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Preserve
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“An increasingly urban America needs the breathing space of natural green areas. . .”

“Succeeding generations of alumni, faculty, students, and staff have here united in a determined effort to keep intact our natural green quadrangles and to provide for new ones as the campus expands. To cut a tree unnecessarily has long been an act of treason against our heritage and the loyalty, love, and effort of our predecessors who have preserved it for us.”

Herman B Wells (1974)
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Welcome to our report about activities and initiatives at the IU Research and Teaching Preserve during its first five years.

The Preserve was established in 2001 and since much has been accomplished and more set in motion for the future. I want to take this opportunity to provide a little background and some of our highlights, and to report on the planning process supported by the NSF Field Station and Marine Laboratory program (NSF DEB-0224619).

Much credit is due to the enthusiastic group of graduate and undergraduate students who have worked for the Preserve, or worked at the Preserve, and the many volunteer groups that have contributed their time and resources. Of special note are Gina Benincasa, the Preserve RA from 2002–2004, and Tom Or, Preserve RA 2004–2005 and Dan Johnson, the current Preserve RA. Gina graduated with her Masters from SPEA and is now working for the EPA in Seattle, Washington. Tom is a PhD student in Parks and Recreation Management through IU’s School of HPER. Dan is finishing his Masters degree in SPEA and will start a PhD program in Biology in 2007. There are too many undergraduates to list butmy thanks and appreciation to all. I also want to acknowledge the support and contributions of our Preserve Executive Committee. The Preserve currently consists of five parcels of land in Brown and Monroe counties totaling 1,150 acres. The 185 acre Griffly Woods is less than one mile from campus and abuts the larger City of Bloomington-owned Griffly Nature Preserve. It contains a diversity of forested and aquatic habitats that are easily accessed for study. Moore’s Creek is 261 acres of mature forest habitat along the shoreline of Monroe Lake, the largest lake in Indiana. Only 7 miles from campus, it is one of the few sites in Indiana where the rare Trailing Arbutus is found. Trailing Arbutus is Indiana University’s official flower and has been intertwined with IU history. Lilly-Dickey Woods is located in Brown County near Nashville, Indiana. A gift from the Lilly family, this 550 acre parcel has been undisturbed since before 1900 and contains some areas of virgin forest. This is one of the most impressive, old-growth forest parcels in the Midwest and a unique resource for Indiana University. Two new additions in 2006 (Bayles Road and Kent Farm) add key diversity in habitats for study. Bayles Road is nearly 40 acres of former agricultural fields being utilized for study of early successional systems. Kent Farm is over 120 acres of various successional stages and physiographic classes, from floodplain to ridge top. Kent Farm has been utilized for research into bird behavior and forest ecology.

Over 30 IU courses have used the Preserve for teaching activities. These courses come from five schools at IU: COAS, Education, HPER, Journalism and SPEA. Indiana State University is also using the Preserve for some of their courses. We hope that additional colleges and universities will take advantage of our natural resources in the future. There have also been many informal activities and outreach events. Over fifty guided nature hikes on a variety of topics have been offered over the past five years with over 700 participants from the community. The Preserve is a regular participant in the well-known Brown County Wildflower Festival.

The IU Commitment to Excellence (CTE) Program in Interdisciplinary Environmental Sciences is based on the Preserve and includes funding for a field laboratory facility and four new faculty members. Two faculty have been hired so far, and the planning process for the field facility is well underway with construction set to start in the coming academic year. The goal of the CTE project is to establish a new program in environmental sciences that will bring together multiple faculty and programs for investigating coupled biological-physical processes in natural systems. Griffly Woods and its associated watersheds will serve as a model ecosystem, a planning grant from the NSF supported a national symposium on forest ecology at IU, a workshop on invasive plants and an advisory meeting with Directors of similar Preserves and Field Stations from around the United States. Reports on these activities are included here.

2004 was the year of Brood X and our research project on periodical cicadas achieved international attention. There were many visitors to the Preserve including officials from the National Science Foundation, the BBC and National Geographic. A series of seven nature walks were organized on periodical cicadas and everyone was a winner! The Preserve is also partnering with WonderLab on cicada displays, and NSF is funding the production of a documentary movie on periodical cicadas. But cicadas were not the only thing buzzing at the Preserve. Many additional research projects have been conducted or are underway including investigations of hydrology and aquatic chemistry, long-term climate change, effects of atmospheric nitrogen deposition, GIS mapping of Griffly Woods, forest ecology, amphibian biology and the threat posed by invasive species. A number of publications based on research in the Preserve are now beginning to appear in top-ranked scientific journals. We are cooperating with both The Nature Conservancy and the US Forest Service on other projects of regional significance.

This report is meant to provide a more detailed look at the Preserve and some of the people and activities of the Preserve. Please visit our website (www.indiana.edu/~preserve) and feel free to contact us if you would like more information or would like to visit any of the Preserve properties. If you want to make a gift to the Preserve, they can be made to the IU Nature Preserve Fund. IU Foundation, PO Box 500, Bloomington, IN 47402. Please also see page 39 for details.

Thanks for your interest and support!
Keith Clay, Director
The Preserve is administered by a Director (Keith Clay) and an Executive Committee of eleven faculty members and one ex officio member:

- **Lynn Coyne**<br>ex officio<br>IU Real Estate
- **Bruce Douglas**<br>Geological Sciences
- **Alan Ewert**<br>HPER
- **Burnell Fischer**<br>SPEA
- **Michael Hamburger**<br>Geological Sciences
- **Ellen Ketterson**<br>Biology
- **Doug Knapp**<br>HPER
- **Vicky Meretsky**<br>SPEA
- **Greg Olyphant**<br>Geological Sciences
- **Heather Reynolds**<br>Biology
- **HaPe Schmid**<br>Geography
- **Jeff White**<br>SPEA

The Preservation has had many staff members over the past five years:

- **Three graduate Research Assistants:**
  - Tom Orr (2004-2006)
  - Daniel Johnson (2005-2007)
- **Paid undergraduate and graduates to assist with labor and maintenance of the properties (Our apologies to those we have missed):**
  - Christian Beck
  - Josh Hall
  - Nathan Knowles
  - Andrew Ruster
  - James Burkey
  - Greg Kern
  - Sandy Flory
  - Bret Sparks
  - Chris Gaudell
  - Matt Kinghorn
  - Derek Robertson
  - Mew Starnhoff
  - Cameron Thibos

Compared to other major research universities, Indiana University has extensive natural areas on campus and in nearby areas, but they have grown smaller and less numerous as lands are developed for other uses. Former President H. B Wells was instrumental in expanding the campus land area ten-fold during his tenure. He was intent on preserving the woodland character of the campus and was fiercely protective of trees and green space. Wells said, “To cut a tree unnecessarily has long been an act of treason against our heritage and the loyalty, love, and effort of our predecessors who have preserved it for us.”

Paul Weatherwax, an alumnus, faculty member, and eminent botanist, wrote in 1974, “Within the memory of alumni and former students, Indiana University has grown to be one of the great educational, cultural, and scientific centers of the world. A unique facet of its many-sided character is its campus with much of its original association of plant and animal life. There are few places in the world where great laboratories, classrooms, libraries, auditoriums, and other such centers of intellectual and artistic creativity are located in an environment which retains its primeval character -- few places where one may so quickly and so completely cast off the tensions and anxieties of this complex modern world in quiet meditation.”

The establishment of the IU Research and Teaching Preserve in 2001 is the most recent manifestation of the continuing tradition of a green campus imbedded within surrounding natural areas. Since it was established, the Preserve has doubled in size to nearly 1,200 acres. These luxuriant forests of southern Indiana have been specifically dedicated for teaching and research. Our extended green campus is a unique strength of Indiana University.

