



**ILLINOIS NATURAL
HISTORY SURVEY**
PRAIRIE RESEARCH INSTITUTE

Re-evaluation of Existing Category I
Illinois Natural Areas Inventory Natural Areas
As part of the Illinois Natural Areas Inventory Update Project.
Final Report

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RE-EVALUATION OF EXISTING CATEGORY I ILLINOIS NATURAL AREAS INVENTORY AREAS AS PART OF THE ILLINOIS NATURAL AREAS INVENTORY UPDATE PROJECT

FINAL REPORT



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Executive Summary

The re-evaluation of INAI sites discovered between 1978 and 2007 began in late summer of 2008 and continued to early fall of 2011. A total of 664 existing Category I Illinois Natural Areas Inventory (INAI) sites were identified in the original proposal for re-evaluation for this project. Through discussions and clarifications with the Illinois Department of Natural Resources (IDNR), this re-evaluation list was reduced to 648 unique sites. Sites were also rejected for re-evaluation (10%) if communities in the initial list were duplicated (extra listing or sites spanned two counties were deleted), were not vegetation-based communities, such as caves, open water, etc. (37 sites), railroad prairies where land owner contact would be denied (24 sites), or they were designated INAI sites after the project began (6 sites). Some sites (9%) were not visited if land owner contact information was not available (42), or access was denied (14). The remaining sites were divided into 3 groups, by geographical area, one group to be visited per field season. A total of 525 (81%) sites were visited for this project.

There are three key findings from this re-evaluation of INAI sites. First, Natural area management is essential to the continued existence of these sites. Natural areas that received moderate to intensive management maintained or improved their natural quality over time. Natural areas that did not receive management have degraded or vanished. Second, small, fragmented natural communities (e.g. hill prairies) and those subject to significant degradation from off-site factors (e.g. marshes, sedge meadows) are especially at risk of disappearing state-wide. And third, prescribed fire at remedial and maintenance regimes is critical to the long-term viability of most natural areas and communities in Illinois. Fire not only helps achieve more natural conditions on the sites, but also prevents degradation by invasive species – the #1 management threat to natural areas generally.

Final Report for the Re-evaluation of Existing Category I Illinois Natural Areas Inventory
Natural Areas, as part of the Illinois Natural Areas Inventory Update Project.

2008 – 2009 First Field Season

The project has a number of problems to overcome before field work could begin. The first major problem was obtaining current Land Owner Contact (LOC) information. A formal request for LOC information was made to IDNR in the fall of 2008. The list received from IDNR contained 932 records because many sites involve multiple landowners or cross county boundaries. Of the 932 records received, 255 had no contact information, 481 had full contact information including phone numbers, 105 had address only, and 91 had fragmented contact information. Within this list there were 4 sites that were listed as “Do Not Contact.” The land owner contact list for the 2009 field season was overlain with Rockford Plat Maps and heavily researched to find possible land owners, however 69 sites for the 2009 field season have no information. Searches were conducted on-line, but that proved time-consuming and ineffective.

The second challenge was the lack of original INAI files and maps. Of the 648 original sites to be visited, only 174 files were received. AES staff received a handful of this information from the DNR and the remainder was provided from local contacts. Of the 174 files that were received, 29 were missing maps and 7 were not legible. AES employees spent 2 days at the IDNR office in Springfield, Illinois reviewing and scanning historic INAI field notes. All of the materials in the original INAI field notes were scanned in the IDNR Springfield office (species list, field notes, maps, etc.). A total of 30 sites were scanned. In the fall of 2009 the team determined that getting scanned files was a priority and hired a temporary employee to scan all original INAI files in the IDNR Springfield office. Mr. John Wilker at IDNR supervised this work and assisted in identifying, organizing and working out the scanning protocol for this project.

The third challenge was the delayed completion of the GIS-based Natural Areas Tracking System (NATS). The NATS program was incomplete when it was delivered to the INAI project. This tool was completed in May, 2009 by Mr. George Krumins of the Illinois Natural History Survey and Ms Cindy Whitehead of AES, as part of the INAI update project, but that was too late for the field biologists to use it in the field. Therefore, AES ecologists used paper forms for data entry for the 2009 field season. In the fall of 2009, AES staff began entering the field maps and data into the computer using the NATS program developed by the IDNR. Forty sites were entered by the end of December, 2009. The remaining sites were completed by February, 2010.

