Plants of Concern: Standardized Rare Plant Monitoring Using Trained Volunteers

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Final Report to Chicago Wilderness and the Illinois Conservation Foundation Grant FS 0504

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Chicago Botanic Garden
Report to Chicago Wilderness
On Plants of Concern:
Standardized Rare Plant Monitoring Using Trained Volunteers

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PLANTS OF CONCERN: CONCEPT AND OBJECTIVES

In 2001, Plants of Concern (POC) was launched. This long-term rare plant monitoring initiative is unique to the region in its use of standardized monitoring protocols. The program has now completed six years of monitoring and has accumulated a substantial base for gathering long-term data on a significant number of species and Element Occurrences.

POC addresses the following needs, as presented in the *Chicago Wilderness* (CW) *Biodiversity Recovery Plan:* to document the locations of rare species, to provide long-term monitoring of the status of rare species populations, and to track their response to management. This information provides managers with the scientifically-acquired data needed to address management problems on their sites and can be used to understand the status of individual Element Occurrences (EOs) as well as multiple populations of a species across the region. On a regional scale it builds the basis for collaboration in adapting, developing, and implementing management strategies that will ensure the presence of these species on a sustainable and stable basis. This long-term monitoring will allow CW to determine at regular intervals the status of rare plant populations in relation to a monitoring baseline and management practices.

In *Chicago Wilderness, 2006: The State of Our Chicago Wilderness. A Report Card on the Ecological Health of the Region*, POC was cited as playing a key role in measuring the status of rare plants. "The most notable progress toward the Biodiversity Recovery Plan goals for endangered and threatened species is the development of a region-wide monitoring program and common database for rare species … Plants of Concern" (Attachment 1)

Species monitored by POC have been selected from the 1999 *Chicago Wilderness Biodiversity Recovery Plan's* species priority list because they are state endangered or threatened and are considered by regional land managers and ecologists to be rare and significant within the CW region. The non-listed species monitored by POC are "species of concern" that represent the interests of individual landowners in the rare species that they wish to track at the county level. This list has been distributed to the Advisory Group, and landowners are encouraged to create new monitoring assignments to track these rare species in their areas. Another species group, indicator plant species that are not necessarily rare, may be added to the program through the CW Strategic Pipeline's Regional Monitoring Plan.

The geographic area covered by POC since 2001 has been the six counties of NE Illinois (Attachment 2), with a few sites in NW Indiana added in 2006. It is the hope of CW and the POC program to see implementation, if not administration, of POC protocols in all areas included in CW.

POC incorporates the following five interrelated elements, all equally important to its success. Through them POC is becoming recognized as a unique, viable, long-term monitoring program:

- Monitoring rare plants, particularly state-listed species, using an expanded census protocol over time to discern population trends within a management context (Level 1, Attachment 3). Selected species have been targeted for more intensive demographic monitoring (Level 2). Since 2004, after four years of Level 2 work and a seed viability study for each species, a modified Level 2 program has continued, much of it through research projects coordinated by CBG researchers.
- Monitoring rare species in relation to management activities reported by monitors and land managers (Attachment 4) to form a feedback loop for short and long-term adaptive management responses.
- Using Advisory Group approved standardized protocols throughout the region to gain uniform data on a regional basis.
- Training volunteers as citizen scientists to significantly leverage agency resources for monitoring rare species and to create an informed conservation constituency.
- Working collaboratively with public and private landowners, land managers, and agencies, through an Advisory Group (Attachment 5) to generate a shared approach to regional monitoring.

SUMMARY: CUMULATIVE MONITORING RESULTS 2001 – 2006

In 2006, the project's sixth year, POC again saw increases in the number of species, sites monitored, and landowner involvement. Retention of Element Occurrences (EOs) was high, with 52% of EOs (listed and non-listed) monitored in previous years also monitored in 2006. In 2006, 105 new EOs were monitored. The element occurrences of the 99 listed species monitored by POC in the six northeast Illinois counties represent approximately 40-45% of the listed EOs in the region, as recorded by the Natural Heritage Database. The following overview, graph and table are detailed in the remainder of the report and in Attachments 6-8.

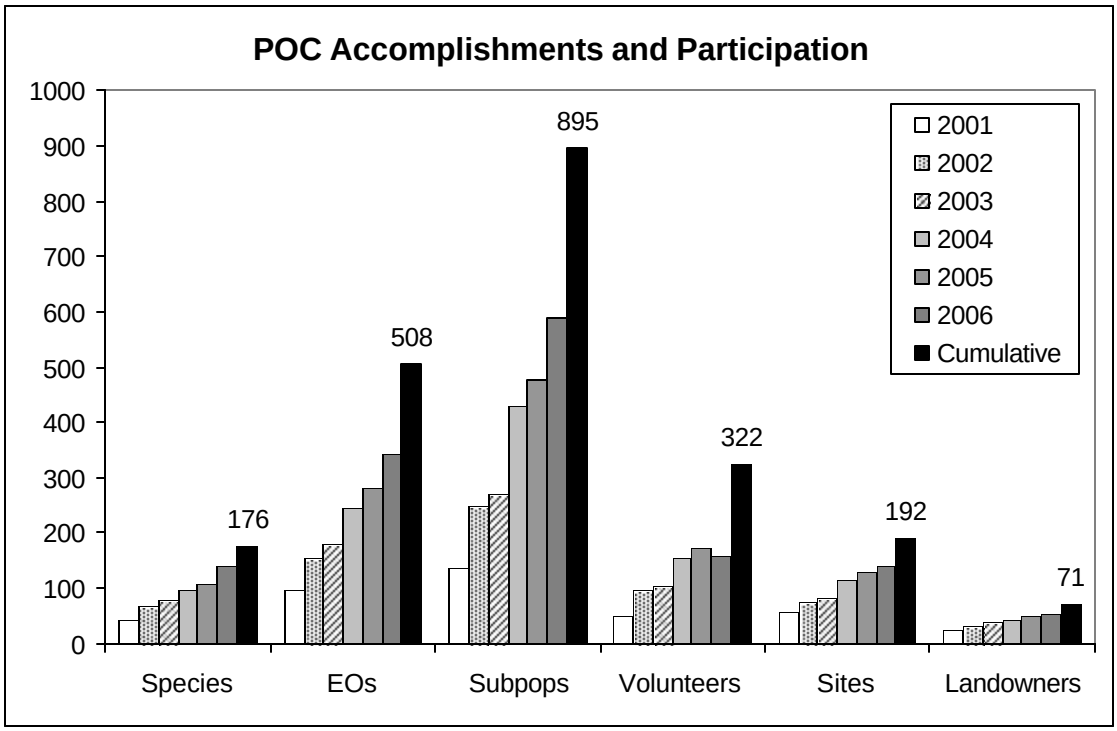


Figure 1. POC accomplishments and participation for all years, 2001-2006.

Table 1.

	2001	2002	2003	2004	2005	2006	Cumulative
Species	44	69	78	96	108	140	176*
EOs	96	155	180	245	279	343	508
Subpopulations**	136	248	269	427	477	591	895
Volunteers	51	96	103	153	172	160	322
Sites	58	76	83	115	131	140	192
Landowners	25	34	41	42	49	53	71

** Includes 99 listed and 77 rare, non-listed species. (See Attachment 9)*

***A subpopulation is defined as a grouping of a species within the same EO that is tracked separately because it is located more than 50 meters from another grouping or because the grouping is within a different management unit or habitat.*

In each annual report, numbers reported in previous reports may shift slightly because of late submission and data entry. For example, for the 2006 season seven late reports have been received that are not included in this analysis but will be included in the 2007 report.

Listed Species monitored in multiple counties (see Attachment 6 for a breakdown of listed and non-listed species and number of EOs monitored for each).

Species monitored across multiple counties are the basis for a regional assessment of species status.

1 species monitored in 6 counties
11 species monitored in 4 counties
11 species monitored in 3 counties
38 species monitored in 2 counties
115 species monitored in 1 county

2001-2006 cumulative EOs monitored (listed and non-listed), by county:

Cook County:	137
DuPage County:	96
Kane County:	48
Lake County:	146
McHenry County:	37
Will County:	41

Volunteer statistics

Number of cumulative volunteers by county: 2001-2006 (some monitors have assignments in more than one county).

Cook:	118	Lake:	98
DuPage:	38	McHenry:	48
Kane:	41	Will:	35

New volunteers in 2006 (total: 42)

Cook: 22; DuPage: 6; Kane: 4; Lake: 12; McHenry: 13; Will: 0.
Average: 9.5 volunteers per county.

Volunteers monitoring for 6 years:	18
Volunteers monitoring for 5 years:	20
Volunteers monitoring for 4 years:	29
Volunteers monitoring for 3 years:	42
Volunteers monitoring for 2 years:	76
Volunteers monitoring for 1 year:	138

Volunteer retention from 2005 to 2006: 67%
Volunteer retention from 2001 to 2006: 44% *(meaning volunteers who monitored in 2006 and have monitored at least one or more previous years)*

Volunteer hours in the field in 2006:	1443
Volunteer hours in workshop training in 2006:	430
Volunteer hours in office support:	248

The role of the volunteers in POC cannot be overstated. They are the backbone of the program and it could not function without them. All the major agencies recognize the importance of volunteers in greatly leveraging their resources for monitoring and management work. At this point, each major agency has one or two staff, usually a volunteer coordinator and/or ecologist, assigned to work with POC in recruitment, training, and other forms of assistance.

Recruitment
Volunteers were recruited through word of mouth, articles in stewardship newsletters, Chicago Botanic Garden's *Garden Talk* (Attachment 10), and *The Habitat Herald*, staff talks and information booths at stewardship conferences, and agency volunteer coordinators. The workshops were listed on the POC website and promoted through an email newsletter to POC volunteers.

On September 17, POC held a volunteer appreciation event at the Chicago Botanic Garden. Thirty people attended and certificates of appreciation were presented to outstanding volunteers. A new POC pin was distributed.

Training
Volunteer training occurred in two different formats: 5 ½ hour workshops and in-field training. Four workshops were offered, one each in Cook and DuPage Counties, and two in McHenry County. Eighty-six prospective and some returning volunteers were introduced to POC program objectives and trained in field monitoring techniques for Level 1 protocols. Representatives from county agencies presented information about rare plants to be monitored in their counties; guided volunteer assignments; and discussed the relationships between monitoring and management and the benefits of POC to their work. The sensitivity and confidentiality of rare plant locations was stressed in all the training, and new volunteers were required to sign a Confidentiality Form. In the field, POC program staff, interns, land managers, site stewards, or experienced volunteer monitors provided new monitors with additional field assistance on protocols and an orientation to sites and populations.

Volunteer retention is important for ensuring continuity of monitoring and consistent application of protocols. Retention rates from year to year have held fairly high, as reported above. Agency staff also contribute to continuity and consistency. Since 2001, POC has worked with many of the same staff from the major agencies. Where there has also been turnover, the new staff have been assigned to take on POC responsibilities. It is clear there will continue to be a high level of staff involvement working with the volunteers, as each year new volunteers need support in the field. However, as they are trained they become more self-sufficient and also can mentor recruits.

LEVEL 1 MONITORING DATA

Database, Data Submission, Storage, and Reporting
All Level 1 monitoring data are entered into the CBG-housed Access database developed and managed by Conservation Data Manager Bianca Rosenbaum. Because of the sensitive nature of the data on listed species, the Access database is restricted to a few personnel and volunteers. Volunteers must submit field/paper copies of their monitoring forms, but also have the option of submitting reports through an online form on a secure POC website. This option saves hours of manual data entry. Individual volunteers can access their own monitoring reports only by means of a password. Monitoring reports are reviewed both by landowners, who have access to their own site reports, and POC staff for accuracy. At the end of the season, after data entry and analysis are completed, Access-based reports are submitted to the Illinois Natural Heritage Database, to landowners for their sites, and to the Nature Preserves Commission for nature preserve sites.

Protocols and Land Management Implications
Monitoring Data
Level l protocols were essentially finalized by 2002, having been evaluated by the Advisory Group after the first year of monitoring. In subsequent years, only minor modifications were made.

Through Level 1 work, POC is gathering census data about the status of individual populations, such as numbers of individuals and area covered by populations, as well as a record of the threats and invasives impacting populations.

Monitors record observable management activities that have taken place within the previous year; some monitors are also volunteer stewards or land managers and can provide management information from their own records.

Land Management Data
A Land Management form, completed by the land manager or steward, was introduced in 2002. The form provides more detailed information than volunteers can be expected to provide about current and past management of the specific areas where populations occur. While land managers report about activities in the area or management unit where the populations occur, they may or may not know precisely how management affects specific population areas. Therefore, the two reports serve to complement each other. General site management information and land use history are also requested on the Land Management form.

Although all Land Management reports have been entered into the database, POC has not been successful in undertaking analysis of the Land Management reports, mainly due to time constraints and the emphasis given to analysis of monitoring reports. In 2006 we received 153 Land Management reports, about 25% of the 597 monitoring forms submitted. There were already on file an additional 30% of previously submitted Land Management reports on these same monitoring reports, giving a total of 55% percent having some level of management input. Among the most important questions POC hopes to explore by comparing monitoring and land management reports are definitive confirmation of management activities within populations such as burning, brush removal, herbaceous invasive removal and mowing so that we can begin to correlate management with population trends.

On the other hand, management implications of POC monitoring are already becoming apparent to managers and volunteers. Some examples are presented:

"Restricted Area" signs posted and Phragmites set back
IDNR biologist Deb Nelson reported that POC monitors have played a role in spurring two important management actions at her site this year. After continual reports of extensive trampling in a sensitive area, "restricted area" signs were posted to reduce trampling by park visitors and photographers. In another area of the park, Karen Lustig discovered and reported a small and still manageable population of *Phragmites australis*. Without the POC monitor, this invasion may have gone unnoticed and grown to an unmanageable size.

Mowing stopped
Joyce Proper noticed that a population of the threatened *Lathyrus ochroleucus* at her site had been mowed. A population of 144 healthy plants in 2005 was reduced to 34 mangled specimens in 2006. She wrote a letter to the forest preserve board president, arranged a tour, and showed the damaged population to the board president, the director of safety and operations, and the staff person in charge of mowing. The forest preserve has agreed to stop mowing in that area and the plants are now safe.

Lakefront grooming impacts curbed
Pam Holy has been monitoring her Chicago lakefront site for four years and seen great improvements in populations of beach species. However, this past year beach groomers accidentally damaged the populations. Fortunately, because of the winter winds, many of the plants were covered in sand and were missed. Angela Sturdevant, then Natural Areas Manager of the Chicago Park District, contacted the lakefront supervisor and ensured that the groomers would avoid this area in the future. There are now plans to fence off the former populations and hope for recolonization.

Orchids and stewardship
Kathleen Garness is an active monitor who loves orchids. She has become so involved through working with POC that she has become the steward of Grainger Flatwoods in Lake County and caged orchids that were being deer-browsed. To leverage her own efforts, she has organized students from a local high school to do volunteer invasive removal.

Results, Data Analysis and Discussion

The Level 1 analysis below reflects information based on subpopulation reports. Each EO may have one or multiple subpopulations, defined as separate groupings of plants spaced at least 50m apart, or distinguished from each other by habitat, management applications, or other factors. For each category of analysis, only reports with data were included in the percentages given. Forms with no data (NA) for a particular field were excluded from the analysis.

It is important to note that in the analyses presented below, data for each year are not based on the equivalent set of populations monitored. Each year new populations and subpopulations are added to the program, and previously monitored populations/subpopulations may not be monitored again. Increases and decreases in values do not reflect the changes within the same set of populations. The overall value of the data is to show general levels of threats, management activity, and recruitment. More accurate assessment of change will be possible when the analysis is applied to the same group of populations over time.

Ecological Threats

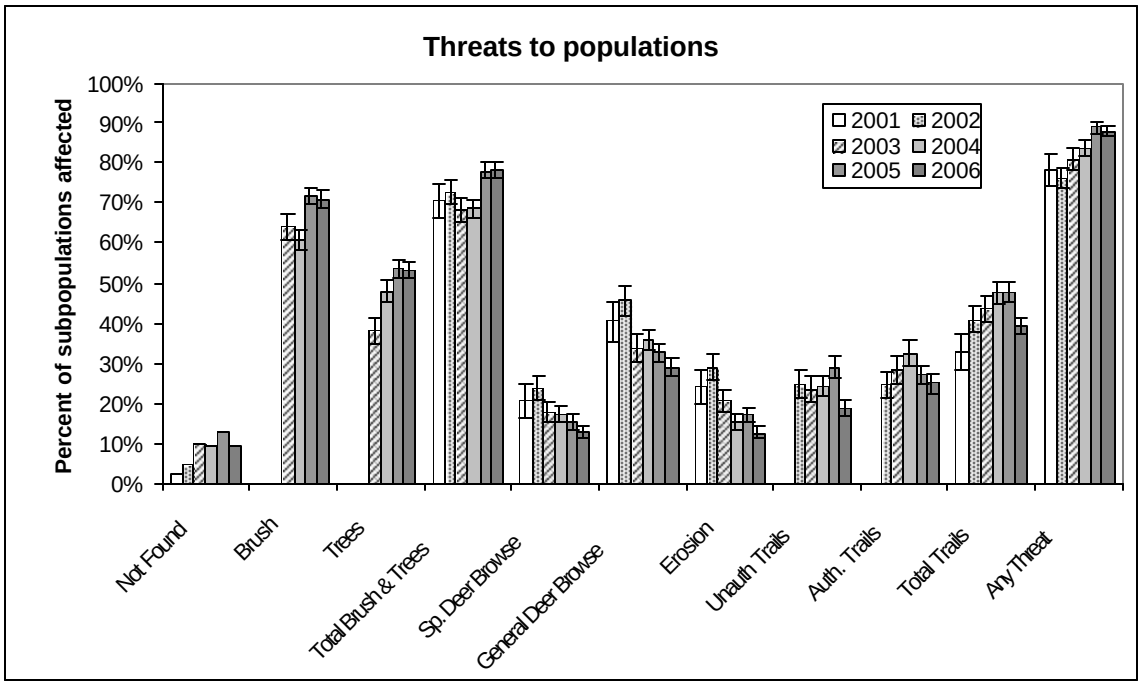


Figure 2. The percent of subpopulations in each year with a given threat present.

Only unauthorized trails were noted in 2001. There is no value for authorized trails in 2001. Because some 2001 responses were ambiguous, they are lumped in total trails. Unauthorized trails include deer trails. In 2001 and 2002, no distinction was made for brush encroachment less than or greater than 1 meter.

The analysis of threats presented here does not reflect the percent impact or magnitude of each threat recorded by monitors, but only the presence of the threat. The magnitude is also recorded on the monitoring forms and further analysis of these impacts is needed.

Percent of populations that were impacted by at least one ecological threat (invasive brush and trees, deer browse, erosion and trails): 78% in 2001; 76% in 2002; 81% in 2003; 84% in 2004; 89% in 2005; 88% in 2006; and a cumulative 88% over all 6 years.

These numbers are fairly consistent over time, but have increased over the years. The importance of recording threats to populations has been increasingly stressed in POC training.

Brush and tree encroachment, which can include native species, such as *Cornus racemosa*, continues to be the greatest threat to monitored populations, followed by trails and deer browse on all species within the population area. Overall, considering that the set of monitored occurrences is not the same from year to year, the relative impact of each of the recorded threats seems relatively consistent from year to year. There are increases and decreases from year to year, but no significant shifts.

Populations not found reflect not only populations formerly monitored by POC but not found in a subsequent year, or older records for which we continue to search. Further analysis of individual records is needed to determine whether populations or subpopulations are disappearing. Other threats recorded in an open-ended question but not quantified by monitors include ATV impact and trampling.

Invasive species

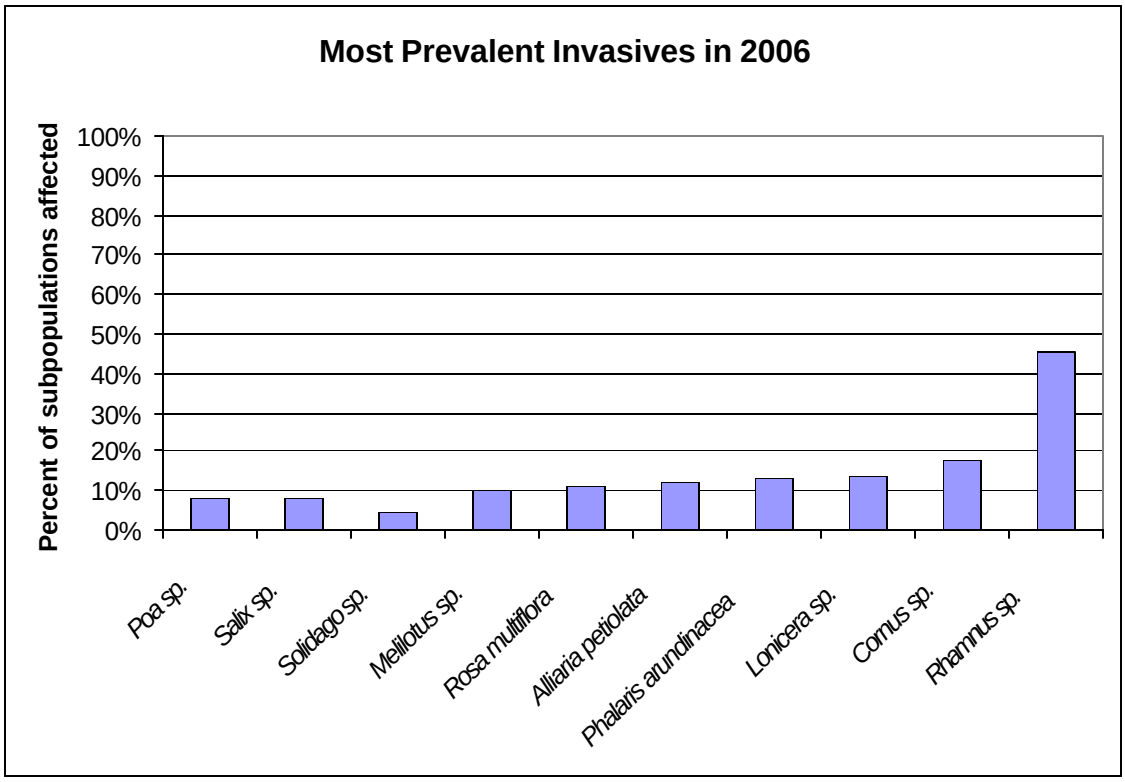


Figure 3. Top 10 most prevalent invasive plant species documented by POC monitors in 2006.

