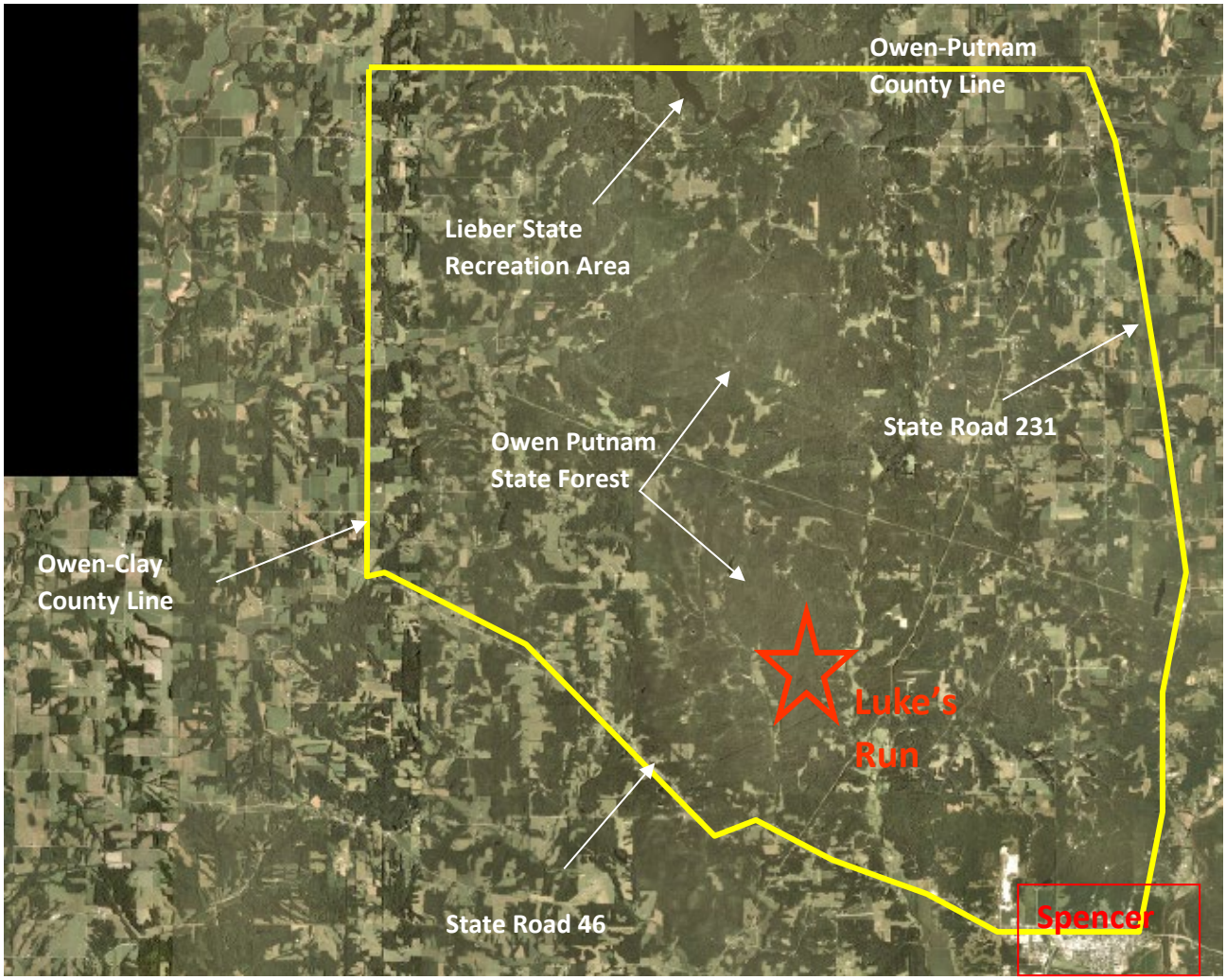
2004 Forest Legacy Area Expansion



The Shawnee Hills/Highland Rim FLA boundary modification is bounded on the North and West by the Owen County line. The Southern extent is bounded by State Road 46, and the East flank by the existing FLA boundary. The addition to the FLA encompasses approximately 112,000 acres and increase the FLA size by approximately 5%.

SHAWNEE HILLS/ HIGHLAND RIM

2004 Forest Legacy Area Expansion Detail



Special Values of the Forests within the Expansion Area

The area is a mix of farm and forest with over 50% of the area in forest cover. The dominant forest feature is the heavy swath of contiguous forest from north to south in the central area of the FLA addition. The areas extensive hardwood forests provide valuable timber resources and is underlain with limestone bedrock, containing karst (cave and sinkhole) topography. It also contains features and plant communities reflecting its place as a transition area between glaciated and un-glaciated Indiana. The forest and plant communities in this area, including several rare species, reflect this unique place on the landscape.

Managed Lands within the Expansion Area

Managed land within the FLA includes Owen Putnam State forest (6,343 acres) and parts of Lieber State Recreation Area (8,075 acres), which includes a 1,500 acre reservoir and Cataract Falls- perhaps Indiana's most well-known natural waterfalls. The area also includes many properties enrolled on the state Classified Forest & Wildlands Program and a dedicated State Nature Preserve.

Appendix B

Application and Evaluations Forms

Contact Forest Legacy Coordinator for current application and evaluation forms.

Appendix C

Authorization Documents

OFFICE OF THE GOVERNOR
INDIANAPOLIS, INDIANA 46204-2797

EVAN BAYH
GOVERNOR

February 10, 1995

Mr. Jack Ward Thomas, Chief
U.S.D.A. Forest Service
14th and Independence SW
P.O. 96090
Washington, DC 20090-6090

Dear Jack:

Please be apprised that I have designated the Indiana Department of Natural Resources, Division of Forestry, as the state's lead agency for the U.S.D.A.'s Forest Legacy Program as authorized under Section 1217 of Title XII of the Food, Agriculture, Conservation and Trade Act of 1990. Please forward information and other pertinent materials to Burnell C. Fischer, State Forester and Director, Indiana Division of Forestry, 402 West Washington Street, Room W296, Indianapolis, Indiana, 46204, (317)232-4107.

The Division of Forestry is a logical agency to lead Indiana's Forest Legacy program because the state's forestry programs are coordinated by that office. Also, the Division leads the State Forest Stewardship Coordinating Committee, which provides leadership and public input for the Forest Legacy program.

I am pleased that Indiana is being considered as a project area for this timely forest conservation program. Thank you for your support of state and private forestry programs.

Sincerely,

Evan Bayh

EB/MSD/dj

cc: Patrick R. Ralston, Director, DNR
Burnell C. Fischer, State Forester

INDIANA FOREST STEWARDSHIP COORDINATING COMMITTEE
6/26/97
(MEETING MINUTES)

1:30 pm Present: B. Fischer, D. Raimo, R. Langdon, C. Eisfelder, K. Day, A. Pursell, B. Schaible, T. Maloney, V. Carson, T. Eubank, C. Rush, B. Cruser, R. Koenig, W. Barton, E. Ballentine, C. Diehl, D. Fitzgibbon, J. Eger, D. Ernst, R. Overton, L. Miller, J. Seifert

Deirdre (sic) ~~Dierdra~~ Raimo - Forest Legacy - Forest Legacy is sister program to Forest Stewardship program which allows federal government to purchase conservation easement on lands to limit use or development of those lands. Pays the difference between the land value with and without the easement restrictions. Reasons to protect unique forest lands: 1) water filtering of municipal watersheds, 2) flood control 3) Aesthetics 4) Insuring a timber resources, more. Indiana can choose to participate in the Legacy program. State's will hold and monitor the easement. Easements take 4+ months to process. Must follow federal appraisal and acquisition procedures. 14 states currently participate - total pot $4-5 million/yr. Participation would require state to develop an "assessment of need" to identify state's important forest areas later known as "forest legacy areas" for acquisition eligibility.

Land Trusts often participate actively in development and implementation of legacy program. Program requires 25% local match. May need to look at state laws/regs. prior to adopting such a program. (e.g. legal length of easements)

* 15% of federal appropriation to a state legacy program can go towards administrative costs.
* purchase grants cover 5 year period, but grant funds must be spent the first 2 years.
* Preparing an "assessment of need" even with grant funds does not lock state into legacy program.
* Brian Cruser proposed IN pursue development of "assessment of need" (2nd by W. Barton) (takes 1 to 1 1/2 years to develop the assessment). Group concurred. Next step is to submit request for assessment development funds.
* Volunteers to work on this project: Brian Cruser, Ken Day, Richard Langdon, Vicki Carson and Tim Maloney.

Indiana Forest Stewardship Coordinating Committee- Meeting Notes
6/25/98

Jack Nelson gave an overview of tomorrow's tour and encourage people to attend at Jen y & Roe Lewis Tree Farm.

Dan Ernst gave an update to the group on me forest stewardship program. Reviewed were: 1) new challenge grant awards, 2) eight year progress update and comparison to 5 year plan, 3) allocation of 1998 funds within Indiana.

The Indiana Forest Legacy Project was presented by Ben Hubbard and Barb Tormoehlen. Reviewed were:
l) background on the forest legacy program and what is an '"Assessment of Need"(AON), Note: Indiana Forest Stewardship committee recommended the Division of Forestry proceed with the AON last year, 2) reviewed the process used to develop Indiana's AON, 3) Data and types of data used to write AON and identify legacy areas (e.g. biological. demographic), 4) the 6 proposed legacy areas.

Open floor to comments: 1) have local authorities voice support of proposed legacy areas and tracts (e.g. have local plan commission support legacy tracts). Or have a local support criteria included in the tract evaluation. Yet retain landowner final say.

By consensus the Indiana Forest Stewardship Coordinating Committee approved the Indiana Forest Legacy Assessment of Need. Legacy letters of support and any final comments on the draft AON are due back to Ben and Barb July 8th. Document will go to printer in mid to late July.

Appendix D

Public Participation Process and Comments

Ben Hubbard, Forest Legacy Coordinator

Division of Forestry Oct 6, 1997

How can you help ensure the children of Indiana will have forests to use and enjoy? How can we ensure hiking, fishing and wildlife viewing - as well as wood for homes, furniture and newspapers?

In Indiana about 85% of the four million or so acres of forest land is privately owned. Increasingly, these private forests which are valued for so many things are being developed with houses and shopping malls, or divided into smaller pieces. Economic pressure on forest owners, such as escalating land values and property taxes, means more rural areas are becoming suburbs and more suburban areas are becoming cities. With the nation's growing population the conversion of forests to non-forest uses and subdividing of forests continues. How can some of these forest be saved? Perhaps the Forest Legacy Program can help.