In 2008-2009, field work was conducted in Northern Illinois, concentrating in Boone, Carroll, Cook, DeKalb, DuPage, Grundy, Iroquois, JoDaviess, Kane, Kankakee, Kendall, Lake, Lee, McHenry, Ogle, Stephenson, Whiteside, Will, and Winnebago counties. For this field season, 233 sites were identified for re-evaluation in the targeted counties. As a result of missing LOC information and a lack of original base maps, a total of 139 sites were scheduled to be visited in

the 2009 field season. The remaining 94 sites were to be visited in the 2010-2011 field seasons as LOC information and original base maps become available.

During this period, 23 sites in Cook, McHenry, and Winnebago counties were visited in 2008 and 116 sites in Carroll, Cook, DuPage, Grundy, Kane, Kankakee, Lake, McHenry, Ogle, Whiteside, Will, and Winnebago counties were visited in 2009. In total, 139 sites containing 184+ natural communities were studied and were found to have very high and/or high quality natural community remnants. This amounts to approximately 95% of the sites originally documented. The majority of the remnants reflecting minimally disturbed conditions were concentrated in the 6-county Chicago Region. This was expected, as fully 1/3 of the natural areas reported in the previous inventory were found in this area. The vast majority of the natural areas examined had been somewhat disturbed, but not sufficiently enough to be considered less than their presettlement ancestors. Those in the best condition were intensively managed primarily by public landowners or private owners for whom conservation was their principal function.

All of the natural communities represented on the original Illinois landscape were discovered in the 164 remnant sites. Prairies of all types were well-represented in these natural areas but, as in the first inventory, were relatively small compared to their original predominance on the Illinois landscape. However, most had improved in quality since the earlier inventory due to diligent management by both their owners' and dedicated volunteers implementing prescribed burning and adventive brush removal programs. In many cases these prairies are expanding due to restoration of adjacent disturbed communities. Remnant forests have retained their original quality but those dominated by oaks are succeeding to sugar maple dominated stands, as the latter are very shade tolerant and prolific seed producers. In the absence of maple thinning and periodic fires, these oak forests are decreasing in diversity at an accelerating rate. Deer browsing and increased shade has greatly reduced the abundance of summer-blooming woodland wildflowers and shrubs. Some deer management programs have helped to reverse this trend. Northeast Illinois has the largest, most numerous, and most diverse wetlands in the state. The great majority is still present, but they show a decline in the extent of high quality acreage compared to the late 1970's study. This is particularly true for marshes and some sedge meadows, as they have been or are being overrun by tall dense stands of hybrid cattail and common reed, both of which thrive on the excessive concentration of nutrients and salt in storm water runoff from adjacent development. Creating or expanding buffer lands around high quality wetland communities and diverting storm water away from them, as well as selective application of herbicides to invading cattails and reed, are needed to reverse this trend.

2010 – Second Field Season

The second field season began in mid-fall of 2009 and continued to mid-fall of 2010. During this period efforts focused on areas in central Illinois north of a line stretching from Vermillion County on the Indiana border to Adams County along the Mississippi River and ten counties in

extreme southern Illinois. In addition, some of the sites remaining from the 2009 northern Illinois region were completed. Field work was split between Southern and Central Illinois, concentrating on Alexander, Gallatin, Hardin, Jackson, Johnson, Massac, Pope, Pulaski, Saline, and Union in the south and Bureau, Ford, Fulton, Henderson, Henry, Knox, LaSalle, Livingston, Marshall, Mason, McDonough, McLean, Mercer, Peoria, Putnam, Rock Island, Tazewell, Union, Vermilion, Warren, and Woodford counties in Central Illinois.

For this second field season, 221 sites are identified in the targeted counties of Illinois. A formal request for land owner contact information for the 2010 field season sites was made to IDNR on December 5, 2009. Key Geographic Information System (GIS) datasets were identified to help with the LOC identification. Any INAI sites that are currently protected will be identified by this process. Mr. John Wilker at IDNR distributed the resulting list to IDNR field staff and Nature Preserves Commission staff for assistance with LOC identification. In all, LOC information was located for 190 sites containing over 250 natural communities.

At the end of the 2010 field season, 329 sites (139 from 2009 and 190 from 2010) were completed. Additional sites in northern Illinois, from the 2009/2010 list, were scheduled to be completed as time permits. In many cases, landowner approval was not received until late in the season or other factors did not allow access to the site at the scheduled time; therefore, 26 of these sites are rescheduled for 2011 sampling. Of the remaining incomplete sites, 32 had no contact information, 22 could not be reached with current contact information, 16 had multiple owners with only partial access granted, and 2 were denied permission. AES continued to work with IDNR staff to identify land owners for the remaining sites.