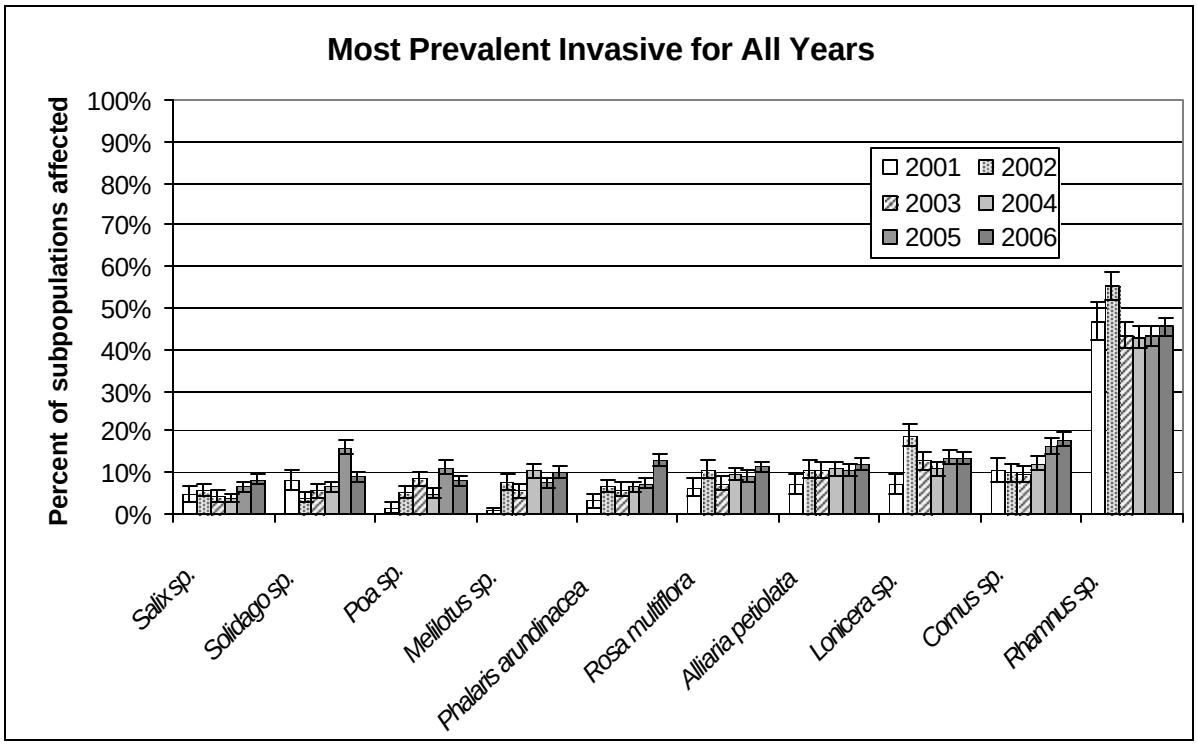


Figure 4. Top 10 most prevalent invasive plant species documented by POC monitors from all years.

Percents based on total number of subpopulation reports for each year. No reports were excluded. Monitors have identified 172 different species as invasive plants over six years, many with a minor or contextual presence (Attachment 11). Of all monitored subpopulations, 87% had at least one invasive species present in 2006.

The most commonly cited invasives in 2006 were *Rhamnus cathartica, Cornus racemosa, Phalaris arundinacea, Alliaria petiolata, and Rosa multiflora.* As with threats, this analysis does not show the percent impact of each invasive on monitored populations, information which is recorded by monitors and requires further analysis. Invasive impact on 87% of all subpopulations monitored can be considered a serious threat. Much effort is put into invasives control as a community management strategy, but these rare populations are individually at risk and a combination of community invasive and population invasive controls seems called for. Managers can review invasives at individual populations to determine which species require control.

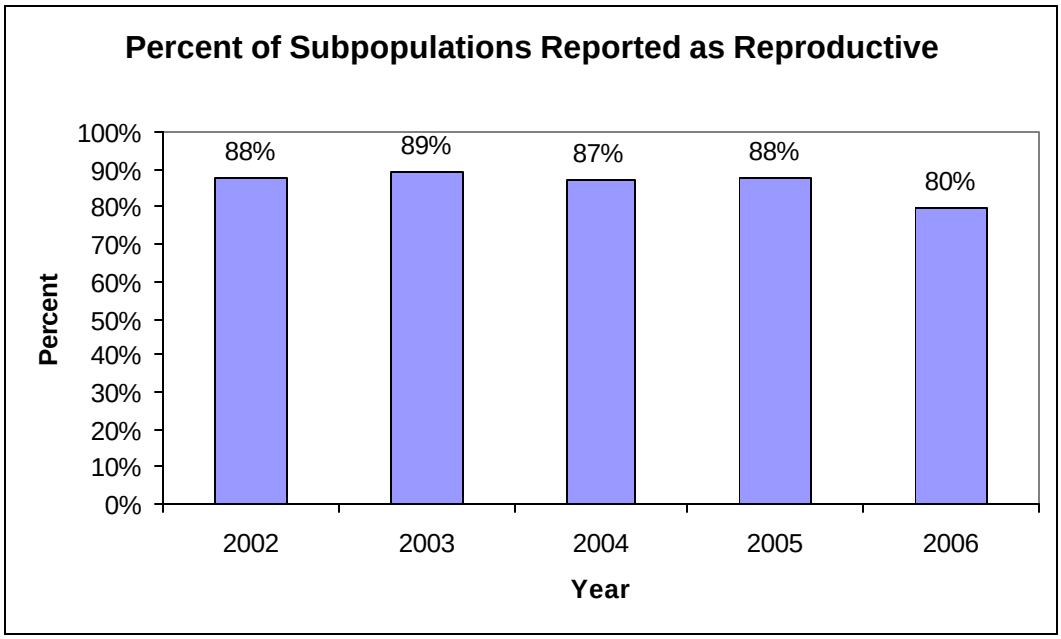


Figure 5. The percent of subpopulations reported as reproductive (i.e. flowering and/or fruiting) for all years.

Percents based on presence of flowers and/or fruits at monitored subpopulations. 2001 forms did not include fields for flowering and fruiting and could not be analyzed in a similar way. These numbers are based only on forms with positive response to flowering and fruiting: 70% of all monitored subpopulations in 2002; 72 in 2003; 83% in 2004; 79% in 2005; and 84% in 2006.

A large percentage of monitored subpopulations are reproductive, that is, having plants bearing flowers and/or fruits. Monitors make their observations ideally during flowering time, but in some instances this is not feasible and fruit presence is recorded. With annual species it is not unusual to find plants in both flower and fruit at the time of monitoring. Level 1 numbers do not reflect full reproductive status of populations, i.e., whether fruits are produced (for most reports), whether seed is viable, and whether juvenile recruitment is taking place. Annuals are included which are always reproductive.

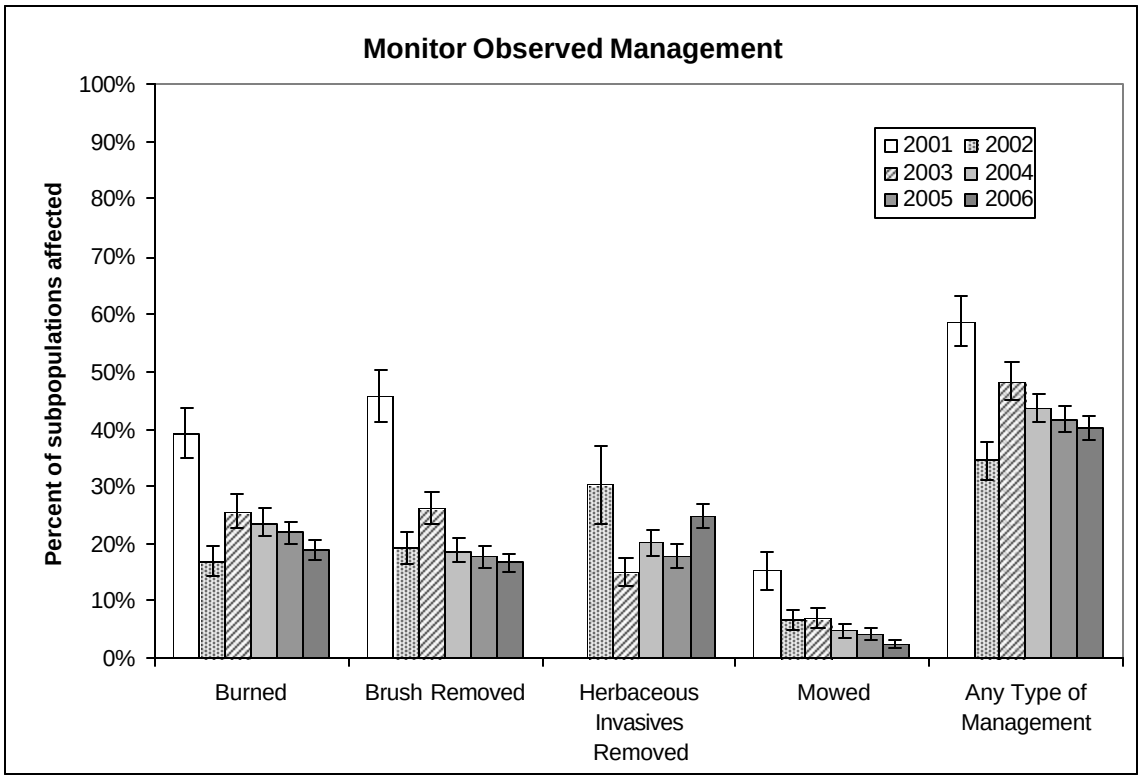


Figure 6. Management observed by monitors for all years. Herbaceous invasive removal was not recorded in a field in 2001, although it was mentioned in the notes section on the forms.

Evidence of Management

These percentages include only those reports for which a "yes" or "no" answer was given for each management activity, as observed or known by the monitor. Reports with blanks or "don't know" were excluded from the analysis. Percent of population impacted by the activity, also reported on the form, is not analyzed here. Data analysis from land managers' reports will provide additional information about actual known management within monitored populations. Based on monitors' observations (that were answered "yes" or "no", not unknown or left blank), 40% of POC populations showed evidence of management activity in 2006, approximately the same as in 2005 (42%).

Overall, after a notable decrease in percentages from 2001 to 2002, levels of management for all activities appear relatively stable, despite the changing set of subpopulations monitored each year. With further investigation we may find that, in 2001, volunteers were largely assigned to known species locations at sites that were under an active management schedule.

Brush removal is the most frequently reported management activity, followed closely by burning. It should be noted that brush removal or burning within the same population is seldom done annually, so these seemingly somewhat low percentages may in fact reflect a multi-year cycle for a given activity. Mowing was high in 2001 possibly because monitors considered mowing for trail or roadside maintenance to be a management strategy. However, this type of activity usually poses a threat to the population. We have since stressed in training that mowing to control invasives or brush, or as a substitute for burning, is what is intended in this question. Other management activities recorded in an open-ended question without quantification include deer culling and drain tile removal or other hydrological changes.

Population Analyses: Added Approach to Level 1 Analysis in 2006

Types of Analyses

With the long term data that POC is collecting, there are several questions that the program hopes to investigate. In general, POC wishes to know how rare plant populations are changing over time and what are the important factors determining rare plant population trends. These questions can be viewed from a regional, species, community type, and/or element occurrence basis. Each of these foci can reveal interesting trends. Ultimately, POC hopes to help land managers determine best management practices for rare species populations.

To these ends, POC will introduce three types of analyses to use in different ways to explore the data:

- Sign test
- Population Viability Analysis (PVA)
- Classification and Regression Tree (CART)

Sign Test

The sign test is the most basic test that is useful for determining which species are increasing or decreasing across the region. This test looks at the difference in plant population counts and compares the count from the last year monitored to the first year monitored. If the population has increased or remained stable, the subpopulation receives a + sign. If the population has decreased, the result is a – sign. The benefits of this test are that it is quick, easy to use, and does not rely upon any assumptions that could confuse the results (e.g. how long the population was monitored or what happened in the between years). The drawbacks of this test are that it can only determine significant results of a dataset with a minimum of 5 occurrences and the occurrences must be very skewed (e.g. most, if not all, +'s or –'s). Therefore, only significant results of species having five or more subpopulations can be analyzed through this test.

To verify the results of the sign test, and to add another way of looking at the data, the linear trends of each subpopulation were analyzed. In essence, a line is drawn through the counts of each subpopulation across the years and the slope observed. If the line was horizontal or rising, the subpopulation was stable or increasing. If the line was declining, the subpopulation was decreasing.

The data used for the sign test and the linear trends are only for subpopulations that were monitored for three or more years. Plant counts were used when available, but if a population was estimated, the mean of the estimation was used (*i.e.*, if estimated at 101-200 plants, 150 is the count). These data incorporate 291 subpopulations or 33% of our total data set. Only 6.8% of the plant count numbers were estimates. There was a 93% correspondence between the results of the sign test and the trend line slope. For both the trend line and the sign test, 59% of all subpopulations are stable or increasing in plant counts. These results are extremely similar to the analysis of subpopulations with two or more years of monitoring data which account for 464 subpopulations and 52% of all data.

Only two plants species were exhibiting a statistically significant increase across the region according to the sign test ($p \sim 0.06$). For species where the sign test was not significant, linear trends and population counts were used to evaluate each species.

Listed species that appear to be generally increasing across the region include (*=statistically significant via the sign test):

- *Ammophila breviligulagta*
- *Cakile edentula**
- *Carex viridula*
- *Carex woodii*
- *Chamaesyce polygonifolia**
- *Cirsium hillii*
- *Isoetes butleri*
- *Oenothera perennis*
- *Scirpus hattorianus*

Listed species that appear to be generally decreasing across the region or are of special concern include:

- *Amelanchier interior*
- *Amelanchier sanguinea*
- *Asclepias lanuginosa*
- *Carex aurea*
- *Minuartia patula*
- *Platanthera psycodes*
- *Trifolium reflexum*
- *Triglochin maritima*

Species that are not on this list either do not have enough data to make any determinations or provide no clear picture (i.e. half of the subpopulations are increasing and the other half are decreasing).

Population Viability Analysis (PVA)

A population viability analysis is useful for looking at individual element occurrences or subpopulations because it predicts the probability of extinction of an individual population. These data can be used to infer what element occurrences are doing well and which are doing poorly. The benefits of this type of analysis are that we can look at an individual population. The drawback is that the analysis is slightly more complicated and requires a long-term set of data. In order to make solid predictions, at least ten years of data is needed. At present, POC only has 32 subpopulations that have been monitored for all six years.

Another limitation of this analysis is that it only relies upon population counts. It does not factor in the seed bank or any sort of catastrophes. It does not factor in intervention of management, or impact of threats, but assumes a trend isolated from other influences. It looks at current trends and makes a prediction of the viability of that population in the future. Managers can pay close attention to declining pops and their actions to remove threats and stimulate healthy conditions can help reverse the trend.

Two populations are selected below to display the *kind* of analysis that POC will be able to conduct in the next few years. The following graphs are by no means a prediction of extinction or survival, but they merely are best guesses based on only six years of data. It is also important to note that PVAs rely upon several assumptions that must be tested because this is only a sample set. In future analyses POC will be able to make these determinations and then choose the best way to examine the data.

These two specific subpopulations of *Cakile edentula* and *Viola conspera* were chosen because they were either clearly increasing or decreasing across the years at their respective sites.

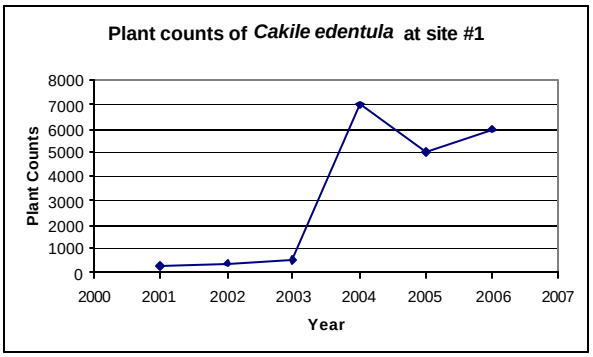


Figure 7 – Plant counts of *Cakile edentula* at site #1.

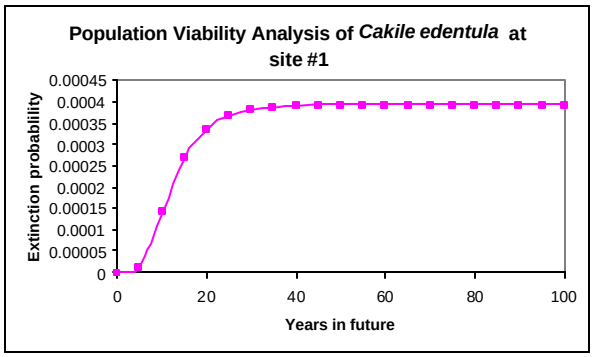


Figure 8 – Population Viability Analysis of *Cakile edentula* at site #1.

We know from the sign test that *Cakile edentula* is increasing across the region. This species has been doing especially well at site #1 (Figure 7). The PVA for *C. edentula* (Figure 8) shows that there is only a 0.04% chance that this population will go extinct within the next 100 years given current trends.

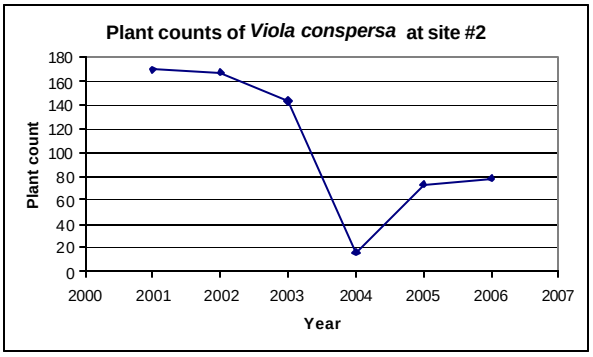


Figure 9 – Plant counts of *Viola conspersa* at site #2.

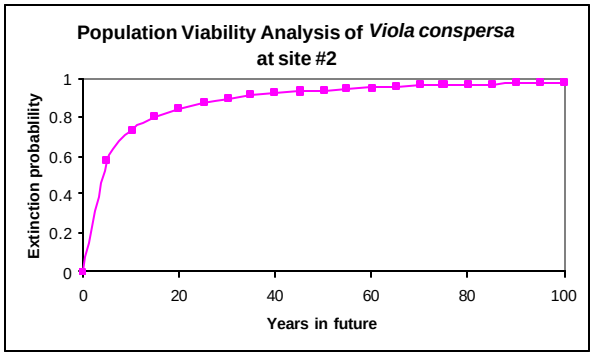


Figure 10 – Population Viability Analysis of *Viola conspersa* at site #2.

We know from the sign test that *Viola conspersa* is faring moderately well across the region. Approximately half of the subpopulations are increasing while the others are decreasing. However, at site #2, the population is not doing very well (Figure 9). The PVA for *V. conspersa* (Figure 10) shows that there is a 97% chance that this population will go extinct within the next 100 years given current trends.

Classification and Regression Tree Analysis (CART)

Along with the PVA, CART appears to be a promising way of exploring the data that POC has collected over the past six years. CART operates by importing a set of data and breaking it down piece by piece into its component parts. It starts by dividing the data into the two largest halves, parts A and B by finding a question that divides the data into the two most basic parts. CART then breaks A and B into their individual components and continues to divide the data. In other words, the data is broken apart into a dichotomous key. See Figure 11 for an example of the kind of diagram CART can generate.

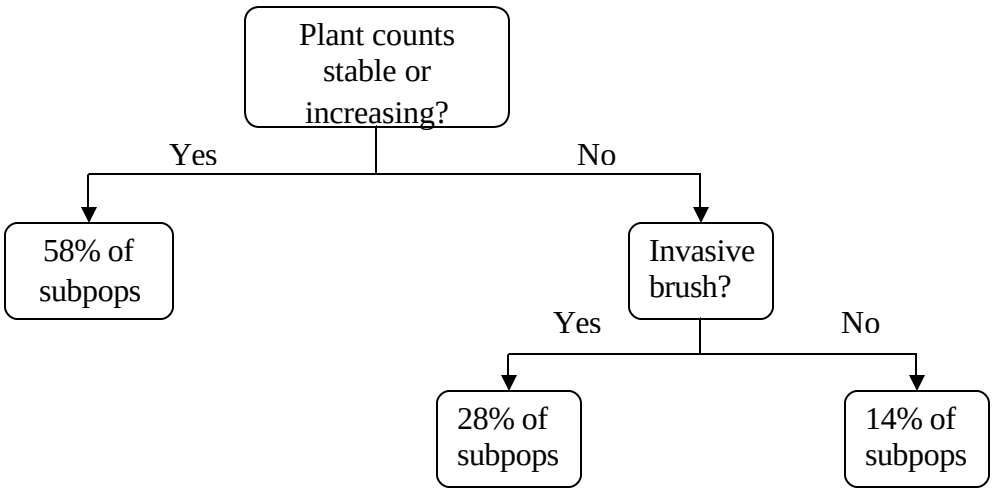


Figure 11 – An *example* flowchart that CART could generate.

From the example flowchart, we would say that the most important factor that divides the data is whether or not plant counts are increasing in a subpopulation. For subpopulations that are decreasing, the most important factor is invasive brush.

The benefits of CART are that it is easy to interpret visually, is non-parametric (i.e. doesn't rely upon a normal distribution of data), can interpret categorical and numerical data, and can deal with missing variables.

We are just beginning this analysis and it cannot be reported at this time. Dr. Anton Endress, professor from the University of Illinois at Urbana-Champaign, has offered to take on this project with help of the POC Research Assistant, Steve Kroiss. They hope to complete this analysis before the 2007 field season.

Outside Researchers / Level 1

With a growing Level 1 data set and the involvement of Chicago Botanic Garden in graduate programs at Northwestern University, the University of Illinois at Chicago and Loyola University, the potential is growing for attracting graduate students and other researchers to assist with data analysis and gain more information from the data than current POC staff have the resources to undertake. An example of this is Northwestern University graduate student Eva Dubey, whose fall 2006 statistics class project was analyzing three years of POC data on prairie species: "Effects of Management on Change in Number of Native Plants in Monitored Sites throughout the Chicago Area." Dubey related population growth or decline to all types of management. Her findings, presented to the Advisory Group, were inconclusive but demonstrate the potential for asking multivariate questions of the data.

LEVEL 2 DEMOGRAPHIC MONITORING UPDATE

Level 2 demographic monitoring of four species (*Viola conspersa, Cypripedium candidum, Cirsium hillii* and *Tomanthera auriculata*), initiated in 2001, was partly discontinued in 2005 after a seed viability study was completed and upon discussion with the Advisory Group. However, that year some Level 2 monitoring took place through related projects, such as Pati Vitt's *Viola conspersa* and *Tomanthera auriculata* research and Jeremie Fant's *Cirsium hillii* genetic studies. In 2006, several populations of all four species were monitored at Level 2. This further research activity demonstrates the ripple effect Plants of Concern has had in stimulating additional work on species for which a large amount of data is already available. It builds on that data and increases its power and value. Program staff believe that ongoing Level 2 work, guided by researchers and assisted by volunteers, can result in a long term data set, relatively rare in ecological studies, that provides

significant population dynamics information not available through Level 1 work. Researchers from universities, graduate and post-doctoral students, as well as CBG staff, can be attracted to this work.

Examples of more recent studies that have built on Level 2 demographic data include:

Jeremie Fant's work for a 2005-2006 grant from Chicago Wilderness was reported in "Investigating reproductive decline and inbreeding depression in *Cirsium hillii* populations in the Chicago Region." Based on demographic and genetic analysis of five populations in NE Illinois, one in Ogle County and two in Wisconsin, Fant concluded that *Cirsium hillii,* while maintaining stable population sizes, had low reproductive rates (0-20% for all but one population which had a high rate 30% in 2002) and low seed viability (less than 20%). However, he also concluded the comparatively high level of genetic diversity found within populations did not seem to support the presence of inbreeding depression without further comparative study on populations outside the Chicago area. Fant also investigated the relation between management activities and population size and reproductive output. This study will hopefully continue with the prospect of additional grant funds and collaboration with University of Wisconsin researchers.

Kelly Kinslow, for her undergraduate research project at DePaul University, is undertaking a study (2006-2007) of *Cypripedium candidum* to determine whether low fruit set reported by Level 2 demographic work is related to low pollinator visitation. Since orchids offer no nectar reward to pollinators, does the presence of other nearby and simultaneously flowering plants that insects visit affect fruit production; *i.e.*, are insects more likely to visit orchids if there are other rewards nearby?

PROGRAM EVALUATION

POC met or greatly exceeded nearly all of the evaluation criteria and delivery of products as outlined in the grant proposal and listed below. Many of these have already been discussed in detail in the preceding text.

Objective 1: *Element Occurrences (EOs) monitored at Level 1 are maintained or increased, with attention to proportionally equalizing sites, species and occurrences among counties; cumulative monitoring for 2001-2006 will reach up to 35% of EOs in northeast Illinois.*

POC monitored an additional 64 occurrences (a 23% increase) from 2005, with increases in four out of six counties:

Table 2.

