ILLINOIS

PRAIRIE RESEARCH INSTITUTE

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Illinois Plant S-rank Project

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Executive Summary

First, we gathered records for all endangered and threatened (hereafter E/T) plant species in Illinois. To accomplish this, we visited herbaria around the Midwest, searched online databases, obtained previously unshared data from local conservation agencies, consulted with botanical experts, and visited over 150 historical plant records in the field which had not been seen in over 20 years. Next, we determined the natural community associations for all E/T species. We then created a Watch List of non-listed species of conservation concern for the state, composed of 35 Species. In order to create this list, we searched herbaria, databases, and contacted experts both within and outside of Illinois. We then assigned S-ranks to all 330 E/T species and the 35 Watch List species (365 total species) in the state. We used these S-ranks to identify areas which contained E/T/Watch List species but did not have any formal land protection. The final list contained 203 sites ranked by conservation priority. We then created a threats assessment for all E/T species in Illinois. Using the threats data and the newly assessed S-ranks, we created a rarity-weighted richness map which displays hotspots of S1-S3 species. To assist the plant Endangered Species Technical Advisory Committee (ESTAC) of the Illinois Endangered Species Protection Board (ESPB), we created a list of trending positive species and criteria for their eventual delisting. We collaborated widely with IDNR District Heritage Biologists, Natural Areas Preservation Specialists, and other land managers in order to ensure that their input was considered and that they are aware of and will utilize the resultant products.

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Objective 1: *Collaborate with the IDNR to update E/T plant species records in the Illinois Natural Heritage Database. Associate each species with its likely natural community type(s) as defined in the IDNR's INAI Standards and Guidelines.*

We began by gathering data from online sources such as the Consortium of Midwest Herbaria, iNaturalist, and the Global Biodiversity Information Facility (GBIF). We visited 7 herbaria across the state and Midwest, including the University of Illinois Herbarium (ILL), Illinois Natural History Survey Herbarium (ILLS), Missouri Botanic Garden Herbarium (MO), Field Museum Herbarium (F), Chicago Botanic Garden Herbarium (CHIC), Southern Illinois University Herbarium (SIU), and Shawnee National Forest Herbarium (SNF). Through those in-person visits, we discovered new records of E/T species, such as *Amelanchier sanguinea* and *Carex diandra.* We obtained records from DuPage, Lake, and Will County Forest Preserves, as well as the Mchenry County Conservation District. We also obtained records from the Lake County Health Department, which monitors aquatic plant species. In total, we found 64 new element occurrence (hereafter EO) records.

A large obstacle which we encountered early on was that many EOs had not been seen in over 20 years. These are considered historical records, since their population, threats, and overall viability may have dramatically changed since they were last surveyed. This makes determining true conservation status difficult and often inaccurate. In order to address a large number of historical records, we allocated a portion of our travel funds to visit historical records. We visited over 150 historical records throughout the state, both on trips specifically designed to relocate historical species, and opportunistically on other trips.

We visited the following sites, with permission and often assistance from the land manager, in order to relocate historical records: Apple River Canyon State Park, Asgard Algific Slope Area, Braidwood Dunes and Savanna Nature Preserve, Castle Rock State Park, Turner Lake Fen Nature Preserve/Chain O' Lakes State Park, Elizabeth Lake Nature Preserve, Fourth Lake Fen Nature Preserve, Franklin Creek State Park, Cedar Lake Bog Nature Preserve, Lac Louette Natural Area, Pistakee Bog Nature Preserve, Sinisawa Bluffs Hill Prairie, Shick Shack Sand Pond Nature Preserve, Sand Prairie Scrub Oak Nature Preserve, Gavin Bog Nature Preserve, Rock Cave Nature Preserve, Green River State Wildlife Management Area, Lost Mound National Wildlife Refuge, Starved Rock State Park, Illinois Beach State Park/Nature Preserve, Warbler Ridge Nature Preserve, Volo Bog State Natural Area, and many sites within the Shawnee National Forest. We have visited other state-owned land such as Land and Water Reserve sites, along with many unprotected railroads and roadsides. We have also incorporated historical record visits into other projects being completed by the project staff, especially when those projects were in remote areas that are otherwise scarcely visited.

During these visits, we relocated 9 species which were considered entirely historical (i.e. all records had not been seen in over 20 years) in the state: *Artemisia dracunculus, Carex diandra, Cornus canadensis, Cardamine pratensis* var. *palustris, Echinodorus tenellus, Eriophorum gracile, Fimbristylis vahlii, Mirabilis hirsuta,* and *Sorbus americana*. Many of these species were difficult to access and/or hard to find due to size and phenology. These species are all extremely high priorities for conservation in Illinois.

In addition to gathering data on individual species records, we also identified the natural community types associated with Illinois E/T species. Natural community type associations are lacking for many rare Illinois species. In order to address this, we used knowledge within our group (collectively over 100 years of experience in Illinois botany), literature (the Sstandards and Guidelines for the INAI 2022, Herkert and Ebinger 2002, Wilhelm and Rericha 2017, Mohlenbrock 2014, INHS reports, and other literature), recent site visits, and the types associated with EOs in Biotics. We listed all community types that each listed species occurs in, and highlighted a primary type when appropriate (see **Appendix 1**). We included community types where species once occurred but have been extirpated from, where reintroduction or potential rediscovery may occur. We also suggested a few new community types such as mud flat and sand pond, which we feel are distinct enough from their parent type to be classified on their own. This is a step forward in understanding the typical occurence patterns and habitat associations for these rare species in Illinois.

Objective 2: *Update State Conservation Status Ranks (S-ranks) for Illinois' E/T plants.*

S-rank Background

S-rank stands for subnational rank (Canada) or state rank (US) and is part of a system of national ranks (N-ranks) and global ranks (G-ranks) for species conservation assessed through NatureServe (https://explorer.natureserve.org/AboutTheData/DataTypes/ConservationStatusCategories). S-ranks are important for conservation consistency, as listing criteria for E/T species are not the same for all state departments of natural resources. See **Table 1** below for a list of the most common and important S-ranks.

Table 1. Guide to major S-ranks and their associated meanings. Adapted from NatureServe.

S-rank	Meaning
SU	Unrankable due to a lack of data/taxonomic inconsistencies.
SX	Extirpated in the state.
SH	State historical, possibly extirpated. Has not been seen in the state in a defined number of years.
S1	Critically Imperiled - At very high risk of extirpation due to very restricted range, very few populations or occurrences, very steep declines, severe threats, or other factors.
S2	Imperiled - At high risk of extirpation due to restricted range, few populations or occurrences, steep declines, severe threats, or other factors.
S3	Vulnerable - At moderate risk of extirpation due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
S4	Apparently Secure - At a fairly low risk of extirpation due to an extensive range and/or many populations or occurrences, but with possible cause for some concern as a result of local recent declines, threats, or other factors.
S5	Secure - At very low or no risk of extirpation due to a very extensive range, abundant populations or occurrences, with little to no concern from declines or threats.

Over the course of the last year, we updated the S-ranks of all 330 listed species. We gathered information in person from herbaria (University of Illinois Herbarium, Illinois Natural History Survey Herbarium, Missouri Botanic Garden Herbarium, Field Museum Herbarium, Chicago Botanic Garden Herbarium, Southern Illinois University Herbarium, and Shawnee National Forest Herbarium), from online herbaria (e.g. Consortium of Midwest Herbaria and the Global Biodiversity Information Facility), literature (both published and gray literature), in-house INHS data (i.e. Critical Trends Assessment Program data, Illinois Department of Transportation reports, Illinois Plant Information Network), regional conservation districts, local experts, and citizen science websites such as iNaturalist. We

audited the rank for each species multiple times. We are extremely confident that our ranks include the most accurate and up to date data possible for listed plant species in Illinois. For 3 species with many casual introductions, 2 ranks were produced: one with remnant populations and genuine restorations only, and one that included casual introductions. Rank totals tallied below omit secondary ranks produced to reflect casual introductions for *Filipendula rubra*, *Salvia azurea* and *Silene regia.* Ranks with question marks were rounded to their base rank for the purposes of summary statistics (e.g. S2? = S2).

Overall, we found that out of the 330 E/T plant species evaluated for this grant, four were extirpated (SX), 22 were historical (SH), 180 were S1, 14 were S1S2, 86 were S2, 7 were S2S3, and 17 were S3 (**see Figure 1**). This is roughly consistent with what we would expect for our E/T species, with slightly more S3 species than were expected. Although S-ranks are not tied to listing status in Illinois, they are in many surrounding Midwestern states. S3 species were reviewed for delisting, and a few such as *Melothria pendula* and *Styrax americanus* were proposed for delisting. See **Appendix 2** for a full list of ranks.

Summary of updated ranks

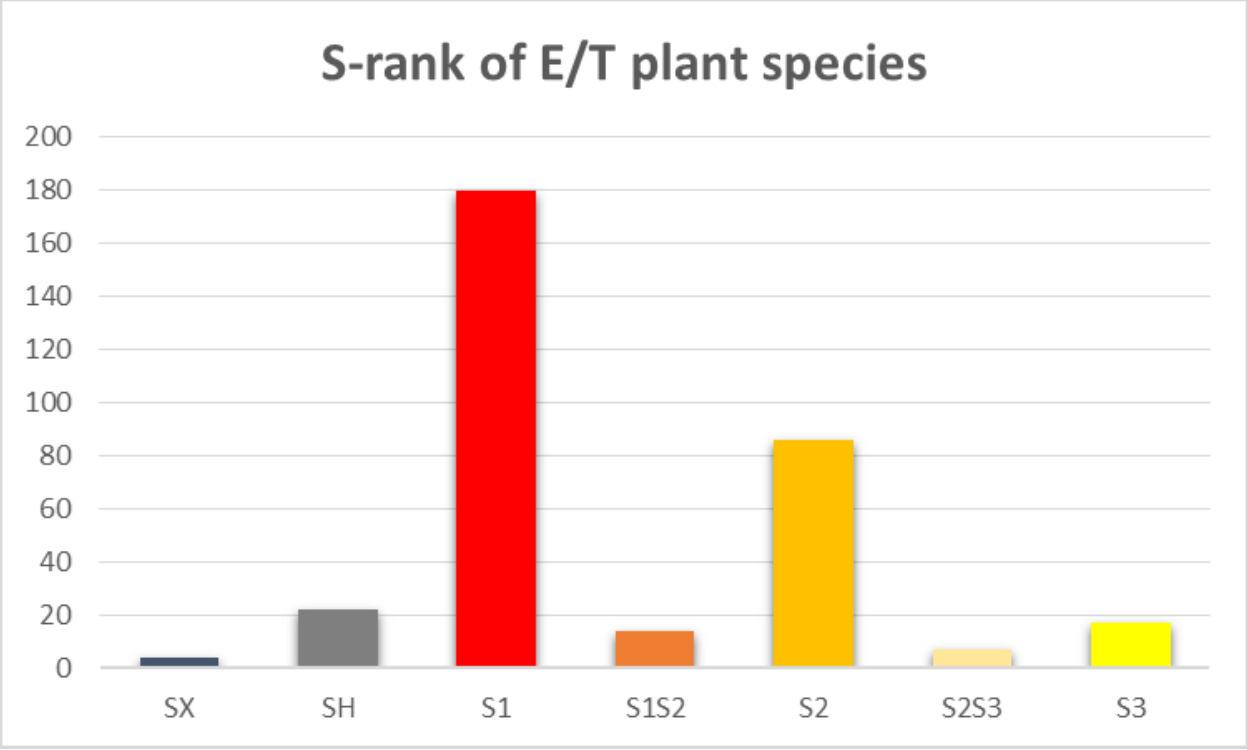

Figure 1. S-ranks of 330 E/T plant species evaluated for this grant. SX = 4; SH = 22; S1 = 180; S1S2 = 14; S2 = 86; S2S3 = 7; S3 = 17.

Species formerly considered extirpated:

SX to S1: *Scleria muehlenbergii*

Species formerly not ranked:

SNR to S1: 18 total. Examples are *Amelanchier sanguinea* and *Salix syrticola*.

SNR to S1S2: 2 total. *Minuartia patula* and *Viola primulifolia*.

SNR to S2: 8 total. Examples are *Ammophila breviligulata* and *Cakile edentula* var. *lacustris*.

Species formerly ranked S1:

156 species remained S1, such as *Clematis viorna*.

S1 to SX: 4 total. *Cystopteris laurentiana, Gaultheria procumbens, Isotria medeoloides, Valerianella chenopodiifolia.*

S1 to SH: 22 total. Examples are *Lycopodiella inundata* and *Ribes hirtellum*.

S1 to S1S2: 10 total. Examples are *Alnus incana* ssp. *rugosa* and *Rudbeckia missouriensis*.

S1 to S2: 64 total. Examples are *Polygonatum pubescens, Glyceria arkansana*

S1 to S2S3: 7 total. Examples are *Hypericum kalmianum* and *Juncus alpinoarticulatus.*

S1 to S3: 10 total. Examples are *Solidago sciaphila, Rubus odoratus.*

Species formerly ranked S2:

11 species remained S2, such as *Chamaedaphne calyculata*.

S2 to S3: 7 total. Examples are *Melothria pendula* and *Lathyrus ochroleucus*.

S2 to S1: 5 total. *Bouteloua gracilis, Juglans cinerea, Juniperus communis, Melanthium virginucum, Vandenboschia boschiana.*

S2 to S1S2: 2 total. *Trillium viride* and *Quercus phellos*.

Species formerly ranked S3:

S3 to S2: 3 total. *Besseya bullii, Buchnera americana* and *Festuca paradoxa*

Objective 3. *Identify and assess the conservation status for a subset of non-listed plant species of highest conservation concern in Illinois— The Illlinois Plant Watch List.*

We created a second tier list for Illinois' at risk and high conservation priority plants—the Illinois Plant Watch List. To select species for our proposed Watch List, we began by creating criteria to identify species that do not fit/fall outside of the criteria for E/T listing but that are high priority for monitoring and conservation attention. Our criteria identify at-risk species for several possible reasons that may not be captured on the state E/T species list. Species needed to meet at least 1 of these criteria in order to make the Watch List:

1) Species has precipitously declined or has the potential for imminent severe decline due to habitat destruction, poaching, disease, lack of protected habitat, or other factors;

2) Species is not common in Illinois and is severely threatened in most surrounding states; such that the Illinois populations are disproportionately important for its survival;

3) Species has been delisted, but still warrant tracking of its trends;

4) Species is new to Illinois' flora, occurs in native habitats, and is presumed rare, but does not have enough data to produce a rank (SU).

We considered over 150 species for this list. We eventually chose the species that — outside of already listed species — we believe are in the greatest need of conservation attention, and that should be the greatest focus of data collection and monitoring in Illinois. We ranked all of them. See the below justification for all watch list species. For rank information, see **Appendix 3**, which provides a table of the species, their ranks, and the above criteria that they meet.

Justification for species added to watch list

Allium stellatum – Many occurrences for this species have been destroyed, and it now remains in only a few locations. This is an extremely high priority for monitoring, and may ultimately need to be listed. Meets criteria 1 and 2.

Berula erecta – Much of the habitat of this species has been destroyed, and it remains mostly in high-quality fens and wet meadows in northeastern Illinois. Climate change and hydrologic alteration especially threaten this species. G4. S2 in Iowa, Michigan, and Minnesota. Meets criterion 2.

Brasenia shreberi – Aquatic species which formerly occurred in bodies of water throughout the state but now only occurs in high-quality glacial lakes in northern Illinois and a few locations in southern IL such as round pond. Wide distribution, but rare throughout its range. S2 in Iowa, S3 Kentucky, SNR in many other states. Meets criteria 1 and 2.

Callirhoe triangulata – Primarily in high quality sandy remnants throughout Illinois. Illinois appears to have the greatest range and abundance of this species. G3 species. S1 in Indiana, S1 in Iowa, SX Missouri, and S2 in Wisconsin. Meets criteria 1 and 2.

Carex richardsonii – Hill prairie species primarily distributed in north-central IL. Although this species is relatively abundant where it occurs, it has declined over time and will continue to decline as hill prairies are encroached by woody invasion. It is currently verified in only 6 hill prairies. S2 in Iowa and Indiana. Meets criteria 1 and 2.

Celastrus scandens – Historically very widespread. Invasion and hybridization by *Celastrus orbuculatus* severely threatens this species. Recent research shows that catastrophic declines have both been occurring and will continue to occur. Meets criteria 1 and 2.

Cirsium hillii – 54 occurrences in Illinois. Illinois is a relative stronghold for this species. Species occupies many unprotected areas. G3 species. S1 in Iowa and Indiana. S3 in all other Midwest states where it is native. Meets criteria 1, 2, 3.

Cryptogramma stelleri – Species of limestone/dolomite outcrops which has historically been reduced by quarrying. Warming climate may threaten species by reducing suitability of microhabitat. S3 in Iowa and Michigan. Meets criteria 1 and 2.

Dactylorhiza viridis – This species historically occurred throughout Illinois, but there are only 2 recent observations in the state. It is widespread throughout the US but rare throughout its range. Meets criteria 1 and 2.

Deschampsia cespitosa – Limited to wet prairies with shallow bedrock in northern Illinois. Continued quarrying is a problem for this species, and its range may be contracted by climate change. Meets criterion 1.

Echinacea simulata – Restricted to glades, railroad prairies, and gravel prairies throughout Illinois. Confusion with *E. pallida* ID has likely led to erroneous reports of both species and the prior notion that *E. simulata* was not native in Illinois. A tentative rank was assigned, but a thorough survey is needed for an accurate rank. G4 species. Meets criteria 1 and 4.

Eleocharis wolfii – Extensive searches have revealed more populations in this state than previously though (22 current EOs). G4 species. S1 in many surrounding states, and Illinois may be disproportionately important for the national resilience of this species. Meets criterion 2.

Equisetum variegatum – This species is primarily restricted to far northeastern Illinois in fens and pannes, although it is occasionally adventive on railroads downstate. Climate change may adversely impact it. Meets criterion 1.