A total of 246 sites remain to be completed in the 2011 field season. Winter sampling on 107 woody communities was conducted for 63 sites in central and southern Illinois. During the winter months one team worked an extended work week (10 days on and 4 days off) in order to maximize time in the field and minimize travel expenses. Summer samplings began in April and continued through the end of September (2011). Sampling in 2011 utilized two field teams and focus on sites in central and southern Illinois. Targeted counties include Adams, Brown, Calhoun, Cass, Clark, Clay, Clinton, Coles, Crawford, Dewitt, Douglas, Edgar, Edwards, Effingham, Fayette, Greene, Hamilton, Hancock, Jasper, Lawrence, Logan, Macon, Macoupin, Madison, Marion, Menard, Monroe, Montgomery, Morgan, Moultrie, Perry, Pike, Randolph, Sangamon, Scott, Shelby, St. Clair, Stark, Wabash, Washington, and Wayne counties.

2011 – Third Field Season

Field work for the final year of the ecological re-evaluation of Category I Illinois Natural Areas Inventory (INAI) sites began in mid-December 2010 and continued to mid-October 2011. During this period, initial efforts were focused primarily in south-central Illinois with the majority of evaluated sites occurring in counties bordering the Mississippi and Illinois Rivers from Henderson to Randolph Counties and within the Kaskaskia, Embarras, Little Wabash, and

Wabash River watersheds. A total of 126 sites were evaluated in the south-central portion of Illinois. Additionally, 70 sites remaining from the 2009 and 2010 field seasons in northern, central, and extreme southern Illinois were completed. In all, a total of 259 communities from 196 sites were studied, with 192 communities from 149 sites retaining or being upgraded to, at least in part, high (B) and/or very high (A) quality natural community remnants. While a total of 40 different community types representing 17 subclasses were evaluated, hill prairies, southern flatwoods, and upland and floodplain forests comprised the largest majority of community types studied.

As in 2009 and 2010, grade changes amongst the natural communities studied indicate that the quality of most Illinois natural areas has been maintained or increased. A total of 115 natural communities retained, at least in part, their “A” or “B” quality and five more previously unranked communities were also determined to be of “A” or “B” quality. In addition, 28 communities increased in quality from a “B” to an “A.” Included within the 2011 totals are 15 moderate quality (C) or grade “C” Best-of-Type communities, of which six appeared to have improved, at least in part, so much that they were suggested for addition to the INAI through the companion INAI Update Project. In contrast, 57 natural communities decreased to moderate (C), low (D), and/or cultural (E) quality, which puts them below INAI inclusion standards. However, a total of 39 natural communities decreased only from “A” to “B”, therefore retaining their INAI quality. This rather “rosy” picture of Illinois’ natural areas may be modified negatively by possible analyses of changes in total extent or acreage of high and very high quality communities. Certainly general assessments during the field work indicated that many high quality natural communities, especially those with insufficient management, have decreased in size.

Essentially, about 75% of forested communities (upland, floodplain, and flatwoods) studied remain as high and/or very high quality. Amongst the 65 upland forest communities evaluated, 48 (72%) were considered of moderate to low quality. Those found to be of lower quality than in the original INAI were primarily suffering from exotic species invasion (i.e. *Lonicera maackii*) and/or a dense understory layer of native shrubs and saplings as a result of irregular prescribed fire or complete fire suppression during the past few decades. In effect, the increased understory stem density reduces richness and diversity of characteristic and conservative ground layer species. However, several examples of grade “A” mesic or dry mesic upland forests were observed in southeastern Illinois, including Robeson Hills (Lawrence County), American Beech Woods and Miller Tract (both in Clark County), Dean Hills (Fayette County), and Warbler Woods (Coles County), all of which have increased from grade “B” to grade “A” quality since their original designation. Upland forests in this region are somewhat unique to Illinois because of their strong floristic affinity to the Eastern Deciduous Forest Region. In contrast to mesic upland forests, grade “A” examples of dry-mesic upland forests were very difficult to find because of their dependence on natural disturbances (i.e. fire) and brush thinning. Where this has occurred (e.g. Emma Vance Woods in Crawford County), a higher grade was achieved.

A similar situation was observed with the 14 high and/or very high quality southern flatwoods evaluated, a community type mostly restricted to Illinois' Southern Till Plain Natural Division. A total of four (29%) were considered moderate in quality primarily as a result of fire suppression, allowing a considerable increase in native and non-native understory stems in these historically more open communities. Additionally, one moderate quality flatwoods was evaluated, but was not determined to be of INAI qualifying status. The majority of high quality southern flatwoods occur in Washington County, with two very high quality examples being Big Open Woodland and Sipple Slough Woods, both on terraces above the Kaskaskia River.