	Cook	DuPage	Kane	Lake	McHenry	Will
2005	98	24	27	82	21	27
2006	105	71	23	98	27	26
Percent change:	7%	196%	-15%	20%	29%	-4%

Cumulative POC monitoring of listed EOs in northeast Illinois is 40-45%.

Retention: 52% of EOs monitored in previous years was also monitored in 2006. Because many populations are monitored in alternate years, or every three years, this is a good retention rate.

Objective 2: *Retention of former volunteers from 2005 is greater than 50%*

Retention rate from 2005 to 2006 was 67%. 34% of volunteers have monitored for three or more years.

Objective 3: *Five volunteers from each collaborating county are recruited and trained for participation.*

New volunteers by county: Cook, 22; DuPage, 6; Kane, 4; Lake, 12; McHenry, 13; Will, 0.

POC recruited 42 new volunteer monitors in 2006, for an average of 9.5 per county. The program more than met its minimal goals overall, except for Will and Kane counties.

Objective 4: *Field data and land management forms are completed and all data is entered into the POC Access database.*

All 2006 submitted monitoring and management forms have been entered into the database.
We are still lacking a number of Land Management forms from the landowners and will continue to request them.

Objective 5: *The POC program is evaluated through questionnaires completed by participating staff, volunteers and recipient agencies, followed by a meeting to evaluate and plan the program in relation to the Regional Monitoring Plan.*

An evaluation survey for volunteers was conducted in 2004 (reported in the POC report to CW for 2004) and POC staff decided it would be too soon to repeat this exercise. An evaluation survey on all aspects of the program was distributed in 2005 to the Advisory Group, which includes the key recipients of the program. Results of this survey were discussed in the 2005. Again, POC staff felt it would be too soon to repeat this questionnaire. It is POC's goal to conduct a survey in 2007.

Regional Monitoring: at the Advisory Group meeting in December 2006, a discussion was held about the results of the Regional Monitoring Plan meeting in October, at which POC was commended for its contributions to monitoring the region's rarest species. At this writing there is no published agreed upon plan for the implementation of the Regional Monitoring Plan. POC stands ready to participate actively in this effort as it moves forward. POC has also asked for space on a Science and Natural Resource Management Team meeting agenda during 2007 to present current data and analysis from the program and to request feedback and evaluation from that group.

Objective 6: *Discussions with Indiana and Wisconsin agencies lead to collaboration with POC and a pilot monitoring program in both states.*

Indiana: The pilot project in NW Indiana was initiated with an exploratory meeting with POC and CW's Chris Mulvaney in January 2006 with representatives from the Indiana Dunes National Lakeshore, Indiana DNR, The Nature Conservancy, the Shirley Heinze Foundation, Talltree Arboretum, Save the Dunes Society, and NW Indiana Regional Planning Commission. The meeting was followed by a special monitoring training workshop held at Talltree in April. Naida Lehmann, formerly on staff at Talltree, coordinated the Indiana pilot effort in 2006. Three monitoring reports were submitted from three sites and involved four volunteers, two staff and one intern. (These reports are not included in the analyses presented in this document.) The National Lakeshore conducts its own rare plant monitoring program and a connection with POC needs to be explored. The results of these efforts, though modest, are encouraging for the 2007 program under Lehmann's coordination. Now on the board of the Shirley Heinze Foundation, she will submit a grant application to CW to support these efforts.

Wisconsin: An exploratory meeting with POC and CW's Chris Mulvaney was held in February 2006 with representatives of Wisconsin DNR, The Nature Conservancy, Chiwaukee Prairie Preservation Fund, AES, Ecological Renaissance and Milwaukee Area Land Conservancy. Despite interest in the program, staff resources from these agencies were not available to coordinate the efforts. For 2007, the Wisconsin Nature Conservancy has indicated an interest in having volunteers monitor selected plant species at two of their sties, Lulu Lake and Chiwaukee Prairie, following up on plant inventories coordinated in 2006 by WDNR. The Chiwaukee Prairie Preservation Fund may be a source for volunteer recruitment through POC volunteer Pam Holy who is on its board. WDNR has also been approached to become part of this effort.

PROGRAM PRODUCTS

All eight products listed in the 2005 Chicago Wilderness proposal have been delivered. These are:

Monitoring results: standardized Level 1 monitoring data on rare plant populations (location-including GPS coordinates, size, threats, management) for formerly monitored and additional occurrences. Level 2 demographic data on initial four targeted species for formerly monitored occurrences.

Monitoring reports on 343 EOs (591 subpopulations) were completed and the data entered on the Access database.

Level 2 demographic data was collected on *Viola conspersa, Cypripedium candidum, Cirsium hillii* and *Tomanthera auriculata* on the majority of formerly monitored occurrences. At one site, tags had been removed from plants by unknown persons and demographic monitoring could not be implemented; at another site the volunteer indicated a willingness to participate but did not do the work. All data has been entered into Excel spreadsheets or an Access database.

All field data entered and analyzed using the Access database.

Monitoring data for all occurrences was entered on the Access database. A representative sample of the analysis is submitted in this report. Reports on all species on their sites were reported to collaborating Forest Preserve Districts and other landowners. The Illinois Natural Heritage Database received reports on all submitted EOs, and the Illinois Nature Preserves Commission received reports on EOs monitored in Nature Preserves. This summary report to CW, which analyzes the data, is also being shared with them.

Three field training workshops

Five field training workshops were held, one each in Cook, DuPage, Lake Counties; two in McHenry County, and one in NW Indiana. 86 volunteers participated.

Advisory Group (AG) meetings: one or two meetings to evaluate, plan and implement program.

One AG meeting was held on December 5, 2006. (See Attachment 12 for minutes). During January and February, 2006, planning meetings were held individually with five Forest Preserve/Conservation Districts and Illinois Department of Natural Resources staff in preparation for the season's assignments, either in person or by phone. Agency staff also participated in the training workshops. Extensive communication with most landowners, including those not on the AG, was ongoing before, during, and after the season.

Meeting with agencies in Indiana and Wisconsin to discuss implementation of a rare plant monitoring program in those areas.

See discussion under Objective 6 above.

Involvement and inclusion of POC (rare and indicator species monitoring) in the CW Regional Monitoring Plan. PI will collaborate with the Regional Monitoring Plan Work Plan and will report and seek guidance from the Advisory Group on POC's role within the broader Regional Monitoring effort.

PI Susanne Masi was a collaborator on the Regional Monitoring Plan Work Plan. In the spring she met with Susan Ask, assistant to the RM Plan, and discussed the regional aspects of Plants of Concern. At the Regional Monitoring meeting on October 24, Plants of Concern was recognized as being the key regional vehicle for rare plant monitoring, for its ability to collect standardized data and whose work should be continued and expanded. In December, Ask reported to the POC Advisory Group that it was not clear whether a list of indicator species would be chosen to reflect community health. If such a list should be

developed, POC would be actively involved in the process and would undertake to include these indicator species in its monitoring program. Determination would need to be made as to the number of occurrences required for monitoring each species and how the data would be used in assessment of community health.

Public Communication: The broader public will be made aware of the importance of monitoring, the Plants of Concern project, and the training workshops through promotion in the Garden's membership publication, Garden Talk, as well as through the public relations vehicles of CBG, Audubon-Chicago Region, and presentations to volunteer and professional groups. Articles will be submitted to volunteer newsletters, the Chicago Wilderness Journal, and local newspapers.

Some highlights of the extensive public communication and outreach for Plants of Concern are presented here, starting with a discussion of the POC website. Several of them are also included as an attachment.

1. Plants of Concern Website

The POC web site (www.plantsofconcern.org) was created in late 2003. Conservation Data Manager Bianca Rosenbaum manages the web site design and content. The intent of the web site is many-fold. It is a way to spread word about rare plants and the POC program, recruit new volunteers, and provide news and monitoring resources such as downloadable forms, form submittal, and plant information to monitors.

There are eight sections on the web site:

- **About POC (home page)** lists background information about POC, as well as statistics from previous years.

- **News** posts newspaper articles about the program or any announcements of events such as workshops and plant outings, as well as pictures from POC events.

- **Forms & Protocols** lets monitors download up-to-date monitoring forms, land management forms, and guidelines and instructions on GPS usage, and pacing and population estimation exercises. The new Plants of Concern Volunteer Manual is also available for download in this section.

- **Plant Resources** has grown substantially this year, and now includes the Plants of Concern Species List, Species Bloom Times Table, and the Plants of Concern Plant Gallery, comprising individual web pages for each plant monitored by POC. These web pages contain photos of the species and links to reputable web sites about the species. This section also has general links to various plant resources.

- **Available Positions** posts jobs or volunteering opportunities for the program.

- **Login.** The web site is also extremely beneficial to POC in that it allows monitors to submit their monitoring forms on-line, saving hundreds of hours of data entry. Over 100 monitoring reports were submitted on-line in 2006, 17% of all submitted forms. This was a two-fold increase from last year. Another benefit to the web site is that it instantly provides land managers access to current and past data forms, giving them up-to-date knowledge on the status of their sites' rare plants.

- **Funders** provides a list of partner web sites and programs that have funded POC.

- **Contact Us** lists the POC staff's contact information.

Our goals for future development include completing the Species Pages for POC-monitored plants. Further resources we will create for the web site are a look-up table for scientific names of associate species, as well as an Invasive Species Plant Gallery with pictures and links to resource web pages.

In 2006, from January to December, the web site averaged 172 hits per month, for a total of 2383 hits. In February 2007 the website had 312 unique visitors, and 32% of the visitors added the POC web site to their favorites. In February 2007, the most visited sections were Available positions, POC Plant Gallery, POC Species List, and form-submitting.

2. Publications/Presentations/Participation in Outreach Events

- January, 2006. Picnic in Chicago's Park Dunes: Recognition for Montrose & Loyola Beaches, by Mary Cannon. *The Habitat Herald*, Vol. 7, # 1. (Attachment 13)
- January, 2006. Protecting the Rarest: Plants of Concern. In *Garden Talk*, a Chicago Botanic Garden publication. (Attachment 10)
- July 15, 2006. Plants of Concern: A Volunteer-based Rare Plant Monitoring Program. Poster by Steve Kroiss and Susanne Masi. Presented at the National Wild Ones annual conference in Naperville, IL. Also presented on October 20, 2006 at the Janet Meakin Poor Symposium on Urban Ecology: Celebrating Ten Years of Chicago Wilderness at the Chicago Botanic Garden.
- July 25, 2006. Rare Opportunities for Intern at Chicago Botanic Garden. By Liz deAvila. Chicago Botanic Garden press release about Research Assistant Steve Kroiss.
- July 2006. Long-Term Rare Plant Monitoring at Midewin National Tallgrass Prairie (Illinois). Poster by Susanne Masi and Emily Kapler. Presented at the North American Prairie Conference at the University of Nebraska at Kearney. Also presented at the 33rd Annual Natural Areas Conference in Flagstaff, AZ, September 2006, and at the Janet Meakin Poor Symposium at the Chicago Botanic Garden, October 20, 2006.
- August 24, 2006. "Rare Plant Monitoring at Midewin" by Susanne Masi and Emily Kapler. Oral presentation at the symposium: "Ten Years of Progress in Restoration & Research at the Midewin National Tallgrass Prairie."
- September 17, 2006. Volunteer Appreciation Potluck Event held at CBG. Recognition certificates were awarded and POC pins distributed. 30 in attendance.
- "Teaming Up with Volunteers" - Midewin Volunteer Recruitment Brochure was produced (designed by CBG Midewin Intern, Emily Kapler)
- December 2006. In Beauty, I Walk 2007 calendar by photographer Carol Freeman. Freeman discusses her involvement in POC in a letter accompanying her calendar. Carol Freeman Photography officially joined POC in 2006. Her lifetime goal is to photograph every listed species in Illinois. In 2007, she is contracted through POC's CW grant to photograph 10-15 POC species to supplement the 30 species already completed and posted on the POC web site.
- 2006. Effects of Community Level Management on *Tomanthera auriculata*, a Rare Non-Target Prairie Annual. By P. Vitt, T.A. Knight and B. Kendall. Submitted to *The Journal of Applied Ecology*. *(Draft of this article was included in the CW 2005 report.)*
- January 31, 2007. Investigating reproductive decline and inbreeding depression in *Cirsium hillii* populations in the Chicago Region. By Jeremie Fant. Annual Report to Chicago Wilderness. This article was also submitted to the *Chicago Wilderness Online Journal* in February, 2007.
- 2006. Plant Species. In The Chicago Wilderness Consortium. *The State of Our Chicago Wilderness: A Report Card on the Ecological Health of the Region*. Chap. 4. Chicago, IL. (Attachment 1)

Other promotion and outreach efforts included email "newsletters", mailings, announcements, and articles in stewardship newsletters.

3. Plants of Concern also has active links to the following regional projects and research: The Habitat Project in the Audubon-Chicago Region; Early Detection and Rapid Response, with The Nature Conservancy and the Forest Preserve District of Lake County; Regional Monitoring Program; the

CW Report Card; Chicago Wilderness Science Agenda; and the Carol Freeman Photography Endangered Species Project.

4. Additional grants that fund POC's efforts demonstrates its benefit and credibility to the region: CorLands (2004); Illinois Wildlife Preservation Fund (2004-2007); C2000 (2006 and 2007) and the Chicago Park District (2004). In addition, a comprehensive monitoring program built on POC protocols and experience has been in place at Midewin National Tallgrass Prairie since 2004 through funding from the USDA Forest Service and the National Fish and Wildlife Foundation (2006 and 2007). CorLands funds in 2004 also partly funded the Midewin program.

The Principal Investigator will submit a final project report to Chicago Wilderness.

Hereby submitted.

CONCLUSION AND FUTURE DIRECTIONS

As the above discussions demonstrate, Plants of Concern continues to grow and show its strength as a viable program that provides essential data on rare plants to land managers and engages trained volunteers to make a meaningful contribution to the regional understanding of biodiversity, its status, and its threats. Three dedicated staff (Coordinator, Program Assistant/Volunteer Coordinator and Research Assistant) manage the program, enabling POC to accomplish more. Another eight-month Research Assistant worked exclusively in 2006 at Midewin National Tallgrass Prairie on POC-based monitoring and studies. In late 2005, POC initiated discussions with agencies in Indiana and Wisconsin, followed by meetings in early 2006, to plan the exportation of POC to those areas. During the 2006 growing season, a small pilot program was implemented in NW Indiana that will continue in 2007, administered locally, but maintaining ties and shared data with POC. The SE Wisconsin pilot program did not materialize due to lack of staff time and resources to administer the program, but there are plans in progress for a 2007 effort. Discussions have been initiated with Illinois DNR regarding exporting the program to other parts of the state. Another area of expansion will be the inclusion of indicator species chosen by the Regional Monitoring project to measure community health. Finally, the Chicago Botanic Garden is in the process of submitting a grant proposal to the National Science Foundation which will include partial funding of POC and its use as a national model.

Further, POC has begun a collaboration with the National Institute of Invasive Species Science (NIISS, www.niiss.org), a collaboration of government and non-government organizations designed to develop cooperative approaches for invasive species science. The mission of NIISS is to gather and compile information about invasive species and their locations across the United States. Currently, POC has uploaded to the NIISS database all the invasive species and their GPS coordinates found in its monitored populations and their GPS locations. Due to the sensitive nature of POC data, all of the locations have been "fuzzed," so that the actual GPS point is protected in the database and users cannot see the exact location.

At present the POC data reservoir is very large, with six years of monitoring data in an Access database format. These data can be mined for far more analysis than POC can provide directly with the resources available. The exploration of these data has great potential to benefit land managers as they make decisions to protect and manage rare plant populations as a parallel effort to managing communities. POC hopes to become a resource for attracting researchers to further tap into the data and is already working with five individuals from four institutions, as described in this report. As discussed above in the section on Level 2, research spin-offs by CBG scientists and others are already building on the work done by POC. These opportunities should be made more widely available in order to maximize the benefits of POC.

Overall, one of the greatest benefits of POC is the collaboration between the many agencies and their volunteers in monitoring rare species. In addition to six forest preserve districts, 65 other landowners have been involved in the program, many of whom would not be able to engage in rare plant monitoring.

ATTACHMENTS

1. Plant Species. In The Chicago Wilderness Consortium. *The State of Our Chicago Wilderness: A Report Card on the Ecological Health of the Region*. Chapter 4. 2006. Chicago, IL.

2. GIS map of POC monitored subpopulations

3. Level 1 monitoring form

4. Level 1 land management form

5. Advisory Group listing

6. Plants of Concern 2001-2006. Species, Status, County, Element Occurrences (Excel)

7. Plants of Concern 2001-2006. County, Site, Landowner & Element Occurrences (Excel)

8. Plants of Concern 2001-2006: Species Monitored by Six NE IL County Frequency – A Regional View (Excel)

9. List of monitored species

10. Spring, 2006. Protecting the Rarest: Plants of Concern. In *Garden Talk* (CBG).

11. List of common invasive species

12. Advisory Group Minutes: December 5, 2006 Meeting

13. Picnic in Chicago's Park Dunes: Recognition for Montrose & Loyola Beaches, by Mary Cannon. *The Habitat Herald*, Vol. 7, # 1, p 1-3.

ATTACHMENT 1

Chicago Wilderness, 2006

CHAPTER 4
PLANT SPECIES

4.1 INTRODUCTION

The *Biodiversity Recovery Plan* reports a total of 237 plant species, 15 percent of the region's total native plant species, as endangered or threatened. The plan also includes an index, based on Illinois and Indiana Natural Heritage databases, that divides endangered and threatened plant species into six priority groupings. The number of species within in each grouping appears parenthetically below. These categories are not mutually exclusive. Some species occur in more than one category.

- Globally rare (17)
- Great Lakes endemic species or those whose critical ranges are within the Chicago Wilderness region (8)
- Species that are disturbance dependent or do not fall within a well-defined community type (17)
- Species that have fewer than 50 percent of their known element occurrences in protected sites (37)
- Species with particular taxonomic or reproductive problems and/or needing life history research, and those whose survival or reproductive success is seriously compromised by external factors (26)
- Species that may be adequately protected or stable but are restricted to rare communities within the region (80)

The *Biodiversity Recovery Plan* acknowledges that some endangered and threatened species will always require special management attention, accompanied by well-designed monitoring programs. Additional recommended actions include:

- Acquire more public lands to increase the size and number of available habitats
- Enact stronger legislation for the protection of rare native plants
- Increase the levels of protection for unprotected or semi-protected sites with known occurrences of endangered and threatened species
- Work with private landowners to protect endangered and threatened species on their properties.
- Specifically address endangered and threatened species in management plans
- Design monitoring programs to provide feedback to adapt management activities and approaches
- Institute a region-wide monitoring program for rare species
- Expand *ex situ* programs for endangered and threatened species so that adequate seed or plant material is available for appropriate reintroductions as more sites are restored
- Develop recovery plans for both federally-listed species and state-listed species that have been identified as priorities

4.2 PLANTS OF CONCERN

Chicago Wilderness has made progress toward the realization of several of the recommended actions for endangered and threatened plant species listed in the *Biodiversity Recovery Plan*, including 1) the acquisition of additional natural areas, some of which were discovered to contain previously unknown populations of threatened and endangered species only after the lands were acquired; 2) the ongoing development of *ex situ* programs for endangered and threatened species by the Center for Plant Conservation, a joint program of the Chicago Botanic Garden and The Morton Arboretum and part of a national network of America's leading botanical institutions, the purpose of which is to prevent the extinction of America's imperiled, native flora; 3) the Chicago Park District's increasing self-policing and protection of its sand dunes; and 4) model protection efforts of endangered and threatened species on private properties, including those owned by Abbott Labs, ComEd, the Boone Creek Alliance and several railroads.

The most notable progress toward the *Biodiversity Recovery Plan* goals for endangered and threatened species is the development of a region-wide monitoring program and common database for rare species. In 2001, a long-term Plants of Concern monitoring program was piloted, one that established standardized monitoring protocols for the region. During the next two years, the program was refined and expanded to provide managers with the scientifi-

cally-acquired information needed to address management problems on their sites and also to facilitate regional collaboration in developing and implementing management strategies to ensure the presence of these species on a sustainable basis.

Species chosen for monitoring were selected both for their position on the rare species priority list in the *Biodiversity Recovery Plan* and according to the individual priorities of regional landowners. The program incorporates five interrelated elements, all equally important to its success:

- Monitoring of rare plants (particularly state-listed species) over time to discern population trends within a community context (Level 1) and selected species targeted for more intensive demographic monitoring (Level 2)
- Monitoring of rare species in relation to management activities to form a feedback loop for adaptive management, leading to both short-term and long-term responses
- Using, for the first time, standardized protocols throughout the region to gain uniform data on a regional basis
- Training volunteers as citizen scientists to leverage significant opportunities to monitor rare species, at the same time creating an informed constituency
- Working collaboratively with public and private landowners, land managers and agencies to generate a shared approach to regional monitoring

Comparisons between pre-2001 data with data collected by the Plants of Concern program starting in 2001, even for the same populations, should be made with caution because different protocols were used and methods of counting plants may have been different.

At its most basic level, the Plants of Concern program gathers census data about the status and trends of individual populations. In its fourth year, already some trends are apparent. For example, of the 215 subpopulations of monitored plants, 106 showed increases while 109 showed decreases. When grouped into species, there are 57 that have measurable short-term trends—26 showing increases and 31 showing decreases. Since the Plants of Concern database contains certain records for select species from the early 1980s through the early 1990s, it is possible to identify some longer-term trends for 26 subpopulations representing 18 different species. Of the 26 subpopulations, 11 increased or remained the same, while 15 decreased in numbers. Of the species having measurable long-term trends, six showed numerical increases or remained unchanged, while twice that many showed decreases. As is the case with current trends, these are actual increases or decreases in each subpopulation, and are not the result of increases or decreases in Plants of Concern monitoring activity (Milde 2004).

The monitoring also provides census data about invasive species. When invasive species were lumped together by genus, the most commonly cited genera was *Rhamnus*, representing 24.5 percent of all invasive citations, up from 19 percent in 2002. *Lonicera* (6.7 percent) is the second most cited genus followed, by *Cornus* (5.2 percent), and *Rosa* (4.8 percent). Monitors identified 99 different species of invasive plants. Of all monitored subpopulations, 73.2 percent had at least one invasive species present in 2003 (Milde 2004).

As reported to the Chicago Wilderness consortium, "Management implications of Plants of Concern monitoring are already becoming apparent. At both individual population locations and region-wide, Plants of Concern is recording the types and levels of threats, including invasive species, which impact populations. This information has value for long-term planning on a regional basis; for example, the response of certain species to fire may help determine fire management for those species. It also has a short-term problem-solving benefit; for example, monitoring reports are helping managers respond to immediate problems, such as the protection of *Amelanchier* species from fire and deer browse or rerouting a trail around a *Tomanthera auriculata* population" (Masi, 2004, p.6).

Over time, the program is intended to correlate performance and trends of rare species with management of community types within the region. Although no strong conclusions can be made at this time, management appears to be on the rise. Based on monitors' observations, 51 percent of Plants of Concern populations showed evidence of management activity in 2003, up from 34 percent in 2002. Preliminarily, in some instances, as in the case with

ATTACHMENT 1

Chicago Wilderness, 2006

Viola conspersa, which has increased 10.5 percent from 1999 to 2004 and 125 percent since the early 1980s, increases or decreases in subpopulations do not seem to correlate directly with any management activity or threat. However, monitors of significantly declining species, including *Triflolium reflexum* and *Arenaria patula*, which decreased 100 percent and 69 percent, respectively, surmise that the lack of fire or other management tools may be the reason for the precipitous decline in numbers.