“...the university lake site had not been cleaned before damming and cattle and hogs from nearby farms were grazing in the watershed. A report to President Bryan in 1913 recommended purchasing the rest of the watershed and trying to achieve storage capacity of 40 million gallons by extending and raising the dam. Eventually, IU again used city water to supplement its own plant. IU’s consumption of city water rose from 48.8 to 170 million gallons per year between 1942 and 1950 as enrollment skyrocketed following World War II.”
Overview

Five Sites for Education and Research

The Indiana University Research and Teaching Preserve consists of five sites totaling over 1150 acres of heavily forested landscape located only minutes from the heart of IU's Bloomington campus—Griffy Woods, Moore's Creek, Bayles Road, Kent Farm and the Lilly-Dickey Woods.

Both the Griffy Woods and Moore's Creek sites are adjacent to lakes offering outstanding access to aquatic habitats. Given the differences in accessibility, distance from campus, and nature of the sites, the Moore's Creek site is primarily dedicated for faculty and graduate research, while Griffy Woods is used for undergraduate education, student research, and public education.

In 2003, the Lilly-Dickey Woods site, a 550-acre property in Brown County was added to the Preserve. The addition of this high quality and unique habitat will enhance opportunities for extramural funding, facilitate Interdisciplinary Environmental Sciences, create opportunities for new educational programs and ensure protection of this property with regional conservation significance.

In 2006, Bayles Road and Kent Farm were added to the Preserve. Both of these properties have been long time favorites of researchers from Biology and the Environmental Sciences. Bayles Road offers previous agricultural fields for a variety of plant research. Kent Farm has a wide array of successional habitats for multiple teaching and research opportunities.

Griffy Woods

Distance from campus: 1-2 miles
Size: 185 acres
Topography: ridge and ravine with some flatter upland and bottomland areas
Forest Habitats: range of successional stages, variation with slope, aspect and elevation
Aquatic Habitats: borders on Griffy Lake, part of S. fork of Grifley Creek, University Lake and intermittent streams
Trail System: several miles of developed trails from parking area
Neighbors: City of Bloomington private
Notable Features: diversity of habitats very close to campus, historical records >100 years
Moores Creek

Distance from campus: 7 miles
Size: 261 acres
Topography: rugged ridge and ravine topography
Forest Habitats: uniform successional age (70 - 80 years), variation with slope, aspect and elevation
Aquatic Habitats: 1.4 miles of shoreline along Lake Monroe (largest lake in state), and intermittent streams
Trail System: Historical (undeveloped) trails along ridgelines. No dedicated parking
Neighbors: Hoosier National Forest, U.S. Army Corp. Engineers, private
Notable Features: diverse wildflowers including remnant populations of rare trailing arbutus (Epigaea repens). Plus resident bald eagles.

Lilly-Dickey Woods

Distance from campus: 22 miles, near Nashville IN
Size: approximately 550 acres
Topography: rugged Brown County Hills topography
Forest Habitats: no logging since before 1900, parts thought to be virgin, more recent burned areas
Aquatic Habitats: limited. A few intermittent streams
Trail System: several miles of developed trails (Trails of the Nations). Parking in camping area
Neighbors: The Nature Conservancy, Indiana DNR, private
Notable Features: extensive old-growth forest with many exceptionally large trees

Historical photos by acclaimed photographer Frank Hohenberger and can be found in IU's Lilly Library.
Kent Farm

Distance from campus: 8 miles
Date Acquired by IU: March 23, 1966
Current Land Use: Early, mid and late successional forest
Land Forms: From Creek Bottom to Ridgetop
Vegetation: A variety of early, mid and late successional tree species can be found at Kent Farm. The property extends from a creek bottom to a ridge top allowing for an elevation shift in species composition. The elevation also allows chances to view wet site species and drier ridgetop and south slope species making Kent Farm a very diverse site within the Preserve.
Soils: Wetland to upland soil types
Access: Kent Farm is not open to the public for use

Bayles Road

Distance from campus: 4 miles
Date Acquired by IU: March 8, 1965
Nearby Public Land: Lake Griffy preserves, both City of Bloomington and IU
Current Land Use: Vegetative experiments with grasses, sedges, and early succession trees. Ruckleshaus dedicated carbon sequestration grove and prairie.
Land Forms: Bottomlands of Griffy Creek
Vegetation: Fencerows with trees (Black Walnut, Tulip Poplar, Black Cherry and Boxelder). Old agricultural fields with grasses, sedges and forbs.
Soils: Haymond, Stendal, Wakeland, and Wilbur soil series
Access: Bayles is not open to the public
Commitment to Excellence

Enhancing Teaching and Research Opportunities

To honor the extraordinary contributions of William Ruckelshaus (first and fifth Administrator of the U.S. Environmental Protection Agency) to this nation’s environmental policy and to commemorate his visit to Indiana University on April 19, 2006, the 39th anniversary of the first Earth Day, the students and faculty of SPEA volunteered to assist the IU Research and Teaching Preserve in planting trees on recently acquired agricultural land.

The carbon that is captured by the newly planted trees over the coming years will be estimated on an annual basis and reported to the U.S. Energy Information Administration’s Voluntary Reporting Program as a carbon sequestration program. No legal obligations arise from reporting – it is simply a show of support for the concept and a sharing of information about the project.

The tree planting occurred at the Bayles Road site of the Research and Teaching Preserve, west of North Walnut and north of Old State Route 37. The trees will serve as a buffer between the Preserve and the traffic on North Walnut, as well as helping mitigate CO₂ accumulation in the atmosphere.

Foresters and biologists from the Preserve and SPEA cooperated to determine appropriate species mixes for the soils at the Bayles Road site. SPEA arranged for acquisition of the seedlings, materials, and tools and also organized a large and enthusiastic volunteer crew to conduct the planting in early April 2006. Approximately 700 trees were planted in a one acre area equally divided among Kentucky Coffee tree (Gymnocladus dioicus), Bur Oak (Quercus macrocarpa), Cherry Bark Oak (Quercus pagoda) and Tulip Poplar (Liriodendron tulipifera). These species are all well adapted to the bottomland soils at the site and should thrive.

Planting was supervised by two experienced foresters, Burrell Fischer and Dan Johnson (SPEA).

In addition to the tree planting, another one acre area will be planted in late summer 2006 with prairie vegetation in order to compare the abilities of grassland and woody vegetation to sequester CO₂. While carbon is stored in the woody trunks of trees, it accumulates primarily below-ground in the root systems of prairie plants. The dominant prairie species will be grasses such as Big Bluestem (Andropogon gerardii), Indian Grass (Sorghastrum nutans) and Switch Grass (Panicum virgatum) as well as many broadleaf herbaceous species. The prairie planting will be overseen by Professors Jim Bever and Peggy Schultz (Biological).

The site and project will be used as an aid in teaching undergraduate and graduate students about field measurement and monitoring for the next several years. It will also be used for research projects looking at the relationship of vegetation to carbon sequestration. There will be a small marker to indicate that the tree and prairie planting was contributed to honor Mr. Ruckelshaus.

The CTE program is gaining momentum and will receive a great boost with the construction of a new research and teaching lab in Griffy Woods. This new facility will benefit undergraduates, graduates and faculty by providing a high quality field lab for environmental science projects.

Our focus is on the biogeochemical cycling of oxygen, carbon, nitrogen and water, the movement of other natural and man-made compounds through ecosystems, and the energy balance of linked forest watershed systems. A better understanding of these complex interactions and processes require multidisciplinary expertise from an array of fields, and is especially critical in light of anthropogenic stresses on local and global ecosystems.