Erythronium mesochoreum – 24 occurrences in Illinois, but many are part of the same population, so there are more like 10-15. Many are outside of protected areas and hit hard by railroad maintenance. G4 species. Illinois forms the eastern edge of its range. Meets criteria 1, 2, and 3.

Eurybia shreberi – Formerly *Aster chasei*, a Midwest endemic centered in Illinois, but now included in *Eurybia schreberi*. Illinois is a stronghold in the western edge of this species' range. Since this species was delisted, some EOs have been extirpated, and the population may have significantly changed. New surveys in appropriate habitat are necessary. G4 species. Meets criteria 1, 2, and 3.

Fimbristylis puberula – Primarily in the Kankakee sands. S1 or SX in many surrounding states. Meets criteria 1 and 2.

Fraxinus nigra – Emerald ash borer has caused catastrophic declines of a species which was already relatively habitat-limited compared with other congeners in the state. Meets criterion 1.

Geum triflorum – Restricted to northern Illinois, climate change may reduce the habitat of this species which has already been impacted by destruction for development/quarrying. S2 in Michigan, S3 in Iowa. Meets criterion 1.

Hasteola suaveolens – Limited to high-quality fens in northeastern and north-central Illinois. G4 species. S2 in Iowa, S3 in Missouri, S2 in Kentucky. Meets criteria 1 and 2.

Ludwigia sphaerocarpa – Rediscovered in Illinois after 150 years. Currently limited to Round Pond, but may be elsewhere. S1 in Indiana and Michigan. Meets criterion 4.

Napaea dioica – In very few protected areas, and wet railroad prairies are especially susceptible to destruction. It is a Midwestern endemic and Illinois has greater abundance than nearly any other state. Monitoring recommended by Phillippe and Robertson suggested it as too common to be listed, but may be rarer today. G4 species. Meets criteria 1 and 2.

Phragmites australis* ssp. *americanus – Competition from the non-native *Phragmites* subspecies is a tremendous problem; the native subspecies is now limited to fens/bogs in NE Illinois. S1 in many eastern seaboard states. Meets criteria 1 and 2.

Polytaenia nuttallii – Restricted to high-quality remnant prairies in Illinois. S1 in Indiana, S2 in Wisconsin. SH in Minnesota and SX in Michigan. Meets criteria 1 and 2.

Pulsatilla patens – Restricted to high-quality gravel hill prairies in north-central Illinois. Illinois is the southern limit of the range in the Midwest. Meets criterion 1.

Rorippa aquatica – Relatively uncommon throughout the state, but apparently more occurrences than in other states. Many historical records in areas where it is no longer present. G4 species. S1 in most surrounding states. Meets criteria 1 and 2.

Silene nivea – Illinois a relative stronghold. Species is present in habitats that could become scarce with climate change. G4 species. Meets criteria 1 and 2.

Spiranthes sheviakii – Species was **recently** described. Older collections need to be reviewed and current populations visited in order to make an accurate status assessment of the species. Meets criterion 4.

Spiranthes ochroleuca – Species "new" to Illinois' flora. Older collections need to be reviewed and current populations visited in order to make an accurate status assessment of the species. Meets criterion 4.

Symphyotrichum parviceps – Limited to hill prairies in central and western Illinois, this species has almost no recent collections and is in dire need of surveys/monitoring. Extensive historical records indicate large long-term declines, and continued degradation/contraction of hill prairies will likely force further declines. G4 species. Meets criterion 1.

Thuja occidentalis – Delisted due to stable and growing size of populations in northern Illinois, but climate change may reduce habitat. S1 in Indiana. Meets criteria 1 and 3.

Tomanthera auriculata – Formerly listed, this species has undergone significant recent declines and has many unprotected occurrences. G3, S1 in many states. Meets criteria 1, 2, and 3.

Uvularia floridana – Species is new to Illinois' flora and currently only occurs at Heron Pond. Molecular and morphometric investigation may eventually identify it as a new species entirely, as it is extremely disjunct nature from the nearest species populations. G3 species. Meets criterion 4.

Valeriana edulis* var. *ciliata – Limited to high-quality fens in northeastern Illinois, this species has already declined substantially and the habitat may decline further due to climate change. T3 variety. Meets criteria 1 and 2.

Veratrum woodii – This species was formerly listed and was delisted due to too many occurrences. However, it is in many unprotected areas, rarely flowers, and most populations are small, so declines are probable. Meets criteria 1, 2, and 3.

Zizania aquatica – A substantial number of populations have been destroyed. Much of its remaining habitat has decreased in quality, such as areas along the Illinois River (e.g. Spring Bay Fen). S2 in Ohio and Michigan, SNR in states surrounding Illinois. Meets criteria 1 and 2.

Species not added to the watch list

Four species that we reviewed for the watch list were instead determined to be candidates for E/T listing instead due to their rarity. These species can be found in **Table 2** below. See **Appendix 4** for species which were considered for the watch but were not added because they did not meet the criteria (e.g. were too common, not threatened enough).

Table 2. Species which qualify for the watch list, but are so limited in both range and population that immediate consideration for listing is warranted.

Species	Common Name	S-rank
Bergia texana (C = 10)	Texas bergia	**S1S2**
Carex albolutescens (C = 9)	Green-white sedge	**S2**
Rhamnus lanceolata (C = 7)	Lanceleaf buckthorn	**S1S2**
Solidago sphacelata (C = 10)	Autumn goldenrod	**S1S2**

Objective 4: *Detect occurrences of E/T and watch list species that are located primarily outside of INAI, INPC, and OMLP lands to identify prioritization of acquisition, protection, and stewardship needs.*

For Objective 4, we identified areas which contained E/T/Watch List species but did not have any formal, permanent protection. We used the updated S-ranks to help inform the priority level of unprotected sites. We used a combination of information from layers in Biotics and ArcGIS, local experts, and ownership data from online data sources to inform the total potential natural heritage value, management need, and possibility for acquisition. See **Table 3** for a breakdown of criteria, **Table 4** for interpretation of management categories, and **Table 5** for how those criteria interact with other site qualities to inform the priority rank. The final list contained 203 sites. Priority 1 sites have extremely high value as a part of our state's natural heritage and should be immediate targets for permanent protection and management. Priority 2 and 3 sites are also extremely important and should be opportunistically targeted. Priority 4 and 5 sites are important, but see rank information below for interpretation of lower priority. **Figure 2** shows the breakdown of sites by priority level. **Appendix 5** shows an abbreviated view of the table that we have compiled.

Table 3. Criteria to meet priorities listed in the table below for lands containing endangered, threatened, or watch list plant species.

Criteria	Meaning
1	Habitat is either high-quality (INAI Grade A or B) OR has the potential to be restored to high-quality habitat with minimal management (INAI grade C or higher);
2	Site contains either: a) one or more E/T or Watch List plant species ranked **S1** or **S2** OR b) two or more state-listed or watch-list plant species ranked **S3**;
3	Site ownership indicates that purchase by the Illinois DNR is possible (i.e. owned by a bank, land trust, or private individual)

Table 4. Management level and associated meaning.

Management level	Meaning
Minimal	There are no immediate management concerns.
Low	Management concerns are present, but the site will likely only need to be visited once a year to monitor and address these concerns. Invasive species are noted, but the either the scope of the invasion or the invasibility of the species is low.
Moderate	Pervasive management concerns exist, which will require consistent but not extensive annual management. These might be related to invasive species, pollution, overall degradation, or many other concerns.
High	Frequent active management will be needed for up to 5 years or more in order to make improvements in site viability. Thinning, burning, removal of invasive species, and habitat restoration at a large scale are likely necessary.
Extensive	Frequent active management is needed consistently for 5 or more years to make improvements in site viability. Thinning, burning, removal of invasive species, and addressing an extensive level of anthropogenic disturbance are likely needed.

Table 5. Priority rank level of sites.

Priority Rank	Meaning
1	Meets all 3 criteria and contains a) 2 or more S1/S2 species AND b) habitat is high quality and rare in Illinois
2	Meets all 3 criteria and also contains a) 2 or more S1/S2 species OR b) one S1/S2 species and 1 or more S3 species
3	Meets all 3 criteria.
4	Has 1 S3 species and habitat is either listed as or presumed INAI grade C or better OR has 1 S2 species OR has 2 S3 species. Acquisition of the site might be infeasible.
5	Has 1 S3 species but habitat quality is either degraded or unknown and assumed degraded.

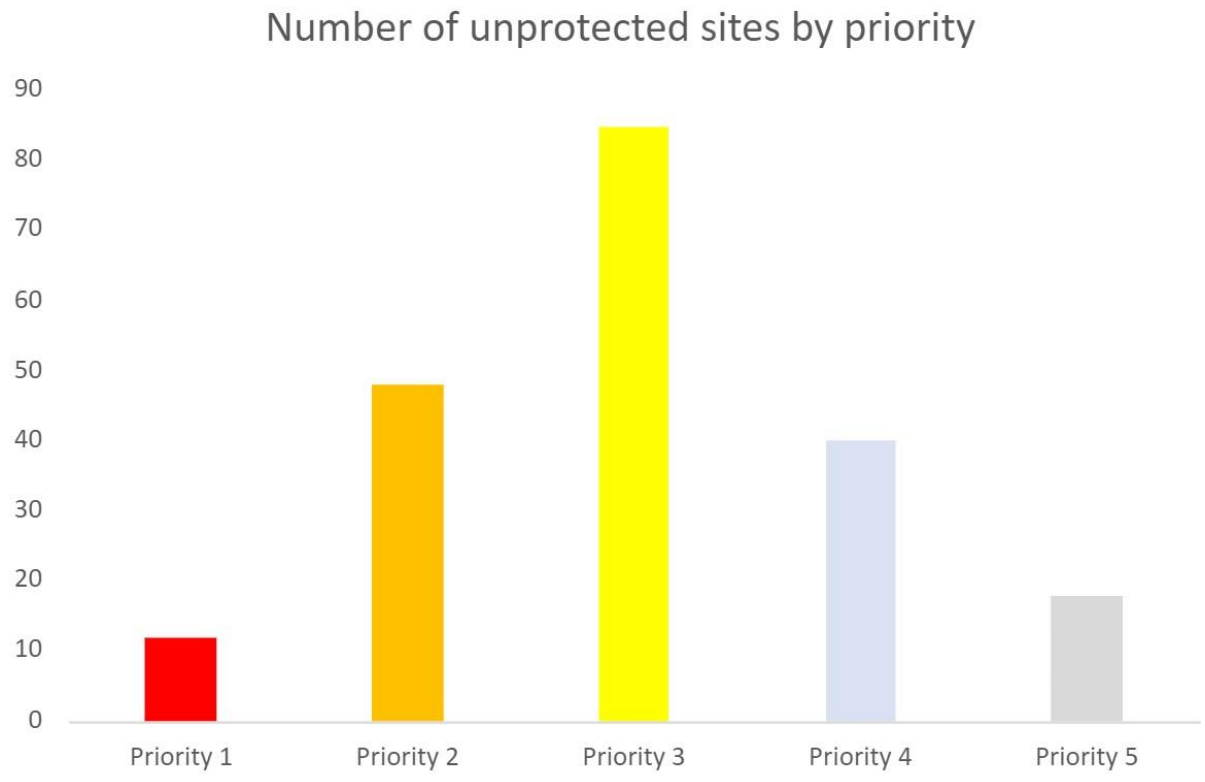

Figure 2. Number of sites by each rank priority.

Objective 5: *Develop a threats assessment for individual E/T plant species.*

Threats Matrix for listed plants

During the S-rank evaluation process, we gathered comprehensive information on threats for each species. We integrated our updated threats with the threats matrix created by Minnis, Sipes, and Gibson in the 2006 Supplement to the Conservation Wildlife Action Plan (Minnis et al. 2006; hereafter known as MSG 2006). The framework they used is consistent with threat evaluations for fauna, therefore some categories are less intuitive for plants. See **Table 6** for a listing of threats and their meaning. For the threat severity level, meaning, and timeline, see **Table 7** for a breakdown. Threats were tiered based on the data quality and how recently it was collected. If recently confirmed information was available on a threat, that value superseded the value listed in MSG 2006. If we could find no information to verify the threat listed in MSG 2006, or if the level of threat was completely unclear, we left their value as it was. See **Appendix 6** for the full table of threats.

Table 6. Meaning of threat categories.

Threat	**Meaning**
Extent	The gross amount of habitat
Fragmentation	Includes the effects of isolation, juxtaposition, patch size, and edge effects
Composition-Structure	Biological and physical attributes of habitat within a patch
Disturbance/Hydrology	Disturbance regimes are the frequency, timing, and intensity of disturbances such as fire, and hydrology relates to patterns in water level and availability
Pollution	Abnormal inputs of chemical or physical materials
Competitors	Individuals of same or other species vying for shared resources
Predators	Primarily consumers of plants such as insects and mammals
Pathogens	Disease causing organisms including fungi, bacteria, and viruses
Invasives/Exotics	Novel organisms functioning as competitors, predators, parasites, etc. (overlaps one or more community stresses category and Composition-Structure of habitat stresses category)
Pollination vector	Organism or other source responsible for pollination
Dispersal vector	Organism or other source responsible for dispersal
Genetics/Reproduction	Genetic constraints such as inbreeding, outbreeding depression
Dispersal vector	Movement of propagules among habitat patches and/or subpopulations
Recruitment	Addition of new individuals to reproducing population
Mortality	Death rate for a population
Harvest/killing	Direct killing/removal by humans
Disturbance	Direct harassment by humans such as ATV, hiking, and mowing
Structures-Infrastructure	Killing or harassment by structures (dams, towers, etc.) or infrastructure (roads, utility lines, etc.)

Table 7. Threat severity levels, associated meaning, and source.

Threat severity level	Threat severity level meaning	Threat timeline and source
Current, recently confirmed threats		
1	The threat is currently having or will have a **small** effect on population viability or abundance	Threat has been recently confirmed with on the ground verification and is currently ongoing or will happen in the near future.
2	The threat is currently having or will have a **moderate** effect on population viability or abundance	Threat has been recently confirmed with on the ground verification and is currently ongoing or will happen in the near future.
3	The threat is currently having or will have a **severe** effect on population viability or abundance	Threat has been recently confirmed with on the ground verification and is currently ongoing or will happen in the near future.
Published and/or otherwise documented threats		
1.1	The threat has had, is having, or is likely to have **little or no** effect on population viability or abundance	Published literature indicates that the threat has either occurred in the past, is currently ongoing, or will happen in the future.
2.1	The threat has had, is having, or is likely to have a **moderate** effect on population viability or abundance	Published literature indicates that the threat has either occurred in the past, is currently ongoing, or will happen in the future.
3.1	The threat has had, is having, or is likely to have a **severe** effect on population viability or abundance	Published literature indicates that the threat has either occurred in the past, is currently ongoing, or will happen in the future.
Unpublished threats		
1.2	The threat has had, is having, or is likely to have **little or no** effect on population viability or abundance	Local experts indicate that the threat either has either occurred in the past, is currently ongoing, or will happen in the future, but there is no published evidence or recent confirmation.
2.2	The threat has had, is having, or is likely to have a **moderate** effect on population viability or abundance	Local experts indicate that the threat either has either occurred in the past, is currently ongoing, or will happen in the future, but there is no published evidence or recent confirmation.
3.2	The threat has had, is having, or is likely to have a **severe** effect on population viability or abundance	Local experts indicate that the threat either has either occurred in the past, is currently ongoing, or will happen in the future, but there is no published evidence or recent confirmation.

Objective 6: *Calculate rarity weighted plant richness statewide. Couple richness values with threats assessment results to generate a hotspots map of E/T species to assist with prioritization of acquisition, protection, and stewardship needs.*

Rarity Weighted Richness Map

We calculated rarity-weighted richness for threatened and endangered plant species. We performed this by first weighting each species according to their S-rank. S1 species were weighted 1.0, S1S2 weighted 0.75, S2 weighted 0.5, S2S3 weighted 0.415, and S3 species weighted 0.33. These weights were then added as an attribute to each EO according to their S-rank in the EO layer. We then performed a spatial join of the EOR layer with the 10-kilometer grid cell layer and the S-rank. There are a total of 14,420 10 km grid cells in Illinois. Subsequently, the attributes of the EORs within each 10-kilometer grid cell were joined and the weights were summed up. The 10-kilometer grid cells were then sorted into 5 categories. No E/T plants (weight 0), low E/T plant species richness (weight between 0-1), medium E/T plant species richness (weight between 1-5), high E/T plant species richness (weight between 5-10), and very high E/T plant species richness (weight 10+). Grid cells with no E/T plants made up 89.4% of total land cover. There were 10.6% cells overall with E/T species. Low E/T richness cells made up 4.2% of total land cover. Medium E/T richness cells made up 5.6% of total land cover. High E/T richness cells made up 0.7% of total land cover. Very high E/T richness cells made up only 0.1% of total land cover. See **Figure 3** for a map with rarity weighted richness across Illinois.