4.3 INDICATORS

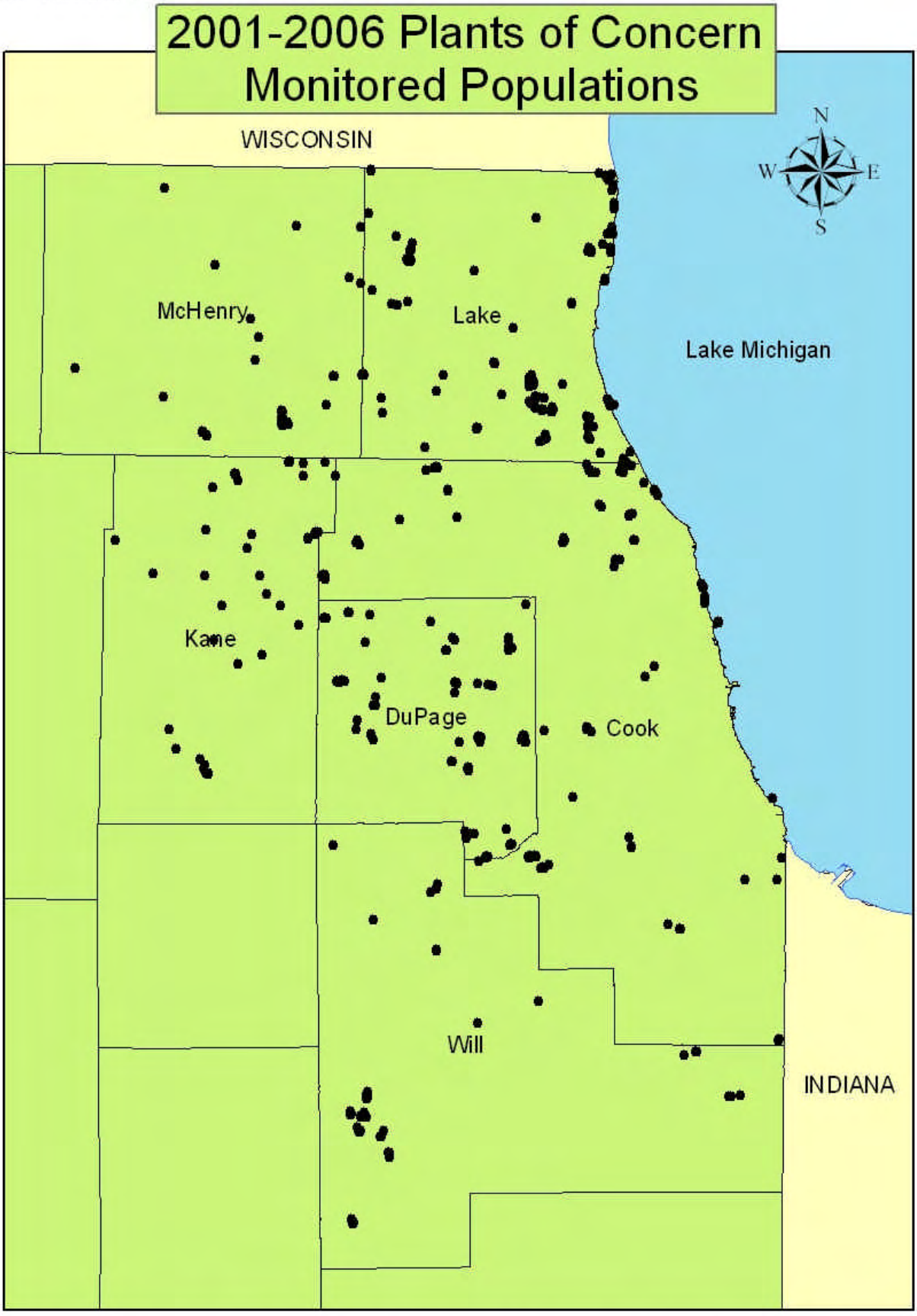
Regional experts convened in 2004 to assess the region's plants of concern. They identified the below as indicators of general status and trends for endangered, threatened, and other rare plant species:

- New occurrences
  - o Arising new populations, due to natural spread or due to positive effects of management
  - o New observations, which might occur during new land acquisitions or increased monitoring efforts
- Flowering/Reproductive status/Seed set and viability
- Redefining of historically lost sites
- General habitat improvement or degradation; more/less stabilized ecological interactions involving the species in question
- Loss/gain of habitat
- Loss of indicator species, for example:
  - o *Cirsium muticum*
  - o *Gentiana* spp.
  - o *Festuca obtusa*
  - o *Panicum* spp.
  - o *Helianthus* spp.
  - o *Aster* spp.
  - o *Silene virginica*
  - o Legumes
- Additional species that may indicate higher-quality sites include, by habitat:
  - o Bogs
    - ◊ *Menyanthes trifoliata*
    - ◊ *Chamaedaphne calyculata*
    - ◊ *Vaccinium oxycoccus*
    - ◊ *Sarracenia purpurea*
    - ◊ *Drosera* spp.
  - o Fens
    - ◊ *Cirsium muticum*
    - ◊ *Utricularia* spp.
    - ◊ *Cypripedium candidum*
    - ◊ *Eleocharis* spp.
    - ◊ *Triglochin* spp.
    - ◊ *Valeriana uliginosa*
  - o Gravel Prairie
    - ◊ *Cirsium hillii*
    - ◊ *Ranunculus rhomboideus*
  - o Dolomite Prairies
    - ◊ *Isoetes butleri*
    - ◊ *Arenaria patula*
    - ◊ *Dalea foliosa*
  - o Remaining habitats were not covered
- Loss/gain of deer-sensitive species
  - o *Trillium* spp.
  - o *Platantera psycodes*
  - o *Lilium philadelphicum var. andinum*
  - o *Lilium michiganense*

4.4 RECOMMENDED ACTIONS

- Clarify the *Biodiversity Recovery Plan* recommended action, "Rotate and diversify management treatments in order to maintain a variety of habitats needed by many species"
- Create a list made of the possible rare plants that can occur in the various Chicago Wilderness community types—this might help in selecting communities that are especially important to protect because of their rare plant potential
- Protect any plant community with a mean conservatism value of 3.8 or greater
- Create recovery plans for each rare, endangered or threatened species
- Reorganize and clarify the priority species list
- Create a watch list of all species in decline
- Define criteria for what additional non-rare, endangered or threatened indicator species should be added to the Plants of Concern monitoring program
- Determine which plant groups should be added to the *Biodiversity Recovery Plan*, i.e., lichens, liverworts, mosses, fungi and aquatic species
- Add an additional category to the priority species list: species that are rare and remnant but are common in restorations, (i.e., *Ratibida pinnata, Ratibida purpureum, Heuchera richardsonii*) and those which are commonly used but haven't done well in restorations, (i.e., *Baptisia leucophaea*)

ATTACHMENT 2



Note: Most points represent multiple subpopulations and element occurences.

Management code: (0ffice use only)	

2006 Plants of Concern Monitoring Form

Lead Monitor's Name: _____ **Monitoring Date**: _____

Use one form for each species element occurrence (EOR) at each site **and for each subpopulation with at least 50m separating the closest plants in each group.** Number each subpopulation, making sure to use the same number used in the past. For consistent data, it is important to visit the plants within 10 days of the previous monitoring date. **Review the accompanying guidelines before you monitor**. **Complete every blank;** enter NA when answer is not known. We encourage you to go over this form with the site manager after you complete your monitoring data, to assist him or her in completing the Land Management form.

Please refer to the last recorded monitoring report for consistency of data. If there are no changes in GPS, associates, or directions, write in "Same as [Previous Year]".

Section 1: General species and site identification

Genus: _____ **County:** _____
Species: _____ **Site Name:** _____
Variety: _____ **Land owner:** _____
EOR #: _____ **Manager:** _____

Searched but did not find the population: ☐ If the population is **not** found, please fill in Sections 4 and 5 for the area searched, and record habitat searched & what information you used to search in notes section.

Whole population or subpopulation? ☐ Whole population ☐ Subpopulation Subpopulation #: ☐

GPS Coordinates - (see Figure 1 in guidelines) Use NAD27 CONUS map datum setting. (In decimal degrees: dd.ddddd**) Also, please draw a simple map of the population in relation to the site on the back of the form or on a separate sheet** (see GPS instructions in manual or online.)

Unit used if other than Decimal Degrees: _____ Datum used if other than NAD27 CONU: _____

	Latitude		Longitude		Accuracy (m)
Center:	.	°N	.	°W	
North:	.	°N	.	°W	
South:	.	°N	.	°W	
East:	.	°N	.	°W	
West:	.	°N	.	°W	

FPD or Agency took readings ☐

Distance covered by population **in meters:** E-W: _____ N-S: _____

Today's soil condition: ☐ Flooded ☐ Saturated ☐ Moist, well-drained ☐ Dry

Section 2: Population information

Growth Form (what was counted): ☐ Stems ☐ Clumps ☐ Rosettes ☐ Other (describe below)

Number (count up to 100; provide as close a number as possible within other ranges; see population estimation exercise):
☐ < or =100 ☐ 101-200 ☐ 201-400 ☐ 401- 800 ☐ >800 #: _____

Reproductive State: ☐ Flower ☐ Fruit ☐ Flower & Fruit ☐ Vegetative % Reproductive ☐

Are there juveniles present? ☐ Yes ☐ No ☐ Annual species ☐ Don't know how to identify

Plant distribution (see Figure 2 in guidelines): ☐ Uniform ☐ Clustered ☐ Random

Species: _____ **Site:** _____ **Subpop #:** ___

Section 3: Associate species information

Associates - (list **DOMINANT NATIVE** plant species up to 3 trees, 3 shrubs, and 5 herbaceous plants; see guidelines. Submit photo or drawing if uncertain. List additional species after the numbered dominant species, if you wish.)

Trees:
1. _____
2. _____
3. _____

Shrubs:
1. _____
2. _____
3. _____

Herbaceous Plants:
1. _____
2. _____
3. _____
4. _____
5. _____

Section 4: Threats to the population (to be completed each year)

Degree of threats - (Check all that apply**, including if none**. See guidelines for list of other threats.)

Invasive brush encroachment < 1 m tall	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Invasive brush/tree encroachment > 1 m tall	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Deer browse (% of stems of study species)	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Deer browse (% of stems of all plants)	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Erosion (% of area with visible signs)	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Other: _____	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Other: _____	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%
Other: _____	___ 0%	___ 1-25%	___ 26-50%	___ 51-75%	___ 76-100%

Are there any authorized trails that might impact the population? ___ Yes ___ No % of impact: _____
Are there any unauthorized trails that might impact the population? ___ Yes ___ No % of impact: _____

Other threats (describe):
(If you notice an immediate threat to the population contact the landowner or POC).

Invasive species (% of invasion of exotic or native plants) **(to be completed each year):**

Species: _____	___ 1-20%	___ 21-40%	___ 41-60%	___ 61-80%	___ 81-100%
Species: _____	___ 1-20%	___ 21-40%	___ 41-60%	___ 61-80%	___ 81-100%
Species: _____	___ 1-20%	___ 21-40%	___ 41-60%	___ 61-80%	___ 81-100%
Species: _____	___ 1-20%	___ 21-40%	___ 41-60%	___ 61-80%	___ 81-100%
Species: _____	___ 1-20%	___ 21-40%	___ 41-60%	___ 61-80%	___ 81-100%

Section 5: Management within the population only

Management being conducted WITHIN THE PAST YEAR within the population of the monitored species:

Examine the site for evidence for the following (see guidelines for ways to find evidence):

Burning: Yes No Don't Know
Evidence: Ash No leaf litter/duff Other:
% Population affected:

Buckthorn, brush or invasive trees removal: Yes No Don't Know
Evidence: Freshly cut stumps Recent brush piles in vicinity Other:
% Population affected:

Herbaceous invasive removal: Yes No Don't Know
Evidence: Piles of stacked up plants Brown and dying plants Other:
% Population affected:

Mowing: Yes * No Don't Know
Evidence: Cut stems Fresh clippings Other:
% Population affected:

* Include a Yes response for mowing only if mowing is done as a restoration management practice. Mowing roadsides is not a community management tool but should be included in threats section.

Other management within or affecting the population and % of population affected:

Section 6: Directions to population and notes

(for new populations/subpopulations or for changes in directions only.) Please give clear and detailed directions to the site for future relocation. Start general and get specific. Include nearest town and route number to the site entrance and where parking is located. Include access route from a major trail, structure, or parking area. (Give approximate distances in meters; sketch a simple location map or show location on an aerial photo.) Describe in a manner that allows another person to find this population by themselves**. Map the outline of the population within the site; use distinguishable landmarks; can be done on back of form or on an additional page.**
Please place additional notes on back of form or on a separate sheet.

Monitor Name	Hours

Monitor Name	Hours

See guidelines for submission of forms and other information to POC & Land Managers ***On-line submission is encouraged at http://www.plantsofconcern.org, but you are also requested to submit a paper form (see guidelines).***

Attachment 4

2006 Plants of Concern Land Management Form

Person completing form: _____ **Date submitted:** _____

If you completed a Land Management Form since 2002 for the EO or for subpopulations of the EO monitored, you only need to fill in the current year's information in Section 4 and Section 5. If you have not yet provided land use history or adjacent land use that may impact the population, please do so. Use one form for each monitoring form you receive from the monitor, including for subpopulations of a species within a site. You may include more than one species per form if they occur in the same management location. Please list all species. Please review the Guidelines for further information on completing this form.

Section 1: General species and site identification

Genus:		**County:**	
Species:		**Site name:**	
Variety:		**Subpop #:**	
EOR #:		**Land owner:**	
		Manager:	

Other species and subpopulations included: _____
Habitat/Community type (CW classification): _____

Section 2: Population information

Was this population:
__ Naturally occurring __ Introduced through restoration __ Don't know

If introduced:
Year: _____
Form: __ From seed __ From plant __ Both seed & plant
Source _____

Section 3: Associate species information

Were some of the associates listed by the monitor introduced through restoration?
__ Yes __ No __ Don't know

Which associates on the list were introduced through restoration? (with year, if known)

Section 4: Hydrology

What were the hydrologic conditions of population during the year since population was last monitored?

Spring (3/21/05 - 6/20/05):	__ Wetter than average	__ Average	__ Drier than average
Summer (6/21/05 - 9/20/05):	__ Wetter than average	__ Average	__ Drier than average
Fall (9/21/05 - 12/20/05):	__ Wetter than average	__ Average	__ Drier than average
Winter (12/21/05 - 3/20/06):	__ Wetter than average	__ Average	__ Drier than average

Was the population flooded at any time during the growing season?
__ Yes __ No __ Don't know If yes, when? _____

Species: **Site:** **Subpop #:**

Section 5: Management within the population

Management history of monitored population: Submit historical information only once. If historical information was previously submitted, include only management occurring within the past year or since last monitoring date. (See map provided by volunteer for exact location of population; see guidelines for definitions of categories).

Burning:

Dates, intensity and area affected by burning

Date (mm/dd/yyyy)	Intensity (1-3)*	% Area affected (1-3)*

Removal of buckthorn, brush or invasive trees within or shading population:

Dates, species removed and/or herbicided and the intensity

Date (mm/dd/yyyy)	Species	Removal Intensity (1-3)*	Herbiciding Intensity (1-3)*

Herbiciding or manual removal of herbaceous invasives:

Dates, species removed and/or herbicided and the intensity

Date (mm/dd/yyyy)	Species	Removal Intensity (1-3)*	Herbiciding Intensity (1-3)*

*** 1 = 1-33%, 2 = 34-66 %, 3 = 67-100%**

Mowing:
Dates, intensity, and area of population affected by mowing as far back as you can determine accurately: **Mowing here refers to a restoration management activity, not roadside or mowing for other purposes.**

Date (mm/dd/yyyy)	Intensity (1-3)*	Area affected (1-3)*

*** 1 = 1-33%, 2 = 34-66 %, 3 = 67-100%**

Other management being conducted **within the population, dates** and degree to which it affects population:

Section 6: Site history of land use as it may affect the population:

Plowing/Agriculture: Yes No Don't know
Years:

Grazing: Yes No Don't know
Years:

Tiling/ditching: Yes No Don't know
Years:

Other:
Years:

Section 7: Management throughout the site

General management relevant to site history and including most current data (not necessarily where monitored population is located):

Year active management began:

Site currently managed? Yes No Don't know

Burning: Yes No Don't know

Removal of buckthorn, brush or invasive trees: Yes No Don't know

Herbiciding or manual removal of herbaceous invasives: Yes No Don't know

Mowing: Yes No Don't know

Hydrological modifications: Yes No Don't know

Species: **Site:** **Subpop #:**

Other management being conducted within the site:

Section 8: Notes

Notes on adjacent land use that might affect the **monitored population:**

Any other additional comments (anything you feel is important and we didn't ask):

Date population monitored:

Lead monitor's name:

Please check to see that the monitoring form is completely filled in by volunteer. Return within 3 weeks of receiving the monitoring forms from the volunteer, or by September 30 if you receive the forms from monitors in September.

FPD agencies may submit all forms in conjunction with their internal reporting schedule.
An Excel or Access format for submission is available from Bianca Rosenbaum as an alternative.
You may review past Land Management forms online, as well as monitoring forms for EO's in your jurisdiction, using your log-in code. These EOs will be assigned to the designated land managers at the beginning of each season.

See Guidelines for Land Management Form for more complete instructions and log-in information.
Please return this form and any changes in the volunteer monitoring form to Susanne Masi.

ATTACHMENT 5

Plants of Concern Advisory Group Listing

Pati Vitt (Chicago Botanic Garden)
Karen Glennemeier (Audubon-Chicago Region)
Scott Kobal (FPD – DuPage County)
Cindy Hedges (FPD – DuPage County)
Restoration Ecologist (FPD – Kane County, to be hired)
Julia Bourque (FPD – Kane County)
Kenneth Klick (FPD – Lake County)
Tom Smith (FPD – Lake County)
Laurie Boldt (CD – McHenry County)
Rebecca Key (FPD – Will County)
Debra Nelson (IDNR, Division of Natural Heritage, Lake County)
Tara Kieninger (IDNR, Natural Heritage Database)
Jeanne Barnes (IDNR, Natural Heritage Database)
Dan Gooch (Illinois Endangered Species Protection Board)
Glen Kruse (IDNR, Division of Natural Heritage)
Kelly Neal (Illinois Nature Preserves Commission)
Ben Dolbeare (Illinois Natural History Survey)
Zhanna Yermakov (Chicago Park District, Natural Areas Manager)
Eric Ulaszek (Midewin National Tallgrass Prairie, National Forest Service)
Karen Tharp (The Nature Conservancy)
Rebecca Grill (Highland Park Park District)
Mary Borecki (Volunteer)
Jane Balaban (Volunteer)
Gail Kushino (Volunteer)

Attachment 6

Species	Status	County	2001	2002	2003	2004	2005	2006	Total # of EOs
Actaea rubra	Not Listed	Cook				1			1
Actaea rubra	Not Listed	Lake					1	1	2
Adiantum pedatum	Not Listed	DuPage						3	3
Adiantum pedatum	Not Listed	Kane					1		1
Adiantum pedatum	Not Listed	Lake			1	1		1	1
Agalinis skinneriana	Listed	Lake				2	2	2	2
Amelanchier interior	Listed	Cook					3	1	3
Amelanchier interior	Listed	DuPage	2	2	2	2	2	1	2
Amelanchier sanguinea	Listed	Cook	1		1	2	2	2	2
Amelanchier sanguinea	Listed	Kane		1	1				1
Ammophila breviligulata	Listed	Cook	3	3	4	5	5	4	7
Ammophila breviligulata	Listed	Lake					1	1	1
Arabis hirsuta	Not Listed	DuPage						1	1
Aristolochia serpentaria	Listed	Kane						1	1
Artemisia serrata	Not Listed	Kane				1	1	1	1
Asclepias exaltata	Not Listed	Lake			2	1	1	1	2
Asclepias lanuginosa	Listed	McHenry		1		1	1	1	1
Asclepias meadii	Listed	DuPage		1					1
Asclepias ovalifolia	Listed	Cook					1		1
Asclepias perennis	Not Listed	Will						1	1
Asclepias viridiflora	Not Listed	Kane	3			2	1	1	4
Aster furcatus	Listed	Cook	2	1	1	1	2	1	2
Aster furcatus	Listed	Kane	2	2	1	2	2	2	2
Aster furcatus	Listed	Lake		2	2	2	3	2	3
Baptisia leucophaea	Not Listed	Cook						1	1
Baptisia leucophaea	Not Listed	Lake			1	1	1	1	1
Beckmannia syzigachne	Listed	Cook				1	2	2	2
Besseya bullii	Not Listed	Kane						1	1
Betula alleghaniensis	Listed	Lake						1	1
Betula populifolia	Not Listed	Will				1			1
Bidens discoidea	Not Listed	DuPage			1	1		2	2
Bolboschoenus maritimus	Listed	DuPage	1	1	1	1		2	3
Botrychium matricariifolium	Not Listed	Porter						1	1
Cakile edentula	Listed	Cook	3	4	5	6	7	5	8
Cakile edentula	Listed	Lake	1	1			1	1	2
Callitriche heterophylla	Not Listed	DuPage						2	2

Attachment 6

Callitriche palustris	Not Listed	DuPage						1	1
Calopogon tuberosus	Listed	Cook	1	1	1	1	1	6	6
Calopogon tuberosus	Listed	Lake			1	1	1	1	1
Calopogon tuberosus	Listed	McHenry			1	1	1		1
Carex alata	Listed	Will				1			1
Carex aurea	Listed	Cook		2	1	1	3	3	3
Carex aurea	Listed	Kane			1	1	1	1	1
Carex aurea	Listed	Lake	1	1	4	1	3	1	4
Carex bromoides	Listed	Cook				1	1	1	1
Carex bromoides	Listed	DuPage			1	1	1	1	1
Carex brunnescens	Listed	Lake			1			1	1
Carex crawei	Not Listed	Cook		1	1	1	2	2	2
Carex crawei	Not Listed	Kane					1		1
Carex crawei	Not Listed	Lake					1	1	1
Carex crawei	Not Listed	Will				3	3	2	3
Carex crawfordii	Listed	Will				1			1
Carex crus-corvi	Not Listed	DuPage			1	1			1
Carex cryptolepis	Listed	DuPage	1	1				1	1
Carex cryptolepis	Listed	Lake			1	1	1	2	2
Carex disperma	Listed	Lake			1		1		1
Carex formosa	Listed	Cook				2	1	2	2
Carex frankii	Not Listed	DuPage						3	3
Carex intumescens	Listed	Cook	1						1
Carex intumescens	Listed	Lake			1		1	1	1
Carex leptalea	Not Listed	Lake						1	1
Carex oligosperma	Listed	Kane		1					1
Carex pedunculata	Not Listed	Lake						1	1
Carex trisperma	Listed	Lake			1			1	1
Carex tuckermanii	Listed	DuPage	2	4	3	4	2	2	4
Carex utriculata	Not Listed	DuPage						1	1
Carex viridula	Listed	Cook		1		1	2	2	2
Carex viridula	Listed	DuPage	4	4	3	2	1	2	5
Carex viridula	Listed	Lake			1			1	2
Carex viridula	Listed	Will			1	1	1	1	1
Carex woodii	Listed	Cook		1		1	1	1	1
Carex woodii	Listed	DuPage	3	6	3	5	3	5	7
Carex woodii	Listed	Lake			3	4	2	2	5

