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Volume 13

Issue 1 *The Science and Practice of Managing  
Forests in Cities*

Article 12

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2020

## Evolution in Natural Area Monitoring at Indianapolis Parks

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### Recommended Citation

Howard, Brenda S.; Goehl, Spencer A.; and Jenkins, Michael A. (2020) "Evolution in Natural Area Monitoring at Indianapolis Parks," *Cities and the Environment (CATE)*: Vol. 13: Iss. 1, Article 12.

DOI: 10.15365/cate.2020.130112

Available at: <https://digitalcommons.lmu.edu/cate/vol13/iss1/12>

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## Evolution in Natural Area Monitoring at Indianapolis Parks

The Indianapolis Land Stewardship (ILS) team's first restoration was in 1992 with high school students planting acorns in a 13-acre field. Since then, managed acreage has increased to nearly 1,900 acres across 37 parks. ILS' monitoring has evolved to meet the challenges of an expanding program. This is accomplished through improved GIS tracking and mapping techniques. Additionally, scientific survey work has broadened from initially a few vegetation surveys to now include longer-duration studies and other taxa for a more balanced and complete assessment.

### Keywords

urban forest monitoring, urban forested natural area, urban forest restoration

## **INTRODUCTION**

The Indianapolis Land Stewardship (ILS) team's first restoration was in 1992 with high school students planting acorns in a 13-acre field. Since then, managed acreage has increased to nearly 1,900 acres across 37 parks. ILS' monitoring has evolved to meet the challenges of an expanding program. This is accomplished through improved GIS tracking and mapping techniques. Additionally, scientific survey work has broadened from initially a few vegetation surveys to now include longer-duration studies and other taxa for a more balanced and complete assessment.

## **CONTEXT**

ILS has utilized multiple monitoring tools throughout its history including baseline and follow-up surveys of diverse taxa, invasive plant mapping, and annual late-fall site visits to review impacts of completed work. Initially, GIS tracking and monitoring was done by ILS staff. As the ILS program grew, an effective system was necessary to track and monitor the increasing acreage under management. Today, an ecological services contract is the primary means of GIS tracking and restoration activities. Part of the contract requires activities be documented with GIS files. This approach has streamlined post-treatment monitoring, allowing ILS to practice adaptive management and institute an early detection and rapid response (EDRR) program for invasive species. ILS has expanded other types of monitoring including baseline and repeat surveys of diverse taxa, invasive plant mapping, and detailed annual stewardship plans. These have proven to be important tools for monitoring stewardship activities.

## **GOALS**

ILS's monitoring goals are three-fold and aim to accomplish the following

- Use monitoring to inform stewardship efforts, practice adaptive management, and permit EDRR of invasive plant species.
- Grow the number of acres under ILS management while maintaining only a three-person staff.
- Further the mission of protecting and managing natural habitats for people, wildlife, clean air, and clean water while increasing the efficiency of stewardship efforts.

## **APPROACH USED**

### **Surveys and Monitoring**

Baseline surveys and repeated monitoring is valuable to gauge successful stewardship and meet diverse conservation goals. Efforts implemented include surveys of vascular plants, breeding birds, and herptiles and monitoring of deer browse effects and bat species. Those efforts are prioritized for critical habitats. Many surveys were initiated due to the presence, or suspected presence, of a state-listed species. Baseline surveys, representing a starting point in time, help

determine management options and any special concerns to address. Repeated monitoring quantifies change over time and gauges the effectiveness of restoration efforts, which allows for adaptive management to ensure goals are being met.



Image 1. Marker installation for permanent survey plot at Eagles Crest Nature Preserve at Eagle Creek Park,. Photo credit: City of Indianapolis, Land Stewardship.

### **GIS Tracking/EDRR Program**

Advances in technology have enabled contracted ecological services restoration technicians to track field visits through GPS breadcrumb trails, a GIS line file of everywhere they work. Technicians also mark data points for EDRR species and file reports with both ILS and Early Detection & Distribution Mapping System (EDDMapS). These reports are used to schedule initial and follow-up control of new invaders to ensure their control.