Attached is background information on the Forest Legacy Program. You, or your organization, have expressed an ongoing interest in Indiana's green space and forests. Because of your interest we'd like your thoughts and opinions to help identify issues as we analyze the status of Indiana's forests and seek to conserve some of them through the Forest Legacy Program. The Forest Legacy program would not discourage economic development but assure that we can have both economic development and viable forests in Indiana for many generations to come. Please take a few minutes and share your knowledge, thoughts and concerns by answering the questions on the attached form, before November 1, 1997. If you have questions about the Forest Legacy Program feel free to contact either myself (317) 232-4114 or Barb Tormoehlen, Assistant Forest Legacy Coordinator at (812) 358-2675

Sincerely,

BEN HUBBARD, COORDINATOR

FOREST LEGACY PROGRAM in INDIANA

FOREST LEGACY IN INDIANA
ISSUES and OPINIONS
OCTOBER 6, 1997

Following is a partial list of some of the issues that may be significant when considering the impacts of the conversion of forest lands to non-forest uses. Please add any other potential issues you may be aware of and then rank the entire list by importance, with (1) being the most important. Feel free to write in any comments about a specific issue. Use extra pages if needed.

__ Forest Fragmentation
__ Availability of timber for the wood products industry
__ Plant and animal habitat
__ Water quality and quantity
__ Tax or other hurdles to long term forest ownership
__ _____
__ _____
__ _____
__ _____

Part of the Assessment of Need process for the Forest Legacy Program requires that each state create local definitions for the following terms: environmentally important forests, threats to the forest and traditional forest uses. Please take a few minutes and share your ideas on each of these terms to assist us in crafting an Indiana definition for each term.

An Environmentally Important Forest in Indiana is/has the following characteristics:

_____
_____
_____
_____

Traditional Forest Uses in Indiana include:

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

Threats to Indiana's Forests include:

_____ _____
_____ _____
_____ _____

PLEASE USE THE ENCLOSED SELF ADDRESSED, STAMPED ENVELOP TO RETURN SURVEY FORM BY **NOVEMBER 1, 1997**

File Copy

INDIANA DEPARTMENT OF NATURAL RESOURCES

LARRY D. MACKLIN, DIRECTOR

October 16, 1997

The Honorable Brent E. Steele
Bank One, Suite One
Bedford, IN 47421

Dear Representative Steele,

I want to take this opportunity to encourage your participation in the initiation of the Forest Legacy Program in Indiana.

How can we all help ensure the children of Indiana will have forests to use and enjoy? How can we ensure opportunities for hiking, fishing and wildlife viewing - as well as wood for homes, furniture and newspapers?

In Indiana about 85% of the four million or so acres of forest land is privately owned. Increasingly, these private forests, which are valued for so many things, are being developed with houses and shopping malls, or divided into smaller pieces. Economic pressure on forest owners, including escalating land values and property taxes, means more rural areas are becoming suburbs and more suburban areas are becoming cities. With the nations growing population the conversion of forests to non-forest uses and the subdivision of forests continues. How can some of these forests be saved? Information on the Forest Legacy Program in Indiana is attached.

The Department of Natural Resources, Division of Forestry has been designated as the state's lead agency for conducting an assessment of need to determine the status of Indiana's forests and the gravity of the threats to its continued vitality. The results of the assessment of need will not only help determine the level of need for the Forest Legacy Program but also will provide the DNR with solid information to assist in future decision making.

I would like to encourage you to contact the Division of Forestry or my office if you have questions or suggestions about the forests of Indiana, or the Forest Legacy Program in Indiana.

Sincerely,

Larry D. Macklin, Director
Department of Natural Resources

"EQUAL OPPORTUNITY EMPLOYER"

PRINTED ON RECYCLED PAPER

INTRODUCING

THE FOREST LEGACY PROGRAM

IN INDIANA

The Forest Legacy Program was created by Congress in 1990 as part of the Farm Bill. Its purpose is to help landowners, state and local governments and private land trusts identify and protect environmentally important forest lands that are threatened by present and future conversion to non-forest uses. The Forest Legacy Program will help assure that both traditional uses of private lands and the public values of America's forest resources are protected for future generations.

The most important part of Forest Legacy is private landowners who want to conserve the special values of their land for future generations. Willing owners who are accepted into the program can sell all or part of their ownership rights, such as the right to develop the land, to the state government. These rights will be purchased at full fair market value. Up to seventy-five percent of the funding is provided through a federal grant; the state or other non-federal sources match the remainder of the purchase price.

Owners may sell their retained rights to other buyers at any time or pass them on to maintain the family forest. If only development rights are sold, the State would hold a "conservation easement" on the property ...forever... and landowners would be committed to managing their property according to the easement that they have voluntarily sold. The owner keeps the remaining property rights and most often continues to live and work on the property. Property taxes are paid on any retained rights as determined by the local assessor.

In general Forest Legacy areas will be encouraged to be "working forests," where forest land is managed for the production of forest products and traditional forest uses are maintained. These forest uses will include both commodity outputs and non-commodity (aesthetic, cultural, wildlife, recreation and water) values.

Implementing a Forest Legacy Program requires a number of steps. The guidelines for Forest Legacy implementation are designed around a partnership between the state lead agency (Department of Natural Resources, Division of Forestry) and the State Forest Stewardship Coordinating Committee (SFSCC), which voted in June of 1997 to begin the process of establishing an Indiana Forest Legacy Program. The initial step is an Assessment of Need, which is a study of the current status of Indiana forests, the various threats and pressures being placed on them and an assessment of future pressure to convert forests to non-forest uses. The Assessment of Need will not only define the statewide status of forests but will identify Forest Legacy Areas within Indiana where the purchase of specific land rights by the State will be most effective in conserving the many forest values. The Indiana Assessment of Need is currently underway with a targeted completion date of June 1998. If, based on the Assessment of Need, Indiana's program is accepted, then the state will begin accepting nominations for properties to be considered for purchase within the designated Forest Legacy Areas.

October 2, 1997

RICHARD G. LUGAR
INDIANA
[illegible] HART SENATE OFFICE BUILDING
WASHINGTON, DC 20510
202-224-4814

United States Senate

WASHINGTON, DC 20510–1401

COMMITTEES:
AGRICULTURE, NUTRITION, AND FORESTRY
CHAIRMAN
FOREIGN RELATIONS
SELECT COMMITTEE
ON INTELLIGENCE

October 30, 1997

Mr. Larry D. Macklin
Director
Indiana Department of Natural Resources
402 West Washington Street
Indianapolis, Indiana 46204

Dear Larry:

Thank you for your letter of October 16, 1997, encouraging my participation in the initiation of the Forest Legacy Program in Indiana.

I will share your letter with members of my Senate staff who share enthusiasm for the remarkable heritage of hardwood forests that we enjoy in Indiana.

I wish you success as the Department of Natural Resources proceeds as Indiana's lead agency for conducting an assessment of the status of Indiana's forests and the gravity of threats to their continued vitality.

I will look forward to staying closely in touch.

Sincerely,

Richard G. Lugar
United States Senator

RGL/kk

INDIANA DEPARTMENT OF NATURAL RESOURCES LARRY D. MACKLIN, DIRECTOR

Division of Forestry
402 W. Washington St., Rm. W296
Indianapolis, Indiana 46204
317-232-4105

Ben Hubbard, Forest Legacy Coordinator
Division of Forestry

January 2, 1998

In October of 1997 you received information about the initiation of the Forest Legacy Program in Indiana. Included with the information was a form asking your opinion on what the primary issues were in protecting Indiana's forests from conversion to non-forest uses and your ideas on how to best define the terms environmentally important forest, traditional forest uses and threats to Indiana's forests.

Attached is a summary of the responses we received and a copy of draft definitions developed with your input. I want to thank each of you who responded, your input was indispensable in helping direct the Forest Legacy Program in Indiana.

I also want to take this opportunity to update you on the status of the Forest Legacy Program in Indiana. The program, which is spearheaded by the Indiana Division of Forestry and the State Forest Stewardship Coordinating Committee, is moving forward with the Assessment of Need (foundation document) for the program, which will be completed by June 1998. Part of the Assessment of Need is the identification of potential Forest Legacy Areas within the state. Forest Legacy conservation easements will only be acquired within the designated Forest Legacy Areas. The task of identifying potential Forest Legacy Areas is being conducted by the Forest Legacy Subcommittee of the Stewardship Committee and is based on an evaluation of the many complex factors which affect the rate of conversion of forest land to non-forest uses. I have enclosed a mailing list of the Subcommittee members and I'm sure any of them would welcome your input about potential areas of the state which you feel may merit consideration as Forest Legacy Areas.

If you have further questions about the Forest Legacy Program in Indiana please feel free to contact me.

Sincerely,

Ben Hubbard

Ben Hubbard

FOREST LEGACY ISSUES AND OPINIONS SHEET
SUMMARY OF RESPONSES

FOREST LEGACY ISSUES

The following five issues were identified as important by the most respondents:

forest fragmentation; availability of timber for products; plant and animal habitat; water quality and quantity; taxes or other hurdles to ownership.

Other issues raised included:

loss of urban forest area; recreation; aesthetics; land use planning; lack of education; air quality; total forest land in state; balancing forests with other land use; private property rights; open access; right to harvest; erosion; climate moderation; conversion to other use; energy; quality of life; management practices.

CHARACTERISTICS OF ENVIRONMENTALLY IMPORTANT FORESTS

The following five characteristics were identified as important by the most respondents:

Size of parcel; watershed protection; native vegetation; species balance; threatened and endangered habitat.

Other characteristics identified included:

Other wildlife habitat; protects sensitive area; part of larger system; unique vegetation; managed for production; vegetation size class balance; high growth; near urban area.

TRADITIONAL FOREST USES

The following five uses were the most frequent responses:

Logging/timber production; recreation; wildlife habitat; watershed protection, wild plant gathering.

Other identified uses included:

Scenic viewing; non-timber forest products; research/education; windbreaks; improve air quality; erosion control; investment, second home construction; carbon sink; oxygen production; grazing.

THREATS TO INDIANA FORESTS

The following threats were identified:

Development
Urban Sprawl
Isolation of fragments

Utility and Road Building
Taxes and poor public policy
Inadequate planning and zoning

Poor logging
Fragmented timber management
Poor management

Clearing for agriculture
Drainage projects

"Locked up" for single use

Exotic species takeover

Lack of landowner knowledge

Livestock grazing

Insect and disease

Water and air pollution

Draft Definition

Environmentally Important Forests

Forests of Indiana are important at a number of scales and to a wide variety of species. On the broadest scale, it can be argued that since Indiana was once about 90% forested prior to European settlement and less than 20% forested today, all of Indiana's remaining forests are environmentally important.

