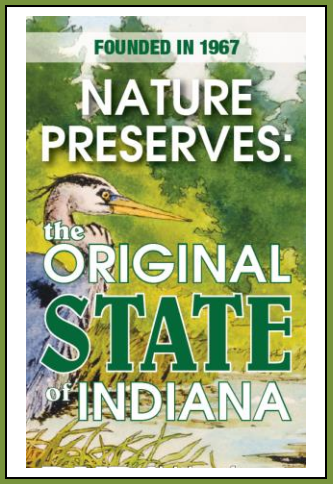
IDNR Division of Nature Preserves

2015 Annual Report



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2015 Annual Report

IDNR – NATURE PRESERVES

Division of Nature Preserves Annual Report for 2015

Executive Summary

The Division of Nature Preserves is charged with finding, protecting, and managing examples of Indiana's natural communities, coastal resources, and rarest species for the benefit of present and future generations. It is comprised of four primary components: Nature Preserve Protection, Nature Preserve Management, the Natural Heritage Data Center, and the Lake Michigan Coastal Program. The Division is funded by a variety of funding sources, including trust funds, grants, and general funds. Approximately one-third of the full-time staff is paid by non-general fund sources, and all of the remaining staff receives a portion of their funding from non-general fund sources (See Figure 1). Division staff work from nine locations scattered around the State, including the Central Office in Indianapolis.

Division staff was involved with numerous publications and outreach activities. These included 56 presentations, 74 partner projects, 84 technical assists to partners, 63 interagency projects, over 300 outreach activities and numerous projects to improve access and trails for visitors; including the addition of ADA accessible trails at Nine Penny Branch Nature Preserve. The Division hosted 12 field days at 12 preserves in 11 counties. DNP staff led a total of 22 hikes on nature preserves, attended over 150 meetings, and wrote 15 articles.

During 2015, some of the field inventory work included monitoring of rare plants as well as known occurrences, including impressive numbers of eastern featherbells. The certified ginseng harvest was 5,609 pounds; a total of twenty-nine ginseng dealers were licensed.

The Natural Heritage Database now contains 17,717 element occurrences (rare plants, animals, natural community locations), and during 2015, 160 new records were entered and 3,789 records were updated. Staff answered 905 information requests and conducted 767 environmental reviews, 396 floodway permit application reviews, 226 public lake permit application reviews, and 18 coal permit application reviews.

Regional ecologists managed over 3,113 acres in 2015, performing habitat restoration and invasive species control on 79 sites. It was a very successful burn season as Regional ecologists were able to achieve a record high of 1,992 acres managed by prescribed fire. Over 35 high priority sites were treated by the efficient mobilization of crews with the assistance of partners and other divisions. Several mitigation projects are underway, including a 1,700 acres conservation area reuse plan being coordinated with partner Vermillion Rise. The Indiana Bat as well as many rare species will benefit.

There is at least one nature preserve in every natural region in Indiana. Nature preserves contain at least one example of all but two of the 58 natural community types known to occur in the State. Of the 230 state-endangered plants, there is at least 1 protected example of 191 of them. All but 3 of the 89 state threatened species have at least 1 population protected, and only 4 of the 107 rare plant species have no protected populations.

As of December 31, 2015, 270 nature preserves have been dedicated. They are owned by 46 different owners, which include 5 different DNR landholding divisions, 14 land trusts, 18 city/county governments, and 4 colleges/universities. Nature preserves protect some of Indiana's most diverse landscapes, including dunes, sand prairies and savanna, wetland complexes, lakes, rivers, forested ecosystems, glades, karst features, prairies, fens, bogs, swamps, and geologic features.

There were nine dedications in 2015, with seven new nature preserves and two additions to existing preserves for a total of 2,798.734 acres. This brings the total number of dedicated acres to 49,879.43. The sites dedicated in 2015 are:

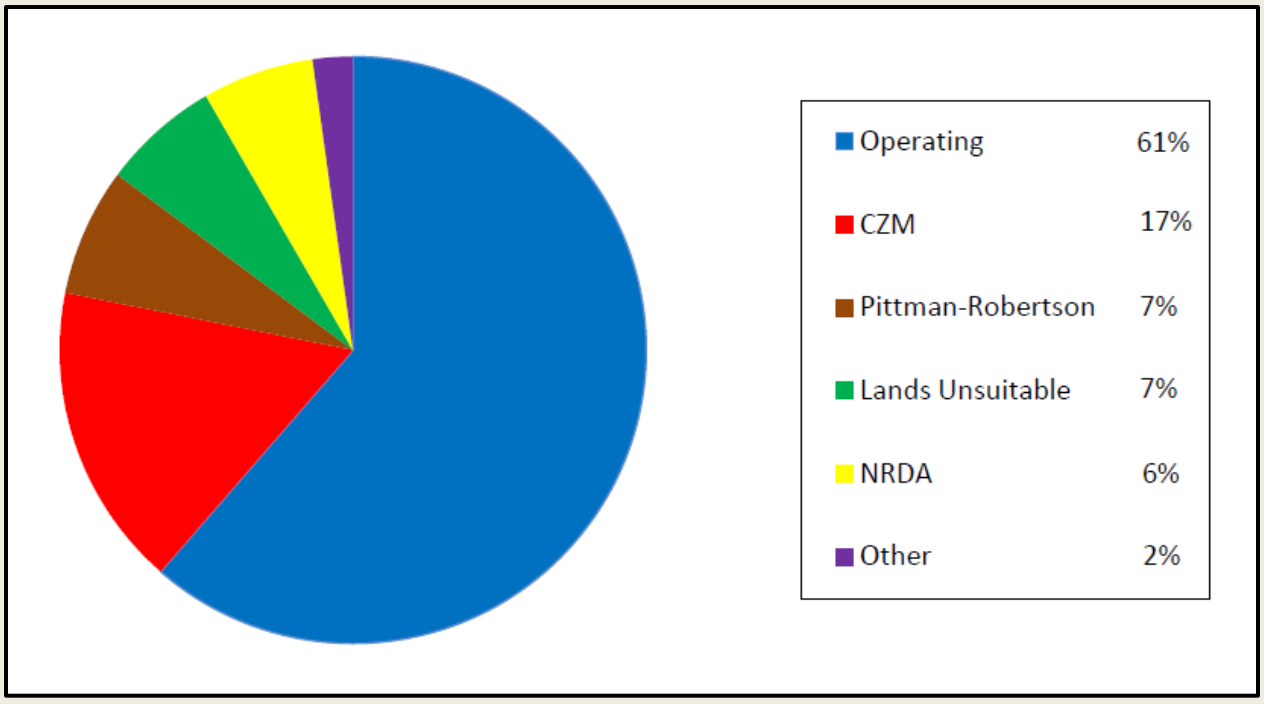
Sally Reahard Woods at Mosquito Creek in Harrison County, Meyer (Fred & Dorothy) in Morgan County, Weiler-Leopold in Warren County, Black Rock in Warren County, Spring Lake Woods & Bog in Allen County, Old Hamilton Road in Wayne County, Old Northwest Boundary Line in Wayne County, an addition to Bloomfield Barrens in Spencer County, and an addition to Moraine in Porter County.

Among these new dedications, protection has included 10 high quality natural communities, 17 plants that are endangered, threatened, rare, or on the watch list, 4 animals that are state endangered or of special concern, 4 insects, and 1 butterfly.

June 2015 was Coastal Awareness Month in the State of Indiana. The Lake Michigan Coastal Program and partners developed events to highlight the diversity and beauty of the Lake Michigan Coastal Region. These events bring attention to the Coastal Region of Indiana, which includes Lake, Porter, and LaPorte Counties. In total 19 events raised public awareness and helped inform participants on the natural, cultural, and historic value of the Coastal Program.

The LMCP and DNR Communications staff worked to overhaul the shipwrecks website. These revisions include several updates as well as 3D virtual tours of the J.D. Marshall, Material Services, Car Ferry #2, and Muskegon shipwrecks. These 3D models were collected using new mobile sector scan data as well as existing site sketches and photos.

Figure 1. Funding sources for the Division of Nature Preserves.



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DNP ANNUAL REPORT

Introduction

The Division of Nature Preserves (DNP) is made up of four components: the Nature Preserve Program, Preserve Management Program, Natural Heritage Data Center, and the Coastal Program. The Nature Preserve Program works with numerous partners to protect natural areas through acquisition and other protection actions and dedication into the State Nature Preserve System. The Preserve Management Program takes care of DNP owned Nature Preserves and assists partners with their nature preserves by using many restoration and management activities, including prescribed burning and control of invasive species; the program also provides access to DNP managed Nature Preserves by providing parking and trails where appropriate. The Natural Heritage Data Center collects and manages data on rare species and high quality natural communities which are used in two primary ways. The Department's environmental review process uses the data and coordinates with other agencies to avoid impacts to important natural features. The data are also used to guide conservation efforts of agencies and organizations across Indiana. The Coastal Program is responsible for coastal activities including natural, cultural, and historic resource activities in the Indiana Lake Michigan Coastal Zone, providing grant funding for a variety of projects, as well as being a central clearinghouse for natural resource conservation and planning.

MISSION

The Indiana Legislature passed the Nature Preserves Act in 1967, creating the Division of Nature Preserves, charging it to work with partners to set aside and preserve areas of unusual natural significance for the benefit of present and future generations. Since that time, Division staff has worked with colleagues in the Department of Natural Resources, and with partners throughout Indiana, to catalogue Indiana's flora, fauna, and natural areas, striving to set up a system of nature preserves that includes examples of all the natural areas and rare species habitats that occur in Indiana. While not totally complete, much progress has been made. At least one example of 56 out of 58 types of natural communities found in Indiana at the time of settlement is included in Indiana's nature preserve system. Ninety percent of the 416 plants considered endangered, threatened, or rare have viable populations in Indiana nature preserves.

The mission of the Division of Nature Preserves is to identify, protect, and manage an array of nature preserves and natural areas in sufficient numbers and sufficient sizes to maintain viable examples of all of Indiana's natural communities. Nature Preserves will also manage and maintain viable populations of endangered, threatened and rare species. These activities will be conducted for the benefit of the natural communities, and their representative species, as well as for the benefit of future generations of mankind.
The purpose of the Indiana Lake Michigan Coastal Program is to enhance the State's role in planning for and managing natural and cultural resources in the coastal region and to support partnerships between federal, state and local agencies and organizations. The Indiana Lake Michigan Coastal Program relies upon existing laws and programs as the basis for achieving its purposes.

Funding

For a number of years, the Division's Operating Budget was funded solely through the Indiana General Fund, and its Capital Funds alternately were either Cigarette Tax or General Fund. Starting in the 1980's, as new staff positions were added to the Division to meet increasing demands, they were paid for with alternate funding sources. Currently, 39% of Division staff is paid through a variety of non-general fund sources: INHPC Endowment, Coastal Program, Natural Resources Damages Account, Lands Unsuitable, and Pittman-Robertson; 61% are paid with General Fund monies (Figure 1). For General Fund paid staff, all have a portion of their salaries paid by non-state funds. These funds come from Office of Surface Mining, US Fish and Wildlife Service (USFWS), and other sources, since a portion of the work being done by these employees is for projects desired by both the Division of Nature Preserves and those entities. A portion of the time of most of these employees also serves as match for employees paid for with NOAA Coastal Program funds. Additionally, all seasonal division employees have at least a portion of their salaries paid for by federally funded projects, which further enhance taxpayer funds, enabling more natural resource work to be accomplished with less state funding.