While IU is very competitive and well-supported in biomedical research, compared to our peer institutions, we are less well positioned to be highly competitive for environmental research funding. The strategic addition of a few faculty positions and enhanced infrastructure within an explicitly interdisciplinary and interdepartmental content will exponentially enhance our national position and competitiveness for federal monies, top faculty and graduate students.

The establishment of a highly instrumented ecosystem facility at the Indiana University Research and Teaching Preserve recognizes the need for state-of-the-art infrastructure and technology for both research and teaching. The Preserve and the Institute for Research in Environmental Sciences (IRES), a joint venture of COAS and SPEA, were established to promote precisely these types of efforts. Detailed information on site-specific processes is needed to understand the complexity of the whole coupled system and extend it to new disciplines (molecular techniques, nanotechnology, information technology). The BSES program was established to educate the large number of students whose primary interests are in environmental sciences, but whose interests were not being served by existing degree programs. Faculty and infrastructure enhancements will better serve this large population, further enhance our educational capabilities in the environmental sciences, and keep IU abreast of national trends in environmental education.

The proposed program in IRES will strengthen existing programs and faculty research and teaching including the evolution, ecology and behavior program in Biology, the environmental sciences in SPEA, the atmospheric sciences, biogeochemistry, hydrology and environmental physics. Further, it will synergize new linkages and innovative research efforts in environmental sciences across campus.

Four faculty positions in multidisciplinary environmental sciences (two each targeted towards COAS and SPEA) will serve as a catalyst for enhancing environmental sciences on campus. Two of the positions have been filled, and two remain to be filled. Kelly Caylor was hired in 2005 in the Geology department and Todd Royer was hired by SPEA.

Please see their biographies on the following pages.

The CTE program is gaining momentum and will receive a great boost with the construction of a new research and teaching lab in Griffy Woods. This new facility will benefit undergraduates, graduates and faculty by providing a high quality field lab for environmental science projects.

The goals of this program are to:

1. Enhance current research programs in the environmental sciences at IUB by recruiting faculty in targeted areas of environmental sciences.
2. Develop a state-of-the-art instrumented environmental facility for investigating coupled biological-physical processes in a natural system.
3. Improve teaching and training in the environmental sciences through concentrated faculty expertise, and cutting-edge infrastructure.
4. Contribute to regional and continental stage understanding of large-scale processes.
Todd Royer

Todd Royer is an aquatic ecologist with broad interests in water resources and watershed processes. Recently, his research has focused on biogeochemical cycles in streams and rivers in agricultural landscapes of the Midwestern U.S. The impetus for this work is concern about nutrient enrichment in the surface waters of the Mississippi River basin and subsequent hypoxia in the Gulf of Mexico. Nutrient cycling has not been studied widely in agricultural streams, and only recently has the role of in-stream processes, such as denitrification, begun to be quantified in these systems. Much of this work is done in the context of the Nutrient Spirling Concept, which allows for the simultaneous assessment of downstream transport and in-stream processing.

A major current project, funded by the National Science Foundation, is investigating the importance of crop residue in the carbon cycle and food webs of small agricultural streams. Other ongoing work is directed at developing science-based phosphorus standards for streams and rivers of Illinois.

Recent Publications


Kelly Caylor

Kelly Caylor is an ecohydrologist with broader interests in terrestrial ecology. At the core of important issues in terrestrial ecology including anthropogenic impacts on species diversity, carbon sequestration, and land degradation/restoration is the way in which ecosystem structure and function are interrelated across spatial and temporal scales. Accordingly, his research and teaching interests are focused on understanding the couplings between mechanisms of spatial pattern formation and temporal dynamics in terrestrial ecosystems across a wide range of scales. He address these interests through the use of ecological models, remote-sensing analysis, and field observation.

Current Projects


Representative Publications

Kelly Caylor


Service

Member, American Association for the Advancement of Science
Member, American Geophysical Union
Member, Ecological Society of America
Member, NASA Earth System Scholars Network
Reviewer, NSF Ecosystems Studies Program
Reviewer, Remote Sensing of Environment
Reviewer, Water Resources Research
Reviewer, Journal of Geophysical Research – Atmospheres
Reviewer, Plant Ecology
Reviewer, Journal of Tropical Ecology
Reviewer, Journal of Applied Vegetation Science
Reviewer, Journal of Environmental Management

IU Research & Teaching Preserve
The Infrastructure of the Preserve is Growing.

A new teaching and research field lab is being rendered in detail in the IU architects office. The plan is to build a LEED certified environmentally friendly building, a first for IU, in the Griffl Woods preserve. The building will have a large teaching lab, four research labs and a meeting room. The facility will be located on the north slope above University Lake. This exciting project will provide serve as a hub for research and teaching in multiple disciplines.

The facility will be equipped with advanced equipment for monitoring atmospheric, aquatic, soil and biological processes, and will be combined with system-level experimental studies. This site offers ready access to diverse terrestrial and aquatic systems. It is well positioned to address such critical questions as the role of invasive species on native biodiversity and ecosystem processes, the effect of suburbanization on watersheds, the movement of pollutants through vegetation, soil and aquatic systems, and the effect of urban environment on forest atmospheric processes. Instrumentation and computing facilities will be linked to campus to enable communication, continuous remote operation, monitoring, and data acquisition at these sites.

Hopefully the building will achieve LEEDs platinum ranking for environmental friendliness. Some of the green features to be included in the building include geothermal heating, composting toilets, natural lighting, solar or green roof, recycled steel framing, and minimal building footprint to minimize environmental impact. If the approval process goes smoothly the building could be ready by the fall of 2007.
The Brown County Hills Project
The Preserve, IDNR & TNC Team Up to Protect Brown County

The Preserves largest contiguous land holding is Lilly Dickey Woods. Located in North Central Brown County this 550 acre parcel was donated by the Lilly and Dickey families for use in research and artistic endeavors. The Nature Conservancy (TNC) also has large land holdings adjacent to Lilly Dickey Woods. The Indiana Department of Natural Resources Department of Nature Preserves (IDNR-DNP) has the Youngman Woods nature preserve very close to Lilly-Dickey Woods, as well. In 2003, the Brown County Hills project was created to protect more acreage in this area and make it a core area for the TNC portfolio.

The Brown County Hills Forest lies along the northern most edge of the Interior Low Plateau Ecoregion. This area was identified as a portfolio site in Indiana to protect matrix forest communities at an appropriate scale. The matrix of forest communities that make up the Brown County Hills Forest have persisted over time thanks to the rugged topography and steep slopes that define the Brown County Hills Section. Traditional agriculture was attempted over much of the site, but because of poor soils and steep topography, failed. Most of the farms were abandoned and have been replaced by second growth forest.

The Bear Wallow Natural Area is an approximately 400 acre site near the center of the Brown County Hills Forest. This site is included in the TNC property originally donated by the Rhodetamal family in mid-1980s. Lilly Dickey Woods owned by Indiana University, Youngman Woods owned by IDNR-DNP and the surrounding privately owned land.

The Bear Wallow Natural Area is a large high quality Chestnut Oak-Hickory drymesic upland forest on rugged sandstone ridge tops and slopes with an open understory including blueberry, huckleberry, diverse mosses and lichens and the whoed pognonia. On lower and less exposed slopes white oak, red oak, and sugar maple become more common with a wide variety of spring ephemerals such as jack-in-the-pulpit, wood poppy, blue phlox, and wild ginger. Mesic floodplain forest occurs in a narrow corridor along intermittent streams within the ravines. Being part of the largest contiguous forest block in Indiana and connected to forested portions of the Ohio River Valley, this site within the Brown County Hills Forest and adjacent forests to the south are of national significance to forest interior and area-sensitive songbirds.