There are a number of working definitions of forests and forest lands currently in use in Indiana, including those used by the Forest Inventory and Analysis, the Gap Analysis Program in Indiana and the Indiana Classified Forest Program. None of the currently used definitions was considered broad enough to define an environmentally important forest for the Forest Legacy Program.

Beginning with the basic definition given in the Forest Legacy Program guidelines and relating the input provided by responses to questions posed to more than 80 interested parties about the objectives of the Forest Legacy Program, the following definition has been developed for Indiana.

A forest will be considered environmentally important if it contains one or more of the following public values:

1. Scenic resources;
2. Public recreation opportunities;
3. Riparian areas;
4. Fish and wildlife habitat;
5. Known threatened and endangered species;
6. Known cultural resources;
7. Other ecological values; and/or

Provides opportunities for the continuation of traditional forest uses, such as forest management, timber harvesting, other commodity use, and outdoor recreation.

In Indiana these public values are further clarified as follows:

Scenic resources;
*contains or contributes to scenic vistas or landscapes

Public recreation opportunities;
*provides forest based recreation opportunities for the landowner or the public at large

Riparian areas;
*provides watershed and groundwater recharge protection assuring water quality and quantity

Fish and wildlife habitat;
*provides habitat for forest dependent animal species

Known threatened and endangered species;

*provides habitat for state or nationally listed threatened, endangered or special concern species of plants or animals

Known cultural resources;

*contains or protects historic or archaeological sites or resources

Other ecological values;

*contains or protects forested wetlands or old growth forests

*contains woody vegetation in a variety of species and size classes

*protects fragile soils or significant topographic or geologic features

*provides connectivity between otherwise isolated forest areas

*contains uncommon or diminishing native forest cover types

Provides opportunities for continuation of traditional forest uses;

*must be a minimum size to be sustainable as a forest

*must be at least 90% covered with woody vegetation or be scheduled for reforestation within a five (5) year period

*site quality must be adequate for the production of a wide variety of forest values

Traditional Forest Uses

Forests in Indiana have traditionally provided wood and other natural products for commerce, wood products for human survival, habitat for wildlife, areas for recreation, research and education, watershed protection, gathering of roots, herbs and human food stuffs, green space and buffers, soil stabilization and climate moderation. All of the proceeding uses have been ongoing for decades and when pursued in moderation appear to be compatible with long term sustainability of the forest. There are also a number of uses of Indiana's forests which are traditional but when uncontrolled appear to contribute to the degradation of the forest and it's ultimate conversion to non-forest uses. Included in this latter list are domestic livestock grazing, construction of homes and businesses and use of the forests as sites for refuse disposal.

Conversion Threats to Indiana's Forests

In Indiana, the primary threats driving the conversion of forest land to non-forest uses can be broadly divided into three categories; economic factors, public policy factors and those threats driven by both economics and public policy. The conversion pressure that results from each of these factors varies from area to area. Intense conversion pressure in some rapidly developing areas may not be obvious from statewide data. Respondents to our inquiries identified the following list as the most pressing conversion threats:

Economic Factors

* economic pressures on forest owners to convert forests to non-forest uses (opportunity cost)
* lack of adequate tax incentives to offset the cost of long term forest investment
* the introduction of aggressive non-native plant and animal species
* inappropriate timber management leading to conversion to non-forest uses
* development pressure in some areas caused by lower land cost of forest land compared to already cleared land

Public Policy Factors

* zoning and development rules that require large minimum lot size in some forested areas
* the propensity of new home owners and builders to choose large wooded acreage as individual home sites and subdivisions as a quality of life issue
* lack of public policy protection of open space and wildland attributes near some urban areas
* lack of appreciation by landowners and planners of the forest's overall value and the impact of certain land use activities on forest values
* accelerated expansion of public utilities into sparsely developed forested areas

Both Economic and Public Policy Factors
* rapid population growth in limited areas
* fragmentation - dividing and isolation of the forest into pieces too small to be a viable forest system;
* the pressure to use forested areas as a choice for infrastructure development and expansion (transportation corridors, utilities and public buildings)
* the proliferation of developments in forested areas which require large acreage (golf courses, strip malls, industrial use)

Brian Cruser
ABC Forest Management
1668 West Co. Rd. 400 South
Greensburg, In 47240

Vicki Carson
IHLA
3600 Woodview Trace, Suite 305
Indianapolis, IN 46268

Barb Tormoehlen
412 Kelly Drive
Brownstown, IN 47220

Sam Smith
Koetter Woodworking, Inc.
533 Louis Smith Road
Borden, IN 47106

Ken Day, Supervisor
Hoosier National Forest
811 Constitution Ave.
Bedford, IN 47421

Tim Maloney
Hoosier Environmental Council
3765 Yellowwood Trail
Nashville, IN 47448

Deirdre Raimo
USFS
P.O. Box 640
Durham, NH 03824

Ben Hubbard, Forest Legacy Coor.
402 W. Washington St. Rm. W296
Indianapolis, IN 46204

Richard Langdon
Heartwood
P.O. Box 232
English, IN 47118

Warren Baird
IN SWCD's Director
5578 South 500 West
Atlanta, IN 46031-9363

Burney Fischer, State Forester
402 W. Washington St. Rm. W296
Indianapolis, IN 46204

Support the Indiana Natural Resources Foundation
Call (317) 232-4020

INDIANA DEPARTMENT OF NATURAL RESOURCES • DIVISION OF PUBLIC INFORMATION AND EDUCATION • 402 W. WASHINGTON ST., RM. W255-B INDIANAPOLIS, IN 46204-2748

FOR IMMEDIATE RELEASE
March 20, 1998

DNR Announces Program to Conserve Private Forests

Seven information sessions will be conducted to discuss a program to help private landowners conserve important forest property, Indiana Department of Natural Resources Director Larry D. Macklin announced today.

"The Forest Legacy Program helps landowners, units of local government and private land trusts identify and protect environmentally important forests so they aren't developed and turned into a parking lot or shopping mall," Macklin said.

Conservation easements are used to purchase development rights at fair market value from willing sellers who want to conserve their forest property. The development rights are then held by the DNR in perpetuity. Rights to the use and transfer of the land remain with the landowner, and the land remains on local tax rolls.

"The value of forests lies not only in the wood products they provide, but in the environmental diversity and quality of life they help sustain. Woodlands provide habitat for wildlife and protection for watersheds. They help conserve energy in urban areas, provide recreation opportunities for our growing population, and their aesthetic beauty enriches our lives," Macklin said.

The program will be implemented only in designated Forest Legacy Areas, where the resource values and the threat of the conversion of forest land to non-forest uses are greatest, according to State Forester Burnell C. Fischer.

Seven potential Forest Legacy Areas have been identified in Indiana by the State Forest Stewardship Coordinating Committee, a diverse advisory group chaired by Fischer.

Landowners whose forest property lies in one of the designated Legacy Areas may be eligible to participate in the program. Eligibility criteria include the location of the forest property, watershed protection provided by the forest and the quality of native vegetation.

"The Forest Legacy Program helps landowners faced with increasing pressure from developers achieve peace of mind. The program provides them with a viable option of protecting

NEWS RELEASE

their trees rather than have the property converted to non-forest uses," Fischer said.

An open house held in each potential Legacy Area will provide the opportunity to discuss details of the program. The DNR seeks local input at each open house on Forest Legacy boundaries and the value and impact of the program for local communities.

The Forest Legacy Program, established in the 1990 farm bill enacted by the U.S. Congress, received a fiscal year 1998 appropriation of $4 million. The appropriation will be shared by 14 states participating in the program to assist with the acquisition of conservation easements.

For more information about the Forest Legacy program or the open houses, contact Julie Charles at 317/232-4105.

Locations and times for Forest legacy Open Houses

City	Location	Date & Time
Evansville	University of Southern Indiana Carter Hall in the University Center 8600 University Blvd.	April 1, 3:00-7:00 pm
Versailles	Southeast Indiana Career Center 901 W. US 50	April 2, 3:00-7:00 pm
Corydon	Harrison Co. Office Bldg. Meeting Room 154 S. Mulberry St., Corydon	April 4, 10:00 am-Noon
Sellersburg	Sellersburg Library 430 Indiana Ave.	April 4, 2:00-4:00 pm
Fort Wayne	Pond Pavilion, Franke Park 1/4 mi SW of Glenbrook Square Mall	April 6, 3:00-7:00 pm
Chesterton	Dunes State Park 1600 N 25 E, Nature Center Auditorium	April 7, 3:00-7:00 pm
Bloomington	Twin Lakes Lodge Twin Lakes Sports Complex 2350 W. Bloomfield Road	April 9, 2:00-4:00 pm
Columbus	Columbus East High School 230 S. Marr Rd.	April 9, 6:00-8:00 pm

For more information contact:
Julie Charles or Ben Hubbard, Division of Forestry (317) 232-4105

Indiana Forest Legacy Program

Potential Forest Legacy Area "B"
Blue River Basin

Description:

Includes all of Harrison County, as well as the southern portion of Washington County (south of Salem), and the eastern portion of Crawford County (east of Marengo). This potential Forest Legacy Area is bounded by the Ohio River on the south, State Roads 56 and 60 on the north, and State Road 66 on the west.

Special Values of the Forest Land in this area:

Encompasses the Blue River watershed, one of The Nature Conservancy's ecosystem focus areas. This area has high quality upland forests, with the largest concentration of Classified Forest in the state, and Harrison-Crawford State Forest. Both Harrison and Crawford counties have high amounts of state-listed rare plants and animals and a moderate amount of federally-listed animals. The Ohio River Scenic Byway traverses this area, and there are many recreational opportunities that currently exist on forestlands within the potential FLA. Caves and karst landscapes are plentiful in this area, yet unique in Indiana and nation-wide. This area is rich in cultural heritage, both historic and prehistoric.

Current Conversion Pressures:

Several townships within the three counties are growing in population at a significantly faster rate than the **state average of 5.3 percent**, between 1990 and 1996. These townships and towns are shown on the below table. *

Harrison County				Washington County			
Town/Twp	PopChg%	Town/Twp	PopChg%	Town/Twp	PopChg%	Town/Twp	PopChg%
Mauckport	12.6	Morgan	12.6	NewPekin	12.9	Pierce	13.5
Boone	12.8	Posey	13.0	Howard	13.7	Polk	13.6
Franklin	12.5	Spencer	13.2	Jackson	13.8	Vernon	13.9
Heth	13.2	Taylor	13.2	Jefferson	13.8	Gibson	13.2
Jackson	13.1	Washington	13.0	Monroe	13.9	Madison	13.3
Webster	13.0						

* Source: Indiana Business Research Center

No townships in Crawford County identified as a potential Forest Legacy Area have population growth greater than the state average; however, this small area of the county is included because it completes the Blue River drainage basin (watershed).