Attachment 6

Cassia hebecarpa	Not Listed	Cook					1	1	1
Castilleja sessiliflora	Listed	Lake			1				1
Cercis canadensis	Not Listed	Lake						1	1
Chamaedaphne calyculata	Listed	Kane		1					1
Chamaedaphne calyculata	Listed	Lake			1			1	1
Chamaedaphne calyculata	Listed	McHenry						1	1
Chamaesyce polygonifolia	Listed	Cook	2	3	3	7	7	6	10
Chamaesyce polygonifolia	Listed	Lake		1			1	1	1
Cicuta bulbifera	Not Listed	DuPage						2	2
Cirsium hillii	Not Listed	DuPage	3	4	3	4	1	4	5
Cirsium hillii	Not Listed	Kane	1	1	2	2	1	2	2
Cirsium hillii	Not Listed	McHenry	1	1	1	1	1	1	1
Cirsium hillii	Not Listed	Pike	1						2
Cirsium hillii	Not Listed	Will	1	2	2	2	2	2	1
Cladium mariscoides	Not Listed	Lake	1				1		1
Collinsia verna	Not Listed	Kane					1		1
Comptonia peregrina	Listed	Cook						2	2
Comptonia peregrina	Listed	Kankakee		1					1
Corallorhiza maculata	Listed	Will			1		1		2
Cypripedium candidum	Listed	Cook	5	5	4	6	7	6	9
Cypripedium candidum	Listed	DuPage	2	4	2	4	3	3	4
Cypripedium candidum	Listed	Kane	3	2	2	3	2	2	3
Cypripedium candidum	Listed	Lake	2	2	4	3	4	2	5
Cypripedium candidum	Listed	McHenry		2	3	4	6	6	10
Cypripedium candidum	Listed	Will		1	1	1		1	1
Cypripedium parviflorum var. makasin	Listed	Lake	1	1	1	1	2	1	2
Cypripedium reginae	Listed	Lake						1	1
Dalea foliosa	Listed	Cook		1			1	1	1
Dalea foliosa	Listed	DuPage	1	1		1			1
Dalea foliosa	Listed	Will				1			1
Delphinium tricorne	Not Listed	Cook				1	1	1	1
Desmodium canescens	Not Listed	DuPage						1	1
Diarrhena americana	Not Listed	Cook					1	1	1
Diarrhena americana	Not Listed	DuPage			1				1
Dichanthelium boreale	Listed	Cook						1	1
Dirca palustris	Not Listed	Kane		1	1		1	1	2
Drosera intermedia	Listed	Kane		1					1

Attachment 6

Drosera intermedia	Listed	Will					1		1
Drosera rotundifolia	Listed	Lake	1	1	1	1	1	1	1
Echinodorus cordifolius	Not Listed	Kane					1	1	1
Elymus trachycaulus	Listed	DuPage	1	1	1	1	1	1	1
Epigaea repens	Not Listed	Porter						1	1
Epilobium strictum	Listed	Will				1	1		1
Erigeron pulchellus	Not Listed	DuPage						2	2
Eriophorum angustifolium	Not Listed	Kane	2			1	1		2
Eriophorum virginicum	Listed	Lake						1	1
Erythronium americanum	Not Listed	DuPage						1	1
Filipendula rubra	Listed	Lake		1	1	1	1	1	1
Filipendula rubra	Listed	McHenry						1	1
Galium labradoricum	Not Listed	Lake		1	1			1	3
Gentiana flavida	Not Listed	Cook						1	1
Gentiana flavida	Not Listed	Lake						2	2
Gentianopsis crinita	Not Listed	Lake						1	1
Geranium bicknellii	Listed	Lake	1	2	2	2	2	1	3
Geum rivale	Not Listed	Kane		1	1				1
Geum triflorum	Not Listed	Lake		1					1
Goodyera pubescens	Not Listed	Kane				1	1	1	1
Gratiola quartermaniae	Not Listed	Will						1	1
Helianthus giganteus	Listed	Cook				1			1
Hepatica americana	Not Listed	Lake					1	2	2
Hybanthus concolor	Not Listed	Cook					1	1	1
Hydrastis canadensis	Not Listed	Cook				1	1	1	1
Hydrastis canadensis	Not Listed	Kane					1	1	1
Hydrocotyle ranunculoides	Listed	Lake		1					1
Hypericum adpressum	Listed	Will					1	1	2
Hypericum kalmianum	Listed	Cook						2	2
Hypericum kalmianum	Listed	Lake		1	3	2	2	3	4
Ilex verticillata	Not Listed	DuPage			1	1			1
Iodanthus pinnatifidus	Not Listed	DuPage						1	1
Isoetes butleri	Listed	DuPage		1		1	1	1	1
Isoetes butleri	Listed	Will			1	2	2	2	2
Jeffersonia diphylla	Not Listed	Cook				1	1	2	2
Juglans cinerea	Not Listed	DuPage				1		2	3
Juglans cinerea	Not Listed	Lake			1	1	1	1	1

Attachment 6

Juncus alpinoarticulatus	Listed	Cook						1	1
Juncus alpinoarticulatus	Listed	DuPage		1	1	1	1	2	2
Juncus alpinoarticulatus	Listed	Kane					1		1
Juncus alpinoarticulatus	Listed	Lake				1			1
Juniperus communis	Listed	Lake		1			1	1	1
Larix laricina	Listed	Lake		1					1
Lathyrus ochroleucus	Listed	Cook					1	1	1
Lathyrus ochroleucus	Listed	DuPage					1		1
Lathyrus ochroleucus	Listed	Lake	2	4	2	6	6	4	8
Lathyrus ochroleucus	Listed	McHenry					1	1	1
Lechea intermedia	Listed	Kane		1	1	1			1
Lespedeza leptostachya	Listed	McHenry				2	2		2
Liatris scariosa var. nieuwlandii	Listed	Cook				2	3	2	3
Liatris scariosa var. nieuwlandii	Listed	Will				1	1	1	1
Lonicera dioica	Not Listed	Lake						1	1
Lycopodium clavatum	Listed	DuPage	1						1
Lycopodium complanatum var. flabelliforme	Not Listed	DuPage				1		3	5
Lycopodium complanatum var. flabelliforme	Not Listed	Kane				1	1	1	1
Malvastrum hispidum	Listed	Will				1	1	1	1
Menyanthes trifoliata	Listed	Kane				1		1	1
Menyanthes trifoliata	Listed	Lake					1	1	1
Minuartia patula	Listed	Cook				1	2	2	2
Minuartia patula	Listed	DuPage	1	1		1		1	1
Minuartia patula	Listed	Will			1	3	2	3	3
Mitella diphylla	Not Listed	Lake			1	1	1	2	2
Mitella diphylla	Not Listed	McHenry						1	1
Napaea dioica	Not Listed	Will						1	1
Oenothera perennis	Listed	Cook	1			4	6	6	9
Oenothera perennis	Listed	DuPage			1	1	1	1	1
Oenothera perennis	Listed	Lake	2	3	5	7	7	6	7
Oenothera perennis	Listed	Will				1			1
Ophioglossum vulgatum	Not Listed	Cook					1	1	1
Orchis spectabilis	Not Listed	McHenry		1	1	1	1		1
Oryzopsis racemosa	Not Listed	DuPage			1	1	1	1	1
Oryzopsis racemosa	Not Listed	Lake			1		1	1	2
Panax quinquefolius	Not Listed	DuPage						2	2
Parnassia glauca	Not Listed	McHenry						2	2

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Penstemon pallidus	Not Listed	DuPage						2	2
Penstemon tubaeflorus	Listed	DuPage				2		2	2
Physocarpus opulifolius	Not Listed	Lake			1		1		1
Plantago cordata	Listed	DuPage		1	1	1	1	1	1
Plantago cordata	Listed	Will					1		1
Platanthera clavellata	Listed	Lake			1	1	1	1	1
Platanthera flava var. herbiola	Listed	Cook						1	1
Platanthera flava var. herbiola	Listed	Lake		2	3	3	3	2	4
Platanthera flava var. herbiola	Listed	Will					1	1	2
Platanthera hyperborea var. huronensis	Not Listed	McHenry		1	1	1	1	2	2
Platanthera lacera	Not Listed	Will					1		1
Platanthera psycodes	Listed	Lake		2	3	3	3	3	3
Poa sylvestris	Not Listed	DuPage			1	1			1
Pogonia ophioglossoides	Listed	Cook	1						1
Pogonia ophioglossoides	Listed	McHenry			1			1	1
Polygonatum pubescens	Listed	Cook				1	2	1	2
Polygonatum pubescens	Listed	DuPage					1		1
Polygonatum pubescens	Listed	Lake		1				1	1
Polystichum acrostichoides	Not Listed	McHenry						1	1
Populus balsamifera	Listed	Cook				1			1
Potamogeton robbinsii	Listed	Lake		1					1
Prenanthes aspera	Not Listed	Cook						1	1
Psoralea tenuiflora	Not Listed	Kane	1			1	1	1	1
Pycnanthemum pilosum	Not Listed	DuPage						1	1
Pyrola elliptica	Not Listed	Lake				1	1	2	2
Ranunculus rhomboideus	Listed	Kane					1	1	1
Rhus vernix	Not Listed	McHenry						2	2
Rubus odoratus	Listed	DuPage	1	1	1	1		1	1
Rubus odoratus	Listed	Kane		1	1	1	1	1	1
Rubus odoratus	Listed	Lake		1				1	1
Rubus pubescens	Listed	Cook			1	1	3	3	3
Rubus pubescens	Listed	Lake		1	2	1	1	1	3
Rudbeckia fulgida var. sullivantii	Not Listed	Will				1	1	1	1
Sagittaria calycina	Not Listed	Kane					1	1	1
Salix candida	Not Listed	Kane				1			1
Sarracenia purpurea	Listed	Lake						1	1
Sarracenia purpurea	Listed	McHenry				1			1

Attachment 6

Scirpus hattorianus	Listed	DuPage	2	2	1	1	1	2	2
Scirpus hattorianus	Listed	Lake		1	1	1	1	1	1
Scirpus microcarpus	Listed	Lake				1	1	3	3
Shepherdia canadensis	Listed	Lake	1	1	1		1	1	1
Silene regia	Listed	Cook		1	1	1	1	1	1
Silene regia	Listed	Kane	2			2	2	2	2
Silene virginica	Not Listed	Cook					1		1
Silene virginica	Not Listed	Lake						1	1
Sisyrinchium montanum	Listed	Cook			1	2	3	2	3
Sisyrinchium montanum	Listed	Lake		1	1				1
Sparganium emersum	Listed	DuPage	1	2		2		1	2
Sparganium emersum	Listed	Kane			1		1		1
Spiranthes lucida	Listed	Cook	1	2	2	2	2	2	2
Stellaria pubera	Listed	Cook					1	1	1
Symphoricarpos albus var. albus	Listed	Kane		1	1				1
Tetraneuris herbacea	Listed	Cook						1	1
Tetraneuris herbacea	Listed	DuPage	1	1		1			1
Thuja occidentalis	Not Listed	Kane		1					1
Thuja occidentalis	Not Listed	Lake		1					1
Tofieldia glutinosa	Listed	Cook	1	1	1	1	1	1	1
Tofieldia glutinosa	Listed	Lake					1	1	1
Tomanthera auriculata	Listed	Cook	3	3	3	5	6	7	7
Tomanthera auriculata	Listed	DuPage	1	1	2	1	1	1	2
Tomanthera auriculata	Listed	Lake					1	1	2
Tomanthera auriculata	Listed	Will	2	3	3	4	4	4	4
Trientalis borealis	Listed	Cook						1	1
Trientalis borealis	Listed	Lake			1		1	2	2
Trifolium reflexum	Listed	Will		1	1	1	1	1	1
Triglochin maritima	Listed	Lake				1	2	2	2
Triglochin maritima	Listed	McHenry				1	1	1	1
Triglochin palustris	Listed	Cook	1	1	1	1	1	1	1
Triglochin palustris	Listed	Kane			1		1		2
Triglochin palustris	Listed	Lake						2	2
Triglochin palustris	Listed	Will				1	1		1
Trillium cernuum	Listed	McHenry				1	1	1	1
Trillium sessile	Not Listed	Cook				1	1	1	1
Trillium sessile	Not Listed	DuPage						1	1

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Utricularia cornuta	Listed	McHenry		1	1	1	1	1	1
Utricularia intermedia	Listed	Cook	1	1	1	2	2	2	2
Utricularia intermedia	Listed	Kane			1				1
Utricularia intermedia	Listed	Lake			1	1	1	1	1
Utricularia intermedia	Listed	McHenry		1	1	1	1	1	1
Utricularia minor	Listed	Cook	1						1
Vaccinium oxycoccos	Listed	Lake			1			1	1
Valeriana edulis var. ciliata	Not Listed	Will						1	1
Valeriana uliginosa	Listed	McHenry		1	1		2	2	2
Veronica scutellata	Listed	Cook				1	2	2	2
Veronica scutellata	Listed	DuPage	2	4	2	4		3	5
Veronica scutellata	Listed	Lake		2	3	2	3	2	7
Veronica scutellata	Listed	Will			1		1	1	1
Viola canadensis	Listed	Cook						1	1
Viola conspersa	Listed	Cook	1	1	1	2	4	3	4
Viola conspersa	Listed	DuPage	1	1	1	1	1	1	1
Viola conspersa	Listed	Lake	4	6	8	7	7	7	9
Viola conspersa	Listed	McHenry			1		1	1	1
Viola striata	Not Listed	Cook					1	1	2
Zizania aquatica	Not Listed	Kane					1		1
			2001	**2002**	**2003**	**2004**	**2005**	**2006**	**Total # of Eos**
		Total	96	155	179	245	279	352	512

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County	SiteName	LandOwner	2001	2002	2003	2004	2005	2006	Total # of EOs
Cook	Bemis Woods	FPD Cook County					1	1	1
Cook	Bergman Slough	FPD Cook County				2	2	2	2
Cook	Black Partridge Fen	FPD Cook County					1	1	1
Cook	Black Partridge Woods	FPD Cook County					1	1	1
Cook	Bluff Spring Fen	FPD Cook County	5	4	5	5	5	5	5
Cook	Bluff Spring Fen	FPD Cook County and City of Elgin	4	2	2	3	2	2	5
Cook	Brookfield Woods Prairie/Salt Creek Prairie	FPD Cook County					3	3	4
Cook	Bunker Hill Prairie and Savanna (Clayton F. Smith Woods)	FPD Cook County				1	1		1
Cook	Bunker Hill Prairie and Savanna (Sidney R. Yates Flatwoods)	FPD Cook County				1	1		1
Cook	Camp Sagawau	FPD Cook County				4	6	6	6
Cook	Camp Sagawau (CCC Quarry)	FPD Cook County				3	3	3	3
Cook	Cap Sauers Holdings	FPD Cook County					1		1
Cook	Chicago Ridge Prairie	Oak Lawn Park District	1	1	1	1	1	1	1
Cook	Deer Grove	FPD Cook County					2	2	2
Cook	Deer Grove	Long Grove Park District					1		1
Cook	Dixmoor Prairie	FPD Cook County				1			1
Cook	Dixon Prairie, Chicago Botanic Garden	FPD Cook County/CBG	1	3	2	3	3	3	5
Cook	Dropseed Prairie	TNC				1	1	1	1
Cook	Edgebrook Woods	FPD Cook County				1	1		1
Cook	Gensburg Markham Prairie	TNC, Northeastern IL Univ, Nat'l Land Institute	1	1	1	1	1	2	2
Cook	Glenbrook North High School Prairie Nature Preserve	Glenbrook School District 225						3	3
Cook	Glencoe Botanical Area (Shelton Park)	Glencoe Park District				1			1
Cook	Glenview Naval Air Station Prairie	Village of Glenview		2	3	3	3	3	3
Cook	Harms Flatwoods	FPD Cook County					1	1	1
Cook	Harms Woods	FPD Cook County					1	1	1
Cook	Jurgensen Prairie	FPD Cook County						3	3
Cook	Kennicotts Grove	Glenview Park District	1						1
Cook	Kloempken Prairie and Savanna	FPD Cook County				1		1	1
Cook	Lake Cook Metra Station (Metra Prairie)	Metra Railroad ?				1	1		1
Cook	Leonardi Park	FPD Cook County						1	1
Cook	Lloyd Park Beach Boat Launch	Village of Winnetka				1			1
Cook	Loyola Beach (Pratt Beach)	Chicago Park District	1	1	1	2	2	3	3

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Cook	McCormick Woods	FPD Cook County					1		1
Cook	McDonald Woods East, Chicago Botanic Garden	FPD Cook County/CBG	1	1	2		2	2	2
Cook	McDonald Woods West, Chicago Botanic Garden	FPD Cook County/CBG	1			1	1		1
Cook	McDonald Woods, Chicago Botanic Garden	FPD Cook County/CBG	1	2	1	2	2	2	2
Cook	Miami Woods Prairie	FPD Cook County					1	1	1
Cook	Montrose Beach Dunes	Chicago Park District	3	3	3	4	5	5	5
Cook	Montrose Beach Dunes	FPD Cook County						1	1
Cook	Northwestern University North	Northwestern University						2	2
Cook	Northwestern University South	Northwestern University						2	2
Cook	Oakton Community College Woods	Oakton Community College				3	3	3	3
Cook	Paintbrush Prairie	TNC	1	1	1	1	1	1	1
Cook	Palatine Prairie	Palatine Park District + MWRD	1	1	1	1	1	1	1
Cook	Plum Creek Preserve	FPD Cook County					1		1
Cook	Poplar Creek Prairie	FPD Cook County					2	2	2
Cook	Powderhorn Prairie	FPD Cook County					2	2	2
Cook	Private Property - Forest Park	Privately Owned						1	1
Cook	Rainbow Beach	Chicago Park District		3	2	3	3	3	3
Cook	Sand Ridge Nature Center	FPD Cook County						3	3
Cook	Sand Ridge Prairie Nature Preserve	FPD Cook County						3	3
Cook	Sante Fe Prairie	Civic Center Auth of I&M Canal Natl Herit Corridor	1	1	1	1	1	1	1
Cook	SEPA Station - Calumet River	MWRD	1						1
Cook	Sheridan Lakeside Condominium Association Beach/Berger Park	Sheridan Lakeside Condominium Association and Owners/Chicago Park District	1		3	3	3		3
Cook	Somme Prairie Grove	FPD Cook County				4	6	4	6
Cook	Somme Prairie Nature Preserve	FPD Cook County				2	2	1	2
Cook	South Boulevard Beach	City of Evanston					2	2	2
Cook	St. Paul Woods	FPD Cook County					1	1	1
Cook	Superior Street Land and Water Reserve	Calumet Memorial Park District						1	1
Cook	Surfside Condominium Beach/Kathy Osterman Beach	Surfside Condominium Association/Chicago Park District	3	3	3	3	3		3
Cook	Theodore Stone Prairie	FPD Cook County						2	2
Cook	Thornton-Lansing Road Nature Preserve (Zanders)	FPD Cook County						3	3
Cook	Tower Road Park Beach	Village of Winnetka				3	3		3
Cook	Watersmeet	FPD Cook County					2	2	2
Cook	Wayside Woods Prairie	FPD Cook County					1	1	1

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Cook	William Powers Conservation Area (Wolf Lake)	IDNR		3	1	1	3	3	3
Cook	Wolf Road Prairie	Village of Westchester	1	1		1	1	1	1
DuPage	Belmont Prairie	Downer's Grove Park District	2	2	2	2			2
DuPage	Big Woods Forest Preserve	FPD DuPage County				2			2
DuPage	Blackwell Forest Preserve	FPD DuPage County	1	2	2	3	1	4	4
DuPage	Churchill Woods	FPD DuPage County	1			1		1	2
DuPage	Des Plaines Riverway	FPD DuPage County				1		2	2
DuPage	East Branch Forest Preserve	FPD DuPage County						1	1
DuPage	East Branch Forest Preserve (East Branch Marsh)	FPD DuPage County		2	2	2	1	1	2
DuPage	Fischer Woods	FPD DuPage County	1	2	8	8	3	5	8
DuPage	Fullersburg Woods	FPD DuPage County	3	3	3	3	3	2	3
DuPage	Goodrich Woods	FPD DuPage County & Naperville Park District						2	2
DuPage	Greene Valley	FPD DuPage County						3	3
DuPage	Hawk Hollow	FPD DuPage County	1	1	1	1		2	2
DuPage	Hidden Lake	FPD DuPage County		1		1		1	1
DuPage	James Pate Philip State Park	IDNR		1		1		3	3
DuPage	Lyman Woods	FPD DuPage County						2	2
DuPage	Lyman Woods	FPD DuPage/Downer's Grove Park District/Village of Downer's Grove	3	3	1	1	1	3	3
DuPage	Mallard Lake	FPD DuPage County	1	1				2	2
DuPage	Maple Grove	FPD DuPage County		2	2	2	2	3	3
DuPage	McDowell Grove	FPD DuPage County						1	1
DuPage	Meacham Grove	FPD DuPage County		1		1		1	1
DuPage	Pratts Wayne Woods	FPD DuPage County	2	3	2			2	4
DuPage	Pratts Wayne Woods (Brewster Creek)	FPD DuPage County	1	1		1			1
DuPage	Saint James Farm	FPD DuPage County						1	1
DuPage	Special 8 Glacial Ridge Park	FPD DuPage County					2		2
DuPage	Swift Prairie (Swift Road Meadow)	FPD DuPage County		1	1	2	1	2	3
DuPage	Timber Ridge (Klein Savanna)	FPD DuPage County	1	1	1	1	1	4	4
DuPage	Warrenville Grove Forest Preserve	FPD DuPage County		1	1	1	1	1	1
DuPage	Waterfall Glen	FPD DuPage County	5	9	1	8	3	10	14
DuPage	West Branch Forest Preserve	FPD DuPage County	1	1	1	1	1	1	1
DuPage	West Chicago Prairie	FPD DuPage County	2	3	2	3	2	3	4
DuPage	West DuPage Woods	FPD DuPage County	2	1	2	1	1	1	4
DuPage	West DuPage Woods (Elsens Hill)	FPD DuPage County	2	1	1	1	1	1	3
DuPage	Wood Dale Grove	FPD DuPage County	2	2	2	2		2	4

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DuPage	Wood Ridge	FPD DuPage County						4	4
Kane	Almon Underwood Forest Preserve	FPD Kane County	1						1
Kane	Big Rock	FPD Kane County						1	1
Kane	Bliss Woods Forest Preserve	FPD Kane County				1	3	2	3
Kane	Brunner Woods	Privately Owned					1	1	1
Kane	Burlington Prairie	FPD Kane County	1	1	1	1	3	1	3
Kane	Burnidge Forest Preserve	FPD Kane County				2	2	2	2
Kane	Campton Hills Park	St. Charles Park District	1		1	1	1	1	1
Kane	Dick Young Forest Preserve	FPD Kane County					3	2	3
Kane	Dick Young Forest Preserve (Nelson Lake Marsh)	FPD Kane County			3	1	1	1	3
Kane	Dixie Fromm Briggs Nature Preserve	Dundee Township		1	1	1	1	2	2
Kane	Fox River Bike Trail and Trout Park	FPD Kane County/City of Elgin	1	1	1	1	1	1	1
Kane	Freeman Kame	FPD Kane County	1			3	1	1	4
Kane	Hannaford Forest Preserve	FPD Kane County	1			1	1	1	1
Kane	Helm Road Woods (Barrington Hills Botanical Area)	FPD Kane County/ComEd	1	1		1	1	1	1
Kane	LeRoy Oakes Forest Preserve	FPD Kane County	2			2	1	2	3
Kane	LeRoy Oakes Forest Preserve (Murray Prairie)	FPD Kane County	2			2	2	2	2
Kane	McLean Road Fen	FPD Kane County					1		1
Kane	Meissner-Corron (Russell Fen)	FPD Kane County	2	1	1	1	2	1	2
Kane	Mooseheart Ravine	Loyal Order of Moose		3	3				3
Kane	Prairie Kame Forest Preserve	FPD Kane County	1						1
Kane	Rutland Bog	Chicago Title and Trust		3					3
Kane	Sauer Family Prairie Kame FP	FPD Kane County				1			1
Kane	Schweitzer Forest Preserve (Pothole Marsh)	FPD Kane County			1		1		1
Kane	Sleepy Hollow Ravine	Glen Speigler		1	1	1			1
Kane	Trout Park Nature Preserve	City of Elgin		3	2	1	1	1	3
Kankakee	Sweet Fern Savanna	Marianne Hahn		1					1
Lake	Berkeley Prairie	FPD Lake County		2	3	3	3	3	3
Lake	Beulah Park	City of Zion						1	1
Lake	Biltmore Way Easement	Citizens for Conservation					1		1
Lake	Buffalo Grove Prairie	Commonwealth Edison			1	1	1	1	1
Lake	Cressmoor Prairie	Shirley Heinze Land Trust						1	1
Lake	Cuba Marsh	FPD Lake County		3					3
Lake	East Skokie Nature Preserve	Lake Forest Open Lands Association		1				1	1
Lake	Elm Road Forest	FPD Lake County			4	2		1	5
Lake	Ethels Woods	FPD Lake County		1		1	1		1
Lake	Farm Trails North Nature Preserve	Citizens for Conservation					1		1