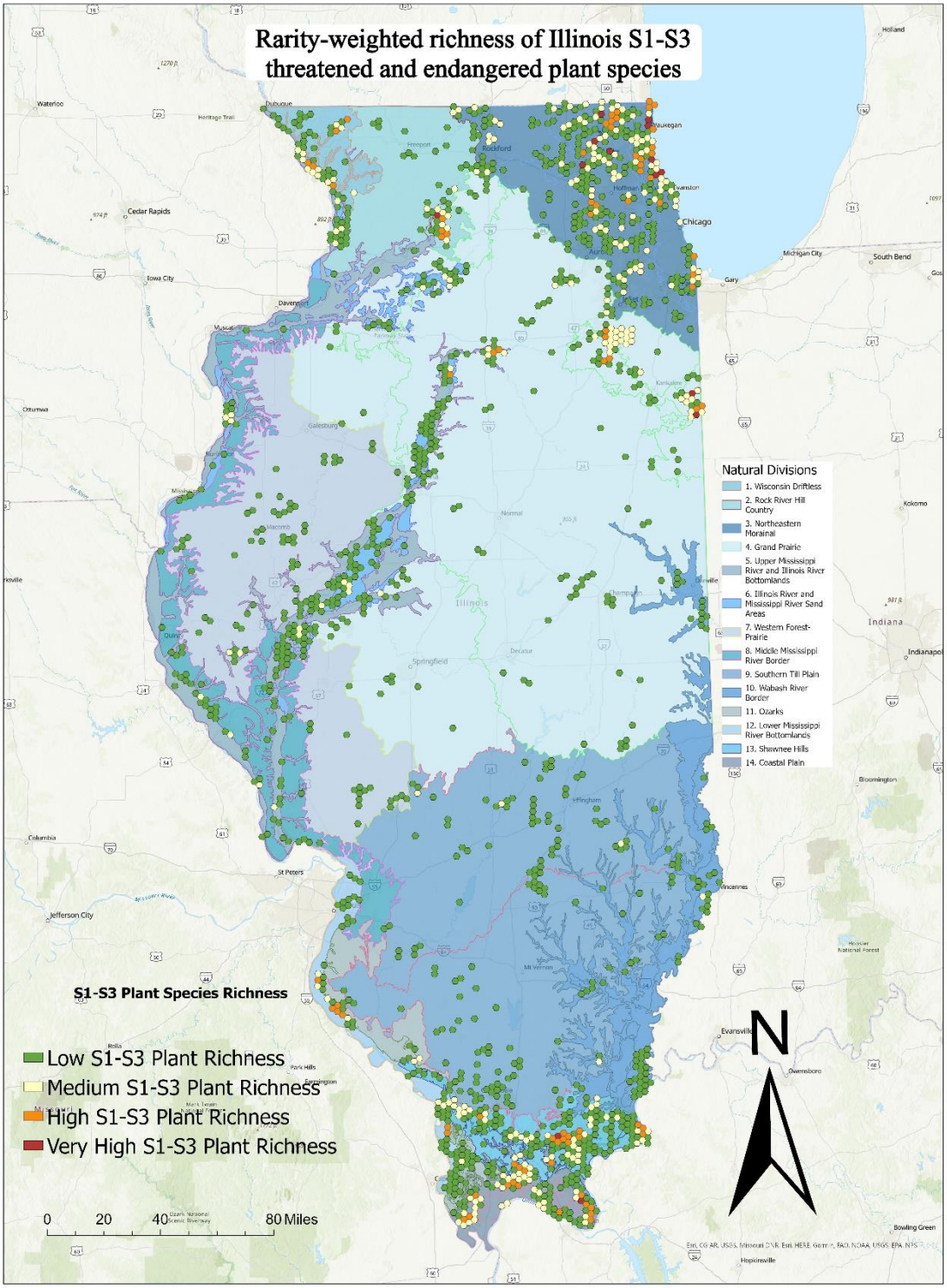

Figure 3. Rarity-weighted richness map showing hotspots of Illinois threatened and endangered plant species.

Objective 7: *Provide professional advice and opinion on Illinois Natural Areas Program questions related to plant biology, distribution, physiology, and conservation status during the length of the contract.*

Throughout the term of the contract, we have provided assistance with action items when requested by the DNR. We met this objective by providing advice through emails, phone calls, and video meetings. We have also assisted with ranking species not included in our grant, such as *Enemion biternatum* (S5), *Oenothera clelandii* (S4) and *Penstemon pallidus* (S5).

Trending positive E/T plant species in Illinois

Although some rare species are stable and many are declining, some are trending positive. In addition to the plants which have been delisted in the last decade due to positive changes (e.g. *Tomanthera auriculata*), there are also a number of plants which are increasing but are not yet ready for delisting. We created a list of such species to show species trends and help the plant ESTAC committee make informed decisions of when to downgrade (endangered to threatened) or delist. To make the trending positive species list, threatened and endangered plant species must meet either criterion 1 or 2. For consideration of downgrading from E to T or being delisted, they should also meet either criterion 3 or 4.

Criteria

1) More than 3 new EOs have been found and no occurrences were extirpated since the previous listing cycle in 2020

OR

2) More than 1/3 of populations have expanded in size with evidence of recruitment/reproduction within the last 10 years while the vast majority of other populations remain stable

AND

3) Overall threats remain low, and any acute threats are limited to fewer than 10% of occurrences

OR

4) The supermajority (2/3) of occurrences are on permanently protected land

Reason for increase

Found more populations: Species is more common than previously thought and dedicated searches or increased awareness revealed more populations

Management: Burning, woody species removal, etc.

Plantings: Numbers are increasing due to planting either from a) genuine, intentional restoration or b) rogue plantings/garden escapes

Natural increase: Populations are naturally expanding either due to a) habitat protection minimizing threats and allowing species to fully occupy niche or b) changes in climate, species niche, habitat availability etc.

24 species in total were placed on this list (see **Table 8** below), which represents 7.3% of Illinois' listed E/T species. Finding more populations was by far the most common reason for a positive trend (see **Figure 4**), which indicates that some listed species may be more common than previously thought. Species which are experiencing regional increases but overall neutral trends due to declines elsewhere were omitted. Such an example would be *Buchnera americana*, which is positively trending in southern Illinois but declining in central Illinois hill prairies.

Table 8. List of species which are trending positive in Illinois.

Species	Criteria met	Reason for increase	Caveats/comments
Actaea racemosa	1, 3	Plantings (b)	Mostly from rogue plantings/garden escapes
Actaea rubifolia	2, 3	Natural increase (a)	Still threatened by equestrian use
Ammophila breviligulata	2	Natural increase (a); plantings (a)	
Aster furcatus	2	Natural increase (a)	Many Chicago-area populations have increased in size, but the long term status of others is questionable
Carex aurea	2	Natural increase (a)	
Carex bromoides	2	Management	Some southern populations declining due to stilt grass
Carex intumescens	1, 3	Found more populations; natural increase	
Carex nigromarginata	1, 3	Found more populations	
Carex willdenowii	1	Found more populations	
Dichanthelium yadkinense	1, 3	Found more populations	
Hexalectris spicata	1	Management; found more populations	
Lysimachia radicans	1	Found more populations	
Micranthes virginiensis	2, 1	Natural increase	
Monarda clinopodia	1	Found more populations	
Oxalis illinoensis	2	Management; natural increase (a)	Equestrian use still threatens some populations
Penstemon tubaeflorus	2	Plantings (b)	Native genotype may be very rare
Platanthera flava var. *flava*	1	Found more populations	
Rhexia mariana	1	Found more populations	
Rubus pubescens	1	Found more populations	

Scleria pauciflora	1	Found more populations	
Spiranthes vernalis	1	Found more populations	
Urtica chamaedryoides	1, 3	Natural increase (b)	
Utricularia intermedia	1, 4	Found more populations	
Veronica scutellata	2	Natural increase (a)	

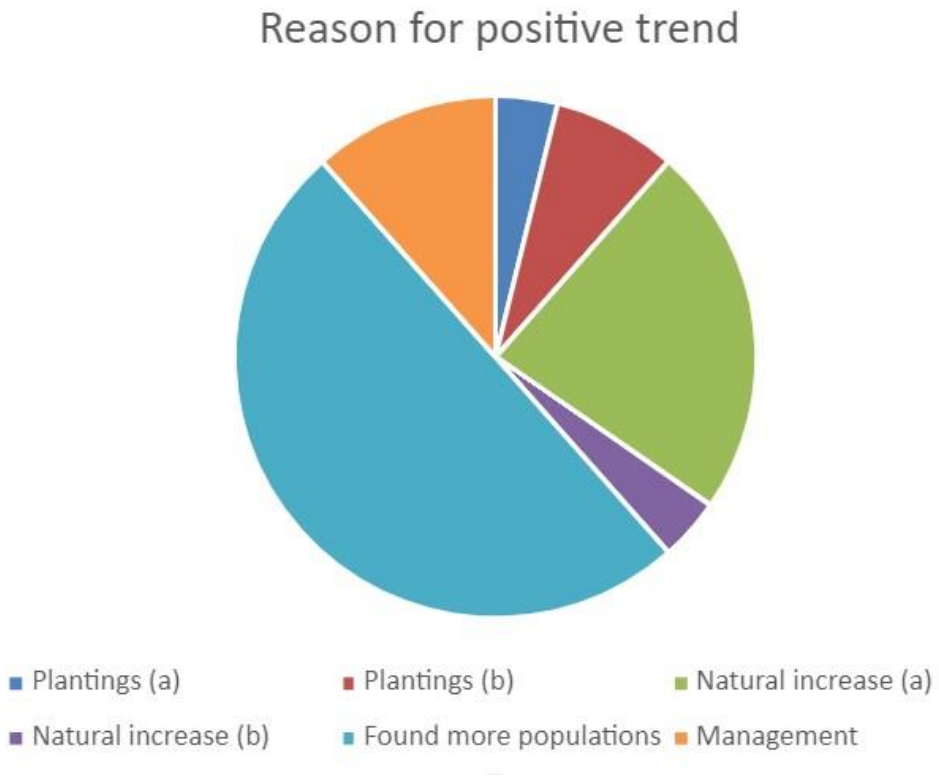

Figure 4. Pie chart showing reasons plants had a positive trend.

Objective 8: *Coordinate triannual progress update meetings. Provide an annual and a final report.*

Collaborations, coordination, and outreach

Collaborations are essential to producing ranks which accurately reflect the current status of our threatened and endangered species. We have worked closely with both District Heritage Biologists such as Melissa Grycan, Russ Blogg, and Duane Ambroz, and Natural Areas Preservation Specialists such as Angella Moorehouse. We have also fostered relationships with local land management agencies, such as the McHenry County Conservation District. We have frequently collaborated with Ken Klick, the botanist for Lake County Forest Preserves, who has been especially helpful with site visits and information. In addition, our relationship with Chicago Botanic Garden's Plants of Concern has been especially fruitful, and they have been of great assistance at every junction. Their data has vastly assisted with ranks, as it contains an exceptional amount of detail. They have provided staff to assist with historical record trips and have located new EOs for E/T species. We also engaged with other non-profit organizations such as the Jo Daviess Conservation Foundation in order to access threatened and endangered species. In order to obtain access to some sites, we have fostered relationships with private landowners. When we worked with private landowners, we ensured that contacts were established with local DNR representatives. These connections are essential to local conservation.

We have presented about the S-rank update process at 8 gatherings and conferences throughout Illinois. We have also attended conservation meetings between states, such as the Natural Heritage Symposium hosted by the Missouri Department of Conservation, and the Illinois Association of Conservation Districts. One or more members from our team regularly attends the Great Lakes Heritage Botanist Working Group, which is critical to sharing and updating our knowledge of plants in our region.

Follow up steps

Watch list outreach and monitoring

The watch list should be publicized widely to increase public awareness and hopefully provide insights into the condition of these species. The first step in doing this is to create a webpage for these species. It could be as simple as a link to a PDF of the watch list along with some brief information regarding it. To capture and curate data, we recommend creating a group on iNaturalist. This will serve to host records of these species so that IDNR does not get inundated with more plant EOs and will also engage community scientists. Monitoring these species is also extremely important to ensure they do not become threatened or endangered. We have enlisted the help of Plants of Concern to do this. Plants of Concern has already begun monitoring watch list species such as *Carex richardsonii* and *Pulsatilla patens*.

Growing and culitvating our most vulnerable plants

Collecting, conserving, and growing out species at high risk of extirpation to preserve local genetics should be a top priority. This should be prioritized in Illinois for all listed species that have 3 or fewer EOs. If we do not establish a way to preserve Illinois genotypes for these species, we will begin to lose our rarest listed plant species. Using the forthcoming Illinois Plant Conservation Alliance as a springboard to collect and germinate these species will be essential since this work requires broad collaboration, expertise, and extensive resources.

Monitoring biodiversity at private INAI sites

Especially clear during field surveys was the fact that privately owned INAI sites are losing biodiversity fast. Sites which at one time hosted 3 or more endangered species, now do not contain any. This happened within a span of only 20 years. We suggest INAI sites which do not have documented recent visits be prioritized for contact based on E/T/Watch list species occurrence. Then, there should be site visits to document their progression. This information would greatly assist with updating EOs as well as give us a better understanding of the current state of Illinois' private lands, which is largely unknown.

Strengthening communication to increase EO reporting accuracy

Strengthening communication with local conservation districts and forest preserves is critical. A large percentage of E/T plants occur on their lands, but many of those are historical. EOs are often surveyed by these groups, but those surveys are either not sent into Biotics, or not formally documented at all. It is strongly suggested that representatives from local conservation districts meet with the DNR in the near future and review all E/T species on their land to make sure the data is consistent between them and that their priorities are aligned. The Illinois Association of Conservation Districts conference presents an ideal forum to convey some of this information broadly, and then to offer individual meetings with land managers.

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Appendix 1. Illinois listed plant species and their typically associated natural communities. Primary community types, when appropriate for a species, are bolded.

Species	Natural Community type
Actaea podocarpa	**Mesic upland forest**
Actaea racemosa	Dry-mesic to wet-mesic upland forest; seep
Actaea rubifolia	**Mesic upland forest**
Adoxa moschatellina	Mesic upland forest; algific talus slope
Agalinis skinneriana	Dry to mesic gravel prairie; dry to wet sand prairie; loess hill prairie; panne
Alnus incana ssp. *rugosa*	Sedge meadow; swamp; forested bog; seep
Amelanchier interior	Tall shrub bog; wet floodplain woods; mesic savanna; mesic upland forest; mesic prairie
Amelanchier sanguinea	Mesic upland forest; eroding bluff
Ammophila breviligulata	Foredune; beach
Amorpha nitens	Mesic to wet floodplain forest; southern flatwoods; shrub swamp (edge)
Andromeda glaucophylla	**Graminoid fen**
Arctostaphylos uva-ursi	**Foredune (blowout)**; dry-mesic sand forest
Artemesia dracunculus	Dry sand prairie; dry gravel prairie
Asclepias lanuginosa	Dry-mesic to mesic prairie; dry-mesic gravel prairie; loess hill prairie
Asclepias meadii	Dry to mesic prairie; dry to dry-mesic savanna; sandstone glade
Asclepias ovalifolia	Mesic prairie; dry-mesic sand savanna; dry mesic woodland
Asclepias stenophylla	**Loess hill prairie**; dry upland forest; dry woodland
Asplenium bradleyi	Dry to mesic sandstone cliffs (also chert outcrops)
Asplenium resiliens	**Mesic limestone cliff**
Aster furcatus	Mesic upland forest; northern flatwoods; seep; freshwater marsh
Astragalus crassicarpus var. *trichocalyx*	**Glacial drift hill prairie**
Astragalus distortus	Dry to mesic sand prairie; loess hill prairie; dry-mesic sand savanna; dry-mesic sand woodland; cultural (roadside)
Astragalus tennesseensis	Gravel hill prairie; dry gravel prairie; dry dolomite prairies
Avenella flexuosa	Dry-mesic to mesic upland forest/woodland
Baptisia tinctoria	Wet-mesic sand prairie; dry-mesic sand savanna
Bartonia paniculata	**Acid gravel seep**
Beckmannia syzigachne	Freshwater marsh; sedge meadow; wet prairie
Berchemia scandens	Mesic upland forest; pine plantation
Besseya bullii	Dry sand savanna; sand prairie; gravel hill prairie; dry-mesic upland forest/ woodland
Betula alleghaniensis	Forested bog; dry-mesic sandstone cliff; dry-mesic upland forest
Bidens beckii	Lake; pond (glacial)
Boltonia decurrens	Freshwater marsh; medium gradient river; wet floodplain forest; cultural (wetland restoration)
Botrychium campestre	**Mesic savanna**
Botrychium matricariifolium	Dry-mesic sand savanna; old field; dry-mesic sand prairie
Botrychium multifidum	Mesic upland forest; mesic sand savanna; old field
Botrychium simplex	Mesic sand prairie; mesic sand forest; old field
Bouteloua gracilis	**Dry sand prairie**; cultural (railroad)
Buchnera americana	Dry hill prairie; loess hill prairie; dry-mesic to mesic sand prairie; dry-mesic savanna
Bumelia lanuginosa	Limestone glade; dry-mesic forest; loess hill prairie; dry-mesic woodland; limestone cliff
Cakile edentula var. *lacustris*	**Beach**; foredune

Calamagrostis insperata	Dry to dry-mesic upland forest
Calla palustris	Forested bog; tall shrub bog
Calopogon oklahomensis	Mesic to wet sand prairie; cultural
Calopogon tuberosus	Sedge meadow; wet-mesic to wet prairie; wet-mesic sand prairie; graminoid fen; graminoid bog; shrub sand prairie
Camassia angusta	Mesic to wet-mesic prairie
Cardamine pratensis var. *palustris*	Calcareous floating mat; forested bog; graminoid bog; graminoid fen
Carex alata	Swamp; wet floodplain forest; southern flatwoods; shrub swamp
Carex arkansana	Southern flatwoods; wet floodplain forest; wetland; cultural (roadside)
Carex atlantica	Seep; sand flatwoods
Carex aurea	Sedge meadow; spring; freshwater marsh (edge); eroding bluff; calcareous seep; cultural
Carex bromoides	**Northern flatwoods**; wet floodplain forest; seep; spring
Carex brunnescens	Forested bog; tall shrub bog
Carex canescens	Forested bog; calcareous floating mat
Carex chordorrhiza	Graminoid bog; shrub bog
Carex crawfordii	Freshwater marsh; wet sand prairie; dry-mesic sand prairie
Carex cryptolepis	Freshwater marsh; sedge meadow; calcareous seep; graminoid fen
Carex cumulata	Wet-mesic to wet sand prairie; mesic woodland; wet-mesic sand shrub prairie; cultural
Carex debilis	Mesic woodland; mesic upland forest
Carex decomposita	Swamp; shrub swamp; seep; spring
Carex diandra	Graminoid bog; graminoid fen
Carex disperma	Forested bog; tall shrub bog
Carex echinata	Sedge meadow; sand flatwoods
Carex formosa	**Northern flatwoods**
Carex garberi	Freshwater marsh (edge); panne; cultural
Carex gigantea	Wet floodplain forest; swamp; southern flatwoods
Carex heliophila	Dry sand prairie; sand hill prairie
Carex intumescens	Mesic to wet floodplain woods; southern flatwoods
Carex nigromarginata	Dry to mesic upland forest
Carex oligosperma	**Low-shrub bog**
Carex opaca	Southern flatwoods (edge); wet-mesic prairie; cultural (railroad; roadside)
Carex oxylepis	Swamp; dry-mesic upland forest; seep; cultural
Carex physorhyncha	**Dry-mesic upland forest**
Carex plantaginea	**Mesic upland forest (sandstone bedrock)**
Carex prasina	Seep; spring
Carex reniformis	Southern flatwoods; swamp
Carex straminea	Wet-mesic sand prairie; sand flatwoods; panne; wet sand shrub prairie
Carex trisperma	**Forested bog**
Carex tuckermanii	Northern flatwoods; wet-mesic upland forest
Carex viridula	Sedge meadow; panne; calcareous seep; graminoid fen; cultural
Carex willdenowii	Dry-mesic to mesic upland forest
Carya aquatica	Swamp; wet floodplain forest
Carya pallida	Dry to dry-mesic upland forest
Castilleja sessiliflora	Dry-mesic gravel prairie; dry-mesic sand prairie; hill prairie
Ceanothus herbaceus	Dry sand prairie; dry gravel prairie; dry dolomite prairie; dry sand savanna
Chamaedaphne calyculata	**Low-shrub bog**
Chamaelirium luteum	Dry-mesic to mesic upland forest; dry-mesic to mesic woodland
Chamaesyce polygonifolia	Beach; foredune
Chimaphila maculata	Dry mesic sand forest; sand flatwoods; pine plantation
Chimaphila umbellata	**Dry-mesic sand forest**