Public Relations and Outreach Activities

Public Relations are documented into 6 broad categories: Presentations, Partner Projects, Technical Support, Inter-Agency Projects, Public Access Projects, and Outreach Activities (Table 1).

Nature Preserves staff made **56 Presentations** to a variety of partners with the majority to Non-Profit Environmental Groups. Those groups ranged from our partner land trusts, wildflower groups, and community organizations. The topics included conservation design, multi-use trail design, Indiana wildflowers, and invasive species control.

Nature Preserves Regional Ecologists were involved in **74 Partner Projects** that included land trusts, Counties, park boards, non-profit groups, and commercial entities. There was a wide variety of projects from habitat restoration, public dedications of nature preserves, trail construction and maintenance, invasive species management, and monitoring of endangered, threatened, or rare species.

An additional **84** partners received **Technical Assistance** with their own projects from nature preserves staff. The bulk of these were for invasive species grants, removal or monitoring, from all sectors of partnerships. DNP staff also provided comments on restoration plans, mitigation projects, streambank stabilization, and erosion control. There were also several large projects with industry that dealt with construction and installation of infrastructure, like new rail lines, culverts, and sewer and power line placement.

There were at least **63 Inter-Agency** Projects that occurred in 2015. Some of the largest were ongoing multi-agency projects at the Vermillion Rise Mitigation Bank, the GLRI or Great Lakes Restoration Initiative at Calumet Prairie, the Grand Calumet River & Roxanna Marsh and adjacent wetlands restorations, and the Governor's Initiative along Sugar Creek has continued to progress.

DNP staff also worked with various state agency personnel on invasive species control, placement of trails, rare plant surveys, forestry inventory, prescribed burns, breeding bird counts, deer monitoring and reduction, and storm damage clean-up on several properties.

There were **300+ Outreach Activities** in 2015. This category includes a major overhaul and upgrade of the State website, including DNR and DNP webpages, with 100+ updates that incorporate a mobile friendly format with many layers of hyperlinks within the various pages. Along with several 'Talk to an Expert' Facebook sessions and the DNP Twitter account, the photo gallery within the News & Photos section was expanded. It now includes photos from the Field Day hikes and Preserve Happenings that are submitted from the various regional ecologists.

DNP staff led **22 hikes** on nature preserves, attended **150+ meetings**, wrote **15 articles**, answered numerous public requests for information, and interacted with visitors at nature preserves, the State Fair and the Hoosier Outdoor Experience. The DNP logo was posted on most of our partner land trust websites. Materials produced include various reports, the DNP Annual Report, the 5th Coastal Ecosystem poster which was distributed at the State Fair along with the bookmark in support of the Loblolly Marsh Nature Preserve and DNP (Figure 4). Also, a part of the proceeds from the sale of 'Wildflowers and Ferns of Indiana Forests' by Mike Homoya go to the Indiana Department of Natural Resources for land protection and stewardship (Figure 5).

69 Public Access Projects include activities that most directly affect a visitor's experience in a nature preserve: improvement to **trails systems**, **parking lots**, and installation of signs at several **preserves**, all trail structures, boardwalk systems, and access roads were maintained, 3 hunter registration stations, and 5 deer reduction hunts. Many nature preserves, in a variety of ownership types, are open and have trails that provide an excellent opportunity for nature study and outdoor recreation. See our website for information and maps at

www.in.gov/dnr/naturepreserve.

Follow DNR Nature Preserves at:
Facebook
Twitter

Table 1. 2015 Outreach Numbers

Public Relations	Count
Presentations	56
Partner Projects	74
Technical Assistance	84
Inter-Agency Projects	63
Public Access Projects	69

Outreach	Count
Hikes	22
Articles	15
Website Updates	100+
Meetings	150+

**Excludes prescribed burn projects*

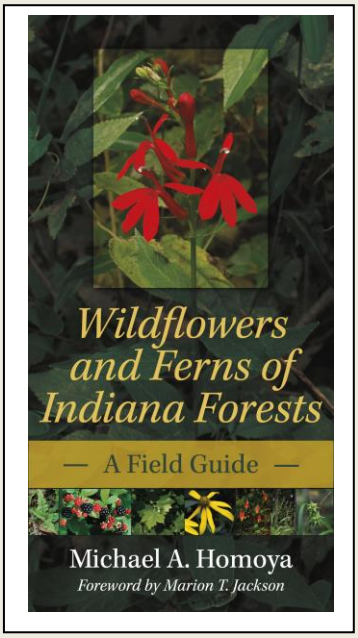


Figure 5. Book published by M.A. Homoya, 2011.

Figure3. 2015 Field Days flyer.

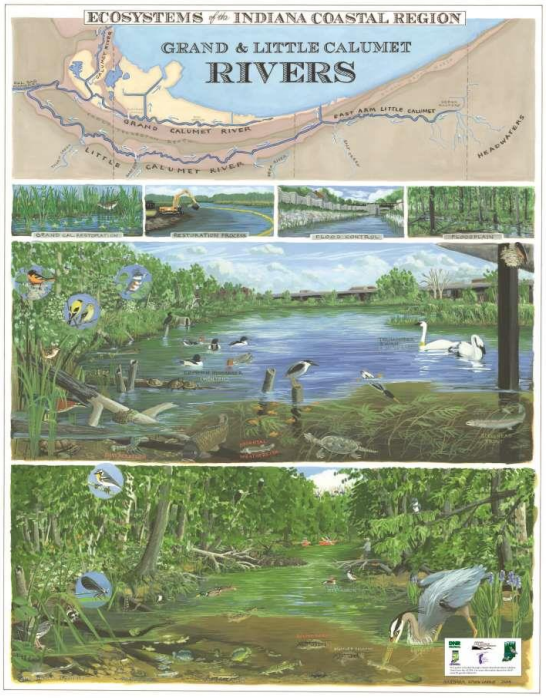


Figure 4. LMCP Ecosystem poster, 2014.

II. INDIANA NATURAL HERITAGE DATA CENTER

The Indiana Natural Heritage Data Center collects and manages natural resource data, including rare plant, rare animal, and natural community information; this information is used to conserve the State's biological diversity. Division ecologists conduct field surveys to find and monitor endangered, threatened, and rare plants and rare and/or high quality natural communities. Information on Indiana's plants and animals is also gathered from biologists statewide; then managed using the program's Biotics software. The data are used by public and private conservationists to help guide protection efforts. The data are also used in the Department of Natural Resources environmental regulatory process to help avoid or minimize impacts to significant natural communities, rare species, and nature preserves.

NatureServe

NatureServe is an international organization which serves as the umbrella for the network of natural heritage programs and conservation data centers in the United States, Canada, Central and South America. The organization helps to insure data consistency across the network, and also serves to provide natural heritage data to clients who need it across state and country boundaries. NatureServe's website is broadly recognized as the best source of summary data on plant associations, plant, animal and insect species and their global significance.

Lands Unsuitable Database
Element Occurrences (EOs)

Statistics

EOs in the INHDC database:	17,717
New records entered:	160
EO records updated:	3,789

The Natural Heritage Data Center Database serves as DNR's Lands Unsuitable Database, for the Division of Reclamation. We continuously update and quality control the database.

Natural Heritage Database Usage

Information requests:	905
Early Coordination:	767
Floodway Permit Applications:	396
Public Lake Permit Applications:	226

The database is used for permit reviews in several DNR Programs and aids in planning and site development, while minimizing impact to sensitive natural resource features.

Permit Applications

46 Research & Collecting Permits were issued.

18 Coal Permits were reviewed

Platanthera leucophaea

—

Eastern-Prairie Fringed Orchid

Federally Listed Species

Monitoring

Monitoring efforts continued this period to re-verify earlier rare plant records in the field. In addition to sites being revisited and the status of species and their habitats assessed, additional habitat information was gathered and GPS coordinates were acquired. This work was primarily accomplished for plants considered state threatened and state endangered.

Federally Listed Species

Pitcher's Thistle (*Cirsium pitcheri*): Federally Threatened

In 2015, the USGS staff continued to monitor the permanent plots at Miller Dunes, West Beach and Big Blowout, along with two restoration sites. Miller Dunes did not have any adults for the second year in a row. Staff continued to investigate the damage impacts by the three weevils; Analysis has not begun on that data. From seeds collected last year, seedlings in the sandbox propagation garden were the largest staff had ever seen with plants having up to 7 leaves. Seeds were also sown at the Miller Dunes late last fall with successful germination on the lee slope of the 1988-1990 foredune. A study was initiated to examine the interaction between distance from lake and aspect on germination and establishment. Preliminary analysis indicates that north slopes are best for total germination and survival, which may mitigate for increasing temperatures with climate change. In 2015, in the area of Big Blowout, DNP staff observed plants scattered throughout the blowout in areas of open sand. Some of the flowering stems appeared to be weakened or damaged but it was undetermined if the insects present were causing the harm.

Globe Bladderpod (*Physaria globosa*): Federally Threatened

Listed as federally threatened on August 1, 2014. Its only known location in Indiana, on state owned land in Posey County, was designated as critical habitat. The habitat is a roadside, and periodic mowing and minor soil disturbance are required to keep the population viable. Management in 2014 included clearing trees and brush to make a wider opening and provide more light, and some light disking to provide bare soil for seed germination. In spring 2015, only a dozen plants were noted, primarily due to the dense growth of accompanying vegetation. More management is needed at the site to promote more successful germination and growth.

Running Buffalo Clover (*Trifolium stoloniferum*): Federally Endangered

This species is named such because it's believed to have been in part symbiotically related to buffalo (bison); the clover benefiting from ground disturbing hooves, and the buffalo benefiting from the clover as a food source. Monitoring in 2008 indicated that known populations had expanded. Since 1987, seven populations have been discovered in Dearborn County, bringing the known total to ten, with all populations existing in far southeastern Indiana. Since 2014, two populations have been monitored, the first had 10-15 plants. There

Trifolium stoloniferum

Running Buffalo Clover

Federally Listed Species

are plans for a differential disturbance regime study in the next year. The second population, with over 1,000 plants, is prospering and responding well to management. Both sites have strong ongoing relationship building with all partners.

Mead's Milkweed (*Asclepias meadii*): Federally Threatened

The only known Indiana site for this species occurs in a nature preserve in the northwestern part of the State. In 2008, the first time since the DNP began monitoring this species, Mead's milkweed produced seeds. In that same year, a total of 25 plants were reported in a recently-burned portion of the prairie. Three plants contained seed pods for the first time since introduction efforts began. Seeds from two of the three Mead's milkweeds were planted in established plots. In 2009, two plants produced seeds. In 2011, six flowering plants were observed. Recent studies have tracked the relative survivorship of seedlings in the solitary population in burned and unburned sites, providing empirical data of significantly higher rates of survivorship among areas experiencing controlled burn conditions (60% vs. 5%). In 2012, one out of two sites were burned, however, due to drought conditions, the plants were dormant. In March of 2015 the site was burned, but the plants were not found later in the growing season.