Potential Future Pressures:

Development associated with riverboats, including residential development and development expansion from Louisville, Kentucky "exurban" (beyond suburban) pressures and desires.

Questions and Answers
about the
Forest Legacy Program in Indiana

Can the way the forest is managed and what its used for be changed after it's in the program?

Answer: Yes. Assuming that the new use is compatible with the long term sustainability of the forest, the forest stewardship plan can be amended.

Can I build a house, or other improvements within the easement area?

Answer: No. Any part of the property that you may want to use for improvements or grazing should be excluded from the easement area at the time the parcel enters the program.

Will a conservation easement keep my property from being taken for a road or utility project?

Answer: No, the property would still be subject to "eminent domain" just as it is now. It is possible that project planners may make more effort to avoid a "conservation property" but that is not guaranteed.

Can I change my mind and take a parcel out of the program after I've sold the development rights?

Answer: No. You will have sold a partial ownership of the property for a cash payment. You may sell or dispose of the remaining rights but the state will continue to hold a permanent easement on the property. Remember that the goal of the program is to keep forests as forests, being flexible on this point would defeat the purpose.

Does participation in the Forest Legacy Program have any affect on other land holdings I have outside the conservation easement area?

Answer: No.

Where does the money come from to buy these conservation easements?

Answer: Up to 75% of the money comes from the United States Department of Agriculture as part of the Farm Bill. The other 25% must come from non-federal sources, either as cash or in-kind contributions.

What are the benefits of the Legacy Program?

To the Landowner;

Answer: * *You receive a one time cash payment for the development rights without having to give up ownership of the property.*
* *You can protect a forest you are attached to from being converted to some other use.*
* *You can continue many of the uses and gain income from the property.*
* *You can assure a permanent undeveloped green space within your community.*
* *Most participants will receive some level of tax reduction in state, local or federal taxes.*

To the Community;

Answer: * *Permanent greenspace is provided in the community without totally removing land from the tax base.*

* *Forest Legacy properties can continue to provide outdoor recreation opportunities and forest products*

* *Having these areas identified can help area planners determine growth patterns for the community and future infrastructure and service needs.*

* *Allows future generations to enjoy the social and economic benefits of living and working in areas with a vital forest component. These "quality of life" factors are often important in recruiting high paying / low impact jobs to a community.*

What are the disadvantages to the program?

To the landowner;

* *Permanent commitment to one type of land use for both current and future owners.*

* *May reduce the potential future selling price of the parcel.*

To the Community;

* *The loss of flexibility in future land use planning decisions may be considered by some a disadvantage.*

* *The transfer of development rights to a non-taxed entity may cause a slight decrease in the property tax base, depending on local assessment. This decrease would most likely be offset by the lack of demand for services from undeveloped property.*

Who decides where the Forest Legacy Areas will be located?

Answer: State Forest Stewardship Coordinating Committee. This is a broad based committee of about 50 members who are appointed by the State Forester.

What factors are considered in delineating Forest Legacy Areas?

Answer: Two broad categories of factors are considered;

Natural Resource Values -- Demographic Pressures

Where will the Forest Legacy Areas be established?

Answer: The State Forest Stewardship Coordinating Committee will delineate Forest Legacy Areas in those parts of Indiana where they feel acquisition of development rights will be most effective in protecting threatened forest values. The Forest Legacy Program is in favor of sound, well thought out, development that compliments the maintenance of vital, productive forests.

When will the Forest Legacy Program be implemented?

Answer: The Forest Legacy Area delineations will be completed by June 1998. The Program should receive official federal approval in late 1998. Nomination, by owners, of parcels for entry into the program will begin at that time.

Do I have to let the public use the easement area of my property for recreation?

Answer: No. You still control access to your property. The only required access is for the Division of Forestry for monitoring. However, if you choose to make your property available for public recreation as part of the easement it may raise it's priority for participation in the program depending on the local situation.

Will participation in this program make my property more likely to be targeted for acquisition by the state or federal government for public land?

Answer: No. You will, however still be able to offer the remaining rights to your property for fee simple purchase as public land or private land if you choose, in the future,. Attempts to acquire it as public land for conservation purposes may actually be less likely because it is already serving conservation purposes.

Is there a size limit on the size of parcels that can be in the program?

Answer: Under the Indiana criteria a parcel must be large enough to be sustainable as a forest. This will vary from area to area but would rarely be less than ten acres. Because of their unique values and scarcity in Indiana very large forest ownerships (250 acres or more) may be prioritized higher than smaller parcels with the same qualities.

How much will be paid for the development rights?

The rights will be purchased at fair market value. The rights to be purchased on each easement will be appraised to determine fair market value. In no circumstances can the program pay more than the appraised value of the rights to be purchased. The landowner can choose to donate the rights or sell them at a bargain price which would provide tax benefits. It is also important to remember that development rights may make up a large portion of the total value of a property in areas with high development pressures but a much lesser part of total value in areas with less development pressure.

Can Forest Legacy conservation easement areas be placed in the Classified Forest Program?

Answer: Yes.

Can existing Classified Forest properties be placed in the Forest Legacy Program?

Answer: Yes.

What can I do and what can I not do within an easement area?

Answer: Under most easements acceptable uses include the following: timber harvesting, firewood cutting, gathering (fruits, roots, herbs and mushrooms), hunting, other outdoor recreation (including non-permanent campsites), production of non-timber forest products (maple syrup, vines, etc.)

Under most easements activities not acceptable include: all buildings, fencing (except on the perimeter), grazing, mining or quarrying that requires surface disturbance, trash or refuse disposal.

If I have already sold the mineral or gas/oil rights to my property to someone else can I put the property in the Forest Legacy Program?

Answer: No. Because this would mean that someone else may already own the right to use all or part of the surface for some uses other than forest.

FOREST LEGACY in INDIANA

WHAT: Forest Legacy is a program established by Congress as part of the 1990 Farm Bill with the express purpose of helping landowners, state and local governments and private land trusts identify and protect environmentally important forest lands that are threatended by present and future conversion to non-forest uses.

HOW: The Forest Legacy Program will identify important and threatened forests through an assessment of need process conducted by the Division of Forestry , the State Lead Agency for the program. Protection of threatened forests will be primarily through the acquisition of conservation easements where the developmental rights to forest parcels will be purchased from willing sellers. The rights covered by the easement are purchased and held by the state using federal funding for up to 75% of the purchase price. The owners will retain all the other rights including the right to harvest timber and sell or bequest to anyone the remaining rights.

WHY: The most serious threat to long term sustainable forestry in Indiana is the ever increasing fragmentation and conversion of forests. Forests are being forever lost for residential sites, business sites, roads and other infrastructure without planning or evaluation of alternatives and the long term costs to society. By acquiring only the developmental rights most of the private property values will be maintained, as well as a portion of the tax base, while assuring that the forest will not face conversion to a non-forest use.

WHERE: The State Forest Stewardship Coordinating Committee will delineate Forest Legacy Areas in those parts of Indiana where they feel acquisition of development rights will be most effective in protecting threatened forest values and local support for the program exists. The Forest Legacy Program is not in opposition to sound well thought out economic development but wishes to complement it with the maintenance of vital, productive forests.

WHEN: The assessment of need for the Legacy Program which is an evaluation of the status of Indiana's forests is being conducted now and is scheduled for completion by June, 1998. If that assessment shows the need for such a program in Indiana then the Division of Forestry will start accepting nominations for parcels from within the designated Forest Legacy Areas to purchase the developmental rights.

For further information:

Ben Hubbard, Forest Legacy Coordinator
Division of Forestry
402 W. Washington St. Rm. W296
Indianapolis, IN 46204
(317) 232-4114

FOREST LEGACY OPEN HOUSES
WRITTEN COMMENTS

Evansville Open House, April 1, 1998
Six (6) individuals registered

-- Excellent idea - program for willing landowners to see their woods preserved the way they want after they are gone. Should look for/encourage opportunities where landowner is willing to donate the 25% match himself.

Versailles Open House, April 2, 1998
five (5) individuals registered

-- There were no written comments -- all verbal comments were supportive of the program

Corydon Open House, April 4, 1998
fourteen (14) individuals registered

-- Gas rights that have been sold should be considered into the Legacy program. Leases sold are intended for production/profit under the ground, not to effect environment issues above the ground.

-- Bravo! I think this program will be valuable to the entire nation, as well as the communities and individuals directly involved. I'm glad to hear that waterways will have focused attention. Please look at the needs along Buck Creek in Harrison Co. Development south of Lanesville is beginning to press in on the upper reaches of that system. Good luck in your work.

-- I think the Blue River Basin, Area B, should be extended west all the way to Hoosier National Forest.

-- Harrison County Fund (Casino and other money) may be a match source for Legacy

Sellersburg Open House, April 4, 1998
eleven (11) individuals registered

-- Silver Creek and its tributaries drain 219 sq miles of Clark/Floyd Counties. Its banks include some existing forested areas, agriculture, and residential development.. (and three golf courses.) Developing riparian buffers along this stream would greatly improve water quality and provide a linear habitat. Some of this land should be cheap, due to floodplain and limited access.

--I have 117+ acres of classified forest in Owen Twp., Clark Co. that I wish to conserve in some way. Picturesque, rugged with Bull Creek running through the property. Valley with rock out croppings and overhangs. a great deal of wildlife -coon, deer, turkey etc.

-- This is a great idea!!

Ft. Wayne Open House, April 6, 1998
five (5) individuals registered

-- Expand Forest Legacy Area to north into DeKalb and Noble Counties and west into Whitley County. Suggested new boundaries would be south of Rte 6, East of Rte 9 and North of Rte 14 plus all of Allen County.

-- I am pleased to hear about the possible availability of conservation easement/purchase of development rights in Allen county. there is growing concern here that valuable resources are being lost to urban sprawl. It's encouraging that there may be some economically viable options available to landowners in the path of development.

-- This seems like an excellent program. Please keep me informed of further developments.

-- We would like to see this program expanded. I would like to see forest left for my children and theirs. And keep the developments closer to the city.

-- This is a fantastic program. We definitely need programs like this to save what natural forests we have left. Allen County is developing so fast that something has to be done soon.