Circaea alpina	**Algific talus slope**
Cirsium pitcheri	**Foredune**; beach
Cladrastis lutea	**Mesic upland forest**
Clematis crispa	Wet floodplain forest; swamp; shrub swamp; cultural (roadside)
Clematis viorna	Wet to wet-mesic floodplain forest
Collinsia violacea	Dry-mesic woodland; barren
Comptonia peregrina	Dry to dry-mesic sand savanna; dry to dry-mesic sand prairie
Conioselinum chinense	Seep; mesic limestone cliff
Corallorhiza maculata	Dry-mesic to mesic upland forest; graminoid fen
Cornus canadensis	Mesic sandstone cliff; forested bog
Corydalis aurea	Dry-mesic dolomite prairie; dry sandstone cliff
Corydalis halei	Dry-mesic limestone cliff; dry-mesic upland forest
Corydalis sempervirens	**Dry sandstone cliff**
Cynosciadium digitatum	Swamp; wet floodplain forest
Cyperus grayoides	Dry sand prairie; dry loess hill prairie (single record)
Cyperus lancastriensis	Old field; developed land; wet-mesic floodplain forest
Cypripedium acaule	Forested bog; wet mesic forest; forested fen
Cypripedium parviflorum	**Forested fen**
Cypripedium reginae	Forested bog; shrub fen
Cystopteris laurentiana	**Mesic limestone cliff**
Dalea foliosa	Dry-mesic to mesic dolomite prairie
Delphinium carolinianum	Loess hill prairie; limestone glade
Dendrolycopodium dendroideum	Dry-mesic upland forest; mesic sand prairie
Dendrolycopodium hickeyi	Sand flatwoods; dry-mesic upland forest; sand shrub prairie; mesic sand prairie
Dennstaedtia punctilobula	**Mesic sandstone cliff**
Dichanthelium boreale	Sedge meadow; sand flatwoods; mesic sand savanna; freshwater marsh
Dichanthelium joori	**Wet-mesic floodplain forest**
Dichanthelium portoricense	Dry to dry-mesic sandstone cliff
Dichanthelium ravenelii	**Dry-mesic upland forest**
Dichanthelium yadkinense	Mesic floodplain forest; seeps; alluvial stream beds
Dodecatheon frenchii	**Mesic sandstone cliff (base; dripline)**
Draba cuneifolia	Loess hill prairie; limestone glade
Drosera intermedia	Wet-mesic sand prairie; wet-mesic sand shrub prairie; bog
Drosera rotundifolia	Calcareous floating mat; graminoid bog; wet prairie
Dryopteris celsa	Swamp; wet floodplain forest
Echinodorus tenellus	**Wet sand prairie (sand pond)**
Eleocharis olivacea	Panne; wet dolomite prairie
Eleocharis pauciflora	Panne; graminoid fen
Eleocharis rostellata	Sedge meadow; graminoid fen; calcareous seep
Elymus trachycaulus	Mesic prairie; mesic savanna
Epilobium strictum	Graminoid bog; calcareous floating mat
Equisetum pratense	Mesic upland forest; dry-mesic sand forest
Equisetum scirpoides	Mesic dolomite cliff; mesic upland forest; eroding bluffs
Equisetum sylvaticum	Seep; mesic upland forest
Eriophorum virginicum	Graminoid bog; calcareous floating mat
Eryngium prostratum	**Pond (mudflat)**
Euonymus americanus	Mesic floodplain forest; mesic upland forest
Eupatorium hyssopifolium	Dry-mesic barrens; acid gravel seep
Euphorbia spathulata	**Limestone glade**
Festuca paradoxa	Southern flatwoods; dry-mesic savanna; prairie
Filipendula rubra	Wet-mesic to wet prairie; graminoid fen; seep
Fimbristylis vahlii	**Wet sand prairie (sand pond)**; sandy alluvial deposits
Galactia mohlenbrockii	Wet-mesic floodplain forest; mesic upland forest

Galium virgatum	Limestone glade; dry upland forest
Gaultheria procumbens	**Sand flatwoods**
Geranium bicknellii	Dry to mesic woodlands; Sand flatwoods; northern flatwoods
Glyceria arkansana	Swamp; wet floodplain forest
Gratiola quartermaniae	**Wet dolomite prairie**
Gymnocarpium dryopteris	Mesic sandstone cliff; mesic dolomite cliff
Gymnocarpium robertianum	Dry-mesic limestone cliff
Hackelia deflexa var. *americana*	Mesic dolomite cliff; mesic limestone cliff
Halesia carolina	Dry-mesic to mesic upland forest
Helianthus giganteus	Sedge meadow; graminoid fen
Helianthus angustifolius	Dry barrens; southern flatwoods; seep; cultural (roadside)
Heliotropium tenellum	Limestone glade; loess hill prairie
Heteranthera reniformis	**Pond (mudflat)**; cultural (roadside)
Hexalectris spicata	Dry upland forest; dry prairie; dry woodland; dry barrens
Hudsonia tomentosa	Dry to dry-mesic sand prairie (blowout)
Huperzia porophila	Dry-mesic sandstone cliff
Hydrolea uniflora	Swamp; shrub-swamp; cultural (roadside)
Hylotelephium telephioides	Mesic limestone cliff; mesic sandstone cliff
Hymenopappus scabiosaeus	Dry to dry-mesic sand prairie
Hypericum adpressum	Wet-mesic sand prairie
Hypericum kalmianum	Wet-mesic sand prairie; sand flatwoods; panne
Iliamna remota	Mesic woodland (with dolomite bedrock); mesic savanna
Iresine rhizomatosa	Mesic to wet-mesic floodplain forest
Isoetes butleri	Wet to wet-mesic dolomite prairie
Isotria medeoloides	**Dry-mesic upland forest**
Isotria verticillata	**Acid gravel seep**
Juglans cinerea	Mesic upland forest; mesic floodplain forest; forested fen
Juncus alpinoarticulatus	Freshwater marsh; graminoid fen; wet sand prairie; panne; calcareous seep; cultural
Juncus vaseyi	Graminoid bog; sedge meadow
Juniperus communis	Foredune; dry sand prairie; dry-mesic woodland; eroding bluff; dry-mesic upland forest
Juniperus horizontalis	Foredune; mesic dolomite cliff
Justicia ovata	Swamp; wet floodplain forest
Larix laricina	**Forested bog**
Lathyrus ochroleucus	Mesic savanna; dry upland forest; dry-mesic woodland
Lechea intermedia	Dry-mesic sand prairie; sand savanna
Lespedeza leptostachya	Dry to dry-mesic gravel prairie; dry sand prairie
Lonicera dioica var. *glaucescens*	Mesic to wet mesic upland forest; mesic sandstone cliff; mesic woodland
Lonicera flava	Dry-mesic sandstone cliff; dry-mesic upland forest
Luzula acuminata	Dry-mesic to mesic upland forest; dry-mesic sandstone cliff
Lycopodiella inundata	**Wet sand prairie**
Lycopodium clavatum	Mesic to wet mesic upland forest; mesic sandstone cliff; seep
Lysimachia radicans	Wet-mesic floodplain forest; swamp
Malus angustifolia	Mesic to wet floodplain forest; southern flatwoods; old field; roadside
Malvastrum hispidum	Dry to mesic dolomite prairie; dry to mesic limestone prairie; cultural
Matalea decipiens	Dry upland forest; floodplain forest
Medeola virginiana	Sand flatwoods; mesic sand forest
Melanthera nivea	Dry-mesic to mesic upland forest
Melanthium virginicum	Dry to wet mesic prairie
Melica mutica	Mesic upland forest; mesic floodplain forest; cultural (railroad)
Melothria pendula	Dry-mesic to mesic forest; swamp; old field
Mentzelia oligosperma	Loess hill prairie; gravel hill prairie; limestone glade

Menyanthes trifoliata	Shrub fen; forested bog; shrub bog
Micranthes virginiensis	Dry sandstone cliff; dry upland forest
Mimosa nuttallii	**Dry prairie**
Mimulus glabratus	**Calcareous seep**
Minuartia patula	Dolomite prairie; limestone glade
Mirabilis hirsuta	Dry sand prairie; sand hill prairie
Monarda clinopodia	Mesic upland forest; mesic floodplain forest
Nemophila triloba	Mesic floodplain forest; developed land
Nothocalais cuspidata	Loess hill prairie; sand hill prairie
Opuntia fragilis	**Dry sand prairie**
Orobanche fasciculata	Dry to mesic sand prairie
Orobanche ludoviciana	Dry to dry-mesic sand prairie (blowout); alluvial floodplain
Oxalis illinoensis	**Mesic upland forest**
Penstemon grandiflorus	**Dry sand prairie**
Penstemon tubaeflorus	**Habitat reconstruction**; mesic prairie
Phacelia gilioides	**Dry-mesic sandstone cliff**
Phaeophyscia leana	**Wet floodplain forest**
Phegopteris connectilis	**Mesic sandstone cliff**
Phemeranthus calycinus	**Sandstone glade**
Phemeranthus parviflorus	**Sandstone glade**
Phlox pilosa ssp. *sangamonensis*	Mesic prairie; mesic woodland
Physaria ludoviciana	**Dry sand prairie (blowout)**
Pinus banksiana	Dry-mesic sand savanna; old field
Pinus echinata	**Dry upland forest**
Pinus resinosa	Mesic sandstone cliff; dry-mesic sand forest
Planera aquatica	Wet floodplain forest; swamp
Plantago cordata	Low-medium gradient small stream; wet-mesic floodplain forest; seep
Platanthera ciliaris	Mesic to wet-mesic sand prairie; sand flatwoods
Platanthera clavellata	Wet-mesic sand prairie; seep; wet sand shrub prairie
Platanthera flava var. *flava*	Southern flatwoods; wet floodplain forest
Platanthera flava var. *herbiola*	Sedge meadow; wet prairie; sand shrub prairie
Platanthera leucophaea	**Mesic to wet-mesic prairie**; dry-mesic savanna
Platanthera psycodes	**Northern flatwoods**
Poa alsodes	Dry-mesic to mesic upland forest
Poa languida	**Mesic upland forest**
Poa wolfii	Dry-mesic upland forest; dry-mesic woodland; dry to dry-mesic barrens
Pogonia ophioglossoides	Graminoid fen; graminoid bog; forested bog
Polanisia jamesii	**Dry sand prairie**
Polygala incarnata	Loess hill prairie; dry prairie; dry to dry mesic barrens; sand prairie
Polygonatum pubescens	Northern flatwoods; mesic upland forest; mesic floodplain forest
Polygonum careyi	Sand flatwoods; mesic savanna; wet-mesic sand prairie; cultural
Populus balsamifera	Mesic upland forest; wet-mesic floodplain forest
Potamogeton gramineus	**Lake (glacial); pond (including sand pond and mudflat)**
Potamogeton praelongus	**Lake (glacial)**
Potamogeton pulcher	**Lake**
Potamogeton robbinsii	**Lake (glacial)**
Potamogeton strictifolius	**Lake (glacial)**
Primula mistassinica	**Mesic dolomite cliff**
Ptilimnium nuttallii	Wet-mesic to wet floodplain forest
Quercus montana	**Dry upland forest**
Quercus phellos	Wet-mesic to wet floodplain forest; southern flatwoods
Quercus texana	**Wet-mesic floodplain forest**
Ranunculus harveyi	Dry-mesic upland forest; sandstone cliff

Ranunculus rhomboideus	Dry-mesic gravel prairie; dry-mesic upand forest
Rhamnus alnifolia	Graminoid fen; graminoid bog; forested bog
Rhexia mariana	Wet-mesic sand prairie; seep; dry-mesic barrens; **Pond (mudflat)**; old field
Rhynchospora alba	Calcareous floating mat; graminoid bog; calcareous seep
Rhynchospora glomerata	Seep; low-gradient small stream
Ribes hirtellum	Low shrub bog; shrub fen; mesic sandstone cliff; mesic dolomite cliff; mesic limestone cliff
Rosa acicularis	**Algific talus slope**
Rubus odoratus	Dry-mesic to mesic upland forest; cultural
Rubus pubescens	Northern flatwoods; wet-mesic floodplain forest; mesic upland forest
Rubus schneideri	Wet-mesic sand prairie; wet-mesic shrub prairie
Rudbeckia missouriensis	Loess hill prairie; limestone glade
Sabatia campestris	Mesic to wet-mesic prairie
Sagittaria australis	Seep; spring
Salix serissima	Graminoid bog; calcareous floating mat
Salix syrticola	**Foredune**
Salvia azurea	Dry-mesic sand prairie; limestone glade; hill prairie
Sambucus racemosa ssp. *pubens*	Mesic upland woods; mesic sandstone cliff; seep; shrub bog
Sanguisorba canadensis	Wet-mesic prairie; mesic to wet-mesic dolomite prairie
Sanicula smallii	Dry to mesic upland forest
Sarracenia purpurea	Graminoid bog; calcareous floating mat
Sceptridium biternatum	Mesic upland forest; mesic floodplain forest; southern flatwoods
Schizachne purpurascens	**Mesic upland forest**
Schoenoplectus hallii	**Wet sand prairie (sand pond)**
Schoenoplectus purshianus	**Wet sand prairie (sand pond)**
Schoenoplectus smithii	**Calcareous floating mat**
Scirpus hattorianus	Freshwater marsh; northern flatwoods; seep
Scirpus microcarpus	**Freshwater marsh**
Scirpus polyphyllus	Seep; spring
Scleria muehlenbergii	**Wet-mesic sand prairie**
Scleria pauciflora	Dry barrens; old field; mesic sand forest; wet-mesic sand prairie
Shepherdia canadensis	**Eroding bluff**
Silene ovata	Dry to mesic upland forest
Silene regia	Dry-mesic sand prairie; gravel prairie
Sisyrinchium atlanticum	Sedge meadow; old field; wet-mesic sand prairie; wet-mesic sand shrub prairie; cultural
Sisyrinchium montanum	Mesic to wet-mesic prairie
Solidago sciaphila	Mesic dolomite cliff; mesic sandstone cliff
Sorbus americana	**Mesic sandstone cliff**
Sparganium americanum	Seep; freshwater marsh
Sparganium emersum	Freshwater marsh; calcareous seep
Spiranthes lucida	Wet-mesic prairie; calcareous seep
Spiranthes vernalis	Old field; mesic prairie; southern flatwoods; cultural (roadside)
Stellaria pubera	Dry to mesic upland forest
Stenanthium gramineum	Mesic floodplain forest; dry-mesic upland forest; mesic sandstone cliff
Stylisma pickeringii	**Dry sand prairie**
Styrax americanus	Wet floodplain forest; swamp; shrub swamp
Styrax grandifolius	Dry mesic to mesic upland forest
Sullivantia sullivantii	Mesic dolomite cliff; mesic upland forest
Synandra hispidula	**Mesic upland forest**
Sypmphoricarpos albus var. *albus*	Dry-mesic dolomite cliff; dry-mesic sandstone cliff
Tetraneuris herbacea	Dry-mesic prairie; gravel hill prairie; dry dolomite prairie
Thelypteris noveboracensis	Mesic upland forest; seep

Tilia heterophylla	**Mesic upland forest**
Tofieldia glutinosa	Calcareous seep; panne; graminoid fen
Torreyochloa pallida	**Shrub swamp**
Tracaulon arifolium	Seep; low-gradient small stream
Tradescantia bracteata	Dry mesic to mesic prairie; dry-mesic sand prairie
Trichophorum cespitosum	**Graminoid fen**
Trientalis borealis	Forested bog; low-shrub bog; mesic upland forest; northern flatwoods
Trifolium reflexum	Southern flatwoods; dry dolomite prairie; old field; dry-mesic savanna
Triglochin maritima	Calcareous seep; graminoid fen; panne
Triglochin palustris	Calcareous seep; graminoid fen; panne
Trillium cernuum	**Mesic upland forest**
Trillium erectum	**Mesic upland forest**
Trillium viride	Mesic upland forest; mesic floodplain forest
Ulmus thomasii	Mesic to wet-mesic floodplain forest; mesic upland forest
Urtica chamaedryoides	Wet to wet-mesic floodplain forest; cultural
Utricularia cornuta	Panne; graminoid fen
Utricularia intermedia	Calcareous floating mat; graminoid fen
Utricularia minor	Lake; calcareous floating mat
Utricularia subulata	**Panne**
Vaccinium corymbosum	Forested bog; tall shrub bog; low shrub bog; sand flatwoods
Vaccinium macrocarpon	Graminoid bog; calcareous floating mat
Vaccinium oxycoccos	Forested bog; low shrub bog
Vaccinium staminenum	**Dry upland forest**
Valeriana uliginosa	**Calcareous seep**
Valerianella chenopodiifolia	Mesic uplant forest; mesic limestone cliff
Valerianella umbilicata	Sedge meadow; old field
Vandenboschia boschiana	**Sandstone overhang**; mesic sandstone cliffs
Veronica americana	Seep; spring; freshwater marsh; wet floodplain forest
Veronica scutellata	Northern flatwoods; sand flatwoods; freshwater marsh; graminoid fen; sedge meadow; cultural
Viburnum molle	**Mesic upland forest**; mesic floodplain forest
Viola blanda	Calcareous fen; mesic forest
Viola canadensis	**Mesic upland forest**
Viola primulifolia	Wet-mesic sand prairie; wet-mesic sand shrub prairie
Woodsia ilvensis	Dry to dry-mesic sandstone cliff
Zigadenus elegans	Algific talus slope; mesic limestone cliff

Appendix 2. Illinois listed plant species, their state listing status, previous rank, and their newly proposed S-rank.