The relatively intact nature of this area makes it special, not only for its beauty, but as a functional ecosystem. It is one of three forests in the Midwest critical for migratory songbird breeding. Together we work towards protecting more of this area for its natural wonder and ecological significance.

The Trailing Arbutus
By Keith Clay, Professor of Biology and Director of the Preserve

The trailing arbutus is an unassuming plant that has been entwined with Indiana University history for over 100 years. From botanical explorations by faculty and students in the 1890s to modern adventures at Arbutus Hill at the turn of the century and 21st century conservation efforts at the new Research and Teaching Preserve, the trailing arbutus is part of Indiana University’s past, present, and future.

Botanically, the plant is a member of the blueberry family, which are uncommon in these parts, and is confined in Indiana to the Dunes region and a few south-central counties, primarily Monroe and Morgan. Mike Homoya, of the Indiana DNR, says there may be no more than 20 or 30 locations in the whole state, and it does not exist further to the west. Around Bloomington, the trailing arbutus is always rare but not impossible to find. Like elusive moths, which are around at the same time, the trailing arbutus has very definite habitat preferences. It likes to grow on the edges of steep, south-facing slopes facing sunrise; it is also fond of facing slopes in association with painted sedge and partridge berry. Its scientific name, Epigaea repens means lying flat on the ground, but it often cascades over the edges of bluffs.

Past scientific research at IU dates back to William Blatchley, a graduate student in the 1890s, who studied the local flora of Monroe County and reported the trailing arbutus from several 6000 acre sites. Around the same time botany professor Anton Boisen thoroughly mapped the local distribution of this habitat and included a valuable record to which we can compare modern day populations.

Boisen later transferred his papers to Indiana University. He assigned Professor Charlie Hagen the job of searching out a trailing arbutus in the wilds and inform us where we might go and gaze upon them...it’s got to be the trailing arbutus.” Most recently, Roger Beckman (now the head of the Life Sciences Library) working with Professor Don Whitehead, did his master’s thesis in biology on factors limiting the distribution of the arbutus. It is safe to say that few plants have received so much attention from Indiana University.

Today, few people associated with IU are familiar with the trailing arbutus. Its scent, described as being intoxicating and even arousing, perhaps lead to the popularity of Arbutus Hill to IU students a century ago, where the trailing arbutus occurred in such abundance as to perfume the air with its scent. This favorite destination of past generations of students led to naming the hill after the trailing arbutus. There may be no more than 30 or 40 (The Indiana University Foundation endowments at $10,000) or visit their website (www.indiana.edu/~preserve) for more information.)

I have always had an interest in the trailing arbutus so I was thrilled to have the opportunity to research and blight the Preserve at Moore’s Creek. As a PhD student in botany at Duke University in the early 1980s, two of my first scientific publications were on the biology of trailing arbutus. This was admittedly old-fashioned stuff, more along the naturalist traditions of John Barram or Andre Michaux than the cutting-edge molecular biology that dominates research at IU today.

Before my wife and I were married we visited Hanging Rock State Park, North Carolina. It was a beautiful place, full of storybook rock formations and rushing streams, and a profusion of plant life. We came away with some trailing arbutus plants with ripe fruits being visited by a steady stream of ants. The fruits consist of gelatinous masses embedded with hundreds of tiny seeds. As ants carried globules of jelly back to their nests, they inadvertently carried away the seeds. A little library research later revealed that this phenomenon has never been observed so I wrote a short paper in just two or three hours describing ant dispersal of trailing arbutus seeds. Today’s literature on trailing arbutus generally mentions this finding. I enjoy the fact that this tiny bit of scientific knowledge arose from a pleasant stroll in the park.

Local trailing arbutus populations, including the one at Moore’s Creek, appear to be in a state of decline. Nothing now exists that resembles the early descriptions of Arbutus Hill. I believe that habitat changes and forest regrowth are endangering the long-term prospects for local survival of IU’s official flower. Ironically, disturbances like logging, fire, or windstorms, which open up the habitat and reduce canopy cover, may be the best thing for the trailing arbutus. There may be no more than 30 or 40 plants hanging on at Moore’s Creek, with apparently no other plants around. We face the dilemma of doing nothing and having the population decline even further. At the same time we could fire back. Research at the Preserve will hopefully generate knowledge that will guide the persistence of trailing arbutus for future generations of IU students and alumni.

(The Indiana University Foundation has funded the IU Nature Preserve Fund to help protect the trailing arbutus and to support research and teaching efforts at the Moore’s Creek Preserve. Contact the Preserve office at 812-855-8742 or visit their website (www.indiana.edu/~preserve) for more information.)
Courses Using the IU Research and Teaching Preserve

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<td>E 442/555 Habitat Analysis Terrestrial</td>
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<td>E 106 Basic Fishing Techniques</td>
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<td></td>
<td>Q 506 Teaching Secondary School Education</td>
<td>Andersen</td>
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Teaching Use of the Preserve

A wide variety of courses have utilized the Preserve during the first five years of its operation (see list below). Biology, Geological Sciences and SPEA use the Preserve the most, and the School of Education, Journalism and HPER have also incorporated the Preserve into some courses. The Preserve has also been used by a class from Indiana State University. We are striving to build up use by a wider variety of classes at IU from different schools and departments.

It should be noted that this list is probably an underestimate given the occasional difficulties of getting faculty to report when they bring a course to the Preserve. Utilization by several courses was only discovered accidentally and after the fact. Teachers are encouraged to contact the Preserve office about taking their classes out to the Preserve, and to please provide us with information about class name, number, semester, and number of participants.

“The whole art of teaching is only the art of awakening the natural curiosity of young minds for the purpose of satisfying it afterwards.”
Anatole France
The goal of our NSF-supported research (NSF DEB-0345331) is to test the hypothesis that the composition and dynamics of forests are affected by periodical cicadas. We are contrasting forests in high density vs. cicada-free and low density sites, potentially reflecting the past effects of one or more generations of cicadas. In addition, we have experimentally manipulated cicada density and damage by protecting areas of young forest with netting and comparing tree damage and growth with neighboring control (unnetted) plots. This research will improve our understanding of the ecological consequences of large-scale biotic disturbances on forests, and may serve as a useful model for other, less predictable biotic disturbances.

**BROOD X**

In addition, our research has important educational and outreach components, including a unique opportunity to provide informal science education about insects and forests to the general community. Over 25 students have worked on this project and several have pursued their own independent research. A large number of public presentations have been made from news conferences at NSF in Arlington VA and at the Indiana State Museum in Indianapolis, IN. Two public lectures were also given at Wonderlab, a local children’s science museum in Bloomington, IN. In addition seven guided nature hikes were organized at the Preserve focused on cicadas. Both the BBC and National Geographic spent nearly a month in Bloomington filming the 2004 emergence for future science documentaries, and we received a NSF Communicating Research to Public Audiences (CRPA) grant (NSF ESI-0514672) to create an educational documentary on periodical cicadas. This documentary project is nearing completion. Shorter versions of cicada documentaries (by Roger Hangarter and Samuel Orr) have won several national film prizes (see http://www.indiana.edu/~preserve/research/cicada/index.html).
Effects of the invasive annual grass *Microstegium vimineum* (Japanese stiltgrass) on native trees and woodland herbaceous species.

S. Luke Flory, PhD student, Dept. of Biology

The goal is to answer the following specific questions:

1. **What are the effects of Microstegium invasion on tree seed germination and subsequent seedling survival and growth?**
2. **What are the effects of Microstegium invasion on 1-year old tree seedling survival and growth?**
3. **How does Microstegium invasion affect the diversity and abundance of native herbaceous species?**

This experiment provides the opportunity for additional undergraduate projects and collaborations. For example, a collaborative side project has been developed to test the effects of Microstegium invasion on insect species diversity and abundance with Dr. Jennifer Rudgers at Rice University. Pitfall traps were installed at the time that the experiment was initiated to sample ground-foraging insects and sweep nets will be used to quantify insects in the herbaceous canopy.