In regards to floodplain forests, only 6 of 28 (21%) evaluated showed significant disturbances to warrant a grade "C" rating. The majority of floodplain forest communities downgraded were the result of hydrological alterations or excessive flooding (i.e. 1993) that has resulted in significant canopy death and treefall creating large canopy gaps. In some cases there does remain some old or old-second growth, but groundlayer composition is often rather poor as a result of the altered hydrological conditions, usually being dominated by disturbance tolerant species, with few conservatives present.

Mild to moderate logging and/or storm damage was observed occasionally within forested communities. However, there were only four instances, two upland and two floodplain forests, where excessive, essentially canopy clear-cutting, resulted in downgrading the community to a grade "C." In fact, it was often noted that canopy structure of the 22 downgraded upland forests and southern flatwoods communities was still very much intact, suggesting that ground layer richness and diversity would likely respond very well with a re-introduction of a regular burning and brush cutting program.

Hill prairie community types constituted about 1/5th of the total communities evaluated during the 2011 field season; the vast majority being loess and glacial drift hill prairies. Amongst all 52 hill prairies evaluated, 12 of 35 (34%) formerly INAI qualifying loess hill prairies were considered moderate quality, while all 14 glacial drift hill prairies, one gravel hill prairie, and two sand hill prairies were determined to retain their grade "A" and/or "B" status. Additionally, two grade "C" loess hill prairies were evaluated, with one considered, in part, to be of high quality. Nearly all of the loess hill prairie communities evaluated were experiencing at least mild woody encroachment from a variety of native and non-native invasive species, with many having moderate to severe encroachment issues. There were a select few that appeared relatively unchanged since the original inventory, likely a result of a consistent management program (i.e. prescribed fire and brush removal) over the past few decades. Excellent examples are the Chandlerville-Snyder and Panther Creek Hill Prairie sites in Cass County. However, a large majority, regardless of current quality, have experienced considerable reductions in total extent of open prairie. It is apparent that fire suppression and/or infrequent prescribed fire and brush cutting activities have resulted in rapid woody encroachment since the original INAI study. In some cases it was noted that an infrequent fire regime had resulted in aggressive growth and spread of shrubs and saplings, such as *Sassafras albidum*, *Rhus glabra*, etc.

While all 14 glacial drift hill prairies studied remain as high or very high quality, a total of five were downgraded from grade “A” to “B” status. As was the case for loess hill prairies, the grade drop for the five glacial drift hill prairies was the result of moderate woody encroachment, in effect, altering overall structure, while retaining a typical composition. Lack of fire and brush removal was the cause of this successional process. Two fine examples of grade “A” glacial drift hill prairies are the Greene Prairie (Jasper County) and the Hopewell Estates Hill Prairie (Marshall County).

A total of 12 glade communities, one shale, one sandstone, and 10 limestone, were evaluated during the 2011 project year, all of them occurring within southwestern and extreme southern Illinois Counties. Of the 10 limestone glades evaluated, only six (60%) were considered of grade “A” or “B” status. While forest succession and/or moderate to severe woody encroachment was observed in nearly all of the limestone glades visited, the majority of those remaining on the inventory exhibited at least irregular signs of fire and/or brush cutting management. Of the four limestone glades considered moderate in quality, three have been nearly eliminated due to forest succession or severe bush honeysuckle (*Lonicera maackii*) invasion. Both the sandstone and shale glades evaluated showed minimal signs of disturbance and remain of INAI quality.

Several wetland community types were also assessed during the 2011 field season, including shrub swamps, swamps, marshes, and seeps. A total of nine shrub swamp and three swamp communities were evaluated within southern and south-central Illinois. All three swamp communities, occurring within the Bottomlands Section of the Coastal Plain Natural Division, have retained the majority of their original grade “A” and/or “B” extent. While mild to moderate hydrological disturbances and/or siltation were often noted for southern Illinois swamps, the majority appear to be relatively stable. The Little Black Slough – Heron Pond Natural Area (Johnson County) likely contains some of the highest quality swamp remaining in the state.

In contrast, of the nine shrub swamps evaluated during the 2011 project year, only four (44%) were considered as grade “A” and/or “B” in quality. Hydrological and water quality disturbances were the primary factors in downgrading most shrub swamps. Shrub swamps visited with hydrological alteration were either nearly devoid of vegetation, including shrubs, or were undergoing forest development. Furthermore, several shrub swamps visited had rather poor water quality resulting in deficient growth conditions for aquatic and emergent forbs. It is possible that the extended flood of 2011 allowed an increase in pollutants and/or sediments. Improved growth conditions may be present in the coming years, but currently, the quality of these shrub swamps appears to have declined.