Species	State listing status	Previous rank	New Rank
Actaea podocarpa	**E**	**S1**	**S1**
Actaea racemosa	**E**	**S1**	**S2**
Actaea rubifolia	**E**	**S2**	**S3**
Adoxa moschatellina	**E**	**S1**	**SH**
Agalinis skinneriana	**T**	**S2**	**S3**
Alnus incana ssp. *rugosa*	**E**	**S1**	**S1S2**
Amelanchier interior	**T**	**S1**	**S1**
Amelanchier sanguinea	**E**	**SNR**	**S1**
Ammophila breviligulata	**T**	**SNR**	**S2**
Amorpha nitens	**E**	**S1**	**S1**
Andromeda glaucophylla	**E**	**SNR**	**S1**
Arctostaphylos uva-ursi	**E**	**S1**	**S1**
Artemesia dracunculus	**E**	**S1**	**S1**
Asclepias lanuginosa	**E**	**S1**	**S1**
Asclepias meadii	**E**	**S1**	**S2**
Asclepias ovalifolia	**E**	**S1**	**S1**
Asclepias stenophylla	**E**	**S1**	**S1**
Asplenium bradleyi	**E**	**S1**	**S1**
Asplenium resiliens	**E**	**S1**	**S1**
Aster furcatus	**T**	**S2**	**S3**
Astragalus crassicarpus var. *trichocalyx*	**E**	**S1**	**S1**
Astragalus distortus	**E**	**S1**	**S1**
Astragalus tennesseensis	**E**	**S1**	**S1**
Avenella flexuosa	**E**	**S1**	**S1**
Baptisia tinctoria	**E**	**S1**	**S1**
Bartonia paniculata	**E**	**S1**	**S1**
Beckmannia syzigachne	**E**	**S1**	**S1**
Berchemia scandens	**E**	**S1**	**S1**
Besseya bullii	**T**	**S3**	**S2**
Betula alleghaniensis	**E**	**S1**	**S1**
Bidens beckii	**E**	**S1**	**S1**
Boltonia decurrens	**T**	**S2**	**S2?**
Botrychium campestre	**E**	**S1**	**S1**
Botrychium matricariifolium	**E**	**S1**	**S1**
Botrychium multifidum	**E**	**S1**	**SH**

Botrychium simplex	**E**	**S1**	**SH**
Bouteloua gracilis	**E**	**S2**	**S1**
Buchnera americana	**T**	**S3**	**S2**
Bumelia lanuginosa	**E**	**S1**	**S1**
Cakile edentula var. *lacustris*	**T**	**SNR**	**S2**
Calamagrostis insperata	**E**	**S1**	**S1**
Calla palustris	**E**	**S1**	**S1**
Calopogon oklahomensis	**E**	**S1**	**S1**
Calopogon tuberosus	**E**	**S2**	**S2**
Camassia angusta	**E**	**S1**	**S1**
Cardamine pratensis var. *palustris*	**E**	**SNR**	**S1**
Carex alata	**E**	**S1**	**S1**
Carex arkansana	**E**	**S1**	**S2**
Carex atlantica	**T**	**S1**	**S2**
Carex aurea	**T**	**S1**	**S3**
Carex bromoides	**T**	**S2**	**S3**
Carex brunnescens	**E**	**S1**	**S2**
Carex canescens	**E**	**SNR**	**S1**
Carex chordorrhiza	**E**	**S1**	**S1**
Carex crawfordii	**E**	**S1**	**S1**
Carex cryptolepis	**T**	**S1**	**S2**
Carex cumulata	**E**	**S1**	**S2**
Carex debilis	**E**	**S1**	**S1**
Carex decomposita	**E**	**S1**	**S2**
Carex diandra	**E**	**S1**	**S1**
Carex disperma	**E**	**S1**	**S1**
Carex echinata	**E**	**S1**	**S1**
Carex formosa	**E**	**S1**	**S2**
Carex garberi	**E**	**S1**	**S2**
Carex gigantea	**E**	**S1**	**S1**
Carex heliophila	**E**	**S1**	**S1**
Carex intumescens	**E**	**S1**	**S3**
Carex nigromarginata	**E**	**S1**	**S3**
Carex oligosperma	**E**	**S1**	**S1**
Carex opaca	**E**	**SNR**	**S1**
Carex oxylepis	**T**	**S1**	**S2**
Carex physorhyncha	**E**	**S1**	**SH**
Carex plantaginea	**E**	**S1**	**S1**
Carex prasina	**T**	**S1**	**S2**

Carex reniformis	**E**	**S1**	**S1**
Carex straminea	**E**	**SNR**	**S1**
Carex trisperma	**E**	**S1**	**S1**
Carex tuckermanii	**E**	**S1**	**S2**
Carex viridula	**T**	**S1**	**S2**
Carex willdenowii	**T**	**S1**	**S2**
Carya aquatica	**T**	**S1**	**S1**
Carya pallida	**E**	**S1**	**S1**
Castilleja sessiliflora	**E**	**S1**	**S2**
Ceanothus herbaceus	**E**	**S1**	**S2**
Chamaedaphne calyculata	**T**	**S2**	**S2**
Chamaelirium luteum	**E**	**S1**	**S1**
Chamaesyce polygonifolia	**E**	**S1**	**S2**
Chimaphila maculata	**E**	**S1**	**S1**
Chimaphila umbellata	**E**	**S1**	**SH**
Circaea alpina	**E**	**S1**	**SH**
Cirsium pitcheri	**E**	**S1**	**S1**
Cladrastis lutea	**E**	**S1**	**S1**
Clematis crispa	**E**	**S1**	**S1**
Clematis viorna	**E**	**S1**	**S1**
Collinsia violacea	**E**	**S1**	**S1**
Comptonia peregrina	**E**	**S1**	**S1**
Conioselinum chinense	**E**	**S1**	**S1**
Corallorhiza maculata	**E**	**S1**	**S1**
Cornus canadensis	**E**	**S1**	**S1**
Corydalis aurea	**E**	**S1**	**S1**
Corydalis halei	**E**	**SNR**	**S1**
Corydalis sempervirens	**E**	**S1**	**SH**
Cynosciadium digitatum	**E**	**S1**	**S1**
Cyperus grayoides	**T**	**S2**	**S2**
Cyperus lancastriensis	**T**	**S1**	**S2S3**
Cypripedium acaule	**E**	**S1**	**SH**
Cypripedium parviflorum	**E**	**S1**	**S2**
Cypripedium reginae	**E**	**S1**	**S1**
Cystopteris laurentiana	**E**	**S1**	**SX**
Dalea foliosa	**E**	**S1**	**S2**
Delphinium carolinianum	**E**	**S1**	**S2**
Dendrolycopodium dendroideum	**E**	**S1**	**S1**
Dendrolycopodium hickeyi	**E**	**SNR**	**S1**

Dennstaedtia punctilobula	**E**	**S1**	**S1**
Dichanthelium boreale	**E**	**S1**	**S1S2**
Dichanthelium joori	**E**	**SNR**	**S1**
Dichanthelium portoricense	**E**	**S1**	**SH**
Dichanthelium ravenellii	**E**	**S1**	**S1**
Dichanthelium yadkinense	**E**	**S1**	**S2**
Dodecatheon frenchii	**T**	**S2**	**S3**
Draba cuneifolia	**E**	**S1**	**S1**
Drosera intermedia	**T**	**S2**	**S2**
Drosera rotundifolia	**E**	**S1**	**S1**
Dryopteris celsa	**E**	**S1**	**S1**
Echinodorus tenellus	**E**	**S1**	**S1**
Eleocharis olivacea	**E**	**S1**	**SH**
Eleocharis pauciflora	**E**	**SNR**	**S1**
Eleocharis rostellata	**T**	**S2**	**S3**
Elymus trachycaulus	**E**	**S1**	**S2**
Epilobium strictum	**T**	**S1**	**S1**
Equisetum pratense	**T**	**S1**	**S2S3**
Equisetum scirpoides	**E**	**S1**	**SH**
Equisetum sylvaticum	**E**	**S1**	**S1**
Eriophorum virginicum	**E**	**S1**	**S1**
Eryngium prostratum	**E**	**S1**	**S1S2**
Euonymus americanus	**T**	**S1**	**S2**
Eupatorium hyssopifolium	**E**	**SNR**	**S1**
Euphorbia spathulata	**E**	**S1**	**S1**
Festuca paradoxa	**T**	**S3**	**S2**
Filipendula rubra (with introductions)	**T**	**S1**	**S3**
Filipendula rubra (remnant)	**T**	**S1**	**S1**
Fimbristylis vahlii	**E**	**S1**	**S1**
Galactia mohlenbrockii	**E**	**S1**	**S1**
Galium virgatum	**E**	**S1**	**S1**
Gaultheria procumbens	**E**	**S1**	**SX**
Geranium bicknellii	**E**	**S1**	**S1**
Glyceria arkansana	**E**	**S1**	**S2**
Gratiola quartermaniae	**E**	**SNR**	**S1**
Gymnocarpium dryopteris	**E**	**S1**	**S1**
Gymnocarpium robertianum	**E**	**S1**	**SH**

Hackelia deflexa var. *americana*	**E**	**S1**	**S1**
Halesia carolina	**E**	**S1**	**S1**
Helianthus giganteus	**E**	**S1**	**S2**
Helianthus angustifolius	**E**	**S1**	**S2**
Heliotropium tenellum	**E**	**S1**	**S1**
Heteranthera reniformis	**E**	**S1**	**S1?**
Hexalectris spicata	**E**	**S1**	**S2**
Hudsonia tomentosa	**E**	**S1**	**S1**
Huperzia porophila	**T**	**S1**	**S2**
Hydrolea uniflora	**E**	**S1**	**S2**
Hylotelephium telephioides	**T**	**SNR**	**S2**
Hymenopappus scabiosaeus	**E**	**SNR**	**S1**
Hypericum adpressum	**E**	**S1**	**S2**
Hypericum kalmianum	**E**	**S1**	**S2S3**
Iliamna remota	**E**	**S1**	**S1**
Iresine rhizomatosa	**E**	**S1**	**S2S3**
Isoetes butleri	**E**	**S1**	**S1**
Isotria medeoloides	**E**	**S1**	**SX**
Isotria verticillata	**E**	**S1**	**S1**
Juglans cinerea	**E**	**S2**	**S1**
Juncus alpinoarticulatus	**T**	**S1**	**S2S3**
Juncus vaseyi	**E**	**S1**	**SH**
Juniperus communis	**T**	**S2**	**S1**
Juniperus horizontalis	**E**	**S1**	**S2**
Justicia ovata	**E**	**S1**	**SH**
Larix laricina	**E**	**S1**	**S1**
Lathyrus ochroleucus	**T**	**S2**	**S3**
Lechea intermedia	**E**	**S1**	**S1**
Lespedeza leptostachya	**E**	**S1**	**S1**
Lonicera dioica var. *glaucescens*	**E**	**S1**	**S1**
Lonicera flava	**E**	**S1**	**S1**
Luzula acuminata	**E**	**S1**	**S2**
Lycopodiella inundata	**E**	**S1**	**SH**
Lycopodium clavatum	**E**	**S1**	**SH**
Lysimachia radicans	**E**	**S1**	**S2**
Malus angustifolia	**E**	**S1**	**S1**
Malvastrum hispidum	**E**	**S1**	**S2**
Matalea decipiens	**E**	**S1**	**S2**
Medeola virginiana	**E**	**S1**	**S1**

Melanthera nivea	**E**	**S1**	**S1**
Melanthium virginicum	**E**	**S2**	**S1**
Melica mutica	**E**	**S1**	**S1**
Melothria pendula	**T**	**S1**	**S3**
Mentzelia oligosperma	**E**	**SNR**	**S1**
Menyanthes trifoliata	**T**	**SNR**	**S2**
Micranthes virginiensis	**E**	**SNR**	**S2**
Mimosa nuttallii	**E**	**S1**	**S1**
Mimulus glabratus	**E**	**S1**	**S1**
Minuartia patula	**T**	**SNR**	**S1S2**
Mirabilis hirsuta	**E**	**S1**	**S1**
Monarda clinopodia	**T**	**SNR**	**S2**
Nemophila triloba	**E**	**S1**	**S1**
Nothocalais cuspidata	**E**	**S1**	**S1**
Opuntia fragilis	**E**	**S1**	**S1**
Orobanche fasciculata	**E**	**S1**	**S1**
Orobanche ludoviciana	**T**	**S1**	**S2**
Oxalis illinoensis	**T**	**S1**	**S3**
Penstemon grandiflorus	**E**	**S1**	**S2**
Penstemon tubaeflorus	**E**	**S1**	**S3**
Phacelia gilioides	**E**	**S1**	**SH**
Phaeophysia leana	**T**	**S1**	**S2**
Phegopteris connectilis	**E**	**S1**	**S1**
Phemeranthus calycinus	**E**	**S1**	**S1**
Phemeranthus parviflorus	**T**	**S1**	**S2**
Phlox sangamonensis	**E**	**S1**	**S1**
Physaria ludoviciana	**E**	**S1**	**S1**
Pinus banksiana	**E**	**S1**	**S1S2**
Pinus echinata	**E**	**S1**	**S2**
Pinus resinosa	**E**	**S1**	**S1**
Planera aquatica	**T**	**S2**	**S2**
Plantago cordata	**E**	**S1**	**S1**
Platanthera ciliaris	**E**	**S1**	**S1**
Platanthera clavellata	**E**	**S1**	**S1**
Platanthera flava var. *flava*	**T**	**S1**	**S3**
Platanthera flava var. *herbiola*	**T**	**S1**	**S2S3**
Platanthera leucophaea	**E**	**S1**	**S1**
Platanthera psycodes	**E**	**S1**	**S1**
Poa alsodes	**E**	**S1**	**SH**

Poa languida	**E**	**S1**	**S1**
Poa wolfii	**E**	**S1**	**S2S3**
Pogonia ophioglossoides	**E**	**S1**	**S1**
Polanisia jamesii	**E**	**S1**	**S1**
Polygala incarnata	**E**	**S1**	**S1**
Polygonatum pubescens	**E**	**S1**	**S2**
Polygonum careyi	**E**	**S1**	**S1**
Populus balsamifera	**E**	**S1**	**S1**
Potamogeton gramineus	**T**	**S1**	**S2**
Potamogeton praelongus	**E**	**S1**	**S1**
Potamogeton pulcher	**E**	**S1**	**SH**
Potamogeton robbinsii	**E**	**S1**	**S1S2**
Potamogeton strictifolius	**E**	**SNR**	**S1**
Primula mistssinica	**E**	**S1**	**S1**
Ptilimnium nuttallii	**E**	**S1**	**S1**
Quercus montana	**T**	**S2**	**S3**
Quercus phellos	**T**	**S2**	**S1S2**
Quercus texana	**E**	**S1**	**S1**
Ranunculus harveyi	**T**	**S2**	**S2**
Ranunculus rhomboideus	**E**	**S2**	**S2**
Rhamnus alnifolia	**E**	**S1**	**SH**
Rhexia mariana	**E**	**SNR**	**S1**
Rhynchospora alba	**E**	**S1**	**S1**
Rhynchospora glomerata	**E**	**S1**	**S1**
Ribes hirtellum	**E**	**S1**	**SH**
Rosa acicularis	**E**	**S1**	**SH**
Rubus odoratus	**T**	**S1**	**S3**
Rubus pubescens	**T**	**S1**	**S2**
Rubus schneideri	**T**	**SNR**	**S2**
Rudbeckia missouriensis	**T**	**S1**	**S1S2**
Sabatia campestris	**E**	**S1**	**S2**
Sagittaria australis	**E**	**S1**	**S1**
Salix serissima	**E**	**S1**	**S1**
Salix syrticola	**E**	**SNR**	**S1**
Salvia azurea (remnant)	**T**	**SNR**	**S2**
Salvia azurea (with introductions)	**T**	**SNR**	**S2S3**
Sambucus racemosa ssp. *pubens*	**E**	**S1**	**S1S2**
Sanguisorba canadensis	**E**	**S1**	**S1**
Sanicula smallii	**E**	**S1**	**S1**