### Additional side projects occurring in plots at Bayles road

1. **What are the impacts of Microstegium vimineum invasion on native insect diversity and abundance?**
   - Undergraduate researcher Benjamin Eddy (in collaboration with Jennifer Rudgers, Rice University and Alan Cady, Miami University, Ohio)
   - Received $4000 HHMI Capstone grant for summer 2006

2. **Does invasion by Microstegium vimineum alter above and belowground resource availability?**
   - With Brett Mattingly, Indiana University

3. **Impact of Microstegium vimineum invasion on mycorrhizal colonization of native trees and shrubs?**
   - With Jim Bever and Scott Mangan, Indiana University

### Funding

- $25,000 from a participating agreement between USDA Forest Service, Hoosier National Forest and Indiana University
- $5,000 from The Nature Conservancy
- $1,000 from the National Wild Turkey Federation
- Side projects funded by the Howard Hughes Medical Institute (see above)

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### NSF Biological Field Stations and Marine Labs (FSML) Program Planning Grant

**Directors Meeting**

A two and a half day planning workshop sponsored by the Preserve and the NSF Biological Field Stations and Marine Labs (FSML) program (NSF DEB-0224809) was held at Indiana University Friday and Saturday, May 23-24, 2003. The objective of the Director’s Planning Meeting was to bring in outside field station and preserve directors/administrators to visit the Preserve sites, meet with our staff, participate in group and individual meetings focusing on policy and planning issues at the Preserve, and participate in strategic planning session. We wanted feedback and recommendations on policy, management and program development directions. The end result was a written report with detailed planning recommendations. The report is included in its entirety. The major topics for discussion included:

- Policies for research and teaching usage.
- Land management for biodiversity and conservation with multiple uses.
- Addition of parcels of land to the existing designated parcels.
- Development of academic programs with cooperation inside/outside of IU
- Administration and financial support of the Preserve.
- Common issues for field stations and research preserves

The planning committee consisted of 10 faculty directors and managers of field stations and preserves at 10 different universities (names and addresses listed below):

- **Tom Brock, University of Wisconsin – Madison**
- **John Dighton, Rutgers University**
- **Janice Schnake Greene, Southwest Missouri State University**
- **Sean E. Jenkins, Western Illinois University**
- **Edward Martinko, University of Kansas**
- **Kerry N. Rabenold, Purdue University**
- **Peter Morin, Rutgers University**
- **James A. Reinartz, University of Wisconsin – Milwaukee**
- **Ryan Stander, Miami University**
- **Stephen Weeks, University of Akron**

Together these directors had over 50 years of experience in managing comparable field facilities with annual budgets ranging from $50,000 to $500,000 per year. The planning meeting was very productive and included discussions with Indiana University administrators, the IUPRF Executive committee, and various user groups including faculty and graduate students. The final day there was a strategic planning session moderated by Rob Fischman of the IU Law School that was conducted independently of any Preserve staff in order to be completely open and unbiased. The culmination of this meeting was a report of findings and recommendations, chaired by Jim Reinartz (see following pages).
Findings and Recommendations of the IU Research and Teaching Preserve Planning Workshop

17 & 18 October 2003

Summary
A field station where ecosystems can be studied and experienced firsthand is as fundamental to an institution of higher learning as a library or museum, and it should be nurtured and supported at the highest levels. At a time in history when we are threatening the integrity of ecosystems as never before, it is imperative that we improve our understanding of their functions. Most good colleges and universities, including those represented in this workshop, have made reserves for field study high priorities, and have devoted resources to their development and maintenance. The value of natural reserves increases with time, unlike brick-and-mortar investments. They will provide, with little maintenance, a steady supply of raw material for scientific, and cultural investigation for centuries, and at a much lower cost than constructed laboratories. We applaud the establishment of the Indiana University Research and Teaching Preserve, and the dedication and support that have made it possible. The Preserve contains old growth and high quality forests for study that are unique in this region. Such a forested reserve is particularly valuable in the extensively forested southern Indiana landscape. We suggest that its value be supported by a reliable fund or endowment at a level of organization high enough to encompass the broad interdisciplinary user base. This level of administration and support will promote wise long-term planning, and development of educational strategies that will realize its potential for the entire university community. The Preserve administration will have to quickly develop infrastructure and regulatory procedures to sustain such a valuable resource.

Overview
The external planning panel found that the mission of Preserve (To provide natural field settings for research and teaching that complement existing facilities and infrastructure at Indiana University) is appropriate, and that development of a field research and teaching facility is likely to contribute substantially to the quality of Indiana University’s infrastructure, and to its capacity to excel in ecological and environmental research and education.

IU has one of the strongest programs in the nation in ecology, evolution, and environmental studies. Nearly all universities with comparable programs, and many universities with much smaller programs in field related studies, support field research and teaching facilities. These universities have found that their programs profit greatly from the availability of these facilities.

Field stations and research preserves contribute to the quality of research and education, promote research investment, help recruit high quality students and faculty, and can attract donations from the private sector. Because of the strength of its existing programs IU is better poised than most universities to realize these benefits from the Preserve.

In addition to the benefits that IU will derive by developing and supporting Preserve, there are aspects of Preserve that are regionally or nationally unique. The area south and east of Bloomington is one of the largest blocks of forested land in the Midwest. Most of this forest is managed for production of forest products, and there are very few blocks of old-growth forest anywhere near the size of the Lilly-Dickey Woods. The Preserve forests, managed as preserves and natural areas, are important reference sites for comparison of ecological processes on disturbed and undisturbed sites. The aquatic resources present at both the Moore’s Creek and Griffy Woods sites are also very valuable for research and teaching. The combination of undisturbed reference forests in a matrix of managed forest, forest and aquatic systems adjacent to urbanized area, and abundant aquatic resources contribute to making the Preserve unique among field stations and research preserves of the region.

The planning panel generated several recommendations that are crucial to the successful development of the Preserve.

- The Preserve lands must by some mechanism be permanently dedicated as a preserve under the control and management of the Preserve to ensure that the Preserve is not threatened by future changes in land use. This insurance of long-term stability is required to realize the benefits of field station facilities listed above.
- The charter that permanently dedicates the Preserve should ensure necessary access to the tracts and give the Preserve control of decisions relating to access. Particularly in need of resolution at this time is a guarantee of long-term control over access to the central part of the Griffy Woods tract across the university golf course, and clarification that the existing residence on the Lilly-Dickey Woods tract is “owned” and controlled by the Preserve.
- No field station facility can support itself entirely by research or teaching revenues. Not a single field station operated by or known by the planning committee is self-supporting. The Preserve will require a line item budget that will provide long-term funding from IU.
- The only existing models of field stations that do not require institutional funding are those that have obtained private endowments. The Preserve may be well positioned to be able to attract an endowment.
- At least a few years will be required before the Preserve can be expected to generate substantial grant income. To be successful the Preserve requires a full-time manager who will work with the faculty Director of the Preserve.
- The Preserve requires either university funding and its own equipment to maintain its properties and facilities, or regular university maintenance services should be extended to these facilities.
- The strengths of IU suggest that several departments and schools will utilize the Preserve. The administrative control and structure, and the budget line for the Preserve should reside at some level in the university’s administration that reflects the use of this facility by multiple schools. The Preserve is a facility with a university-wide support mission, analogous to the university’s library system; its funding source and administration should probably not be through a department or school that represents a single group of users.
- The current timeline for guaranteed support for the Preserve is too short. There must be a commitment of university support for the Preserve past 2004 for continued strong progress in development of the Preserve.