Chesterton Open House, April 7, 1998
seventeen (17) individuals registered

-- I am the owner of a Classified forest in LaPorte county and I thoroughly endorse this Forest Legacy Program. I believe that Hwy 2 as a southern boundary is basically acceptable, except that it should shift southward to include the lands north of Hwy 4, from LaPorte eastward. I believe that all forests in the program area need to be eligible, but those forests on the high, dry Valparaiso Moraine must be targeted first, because they are most endangered and existence has a profound, positive influence for Laporte and Porter Counties. The LaPorte county Natural Resources League, Inc.(LPCNRL) would be delighted to work with the DNR on this program. I would also suggest that within each program area a "forest Cooperative" be formed, which both creates a sense of unity and maintains communications among forest owners therein.

-- LaPorte County has valuable forested areas to the south and east of the present boundary of State Road 2. Moving that boundary south to State Road 4 would include these "Haverstock Woods" and the woods north of Fish Lake. "Haverstock Woods" was included in the 1979 DNR Natural Areas survey and includes a relatively large acreage of botanically high quality growth. The wooded area north of Fish Lake adjoins/includes TNC wetlands of exceptional value. Other LaPorte county forested areas along 900N and 1000N also are very important! The LaPorte County Natural Resources League, Inc. is a qualified land trust anxious to cooperate. Development pressures in the area are enormous.

-- Gregory M. Quartucci, Natural resource Analyst for Northern Indiana Public Service Company was verbally very supportive of the program and expressed his companies interest in being involved as the program progresses.

Bloomington Open House, April 9, 1998
seventeen (17) individuals registered

-- I would like to see the DNR encourage forest legacy participants to include in the easement contract the exclusion of all timber harvesting on the land. I would like to see the state legislature create a state forest legacy program. Lobby them to the fullest extent. Encourage legacy participants to allow public access to the land.

-- Two primary suggestions for FLP: 1) Include a fisheries and wildlife biologist (one each) on the committee that selects the Forest Legacy Areas. 2) Involve the district fisheries and wildlife biologists in the prioritization of parcels within FLP areas to help achieve greatest watershed protection. These people have on-the-ground knowledge not available elsewhere.

-- The Forest Legacy Program is a wonderful idea. I am at first hesitant about the continuation of timber harvest on these forest, but accept that when done wisely. this practice may not harm the integrity of the forest. I would also ask that these lands not be subject to eminent domain (wishful thinking). I hope that state and federal governments will continue to strengthen programs like this with both funding and education. thank you. Please send me updated information about the program as it becomes available.

-- Also included in the comments box were two maps suggesting that the area needs to be expanded further north into Morgan and Owen County.

Columbus Open House, April 9, 1998
nine (9) individuals registered

-- Please consider the Forest Legacy Program in the area north of Martinsville. Many forested areas are being developed for commuter homes.

-- Make sure easement is recorded on both state easement and landowner deed.

-- Do not go to any type of bid process instead of application process for prioritizing parcels if the opportunity presents itself. The disadvantages outweigh the advantages.

ADDITIONAL LETTERS AND COMMENTS

Counties Containing a Forest Legacy Area

County	FLA	Commissioners	Date	Remarks
Allen	Maumee	**Linda Bloom**, Jack McComb,Edsin Rousseau	6/30/98	N/A
Bartholomew	Shaw.	**Larry Kleinhenz,** Byron Carr, Paul Franke	6/30/98	N/A
Brown	Shaw.	**James Crane**, Randy Snyder, James Gredy	7/1/98	Has not seen AON, requested info. I FAXed Q/A, map of his FLA, and brochure. Told him to call if ??/concerns.
Clark	BlueRvr	**M. Edward Meyer**, Paul Garrett, Ralph Guthrie	6/30/98	
Crawford	BlueRvr	**David Sillings**, Curtis Tucker, Glenn Crecelius	6/30/98	Main concern is how this compares to Class. For. Doesn't like CF, but doesn't know much abt it. Requested infc, I sent the CF pamphlet w/note to call D.Ernst if ?? No further ?? on For. Leg. but just found AON on desk.
Dearborn	B-grass	**Craig Beckley**, John Kyle, Mark Dole	7/1/98	Good ??, motivation, effects, home-building, etc. Said Dearborn is 2rd fastest growing cty in IN. Said they will discuss and get back with me is needed.
DeKalb	Maumee	**William C. Ort**, Don Kaufman, Connie Miles (Mary Bowman, sec)	6/30/98	N/A
Floyd	BlueRvr	**Larry Denison**, Jerol Miller, Michael Schindler	7/6/98	Talked w/Beverly Smith, PlanComm. She is in the midst of Comp Lnd Use Plan, and felt that FLP complements their efforts. Suggested we talk w/Koetter (told her Sam Smith had been involved in early mtg. She said they need to save the knobs, and don't want houses hanging over the edge. Very positive discussion.
Franklin	B-grass	**Louis Linkel**, Robert Brack, Thomas Wilson	6/30/98	Prelim. discussed.
Greene	Shaw.	**William Sipes**, Tom Britton, Thomas Bailey (Sue McDonald, sec)	6/30/98	N/A
Harrison	BlueRvr	**Steve Haggard**, Terry Miller, Ed Emily	7/6/98	Spoke @ Co. Comm. mtg, on invite by S.Haggard. Good ?? abt fair mkt value, CF, Cons.Esmts, etc. Positive feedbk, and asked what they might need to do to endorse the progrm, Told them they could write a ltr of support, but not requrd. They mentioned Rvr Bt, and need to hedge against development.
Jackson	Shaw.	**Jack Gilbert**, Gary Darlage, John Schafstall	6/30/98	N/A
Johnson	Shaw.	**Joseph E. DeHart**, Alfred T. Chappel MD, William F. Walker	7/1/98	N/A
LaPorte	NWMor	**Clay Turner**, Jim Kruse, Bud Kintzele	7/1/98	Talked to Tim Morgan, Superintendent of Parks and Recreaiton. Said he had reviewed the AON in depth, and FAXed to me a letter he sent to the Co. Comm. recommending the FLP in LaPorte County. Letter on file.
Lawrence	Shaw.	**Eace Roberts**, Tim Terry, Janie Shenault	6/30/98	N/A
Monroe	Shaw.	**Norman Anderson**, Kirk White, Iris Kiesling	7/1/98	N/A
Morgan	Shaw.	**James Bowyer**, Tommy Joe Goss, Marvin Mason	6/30/98	N/A

Counties Containing a Forest Legacy Area

County	FLA	Commissioners	Date	Remarks
Noble	Maumee	**Harold Troyer**, Richard Winebrenner, Mark Pankop	7/1/98	N/A
Ohio	B-grass	**Bill Marksberry**, Connie Brown, Michael Hayes	6/30/98	Hadn't seen yet. Will call if they have ??. No concerns at this time.
Owen	Shaw.	**Dale Dubois**, Nick Robertson, Lowell Simpson	7/1/98	N/A
Porter	NWMor	**Brian Gesse**, Jim Biggs, Vacant	6/30/98	N/A
Posey	SWBtm	**Greg Martin**, William Elpers, Randal Thornburg	7/1/98	Auditor said rec'ved AON. Will discuss @ tomorrow's mtg.. Left msg on Martin's voice-mail.
Putnam	Shaw.	**Donald Walton**, Dennis O'Hair, Gene McFarland	7/1/98	Hadn't seen AON yet, but will review tomorrow. Have been cleaning up downed trees thru-out cty (looks like a hurricane went thru in some parts. Will call me if ??.
Ripley	B-grass	**Donald Dunbar**, George Ammerman, John Little	7/1/98	N/A
Scott	Shaw.	**Billy Comer**, Carl Stout, Larry Blevins	7/1/98	N/A
Vanderburgh	SWBtm	**Bettye Lou Jerrel**, Richard Mourdock, Pat Tuley	7/6/98	Talked w/Ms. Jerrel. Many ?? abt signif. of the forest land in her cty. Requested list of attendees at the Evsvl open house[Ben to FAX]. Wanted to know about funding (fed. prgm) We reviewed the twps w/h gh forest, and bottomlnd forest. Said would discuss w/other comms.
Warrick	SWBtm	**David Rector**, Larry Barr, Jack Pike	7/1/98	N/A
Washington	BlueRvr	**Joseph Bundy**, Dale MCKinley, Kevin Stewart	7/1/98	N/A
Whitley	Maumee	**James Argerbright**, James Pettigrew, Joseph Redman	7/1/98	He lives on SE edge of FLA. Receiving a tremendous amt of pressure. Had not seen AON yet. I told him to call me if ??.

Total = 29 counties

Ben Hubbard
Division of Forestry

Bruce Evans
9683 S. Lakeshore Dr.
Huntingburg, IN 47542

March 20, 1998

Re: Forest Legacy

Dear Bruce,

I'm writing as a follow-up to our conversations about the Forest Legacy program. I told you that I would get back with you once the Legacy Subcommittee identified potential Forest Legacy Areas. I've enclosed a map showing the location of the proposed areas along with a news release announcing open house sessions in each area to hear what the local folks have to say about the program. As you can see from the map it appears to me that the only area that contains significant coal resources is the area around Evansville.

In our discussion about how the program might impact the coal industry you raised some questions. Let me begin by clarifying a couple of items we discussed:

1) A property on which the mineral rights belong to someone other than the owner of the surface rights the property will not be considered eligible for the program in Indiana. Each property considered for a conservation easement will undergo a title search to assure title is free and unencumbered or that title insurance is secured for the full value of the encumbered property. This should prevent a surface only owner from entering the program.

2) In the situation where the same individual owns both the surface and the minerals and is interested in participating in the program they will be informed that they will be unable to extract the minerals by any means that requires surface disturbance. They can then choose to keep the minerals under those restrictions or include the control of the mineral rights along with the development rights as part of the easement which would probably make the value of the rights prohibitively high for this program in all but the most unusual circumstances.

If you have further questions I would be happy to discuss them with you either at the Evansville open house on April 1 or in a separate meeting sometime after I get through all these open house meetings. Let me know what you think.

Sincerely,

Ben Hubbard

J. Nathan Noland, President

OFFICE (317) 638-6997
FAX (317) 638-7031

INDIANA COAL COUNCIL, INC.

701 HARRISON BLDG. - 143 W. MARKET ST.
INDIANAPOLIS, INDIANA 46204

April 15, 1998

Mr. Ben Hubbard
Division of Forestry
402 W. Washington St., Rm. W296
Indianapolis, IN 46204

Re: Forest Legacy

Dear Mr. Hubbard:

Mr. Bruce Evans from Black Beauty Coal Company recently shared a copy of your March 20, 1998 letter with members of the Indiana Coal Council, Inc. ("ICC") Regulatory Committee.