Eastern-Prairie Fringed Orchid (*Platanthera leucophaea*) Federally Threatened

Annual monitoring of Indiana's only population revealed three flowering plants in 2015. No plants were identified in 2010, 2011, 2012, 2013, or 2014, ending a five (5) year absence. Both high precipitation levels and fire have been suggested to promote flowering of ***Platanthera leucophaea*** in tallgrass prairie habitat, but moisture levels appear to be an overriding factor— the spring of 2015 was particularly wet. Flowering plants were identified as early as June 17. Two of the EPFO's were both in full bloom on June 24. Individuals from the USFWS joined with two DNP representatives to conduct pollination efforts; five (5) flowers were cross pollinated as of July 17. All pollination efforts appeared to be successful. The eastern-prairie fringed orchid site is secure and restoration is ongoing. The site was burned in 2012, and will be burned again in spring of 2016.

Short's Goldenrod (*Solidago shortii*): Federally Endangered

A site visit to Indiana's only known population was made in 2015. The single population of ***Solidago shortii*** in Indiana continues to be stable and in good condition. The site where it occurs was flooded during the growing season, but appears mostly unscathed. There were perhaps up to five (probably fewer) that were covered by an accumulation of gravel and small boulders deposited during the flood, but otherwise all others are okay. In the fall of 2014, seeds were collected for long term seed storage by staff from the Missouri Botanical Garden.

Mitchell's Satyr (*Neonympha mitchellii*): Federally Endangered

Of all the butterflies in the US, this species may have the most restricted range. Also in its disfavor are the highly-specific habitat requirements needed to support Mitchell's satyr. Existing populations are fragmented and scattered with a handful of populations in Indiana and Michigan. Currently there are 16 sites in Michigan and 1 in Indiana; seven are considered viable (6 in Michigan and 1 in Indiana). Since 2007, only one population in Indiana remains, in LaGrange County. The LaGrange County site, yielded 100 butterflies during a 2008 survey. This last extant MSB population is on a privately owned site. Access and management of the site have been difficult, but efforts to build a relationship are ongoing and showing some success. DNR Nature Preserves staff are active participants in the Mitchell's Satyr Habitat Conservation Plan process. The Mitchell's Satyr Working Group received a grant from NFWF for the Toledo Zoo to rear larvae for release.

Karner Blue Butterfly (*Lycaeides melissa samuelis*): Federally Endangered

By legislative decree, the Division of Nature Preserves is charged with the monitoring and protection of this insect in the State of Indiana. In 2012, weather was a significant threat to populations viability, resulting in a dramatic decrease in observed numbers due to two years of severe drought and heat. In 2013, numbers were down again and monitoring partners reported only 1 adult at a single nature preserve. In 2014, two adults were reported in the Indiana Dunes National Lakeshore and several more by a monitoring partner in a managed area. However, in 2015, none were seen at any of the monitoring sites.

Rare Plant Inventory and Monitoring Highlights

DNP botanists and ecologists monitored a number of sites and rare plants in 2015. Of particular note were inventories at Cave River Valley and select sites on the Hoosier National Forest.

Cave River Valley:

DNP conducted a vascular plant inventory of a DNR property known as Cave River Valley, located approximately 2.5 miles north of Campbellsburg in Washington County. Over 375 taxa were identified. This approximately 300 acre tract is a satellite property of Spring Mill State Park administered by DNR Division of State Parks. The site is characterized by rugged karst topography containing two impressive cave openings. Natural communities at this property include sinkholes, limestone cliffs, streams, caves, upland forests, and small forest openings that may be remnants of former larger glades. A little over 60 acres is presently dedicated as a state nature preserve that contains a variety of communities including an area that may have formerly been a limestone glade.

Some of the species present that suggest this include post oak (*Quercus stellata*), false aloe (*Manfreda virginica*), little bluestem (*Schizachyrium scoparium*), Culver's root (*Veronicastrum virginicum*), clasping aster (*Symphiotrichum patens*), hoary puccoon (*Lithospermum canescens*), heart-leaved noseburn (*Tragia cordata*), and obedient plant (*Physostegia virginiana*). Although our inventory did not turn up any endangered, threatened, or rare (ETR) plant species, several species were encountered that are considered uncommon statewide. And although several areas exhibit signs of relatively recent past disturbance, there are some sizable areas of good quality natural communities. One area in particular, located on the southeastern portion of the property contains a relatively large forested tract with impressive sinkhole topography. This site is being considered for nature preserve status. DNP also identified areas on the property that need particular attention in regards to invasive exotic species. The species list compiled, as well as management recommendations including potential dedication of one tract were made to State Parks.

Hoosier National Forest Special Interest Areas:

At the request of the U.S. Forest Service, DNP also conducted a rare plant survey of select Special Interest Areas (SIAs) on the Hoosier National Forest, namely Harding Flats, Carnes Mill, Clover Lick, Boone Creek, Faucett Chapel, and Deer Creek. The survey focused on monitoring of known occurrences of rare species at the above sites, but DNP botanists kept an eye out for potential new occurrences and also made note of possible recommendations relative to management that might enhance the natural communities and associated rare species at these sites.

Harding Flats:

Perry County contains dry upland forest and barrens communities. A rare species that was monitored at this location is southern blue monkshood (*Aconitum uncinatum*). This primarily Appalachian Mountain species is disjunct in Indiana. At Harding this state endangered plant occurs on a mesic terrace just above a small creek. Several plants were tallied by DNP botanists.

Cave River Valley Limestone Boulder

Carnes Mill:

Natural Area in Crawford County is characterized by sandstone cliff, upland forest, and floodplain forest natural communities. Eastern hemlock (*Tsuga canadensis*) and occasional mountain laurel (*Kalmia latifolia*) occur along a steep bluff above the Little Blue River. The state endangered Porter's reedgrass (*Calamagrostis porteri* ssp. *porteri*) occurs in dry-mesic upland forest above the bluff, one of only two sites known in Indiana for this rare grass. In the talus slope below another state endangered plant that was monitored is smooth rock skullcap (*Scutellaria saxatilis*). This rare plant is hanging on, but struggling to compete with non-native invasive species, most notably ground ivy (*Glechoma hederacea*).

Clover Lick:

Perry County – The most significant features of this Special Interest Area are the limestone barrens and associated natural communities. Occurring primarily on south and west-facing slopes of dry, shallow, rocky soils the barrens here support an interesting array of plant species, including many that are rare in Indiana. In large open areas of the barrens and amid stunted post and blackjack oaks are blazing stars (*Liatris spp.*), prairie dock (*Silphium terebinthinaceum*), stiff goldenrod (*Solidago rigida*), rattlesnake master (*Eryngium yuccifolium*), little bluestem (*Schizachyrium scoparium*), and Indian grass (*Sorghastrum nutans*). The state endangered bluehearts (*Buchnera americana*) occurs here in impressive numbers and this, along with cream gentian (*Gentiana alba*), state rare were easily relocated. DNP botanists also searched unsuccessfully for clustered fescue (*Festuca paradoxa*), a state threatened species that is known from the area. The plant would likely be more conspicuous earlier in the growing season, however, and will be checked for earlier in the year in the future.

Boone Creek:

Crawford and Perry Counties – Noteworthy communities here include barrens and dry forest. DNP botanists saw only a couple of plants of the state endangered, buffalo clover (*Trifolium reflexum*), but likely more are present and the site will be checked in the future. The area is burned and portions of it have a vigorous regrowth of sassafras and sumac, which may be problematic if not controlled. Although known to have occurred at a few other locations historically, the buffalo clover is presently known from only two Indiana counties, Perry and Posey.

Faucett Chapel:

Orange County – A south-facing dry-mesic forest slope here supports the state threatened eastern featherbells (*Stenanthium gramineum*), a showy member of the lily family. Just under 1000 plants were estimated in this population.

Deer Creek:

Perry County – Good quality upland forest and sandstone cliff communities are the primary features of this area. A previously unknown occurrence was discovered for resurrection fern (*Pleopeltis polypodioides*), state rare. Plants were found on large, mossy sandstone boulders that had broken off of a nearby cliff. The invasive exotic, Japanese stiltgrass (*Microstegium vimineum*) was found nearby in similar habitat. Also noted nearby is the watch list species, Virginia saxifrage (*Saxifraga virginiensis*).

Rock Skullcap (Scutellaria saxatilis)

Ginseng Conservation

There was a total of **5,609 lbs**. and **12.92 oz.** of wild ginseng certified in Indiana this year. No cultivated ginseng was reported. This season Indiana had a total of 29 licensed dealers, however, long time dealers Phillip and Judy Fulton decided to retire before buying any roots. This year's annual harvest total was anticipated to be average due to fair growing conditions. The most notable factor regarding this season was the remarkable **521 lbs. of green ginseng certified, nearly 10 times the previous high of 54 lbs.** having been reported for a harvest year.

American ginseng - *Panax quinquefolius*

Gap Analysis ~ Protecting Natural Communities

There are now nature preserves in every **Natural Region** in Indiana with the dedication of Blue Cast Springs in the *Black Swamp Natural Region* (Appendix B, Map 2). A natural region is a major, generalized unit of the landscape where a distinctive assemblage of natural features is present. It is part of a classification system that integrates several natural features, including climate, soils, glacial history, topography, exposed bedrock, presettlement vegetation, species composition, physiography, and flora and fauna distribution to identify a natural region. A section is a subunit of a Natural Region where sufficient differences are evident such that recognition is warranted. The map (Appendix B, Map 2) illustrates the twelve natural regions and twenty-five sections determined in 1984 (Homoya, et al., 1984).

A **Natural Community** is a group of organisms, flora and fauna, that are interrelated with each other and their environment. They are identified by such natural features as soil moisture and reaction, substrate, species composition, vegetation structure and topographic position. Some natural community types can be distributed across multiple regions, for example mesic prairies or upland forests. This distribution may represent the limits of these communities that provide habitat for species not commonly found in a natural region or section.

ETR'S The Division of Nature Preserves and Indiana Natural Heritage Data Center (INHDC) are responsible for tracking, monitoring, and recording Indiana's natural communities, and the *endangered, threatened, and rare (ETR)* plants, vertebrate and invertebrate animals. The number of native populations of a plant is used to assign the ranking of ETR; endangered has 1 – 5 occurrences, threatened has 6 – 10 occurrences, and rare has 11 – 20 occurences. Botanists and ecologists scour the state every year, searching for new and previously known populations of ETR plants. When field scientists from around the state return from their searches, they bring with them "records" of their findings which are added to the Indiana Natural Heritage Database's 17,000+ existing records. The DNP seeks to protect and/or purchase lands supporting natural communities with populations of ETR plants.

The Division undertook a **Gap Analysis** last year to identify the 'gaps' of high quality natural communities by Natural Region and Section that have not yet been protected. In 2015, nine high quality natural communities were protected, including: clay barrens, dry flatwoods, mesic floodplain forest, dry mesic upland, mesic upland forest, fen, forested swamp, and multiple ponds.