More Specific Recommendations for Consideration by the Preserve Executive Committee:
- The Preserve can excel at research, education, and outreach.
  - Field stations often find that it is best to give research use priority for land use and program planning.
  - Teaching use can almost always be accommodated so that it does not conflict with research programs given priority use of the Preserve.
  - At this time, the Preserve should be available for outreach use generated by outside departments and institutions (e.g. School of Education, IU undergraduate recruiting, community adult education, K-12 education), but the Preserve should not devote substantial resources to developing an extensive outreach program. In the future the Preserve may profit by development of an active volunteer group, or a “Friends of the Preserve” group, but the Preserve’s current mission should focus on research and university-level education.
  - Development of users’ guides to specific areas on the Preserve that describe basic ecology such as history, identification, and basic ecological principles like succession will encourage use by classes and undergraduate research.
- Given the availability of resources, there are certain types of research (inventories, monitoring, baseline data collection) that the Preserve should conduct to enhance the research and teaching value of the Preserve. One of the primary assets of a field station is the accumulated database that renders certain aspects of a specific site well known. For example, the value of the Preserve could be increased by:
  - Development of a site-specific GIS system
  - Development of a flora, or inventories of any other groups of organisms (Specimens should be deposited in the IU herbarium and other IU natural history museums.)
  - Collection of long-term weather records
The Preserve Executive Committee should be kept at a manageable number of members with representatives from the associated schools and departments and additional members who are the primary IU users of the Preserve.

Preserve policies:

- Research uses should be formally approved using a standard, short permit or proposal form completed by the potential investigator. This form should specify certain important conditions or terms to which the investigator can agree. For example, 1) investigators may be encouraged to deposit raw data with the Preserve when their research collects data that may be useful for the long-term baseline data archives, or that lend themselves to long-term follow-up studies, 2) investigators agree to provide IU IRP with copies of all publications, theses and dissertations resulting from work at the Preserve. Standard Preserve rules and regulations (e.g., no dogs) should be attached to the proposal form. A proposal for each research project will help The Preserve staff keep track of research uses of the sites.

- Development of a newsletter and a user list serve could facilitate communication among the Preserve stakeholders.

- Owners of properties in the vicinity of the Preserve should be kept informed of activities on the Preserve sites. Communication tends to maintain good neighbor relations, helps provide security for the sites, and cultivates future donations.

The Preserve planning:

- A clear land use plan and policy should be developed specifying preferred uses for different sectors of the three preserves. The Manager and Director will then know that, for example, teaching, manipulative research, and strict preservation, allowing only observational research, are all to be encouraged on different parts of the Preserve. Although use requests may be considered on a case-by-case basis, these plans will help to direct research and teaching users to appropriate areas of the sites.

- The Preserve may profit by requiring an annual report from research users, and all researchers should describe in detail the structure and contents of any data sets deposited with the Preserve.

- Spatially-specific land management plans for the sites should include experimental areas, strict preserves, and should target invasives for eradication on most of the Preserve land.

- A thorough inventory of invasives should be conducted on all Preserve land.

- The Preserve Manager should develop a plan for long-term management of Preserve data. The Manager should be sent to a course on database management and informatics for field stations.

- The Preserve should produce an annual report at least for internal use. The Preserve will probably find that an annual report will be a useful tool for a variety of communication purposes.

Future directions and opportunities for the Preserve:

- The Preserve should make a concerted effort to promote research at Lilly-Dickey Woods and to develop relationships with potential partners managing forest in the region, since Lilly-Dickey Woods may have the greatest potential to attract outside users of the Preserve.

- The Preserve should consider whether the Kent Farm and Bayles Road properties should be brought into the Preserve. The three existing Preserve properties are all high quality natural areas in their own right, and opportunities for intensively manipulative or destructive research will likely be limited. It may make sense for IU, and be beneficial for the programs of the Preserve, for the Preserve to manage the university’s historical field experimental areas.

- The Preserve will probably be very competitive for an NSF Improvement of Facilities at Field Stations grant for Lilly-Dickey Woods within two or three years.

Development of facilities and infrastructure will be crucial for the Preserve. The Preserve should further enlist help from IU’s current and potential user groups to find out what will make the Preserve attractive for their research and teaching use.

- Providing good, controlled road access, and a source of electrical power, water, and telephone (data transfer) service to the eastern Sycamore Valley portion of Griffy Woods may greatly enhance its usefulness for research and teaching.

- Construction of a lab facility at the eastern entrance to Griffy Woods is likely to enhance use of the site. However, considering how close this site is to the main campus, and the wide variety of potential facilities development that could be accomplished with currently available funding, further planning involving user groups should be conducted before plans for the use of these funds are finalized.

- One option that should be considered is to develop a more modest lab facility at Griffy Woods, leaving funds for modular instrumentation outposts elsewhere.

- The Preserve should seek funding for renovation and remodeling of the house at Lilly-Dickey Woods. There are many potential uses of this house including teaching and research space, housing for users, or housing for a caretaker or the Preserve Manager on-site. The Preserve Executive Committee should consider potential uses of the existing house and long-term plans for development of other facilities at Lilly-Dickey Woods. Over the long term Lilly-Dickey Woods may become identified as the "main" field station site of the Preserve.

- A permanently marked grid system (e.g., 50m x 50m grid) would be extremely valuable for research and teaching use of any of the sites.

- All preserves need boundary surveys and markers for effective management of the properties. These will be valuable for establishing reference grid systems.

- The Preserve Manager will need office space, on campus in the near term, and perhaps eventually on-site at a Preserve property.

- The Preserve Executive Committee should have both an advisory and approval role in management of the Preserve and approval of uses and facilities development. It is essential that major decisions regarding development of any facilities (e.g., trails, infrastructure, etc.) or research or teaching uses that will require disturbance to the natural areas, be approved and supported by a group wider than just the Director and Manager. The Manager and Director can conduct routine management, and make decisions regarding uses with no potential conflicts.

- It will take time, and development of supporting facilities and infrastructure, to attract a substantial amount of use of the Preserve from outside of IU.

- The Preserve Executive Committee should focus early efforts on attracting and providing technical and logistic support to IU faculty and graduate student users.

- There is a strong potential for possible use by, and collaboration with, the Purdue Department of Forestry. Much of the southern Indiana forest is under state and national forest management. The Preserve tracts are extremely valuable for comparison of forests under different management regimes that lead to a variety of collaborative efforts.

- The Preserve will probably be very competitive for an NSF Improvement of Facilities at Field Stations grant for Lilly-Dickey Woods within two or three years.
Our focus on invasive plants resulted from several factors. There is growing awareness of the growing importance of invasive species for conservation of native species, for community organization and for recreation. Second, at the student level, the workshop provided an opportunity for graduate and undergraduate students to present their research findings and to discuss the challenges and opportunities of invasive plant research and management. Third, the workshop focused on four main topic areas: 1) Invasive plant impacts on native communities, 2) Characteristic growth forms and invasibility of common invasive plants, 3) Communication between land managers and researchers in a focused setting, and 4) Opportunities for research and teaching.