The ICC would like to make some initial comments on issues discussed in your March 20, 1998 letter. We certainly agree with the DNR position enumerated in paragraph 1. However this is really not inconsistent with Indiana real property law in that it is very questionable whether a subsequently granted easement from a surface owner could restrict the rights granted in a previous lease or sale of mineral interests.

We would disagree and oppose the position enumerated in paragraph 2. Future development of any minerals should not be prohibited by a conservation easement. Future societies will depend on valuable minerals and current surface owners should not be given the right to restrict future mineral development beyond a reasonable period of time. Easements should not become the dominant property right and all other sub-surface uses servient thereto.

Underground mineral extraction should absolutely be permitted in the granting of any forestry conservation easement. Surface extraction of minerals should also not be restricted where the surface can be reclaimed in a forest post-extraction land use. This approach is consistent with the federal Surface Mining Control and Reclamation Act of 1977 where in Section 102 it states, "assure that the coal supply essential to the Nation's energy requirements, and to its economic and social well-being is provided and strike a balance between protection of the environment and agricultural productivity and the Nation's need for coal as an essential source of energy". A requirement to mandate a post-mining land use of forestry where a conservation easement has been granted is the balance that we think the federal government intended.

We encourage DNR to notice this new program proposal in the Indiana Register and schedule additional public meetings for interested parties. Local government, agricultural interests, non-coal mineral interests, manufacturing and other groups will all be affected by the current proposal.

At a minimum the ICC would like to meet with DNR to discuss potential options to the position enumerated in paragraph 2.

Sincerely yours,

J. Nathan Noland

cc: Larry Macklin
William F. Stuart

INDIANA DEPARTMENT OF NATURAL RESOURCES

LARRY D. MACKLIN, DIRECTOR

Division of Forestry
402 W. Washington St., Rm. W296
Indianapolis, Indiana 46204
317-232-4105

Ben Hubbard
Forest Legacy Coordinator
Division of Forestry

J. Nathan Noland, President
Indiana Coal Council, Inc.
701 Harrison Bldg.
143 W. Market St.
Indianapolis, IN 46204

April 27,1998

Re: Forest Legacy

Dear Mr. Noland:

Thank you for your comments regarding the Indiana Coal Council's concerns about the Forest Legacy Program in Indiana.

The positions I stated in my letter to Mr. Evans (see attachment 1)are based on stipulations set forth as national guidelines by the United States Department of Agriculture, Forest Service which oversees the Forest Legacy Program (see attachment 2). I will be in contact with the United States Forest Service and the State Forest Stewardship Coordinating Committee (Indiana oversight entity) in the very near future to specifically discuss your concerns and determine the potential level of flexibility in regard to surface mining. I will contact you after I have received this clarification and we can discuss potential options at that time.

Your comments will also be included, along with other comments, in the Assessment of Need Document which is currently under development for the Forest Legacy Program in Indiana. This document will be used by the Secretary of Agriculture in authorizing the Forest Legacy Program at the state level.

Thank you again for your interest and I will be in contact with you again in the near future.

Sincerely,

Ben Hubbard

D-12D

Ben Hubbard, Forest Legacy Coordinator
Division of Forestry

J. Nathan Noland
Indiana Coal Council, Inc.
701 Harrison Bldg.
143 W. Market St.
Indianapolis, IN 46204

May 26, 1998

Re: Indiana Forest Legacy Program

Dear Mr. Noland;

As I promised in my letter of April 27, 1998 I discussed the Indiana Coal Council's concerns about the Forest Legacy Program with the USDA Forest Service, Northeast Area Forest Legacy Coordinator, Deirdre Raimo and with the Indiana Forest Legacy Subcommittee.

Let me begin by addressing the scale and scope of the Forest Legacy Program to try and put these issues into a statewide perspective. On the national scale the Forest Legacy Program has been funded by Congress at an annual level of between two million and ten million dollars total for all 14 states participating. This translates to a very limited amount of money to each state to purchase conservation easements, which further means that many more parcels will probably be nominated than will have easements purchased. A parcel which would require a large investment to acquire mineral rights would have to be very limited in size and of outstanding natural resource values to be prioritized very highly for the Forest Legacy Program. In Indiana, potential for the program to impact the coal industry is further reduced because conservation easements for this program may only be purchased within designated Forest Legacy Areas (see attached map). To the best of my knowledge only a portion of the southwest Bottomland Area in Warrick, Vanderburg and Posey Counties and possibly a small portion of the western edge of the Shawnee Hills Area in Greene County are in the coal producing portion of Indiana. It is also important to remember that the proposed guidelines do allow for the recovery of coal under conservation easement lands, they only limit surface disturbance (total non-forest use cannot exceed 10% of the easement area).

It is the Subcommittee's position that because the program is completely voluntary a current landowner's decision to permanently extinguish the surface coal mining rights by selling a conservation easement was not significantly different than the landowner deciding to similarly extinguish those rights by selling the development rights to the surface for a long term, capital intensive development such as a manufacturing plant.

In discussing your suggestion of a post mining land use of forestry for easement areas the subcommittee's feeling was that many of the forest values that would make a piece a high priority for the program might be permanently lost or would take a very long time to recover if the area was surface mined. Again it is the landowners decision as to how much of the ownership upon which he/she is willing to forego the forest values for the higher return of surface mining and vice versa.

In summary, be assured that the Forest Legacy Subcommittee and the Division of Forestry are also committed to a balance between resource protection and economic development. Based on the goals of the Forest Legacy Program and what appears to be a very limited potential for impact on Indiana's important coal industry the Subcommittee felt that the guidelines allowing for subsurface mining and up to 10% surface disturbance remain appropriate for this voluntary program in Indiana and provide the necessary balance.

Public open house meetings were held in each Forest Legacy Area . All of the comments received were positive toward the establishment of the program.

If you still feel there would be an advantage to face to face discussions on this program we would be happy to sit down with you and discuss it further. Also, if there is additional specific information about the program that you feel would allay some of your concerns please let me know.

Sincerely,

Ben Hubbard, Forest Legacy Coordinator

cc Larry Macklin, Bill Stuart, Jack Costello, Burney Fischer

LETTERS OF SUPPORT

LaPorte County Parks

☐ *Administrative Offices:*
LaPorte County Parks and Recreation Department
County Complex - 3rd Level
Courthouse Square
LaPorte, IN 46350
(219) 326-6808 Ext. 223
(219) 873-7014 Ext. 223
FAX: (219) 326-5615

☐ *Nature Center*
Luhr County Park
3178 S. County Road 150 W.
LaPorte, IN 46350
(219) 324-5855
(TTY/TDD/VOICE)

☐ *Maintenance Facility*
Luhr County Park
3178 S. County Road 150 W.
LaPorte, IN 46350
(219) 326-0524

July 2nd, 1998

Clay Turner, County Commissioner
County Courthouse

Dear Honorable Commissioners,

Thank you for sharing with me the information concerning the Forest Legacy Program. This is the first I had heard of it. I looked through the entire document and highlighted areas that may be most beneficial for your review. Overall it seems to be a very sound document with very positive support! I would add that this program seems to be in order with other similar state conservation programs like that of Classified Forest and Classified Wildlife Habitat programs. Both of these programs are in effect at Luhr County Park. We also plan to utilize both of these wildlife management programs at the Bluhm property upon its development.

My assessment of the Forest Legacy Program is a positive one. It has merit to help preserve forests for generations of Hoosiers to come. Should the opportunity present itself concerning the possibility to enter into an agreement for one of the County Parks, I would feel confident that the Park Board would consider this program.

I spoke briefly with Theresa Wojkovich, District Conservationist for the LaPorte County Soil and Water Conservation offices, concerning this document. I think it would be wise to consult her on this issue as well. Especially since the 1990 Farm Bill is were this program came from.

Please feel free to contact me if you should have any additional questions or concerns.
Thank You!

Sincerely,

Timothy E. Morgan
Superintendent
LaPorte County Parks

MONROE COUNTY PLANNING DEPARTMENT
and the offices of
MONROE COUNTY PLAN COMMISSION
BOARD OF ZONING APPEALS

Courthouse Room 306, Bloomington, IN 47404 Telephone: 812/349-2560 Facsimile: 812/349-2837

July 1, 1998

Ben Hubbard
Indiana Forest Legacy Coordinator
Division of Forestry
402 W. Washington St., Rm. W296
Indianapolis, IN 46204

Dear Mr. Hubbard:

We recently received your letter regarding the Forestry Legacy Program, and are pleased that the State of Indiana has taken initiative in preserving one of Indiana's most important resources. As you know, the City of Bloomington and Monroe County have long been admired for scenic beauty and we recognize that continued deforestation is cause for concern. The environmental, aesthetic, and economic benefits we derive from quality hardwood forest are significant and we support your efforts to promote wise use and conservation.

We also agree that the use of voluntary conservation easements can be "win-win". Your approach seems to respect the rights of property owners, while facilitating and advocating the wise use of a sensitive and valuable resource. If your program succeeds in Monroe County, please provide us with the location(s) of the easement(s) that you establish. We would like to add this information to our own database; land use restrictions cannot be enforced if we are not aware of them.

We wish you success with the program, and please contact us if we can be of help.

Sincerely,

David Hall, Interim Director
Monroe County Planning Department

The Monroe County Commissioners

Norm Anderson

Kirk White

Iris Kiesling

1002 East Washington Street
Suite 300
Indianapolis, Indiana 46202
(317) 685-8800
Fax (317) 686-4794

July 8, 1998

Hoosier Environmental Council

Burnell Fischer
State Forester
Indiana Department of Natural Resources
402 W. Washington St.
Indianapolis, IN 46204

Dear Burney:

The Hoosier Environmental Council wishes to express its enthusiastic support for Indiana's participation in the Forest Legacy Program. We have reviewed the Assessment of Need, and find that it fully presents the case for implementation of this important program in our state.

Indiana's forestlands constitute an essential component of our state's biological diversity, supporting hundreds of species of plants and animals including many of our most imperiled species. Our forests' contribution to environmental quality is well documented, protecting our waters, soils, and air. They provide the setting for a substantial part of the outdoor recreation that occurs in Indiana. With most of our forestlands in private ownership, public forests alone cannot provide the necessary opportunities to protect and restore these biological resources.

Because our private forests represent nearly nine-tenths of the timberlands available for use by Indiana's forest products industry, for this industry to be assured of a dependable supply in the future, the state should encourage the protection of these private forests from the variety of factors causing their conversion to non-forest uses. We believe the Forest Legacy will be an important part of a state policy to protect forest lands as well as other rural lands and open space.