### **Invasive Plant Mapping and Follow-Up Monitoring**

Systematic, broad-level, invasive plant mapping provides a baseline of existing conditions which aids in strategic planning, implementation, and monitoring efforts. Mapping helps prioritize management efforts, informs herbicide tank mixes (allowing multiple species to be treated in a single pass), increases applicator efficiency by identifying precise outbreak locations, and aids in post-treatment monitoring to gauge the extent of control. This approach allows a review process to be used whenever control levels are not acceptable and spurs efforts to improve overall process efficiency and effectiveness.

## Marott Park wintercreeper monitoring: 85% reduction

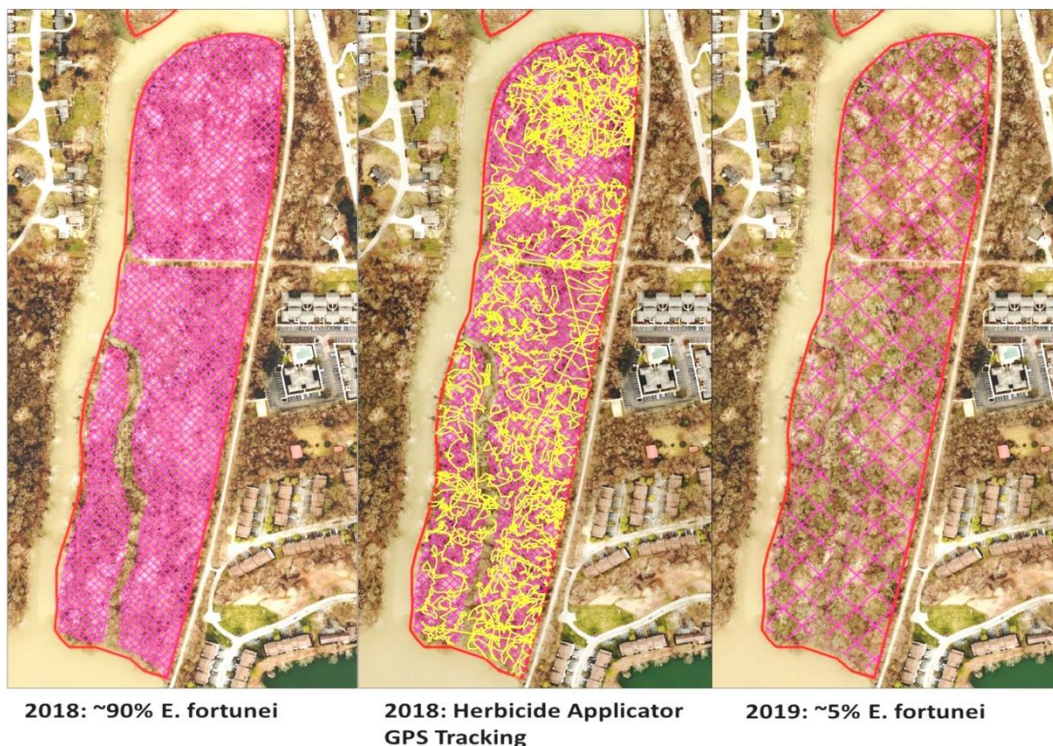


Image 2. Photo credit: Eco Logic, LLC.

### Site Visits

In addition to daily visits, annual site monitoring during the fall focuses on overall ecological health, creating stewardship plans for the next year and setting long-range site goals. Data is collected to track changes in vegetation and effectiveness of recently completed stewardship activities. As habitat quality increases, and less intensive management is needed, opportunities for expansion into new project areas can emerge.