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Lake	Florsheim Park/North Park	Village of Lincolnshire	1	2	2	3	3	4	4
Lake	Fort Sheridan Bluff (Ft. Sheridan Golf Course)	FPD Lake County	2	7	3		8	10	13
Lake	Foss Park	Municipality of North Chicago						1	1
Lake	Fourth Lake Fen	FPD Lake County			1				1
Lake	Gander Mountain	FPD Lake County					3	2	4
Lake	Gavin Bog and Prairie	FPD Lake County	2	3	8	4	4	10	10
Lake	Grainger Flatwoods	FPD Lake County	1	3	6	3	5	5	8
Lake	Grant Woods Forest Preserve	FPD Lake County	1	1	1	2	2	2	2
Lake	Grassy Lake/Flint Creek (Wagner Fen)	FPD Lake County	1				1		1
Lake	Greenbelt Forest Preserve	FPD Lake County			2	1	2	1	2
Lake	Heller Nature Center	Highland Park/Park District			1	2	2	2	2
Lake	Highmoor Prairie	Highland Park/Park District				1	1	2	2
Lake	Illinois Beach State Park (North Unit)	IDNR				2	2	3	3
Lake	Illinois Beach State Park (North Unit) and Hosah Prairie	IDNR + Zion Park District				2	2	3	3
Lake	Illinois Beach State Park (South Unit)	IDNR	2	3	6	6	8	9	11
Lake	Independence Grove	FPD Lake County				2			2
Lake	Leonardi Park	Highland Park/Park District			1	1	1	1	1
Lake	Liberty Prairie	Libertyville Township						2	2
Lake	Lyons Prairie and Marsh	CD McHenry County			2		2		3
Lake	Lyons Woods	FPD Lake County			2	1	1		2
Lake	MacArthur Woods	FPD Lake County		4	6	5	5	1	6
Lake	Marl Flats Forest Preserve	FPD Lake County				2	2	2	2
Lake	Middlefork Savanna	FPD Lake County		2	1				3
Lake	Red Oak Woods	North Shore School District 112				1	1	1	1
Lake	Reed-Turner Woodland and Woodland Ridge Lot 2	Village of Long Grove	1	1	1	1	1	2	2
Lake	Rollins Savanna	FPD Lake County			1			3	3
Lake	Ryerson Conservation Area	FPD Lake County	1	4	8	7	6	9	10
Lake	Singing Hills	FPD Lake County			1		1		1
Lake	Spring Bluff	FPD Lake County		2	4	2	2	2	4
Lake	Sun Lake	FPD Lake County		2					2
Lake	Turner Lake	IDNR	1	1	1	1			1
Lake	Volo Bog	IDNR					2	3	3
Lake	Wadsworth Prairie	FPD Lake County	1	1	1	1	1		1
Lake	Wadsworth Prairie	FPD Lake County/RR Right of Way	1	1	1		1		1
Lake	Wagner Fen Nature Preserve	FPD Lake County						1	1
Lake	Wauconda Bog	FPD Lake County	1				1	4	5

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Lake	Waukegan Beach	City of Waukegan			2	2	3	3	3
Lake	Wright Woods	FPD Lake County	1	1	2	3	2	2	3
McHenry	Alden Sedge Meadow	CD McHenry County			1	2	1		2
McHenry	Amberin Ash Ridge	CD McHenry County						1	1
McHenry	Bailey Easement: Boone Creek	Bailey Family		1	1		1		1
McHenry	Boloria Fen and Sedge Meadow	Boone Creek Watershed Alliance						3	3
McHenry	Boone Creek Fen	O'Donnell Family			1			1	1
McHenry	Cotton Creek Marsh	CD McHenry County						2	2
McHenry	Frank and Margo Blair Property	Frank and Margo Blair		1	1	1	1	1	1
McHenry	Glacial Park	CD McHenry County		1	2	1	2	4	4
McHenry	Gladstone Fen	Lorna Gladstone						1	1
McHenry	Greenwood Fen	CD McHenry County				1	1	1	1
McHenry	Hickory Grove Tszurz	CD McHenry County					1		1
McHenry	HUM 58-59	CD McHenry County				1			1
McHenry	HUM 61	CD McHenry County				2	2		2
McHenry	HUM Coyne Station East	CD McHenry County				2	2	2	2
McHenry	HUM Railroad Prairie West	CD McHenry County				1	1		1
McHenry	Lake in the Hills Fen	IDNR/Village of Lake in the Hills	1	5	5	4	5	6	6
McHenry	Manuk-Sook Land and Water Reserve	John Clemetsen						2	2
McHenry	Nippersink Canoe Base	CD McHenry County					1	1	1
McHenry	Oakwood Hills Fen	Oakwood Hills					1	1	1
McHenry	Oakwood Hills Fen	Village of Oakwood Hills					1	1	1
McHenry	Tom Burroughs Property	Tom Burroughs		1	1	1	1		1
Pike	Walnut Grove Hill Prairie	Privately Owned 3	1						1
Porter	Cowles Bog Trail (INDU)	National Park Service						1	1
Porter	Indiana Dunes National Lakeshore	National Park Service						1	1
Will	Blodgett Road Dolomite Prairie (Des Plaines River Conservation Area)	IDNR		1	1	1	1	1	1
Will	Braidwood Dunes and Savanna	FPD Will County					4		4
Will	Dellwood Park West (North Prairie)	Lockport Township Park District				4	2	2	4
Will	Four Seasons Park	Plainfield Park District			1	1	1	1	1
Will	Goodenow Grove Nature Preserve	FPD Will County				3	2	1	4
Will	Grant Creek Prairie	IDNR	1	1	1	1	1	2	2
Will	Grant Creek Prairie and Midewin National Tallgrass Prairie	IDNR + U.S. Forest Service		1	1	1		1	1
Will	Hickory Creek Barrens	FPD Will County				1			1
Will	Messenger Woods	FPD Will County					1		1

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Will	Middle Plum Creek	FPD Will County				1			1
Will	Midewin National Tallgrass Prairie (Blodgett Road)	U.S. Forest Service	1	1	1	1	1	2	2
Will	Midewin National Tallgrass Prairie (Drummond Prairie)(Joliet Army Ammunition Plant)	U.S. Forest Service						1	1
Will	Midewin National Tallgrass Prairie (Drummond Prairie)(Joliet Army Ammunition Plant)	U.S. Forest Service/Exxon/Mobil			2	3	3	3	3
Will	Midewin National Tallgrass Prairie (Joliet Army Ammunition Plant)	U.S. Forest Service				2	2	2	2
Will	Midewin National Tallgrass Prairie and Des Plaines River Conservation Area: Foxglove Prairie (Joliet Army Ammunition Plant)	U.S. Forest Service/IDNR	1	1	1	1	1	1	1
Will	Romeoville Prairie Nature Preserve	FPD Will County		1	1	5	5	3	5
Will	Sand Ridge Savanna	FPD Will County						2	2
Will	Thorn Creek Woods	FPD Will County, IDNR, Villages of Park Forest and University Park			2		1	1	2
Will	Thorn Grove Forest Preserve	FPD Will County				1	1	2	2
Will	Vermont Cemetery	FPD Will County		1	1	1	1	1	1

Attachment 8

# of Counties	Species	Cook	DuPage	Kane	Lake	McHenry	Will	Total # of EOs
6	Cypripedium candidum	*	*	*	*	*	*	32
4	Carex crawei	*		*	*		*	7
4	Carex viridula	*	*		*		*	10
4	Cirsium hillii		*	*		*	*	10
4	Juncus alpinoarticulatus	*	*	*	*			5
4	Lathyrus ochroleucus	*	*		*	*		11
4	Oenothera perennis	*	*		*		*	18
4	Tomanthera auriculata	*	*		*		*	15
4	Triglochin palustris	*		*	*		*	6
4	Utricularia intermedia	*		*	*	*		5
4	Veronica scutellata	*	*		*		*	15
4	Viola conspersa	*	*		*	*		15
3	Adiantum pedatum		*	*	*			5
3	Aster furcatus	*		*	*			7
3	Calopogon tuberosus	*			*	*		8
3	Carex aurea	*		*	*			8
3	Carex woodii	*	*		*			13
3	Chamaedaphne calyculata			*	*	*		3
3	Dalea foliosa	*	*				*	3
3	Minuartia patula	*	*				*	6
3	Platanthera flava var. herbiola	*			*		*	7
3	Polygonatum pubescens	*	*		*			4
3	Rubus odoratus		*	*	*			3
2	Actaea rubra	*			*			3
2	Amelanchier interior	*	*					5
2	Amelanchier sanguinea	*		*				3
2	Ammophila breviligulata	*			*			8
2	Baptisia leucophaea	*			*			2
2	Cakile edentula	*			*			10
2	Carex bromoides	*	*					2
2	Carex cryptolepis		*		*			3
2	Carex intumescens	*			*			2
2	Chamaesyce polygonifolia	*			*			11

Attachment 8

2	Diarrhena americana	*	*					2
2	Drosera intermedia			*			*	2
2	Filipendula rubra				*	*		2
2	Gentiana flavida	*			*			3
2	Hydrastis canadensis	*		*				2
2	Hypericum kalmianum	*			*			6
2	Isoetes butleri		*				*	3
2	Juglans cinerea		*		*			4
2	Liatris scariosa var. nieuwlandii	*					*	4
2	Lycopodium complanatum var. flabelliforme		*	*				6
2	Menyanthes trifoliata			*	*			2
2	Mitella diphylla				*	*		3
2	Oryzopsis racemosa		*		*			3
2	Plantago cordata		*				*	2
2	Pogonia ophioglossoides	*				*		2
2	Rubus pubescens	*			*			6
2	Sarracenia purpurea				*	*		2
2	Scirpus hattorianus		*		*			3
2	Silene regia	*		*				3
2	Silene virginica	*			*			2
2	Sisyrinchium montanum	*			*			4
2	Sparganium emersum		*	*				3
2	Tetraneuris herbacea	*	*					2
2	Thuja occidentalis			*	*			2
2	Tofieldia glutinosa	*			*			2
2	Trientalis borealis	*			*			3
2	Triglochin maritima				*	*		3
2	Trillium sessile	*	*					2
1	Agalinis skinneriana				*			2
1	Arabis hirsuta		*					1
1	Aristolochia serpentaria			*				1
1	Artemisia serrata			*				1
1	Asclepias exaltata				*			2
1	Asclepias lanuginosa					*		1
1	Asclepias meadii		*					1
1	Asclepias ovalifolia	*						1

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1	Asclepias perennis						*	1
1	Asclepias viridiflora			*				4
1	Beckmannia syzigachne	*						2
1	Besseya bullii			*				1
1	Betula alleghaniensis				*			1
1	Betula populifolia						*	1
1	Bidens discoidea		*					2
1	Bolboschoenus maritimus		*					3
1	Callitriche heterophylla		*					2
1	Callitriche palustris		*					1
1	Carex alata						*	1
1	Carex brunnescens				*			1
1	Carex crawfordii						*	1
1	Carex crus-corvi		*					1
1	Carex disperma				*			1
1	Carex formosa	*						2
1	Carex frankii		*					3
1	Carex leptalea				*			1
1	Carex oligosperma			*				1
1	Carex pedunculata				*			1
1	Carex trisperma				*			1
1	Carex tuckermanii		*					4
1	Carex utriculata		*					1
1	Cassia hebecarpa	*						1
1	Castilleja sessiliflora				*			1
1	Cercis canadensis				*			1
1	Cicuta bulbifera		*					2
1	Cladium mariscoides				*			1
1	Collinsia verna			*				1
1	Comptonia peregrina	*						2
1	Corallorhiza maculata						*	2
1	Cypripedium parviflorum var. makasin				*			2
1	Cypripedium reginae				*			1
1	Delphinium tricorne	*						1
1	Desmodium canescens		*					1
1	Dichanthelium boreale	*						1
1	Dirca palustris			*				2

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1	Drosera rotundifolia				*			1
1	Echinodorus cordifolius			*				1
1	Elymus trachycaulus		*					1
1	Epilobium strictum						*	1
1	Erigeron pulchellus		*					2
1	Eriophorum angustifolium			*				2
1	Eriophorum virginicum				*			1
1	Erythronium americanum		*					1
1	Galium labradoricum				*			3
1	Gentianopsis crinita				*			1
1	Geranium bicknellii				*			3
1	Geum rivale			*				1
1	Geum triflorum				*			1
1	Goodyera pubescens			*				1
1	Gratiola quartermaniae						*	1
1	Helianthus giganteus	*						1
1	Hepatica americana				*			2
1	Hybanthus concolor	*						1
1	Hydrocotyle ranunculoides				*			1
1	Hypericum adpressum						*	2
1	Ilex verticillata		*					1
1	Iodanthus pinnatifidus		*					1
1	Jeffersonia diphylla	*						2
1	Juniperus communis				*			1
1	Larix laricina				*			1
1	Lechea intermedia			*				1
1	Lespedeza leptostachya					*		2
1	Lonicera dioica				*			1
1	Lycopodium clavatum		*					1
1	Malvastrum hispidum						*	1
1	Napaea dioica						*	1
1	Ophioglossum vulgatum var. pseudopodum	*						1
1	Orchis spectabilis					*		1
1	Panax quinquefolius		*					2
1	Parnassia glauca					*		2
1	Penstemon pallidus		*					2
1	Penstemon tubaeflorus		*					2

Attachment 8

1	Physocarpus opulifolius				*			1
1	Platanthera clavellata				*			1
1	Platanthera hyperborea var. huronensis					*		2
1	Platanthera lacera						*	1
1	Platanthera psycodes				*			3
1	Poa sylvestris		*					1
1	Polystichum acrostichoides					*		1
1	Populus balsamifera	*						1
1	Potamogeton robbinsii				*			1
1	Prenanthes aspera	*						1
1	Psoralea tenuiflora			*				1
1	Pycnanthemum pilosum		*					1
1	Pyrola elliptica				*			2
1	Ranunculus rhomboideus			*				1
1	Rhus vernix					*		2
1	Rudbeckia fulgida var. sullivantii						*	1
1	Sagittaria calycina			*				1
1	Salix candida			*				1
1	Scirpus microcarpus				*			3
1	Shepherdia canadensis				*			1
1	Spiranthes lucida	*						2
1	Stellaria pubera	*						1
1	Symphoricarpos albus var. albus			*				1
1	Trifolium reflexum						*	1
1	Trillium cernuum					*		1
1	Utricularia cornuta					*		1
1	Utricularia minor	*						1
1	Vaccinium oxycoccos				*			1
1	Valeriana edulis var. ciliata						*	1
1	Valeriana uliginosa					*		2
1	Viola canadensis	*						1
1	Viola striata	*						2
1	Zizania aquatica			*				1
		Cook	**DuPage**	**Kane**	**Lake**	**McHenry**	**Will**	**Total**
	Total	137	99	48	147	36	41	508

Attachment 9

Species Monitored by Plants of Concern 2001-2006					
Species	**Common Name**	**Status***	**Species**	**Common Name**	**Status***
Actaea rubra	Red Baneberry	R	*Carex disperma*	Shortleaf Sedge	E
Adiantum pedatum	Maidenhair Fern	R	*Carex formosa*	Awnless Graceful Sedge	E
Agalinis skinneriana	Pale False Foxglove	T	*Carex frankii*	Bristly Cattail Sedge	R
Amelanchier interior	Inland Serviceberry	T	*Carex intumescens*	Shining Bur Sedge	T
Amelanchier sanguinea	Roundleaf Serviceberry	E	*Carex leptalea*	Slender Sedge	R
Ammophila breviligulata	American Beach Grass, Marram Grass	E	*Carex oligosperma*	Running Bog Sedge	E
Arabis hirsuta	Hairy Rock Cress	R	*Carex pedunculata*	Long-stalked Hummock Sedge	R
Aristolochia serpentaria	Virginia Snakeroot	R	*Carex trisperma*	Three-seeded Bog Sege	E
Artemisia serrata	Saw-toothed Sagebrush	R	*Carex tuckermanii*	Bent-Seeded Hop Sedge	E
Asclepias exaltata	Poke Milkweed	R	*Carex utriculata*	Common Yellow Lake Sedge	R
Asclepias lanuginosa	Woolly Milkweed	E	*Carex viridula*	Green Yellow Sedge	T
Asclepias meadii	Mead's Milkweed	E	*Carex woodii*	Wood's Stiff Sedge	T
Asclepias ovalifolia	Oval Milkweed	E	*Cassia hebecarpa*	American Senna	R
Asclepias perennis	White Milkweed	R	*Castilleja sessiliflora*	Downy Yellow Painted Cup	E
Asclepias viridiflora	Green Milkweed	R	*Cercis canadensis*	Eastern Redbud	R
Aster furcatus	Forked Aster	T	*Chamaedaphne calyculata*	Leatherleaf	T
Baptisia leucophaea	Cream Wild Indigo	R	*Chamaesyce polygonifolia*	Seaside Spurge	E
Beckmannia syzigachne	American Sloughgrass	E	*Cicuta bulbifera*	Bulblet-bearing Water Hemlock	R
Besseya bullii	Kitten Tails	R	*Cirsium hillii*	Prairie Thistle, Hill's Thistle	R
Betula alleghaniensis	Yellow Birch	E	*Cladium mariscoides*	Twig Rush	R
Betula populifolia	Gray Birch	R	*Collinsia verna*	Blue-Eyed Mary	R
Bidens discoidea	Swamp Beggar's Ticks	R	*Comptonia peregrina*	Sweet Fern	E
Bolboschoenus maritimus	Alkali Bulrush	E	*Corallorhiza maculata*	Spotted Coral Root	T
Botrychium matricariifolium	Matricary Grapefern	R	*Cypripedium candidum*	White Lady's-Slipper	T
Cakile edentula	Sea Rocket	T	*Cypripedium parviflorum var. makasin*	Small Yellow Lady's Slipper	E
Callitriche heterophylla	Large Water Starwort	R	*Cypripedium reginae*	Showy Lady's Slipper	E
Callitriche palustris	Common Water Starwort	R	*Dalea foliosa*	Leafy Prairie Clover	E
Calopogon tuberosus	Grasspink Orchid	E	*Delphinium tricorne*	Dwarf Larkspur	R
Carex alata	Wingseed Sedge	E	*Desmodium canescens*	Hoary Ticktrefoil	R
Carex aurea	Golden Sedge	T	*Diarrhena americana*	Beak Grass	R
Carex bromoides	Brome Hummock Sedge	T	*Dichanthelium boreale*	Northern Panic Grass	E
Carex brunnescens	Green Bog Sedge	E	*Dirca palustris*	Leatherwood	R
Carex crawei	Early Fen Sedge	R	*Drosera intermedia*	Narrow-leaved Sundew	T
Carex crawfordii	Crawford's oval sedge	E	*Drosera rotundifolia*	Round-Leaved Sundew	E
Carex crus-corvi	Crowfoot Fox Sedge	R	*Echinodorus cordifolius*	Creeping Burrhead	R
Carex cryptolepis	Small Yellow Sedge	E	*Elymus trachycaulus*	Bearded Wheat Grass	T

* E = Endangered
T = Threatened
R = Locally Rare

Attachment 9

Species Monitored by Plants of Concern 2001-2006 (cont'd)					
Species	**Common Name**	**Status***	**Species**	**Common Name**	**Status***
Epigaea repens	Trailing Arbutus	R	*Lycopodium complanatum var. flabelliforme*	Trailing Ground Pine	R
Epilobium strictum	Downy Willow Herb	T	*Malvastrum hispidum*	False Mallow	E
Erigeron pulchellus	Robin's Plantain	R	*Menyanthes trifoliata*	Buckbean, Bogbean	T
Eriophorum angustifolium	Cotton Grass	R	*Minuartia patula*	Slender Sandwort	T
Eriophorum virginicum	Rusty Cotton Grass	E	*Mitella diphylla*	Bishop's Cap, Miterwort	R
Erythronium americanum	Yellow Trout Lily	R	*Napaea dioica*	Glade Mallow	R
Filipendula rubra	Queen-of-the-Prairie	E	*Oenothera perennis*	Small Sundrops	T
Galium labradoricum	Bog Bedstraw	R	*Ophioglossum vulgatum var. pseudopodum*	Northern Adder's Tongue Fern	R
Gentiana flavida	Yellowish Gentian	R	*Orchis spectabilis*	Showy Orchis	R
Gentianopsis crinita	Fringed Gentian	R	*Oryzopsis racemosa*	Black-Seeded Rice Grass	R
Geranium bicknellii	Northern Cranesbill	E	*Panax quinquefolius*	Wild Ginseng	R
Geum rivale	Purple Avens	R	*Parnassia glauca*	Grass of Parnassus	R
Geum triflorum	Prairie Smoke	R	*Penstemon pallidus*	Pale Beard Tongue	R
Goodyera pubescens	Downy Rattlesnake Plantain	R	*Penstemon tubaeflorus*	Western Beard Tongue	E
Gratiola quartermaniae	Limestone Hedge-hyssop	R	*Physocarpus opulifolius*	Ninebark	R
Helianthus giganteus	Tall Sunflower	E	*Plantago cordata*	Heart-leaved Plantain	E
Hepatica americana	Round-lobed Hepatica	R	*Platanthera clavellata*	Club-spur Orchid	E
Hybanthus concolor	Green Violet	R	*Platanthera flava var. herbiola*	Tubercled Orchid	T
Hydrastis canadensis	Golden Seal	R	*Platanthera hyperborea var. huronensis*	Northern Bog Orchid	R
Hydrocotyle ranunculoides	Buttercup Pennywort	E	*Platanthera lacera*	Ragged Fringed Orchid	R
Hypericum adpressum	Shore St. John's Wort	E	*Platanthera psycodes*	Purple Fringed Orchid	E
Hypericum kalmianum	Kalm St. Johnswort	E	*Poa sylvestris*	Woodland Blue Grass	R
Ilex verticillata	Winterberry	R	*Pogonia ophioglossoides*	Snake-mouth Orchid	E
Iodanthus pinnatifidus	Violet Cress	R	*Polygonatum pubescens*	Downy Solomon's Seal	E
Isoetes butleri	Glade Quillwort	E	*Polystichum acrostichoides*	Christmas Fern	R
Jeffersonia diphylla	Twinleaf	R	*Populus balsamifera*	Balsam Poplar	E
Juglans cinerea	Butternut	R	*Potamogeton robbinsii*	Fern Pondweed	E
Juncus alpinoarticulatus	Alpine Rush	E	*Prenanthes aspera*	Rough White Lettuce	R
Juniperus communis	Common Juniper	T	*Psoralea tenuiflora*	Scurfy Pea	R
Larix laricina	American Larch	T	*Pycnanthemum pilosum*	Hairy Mountain Mint	R
Lathyrus ochroleucus	Pale Vetchling	T	*Pyrola elliptica*	Shinleaf	R
Lechea intermedia	Savanna Pinweed	T	*Ranunculus rhomboideus*	Prairie Buttercup	T
Lespedeza leptostachya	Prairie Bush Clover	E	*Rhus vernix*	Poison Sumac	R
Liatris scariosa var. nieuwlandii	Savanna Blazing Star	T	*Rubus odoratus*	Purple Flowering Raspberry	E
Lonicera dioica	Red Honeysuckle	R	*Rubus pubescens*	Dwarf Raspberry	T
Lycopodium clavatum	Ground Pine	E	*Rudbeckia fulgida var. sullivantii*	Showy Black-eyed Susan	R

* E = Endangered
T = Threatened
R = Locally Rare

Attachment 9

Species Monitored by Plants of Concern 2001-2006 (cont'd)		
Species	**Common Name**	**Status***
Sagittaria calycina	Hooded Arrowhead	R
Salix candida	Hoary Willow, Sage Willow	R
Sarracenia purpurea	Pitcher Plant	E
Scirpus hattorianus	Early Dark Green Rush	E
Scirpus microcarpus	Reddish Bulrush	E
Shepherdia canadensis	Buffalo Berry	E
Silene regia	Royal Catchfly	E
Silene virginica	Fire Pink	R
Sisyrinchium montanum	Mountain Blue-eyed Grass	E
Sparganium emersum	Green-fruited Bur Reed	E
Spiranthes lucida	Early Ladies' Tresses	E
Stellaria pubera	Great Chickweed	E
Symphoricarpos albus var. albus	Snowberry	E
Tetraneuris herbacea	Lakeside Daisy	E
Thuja occidentalis	Eastern White Cedar	R
Tofieldia glutinosa	False Asphodel	T
Tomanthera auriculata	Eared False Foxglove	T
Trientalis borealis	Starflower	E
Trifolium reflexum	Buffalo Clover	T
Triglochin maritima	Common Bog Arrow Grass	T
Triglochin palustris	Slender Bog Arrow Grass	T
Trillium cernuum	Nodding Trillium	E
Trillium sessile	Toad Trillium	R
Utricularia cornuta	Horned Bladderwort	E
Utricularia intermedia	Flat-leaved Bladderwort	T
Utricularia minor	Small Bladderwort	E
Vaccinium oxycoccos	Small Cranberry	E
Valeriana edulis var. ciliata	Common Valerian	R
Valeriana uliginosa	Bog Valerian	E
Veronica scutellata	Marsh Speedwell	T
Viola canadensis	Canada Violet	E
Viola conspersa	Dog Violet	T
Viola striata	Cream Violet	R
Zizania aquatica	Wild Rice	R

* E = Endangered
T = Threatened
R = Locally Rare

Plants of Concern

Protecting the Rarest

For Ann Whelan, it all started with a thistle. A volunteer monitor in the Chicago Botanic Garden's Plants of Concern (POC) program, Whelan drove from her Cook County home to DuPage County for three years to monitor, record and map a population of Hill's thistle, *Cirsium hillii,* a globally rare species fighting for its life amidst heavy competition from exotic shrubs.