We look forward to the successful implementation of the Forest Legacy Program in Indiana.

Sincerely,

Tim Maloney
Natural Heritage Director

cc: Governor Frank O'Bannon
Secretary of Agriculture Dan Glickman
Senator Richard Lugar

Learning
Opportunity
Collaboration
Accountability
Leadership
RESPONSIBILITY

Indiana Association of Soil and Water Conservation Districts, Inc.

Burnell C. Fischer
State Forester
IDNR
402 W. Washington Street
Indianapolis, IN 46204

June 19, 1998

Dear Mr. Fischer:

The Indiana Association of Soil and Water Conservation Districts fully supports the Forest Legacy Plan proposal for Indiana.

The conservation of forested land prevents soil erosion, protects water and air quality, and provides wildlife habitat. Indiana's soil and water conservation districts need a wide variety of tools to address conservation on private lands; the Forest Legacy Program is an excellent opportunity for landowners to participate in voluntary conservation.

We implore the Secretary of Agriculture to renew this program, for the benefit of Indiana forest owners and the citizens of Indiana.

Sincerely,

Garry Tom

Garry Tom
President

225 South East Street, Suite 740; Indianapolis, IN 46202
317/692-7374 • 317/692-7363 FAX

INDIANA FORESTRY and WOODLAND OWNERS ASSOCIATION

5578 S - 500 W - Atlanta, Indiana 46031-9363

4 June 1998

Mr. Burnell C. Fischer
State Forester
Indiana Dept. of Natural Resources
402 West Washington Street
Indianapolis, IN 46204

Dear Mr. Fischer:

This letter is written to express our support for the Forestry Legacy Program created in the 1990 Farm Bill and administered by the USDA Forest Service. The Forest Legacy Program offers the opportunity for landowners in designated Forestry Legacy areas to voluntarily protect, manage, and restore their forested lands.

Lands enrolled under this program will provide many natural resource benefits including but not limited to erosion control, wildlife habitat, clean water, and carbon storage. Considering the economic impact the wood-using industries of Indiana have on the State, the Forest Legacy Program in combination with other Federal and State cost-share incentive programs will be very beneficial to the people of Indiana and our natural resources. This program offers a reasonable means of responding to this need and is equally fair to the landowner and resident citizen alike by acquiring the desired rights for the community while retaining ownership in the individual owner.

IFWOA earnestly believes that owners of private woodlands in the State can, with this program, continue to employ sensible long term management practices that will benefit the entire State.

Sincerely,

William A. Sigman, Secretary

cc: Mr. Warren Baird

IHLA

INDIANA HARDWOOD LUMBERMEN'S ASSOCIATION, INC.

"Working to ensure a sustainable, affordable supply of quality North American hardwoods for the public good."

3600 Woodview Trace
Suite 305
Indianapolis, IN 46268
(800) 640-4452
(317) 875-3660
Fax (317) 875-3661
E-mail: IHLA@aol.com

July 16, 1998

Burnell Fischer
State Forester
IDNR
402 West Washington St.
Indianapolis, IN 46204

Dear Dr. Fischer,

On behalf of the Indiana Hardwood Lumbermen's Association (IHLA), the Board of Directors voted unanimously at a recent meeting to offer our endorsement for Indiana to become a participant in the Forest Legacy Program.

From this industry's perspective, the program offers all the positive opportunities available to respect private property rights, while encouraging preservation of our valuable Forest Resource in Indiana.

If Indiana is to continue as a leading producer of quality hardwoods in the central hardwood region, it is imperative to find programs like Forest Legacy to address the urban sprawl issues that face our state.

We view the Forest Legacy Program as an important tool to curtail this loss of woodland and strongly support any measure to fund and implement this project.

Sincerely,

Dave Bramlage
IHLA President

Vicki Carson
Executive Director

Vicki L. Carson, *Executive Director*

John R. Seifert, Editor * P.O. Box 216 * Butlerville, IN 47223 * 812/458-6978 * Fax 458-6979

May 26, 1998

Burnell C Fischer
State Forester
IDNR
402 West Washington St.
Indianapolis, IN 46204

Dear Mr. Fischer

I write to you on behalf of the Woodland Steward Institute to express our support for the Forestry Legacy Program created in the 1990 Farm Bill and administered by the USDA Forest Service. The Forest Legacy Program offers the opportunity for landowners in designated Forestry Legacy areas to voluntarily protect, manage, and restore their forested lands.

The Woodland Steward Institute is a consortium of organizations representing landowners, government agencies, timber industries, and natural resource professionals. Our primary purpose is to disseminate information about forest and land stewardship to woodland owners and the general public. We publish a quarterly newsletter with a circulation of 30,000 that addresses the importance of Indiana's vibrant forest resources and its contribution to our economy, environment, and quality of life.

As a conservation organization, we are also concerned with the conversion of our woodlands to other land uses. Throughout our State's history there has been a steady loss of forest cover from a pre-settlement level of ninety percent to the current level of about ten percent. The Forest Legacy Program could be an important tool to curtail this loss of woodland and we strongly support any measure to fund and implement this project.

Sincerely,
Fred Hadley
Fred Hadley
President, Woodland Steward Institute

A Publication of the Woodland Steward Institute, Inc.

FORSZT, PAWLOWSKI & SMITH

SUITE 2A
390 WEST U.S. HIGHWAY 6
VALPARAISO, INDIANA 46385
TELEPHONE (219) 762-0000
FACSIMILE (219) 763-0002

ATTORNEYS AT LAW

ROBERT P. FORSZT
DAVID R. PAWLOWSKI
JEFFREY H. SMITH

June 15, 1998

Mr. Ben Hubbard
Forest Legacy Coordinator
Division of Forestry
402 West Washington Street, Rm. W296
Indianapolis, IN 46204

Dear Mr. Hubbard:

I am writing to register my support for instituting a Forest Legacy Program in Indiana as proposed for Porter and Laporte Counties. It is my understanding that through this program the State would purchase conservation easements from landowners for the purpose of preserving our local wooded areas. As a Jackson Township, Porter County resident for approximately twenty years, I see the Forest Legacy Program as an effective way to assist local landowners in their desire to limit development and maintain the morainal forests which are unique to this area.

Thank you very much for your consideration of the above. Please place me on any mailing list which is relevant to this program.

Very truly yours,

ROBERT P. FORSZT

RPF:ao

September 23, 1998

Ben Hubbard
Department of Natural Resources
Division of Forestry
402 N. Washington St., Rm 296
Indianapolis, IN 46204

Dear Mr. Hubbard,

Thank you very much for the draft copy of the Indiana Forest Legacy, Assessment of Need. I just received it and can't wait to begin reading what clearly appears to be a very thorough, scholarly and convincing report. I would be very proud of this work if I were you.

The Forest Legacy program is an important step toward protecting Indiana's remaining forest ecosystems, and I hope, fostering the restoration of degraded forest areas to their original character as much as possible, for the benefit future generations. We may differ in our feelings about the value and wisdom of current forest "management" practices, but I know we share the strong desire to see the Forest Legacy, and similar preservation and stewardship programs for natural areas, become wildly successful throughout the state and nation.

Sincerely yours,

Keith Mulholland
9249 Gleannloch Dr.
Indianapolis IN 46256

(w) 317-274-4141
(h) 317-842-0181
(fax) 317-278-1072

email: gmulholl@iupui.edu

April 26, 1998

Mr. Ben Hubbard
Forest Legacy Coordinator
Division of Forestry
402 W. Washington St.
Room W296
Indianapolis, IN 46204

Dear Mr. Hubbard:

This letter is written in support of the inclusion of Porter and LaPorte counties into the federally funded Forest Legacy Program. With the rapid development taking place in these counties it is extremely important to retain some of the natural characteristics that have drawn people to them in the first place. This program, we understand, provides for the continuation of sustainable forest cover on lands for which owners sell conservation easements. It appears to be an excellent way to provide for the long term future of these counties. We hope you will act to include these counties in the program.

Sincerely yours,

Edward J. Olsen

Lorain S. Olsen

Edward J. Olsen
Lorain S. Olsen
24 Summit Drive
Porter County
Chesterton, IN 46304-1024

Mr. Ben Hubbard
Forest Legacy Coordinator
Division of Forestry
402 W. Washington St.
Indianapolis, In.

May 4, 1998

Dear Mr. Hubbard,

After reading an article in our local newspaper (Chesteron Tribune) I immediately hoped I could offer some names to support your plan to save forests.

It seems that far too many people take our environment for granted, not realizing it is being fouled and that our very well being depends on it. I have seen destruction of open land areas developed all over our country and it has concerned me deeply. I have a son who became a environmental engineer and hopefully because of my feelings and his own.

I gave this plan an announcement at our church service and approached people after the service and also gave an annoucement at our local Woman's Club and asked for signatures. Now and then I still encountered individuals who wil not see the light. Our wildlife have lost habitat and I see them laying dead on the roads and know it is because tthey have so little space left in which to live. Truly I hope your plan goes into effect.....wishing this and you all the very best.

Most Sincerely,

Gloria Rector

Gloria Rector
830 S. Fifth St.
Chesterton, In. 46304

[Sixty-seven people signed the following statement enclosed with this letter. "The undersigned hereby support the plan to preserve forested lands in Porter and LaPorte counties." Their signatures are on file at the IDNR Division of Forestry office in Indianapolis, Indiana.]

CHESTERTON TRIBUNE, 4/16/98

Residents urged to write in support of preserving north county forests

By BOB KASARDA

Among the recommendations made in a land use plan completed last year for Porter County is the preservation of wooded areas.

Chesterton Town Council member Gina Darnell, R-5th, has found one way for the county to reach that goal and on Monday, called on the public to help make it possible.

Letters of support are needed to encourage the Indiana Department of Natural Resources to include a large section of Porter and LaPorte counties into the federally-funded Forest Legacy program, said Darnell.

The land north of Ind. 2 is one of seven areas throughout the state that are being eyed for the program, which protects wooded areas through the voluntary purchase of conservation easements, said Forest Legacy Coordinator Ben Hubbard.

"I'd really like folks to lobby for it," said Darnell, who became aware of the program during an open house last weeks at the Indiana Dunes State Park. "We'd be crazy not to take advantage of this."

In agreeing to sell off a conservation easement, Hubbard said that landowners retain ownership of their property, yet agree that it will never be developed.

It has to remain a forest," he said. The land can still be used for recreational purposes, he said, and even for timber production as long as it is done in manner that assures the sustainability of the forest.