Of the four grade “B” marshes evaluated in south-central Illinois, all but one retained its INAI quality. All are negatively impacted slightly by siltation and/or hydrological alteration. One marsh in northern Illinois is a grade “C” best-of-type which lost over 90% of its moderate quality acreage due to nutrient overloading.

Nine seeps and fens were evaluated in 2011, four in south-central Illinois and five in northern and central Illinois. All nine retained some “A” and “B” quality seep vegetation, indicating that they have experienced little to no hydrological alteration, likely due to their rural location and a vegetation buffer around them. One seep lost some of its “B” quality acreage to active cattle grazing. Nowhere is the importance of buffer better illustrated than at the large groundwater-fed grade “A” and “B” Kyte Creek graminoid fen in Ogle County.

A number of communities represented by a small number of sites and very small acreages were completed in 2011. Only three high or very high quality, and one moderate quality, black soil prairies were evaluated in south-central Illinois’ Southern Till Plain Division. The majority of the original prairie of this type has been converted to row crop agriculture, so the low number was not unexpected. Over half of these prairie remnants were located on right-of-ways. For the most part, the quality of these prairies has remained unchanged or slightly increased. Nineteen additional black soil prairies were field-checked in northern and central Illinois, the 2009 and 2010 target geographic areas. All but four of these prairies remained of INAI quality; three very large examples of this prairie type are in the 2500-acre Goose Lake Prairie State Park and they were passed on to the INAI Update Project as all were originally considered “C” quality. Goose Lake Prairie is the largest prairie remnant in Illinois. It is a vast mosaic of mesic, wet-mesic, and wet prairie punctuated by pothole marshes. AES staff rechecked large areas designated as potentially of high quality on a sketch map in the original site file and confirmed that very large areas of high quality mesic and wet mesic prairie now exist after 30 years of intensive IDNR management.

Sandstone and limestone/dolomite cliffs are protected well from human disturbance by their steep to vertical structure. Most are grade “A” unless they are impacted by soil erosion on their upper, usually forested, ledges ; trampling of talus by off-trail hiking at their bases; or wave washing due to high water in the streams below them. Six cliff communities were evaluated in 2011; four sandstone and two limestone/dolomite. Three of them did show some degradation due to the factors described above, but all but one remained of “A” or “B” quality. One of the finest and largest examples of a cliff community is the Waukarusa Canyon (Carroll County), a nearly mile-long, edaphically diverse dolomite cliff imbedded in a very rich mesic upland forest.

A total of 10 barren and savanna communities were evaluated during the 2011 field season. Four of five INAI qualifying barren remnants, and one formerly non-qualifying “C” barren, were considered to be of very high quality and had an exceptionally rich flora composed of prairie, open woodland, and drought tolerant species. All five of these barrens, three of which showed increases from previously lower ratings, were intensively managed by their highly dedicated land stewards and are worthy of special mention because of the rarity of any good examples of this community: McKee Creek Barrens (Adams County), Beadles Barrens (Edwards County), Cedar Glen Kibbe (Hancock County), and Shoal Creek Barrens (Montgomery County). The four INAI qualifying savannas maintained ratings of “B” (3) or increased to “A” (1); one additional grade “C” savanna remained as moderate quality. It is apparent that diligent management using

frequent prescribed burning, extensive brush/tree cutting, and herbicide treatment of problem exotics has maintained or increased the quality of these remnant communities. In many of these savanna and barren remnants, management activities have been extended into bordering woodlands, increasing the potential for larger natural community mosaics and decreasing the threat of degradation by the factors which now make them so rare.

By the close of the 2011 INAI Category I field season in mid-October, staff ecologists had completed all sites for which access was granted from landowners. The total number completed in this final year exceeded that for the first two years of the project, largely due to intensive and successful attempts to contact private landowners for sites remaining from the 2009 and 2010 field seasons in northern, central, and extreme southern Illinois. Increased collaboration with and enhanced efforts by Illinois Department of Natural Resources personnel undoubtedly aided in this success. Additionally, transect sampling was not completed for sites visited during the spring and summer months in an attempt to evaluate as many of the remaining sites as possible. For the most part, only herbaceous transect sampling data is lacking for 2011 sites, as woody sampling was completed for 56 forested sites during the winter months.