Sarracenia purpurea	**E**	**S1**	**S1S2**
Sceptridium biternatum	**E**	**S1**	**S2**
Schizachne purpurascens	**E**	**S1**	**S1**
Schoenoplectus hallii	**T**	**S1**	**S2**
Schoenoplectus purshianus	**E**	**S1**	**S1**
Schoenoplectus smithii	**E**	**S1**	**S1**
Scirpus hattorianus	**E**	**S1**	**S1**
Scirpus microcarpus	**E**	**S1**	**S1**
Scirpus polyphyllus	**E**	**S2**	**S2?**
Scleria muehlenbergii	**E**	**SX**	**S1**
Scleria pauciflora	**E**	**S2**	**S2**
Shepherdia canadensis	**E**	**S1**	**S1**
Silene ovata	**E**	**S1**	**S1**
Silene regia (remnant)	**E**	**S1**	**S1**
Silene regia (with introductions)	**E**	**S1**	**S3**
Sisyrinchium atlanticum	**E**	**S1**	**S2**
Sisyrinchium montanum	**E**	**S1**	**S2**
Solidago sciaphila	**T**	**S1**	**S3**
Sorbus americana	**E**	**S1**	**S1**
Sparganium americanum	**E**	**S1**	**S1**
Sparganium emersum	**E**	**S1**	**S2**
Spiranthes lucida	**E**	**S1**	**S1**
Spiranthes vernalis	**E**	**S1**	**S2**
Stellaria pubera	**E**	**S1**	**S2**
Stenanthium gramineum	**T**	**S1**	**S1S2**
Stylisma pickeringii	**E**	**S1**	**S1**
Styrax americanus	**T**	**S2**	**S3**
Styrax grandifolius	**E**	**S1**	**S1**
Sullivantia sullivantii	**T**	**S1**	**S2**
Synandra hispidula	**T**	**S1**	**S2**
Sypmphoricarpos albus var. *albus*	**E**	**S1**	**S1**
Tetraneuris herbacea	**E**	**S1**	**S1**
Thelypteris noveboracensis	**E**	**S1**	**S1**
Tilia heterophylla	**E**	**S1**	**S1**
Tofieldia glutinosa	**T**	**S2**	**S2**
Torreyochloa pallida	**E**	**S1**	**S1**
Tracaulon arifolium	**E**	**S1**	**S1?**
Tradescantia bracteata	**E**	**S1**	**S2**
Trichophorum cespitosum	**E**	**S1**	**S1**

Trientalis borealis	**E**	**S1**	**S3**
Trifolium reflexum	**T**	**S1**	**S2**
Triglochin maritima	**T**	**S1**	**S2**
Triglochin palustris	**T**	**S1**	**S2**
Trillium cernuum	**E**	**S1**	**S1**
Trillium erectum	**E**	**S1**	**S1**
Trillium viride	**E**	**S2**	**S1S2**
Ulmus thomasii	**E**	**S1**	**S1**
Urtica chamaedryoides	**T**	**S1**	**S2**
Utricularia cornuta	**E**	**S1**	**S1**
Utricularia intermedia	**T**	**S1**	**S2**
Utricularia minor	**E**	**S1**	**S1**
Utricularia subulata	**E**	**S1**	**S1**
Vaccinium corymbosum	**E**	**S1**	**S1S2**
Vaccinium macrocarpon	**E**	**S1**	**S1**
Vaccinium oxycoccos	**E**	**S1**	**S1**
Vaccinium staminenum	**E**	**S1**	**S1**
Valeriana uliginosa	**E**	**S1**	**S1**
Valerianella chenopodiifolia	**E**	**S1**	**SX**
Valerianella umbilicata	**E**	**S1**	**S2**
Vandenboschia boschiana	**E**	**S2**	**S1**
Veronica americana	**E**	**S1**	**S2**
Veronica scutellata	**T**	**S1**	**S3**
Viburnum molle	**T**	**S1**	**S2**
Viola blanda	**E**	**S1**	**S1**
Viola canadensis	**E**	**S1**	**S2**
Viola primulifolia	**E**	**SNR**	**S1S2**
Woodsia ilvensis	**E**	**S1**	**S1**
Zigadenus elegans	**E**	**S1**	**S1**

Appendix 3. Watch list with species, their calculated S-rank, and the criteria from the list that they meet.

Scientific name	**Common name**	**S-Rank**	**Criteria met**
Allium stellatum (C = 10)	Prairie onion	**S1S2**	**1, 2**
Berula erecta (C = 10)	Cut-leaf water parsnip	**S2?**	**2**
Brasenia schreberi (C = 7)	Watershield	**S1S2**	**1, 2**
Callirhoe triangulata (C = 9)	Clustered poppy-mallow	**S2S3**	**1, 2**
Carex richardsonii (C = 10)	Richardson's sedge	**S2**	**1, 2**
Celastrus scandens (C = 2)	American Bittersweet	**S2S3**	**1, 2**
Cirsium hillii (C = 7)	Hill's thistle	**S3**	**1, 2, 3**
Cryptogramma stelleri (C = 10)	Steller's rock brake	**S2S3**	**1, 2**
Dactylorhiza viridis (C = 8)	Longbract frog orchid	**S1S2**	**1**
Deschampsia cespitosa (C = 8)	Tufted hairgrass	**S2**	**1**
Echinacea simulata (C = 9)	Wavyleaf purple coneflower	**S3?**	**1, 4**
Eleocharis wolfii (C = 9)	Wolf's spikerush	**S3**	**2**
Equisetum variegatum (C = 8)	Variegated horsetail	**S2**	**1**
Erythronium mesochoreum (C = 9)	Prairie fawn lily	**S2S3**	**1, 2, 3**
Eurybia schreberi (C = 10)	Shreber's aster	**S2S3**	**1, 2, 3**
Fimbristylis puberula (C = 9)	Hairy fimbry	**S2**	**1, 2**
Fraxinus nigra (C = 8)	Black ash	**S1**	**1**
Geum triflorum (C = 9)	Prairie smoke	**S2S3**	**1**
Hasteola suaveolens (C = 10)	Sweet indian plantain	**S2**	**1, 2**
Ludwigia sphaerocarpa (C = 5)	Round-pod water primrose	**SU**	**4**
Napaea dioica (C = 4)	Glade mallow	**S3**	**1, 2**
Phragmites americanus (C = 1)	American reed	**S1**	**1, 2**
Polytaenia nuttallii (C = 8)	Prairie parsley	**S2**	**1, 2**
Pulsatilla patens (C = 9)	Pasqueflower	**S2S3**	**1**
Rorippa aquatica (C = 10)	Lake cress	**S2?**	**1, 2**
Silene nivea (C = 8)	Snowy campion	**S3**	**1, 2**
Spiranthes ochroleuca	Yellow ladies' tresses	**SU**	**4**
Spiranthes sheviakii	Old-field ladies' tresses	**SU**	**4**
Symphyotrichum parviceps (C = 3)	Small white aster	**S2?**	**1**
Thuja occidentalis (C = 10)	American arborvitae	**S3**	**1, 3**
Tomanthera auriculata (C = 8)	Eared false foxglove	**S3**	**1, 2, 3**
Uvularia floridana	Florida bellwort	**SU**	**4**
Valeriana edulis (C = 10)	Edible valerian	**S2**	**1,2**
Veratrum woodii (C = 9)	Ozark bunch flower	**S3**	**1, 2, 3**
Zizania aquatica (C = 9)	Wild rice	**S2**	**1, 2**

Appendix 4. Species considered for watch list but not added.

Species
Aesculus pavia
Agastache scrophulariifolia
Ascyrum hypericoides
Asplenium ruta-muraria
Bolboschoenus maritimus
Bromus nottowayanus
Bumelia lycioides
Callitriche heterophylla
Callitriche palustris
Carex prairea
Carex pedunculata
Carex woodii
Celtis tenuifolia
Cirsium carolinianum
Cladium mariscoides
Corallorhiza odontorhiza
Corallorhiza wisteriana
Cornus rugosa
Crataegus demissa
Cyperus engelmannii
Cypripedium candidum
Diarrhena americana
Didiplis diandra
Diervilla lonicera
Dirca palustris
Dryopteris mas
Dulichium arundinaceum
Echinodorus berteroi
Eleocharis equisetoides
Equisetum palustre
Eriophorum tenellum
Eriophorum angustifolium
Euthamia caroliniana
Euthamia leptocephala
Fimbristylis annua
Fleischmannia incarnata
Fraxinus quadrangulata
Galium labradoricum

Gentiana alba
Gentiana puberulenta
Gentianopsis virgata
Gentianopsis crinita
Glyceria borealis
Hemicarpha drummondii
Hepatica americana
Hybanthus concolor
Hydrastis canadensis
Hydrophyllum macrophyllum
Hypericum ellipticum
Hypericum boreale
Hypericum lobocarpum
Iodanthus pinnatifidus
Iris cristata
Jeffersonia diphylla
Juncus articulatus
Juncus scirpoides
Juncus validus
Lactuca hirsuta
Lactuca ludoviciana
Lathyrus venosus
Liatris scariosa var. niewlandii
Lilium superbum
Lycopus amplectens
Lysimachia fraseri
Malaxis unifolia
Mitchella repens
Monotropa hypopitys
Oenothera perennis
Ophioglossum pusillum
Orbexilum simplex
Orobanche riparia
Oryzopsis asperifolia
Oryzopsis pungens
Oryzopsis racemosa
Panax quinquefolius
Parnassia glauca
Penstemon hirsutus
Persicaria robustior
Phlox maculata

Physalis texana
Physalis pumila
Physocarpus intercedens
Physostegia parviflora
Pilea fontana
Plantago heterophylla
Platanthera dilatata
Platanthera lacera
Polygala paucifolia
Potamogeton amplifolius
Potentilla palustris
Pyrola elliptica
Ranunculus ambigens
Rhododendron prinophyllum
Rhododendron periclymenoides
Toxicodendron vernix
Rhynchospora globularis
Ruppia cirrhosa
Sagittaria platyphylla
Saxifraga forbesii
Schenoplectus saximontanus
Scirpus atrocinctus
Scleria verticillata
Scutellaria ovata
Sida elliottii
Sisyrinchium mucronatum
Solidago arguta
Sparganium natans
Spiranthes romanzoffiana
Spiranthes magnicamporum
Stellaria crassifolia
Swertia caroliniensis
Symphyotrichum boreale
Talinum rugospermum
Taxus canadensis
Triadenum walteri
Trichophorum planifolium
Tragia cordata
Trichostema setaceum
Uvularia sessilifolia
Valerianella intermedia

Vicia caroliniana
Zizania interior
Zizaniopsis miliacea

Appendix 5. TABLE REDACTED DUE TO SENSITIVE INFORMATION.

Appendix 6. Integrated threats matrix. CCVI = Climate Change Vulnerability Index, as assessed by Molano-Flores et al. 2019.