The list of speakers and sites was as follows:

I. Pests, Invaders and Outbreaks

- Prof. Michael Frank, University of Illinois
- Prof. Mary Jane O'Keefe, University of Wisconsin
- Dr. John Widegren, USDA Forest Service

II. Conservation Biology

- Dr. Larry Sluder, Indiana University
- Dr. John Traw, University of Illinois
- Dr. Elaine Bannister, University of Michigan

III. Forest Community Dynamics

- Dr. Robert Keeler, Indiana University
- Dr. David Smith, University of Michigan
- Dr. Jonathan Bennett, University of Wisconsin

IV. Ecosystem Processes

- Dr. Gary Moulton, University of California
- Dr. John Traw, University of Oregon
- Dr. Alan Knapp, University of Minnesota

The symposium was a success, with over 100 attendees from various fields of study, including ecology, botany, and forestry. The participants provided valuable insights and recommendations for future research and management strategies to combat invasive plant species. The workshop was well-received, and the feedback from attendees was positive, indicating that it was a successful event. The workshop was a great opportunity for researchers to network and collaborate on future projects. The symposium was a great success, and the field sites provided ample opportunities for hands-on learning and practical experience.
Student Research

Jen Cianciolo
Graduate Student
Department of Biology

Jen Cianciolo is a graduate student in Biology studying mites that live in the litter layer of the forest floor. Sexual and asexual orbited mites overlap locally in distribution and appear to have done so for millions of years. It is surprising that one reproductive mode has not replaced the other given their similar ecologies. She is testing the hypothesis that orbited species coexist, despite differences in reproductive mode, through a trade-off in colonization and competitive abilities; asexuals are expected to be better colonizers and sexuals to be better competitors. Litter enclosures devoid of mites were placed in the field and have been collected bimonthly over a period of almost two years. At each collection a soil core is collected adjacent to the litter bag in order to compare colonizers with mites present in the surrounding habitat according to the following reproductive modes: sexual, asexual (for asexual species which occur in primarily sexual genera) and ancient asexual (for asexual species which occur in monophyletic asexual taxa).

Adam Davis
Graduate Student
Department of Geological Sciences

Graduate student Adam Davis of the Department of Geological Sciences is utilizing the Griffy Woods property for his PhD research. He is investigating the ways that soils, hydrology and geomorphology affect plant distributions in old field situations. He is exploring the geographical correlations among soil properties, slope character, and plant types for abandoned fields. Understanding how soils and landforms affect plant communities is important in estimating natural resources in the present and the future. This work will assist in predicting plant community development over time on disturbed sites based on the character of soils and terrain.

S. Luke Flory
Graduate Student
Department of Biology

Luke Flory uses the Preserve properties to study the management of invasive shrubs, the impact of cicada oviposition, and the impacts of the invasive grass Microstegium vimineum, Japanese stilt grass, on native tree regeneration. See page 24 for details.

Tim Greives
Graduate Student
Department of Biology

Tim Greives is interested in how environmental signals are translated to physiological signals used by a seasonally breeding rodent, the deer mouse, to time breeding to coincide with favorable environmental conditions. More specifically he will investigate how food supplementation during the winter affects leptin, a hormone secreted by white adipose tissue, and how the brain interprets this signal, combined with changing day length, to initiate the hormonal cascade that initiates reproductive behaviors and organ growth (testes and ovaries).

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Brett Mattingly
Graduate Student
Department of Biology

Brett Mattingly studies patterns of resource use within communities to gain insight into mechanisms that either promote or compromise diversity. Within the Preserve, he is conducting a long-term study of community assembly that addresses the relationship between the establishment sequence of perennial grassland species selected from four functional groups (cool-season grasses, warm-season grasses, legumes, and composites) and community-level phenomena of key interest to Natural Systems Agriculture, such as diversity, productivity, and stability. This study is supported by The Land Institute.

Brett is also conducting two additional field studies within the Preserve that address 1) the effects of habitat selection on the hatching success and nymphal survival of the 17-year cicada and 2) the changes in the availabilities of aboveground and belowground resources that underlie the impacts of Microstegium invasions on resident communities.

Alissa Packer
Associate Professor of Biology
Susquehanna University

Alissa Packer is currently an Associate Professor of Biology at Susquehanna University. She received her PhD from IU Biology. While at IU, she utilized the Preserve to study the effects of soil pathogens on tree germination. Specifically, Alissa investigated the role of a soil fungus associated with Prunus serotina, black cherry, and its role in limiting the success of new P. serotina seedlings. Her research has been influential in suggesting that soil-borne pathogens may help maintain tree species diversity in temperate forests.

Kurt Reinhart
Post-doctoral Research Scientist
Department of Biology

Kurt Reinhart is currently a post-doctoral research scientist in IU Biology and is continuing to study the interactions between black cherry and soil-borne pathogens at the Preserve and numerous sites in the eastern US. His research has found that soil-borne pathogens negatively affect black cherry throughout the eastern US. His research has also explored why this American tree forms dense stands in Europe and out-competes resident tree species there. In Europe, black cherry is a highly invasive tree species, and Reinhart’s research suggests that its invasive success abroad versus here in the US is likely the result of escaping belowground pathogens.

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Outreach

The Preserve has been active in a great diversity of outreach activities from on-site visits by other scientists and the Bloomington community to public presentations to many community and university groups. The Preserve and its activities have received tremendous, and very positive, media coverage when Brood X cicadas was at its peak. A sampling of these activities is listed below.

Guided Nature Hikes

Nearly fifty guided nature hikes on a variety of topics have been offered over the past five years with over 700 participants from the community. Of special note is the fact that the Preserve is now part of the annual Brown County Wildflower Fary.

Notable visitors to the Preserve

Hank Huffman, Indiana DNR, Division of Nature Preserves
Kay Zevasky, author of Field Guide to Indiana Wildflowers (IU Press)
Peter Vitousek, NAS, Stanford University
NSF Preserve Planning Meeting – site visit (10 visitors)
NSF Evolution Center Review Team – site visit (8 visitors)
Preserve Symposium on Forest Dynamics – site visit by speakers (12 visitors)
Preserve Workshop on Invasive Plants – site visit by 4 speakers (25 participants in workshop)
Lenore Tesisco, Director of the Center for Earth and Environmental Science, IUPUI
Paul Rothrock, Taylor University
Fox News 59
British Broadcasting Company
National Geographic International
USA Today
WFIU and WTIU
John Cooley, University of Connecticut
Gene Kritsky, College of Mount Saint Joseph
Hoosier Hiker Council
Indianapolis Hiking Club
St. Charles School Summer Camp
Hilltop Gardens Summer Camp
Various Scout Groups
Indiana State University Dendrochronology class
Miami University of Ohio vole research team
Rice University endophyte research team
Indiana University Summer Enrichment Program

Presentations

IU Board of Trustees
Wonderlab (two presentations on Brood X periodical cicadas generated the largest turnout in Wonderlab’s history)
Organization of Biological Field Stations (OBFS) annual meeting, Alberta CA
Sycamore Land Trust Spring Gardening and Landscape Show
Meadowood Retirement Community
South Grant Neighborhood Association Meeting
Bloomington Kiwanis Club
Bloomington Brownie Scout Group
Batchley Nature Club, Noblesville IN
Indiana University Mini-University
Sassafras Audubon Club

Service projects

Boy Scouts – grapevine clearing
Duke Energy Day of Service
– Moore’s Creek cleanup
Collins Living Learning Center 2005
– Grify Woods cleanup
Collins Living Learning Center 2002
– Trail building
Collins Living Learning Center 2003
– Moore’s Creek cleanup
Collins Living Learning Center 2002
– University Lake cleanup
BSES Majors – Stair building and trail improvement
SPEA students and faculty – Ruckelshaus Tree-planting project at Bayles Road
The Future of the Indiana University Research and Teaching Preserve

Indiana University is a world-class institution with state-of-the-art scientific laboratories and computing facilities, and world-renowned collections of music, art and literature. But more valuable and essential to human well being and scientific endeavor are natural ecosystems that sustain all life and harbor the diminishing biodiversity of Earth. The natural habitats and processes occurring at the Preserve will foster new investigations based on natural field-based problems, and will contribute to a better understanding of how the world works and how it can be sustained. Scientific investigations will continue to become increasingly more interdisciplinary and multidisciplinary over the next generation. These scientific inquiries will have increased emphasis on quantitative and collaborative projects that are linked to primary field-based observations. The Preserve will provide a platform for these interdisciplinary studies and a portal from the classroom and laboratory to the natural world.