The dedications this year protected communities that support 6 Endangered, 5 Threatened, 1 Watch List and 4 Rare plants; 2 State Endangered, 2 Rare, 1 Watch List and 2 Species of Special Concern animals.

III. Nature Preserve Dedication and Land Acquisition

There are 270 nature preserves dedicated under state law, Indiana Code 14-31-1. This represents more than 49,879.43 acres spread throughout Indiana. We work closely with many others in dedicating significant natural areas, including DNR Divisions of State Parks and Reservoirs, Forestry, and Fish and Wildlife, as well as Indiana State Museum and Historic Sites, The Nature Conservancy, local land trusts, local county park systems, and colleges and universities.

The first dedicated nature preserve was Pine Hills Nature Preserve in Shades State Park dedicated in 1969. Since then, the nature preserve system has grown to be the most widely distributed system of protected lands in the state. Seventy-one counties contain a nature preserve. More than any other reason, nature preserves are set aside to protect the plants, animals, and natural communities which are found on them, providing in perpetuity protection for the benefit of future generations. Visitation is allowed to the extent that the features can tolerate it without deterioration. For a list of community types and a nature preserve example, please visit our website www.in.gov/dnr/naturepreserve.

Overview of Indiana's Nature Preserve System as of 2015

Number of nature preserves: 270

Number of acres: 49,879.43

Average size: 183 acres

Number of Owners

46 different owners: 4 colleges and universities; 13 land trusts; 18 city/county/local governments; 1 federal agency; 2 private conservation groups/organizations; 2 state agencies. Within the Department of Natural Resources, nature preserves are owned by 6 divisions.

Ownership Information

138 nature preserves are owned by DNR (68 by Division of Nature Preserves; 37 by State Parks and Reservoirs; 18 by Forestry; 9 by Fish and Wildlife; 7 jointly owned by Fish and Wildlife and Nature Preserves; 2 by State Museum and Historic Sites. Of land trusts, 31 are owned by The Nature Conservancy; 33 by ACRES; 5 by Shirley Heinze; 8 by CILTI; 7 by Whitewater Valley; 3 by Sycamore Land Trust, 5 by NICHES; 2 each by Oak Heritage, Indiana Karst Conservancy, and Red-tail Land Conservancy and 5 by colleges and universities. See Appendix A for complete listing of owners.

Interesting Statistics

Smallest Nature Preserves:	German Methodist Cemetery Prairie	1.01 acres
	Smith Cemetery Prairie	1.10 acres
	Orangeville Rise	3.02 acres
Largest Nature Preserves:	Ten O'clock Line	3,339 acres
	Rocky Hollow-Falls Canyon	1,608 acres
	Fourteenmile Creek	1,602 acres
	Dunes	1,530 acres
	Minton	1,301 acres
	Whip-poor-will Woods	908 acres
	Thousand Acre Woods	933 acres
	Thomastown Bottoms	888 acres

2015 Nature Preserve Dedications

2,798.734 Total Acres

There were nine total dedications in 2015, with seven new preserves and two additions to existing preserves for a total of 2,798.734 acres. This brings the total number of dedicated acres to 49,879.43. Among those new preserves, protection has included 10 high quality natural communities, 17 plants that are endangered, threatened, rare, or on the watch list, 4 animals that are state endangered or of special concern, 4 insects, and 1 butterfly.

Seven New Nature Preserves and two additions in 2015 = 2,798.734 acres

Sally Reahard Woods at Mosquito Creek Nature Preserve

This Nature Preserve is a **657.91 acre** property that is in the southern portion of Harrison County, approximately 2.25 miles east of Laconia. This nature preserve protects an example of a high quality limestone glade complex community and located within the Mitchell Karst Plain Section of the Highland Rim Natural Region. The topography is characterized by rugged sandstone capped hills, limestone bedrock forming cliffs along Mosquito Creek and primarily upland deciduous forest communities. The West Branch of Mosquito Creek, a tributary of the Blue River, passes through the property. The ridges are mainly oak-hickory while beech-maple dominates the ravines. The preserve is owned and managed by The Nature Conservancy.

Meyer (Fred & Dorothy) Nature Preserve

This Nature Preserve is a **68.067 acre** property that is in the northeast portion of Morgan County, approximately 5.0 miles south of the town of Mooresville. Located within the Brown County Hills Section of the Highland Rim Natural Region, it protects an example of high quality xeric and dry-mesic upland forest natural communities. The land comprises large forest blocks unbroken by roads and a forest interior habitat that serves as home to rare native species like hooded and worm-eating warblers, the eastern box turtle, as well as the state endangered cerulean warbler.

The preserve consists of topography that is characterized by steep slopes, ridges and valleys. The xeric upland forest is dominated by chestnut oak and associated plant community, one of the northern most stations for this community in Indiana. The dry-mesic upland forest is dominated by white and black oak; while the mesic upland forest is dominated by red oak, tulip poplar, sugar maple and American beech.

The property is part of the Long Ridge Core Conservation Area and is "core forest" as part of Central Indiana Land Trust's (CILTI) science based strategic conservation plan, 'Greening the Crossroads'. The original 14 acres, known as Shalom Woods, was donated to CILTI by the Cohen family in the 1990's. The purchase of this special property was made possible by a significant donation from Bob Meyer and his family. Bob's father, Fred Meyer, was instrumental in the establishment of the first dedicated nature preserve in 1969. Funding was also provided by the Indiana Heritage Trust to assist with acquisition. The nature preserve is owned and managed by the Central Indiana Land Trust (CILTI).

Weiler-Leopold Nature Preserve

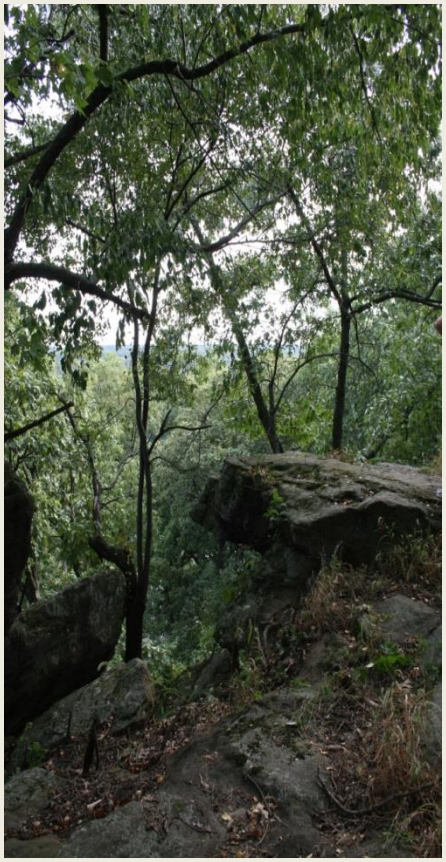
This Nature Preserve is **178.967** acres along the eastern border of Warren County, approximately 20 miles southwest of West Lafayette. Located immediately adjacent to Black Rock Barrens Nature Preserve and within the Entrenched Valley Section of the Central Till Plains Natural Region, the preserve consists of extensive frontage along both the Wabash River and Little Pine Creek. It protects examples of open oak woodlands and floodplain forest natural communities, as well as extensive forest plantings and a tallgrass prairie planting.

The preserve is named after its former co-owners; Emanuel Weiler, founding dean of Purdue's School of Management and of the Krannert Graduate School, and A. Carl Leopold, internationally known plant physiologist and son of Aldo Leopold, the naturalist. It was acquired in 1999 with funding support by the Indiana Heritage Trust, the Roy Whistler Foundation, and the Sycamore Audubon Society, the families of Weiler, Leopold, and Sanna, along with additional individuals, families, groups and businesses. The nature preserve is owned and managed by NICHES Land Trust, Inc.

Black Rock Nature Preserve

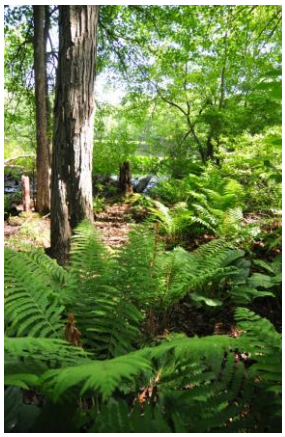
The Nature Preserve is a **32.024 acre** property that is along the eastern border of Warren County, approximately 4.5 miles east of the town of Independence. Located within the Entrenched Valley Section of the Central Till Plain Natural Region, it protects examples of high quality natural communities that include open oak woodlands, sandstone barrens, sandstone bedrock exposures and sandstone cliff communities.

The topography is characterized by the Black Rock geologic feature, a sandstone promontory that soars to one hundred and ten feet above the Wabash River. This highly unusual landform anomaly with steep-sided shale ravines, sandstone cliffs, and seep springs provide varied and uncommon habitats. The rocky slopes and shallow acid soils are habitat for a stunted black oak barrens community supporting a State threatened plant, *Selaginella rupestris* – ledge spikemoss and a State Rare plant, *Napaea dioica* – glade mallow. This barrens community type composed of Mississippian (Borden Formation) sandstone/siltstone/shale is the best and largest example and occurs in only two areas of the state: The Knobstone Escarpment in south-central Indiana and in northwestern Indiana along and near the Wabash River.



This Nature Preserve has a long cultural history in the area. In 1811, Tecumseh's warriors were stationed here to await General Harrison's troops before the Battle of Tippecanoe. In 1838, during the Potowatomi Trail of Death, a location near this site was used as a campsite. During the canal era, settlers fished and provided lumber for shipping along the Wabash and Erie Canal on the opposite side of the river. The 20th century attracted merrymakers for picnics, boating and dancing. The preserve is owned and managed by the NICHES Land Trust, Inc. Funding from the Indiana Heritage Trust assisted with its acquisition.

Spring Lake Woods & Bog Nature Preserve

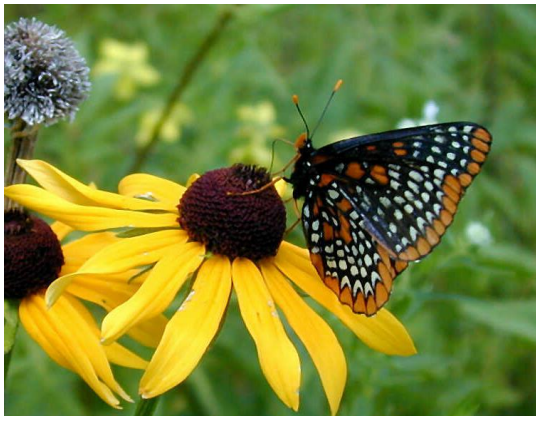


The Nature Preserve is a **98.328** acre property that is in the northwest part of Allen County, approximately 5.5 miles from Fort Wayne. It protects mesic upland woodlands, a bog, and portions of lakeshore along Lake Everett and is located in Indiana's Northern Lakes Natural Region.