Species	*S-rank threat level*	*CCVI*	*Extent*	*Fragmentation*	*Composition-Structure*	*Disturbance-Hydrology*	*Pollution*	*Competitors*	*Predators*	*Pathogens*	*Invasives/Exotics*	*Pollination vectors*	*Dispersal vectors*	*Genetics/Reproduction*	*Dispersal*	*Recruitment*	*Mortality*	*Harvest/killing*	*Disturbance*	*Structure/infrastructure*
Actaea podocarpa	*Medium*	*Highly vulnerable*	*1*	*2*	*1*	*1*								*2*		*2*				
Actaea racemosa	*Medium*	*Highly vulnerable*	*1*	*1*				*2*			*1*							*3.1*	*2*	
Actaea rubifolia	*Medium*	*Highly vulnerable*	*3.1*	*1.1*	*2.1*	*2.1*		*2*	*1*		*2*	*2.1*		*1.1*				*3.1*	*3.1*	*2.1*
Adoxa moschatellina	*Medium-High*	*Highly vulnerable*	*1*	*1*	*1*	*1*									*2*	*2*				*1.1*
Agalinis skinneriana	*Medium*	*Presumed stable*	*2.1*	*2.1*	*2*	*3*	*1.2*	*3*	*2.2*	*1.2*	*2*	*2.2*		*2.1*	*2.2*	*2.2*	*1.2*	*1.2*	*2*	*1.2*
Alnus incana ssp. rugosa	*Medium-High*	*Moderately vulnerable*	*2*	*2*		*2*	*2*	*2*	*2*		*2*	*1.1*							*3*	*1*
Amelanchier interior	*Medium*	*Moderately vulnerable*		*2*		*2*	*2*	*2*	*2*		*3*					*2*	*2*	*2.2*		
Amelanchier sanguinea	*Medium*	*Moderately vulnerable*	*2*	*2*	*2*	*2*	*1*	*2*	*2*	*1.2*	*2*					*2*			*3*	*1*
Ammophila breviligulata	*Medium*	*Presumed stable*	*2*	*2*	*3.1*	*3*	*1.2*	*2.2*	*1.2*		*2.2*	*1.1*	*1.1*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*2.2*	*2*
Amorpha nitens	*High*	*Highly vulnerable*	*2.1*	*1*	*1.1*	*2*	*1*	*2*	*2.1*		*2*		*1.1*	*2.1*	*2.1*	*1.1*	*1.1*	*1.1*	*2*	*2.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Arctostaphylos uva-ursi	*High*	*Moderately vulnerable*	*2*	*2*	*3*	*3*	*1.2*	*2.2*	*1.2*		*2.2*			*2*	*2.2*			*1.2*	*2*	*3.1*
Andromeda glaucophylla	*High*	*Not assessed*	*2*	*2*		*2*	*2*	*2*			*3*				*2*	*1*				
Artemisia dracunculus	*Medium*	*Presumed stable*	*1*	*1*				*2*			*1*								*1*	*2*
Asclepias lanuginosa	*Very High*	*Moderately vulnerable*	*2*	*3*	*2*	*3.2*	*1.2*	*2*	*3*	*1*	*2*			*3*	*2*	*3*	*3*	*1.2*	*2*	*3.1*
Asclepias meadii	*High*	*Moderately vulnerable*	*2*	*1.1*	*3.1*	*3.1*	*1.1*	*2*	*2*	*1.1*	*2*	*2.1*	*1*	*3*	*1.1*	*3*	*1*	*1.1*	*2*	*1*
Asclepias ovalifolia	*Very High*	*Moderately vulnerable*	*3*	*3*					*3*		*1*	*3.2*		*3*		*3*	*3*		*1*	*1*
Asclepias stenophylla	*High*	*Highly vulnerable*	*3*	*3*	*3*	*2*	*1.2*	*3*	*1*	*1.2*	*2*			*2*		*2*		*1.2*	*2*	*1*
Asplenium bradleyi	*Low-Medium*	*Moderately vulnerable*	*2.1*	*1*	*1*	*3.1*	*1.1*	*2.1*	*1.1*		*2.1*	*1.1*	*1.1*	*2.2*			*1.2*	*3.1*	*2*	*1*
Asplenium resiliens	*Medium*	*Presumed stable*	*2*	*2*	*2*	*3.1*	*2.1*	*3.1*			*1*	*1.1*	*1.1*	*2.2*				*3.1*	*2*	*3.1*
Aster furcatus	*Medium*	*Moderately vulnerable*	*3.1*	*1.2*	*3.1*	*1*	*1.2*	*2.2*	*2.2*	*1.2*	*1*		*2.2*	*3*	*2.2*	*3*		*1.2*	*2*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Astragalus crassicarpus var. trichocalyx	*Medium*	*Highly vulnerable*	*2.2*	*2*	*2*	*2*		*2*	*1*		*2*	*2.2*	*2.2*	*1*	*2.2*	*2.2*		*1.2*	*2*	*1*
Astragalus distortus	*High*	*Highly vulnerable*	*2.2*	*2.2*		*2*	*2.1*	*2*			*3*			*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*3*	*2*
Astragalus tennesseensis	*High*	*Extremely vulnerable*	*2*	*2*	*3.1*	*3.1*	*1.2*	*2*	*3.1*	*1.2*	*2*		*1.2*	*2*	*1*	*2*	*1.1*	*1.1*	*2*	*3.1*
Avenella flexuosa	*Low*	*Moderately vulnerable*		*1*	*1*			*1*	*1*			*1.1*	*1.1*							
Baptisia tinctoria	*High*	*Moderately vulnerable*	*2*	*2*	*2*	*2.2*		*2.2*			*1*			*2*		*2*			*3*	*3*
Bartonia paniculata	*Medium-High*	*Extremely vulnerable*	*3.1*	*2*	*3.1*	*3.1*	*2.2*	*2*			*2*								*2*	
Beckmannia syzigachne	*High*	*Moderately vulnerable*	*2.2*	*2*		*2*	*2*	*2.2*			*2*	*1.1*		*1*	*1*			*1.2*	*2*	*2*
Berchemia scandens	*Low*	*Moderately vulnerable*	*2.2*	*1*	*1.2*	*3.1*	*1.2*	*2.2*			*1*							*1.2*		*2*
Besseya bullii	*High*	*Highly vulnerable*	*2.2*	*2*	*2.2*	*2*	*1.2*	*2*	*1.2*	*1.2*	*2*		*1.2*		*1.2*	*2*	*1.2*	*1.2*	*2*	*3*
Betula alleghaniensis	*Medium*	*Moderately vulnerable*	*3.2*	*2*		*2*	*1.2*	*1*	*1*	*1*	*1*	*1.1*			*1*		*1*	*1.2*	*1*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Bidens beckii	*High*	*Highly vulnerable*	*3*	*2*	*3.1*	*1*	*3*	*2.2*			*1*								*2*	*3*
Boltonia decurrens	*High*	*Presumed stable*	*3*	*2*	*2*	*3*	*3*	*3.1*				*1.1*	*3.1*	*1.1*	*2*	*2.1*			*2*	*3*
Botrychium campestre	*Medium*	*Moderately vulnerable*	*3.2*	*1*		*1*			*1*		*1*	*1.1*	*1.1*	*1*		*2.2*				
Botrychium matricariifolium	*Medium*	*Moderately vulnerable*	*2.2*	*2*	*3.1*	*3.1*	*1.2*	*2*	*1*	*1.2*	*2*	*1.1*	*1.1*	*2*				*1.2*		*1.2*
Botrychium multifidum	*Unknown*	*Moderately vulnerable*	*3.2*	*3.2*								*1.1*	*1.1*			*2.2*				*1.2*
Botrychium simplex	*Unknown*	*Presumed stable*	*3.2*	*3.2*	*2.2*	*2.2*	*1.2*	*2.2*		*1.2*	*2.2*	*1.1*	*1.1*			*2.2*		*1.2*		*1.2*
Bouteloua gracilis	*Medium*	*Presumed stable*	*2*	*2*		*2*						*1.1*	*1.1*	*1.1*					*2*	*2*
Buchnera americana	*Medium-High*	*Presumed stable*	*2*	*2*		*2*		*3*			*2*								*2*	*2*
Bumelia lanuginosa	*Medium-High*	*Moderately vulnerable*	*2*	*2*	*2.2*	*2*		*3*	*1.2*		*2*				*2*	*2*		*1.2*	*2*	*2*
Cakile edentula var. lacustris	*Medium*	*Presumed stable*	*2*	*2*	*3.1*	*2*	*1.2*	*2.2*	*1.2*		*2.2*	*1.2*	*1.2*	*2*	*1*	*1*	*1.2*	*1.2*	*2*	*2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Calamagrostis insperata	*Medium*	*Highly vulnerable*	*2.1*	*2*	*2*	*2.1*	*1.1*	*2.1*	*1*		*2*	*1.1*	*1.1*	*2*	*3.1*	*2*	*1.1*	*1.1*	*1*	*2.1*
Calla palustris	*Low*	*Highly vulnerable*	*3.2*	*1*		*1*		*2.2*			*2.2*								*2.2*	*2.2*
Calopogon oklahomensis	*Medium*	*Highly vulnerable*	*1.2*	*2*	*1.2*	*2*	*1.2*	*1*	*1*		*1*			*2*		*2.2*	*1.2*	*1.2*	*3.1*	*3.1*
Calopogon tuberosus	*Medium*	*Highly vulnerable*	*3.1*	*2*	*1.2*	*1*	*2*	*2*	*1*		*2*			*1*				*3.1*	*3.1*	*3.1*
Camassia angusta	*Very High*	*Highly vulnerable*	*3*	*2*	*2*	*3*	*1.2*	*2*	*1*		*3*					*1.2*			*3*	*3*
Cardamine pratensis var. palustris	*High*	*Highly vulnerable*	*2*	*2*		*2*	*2*	*3*	*1*		*3*					*2*				
Carex alata	*Low*	*Highly vulnerable*	*2.2*			*1*		*1*			*1*	*1.1*	*1.1*							
Carex arkansana	*Medium*	*Moderately vulnerable*		*1*		*2*		*1*	*1*		*2*	*1.1*	*1.1*						*1*	
Carex atlantica	*Medium*	*Moderately vulnerable*				*2*					*2*	*1.1*	*1.1*						*1*	
Carex aurea	*Low-Medium*	*Moderately vulnerable*	*2.2*	*2*		*2*	*2*					*1.1*	*1.1*						*2*	*1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Carex bromoides	*Low-Medium*	*Moderately vulnerable*	*2.2*	*2*	*1.2*	*2*	*2*	*2.2*			*2*	*1.1*	*1.1*					*1.2*	*2*	*1.2*
Carex brunnescens	*Medium*	*Highly vulnerable*	*2*	*2*		*2*		*2*			*2*	*1.1*	*1.1*						*2*	
Carex canescens	*Low*	*Highly vulnerable*	*1*	*1*				*3.1*			*3.1*	*1.1*	*1.1*							
Carex chordorrhiza	*Medium*	*Highly vulnerable*	*2*	*2*			*2*	*2*			*2*	*1.1*	*1.1*							
Carex crawfordii	*Medium*	*Highly vulnerable*	*2*	*2*				*3.1*			*2*	*1.1*	*1.1*							*3.1*
Carex cryptolepis	*Medium*	*Highly vulnerable*	*3.2*	*2.2*	*2.2*	*2.2*		*2.2*	*1.2*		*2*	*1.1*	*1.1*				*1.2*	*1.2*	*2*	*1*
Carex cumulata	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*1*	*2*				*2*	*1.1*	*1.1*						*2*	
Carex debilis	*Unknown*	*Not assessed*																		
Carex decomposita	*Medium*	*Highly vulnerable*	*2*	*1*	*3.1*	*2*	*2.1*	*1.1*			*1*	*1.1*	*1.1*	*1.2*				*3.1*	*1*	*2.1*
Carex diandra	*Medium-High*	*Moderately vulnerable*	*2*	*2*				*2*			*3*	*1.1*	*1.1*						*2*	
Carex disperma	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2.2*	*2*	*2*			*2*	*1.1*	*1.1*	*3*					*2.2*	*2.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Carex echinata	*Medium*	*Moderately vulnerable*	*2*	*2*		*2*	*2*	*2*			*2*	*1.1*	*1.1*							
Carex formosa	*Medium*	*Moderately vulnerable*	*2*	*2*	*3.1*	*1*		*1*	*1*		*2*	*1.1*	*1.1*	*2.2*			*1.2*	*1.2*	*1*	*1*
Carex garberi	*Medium*	*Moderately vulnerable*	*2*	*2*	*3.1*	*3*	*2*	*2.2*	*1.2*		*1*	*1.1*	*1.1*					*2.2*	*2*	*2.2*
Carex gigantea	*Medium*	*Moderately vulnerable*	*3.1*	*1.2*	*3.1*	*2*	*3.2*	*2*	*1.2*	*1.2*	*2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Carex heliophila	*Unknown*	*Moderately vulnerable*										*1.1*	*1.1*							
Carex intumescens	*Medium*	*Presumed stable*	*2.2*	*2.2*	*3.2*	*1*	*3.2*	*3.2*	*1.2*	*1.2*	*2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Carex nigromarginata	*Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*1.2*	*1*	*1.2*	*2.2*			*1*	*1.1*	*1.1*	*1*					*1*	
Carex oligosperma	*Medium*	*Highly vulnerable*	*2.2*	*2.2*	*2.2*	*2*	*1*	*2*			*1*	*1.1*	*1.1*					*1.2*	*2*	*2.2*
Carex opaca	*Medium*	*Not assessed*									*2*								*2*	*2*
Carex oxylepis	*Medium*	*Moderately vulnerable*	*2.2*	*1.2*	*3.2*	*3.2*	*3.2*	*2*	*1.2*	*1.2*	*2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Carex physorhyncha	*Unknown*	*Highly vulnerable*	*1.2*	*2.2*	*2.2*	*2.2*		*2.2*	*1.2*		*2.2*	*1.1*	*1.1*		*2.2*	*2.2*		*1.2*	*1.2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Carex plantaginea	*Low*	*Moderately vulnerable*	*1*	*1*				*1*	*1*										*1*	
Carex prasina	*Medium*	*Moderately vulnerable*	*3.1*	*1*	*2*	*2*	*2.2*	*2.2*	*1.2*		*2*	*1.1*	*1.1*		*1.2*		*1.2*	*1.2*	*1*	*1.2*
Carex reniformis	*Medium*	*Highly vulnerable*	*2.2*	*1.2*	*3.2*	*2*	*3.2*	*1*	*1*	*1.2*	*1*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Carex straminea	*Medium*	*Not assessed*	*2*	*2*			*1*	*2*	*1*		*1*								*3*	*1*
Carex trisperma	*Medium*	*Highly vulnerable*	*2*	*2*	*3.1*	*3.1*	*2*	*2*			*2*	*1.1*	*1.1*						*1*	
Carex tuckermanii	*Low*	*Moderately vulnerable*	*2.2*	*2.2*				*1*			*1*	*1.1*	*1.1*			*2.2*				
Carex viridula	*Medium*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*2*	*2*	*2.2*			*2*	*1.1*	*1.1*						*1*	*3*
Carex willdenowii	*Medium*	*Presumed stable*	*3.1*	*1.2*	*3.1*	*3.2*	*3.2*	*2*	*1.2*	*1.2*	*2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Carya aquatica	*Medium*	*Highly vulnerable*	*2*	*2*	*2*	*3*	*2.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*
Carya pallida	*Low*	*Presumed stable*	*1*	*1*						*2*										
Castilleja sessiliflora	*Medium*	*Highly vulnerable*	*2*	*2*	*3.1*	*2*	*1.2*	*2*	*1*	*1.2*	*2*			*1*		*2*		*1.2*	*2*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Ceanothus herbaceus	*Medium*	*Moderately vulnerable*	*2*	*2*	*2.2*	*2.2*	*1.2*	*2*	*2.2*	*1.2*	*2*			*2.2*		*2.2*		*1.2*	*2*	*1.2*
Chamaedaphne calyculata	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*2*	*2*			*2*								*2*	*1*
Chamaelirium luteum	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*			*2*	*2*		*2*					*2*		*2.2*		
Chamaesyce polygonifolia	*Medium*	*Presumed stable*	*2*	*2*	*2*	*2*		*1*	*1.2*		*1*	*1.2*	*2.2*	*1*	*2.2*	*2.2*	*1.2*	*1.2*	*2*	*2*
Chimaphila maculata	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*		*2.2*			*1*			*2*		*2.2*		*3.1*	*2*	*1.2*
Chimaphila umbellata	*Unknown*	*Highly vulnerable*																		
Circaea alpina	*Unknown*	*Highly vulnerable*																		*3.1*
Cirsium pitcheri	*High*	*Extremely vulnerable*	*2*	*2*	*3.1*	*2*		*2*	*2*	*2.2*	*2.2*	*2.1*	*2.2*	*3*	*2.2*	*3*		*1.2*	*2*	*2*
Cladrastis lutea	*Medium*	*Highly vulnerable*	*2*	*1*	*2*	*1*	*1.2*	*1*	*1*	*2*	*2*	*1.2*	*1.2*	*2*		*2*	*2*		*2.2*	
Clematis crispa	*Medium*	*Moderately vulnerable*	*1*	*1*	*2*	*1*	*2*	*2*	*1*	*1.2*	*2*	*1.2*	*1.2*	*1*	*1.2*	*1.2*	*1.2*	*1.2*	*1*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Clematis viorna	*Very high*	*Highly vulnerable*	*1*	*2*		*2*			*2*		*2*			*3*				*1.2*	*1.2*	*1.2*
Collinsia violacea	*Medium*	*Moderately vulnerable*	*2*	*2*	*2*	*3.2*	*1.2*	*2*	*1*	*1.2*	*2*	*1.2*	*2.2*	*2*	*2*	*2*		*1.2*	*1*	*2.2*
Comptonia peregrina	*Medium*	*Moderately vulnerable*	*2*	*2*	*3.1*	*3.1*	*2*	*1*			*1*			*1.2*				*1.2*	*1*	*2*
Conioselinum chinense	*Low-Medium*	*Moderately vulnerable*	*1*	*1*										*1*	*2*	*2*				
Corallorhiza maculata	*Medium-High*	*Presumed stable*	*2*	*2*	*2*	*2.2*	*1.2*	*2*	*2*	*1.2*	*2*			*3*		*2.2*		*1.2*		*1.2*
Cornus canadensis	*High*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*2*	*2*	*2.2*	*1.2*	*3*					*2.2*		*1.2*	*2.2*	*1.2*
Corydalis aurea	*High*	*Moderately vulnerable*	*2*	*2*	*2*	*2.2*	*1.2*	*2*	*2*	*1.2*	*2*				*2.2*	*2.2*	*2.2*	*1.2*	*2*	*2*
Corydalis halei	*Medium*	*Moderately vulnerable*	*1*	*1*	*2*			*2*								*2*			*1*	*1*
Corydalis sempervirens	*Unknown*	*Moderately vulnerable*	*2.1*	*1*	*2.2*	*3.1*	*1.2*	*1*	*1*	*1.2*	*2*			*3.1*	*2.2*	*2.2*	*2.2*	*1.2*	*2*	*2*
Corylus cornuta	*Unknown*	*Extremely vulnerable*	*2*	*2*	*2*				*3*									*2.2*		