The program is designed to try to help landowners keep forested areas forests," he said.

The program is funded through the 1990 Farm Bill, Hubbard said, and the federal funds cover 75 percent of the fair market price of the land. This means that the landowner either agrees to sell at a reduce price or another interest steps in to make up the balance of the purchase price. There are currently no state dollars set aside to support the effort.

The program can only be utilized in areas designated by the DNR as having significant wooded areas that are at particular risk to being lost to development, Hubbard said. The seven areas around the state are being evaluated by a committee made up of representatives from the DNR, farming and logging interests, and the environmental groups.

The local area, which falls north of Ind. 2, takes in all but a tiny southeastern section of the Duneland area and includes the northern section of LaPorte County, he said. The land contains montainal forests that are unique to Indiana and yet at risk by the high rate of development underway in the area.

The response to the seven targeted areas around the state has been positive, Hubbard said, and a recommendation as to which ones should be included in the program is expected in June. At least part of that decision will hinge on the response from the public, he said in support of Darnell's call for letters of support from area residents.

Letters supporting the inclusion of the local area into the program should be addressed to Ben Hubbard, Forest Legacy Coordinator, Division of Forestry, 402 W. Washington St., Rm. W296, Indianapolis, IN, 46204.

It would also help to express support for the program to federal and state representatives, he said.

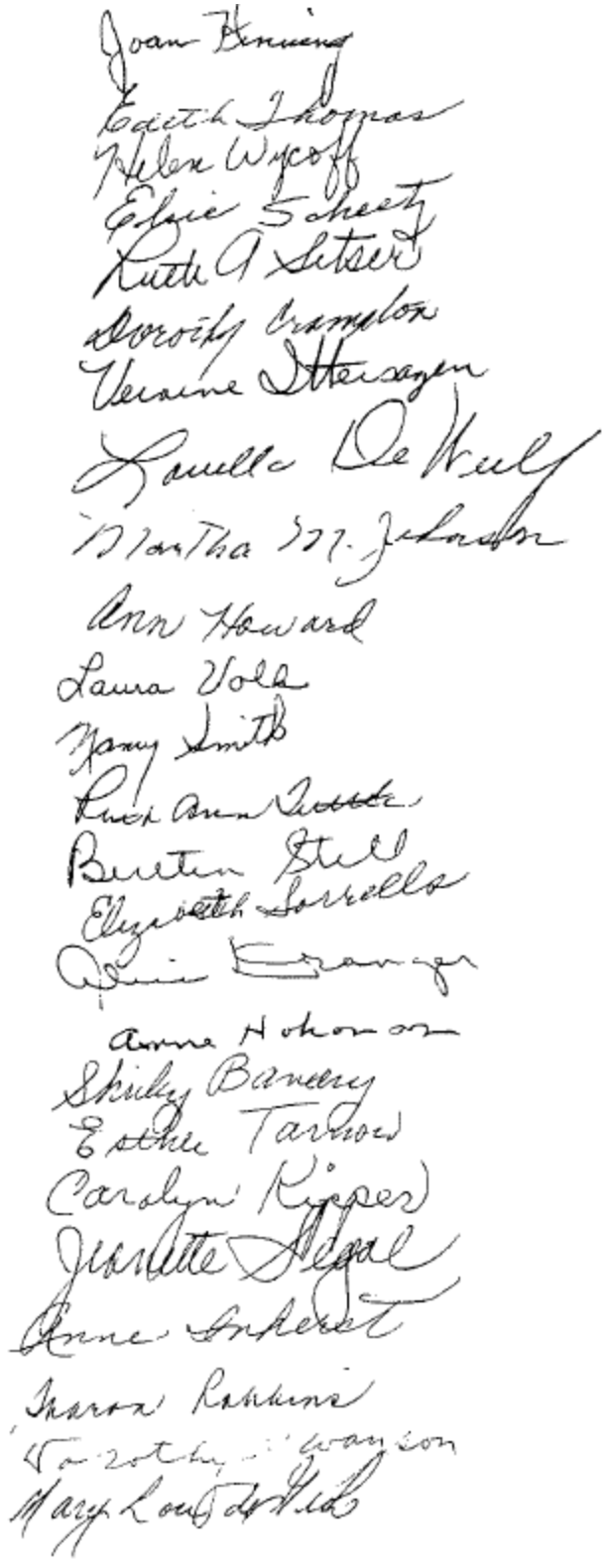
If all goes as planned, he said that interested landowners should be able to begin applying for consideration into the program around the beginning of 1999.

Mr. Ben Hubbard
Forest Legacy Coordinator
Division of Forestry
402 W. Washington St/ Rm. W296
Indianapolis, Indiana 46204

I, THE UNDERSIGNED, HEREBY SUPPORT THE PLAN TO PRESERVE FORESTED LANDS IN PORTER & LAPORTE COUNTIES.

Donna Beth Hammond
Anna Laura Doane
Noreen Hokanson
[illegible] Cloud
Bob Elmore
[illegible] H. [illegible]
Sylvia J. T. Rhine
Bob Monach
Jim [illegible]
Warren Cartright
Ada Hoffmaster
Mae Brooks
Lee Baughman
Pearl Case
Mary Russell
Helen Kelly
Judy Rosso
Dolores Sivan
Marie Ameling
Ruby Miller

Beulah Kimberlin
Virginia Baudouine
[illegible]
Betty Carlson
Betty B.
Florence Baudouine
Kenneth E. Keller
Carl McWilliams
Charles Baudouine
Frances L. Meyer
H. H. Meyer
Carolyn Madey
Eda Clark
Sue Keiser
Robert M. [illegible]
Joanne Boyer
Gloria J. Rector
Walter L. Rector
Dorothy Proffitt
Bonnie Taylor
Daisy Wuletich
Lois Franson
Betty Woodruff



NEWS RELEASE

Senator Dick Lugar

U.S. Senator for Indiana

Contact: Andy Fisher or Tiffany Steele 202-224-4814 *Date: 12/11/98*

LUGAR PROGRAM TO HELP CONSERVE INDIANA FOREST LANDS
Senator Announces Indiana's Participation in Forest Legacy Program

INDIANAPOLIS -- U.S. Sen. Dick Lugar, Chairman of the Senate Committee on Agriculture, Nutrition and Forestry, today announced Indiana's acceptance into the Forest Legacy Program of the U.S. Forest Service.

The Forest Legacy Program helps protect environmentally important forest lands from being developed for commercial, residential or other non-forest uses. The program is administered through state forestry departments and is funded by the United States Department of Agriculture (USDA) Forest Service.

The Forest Legacy Program will help Indiana acquire conservation easements, or development rights, from willing landowners. While ownership remains in private hands, the permanent conservation easement would ensure that the land would remain forested for future generations. The state would hold and administer the easement, and the land would remain taxable.

"Hoosier forest lands provide recreational opportunities and multiple environmental benefits such as water quality, wildlife habitat, and the protection of endangered species," said Lugar, who owns and operates his family's 604 acre corn, soybean and tree farm in Marion County. "The Forest Legacy Program will help Indiana conserve its important forest heritage."

Indiana's application targets six potential areas in the state where key forest lands are threatened with deforestation. Of Indiana's 4.4 million acres of forest land, 87% is privately owned. Economic pressures on forest landowners have prompted the sale of land to developers for shopping malls, houses or other non-forest uses.

Indiana is the 16th state to be accepted into the Forest Legacy Program. Today's approval by the USDA makes Indiana eligible for project funding for the current fiscal year. Any federal funds awarded will be matched by 25% in non-federal funds.

The Forest Legacy Program was established in the 1990 Farm Bill by Lugar and Sen. Pat Leahy (D-VT). Originally restricted to the New England states and the State of Washington, the Forest Legacy Program is now expanding nationwide.

Lugar has been a national and international leader on forest conservation. He authored the Conservation Reserve Program of 1985, which is the largest tree planting program since the New Deal era. He is the coauthor of the Tropical Forest Conservation Act of 1998, which protects outstanding tropical forests in developing nations through "debt for nature" swaps.

Lugar made the announcement at an Indiana State House press conference with State Forester Burnell C. Fischer and Hoosier National Forest Supervisor Ken Day.

# # #

Bloomington, IN.

Indiana to participate in Forest Legacy Program

Associated Press

INDIANAPOLIS — Indiana is participating in the federal Forest Legacy Program designed to protect woodlands that otherwise might have been sold off to developers and paved over.

Under the voluntary program, part of the 1990 Farm Bill, the state identifies the land and negotiates with landowners who want to sell conservation easements to the U.S. Forest Service. The state would hold and administer the easements, while the land would remain taxable.

"Hoosier forest lands provide recreational opportunities and multiple environmental benefits such as water quality, wildlife habitat and the protection of endangered species," Sen. Richard Lugar, R-Ind., said Friday.

"The Forest Legacy Program will help Indiana conserve its important forest heritage."

Six areas where key forest lands are threatened with deforestation are being targeted in Indiana. They are Southwest Bottomland Forests, Blue River Basin-Knobs Escapement, Bluegrass Forests, Shawnee Hills, Maumee River Basin and Northwest Morainal Forests.

"These are areas that have important forest lands in them and have strong demographic forces on the forest land," state forester Burney Fischer said. "That means development pressure, sprawl, that sort of thing, but the forest lands still exist."

The program will be 75 percent funded with federal money with a 25 percent match from either state or private funds. Fischer expects Indiana's land trusts, including the Nature Conservancy, the Shirley Heintz Environmental Fund and the Sycamore Land Trust, to provide much of the matching funds.

Although Indiana's acceptance into the program was not announced until Friday, word of the program spread in recent months and about 100 landowners already have contacted the state about how they might obtain the conservation easements, Fischer said.

Indiana is the 16th state to be accepted into the Forest Legacy Program. The program was established in the 1990 Farm Bill by Lugar and Sen. Pat Leahy, D-Vermont. It is administered through state forestry departments and is funded by the U.S. Department of Agriculture Forest Service.

Fischer said the Forest Legacy program is a good match with Gov. Frank O'Bannon's Farmland Preservation Task Force, which is searching for ways to save the state's farmland from development.

"Philosophically, they're both trying to do the same thing," he said.

Under Title VI of the 1964 Civil Rights Act, Section 504 of Rehabilitation Act of 1975, Title IX of the Education Amendments of 1072, the U.S. Government prohibits discrimination on the basis of race, color, national origin, age, gender, or handicap. If you believe that you have be discriminated against in any program, activity or facility as described above, or if you desire further information, please write to: Department of Natural Resources, Executive Office, 402 W. Washington Street, Indianapolis, IN 46204, 317-232-4020.