This Nature Preserve is one of the sites listed in Alton Lindsey's 'Natural Ares of Indiana and Their Preservation'. It consists of 1,000+ feet of Lake Everett shoreline, the county's only natural lake, mesic woodlands with peaty soils across rolling topography and a 2 acre bog. The sphagnum bog provides habitat for orchids, pitcher plants and four-toed salamanders – a State Special Concern species. This northern muckland woodland is also home to a healthy population of cinnamon ferns that reach 5 feet in height.

This tract is owned and managed by the ACRES Land Trust. Funding assistance for this project was from multiple sources and includes: Indiana Heritage Trust, Bicentennial Nature Trust, and the Community Foundation of Greater Fort Wayne.

Old Hamilton Road Nature Preserve



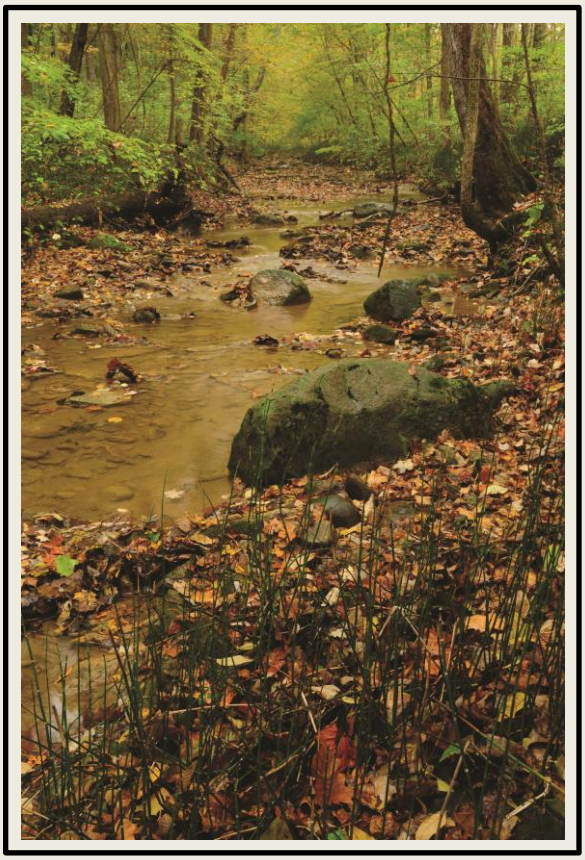
Baltimore Checkerspot - *Euphydryas phaeton*

The Nature Preserve is a **27.111 acre** property that is in the southeast portion of Wayne County and approximately 2.5 miles southwest of the town of Richmond. Located within the Tipton Till Plain Section of the Central Till Plain Natural Region it protects an example of a high quality graminoid fen community.

The topography is characterized by a small stream valley deeply incised into rolling Wisconsin glacial deposits. Springs and seeps are frequent within the valley, with a significant fen wetland being the most prominent groundwater feature. Noteworthy animals in this nature preserve include the State Endangered *Cordulegaster bilineata* – brown spiketail dragonfly, the State Rare *Tachopteryx thoreyi* – Gray Petaltail dragonfly, and the *Euphydryas phaeton* – baltimore checkerspot butterfly. Other animals of Special Concern include *Terrepene carolina*, the eastern box turtle.

There is a long cultural history in the area; the name comes from the 1820's destination of the Hamilton, Ohio market. The road passed through a corner of the uplands and now is a barely discernable sunken track. The preserve is owned and managed by the Whitewater Valley Land Trust, Inc. Funding from the Bicentennial Nature Trust assisted with its acquisition.

Old Northwest Boundary Line Nature Preserve



The proposed Nature Preserve is a **91.767 acre** property that is in the southeast portion of Wayne County and approximately 2.5 miles southwest of the town of Richmond. This nature preserve protects an example of a high quality mixed mesophytic forest, species rich but dominated by large beech. It is located within the Tipton Till Plain Section of the Central Till Plain Natural Region.

This Nature Preserve consists of topography that is characterized by uplands and dissected by ravines that drain into a tributary stream of Lick Creek. A large part of the uplands contain a diverse and maturing reforestation planting. This preserve will contribute to the protection of the watershed.

Noteworthy plants in this nature preserve include the American ginseng – *Panax quinquefolius.*

This tract is owned and managed by the Whitewater Valley Land Trust, Inc. Funding from the Indiana Heritage Trust assisted with its acquisition.

Two Additions to Existing Preserves 1,025.085 acres protected

Bloomfield Barrens Addition Nature Preserve

The Nature Preserve is a **619.43 acre** property that is in the west central portion of Spencer County, along the Warrick County border, approximately 2.5 miles south of the town of Tennyson. This nature preserve will protect classic examples of the floodplain forest along the Little Pigeon Creek in Indiana's Southern Bottomlands Natural Region and the Driftless Section of the Southwestern Lowlands Natural Region.

This Nature Preserve consists of mesic floodplain forests, dry flatwood forests dominated by post oak, with clay barrens in the canopy openings, riparian communities along a tributary to Little Pigeon Creek, and frontage along the Little Pigeon Creek.

Many unique and beautiful plants including the annual fimbry, Deam's phlox, Bush's sedge, social sedge, green hawthorn, pursh buttercup, blackfoot quillwort, slick-seed wild-bean, and buffalo clover. This larger forested block provides habitat for such species of concern as the Northern cricket frog.

This tract is owned and managed by the IDNR Division of Nature Preserves.

Moraine Addition Nature Preserve

The Nature Preserve is a 405.655 acre property that is in the east central portion of Porter County, approximately 5.5 miles northeast of the town of Valparaiso. This nature preserve will protect an example of the many land forms associated with the Valparaiso Moraine in Indiana's Valparaiso Moraine Section of the Northwestern Morainal Natural Region.

This Nature Preserve consists of rolling ridges, steep hills, muck pockets, pot holes, shallow ponds, fens, a tributary creek to Coffee Creek all formed by the southern edge of the Lake Michigan Lobe of Wisconsinan glaciations.

This site also includes a combination of natural communities with mature beech-maple forest found on some of the uplands and ravines. Buttonbush and black willow surround a number of pot holes and ponds. Sedge meadow and a fen are also located here.

Bicentennial Nature Trust and Indiana Heritage Trust Program

In 2012, Governor Daniels initiated a new conservation program, the Bicentennial Nature Trust (BNT). This program encourages local conservation projects all around Indiana, as a way to celebrate Indiana's upcoming bicentennial. The Bicentennial Nature Trust is an excellent companion to the Indiana Heritage Trust. In many cases in 2015, funds from both programs were used to help protect significant areas. Funding from the environmental license plate is the source of funds for the Indiana Heritage Trust (Figures 6 and 7); funding for the Bicentennial Nature Trust comes from other sources including a generous contribution from the Lilly Endowment.

On October 9, 2013, Governor Pence announced the first Bicentennial Celebration event. In conjunction with the Bicentennial Commission, DNR has designated five project areas: 1. a protection area near Richmond called the Whitewater Valley Legacy Conservation Area (Whitewater Valley Land Trust). 2. The Cedar Creek project area along Cedar Creek in Allen County (ACRES Land Trust). 3. Beanblossom Creek project area in Monroe County (Sycamore Land Trust). 4. The Glades and Caves project area in Harrison & Floyd Counties (The Nature Conservancy). 5. The Little Calumet project area in Northwest Indiana (Shirley Heinze Land Trust). Further information can be found at: http://www.in.gov/dnr/heritage/4422.htm

Land Acquisition

In 2015, the Division of Nature Preserves forged IHT and BNT partnerships with a number of partners to help acquire twenty-eight parcels of ground with significant features. Those sites, their ecological features, locations and sizes, and the partners involved, are shown in the following Table 2.

Table 2. Indiana Heritage Trust and Bicentennial Nature Trust partners, the ecological features, county of location and acreage of project sites.

SITE	PARTNERS	ECOLOGICAL FEATURES	COUNTY	ACRES
Big Walnut - Fitzwater	TNC	hardwood forest, reforested fields	Putnam	80
Scott's Pond Addn	NICHES	oak woodlands	Fountain	23
Flint Lake	Valparaiso Lakes Area Conservancy District	upland forest	Porter	8
Branigin Peninsula Addn	SLT	forested peninsula	Monroe	13.7
Scarlet Oak Woods Addn	SLT	upland forest	Monroe	61
Ohio Wabash Confluence	TNC	oxbow lake	Posey	57.92
Pine Knob	LaGrange Co Parks Div. Outdoor Rec.	sedge meadow, fen, shrub swamp, pond	LaGrange	20.7

SITE	PARTNERS	ECOLOGICAL FEATURES	COUNTY	ACRES
Birdsfoot Barrens	NICHES	siltstone barrens	Warren	258
Green's Bluff – Ooley	TNC	mesic upland	Owen	195
Ober Savanna Addn	TNC	black oak savanna buffer	Starke	30
Ambler Flatwoods Addn	Shirley Heinze LT	boreal forest	LaPorte	29
Green's Bluff – Boones	TNC	cave	Owen	60
Pennywort Cliffs – Passwater	TNC	limestone cliff, upland forest	Jefferson	43
Dallas Lake	ACRES	lake, forested floodplain	LaGrange	77
Lake James Peninsula	ACRES	forest, lakefront	Steuben	18
Lake Monroe Peninsula	SLT	wooded peninsula	Monroe	35
Shawnee Bottoms Addn	NICHES	bottomland forest	Fountain	23
Fisher Oak Savanna Addn	NICHES	pine oak flatwoods, fields	Jasper	85
Mosquito Creek Addn	TNC	upland forest	Harrison	40
White Oak Woodland	Friends of Limberlost	upland forest	Jay	19.5
Smith-Crisler	Redtail	upland forest and cropland	Henry	104
Valena Wood	Redtail	floodplain forest	Delaware	44.4
Victory Noll	ACRES	upland & floodplain forest, wetlands	Huntington	34
Quog Lake	ACRES	oak hickory forest, wetlands	LaGrange	126
Glacier's End	CILTI	upland and ravine forest	Morgan	97
Flora Richardson Woods	Flora Richardson Foundation	woodland, fen, seeps, ponds	LaPorte	94.74
Lydick Bog	Shirley Heinze LT	upland forest, bog	St. Joseph	170
McCloskey Savanna Addn	Shirley Heinze LT	savanna, buffer	Lake	36.86

BICENTENNITAL CONSERVATION AREAS	PARTNERS	ECOLOGICAL FEATURES	COUNTY	ACRES
Whitewater Valley	WVLT, Cope Center	floodplain & upland forest	Wayne	608
Cedar Creek	ACRES	floodplain and upland forest	Allen	
Beanblossom	SLT	upland & floodplain forest	Monroe	477
Ohio River Glades	TNC	glades, caves, upland forest	Floyd, Harrison	231
Little Calumet River	Shirley Heinze LT	floodplain forest	Porter, Lake, LaPorte	286

Figure 6. Indiana Heritage Trust License Plate.

Figure 7. The new IHT logo!

IV. NATURE PRESERVE PROGRAM

The work done to maintain the long term viability and ecological health of our nature preserve system is one of the most important functions of the Division of Nature Preserves. Towards this fundamental goal, the Division maintains 8 regional field offices that oversee our statewide system of preserves. (Appendix D, Map 1). They care for numerous preserves found across large geographic areas covering many counties.