### RESOURCES

Initially, ILS was housed under the Indianapolis Department of Parks and Recreation. Now in the Department of Public Works, the ILS budget has grown, culminating with an addition of stormwater funding that allows ILS to have a \$750K annual budget for an ecological services contract. The increased budget has allowed for expansion of monitoring and, therefore, more efficient use of resources. ILS has also utilized grants and cost-share from federal, state and non-profit organizations including U.S. Fish & Wildlife Services, Indiana Department of Natural Resources, Indiana Wildlife Federation, and others.

## KEY RESULTS

- Monitoring of deer browse has documented the recovery of vegetation communities, thus providing key support for the successful implementation of the deer reduction program. Initial deer browse surveys indicated a need for a reduction in the deer population, while follow-up surveys documented the recovery of vegetation communities with decreased deer abundance. Continued monitoring is important in determining the frequency needed for deer reduction efforts.
- Breeding bird surveys have revealed a loss of species diversity as reforestation plots matured, emphasizing the need for shrubby, early-successional habitats as well as mature, closed-canopy forests. This monitoring has led to adjustments in restoration efforts to include additional shrubby, early-successional woods in order to maintain a greater array of bird species.
- Annual monitoring is streamlined by GIS breadcrumb and point data taken during restoration activities. This allows for increased accuracy and aids future management plans.
- Broad-level invasive plant mapping with GIS gives applicators a geospatial location for handling outbreaks efficiently while post-treatment monitoring and mapping determines the percentage of areas requiring follow-up control.

## ADDITIONAL RESOURCES:

Land Stewardship Master Plan, overview of ILS program:

<https://citybase-cms-prod.s3.amazonaws.com/0ed01295a33f482c9d16a71e8ad43c79.pdf>

### Nature preserve floral inventories:

- Floral Inventory: 1996 Spring Pond;  
[https://issuu.com/andrewstephens/docs/spring\\_pond\\_1996\\_-\\_floral\\_inventory](https://issuu.com/andrewstephens/docs/spring_pond_1996_-_floral_inventory)
- Floral Inventory: 2007 Spring Pond Nature Preserve;  
[https://issuu.com/andrewstephens/docs/spring\\_pond\\_2007\\_-\\_floral\\_inventory](https://issuu.com/andrewstephens/docs/spring_pond_2007_-_floral_inventory)
- Floral Inventory: 1997 Eagles Crest Nature Preserve;  
[https://issuu.com/andrewstephens/docs/eagles\\_crest\\_1997\\_-\\_floral\\_inventor](https://issuu.com/andrewstephens/docs/eagles_crest_1997_-_floral_inventor)
- Floral Inventory: 2007 Eagles Crest;  
[https://issuu.com/andrewstephens/docs/eagles\\_crest\\_2007\\_-\\_floral\\_inventor](https://issuu.com/andrewstephens/docs/eagles_crest_2007_-_floral_inventor)

### Deer browse studies:

- Assessment of White-tailed Deer Browsing on Understory Vegetation within Spring Pond and Eagle's Crest Nature Preserves in Eagle Creek Park, Indianapolis, IN;  
[https://issuu.com/andrewstephens/docs/indy\\_parks\\_-\\_scanned\\_reports\\_2003-2](https://issuu.com/andrewstephens/docs/indy_parks_-_scanned_reports_2003-2)
- Effects of herbivory by white-tailed deer on forest vegetation in Eagle's Crest and Spring Pond Nature Preserves, Eagle Creek Park, Indianapolis, Indiana;  
[https://issuu.com/andrewstephens/docs/eagle\\_creek\\_report\\_jenkins\\_2013](https://issuu.com/andrewstephens/docs/eagle_creek_report_jenkins_2013)

### Outside resources utilized:

- To report invasive species and track threats in state and nationwide: EDDMapS Report IN. 2019. Early Detection & Distribution Mapping System. The University of Georgia - Center

for Invasive Species and Ecosystem Health. Available online at <http://www.eddmaps.org/indiana>; last accessed December 3, 2019.

- To report rare, threatened, and endangered species occurrences: Indiana Natural Heritage Data Center; <https://www.in.gov/dnr/naturepreserve/5628.htm>