Now in its sixth year as a rare plant-monitoring program, Plants of Concern is coordinated through the Garden by Susanne Masi, manager of regional floristics.

More than 200 trained volunteer monitors meticulously collect data at 165 sites in six counties. The research informs 57 participating landowners about the state of the rare plants on their lands and how their management actions may be affecting the plants. Without POC-trained volunteers, it's likely scarce resources wouldn't allow for this level of observation.

"We are providing landowners with information on invasive species and other threats to populations with the direct intention of spurring immediate responses," Masi says. "For instance, if a rare plant is being inadvertently mowed in the process of trail management, the landowner can move the trail or adapt mowing to avoid the flowering and fruiting season."

Masi believes that in the long term, data gathered through POC will be a major contribution to a shared understanding among land managers of "best practices" to protect and enhance the rarest elements of biodiversity of the Chicago region.

Along the lake, the program stretches from Illinois Department of Natural Resources' (IDNR) Illinois Beach State Park to Winnetka Beach to Chicago's Rainbow Beach. The Chicago Park District has been partnering with POC at five of its sites around the lakeshore, from Rainbow Beach at 79th Street all the way to Loyola Beach on the city's north side."It's the most scientifically-based monitoring program we have in any of our natural areas," says Angela Sturdevant, natural areas manager, Chicago Park District. "The data and recommendations we get from POC have informed our management decisions in terms of thinking ahead about how what we do affects rare plants."

POC's volunteer monitoring efforts on Chicago's beaches have led to remarkable discoveries. Leslie Borns, longtime POC monitor and Montrose Beach Dunes site steward, noticed rare plant species at Loyola Beach and realized that something extraordinary was going on at this heavily trafficked public site. When Ann Whelan took over as monitor, she set into motion a process that led to the Park District's erecting a dune protection fence at Loyola Beach and garnering funding for site restoration from the U.S. Fish and Wildlife Service.

"Here we are in this very urban park, and we are allowing this natural area to regenerate. It's very exciting for a neighborhood to have a little wilderness in it. We can do things to provide a more natural environment for neighborhoods," says Whelan.

POC is funded by Chicago Wilderness, Illinois Wildlife Preservation Fund, Illinois Conservation 2000 program, U.S. Forest Service, Midewin National Tallgrass Prairie and National Fish and Wildlife Foundation. POC works in partnership with the Habitat Project of Audubon-Chicago Region and other volunteer groups.

Thanks to Leslie Borns' work monitoring and stewarding Montrose Beach Dunes, the site was designated an Illinois Natural Areas Inventory (INAI) in 2005, the first Chicago Park District land to be so recognized. A natural dune and swale system is developing at the site.

Conservation at the Garden

It's easy to go about our lives and forget how much plants generously offer us. Their presence ensures the health of our planet, and by extension, our own.

Conservation is a major part of the Garden's mission. The Garden is recognized around the world for its research in plant conservation and establishing "best practices" to restore rare and endangered plants.

With this issue, we introduce a focus on science and conservation. Within these pages, you'll learn about the Garden's ongoing conservation work, its research and the science staff, successes and opportunities to help preserve biodiversity for generations to come.

The natural world needs each of us to be stewards and caretakers, holding earth's preciousness in all that we do (or choose not to do). We feel fortunate to have your support in this mission.

How You Can Help Protect Rare Plants

1. Stay on authorized paths when visiting forest and nature preserves. They're designed to circumvent potentially fragile areas.

2. Never pick flowers, collect seed or remove plants without authorization.

3. Come to a POC training and become a rare plant monitor for the 2006 season. Workshops are held on April 8, 23 and 30 in DuPage, McHenry and Cook counties, respectively. For information, call Emily Hudson, POC program assistant, at (847) 835-6873 or visit **www.plantsofconcern.org.**

Photo by Kenneth Dritz

Attachment 11

Selected List of Most Common and Most Invasive Species Documented by Plants of Concern 2001-2006

Invasive Species					
Species	**Common Name**	**U.S. Nativity***	**Species**	**Common Name**	**U.S. Nativity***
Acer negundo	Box elder	N	*Helianthus grosseserratus*	Sawtooth sunflower	N
Acer platanoides	Norway maple	X	*Hemerocallis fulva*	Orange daylily	X
Acer saccharum	Sugar maple	N	*Hesperis matronalis*	Dame's rocket	X
Agropyron repens	Quack grass	X	*Hieracium caespitosum*	Field hawkweed	X
Ailanthus altissima	Tree of heaven	X	*Hypericum perforatum*	Common St. Johnswort	X
Alliaria petiolata	Garlic mustard	X	*Iris pseudacorus*	Tall yellow iris	X
Allium mutabile	Meadow garlic	N	*Lactuca serriola*	Prickly lettuce	X
Arctium minus	Common burdock	X	*Lonicera japonica*	Japanese honeysuckle	X
Barbarea vulgaris	Yellow rocket	X	*Lonicera maackii*	Amur honeysuckle	X
Berberis thunbergii	Japanese barberry	X	*Lonicera tatarica*	Tartarian honeysuckle	X
Bromus inermis	Smooth brome	X	*Lonicera x muendeniensis*	Bush honeysuckle	X
Carduus nutans	Musk or Nodding thistle	X	*Lonicera xylosteoides*	Fly honeysuckle	X
Celastrus orbiculatus	Oriental bittersweet	X	*Lotus corniculatus*	Bird's-foot trefoil	X
Centaurea maculosa	Spotted knapweed	X	*Lysimachia nummularia*	Moneywort	X
Chrysanthemum leucanthemum var. pinnatifidum	Oxeye daisy	X	*Lythrum salicaria*	Purple loosestrife	X
Cirsium arvense	Field or Canada thistle	X	*Maclura pomifera*	Osage orange	N
Cirsium vulgare	Bull thistle	X	*Melilotus alba*	White sweet clover	X
Convallaria majalis	European lily of the valley	X	*Melilotus officinalis*	Yellow sweet clover	X
Cornus racemosa	Gray dogwood	N	*Morus alba*	White mulberry	X
Cornus stolonifera	Red osier dogwood	N	*Myriophyllum spicatum*	Eurasian water milfoil	X
Coronilla varia	Crown vetch	X	*Pastinaca sativa*	Wild parsnip	X
Daucus carota	Queen Anne's lace	X	*Phalaris arundinacea*	Reed canary grass	X/N
Dianthus armeria	Deptford pink	X	*Phragmites australis*	Common reed	N
Dipsacus laciniatus	Cutleaf teasel	X	*Poa compressa*	Canada blue grass	X
Duchesnea indica	Indian strawberry	X	*Poa pratensis*	Kentucky blue grass	X/N
Elaeagnus umbellata	Autumn olive	X	*Populus deltoides*	Eastern cottonwood	N
Elymus arenarius	Lyme grass	X	*Populus tremuloides*	Quaking aspen	N
Euonymus alatus	Burning bush	X	*Prunus serotina*	Black cherry	N
Fraxinus pennsylvanica var. subintegerrima	Green ash	N	*Ranunculus ficaria*	Lesser celandine	X

*** N= Native**
X= Exotic

Attachment 11

Selected List of Most Common and Most Invasive Species Documented by Plants of Concern 2001-2006

Invasive Species (cont'd)		
Species	**Common Name**	**U.S. Nativity***
Rhamnus cathartica	Common buckthorn	X
Rhamnus frangula	Glossy buckthorn	X
Rhus sp.	Sumac	N
Robinia pseudoacacia	Black locust	N
Rosa multiflora	Multiflora rose	X
Rubus sp.	Raspberry/Blackberry	N
Rumex crispus	Curly dock	X
Salix fragilis	Crack willow	X
Salix interior	Sandbar willow	N
Saponaria officinalis	Bouncing bet	X
Solanum dulcamara	Bittersweet nightshade	X
Solidago altissima	Tall goldenrod	N
Solidago canadensis	Canada goldenrod	N
Sporobolus vaginiflorus	Sheathed rush grass	N
Torilis japonica	Japanese hedge parsley	X
Toxicodendron radicans	Eastern poison ivy	N
Trifolium repens	White clover	X
Typha angustifolia	Narrowleaf cattail	X
Ulmus pumila	Siberian elm	X
Verbascum thapsus	Common mullein	X
Viburnum opulus	European highbush cranberry	X
Xanthium strumarium	Cocklebur	X/N

*** N= Native**
X= Exotic

Attachment 12

Plants of Concern Advisory Group Meeting
Chicago Botanic Garden
December 5, 2006

In attendance were: Susanne Masi, Pati Vitt, Alycia Crall, Bianca Rosenbaum, Jeremy Fant, Steve Kroiss, Emily Hudson Richter, Emily Kapler, Mary Borecki, Susan Ask, Laurie Boldt, Rebecca Key, Debbie Antlitz, Rebecca Grill, Karen Tharp, Cindy Hedges, Scott Kobal, Hillary Pranga, Debra Nelson, Ken Klick, Chris Hauser, Julia Bourque, Tom Smith, Eric Ulaszek, Carol Freeman

Susanne gave a warm welcome to the meeting participants of the sixth annual Plants of Concern Advisory Group Meeting.

Handouts:
- Agenda
- Excel spreadsheet of species and sites monitored 2001-2006 (confidential draft)
- List of species monitored (listed and non-listed species) 2001-2006 (draft)

Susanne Masi's presentation – Yearly Summary
- POC Accomplishments and Participation – Note: all numbers reported during the meeting will be revised once all 2006 data are entered.

	2006	Cumulative (2001-2006)
Species	135	175
EOs	318	502
Subpops	547	881
Sites	152	228
Landowners	56	86

- Grants for 2007
  - Chicago Wilderness (workplan project) $25,000
  - IDNR: Wildlife Preservation Fund $10,500
  - National Fish and Wildlife Foundation $24,308
    - *(monitoring work at Midewin)*

  _____

  - Total: $59,808

  - Pending: C2000 $55,433

Note: On December 11, we received word that the C2000 grant was fully awarded. Also congratulations to several of our partners who also received C2000 funding!

- Discussed status of the expansion of POC into southeast Wisconsin and northwest Indiana. Workshop was held and monitoring was begun in Indiana. Further discussion needs to occur to evaluate the status of these pilot programs.
- Susanne gave a few edifying stories about the impact that POC has had in Chicago Wilderness
  - A population of Pale Vetchling (*Lathyrus ochroleucus*) was being mowed; so the monitor-steward contacted the head of the forest preserve & head of operations and effectively stopped the mowing.
  - Leslie Borns, steward at Montrose Beach, worked with IDNR's Debra Nelson and the Chicago Park District to get Montrose Beach on the Natural Areas Inventory. She has a

large force of dedicated volunteers who help to monitor several plants and conduct restoration on the dunes.
  - Kathy Garness has worked extensively throughout the area and has done a significant amount of monitoring. She is steward at Grainger Woods and has organized Stevenson High School student restoration workdays.
  - Rebecca Grill, Natural Areas Coordinator of Highland Park Park District, is monitoring 3 sites in Highland Park and has organized a great group of volunteer monitors. Site-based volunteer groups, like this and at Lake in the Hills Fen, are a great asset to POC.

Emily Hudson Richter's presentation (POC Program Assistant) – Volunteer Participation

- Retention and new recruits
  - Retention rate of volunteers from 2005-2006 was ~ 70%; from 2004-2005 the retention rate was 76.5%.
  - 35 new volunteers were recruited in the 2005-2006 season.
  - 80 active volunteers in 2006 have been POC monitors for 3 or more years.
- Number of Monitors 2001-2006

	2001	2002	2003	2004	2005	2006	Cumulative
Volunteers	52	96	103	153	172	147	317

- Volunteer Hours
  - *Total Monitoring Hours:*
    - 1344.81 (2006)
    - 1361.6 (2005)
  - *Total In-Office Volunteer Hours*:
    - 248 (2006)
    - 277.5 (2005)
  - *Total Workshop Hours*:
    - 430 (2006, 4 workshops attended by 86 monitors)
    - 425 (2005, 4 workshops attended by 85 monitors)
- The annual POC volunteer potluck was a great success. POC gave out pins with the POC logo and also awarded certificates to several outstanding volunteers for their dedication to the program.

Steve Kroiss's Presentation (POC Intern) - Project Goals for 2006 & Summary of Monitoring Data

- POC Predicted Growth for 2007

	Predicted Trend	10% Increase
Volunteers	49	15
Species	13	14
EOs	48	32
Subpops	92	55
Sites	24	15
Landowners	6	6

- EO Retention and Coverage

2005	2006	
52%	55%	EO retention
69	95	New EO's
810	810	Number of EO's from Natural Heritage Database
322	364	Number of cumulative, listed, monitored EO's
39.8%	44.9%	Percent of monitored listed EO's in NE IL

- Threats: Presence/Absence

    - Average percent of subpops with a threat: 83%
    - Highest threat is invasive brush and tree encroachment
- Average percent of subpops with at least one invasive: 82%
- Most prevalent invasive species for 2001-2006 were *Rhamnus* spp., *Cornus* spp., *Lonicera* spp., *Alliaria petiolata*, *Rosa multiflora*, *Melilotus* spp., *Phalaris arundinacea*, *Poa* spp., *Solidago* spp., and *Salix* spp.
- Average percent of subpops with observed management: 45%
- Percent of subpops that increased in plant counts in 2006 relative to their overall average count: 50.6%

Effects of Management on Plant Populations - by Eva Dubey (Northwestern Univ.), presented by Steve Kroiss

- Study compared the percent change in means of plant numbers for all managed versus unmanaged sites and for only prairie sites
- Used subpopulations that were monitored in all years from 2003 to 2005 that had precise plant counts (not estimates)
- Compared sites that had management in 2004 to sites with no management
- Logistical regressions were used to evaluate significance of change in the means of plant numbers
- No significant differences in percent change in means of plant numbers were found in general managed versus unmanaged sites or in prairie sites
- May be due to low sample size as well as the high degree of variance
- Future analyses?
    - 2004-2006, 2003-2006, logistical regressions, negative binomial regressions
    - What types of analysis do managers want to see?

Eva Dubey's Study– Group Discussion – Major Points

- Found no significant impact by management (or lack thereof) on plant numbers in prairie sample.
- Limitations
    - Only prairie species sampled
    - Management effects are often clearly observable in the field – are stats misleading?
    - High quality sites may not need much management but populations can be stable
    - Small sample size
    - Highly threatened plant populations not decreasing, either, which is positive.
    - Management data comes from monitoring forms with observations by volunteers, not from land management forms and land manager's records
- Further studies needed to create other meaningful data analyses

- Other points of discussion following the Level 1 data analysis report were whether management effects can really be traced in one year - there is usually a lag time for results to appear; that land management reports and volunteer reports on land management supplement each other, but land management reports were not yet available for use in the analysis; that we need to focus on submission and analysis of LM reports. Perhaps plants should be stratified in the analysis: woody, herbaceous, annual, species, location etc. Don't bog the program down in fine analysis: often we need to know whether a plant is still there or not, may not need to count large numbers.

Emily Kapler's presentation (Midewin POC Intern) – Midewin Monitoring highlights

- Currently monitor a total of 12 rare species, some since 2001
- *Minuartia patula*: winter annual that occurs in the remnant dolomite prairie at Midewin. Photopoints in permanent plots help visually track vegetation changes from year to year. Flooding between 2005 and 2006 has damaged populations in northern areas.
- *Malvastrum hispidum*: some also occurs in flooded area but population counts not impacted. Instead, the annual had a very low % reproductive.

- *Gratiola quartermaniae*: species new to science (Duane Estes, 2006) found at Midewin by Steve Hill (2003). Grows in shallow standing water over dolomite. Drought years and graminoid encroachment are threats.
- *Isoetes butleri*: needs water to reproduce as the plant is dioecious; water carries male spores to female plants. Too much flooding is still bad for the plant. Extensive demographics done on this plant as well as photos of individual tagged plants
- *Rudbeckia fulgida* var *sullivantii*: monitored at five plots with distinct management regimes. So far healthy populations have been maintained using general restoration, mowing, and burning but not using cattle grazing.
- *Tomanthera auriculata*: annual plant where deer browse is a prime threat. At the Blodgett site in 2003, there was low fruit count relative to buds/flowers observed at the first visit. Data show the cause was clearly heavy deer browse. Hunting does occur as a control.

Bianca Rosenbaum's presentation (Database Technician) – www.plantsofconcern.org

- Total number of website visitors: 2383
- Average number of visitors/month: 170
- Number of visitors last month: 172
- Most visited pages: Submitting Forms, Species List, POC Plant Gallery, Resources, and News
- Since October, 16% added webpage to favorites
- On-Line Form Submissions
    - 102 monitoring forms were submitted on line (double from last year)
    - 19% of all monitoring forms (double from last year)
- Goals for this year are to develop the plant resources page and the invasive species gallery. A link to the Invaders Watch List will be added to the site.
- Bianca went online to demonstrate the parts of the website, particularly the monitoring report submission section.
- Participants discussed the possibility of going completely digital and not needing paper copies, the ability to submit land management forms online, and the ability of land managers to see data collected by monitors in their area of management. A question was raised about sharing the Access POC database with land managers in ways that are user friendly and could respond easily to key queries about species, sites and changes.

Carol Freeman's presentation (Carol Freeman Photography)

- Carol is now officially part of the POC CW grant and will be photographing POC plants. Carol's goal is to photograph all the endangered species in Illinois in order to collect awe inspiring photos that will cause the public to be more aware of the beauty of biotic diversity in Illinois. She will photograph a subset of these in NE IL for POC. Contact her with bloom times and seed set times of your species so that she may photograph them.

Jeremie Fant (CBG Geneticist) – *Cirsium hillii:* genetic implications (an example of building on POC data for continuing research projects)

- R. Mann's work showed a low number of flowering plants (2-7% of total plants) and low seed viability. What is the cause?
- Possible causes: habitat fragmentation (suggested that this species is used to this, however), widely dispersed populations, and lack of rare events to add new genetic material
- Rare events include: colonization into new habitat areas, pollination within the population, re-colonization
- Poor seed set causes: lack of pollinators (unlikely the problem), self-incompatibility, inbreeding depression
- Collected genetic samples from several sites; some designated healthy, others unhealthy based upon percent of flowering individuals. Sites located in northern Illinois (especially the Chicago region) and southern Wisconsin

- Three analyses conducted based on genotypes, on alleles, and on genetic distance between populations (how much have they exchanged genes?).
- Conclusions: the CW is as diverse as other larger populations; genetic diversity is not currently the issue. Poor seed set due to lack of flowering individuals will become an issue. The rare events needed will become less common with increasing urban fragmentation.

Alycia Crall - Natural Resource Ecology Laboratory, Colorado State University *(POC is included in a grant application to NSF in partnership with this and other programs)*

- Spoke about Global Organism Detection and Monitoring System (National Institute of
- Invasive Species Studies); referred to her distributed handout
- The aim of GODM is to facilitate data sharing on a national scale while addressing sensitivity concerns of these data
- Also will provide statistical tools for analyzing available datasets; currently limited to a few options but more statistical applications will be made available in the future
- Sensitivity of data is addressed by internal controls and different user login privileges. Locations of rare species protected by filters that do not impede the data analysis.
- Of critical importance is file compatibility; the program aims to have complete compatibility and be interchangeable with many organizations so you don't have to redo how you keep your own databases
- EcoNab PALM application allows for taking data in the field quickly and easily, avoiding transcription errors from paper to pixels

Pati Vitt: (CBG – Plant Demographer): Future prospects for POC's long-term datasets

- Use of PALMs in the field is encouraged with important caveat: be sure to use memory cards because the PALM units are not field-rugged and you do not want to loose your data. Overall the system acts as a big time saver
- As larger data sets for level 2 work accumulate (6+ years of data) we can apply for grants (e.g. NSF) to continue this work or bring in some more experimental research; Pati has this data on *Viola conspersa* which started before POC and became incorporated into the program.
- Some level 1 analysis could also be funded by similar measures; how can we use the data that we have now?

Group Discussion - Planning for 2007

The Regional Monitoring program (headed by Geoff Levin at Illinois Natural History Survey) met in October and arrived at some of the following consensus points.

- Community sampling seems to be the direction the program is going
    - track managed and unmanaged sites
    - track populations and species of conservation concern
    - track invasives and exotics

Region-wide program would include POC by embedding in community sampling a standardized species data collection model. A question was raised whether other indicator species would be considered in evaluating site health.

Susan Ask, who assists with the RM grant, will be completing her report soon. She spoke of the overall respect held in the region for POC protocols and the program.

Ken Klick raised a question about how do we define subpopulations when they do not fit into the POC model? (Illustrated by two aerials showing extensive populations).

- large sites with a continuous population (e.g. IBSP, Fort Sheridan)
- subpops with scattered individuals

- Suggestions
    - Aerial photography – Carol Freeman
    - Type "b" subpop definition
        - need to explore new options for some populations
        - use a species case-by-case basis to re-define subpops

Susanne suggested that a small group might re-work current protocols to accommodate these situations.