In 2015, habitat restoration and invasives control was performed on 3,113 acres over 79 sites (Table 2).

These regional field offices serve as a base of operations for our ecologists along with their staff and equipment. Nature Preserves regional ecologists perform an array of work including ecological restoration, public land management, conservation planning, monitoring and inspections, environmental reviews, and botanical and natural areas inventory. They also provide many community services including technical consultation and environmental education. Importantly, the regional ecologists also maintain safe public access to our unique and growing Division of Nature Preserves trail system.

Regional ecologists integrate expertise in many fields, and decades of experience working in natural areas, to offer innovative management to Indiana's nature preserve system. This includes conservation biology, forest health issues, wildland firefighting, public speaking, wetland restoration, and recreational trail design and installation, among many others.

The regional ecologists also supervise and manage a specialized team of stewardship staff. Our stewardship staff performs the daily work of property management and controlling invasive species. They are experienced with heavy equipment, chain saws, herbicide application, wildland firefighting, trail maintenance, and safety issues.

This report addresses nature preserves on public lands that are owned by the Department of Natural Resources, as well as nature preserves owned by our private and local government partners.

Regional ecologists work with the private sector to place mitigation projects on existing conservation lands, including nature preserves. Mitigations are required to replace wetlands and forests impacted by development. This provides valuable restoration funding for public lands while helping the private sector fulfill the requirements of regulatory permits and settlements. This effort is resulting in significant enhancements at several nature preserves.

Regional staff are heavily involved with land protection, conservation planning, and community outreach. They provide technical assistance to their communities, partner land trusts, federal and municipal agencies, as well as other DNR divisions and agencies.

Table 2. Habitat Restoration & Invasives Control

region	number of sites/acres treated
Grand Calumet	5 sites/388 acres
Dunes-Coastal	10 sites/375 acres
NW Kankakee	5 sites/305 acres
Northeast	16 sites/449 acres
Central	8 sites/222 acres
East-central	5 sites/184 acres
Southeast	17 sites/773 acres
Southwest	13 sites/417acres
TOTALS	**79 sites/3,113**

Invasive Species Control

Numerous invasive species continue to invade natural areas and the list of species of concern seems to grow every year. Control does not mean eradicate, control means to maintain invasive species at a level where they do not threaten the natural communities of the preserve. Complete eradication is practically impossible and prohibitively expensive unless the population to be controlled is relatively small. Sometimes, a species is an extreme threat and risk outweighs cost, for example the woolly adelgid and the threat to native hemlock stands. Fortunately, woolly adelgid has not yet been found in Indiana's native hemlock stands.

This year regional ecologist aimed invasives eradication efforts at the following species: garlic mustard, Canada thistle, glossy buckthorn, bush honeysuckle, Japanese honeysuckle, teasel, phragmites, white sweet clover,

yellow sweet clover, autumn olive, knapweed, crown vetch, sericea lespedeza, Japanese stiltgrass, reed canary grass, moneywort, bouncing bet, brome grass, ground ivy, privet, purple loosestrife, oriental bittersweet, multiflora rose, amur cork tree, tall fescue, Johnson grass, scurf pea, burning bush, hybrid cattail and Japanese chaff flower.

Emerald Ash Borer (EAB)

The spread of emerald ash borer is having the following effects on nature preserve management. Death of ash trees will change the composition (no more ash) and openness of the forest canopy. Where invasive shrubs, such as multiflora rose, are present in small quantities, increasing light reaching the forest floor will favor these species in the short run. We are increasing efforts to control those species so they do not fill in the gaps before the native species have a chance.

Where ash trees are near heavily used areas and structures they have to be felled for safety. Where ash is not in heavily used areas they are being left to fall on their own. Regional Ecologists have assisted with the emerald ash borer response at Spring Mill State Park and the associated Nature Preserves. Monitoring in 2015 has been ongoing in collaboration with the Division of Entomology.

Hybrid Cattail

For 30 years we have been concerned about the loss of rare sedge communities to hybrid cattails. In the last few years we have found a combination of techniques that are effective at controlling hybrid cattail and restoring sedge communities.

Purple Loosestrife Control

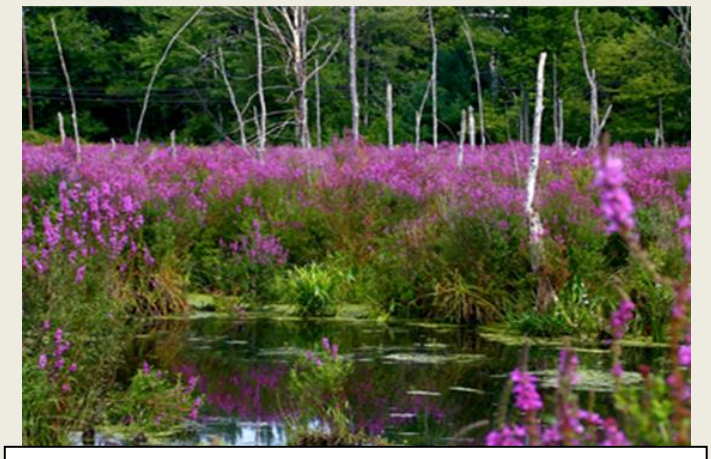
Galerucella (leaf eating beetle) populations are now present in almost all available habitats in northern Indiana. Regional ecologists worked together to document significant reductions in purple loosestrife at nature preserves in those regions due to exploding Galerucella populations. Nanophyes (flower feeding weevils) continue to expand rapidly in northern Indiana. The Northeastern regional ecologist continued to coach biologists in southern Indiana on monitoring the spread of both Galerucella and Nanophyes in that region. They were developing a 'nursery' population for distribution. An article on the effects of Galerucella on purple loosestrife populations was published by the Indiana Academy of Science. Inquiries from the public and field biologists on biological control were too numerous to count over the past year.

Kudzu Monitoring and Eradication

A grant was received from the Division of Entomology to eradicate a serious population at Hardin Ridge Nature Preserve inFloyd County. Multiple Divisions are working with landowners to control new populations. Effective treatment includes foliar and cut stump methods.

Garlic Mustard

Supported national efforts to develop a biological control for garlic mustard with continued monitoring of two long term garlic mustard transects, those results will be published in a peer reviewed article. Seed were collected for new research at Cornell University to discover the mechanism behind an unexplained decline in garlic mustard on many sites.



Purple Loosestrife - *Lythrum salicaria*

MITIGATION PROJECTS ON NATURAL AREAS

A number of conservation lands have benefited from significant restoration projects conducted by DNP staff and consultants helping private sector impactors to fulfill regulatory requirements. These projects are helping to improve biodiversity at significant savings to the Division of Nature Preserves.

Newport Chemical Depot, Vermillion County DNP staff have worked with partner Vermillion Rise on a 1,700 acre conservation area as part of the reuse plan for the former Newport Chemical Depot, a former Army base. This reuse plan balances conservation and greenspace with economic development. Many rare species, including Indiana bat will benefit. Approval of a mitigation bank has been granted by USACE.

Hobart Marsh Restoration, Lake County DNP staff attended many planning sessions with the US Army Corps of Engineers, and local planners in preparation for the large-scale restoration of the Hobart Marsh conservation area.

Indiana Dunes Savanna Restoration, Porter County DNP staff have worked with Dominion and the Division of State Parks to secure funding and plan for the restoration of 32 acres of oak savannas within the Indiana Dunes State Park.

Moraine Nature Preserve Pollinator Planting and Reforestation, Porter County DNP Ecologists worked together with Enbridge Corporation and the Shirley Heinze Land Trust to design and plan 27 acres of reforestation at Moraine Nature Preserve on former agricultural fields. Tree plantings and pollinator plants were installed in 2015.

PITTMAN-ROBERTSON WILDLIFE RESTORATION GRANT

Thanks to the Division of Fish and Wildlife, the Division of Nature Preserves received a continuation of a Pittman-Robertson grant which started in July, 2014 and will run through June, 2016. The grant, entitled "**Wildlife Restoration Activities on Natural Areas**", focuses on wildlife habitat restoration activities, including prescribed burning as well as invasive species and woody plant succession control methods on several nature preserves where hunting is permitted as part of the preserves' management plans.

The grant funded activities at 38 nature preserves totaling 3,500 acres of treatment, either prescribed fire or mechanical control of invasives and woody plant succession for the two year grant duration. Grant funds will help DNP significantly offset budget shortfalls, help DFW meet grant match goals, and help restore some very important natural areas throughout the state.

Science and Monitoring

Deer Monitoring

Deer exclosures have been installed and are monitored at several nature preserves and state parks. Regional ecologists monitor them annually, comparing deer browse on vegetation inside and outside the exclosure to determine whether deer browse on vegetation is excessive. Many nature preserves are open to deer hunting, which has resulted in recovery of vegetation that has been over-browsed by deer. Monitoring helps document these changes.

Eastern Hemlock Monitoring

Eastern hemlock is a rare coniferous species known from only a few populations in Indiana. White-tailed deer favor this species, and deer browsing has caused its decline in certain areas. Additionally, the woolly adelgid, an invasive insect pest, has decimated hemlock populations in the southeastern United States. DNP ecologists, and many of our partners, annually monitor hemlock populations, to ascertain whether the woolly adelgid has arrived in Indiana. It has been detected in one area in Northwest Indiana in a residential yard. Early detection is hoped to eradicate it before it is able to destroy our native hemlock populations.

Running Buffalo Clover

Since 2014, sites of the federally endangered running buffalo clover (*Trifolium stoloniferum*) have been monitored. The first had 10-15 plants. Plans for a differential disturbance regime study were developed in 2015. The second population, with over 1,000 plants, is prospering and responding well to management treatment. Both sites have strong ongoing relationship building with all partners.

Karner Blue and Wild Lupine

By legislative decree, the Division of Nature Preserves is charged with monitoring and protection of this insect in the State of Indiana. In 2012, weather was a significant threat to the population's viability, resulting in a dramatic decrease in observed numbers due to two years of severe drought and heat. In 2013, numbers were down again and monitoring partners reported only 1 male at a single nature preserve. In 2014, two adults were reported in the Indiana Dunes National Lakeshore and another two males reported by a monitoring partner at a managed area. In 2015 none were observed at any of the monitoring sites.

Karner blue – *Lycaeides melissa samuelis*

Prescribed Burns

The Division of Nature Preserves burn program is one of the oldest prescribed fire programs in the state of Indiana. We have been safely and effectively using prescribed fire to manage Indiana ecosystems for over thirty years. These range in size from tiny prairie remnants to landscape-scale fires of hundreds of acres. For the 2015-16 Burn Season, the Division successfully burned 1,993 acres at 35 different sites. In addition, Nature Preserves staff assisted The Division of Forestry at an additional 3 sites totaling over 320 acres.

Prescribed fire is a land management tool that provides certain benefits that no other technique offers, and is crucial for maintaining rare and declining habitats that are considered "dependent" upon periodic fires. These carefully planned and managed burns maintain such natural processes as plant germination, forest succession, and control of weedy and invasive species in Indiana's prairies, oak woodlands, and wetlands. While healthy native habitats are the first goal for DNP's burn program, prescribed fire is also an important part of reducing hazardous fuel loads of woody debris and brush on our public lands.