Separate from its academic value, the five parcels of land making up the Preserve (nearly 1,200 acres total) represent a significant contribution to the conservation of biodiversity and natural habitats in the Midwest, and complement efforts by government organizations and groups such as The Nature Conservancy and the Sycamore Land Trust. Within the Preserve there are populations of rare plants and animals (including IU’s official flower, the trailing arbutus), relic areas of old-growth forest, and extensive areas characteristic of the rugged Brown County Hills region of southern Indiana. These land holdings are particularly valuable because of their extraordinary quality and diversity; because they adjoin other protected areas effectively increasing their size; and because of their proximity to the IU campus. Moreover, unlike campus buildings and equipment that have a fixed lifespan and begin to decrease in utility immediately, the natural lands protected by the Preserve will increase in value over time, especially as unprotected natural areas are developed or are otherwise lost.

In the future we hope that the Preserve will continue to grow and thrive. Grow not only in the quality and quantity of research and teaching conducted in the Preserve, but also grow physically with the addition of additional land holdings or expansion of existing holdings. These long-term goals will be most successfully achieved by continued investment in the present. Not just financial investment but also investment of time and effort by users and supporters of the Preserve. In the future we anticipate that the Preserve will be as key to the strength of Indiana University as the library, the research laboratories, classrooms or any athletic facility.

The Preserve has benefited tremendously from the hard work of volunteers. Students, teachers, and the community have all given their time and energy to help the Preserve to become what it is today. Much of the trail system at Griffy Woods was created with volunteer effort. Countless bags of refuse have been removed from the properties with the hard work and sweat of willing help. Volunteers planted hundreds of trees for a dedicated carbon sequestration grove. At the end of the day, when the dumpster is full, trees planted and the trails are complete, smiles are abundant and joy is plentiful.

The Preserve would like to thank all of those people that have given of themselves to improve the Preserve for everyone.
Preserve Supporters

The Preserve would like to thank the following people for their generous donations:

Sandra Lonsfoote Bate
Linda and Wayne Boyd
Ronald Clapp
Keith and Caroline Clay
Culver Family Foundation
Mary Desmond
Michael Hamburger and Jennifer Bass
Selma Horn
Brian and Marie Kautz
Carl Langenhop
Richard Mower
Dale A. Rogers
Susan Schwanke
Daniel Willard and Melinda Swenson
Stephanie and Jason Ward

Preserve Top Priorities for Preserve

1. Lilly-Dickey Facility: Creation and expansion of existing facilities, including the eventual renovation/ restoration of historic Dickey house for field lab, meeting rooms, and housing for researchers and students. Estimated cost: $500,000 - $1,000,000. Lilly-Dickey Woods is a very high quality, old-growth forest almost unique in Indiana that has extraordinary value for teaching, research, and conservation.

2. Construction of Outdoor Pavilion: Rustic outdoor multi-purpose pavilion at Griffl Woods. Simple design, stone construction. Some added expense for site access, handicap access, and pedestrian bridge. Estimated cost: $25,000 for pavilion; $10,000 for trial improvements for handicap access; $50,000 bridge. This facility will be invaluable for on-site teaching and research and has been identified by users as the most critical need for the Griffl Woods, one mile north of campus.

3. Endowed Professorship/Chair in Biodiversity and Conservation: Aimed at the Director of the Preserve, but could rotate or be used for recruitment. Estimated cost: $100,000 - $1,000,000 for endowed chair. This position would serve to solidify Indiana University’s commitment to scholarly pursuits in the areas of ecology, diversity, and conservation, and would be an invaluable tool for the retention and recruitment of world-class scientists.

4. Land Acquisition for improved access Moore’s Creek: This would be along Shields Ridge Road in order to enter the center of the Preserve. Right now, access is a critical problem limiting usage. Probably 5-10 acres would be needed. Estimated cost: $25,000-$50,000.

5. Enhancement of Interdisciplinary Environmental Sciences Field Laboratory: Indiana University has committed $250,000 towards the construction of field laboratory sciences in a natural setting along the south fork of Griffl Creek in the Sycamore Valley. This funding is sufficient to build a basic structure of approximately 5,000 ft², but supplementary funds could greatly enhance the quality, size and utility of the field laboratory. There would be possible naming opportunities.

6. Research and Conservation Equipment: 4-wheel-drive vehicle, boat with motor and trailer, video camera and other photographic equipment, laptop computer for use in the field, and other field equipment. The vehicle in particular is a major limiting factor for travel, field work and infrastructure improvement. Estimated cost: $50,000 - $100,000.

7. Graduate Fellowship(s)/Land Stewards: To support students conducting research on the Preserve, to conduct biodiversity inventories, to manage databases both physical and electronic, and for maintenance and improvement. Estimated cost: $4,000 per student for summer fellowship; $16,000 per year for whole year; $26,000 per year for full-time manager.

How to Give

The Indiana University Research and Teaching Preserve was established to enhance the research, teaching and service missions of the university.

To better support the mission of the Preserve, we have established the IU Nature Preserve Fund, which is dedicated enhancing the research and teaching mission of the Preserve, including outreach and conservation initiatives. You can help IU continue to provide quality outdoor teaching and research facilities, and conserve biodiversity and natural habitats in southern Indiana, by making a gift to the

Indiana University Nature Preserve Fund
PO Box 500
Bloomington, IN 47402

Publication List

The following is a cumulative list of publications based on work done in the Preserve thus far.


Beckman, R. 1994. Epigaea repens in Indiana: habitat associations and the effects of controlled burning. Indiana University, MS.

Blair, A. P. 1940. Interrelations of toad populations. Indiana University, PhD.


Jones, J. M. 1972. Effects of thirty years hybridization on the toads Bufo americanus and B. boreas: a field study. Indiana University, PhD.


Junko hyemalis hyemalis


Ketterson, E.D. and V. Nolan Jr. 1987. Suppression of autumnal migration unrest in Dark-eyed Juncos held during summer on, near, or far from their previous wintering sites. Auk 104:303-310.

Koska, J. 1991. Morphometric and historical analyses of reproductive interactions between two species of toad. Indiana University, MS.

Kover, P.X. 1997. The importance of mixed reproductive strategies on plant/ pathogen interactions. Indiana University, PhD.


Yolk steroids and the development of the hatching muscle in nestling European Starlings. *Journal of Avian Biology* 32 (3), 231-238.


Manore, C. G. 1950. The significance of their woodlands to Brown, Monroe and Morgan Counties, Indiana. *Indiana University, MS.*


Price, G. and Welch, W. 1939. A geographic study of the water supply of Bloomington Indiana. *Indiana University, MS.*


Schmidt, J. M. 1996. Dioecy, demography and disease in the clonal herb *Carex Picta Stued.* *Indiana University, PhD.*


Taylor, H. W. 1955. A geographic study of the water supply of Bloomington Indiana. *Indiana University, MS.*


Walters, B. 1972. Studies of interspecific predation within an amphibian community. *Indiana University, MS.*

Welch, W. H. 1928. A contribution to the phytoecology of southern Indiana with special reference to certain *Ericaceae* in a limestone area of the Bloomington Quadrangle. *Indiana University, PhD.*