Recruitment

- Wild Things – POC will be present with a booth and as part of a monitoring panel
- Newsletters – these are great ways to publicize our workshops; also volunteer bulletin boards
- Three workshops are being scheduled in late March/April. Land Manager/Volunteer Coordinator participation is invited as an important way of validating volunteer work.
- Targeted recruitment needed in counties/areas (ex. Will County and Midewin)

Assignments/Species

- POC staff will be in touch with the major land managers for January/February meetings to plan the next season. These are very helpful, good working sessions.
- Keep in mind providing volunteers with known, location-specific assignments for the most part
- Review list of non-listed monitored species. Susanne recommended agencies focus on covering the listed EOs first, then assign volunteers to non-listed species that are regionally rare. Managers may use the protocols for any species they wish to monitor, but not all of them will become POC species.
- *Note: POC now monitors about 45% of listed EOs in NE Illinois. Some of the increase in percentage over the last year is due to the Natural Heritage Database merging some EOs.*

Program Evaluation is required by the CW grant. Susanne asked for input on how this might be done.

- Questionnaire sent to land managers last year – 7 responses
- Post a new questionnaire online for voluntary participation?
- Hold a meeting, inviting various constituents to evaluate the value of the program and its future. This might be combined with a joint Science/Land Management Team meeting or with a Regional Monitoring meeting. *(Susanne will discuss this with Chris Mulvaney).*

The Habitat HERALD

January 2006 **Volume 7, Issue 1**

Picnic in Chicago's Park Dunes: Recognition for Montrose & Loyola Beaches

By Mary Cannon

Photo by Pete Leki

Julian Rodriguez, an eighth grader at Waters School in Chicago, removes a mammoth cottonwood sapling at Montrose Beach Dunes.

"It's a wonderful site and will now be more secure."

Debra Nelson, IDNR District Biologist is talking about Montrose Beach Dunes, which received an Illinois Natural Areas Inventory (INAI) designation in October. Created in the '70's, INAI's goal is compiling a statewide inventory of the significant, highest level, natural areas that will serve as a guide for government and non-government organizations when making long-term decisions about natural resources.

Angela Sturdevant, the Chicago Park District's Natural Areas Manager is delighted. "This is the first park district designated site," she says. So, why Montrose—the largest public beach in Chicago? Leslie Borns, long-time Plants of Concern (POC) monitor and Montrose Beach site steward answers.

"Interesting vegetation started showing up on the beach in the early 90's. The vegetation managed to take hold because the park district's beach-grooming machines had inadvertently missed it. Soon the plants started to collect sand, and small dunes formed." By the late 90's, Borns was documenting more plants, including Lakeshore Rush (*Junicus balticus)*, not seen on a Chicago beach in 50 years. At that point she approached the Chicago Park District (CPD) and asked them to fence and protect the area.

The fencing worked, allowing more dunes to form and vegetation to naturally occur. The CPD helped by doing some planting in 2001 to stabilize parts of the site, which encouraged even more growth.

IDNR's Nelson explains further. "When Leslie called and then toured the site with me and Susanne Masi (coordinator of POC), I realized its importance. It has five State-Listed (E/T) plant species and four nesting bird species. It even has a Panne community, which is globally imperiled—with fewer than 200 acres world-wide," she adds.

Borns points to more features. "The vegetation is not only important in its own right but provides wildlife habitat and is rich in food sources and cover for birds. It's a critical stop-over for migratory birds, including the federally-endangered Piping Plover. It's also wonderful for people—while others are playing volleyball or swimming on the main portion of the beach, we might have photographers, birders, Native-American medicine circles or a Tibetan chanter enjoying our site." She adds, "This was my vision, and it's thrilling it has become a reality. The Park District should be commended for nurturing biodiversity in the middle of a big city."

Picnic In Chicago's Park Dunes- continues on page 3

The Habitat Project serves the Chicago Wilderness conservation community

Monitors
Volunteers and staff monitor plants and animals to document current distributions, abundance, and health– and to track trends in these numbers over time.

Stewards
Volunteers and staff remove invasive trees and brush, pull weeds, collect and plant native seeds, conduct controlled burns, and shepherd our most treasured natural areas back to good health.

Advocates
Volunteers and staff use data and field expertise to advocate for sound public policy to fund and facilitate habitat restoration and quality of life for plants and animals (including people).

The future of nature depends on the thousands of volunteers and staff who conduct the controlled burns, combat the invasive species, fend off the off-road-vehicles, monitor the plants and animals, and generally work for the wellness of wild animals and habitat. The Habitat Project is a network of thousands of volunteer and staff scientists, monitors, land managers and advocates who work side by side to assure the holistic and effective conservation of Chicago Wilderness– a regional nature reserve.

Monitoring Opportunities

Breeding Bird Census of the Bird Conservation Network
Lee Ramsey 847-501-4683

Bird Blitzes to cover grasslands, woodlands, shrublands, or wetlands
Karen Glennemeier 847-965-1150

Chicago Wilderness Calling Frog Survey
Rebecca Blazer 847-965-1150 ext.10

Illinois Butterfly Monitoring Network
Melanie Manner 847-464-4426

Dragonfly Monitoring Network
Gareth Blakesley 773-755-5100 x3032

Plant Community Audits of woods, prairies, or wetlands
Karen Glennemeier 847-965-1150

Plants of Concern Rare Plant Monitoring
Susanne Masi 847-835-8269

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We welcome to our newsletter team new writers, editors, stamp lickers, photographers, graphic artists, staplers, and anyone else who would enjoy getting involved. To learn more, contact Mary Cannon at 847-375-8301 or mjkcannon@hotmail.com

Picnic In Chicago's Park Dunes- continued from page 1

Spurred by her findings at Montrose, in 2000 Borns started exploring other areas looking for volunteer vegetation. After finding some at Loyola and Kathy Osterman Beaches, she notified Susanne Masi and the CPD. Soon these sites became protected and managed like Montrose Beach Dunes. Ann Whelan eventually took over as POC steward at Loyola. ("Acting Locally," Jan. 2005 Herald). Now the park district has received an $18,000 grant to perform more work there. "This will allow us to prepare a restoration plan, control invasives, plant native species, and provide outreach and education. We're trying to increase dune habitat on the lakefront, trying to enhance this natural gift," says an energized Angela Sturdevant. Ann Whelan agrees. "If we can find ways to bring improved habitat into the area and educate people about wildlife so they're happy with it, then we can talk about co-existence. Picnics in the city park dunes could be a new adventure." Or, as Debra Nelson says, "If you build it—maybe they will come."

> "The Park District should be commended for nurturing biodiversity in the middle of a big city."

Note: Volunteers at both beaches are needed—and welcomed. Contact Leslie Borns at birdperson1@msn.com or Susanne Masi at smasi@chicagobotanic.org.

Photo by Carol Freeman

Piping Plover at Montrose Beach Dunes.

Learn From the Experts

Classes are offered in partnership with the Forest Preserve District of Kane County, Geneva Park District and Fox Valley Park District. Register on-line at www.genevaparks.org or call 630-232-4542. For questions, please contact Renae Frigo at 630-584-1885.

Going Native: Why, How, and How Much? As a homeowner, would you like to save money, time and resources – while beautifying your property AND promoting environmentally friendly practices? Jack Pizzo, Senior Ecologist and owner of Pizzo and Associates will review the numerous benefits of going native, how to establish native plants on your property, and the costs and maintenance involved.

Saturday, February 4—1-4pm, Pottawatomie Community Center, St. Charles. Ages 18 and up. $18 per person.

Urban Tree Advancements Want to learn about urban trees and what qualities make them special? Dr. George Ware of the Morton Arboretum will review his work and current issues in the field of trees in the urban and suburban environments.

Thursday, February 9—7-9pm, Pottawatomie Communtiy Center, St. Charles. Ages 18 and up. $8 per person.

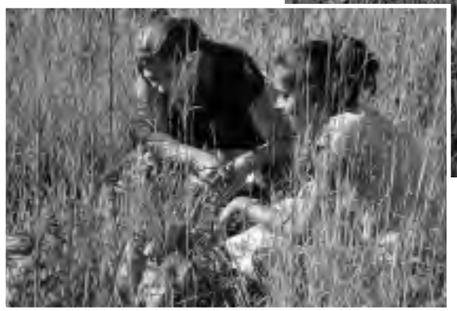
Going to the Dogs: A Report on a Prairie Invasive

By Joe Walsh

Grey dogwood (*Cornus racemosa*) is a native weedy invader that overruns wet prairies in the absence of fire. It grows clonally underground in dense thickets which produce no good fuel for fires. By itself, it is a great plant–birds eat the berries, the thickets provide cover for animals, and, under natural conditions of periodic fire, the thickets are contained. But without fire, it is a bully.

"From a management standpoint, identity matters"

During the moratorium on restoration work in my local preserves on the North Branch of the Chicago River, lots and lots of dogwood invaded the sites. When I first started teaching a field ecology class at Northwestern, I thought this would be a fantastic case for the students – an intersection of local fire ecology, invasiveness, biodiversity, management issues, and politics – the perfect learning experience. So, the students mastered the identification of two-to-three dozen plant species, set up meter-square plots, measured the biodiversity of the plots, and the effect of the dogwoods. I knew for sure that, with these sun-loving prairie plants, we would see a decline in biodiversity per plot, whether we used the number of species, or a measure like evenness (the idea being that 5 robins and 5 crows is more diverse than 9 robins and 1 crow). When we collected data that first year, it looked like there was a trend; unfortunately, the statistics came back as not quite significant. I said, "Aah, we just need more data."



Photos by Joe Walsh

Students settle down in the prairie to scientifically document the negative effects of dogwood invasion.

So, I went back again this fall–thinking we would clinch it with more data. We didn't. Number of species per plot and evenness did not respond at all to dogwood invasion (until, of course, you measure a dogwood-only thicket). I love it when nature sticks its thumb in the eye of your pet hypothesis. After thinking some more, I realized that, from a pure theory standpoint, one species is as good as the next. But, from a management standpoint, identity matters. So, I had the students calculate FQI, floristic quality per plot. FQI rates conservative species higher than weedy ones. Wow, what a result. It turns out that as dogwood invades there is a silent turnover in prairies—from high-quality species, like blazing stars, to weedy ones, like tall goldenrods. Slowly, and imperceptibly, those plots were going to the dogs. All the rare and important stuff that lives around here was dying off while the weedy generalists found on any roadside were ousting them.

The good news is that the moratorium is over for most of those sites, and now we can watch them rebound in quality. We can also get out there and count crayfish burrows after the fires. Why? Well, we did it once, and my students noticed that the crayfish really seemed to avoid areas with dogwood. Good to know if you are trying to preserve the smooth green snakes and the red-bellied snakes that use crayfish burrows for hibernating. Now, we just need one more year's data…

BCN Census Data Shows Where the Birds Are

By Lee Ramsey and Judy Pollock

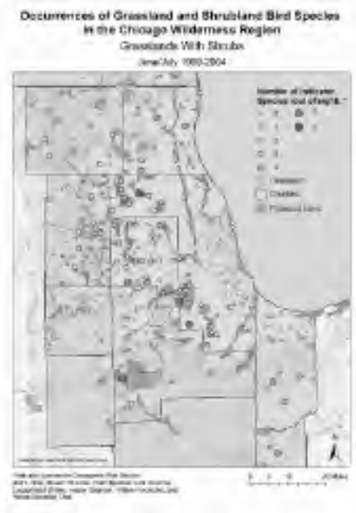
How are grassland and shrubland birds doing in the Chicago area? According to a recent study done for the Bird Conservation Network (BCN), populations are in fair-to-poor condition overall, but several preserves in outlying areas of Chicago are still maintaining a healthy diversity of species.

Heather Secker prepared the report, "Occurrences of Grassland and Shrubland Bird Indicator Species in the Chicago Wilderness Region," as a graduate research project. She used data collected by BCN volunteer monitors during the breeding seasons from 1999 through 2004. Our monitors found the greatest diversity of species at the John J. Duffy Preserve in Cook County and the Des Plaines Conservation Area in Will County. Other preserves with good numbers of indicator species were Orland Grassland, Bartel Grassland, Paul Douglas Forest Preserve and Poplar Creek Forest Preserve in Cook Co., Rollins Savanna in Lake County (Illinois) and Midewin National Tallgrass Prairie in Will Co. (Note that Midewin does not have a BCN Census monitor. If we had complete data from that site, it would no doubt have ranked higher.)

The study analyzed more than 4,700 monitoring records covering 22 "indicator species" at 110 locations in six Illinois and two Indiana counties. The areas were considered in four different grassland categories, moist with shrubs (5 indicator species), moist without shrubs (11 species), dry with shrubs (3 species) and dry without shrubs (4 species). Greatest diversity by far occurred in the moist grasslands. Two preserves, Orland and Des Plaines, reported all of the moist-with-shrubs indicators (Bell's vireo, brown thrasher, field sparrow, willow flycatcher, yellow-breasted chat), and 14 other locations reported four of the five. Twenty-three locations reported more than half of the 11 moist-grasslands- without-shrubs indicator species, which include bobolink, dickcissel, eastern meadowlark, grasshopper and Henslow's sparrow, and sedge wren. Accompanying Heather's report are seven maps showing the results. These can be seen at http://bcnbirds.org/data/ebirdmaps.html.

Heather's analysis helps to confirm earlier studies that have shown how important the habitat structure is if we want to maintain a diversity of species, and gives us a good idea of the extent and diversity of these four groups of birds in the region. She recommends future studies of the history and the hydrology of the more diverse preserves. She believes that more intense focus on a few individual species and a few of the more important preserves would be profitable.

It's encouraging to see this new evidence of the contributions our volunteer monitors are making. As we bring in new recruits to our monitoring corps and get even better coverage in the future, perhaps we can bring some of Heather's suggestions to life.



Watch for a future article about Heather's brother Eric Secker's analysis of BCN data – scheduled to be released on www.bcnbirds.org soon after we go to press.

Swainson's Hawk Announcement

Help is needed to save a noble raptor. Each year 3 to 5 pairs of Swainson's Hawks nest in a small area of northern Kane or southern McHenry Counties. The area has the only breeding population of these hawks east of the Mississippi. This summer, three nests were found. The Swainson's Hawk Project has formed to search nearby areas in the hopes that hawks displaced by development are relocating there – and to find ways to protect them.

Field team volunteers are needed next spring and summer. For more information contact Vic Berardi 847-680-5281 or vbirdman@aol.com or Bob and Anita Morgan at 708-209-1938.

The Introduction of Multicolored Asian Ladybugs *Harmonia axyridis* and Consequent Decline of Local Ladybugs

By Moneen Marie Jones

Did you know that those swarms of orange ladybugs that try to make their way into our houses are an introduced species? They are often sold to gardeners to control aphids. One of our monitors recently studied their effects on native species.

'M' marking behind the head shows this is the Multi-colored Asian lady beetle.

The introduced ladybird beetle, *Harmonia axyridis* has been thought to be responsible for the recent decline in numbers of native ladybird beetles, *Hippodamia convergens*. While adults of *H. convergens* eat an average of 75 aphids per day, and consume up to 350 aphids over their larval development, adults of *H. axyridis* eat approximately twice that amount per day and can consume up to 1200 aphids through their larval stages alone. These observations have led researchers to assume that declines of native species are due to the better competitive ability of *H. axyridis*.

However, it is also possible that predation is the cause, since larvae of *H. axyridis* are known to prey upon the native Pink spotted ladybug, and have also been shown to lower rates of larval development in another native, the two-spotted ladybug. Predation occurs when species share the same prey resources. For my research, I studied the larvae of two co-existing, aphid-eating ladybug species, *H. axyridis* (non-native) and *H. convergens* (native).

In the laboratory, predation occurred between *H. axyridis* and *H. convergens* even when alternative prey was in overabundance, with *H. axyridis* the winner in the high majority of cases. *H. axyridis* larvae also ate each other at an even higher rate.

In the laboratory, *H. axyridis* also displayed shorter development time and egg duration and longer larvae length, which could contribute to development and survival successes. These results suggest that while predation was a small factor, it does occur when food is overabundant and population density is not a factor.

I am currently surveying the distribution and habitat of *H. axyridis* throughout Illinois in hopes of discovering the correlation of beetle density to Illinois vineyards, crops, urban and natural areas.

For a copy of this paper in its entirety, call Moneen Jones at 773-220-7716 or email her at mmjones@neiu.edu.

Plants of Concern Training

Plants of Concern is a rare plant monitoring program, a collaboration of over 200 trained volunteer monitors working together with 54 cooperating landowners at over 165 sites in six counties. The data are providing land managers with information that helps them to set management practices. Plants of Concern will be holding training workshops on weekends during April and early May at various sites throughout the region.

Workshop Schedule for April

Saturday, April 8—Blackwell Forest Preserve, Warrenville, DuPage County
Sunday, April 23—Glacial Park, Ringwood, McHenry County
Sunday, April 30—Chicago Botanic Garden, Cook County

Workshops will be held from 9:30am to 3pm. This workshop will give you an opportunity to learn monitoring skills and to select a monitoring assignment or will refresh your skills for the new season. We strongly encourage any monitors who have never been to a workshop to attend.

Bring a lunch. Morning refreshments will be served.

Registration is required. A confirmation will be sent after registration and directions will follow shortly before workshop date.

More dates will be announced soon. For more information, please visit our webpage at: www.plantsofconcern.org. To get on the mailing list, contact: Emily Hudson, Program Assistant, Plants of Concern, 1000 Lake Cook Road, Glencoe, IL 60022, or call 847-835-6873 or email: ehudson@chicagobotanic.org.

Save the Date!
Wild Things Winter Workshops

Chicago Wilderness and Audubon, Chicago Region will host a series of Winter Workshops at The Brookfield Zoo and DePaul University to discuss a variety of topics for advocates, stewards and volunteers. We encourage anyone who is interested to please join us!

Saturday, January 21—10am-12:30pm
DePaul University Student Center, Room 313
The Natural Science Research Agenda for Chicago Wilderness–Volunteers, stewards and interested members of the conservation community are invited to offer their suggestions as to the research that's needed to help us achieve our conservation goals. RSVP not required but appreciated: Lauren Umek, 773-325-4639 or lumek@depaul.edu. For more information, please visit: www.depaul.edu/~lumek/CWResearchAgenda.

Sunday, February 19—10am-3pm
Brookfield Zoo
New Faces–Presentations and discussion on recruitment, outreach, partnerships and community and youth involvement. Learn what others are doing.
Friends and Politics–Presentations and discussion on advocacy, communications, the political process and dealing with public. RSVP not required but appreciated: Maggie Kurcz, 847-965-1150 or mkurcz@audubon.org. For more information visit www.habitatproject.org.

Saturday, March 4—1:30pm-4:30pm
Brookfield Zoo
Invasive Species–Comparing notes on what works and what doesn't. Evaluating and improving the region's "Best Management Practices", building on the Nature Preserve Commission's Invasive Species Guidelines–and our own experiences.
Restoration Planning–Presentations and discussion from a case-study perspective. Local examples of restoration plans that have improved the work (and sometimes attracted special funding). RSVP not required but appreciated: Maggie Kurcz, 847-965-1150 or mkurcz@audubon.org. For more information visit www.habitatproject.org.

Confirmed Participants for the preceding 4 workshops:
Roger Keller and Joe Neumann, stewards, Palos Preserves
Barbara Birmingham, steward, Ted Stone Preserve
Dick Riner, steward, Bartel Grassland
Logan Lee, Midewin National Tallgrass Prairie
Renae Frigo, Nature Programs Supervisor at the St. Charles Park District
Sue Harney, Supervisor, Dundee Township
Donnie Dann, president, Bird Conservation Network
Sam Oliver, Citizens for Conservation
Dave Hodge, Turning Leaf

Frog Monitoring Workshops 2006

These workshops are for both beginning and experienced monitors. We'll teach and review the calls of our 13 species of frogs and toads, help new monitors find survey sites, and discuss the monitoring protocol. Experienced monitors are encouraged to attend, in order to learn any protocol changes, obtain data sheets, review frog calls, and share lessons learned from last year.

Tuesday, January 24—7–9pm, St. Joseph College, Renssalaer, IN (Jasper County). On Hwy. 231 South, just off of I–65. Meet in the Science Building, Room 011. Contact Bob Brodman, (219) 866-6215.

Saturday, February 4—1-4pm, Ryerson Conservation Area Visitors Center (Lake County, IL). Located about a mile south of Half Day Road, between I-94 and Hwy. 45. Head west on Half Day road from I-94, then turn south on Riverwoods Road and look for the entrance on your right. Contact Tom Smith, (847) 968-3329.

Tuesday, February 7—7-9pm, Volunteer Resource Center (Cook County). Located at 6100 N. Central on Chicago's northwest side. This workshop is co-sponsored by the Forest Preserve District of Cook County and the Chicago Park District. Contact Bill Koenig, (773) 631-0237.

Thursday, February 16—7-9pm, Sugar Creek Administrative Building of the Forest Preserve District (Will County). At 17540 W. Laraway Road in Joliet. Take Rte. 80 to Briggs, head south on Briggs (turns into 52-S), then west on Laraway Road, and look to the north side of the street after about a half mile. Contact Rebecca Key, (815) 722-7366.

Wednesday, February 22—7-9pm, Prairieview Education Center, Crystal Lake (McHenry County). At 2112 Behan Road, just south of Hwy. 176, between Hwy. 31 and the Fox River. Heading NE from -Crystal Lake on Hwy. 176, turn right on Behan Rd after passing Valley View/Silver Lake Rd, and take another right at the end of the road. Please call 815-479-5779 to pre-register.

Saturday, February 25—9am-noon, Pottawatomie Park, St. Charles (Kane County). Coming west on Route 64 (called Main St. in St. Charles), turn north at 2nd Ave., two blocks before the river. Second Ave. ends at Pottawatomie Park - head west and go to the large building down by the river. Contact Mary Ochsenschlager, (630) 584-1885.

Tuesday, February 28—7-8:30pm, At the Valparaiso branch of the Porter County Public Library, (Porter County). Located at 103 Jefferson Street in Valparaiso, IN. Workshop will be in Meeting Room A. For location details, see: http://www.pcpls.lib.in.us/. Contact Alan Resetar with questions, 219-465-7231.

Chicago Wilderness Habitat Project

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Setting Your Sights: A Photographer Reflects on Dragonflies

By Carol Freeman

Photo by Carol Freemen

Mystery Dragonfly or Black-tipped darner?

Could this be the first sighting of a Black-tipped darner in Illinois? Experts think so. I took this photograph at Illinois Beach State Park on September 9, 2005. After getting the film back and searching all my field guides, I decided I could not be sure what species I had found. I sent the photos to Gary Moore and Gareth Blakesley for some expert identification. They came up with two possible ID's: it could either be a Lance-tipped darner, (recorded throughout Illinois) or the Black-tipper darner, which has never been recorded in Illinois.

Several indicators point to the positive ID of this species as a Black-tipped darner. One of the reasons is size: the Lance-tipped is supposed to have an s-9 noticeably larger than s-8 because of the female having the largest ovipositor of the Mosaic's. On this photo, s-8 and s-9 seem to be the same. The lack of spots on s-10 also favors a Black-tipped ID. Another trait that might determine this "girl" is the color of the stigma and costa of the wings; the color observable in the photo (not seen in this newsletter's black-and-white rendition) is much closer to the color described in a major science book on dragonflies for a Black-tipped darner - "dark reddish brown," while the Lance-tipped would be more yellow-orange.

I was thrilled when I thought I had been the first person to spot this species in Illinois. I was then equally disappointed when told my sighting would not count because only specimens are accepted for official records. As a nature photographer and lover of nature, I would never consider collecting a specimen for any reason. Photographing nature has always been my way of "collecting" species. This is the second time I have photographed a first record of a dragonfly in Illinois (the last was in 2004 with a sighting of a Russet-tipped clubtail in Cook County); and yet my information is not being used because it is "only" a photograph. It seems a shame to waste this valuable information. I hope there is room somewhere to include citizen-science observations, as I am sure other non-scientists are seeing and recording firsts all the time.

Carol Freeman is a noted wildlife photographer. Her 2006 calendars are now on sale, with proceeds going to her Endangered Species Photography Project. You can reach her at carol@carolfreemanphotography.com.