Nature Preserves Ecologists spend much time training and planning for the application of prescribed fire. This includes several disciplines including ecology, weather, wildland firefighting, incident command, communications and logistics. A profound knowledge of fire ecology informs our planning and use of fire. Important ecological factors include targeted native plant and animal communities, seasonal timing of burns, fire return intervals, and forest regeneration (e.g. oaks). Special consideration goes into fire managing sensitive species such as the eastern box turtle (*Terrapene c. carolina),* eastern massassauga *(Sistrurus c. catenatus)*, and Indiana bat *(Myotis sodalis)* among many others.

Nature Preserves Ecologists are necessarily skilled in the operation and maintenance of the highly specialized equipment required for wildland fire. This includes fire engines, ATV mounted pumpers, radio communications, ignition devices, and personal protective equipment.

Crucial to the continued success and growth in our burn program is cooperation among partners to field effective wildland fire crews. Nature Preserves staff frequently works within multi-divisional DNR burn teams. Collaboration with non-DNR partners, such as municipalities, and non-profit conservation groups (The Nature Conservancy, NICHES), enable us to assemble larger more capable crews and the interaction contributes to exchange of ideas and crew cohesion.

Our ecologists put maintain a staff of 20 part-time and intermittent stewardship employees that, in addition to their restoration and property management responsibilities, are trained and experienced in conducting prescribed burns. This capacity, along with our partners' support, enables us to safely conduct multiple controlled burns during a given window of ideal burn weather.

Region	Planned & Site Prepped	Completed Acres / Count	Burn Count Completed
Grand Calumet	57a/2	57a/2	2
Dunes-Coastal	164a/6	164a/6	6
NW Kankakee	396a/10	396a/10	10
Northeast	14a/2	13a/1	1
Central	876a/3	876a/3	3
East-central	147a/5	121a/4	4
Southeast	60.5a/4	60.5a/4	4
Southwest	534.2a/10	307.2a/5	5
Grand Calumet	57a/2	57a/2	2
Statewide Totals	2,253 acres / 42 Sites	1,993 acres / 35 Sites	35

Burn seasons are traditionally counted as a fall/spring season reflecting the November- March dormant growing period when most fires are conducted.

Summary The Division of Nature Preserves performed prescribed fire on 1,993 acres over 35 priority sites. This exceeds the acres burned in 2014-15 by over 100%. An additional seven burns over 260 acres had completed planning processes, including written burn plans, crew coordination, and onsite preparation, all intensive work. These burns were not completed due to unexpectedly wet conditions.

Indiana's 2015-16 burn season was greatly impacted by difficult weather, yet the division was able to accomplish a record high total of 1,993 acres managed by prescribed fire. This is due to the efficient mobilization of crews and resources across the state during given burn windows.

V. LAKE MICHIGAN COASTAL PROGRAM – LMCP

The U.S. Congress makes available to states and territories with approved coastal zone management programs, funds for competitive grants for community-based coastal activities. Funding and oversight are provided by the National Oceanic and Atmospheric Administration (NOAA), Office of Ocean and Coastal Resource Management (OCRM). Projects must be consistent with the goals and objectives of the Coastal Zone Management (CZM) Act of 1972 (CZMA, 16 U.S.C. §1451 et seq.) and meet the requirements of the CZM Program administered by OCRM.

The vision of the LMCP is to provide technical, financial and programmatic assistance to ensure that the Lake Michigan coastal area is thriving for future generations. In so doing the LMCP staff participated in a number of events, oversaw projects, and provided funding to empower partner initiatives.

No Adverse Impacts Workshop helps local communities better plan for the future:

The Lake Michigan Coastal Program partnered with Illinois Indiana Sea Grant, the Association of State Floodplain Managers, Northwestern Indiana Regional Planning Commission, and the Porter County Surveyor to host a *Coastal No Adverse Impact Approach Workshop* in Hammond on June 25, 2016. The target audience included city and county planners, city and county elected officials, state agency staff, private consultants, and interested public.

The program was modeled on the "Great Lakes Community Resilience: A No Adverse Impact Approach" workshop organized by the Association of State Floodplain Managers in Milwaukee in August 2014. http://www.floods.org/index.asp?menuid=%20805

The day-long workshop focused on applying the No Adverse Impact approach in Northwest Indiana with emphasis on green infrastructure and regionally-relevant legal issues practitioners face such as: liability, takings, and the Public Trust Doctrine. Other items of discussion include: watershed planning and community outreach using interactive mapping exercises.

June 2015 was Coastal Awareness Month in the State of Indiana!

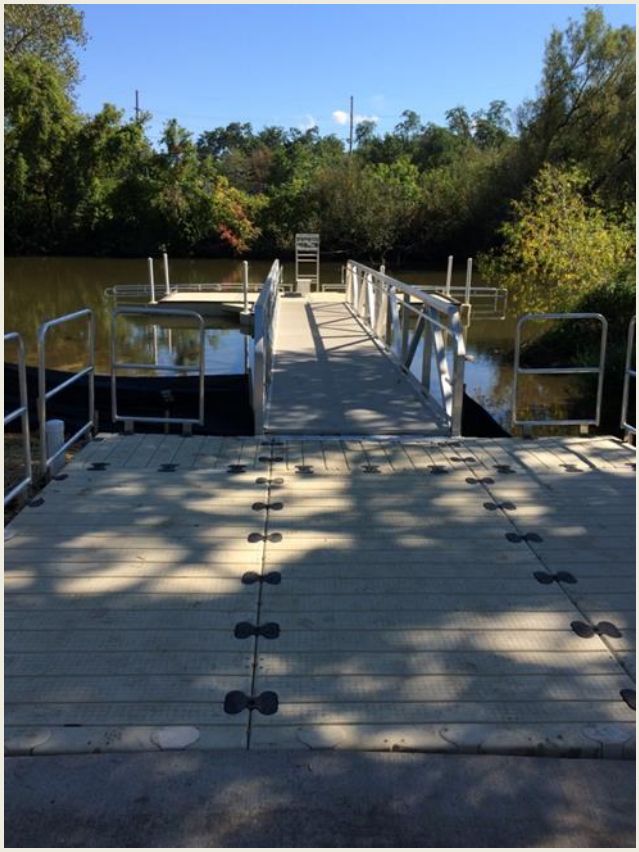
The Lake Michigan Coastal Program and partners worked together to develop a wide variety of events to celebrate the diversity and beauty of the Lake Michigan Coastal Region. Events highlighted natural, cultural and historic resources in the Coastal Region of Indiana - Lake, Porter, and LaPorte counties. The goal was to increase public awareness of these coastal resources and engage people in targeted activities that take them places they may have never been before. Coastal Awareness Month 2015 included nineteen events and many, many attendees

First ADA-compliant Canoe and Kayak Launch in the State of Indiana
Hansen Park, Michigan City, Indiana

The first ADA-compliant canoe/kayak launch system in the State of Indiana was completed and officially opened for paddling in September of 2015.

The DNR Lake Michigan Coastal Program provided $44,715.00 in funding for the project, which was matched by the City of Michigan City Common Council,

and the Michigan City Redevelopment Commission with strong support from the Mayor. Located in Hansen Park, on Trail Creek, in Michigan City, the launch system improves access to the Trail Creek Water Trail, as well as the Lake Michigan Water Trail.



The project was accomplished by the partnership of the DNR Coastal Program, the Michigan City Parks Department, the Michigan City Port Authority and the Northwest Indiana Paddling Association. Not only does it enhance the paddling and fishing experience in northwestern Indiana, it also makes it easier for young, elderly, and physically challenged individuals to access Trail Creek for recreational activities. Trail Creek has relatively high water quality, making it well-known to fishermen who take advantage of seasonal runs of coho, chinook, Atlantic salmon, steelhead, lake trout, brown trout.

Blue way trails were once a part of all commerce and travel before roads had been constructed. Rivers were the highway system of the early settler days, and Lake Michigan was at the heart of connecting the Mississippi River to the Atlantic Ocean. Water trails are an important and often overlooked recreational trail system. Water trails/blue way trails provide opportunities for people to be more physically active and to get out and appreciate nature. There are over 1500 miles of Indiana streams that provide paddling opportunities.

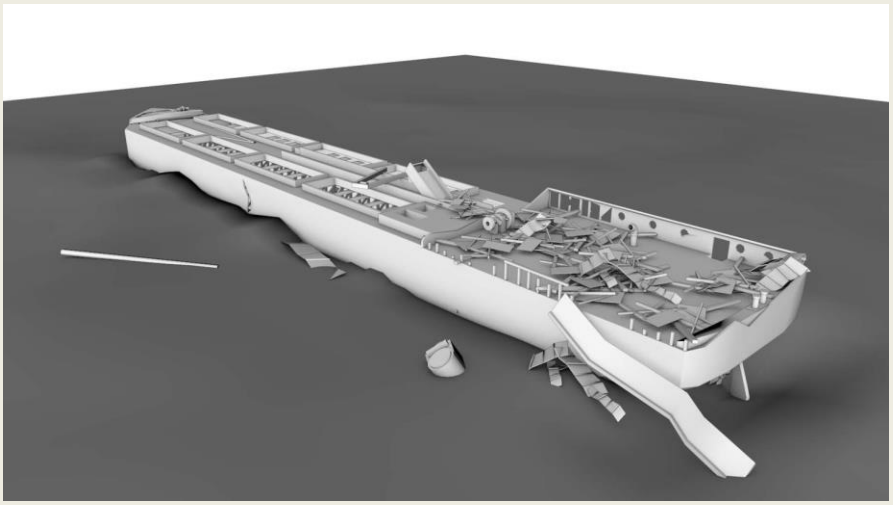
LMCP provides CELCP Funds to protect important bird habitat in Porter County:

The LMCP reallocated funding from the failed Moon Valley project to a Porter County Parks project. The Cain or Old Chicago road project protects approximately 137 acres of land. The property contains deciduous hardwood forest, including Oak and Hickory; fallow agriculture fields; and herbaceous wetlands.
The parcel is adjacent to or in close proximity of several protected areas as well as three National Audubon Society "Important Bird Areas," including the Heron Rookery Unit of the Indiana Dunes National Lakeshore, Reynolds Creek Fish and Wildlife Area, and protected dunes to the North.
Total project cost was $904,440. The project leveraged $452,220 of Federal CELCP funds with $245,300 from Bicentennial Nature Trust, $196,920 from The Conservation Fund, and $10,000 in seller donation.

You can now "Dive" Indiana shipwrecks from the comfort of your couch wearing pajamas…

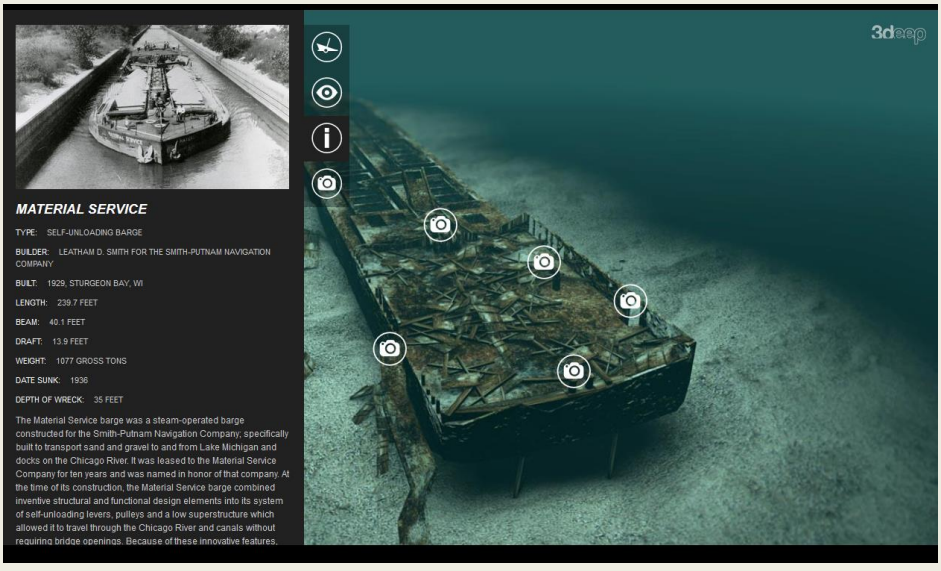
The LMCP and partners continued work on the shipwreck project. Building on previous efforts and success, the LMCP contracted with Commonwealth Cultural Resources Group to acquire additional information. The contractor collected new mobile sector scan sonar data of the *J.D. Marshall, Material Services, Car Ferry #2,* and *Muskegon* shipwreck sites. The new sonar data, existing site sketches and photos, served as the base for creating new 3D models of the four shipwrecks. The LMCP and DNR Communications staff overhauled the shipwrecks website. The revision includes new data and the 3D virtual tours. See www.indianashipwrecks.org for more information.

The new and improved site had over 18,000 website hits in last 6 month period – 18 times as many as entire LMCP website for entire year.



Material Service "wire" model

Material Service textured online model



Mighty Acorns Program in Northwestern Indiana's Lake Michigan Coastal Region

Mighty Acorns is a conservation education program that provides 3-6 graders with hands-on stewardship, engaging students and educators in year-round experiential learning opportunities that benefit quality of life in the region and provide conservation benefits to sites in local communities. Mighty Acorns participate in study trips where they restore native habitats, study ecology through hands-on activities, and explore their natural surroundings. Having worked hard to protect the environment, Mighty Acorns are rewarded with the opportunity to apply to attend Dunes Learning Center's Mighty Acorns summer camp at a greatly reduced cost.

The Northwest Indiana Mighty Acorns Partnership is a collaboration between Dunes Learning Center, Shirley Heinze Land Trust, and the Field Museum of Chicago. Dunes Learning Center received a $50,000 grant from the Lake Michigan Coastal program to fund delivery and expansion of the Mighty Acorns program within Northwest Indiana's Lake Michigan watershed during 2014-15.

NW Indiana Septic System Coordination Workgroup

In 2013 the LMCP, as part of the Coastal Nonpoint Pollution Control Program, established the NW Indiana Septic System Coordination Work Group to develop plans and project implementation strategies to address the impacts of failing septic systems on local water quality and public health. Since that time, in partnership with 14 federal, state, and local partners, the Work Group has conducted bi-monthly meetings, developed septic served area GIS mapping and database support, participated in outreach and education efforts, and facilitated coordination and information sharing between health departments and nonpoint source pollution control and prevention agencies and programs. In addition, a federal partner piloted focus groups across the coastal counties to assist in determining septic system owner knowledge of proper operation and maintenance and their go-to sources for information. In 2015 LMCP provided grant funding to a local non-profit Work Group partner to develop and implement a targeted Lake Michigan based outreach and education program to promote proper septic system operation and maintenance with a focus on the importance of inspection and pump outs. The Work Group partners promoted and participated in the annual EPA SepticSmart Week in September 2015 and engaged 43 local governments, agencies, and organizations to distribute SepticSmart operation and maintenance educational materials.

Appendix A: Division Staff through 2015

Nature Preserves Management

John Bacone	Division Director
Tom Swinford	Assistant Director
Cary Floyd	Projects Coordinator
Gail Riggs	Division Administrative Manager

Natural Heritage Data Center

Ron Hellmich	Natural Heritage Coordinator
Robin Wilson	Heritage Data Manager
Roger Hedge	Heritage Ecologist
Mike Homoya	Heritage Botanist
Matt Wyrick	Protection Director

Regional Ecologists *

Andrew Reuter	**Central**
Ryan Keller	**Southwest**
Rich Dunbar	**Northeast**
Tom Post	**Northwest**
Ben Hess	**East Central**
Derek Nimetz	**Coastal**
Jason Larson	**Southeast**
Emily Stork	**Grand Calumet**

***See Appendix C, Map 1: Regionals Service Area

Regional Ecologist Part-time and Intermittent Staff

Paul Osborn	John Petzl
Jessica Gomez	Mike Schmidt
Anne Crecelius	Ira Auffenberg
Fred Affolder	Al Schott
Lorraine Shier	Jesse Parsons
Brian Abrell	Tom Walstra
Brian Grieger	Matt Wise
Adam Delucaney	Nate Simons
Tina Flanigan	Angel Korte
Phil Bieberich	Joshua Grubaugh

Lake Michigan Coastal Program

Mike Molnar	Program Manager
Kacey Alexander	Operations Manager
Maggie Byrne	Grants Specialist
Vacant	Coastal Resources Planner
Dorreen Carey	Special Projects Coordinator

LMCP Seasonal Staff

Dejan Koch

Appendix B: Owners of Nature Preserves

County and City Partners

Allen County Parks and Recreation
Bartholomew County Parks and Recreation
Bloomington Parks Board
City of Elkhart
Evansville Park Board
Ft. Wayne Park Board
Town of Fishers
Harrison County Parks and Recreation
Indy Parks
Jennings County Community Foundation
LaGrange County Parks Board
Lake County Parks and Recreation
LaPorte County Parks and Recreation
LaPorte County Conservation Trust
Muncie YMCA
St. Joseph County Parks and Recreation
Steuben County Parks and Recreation
Terre Haute Park Board
Town of DeMotte
Vigo County Parks and Recreation

Federal Partners

U.S. Fish and Wildlife Service
US Environmental Protection Agency
NOAA Office for Coastal Management

University Partners

Goshen College
Indiana State University
Purdue University
Wabash College

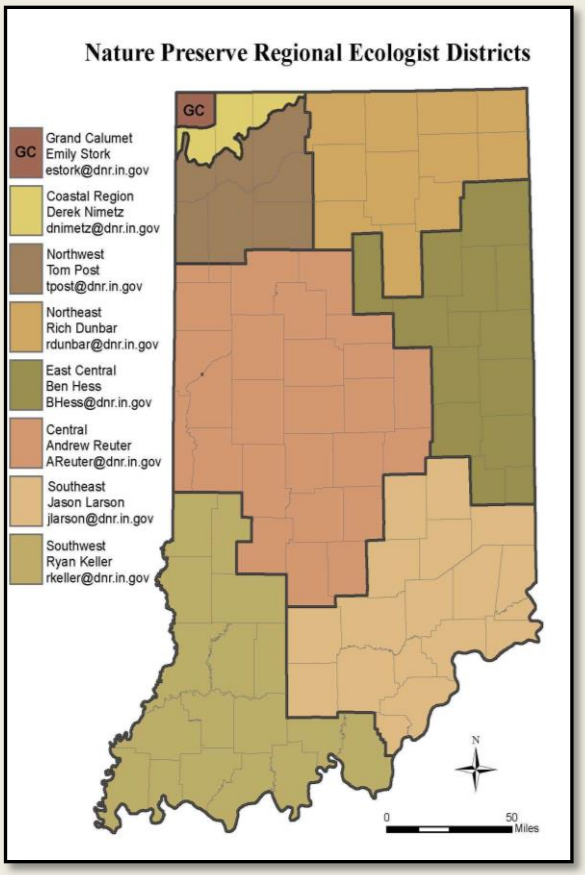
State Partners

DNR Forestry
DNR Fish and Wildlife
DNR State Museum and Historic Sites
DNR State Parks and Reservoirs
State Board of Health

Land Trust and Non-Profit Partners

ACRES Land Trust, Inc.
Central Indiana Land Trust (CILTI)
Indiana Karst Conservancy
Izaak Walton League
NICHES Land Trust
Red-Tail Land Conservancy, Inc.
Shirley Heinze Land Trust
Sycamore Land Trust (SLT)
The Nature Conservancy (TNC)
Whitewater Valley Land Trust
Oak Heritage Conservancy
Ouabache Land Conservancy
Save the Dunes

Appendix C: MAPS



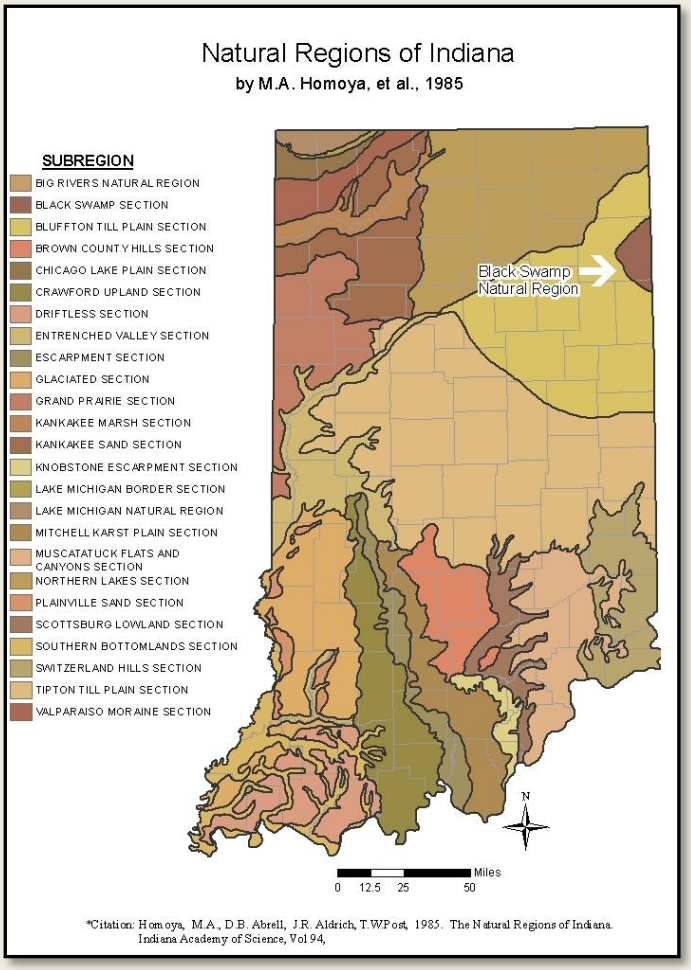
Map 1.

Geographic area of the

Eight Regional Ecologists

for the

Division of Nature Preserves.



Map 2.

Natural Regions of Indiana