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Cynosciadium digitatum	*Medium*	*Moderately vulnerable*	*3.2*	*2.2*	*2.2*	*2*		*2*	*1.2*		*1*				*2.2*	*2.2*		*1.2*	*2*	*2.2*
Cyperus grayoides	*Medium*	*Moderately vulnerable*	*2*	*2*	*2*	*2.2*	*1.2*	*1*			*1*	*1.1*	*1.1*	*1.2*	*2.2*	*2.2*	*1.2*	*1.2*	*3*	*2*
Cyperus lancastriensis	*Low*	*Moderately vulnerable*	*2*		*2*														*2*	*2*
Cypripedium acaule	*High*	*Extremely vulnerable*	*3*	*2*	*3.1*	*2*	*3*	*2*	*3*	*1.2*	*3*		*2.2*	*3*	*2.2*	*2*		*3*	*2*	*3.1*
Cypripedium parviflorum	*Medium*	*Extremely vulnerable*	*2*	*2*	*3.1*	*2*	*1*	*1*	*2*		*2*				*2.2*	*2.2*		*2*	*3.1*	*3.1*
Cypripedium reginae	*Very High*	*Extremely vulnerable*	*3*	*2*	*2*	*2*	*1*	*2*	*2*	*1.2*	*2*		*1.2*	*2*	*1.2*	*2*	*1.2*	*3*	*2*	*3.1*
Cystopteris laurentiana	*Unknown*	*Moderately vulnerable*	*3*																	
Dalea foliosa	*Medium*	*Extremely vulnerable*	*2*	*2*	*1.2*	*2*		*2*	*1*		*1*		*2.2*	*2*				*1.2*	*2*	*2*
Delphinium carolinianum	*Medium*	*Moderately vulnerable*	*2*	*2*	*2*	*2*		*3*	*2*		*2*								*2*	
Dendrolycopodium dendroideum	*Medium*	*Presumed stable*	*2.2*	*3.2*	*2.2*	*2.2*	*1.2*	*2*			*2*	*1.1*	*1.1*	*1.2*	*2.2*	*2.2*	*1.2*	*1.2*	*2*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Dendrolycopodium hickeyi	*Medium-High*	*Not assessed*	*2*	*2*				*2*			*1*								*2*	
Dennstaedtia punctilobula	*Low*	*Presumed stable*	*3.1*	*1*	*3.1*	*2.1*	*2.1*	*1*	*1.1*		*2.2*	*1.1*	*1.1*	*2.2*			*1.2*	*2.1*	*2*	*2.1*
Dichanthelium boreale	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*1*		*2*	*1*		*2*	*1.1*	*1.1*				*1.2*	*1.2*	*1*	*1.2*
Dichanthelium joorii	*High*	*Moderately vulnerable*	*3.1*	*2.2*	*2.2*	*3*	*1.2*	*3.1*	*1.2*	*1.2*	*3*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Dichanthelium portoricense	*Medium*	*Presumed stable*	*3.1*	*2*	*2*	*1.2*	*1.2*	*1*	*2.2*	*1.2*	*2.2*	*1.1*	*1.1*	*2*				*1.2*	*2.2*	*1.2*
Dichanthelium ravenelii	*Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*3*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*3.1*
Dichanthelium yadkinense	*Medium*	*Moderately vulnerable*	*3.1*	*1.2*	*3.1*	*2*	*1.2*	*2*	*1.2*	*1.2*	*2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Dodecatheon frenchii	*Medium*	*Highly vulnerable*	*2*	*1*	*3.1*	*2*		*1.1*	*2.2*		*1.1*	*2.2*	*1.1*	*1.2*			*1.2*	*1.1*	*3*	*2.1*
Draba cuneifolia	*High*	*Moderately vulnerable*	*2*	*2*	*1*	*2.2*		*3*	*1.2*		*2*			*2*	*2.2*	*2.2*		*1.2*	*2*	*1.2*
Drosera intermedia	*High*	*Extremely vulnerable*	*2*	*2*	*2*	*3*	*2*	*3*	*1.2*		*2*	*1.2*				*1.2*		*1.2*	*2*	*2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Drosera rotundifolia	*Medium-High*	*Highly vulnerable*	*2*	*2*	*2*	*1*	*1*	*2*			*2*				*2*	*2*			*2.2*	
Dryopteris celsa	*Low*	*Moderately vulnerable*	*1*	*1*	*1*	*1*					*1*	*1.1*	*1.1*							
Echinodorus tenellus	*High*	*Highly vulnerable*	*2*	*2*	*2*	*3*	*3*	*2.2*			*2*			*2.2*	*2.2*	*3.2*	*1.2*	*1.2*	*3*	*2*
Eleocharis olivacea	*High*	*Presumed stable*				*3.2*	*3.2*				*2.2*								*1.2*	*3*
Eleocharis pauciflora	*High*	*Moderately vulnerable*	*2*	*2*		*3*													*2*	*2*
Eleocharis rostellata	*Low*	*Moderately vulnerable*	*2.2*	*2.2*	*1.2*	*2*	*1*	*2.2*	*1.2*		*1*	*1.1*	*1.1*				*1.2*	*1.2*	*1.2*	*3.1*
Elymus trachycaulus	*Medium*	*Moderately vulnerable*	*3.2*	*2.2*	*2.2*	*1*		*2*	*2*		*1*	*1.1*	*1.1*	*2*	*2.2*	*2.2*			*2*	*1*
Epilobium strictum	*High*	*Moderately vulnerable*	*2*	*2*	*3*	*2*	*2*	*3*			*3*					*2*			*2*	*2.2*
Equisetum pratense	*Medium*	*Presumed stable*	*2.2*	*2.2*	*2.2*	*2*	*1.2*	*2*		*1.2*	*3*	*1.1*	*2.2*	*2.2*				*1.2*		*1.2*
Equisetum scirpoides	*Medium*	*Presumed stable*	*3.1*	*2*	*3.1*	*3.1*						*1.1*	*1.1*						*3.1*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Equisetum sylvaticum	*Medium*	*Presumed stable*	*2.2*	*2.2*	*2.2*	*2*	*1.2*	*2.2*		*1.2*	*2*	*1.1*	*2.2*	*2.2*				*1.2*	*2*	*1.2*
Eriophorum virginicum	*Medium-high*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*2*	*2*	*2*			*2*	*1.1*	*1.1*						*2.2*	*2.2*
Eryngium prostratum	*Medium*	*Moderately vulnerable*	*2*	*1.2*	*2*	*2*	*2.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Euonymus americanus	*Medium*	*Moderately vulnerable*	*2.2*	*1.2*	*3.2*	*3.2*	*2.2*	*2.2*	*3*	*1.2*	*1*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Eupatorium hyssopifolium	*Medium-High*	*Moderately vulnerable*	*2*	*1*	*2*	*1.2*	*1.2*	*3*	*1.2*	*1.2*	*3*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Euphorbia spathulata	*Medium-High*	*Presumed stable*	*2*	*2*	*1*						*2*								*2*	
Festuca paradoxa	*Medium*	*Not assessed*						*2*	*2*		*2*									
Filipendula rubra	*High*	*Extremely vulnerable*	*2*	*2*	*2*	*3*	*2*	*2*	*2*	*1.2*	*2*	*1.1*		*3*		*2.2*		*1.2*	*3*	*3*
Fimbristylis vahlii	*High*	*Moderately vulnerable*	*2*	*2*	*2*	*3*	*3*	*2.2*			*1*	*1.1*	*1.1*	*2.2*	*2.2*	*3.2*	*1.2*	*1.2*	*3*	*2.2*
Galactia mohlenbrockii	*Medium*	*Highly vulnerable*	*2*	*1*	*2*	*1.2*	*1.2*	*1.2*	*1*	*2.2*	*3*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Galium virgatum	*Medium*	*Highly vulnerable*	*1.2*	*2.2*	*2.2*	*2.2*		*2*	*1*		*1*				*2.2*	*2.2*		*1.2*	*1.2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Gaultheria procumbens	*Very high*	*Not assessed*	*3*	*3*		*3*	*2*		*3.1*		*3*			*3*					*3*	*2*
Geranium bicknellii	*Medium*	*Highly vulnerable*	*2*	*2*	*3*	*3.1*		*2*	*1*		*2*	*1.2*		*2*	*2.2*	*2.2*	*2.2*	*1.2*	*2.2*	*3.1*
Glyceria arkansana	*Medium*	*Presumed stable*	*3.1*	*2.2*	*3.1*	*2*	*1*	*3.1*	*1.2*		*1*	*1.1*	*1.1*		*2.2*	*2.2*		*1.2*	*2.2*	*2.2*
Gratiola quartermaniae	*High*	*Moderately vulnerable*	*3*	*3*	*3*	*2*	*3*	*2*			*1*						*2*		*3*	*3*
Gymnocarpium dryopteris	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*		*1.2*	*2*	*3.1*	*1.2*	*2*	*1.1*	*1.1*					*1.2*		*1.2*
Gymnocarpium robertianum	*Unknown*	*Moderately vulnerable*																		
Hackelia deflexa var. americana	*Low-high*	*Moderately vulnerable*	*2*	*2*				*2*	*1*		*1*					*2*				
Halesia carolina	*Medium*	*Highly vulnerable*	*2.2*	*1.2*	*2.2*	*2*	*1.2*	*2.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*3.1*
Helianthus angustifolius	*Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*	*2.2*	*1*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1*	*1*
Helianthus giganteus	*Medium*	*Moderately vulnerable*	*2*	*2*	*1.2*	*2*	*2*	*2*	*1*		*2*	*1.2*	*1.2*	*2.2*	*1.2*		*1.2*	*1.2*	*1*	*1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Heliotropium tenellum	*Medium-High*	*Moderately vulnerable*	*2*	*2*				*3*											*2*	
Heteranthera reniformis	*Medium*	*Moderately vulnerable*	*1.2*			*2*	*1*	*2.2*			*2*									
Hexalectris spicata	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2.2*	*1.2*	*2*	*2*		*2*			*1*	*2.2*	*2.2*		*1.2*	*1*	*1*
Hudsonia tomentosa	*High*	*Highly vulnerable*	*2*	*2*							*1*			*3*		*3*				
Huperzia porophila	*Medium*	*Presumed stable*	*3.1*		*2*	*3.1*					*1*	*1.1*	*1.1*					*3.1*	*2*	
Hydrolea uniflora	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*2.2*	*2.2*	*1.2*	*1.2*	*1*	*1.2*	*2.2*	*1.2*	*2.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*
Hylotelephium telephioides	*Medium*	*Not assessed*	*2*	*1*	*1*						*2*								*2*	
Hymenopappus scabiosaeus	*High*	*Moderately vulnerable*	*2*	*2*	*2*	*3.2*	*1*	*2*			*1*								*3*	*2*
Hypericum adpressum	*Medium*	*Extremely vulnerable*	*2*	*2*	*2.2*	*2*	*1.2*	*2.2*			*2*			*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*2*	*1*
Hypericum kalmianum	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*		*2*	*1*		*2*					*1.2*	*1.2*	*1.2*	*2.2*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Iliamna remota	*Medium*	*Highly vulnerable*	*2*	*2*	*1.2*	*2*	*1.2*	*2.2*	*3*		*2*						*1.2*	*1.2*	*1.2*	*1.2*
Iresine rhizomatosa	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*1*	*2.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*2*	*2*
Isoetes butleri	*High*	*Moderately vulnerable*	*2*	*2*	*2.1*	*3.1*		*2*	*1.2*		*2*	*1.2*	*2.2*	*3*	*2.2*		*2.2*	*1.2*	*2*	*1.2*
Isotria medeoloides	*Very high*	*Not assessed*	*3.1*	*1.1*	*3.1*	*2.1*	*1.1*		*2.1*			*1.1*	*1.1*	*2.1*					*3.1*	*2.1*
Isotria verticillata	*Medium*	*Highly vulnerable*	*2*	*2*	*2.1*	*2.1*	*1.1*	*2.1*			*2*	*2.2*	*1.1*	*1*	*1.2*			*2*	*2*	*1.2*
Juglans cinerea	*Very High*	*Not assessed*		*2*						*3*									*2*	*1*
Juncus alpinoarticulatus	*Medium*	*Moderately vulnerable*	*2*	*2*		*2*	*1*	*2.2*	*1.2*		*1*	*1.1*	*1.1*	*1.2*		*1.2*	*1.2*	*1.2*	*2*	*2*
Juncus vaseyi	*Unknown*	*Moderately vulnerable*				*2*						*1.1*	*1.1*							
Juniperus communis	*Medium-High*	*Presumed stable*	*2*		*3*	*2*		*1*											*3.1*	*2*
Juniperus horizontalis	*Medium*	*Moderately vulnerable*	*2*	*2*		*2*		*1*			*1.2*							*1.2*	*2.2*	*2*
Justicia ovata	*Unknown*	*Highly vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Larix laricina	*High*	*Highly vulnerable*	*2*	*1*	*3.1*	*3*	*3*	*3*	*3.1*		*3*	*1.1*					*3.1*		*2.2*	*3.1*
Lathyrus ochroleucus	*Medium*	*Presumed stable*	*2*	*1*					*2*		*2*								*1*	
Lechea intermedia	*Medium*	*Moderately vulnerable*	*1*	*1*		*1*		*2*			*2*									
Lespedeza leptostachya	*High*	*Highly vulnerable*	*1*	*2*	*2.2*	*2.2*	*1.2*	*3*	*1*	*1.2*	*2*	*1.2*	*2.2*	*3*	*2.2*	*3*	*1.2*	*1.2*	*2*	*1*
Lonicera dioica var. glaucescens	*Medium*	*Moderately vulnerable*	*2*	*1*	*3*	*2.1*	*2.1*				*2*	*1.2*	*1.2*	*2.2*	*1.2*	*2.2*		*1.1*	*2*	*1.1*
Lonicera flava	*Medium*	*Highly vulnerable*	*1*	*2*	*2*	*2.1*	*2.1*				*1*	*1.1*	*1.1*	*2.2*	*1.2*			*1.1*	*2*	*1.1*
Luzula acuminata	*Medium*	*Highly vulnerable*	*1*	*1*	*2*	*2.2*	*1.2*	*1*	*1*	*1.2*	*1*							*1.2*	*1*	*1.2*
Lycopodiella inundata	*Unknown*	*Presumed stable*	*3.1*	*2.2*	*2.2*	*3.1*	*1.2*	*2.2*	*3.1*	*1.2*	*2.2*	*1.1*	*2.2*		*2.2*	*1.2*	*1.2*	*1.2*	*2.2*	*3.1*
Lycopodium clavatum	*Medium-High*	*Presumed stable*	*2*	*2*				*2*			*2*			*3*					*3*	
Lysimachia radicans	*Medium*	*Highly vulnerable*	*3.1*	*1.2*	*3.1*	*2*	*2.2*	*3*	*3*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Malus angustifolia	*Medium*	*Moderately vulnerable*			*1*			*2*			*2*								*2*	*2*
Malvastrum hispidum	*High*	*Moderately vulnerable*	*2*	*1*	*1.2*	*2.2*		*2.2*	*1.2*		*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*3*
Matelea decipiens	*Medium*	*Moderately vulnerable*	*1*	*2.2*	*2.2*	*1*		*2*	*1*		*2*				*2.2*	*2.2*		*1.2*	*2*	*3.1*
Medeola virginiana	*High*	*Moderately vulnerable*	*3.1*	*1*	*3.1*		*2*	*3*	*3*		*2*			*2*						*3.1*
Melanthera nivea	*Medium*	*Moderately vulnerable*	*2*	*2*	*2.2*	*2*	*2.2*	*2.2*	*1.2*	*1.2*	*1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Melanthium virginicum	*High-Very High*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*3.1*	*1.2*	*3*	*1.2*	*1.2*	*3*			*3*		*2.2*	*1.2*	*1.2*	*3*	*3*
Melica mutica	*Medium*	*Moderately vulnerable*	*2*	*1*	*3.2*	*2.2*	*1.2*	*2.2*	*1.2*	*1.2*	*2*	*1.1*	*0.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*
Melothria pendula	*Medium*	*Moderately vulnerable*	*2*	*1*	*1.2*	*1*	*2.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1*
Mentzelia oligosperma	*High*	*Not assessed*		*2*	*1*			*3*											*3*	*2*
Menyanthes trifoliata	*Medium-High*	*Highly vulnerable*	*3.1*	*2*		*2*	*2*	*2*			*3*								*2.2*	*2.2*
Micranthes virginiensis	*Medium*	*Extremely vulnerable*	*1*	*1*	*2*	*1.2*		*2.2*			*2*								*1*	

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Mimosa nuttallii	*Unknown*	*Not assessed*				*1*					*2*									
Mimulus glabratus	*Medium-High*	*Highly vulnerable*	*2*	*2*	*3.1*	*2*	*1*	*2*	*1*	*1.2*	*2*		*2.2*		*2.2*			*1.2*	*2*	*3.1*
Minuartia patula	*Medium-High*	*Moderately vulnerable*	*1*	*2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*		*2*	*1.2*	*1.2*		*1.2*	*1.2*	*1.2*	*1.2*	*3*	*3*
Mirabilis hirsuta	*Medium-High*	*Moderately vulnerable*		*2*				*3*			*1*			*2*						
Monarda clinopodia	*Medium*	*Not assessed*				*1*		*3*			*2*								*1*	*1*
Nemophila triloba	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*3.2*	*1.2*	*2.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*
Nothocalais cuspidata	*Very High*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*2.2*	*1.2*	*3*	*3*	*1.2*	*3*		*1.2*	*3*	*1.2*	*2.2*		*1.2*	*3*	*3.1*
Opuntia fragilis	*Medium*	*Moderately vulnerable*	*3.1*	*1*	*3.1*	*3.1*					*1*			*1*					*1*	*3*
Orobanche fasciculata	*Medium*	*Highly vulnerable*	*3.1*	*1*	*3.1*			*2*			*2*								*2*	
Orobanche ludoviciana	*Medium-High*	*Moderately vulnerable*	*3.1*		*2.2*	*2.2*	*1.2*	*3*	*1.2*		*2*					*1.2*	*1.2*	*1.2*	*3*	*1.2*
Oxalis illinoensis	*Medium*	*Extremely vulnerable*	*3.1*	*1.1*	*3.1*	*1.1*	*1.1*	*1*	*2.1*		*1*		*1.1*	*1.1*				*1.1*	*3*	*2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Paspalum dissectum	*Very high*	*Not assessed*		*3*		*3*								*3*						
Penstemon grandiflorus	*Medium*	*Moderately vulnerable*	*2*	*2*	*1.2*	*2.2*	*1.2*	*2*	*1.2*	*1.2*	*2*	*2.2*			*1.2*	*2.2*	*1.2*	*2*	*2*	*1.2*
Penstemon tubaeflorus	*Medium*	*Presumed stable*	*2*	*2*	*2.2*	*2.2*	*1.2*	*2*	*1.2*		*2*	*1.2*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*	*1.2*	*2.2*	*2.2*
Phacelia gilioides	*High*	*Highly vulnerable*			*3.1*			*3*			*2*								*2*	*2*
Phaeophyscia leana	*Medium*	*Increase likely*	*3.1*	*1.1*	*3.1*	*3*	*3*	*1.2*	*1.2*			*1.1*	*1.1*					*1.1*	*2*	*3.1*
Phegopteris connectilis	*Low-Medium*	*Moderately vulnerable*	*2*	*2*	*2.2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*		*2.2*			*3.1*	*2.2*	*1.2*
Phemeranthus calycinus	*Medium*	*Moderately vulnerable*						*3*			*3*								*2*	
Phemeranthus parviflorus	*Medium*	*Moderately vulnerable*	*2*	*1*	*3.2*	*1.2*	*1.2*	*3*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2.2*	*2.2*	*3*	*2*
Phlox pilosa ssp. sangamonensis	*High-Very High*	*Highly vulnerable*	*3.1*	*2*	*2*	*3.1*	*1.2*	*2*	*1*		*2*								*3*	*3*
Physaria ludoviciana	*Low-medium*	*Moderately vulnerable*	*2*	*2*	*2*	*3.2*		*2*	*2*		*1.2*		*3.2*	*2*	*3.2*					
Pinus banksiana	*Medium-High*	*Moderately vulnerable*	*3.1*	*2*	*2*	*3*				*2*		*1.1*							*3.1*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Pinus echinata	*Medium*	*Presumed stable*	*3.1*	*2*	*3.1*	*3.1*	*2.2*	*2*	*1.2*	*1.2*	*2.2*	*1.1*	*1.2*	*2*	*2.2*	*3.1*	*1.2*	*1.2*	*2.2*	*1.2*
Pinus resinosa	*High-Very High*	*Moderately vulnerable*	*2*	*3*	*2.2*	*2.2*	*1.2*					*1.1*		*3*	*2.2*	*2.2*	*2.2*		*2*	*1*
Planera aquatica	*Medium*	*Highly vulnerable*	*3.1*	*1*	*3.1*	*3*	*2.2*	*2.2*	*1.2*	*2*	*2.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*3.1*
Plantago cordata	*Very High*	*Highly vulnerable*	*3.1*	*1.1*	*3.1*	*3*	*3*	*2.1*	*1.1*	*1.1*	*2.1*	*1.1*	*1.1*	*2.1*	*2.1*	*3.1*	*2.1*	*2.1*	*3*	*3.1*
Platanthera ciliaris	*High*	*Extremely vulnerable*	*3.1*	*2*	*3.1*	*2*	*1*	*2.2*	*1*		*1*			*2.2*				*2*	*2*	*1*
Platanthera clavellata	*Medium-High*	*Highly vulnerable*	*2.1*	*2.2*	*2.1*	*3*	*2*	*2.1*	*2*	*1.2*	*3*	*1.1*	*1.1*					*2.1*	*2.1*	*1.2*
Platanthera flava var. flava	*Medium*	*Extremely vulnerable*	*3.1*	*1.1*	*2.1*	*2*	*2.2*	*3.1*	*2*	*1.2*	*2*	*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*2.2*	*2.1*	*2.1*
Platanthera flava var. herbiola	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*3*		*2.2*	*2*		*1*							*2.2*	*2*	*2.2*
Platanthera leucophaea	*Very High*	*Extremely vulnerable*	*3.1*	*2.1*	*3.1*	*3.1*		*3*	*3*		*2*	*2.1*	*1.1*	*3*	*1.1*	*2.1*	*1.1*	*2.1*	*3*	*3.1*
Platanthera psycodes	*Medium-High*	*Highly vulnerable*	*3.2*	*2.2*	*2.2*	*3.1*		*2*	*2*		*3*	*2.2*	*2.2*	*3.1*	*2.2*	*3.1*		*2.2*	*2.2*	*2.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Poa alsodes	*Unknown*	*Moderately vulnerable*	*1.1*		*1.1*							*1.1*	*1.1*							
Poa languida	*Low*	*Moderately vulnerable*	*2.2*	*2*	*2.2*	*2.2*	*1.2*	*2.2*			*2.2*	*1.1*	*1.1*					*1.2*	*1*	*1.2*
Poa wolfii	*Low-Medium*	*Presumed stable*	*2.2*	*3.2*	*2.2*	*2.2*	*1.2*	*2.2*			*2*	*1.1*	*1.1*	*1.2*	*2.2*	*2.2*	*1.2*	*1.2*	*1*	*1.2*
Pogonia ophioglossoides	*Medium-High*	*Highly vulnerable*	*3.1*	*2.2*	*2.2*	*2*	*2*		*1*		*2*							*2*	*3.1*	*3.1*
Polanisia jamesii	*Medium*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*3.1*		*1*			*2*								*2*	*2*
Polygala incarnata	*High*	*Moderately vulnerable*	*3.1*	*2.2*	*3.1*	*3.1*	*1.2*	*2*	*3.1*	*1.2*	*3*	*1.2*	*1.2*	*2*	*2.2*	*2.2*	*1.2*	*3.1*	*2*	*3.1*
Polygonatum pubescens	*Medium*	*Moderately vulnerable*	*3.1*	*2*	*2.2*	*2.2*		*1*	*1*		*2*								*2*	*3.1*
Polygonum careyi	*Unknown*	*Highly vulnerable*	*2.2*	*2*	*2.2*	*3.1*	*1.2*				*2.2*								*2*	*2*
Populus balsamifera	*High*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*3.1*		*2.2*	*1.2*	*2*	*2*	*1.2*		*1*	*2.2*	*2.2*	*2.2*	*1.2*	*2*	*3.1*
Potamogeton gramineus	*Medium-High*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*3*	*3*				*2*	*1.1*							*3*	*2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Potamogeton praelongus	*Medium-High*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*3*	*3*				*2*	*1.1*							*3*	*2*
Potamogeton pulcher	*High*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*3*	*3*					*1.1*								*3*
Potamogeton robbinsii	*Medium-High*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*3*	*3*				*2*	*1.1*							*2*	*2*
Potamogeton strictifolius	*Medium-High*	*Highly vulnerable*	*3.1*	*2*	*3.1*	*3*	*3*				*2*	*1.1*							*2*	*2*
Primula mistassinica	*Low*	*Highly vulnerable*	*3.1*		*3.1*	*3.1*														
Ptilimnium nuttallii	*Medium*	*Highly vulnerable*				*3.1*					*2*								*3*	*2*
Quercus phellos	*Medium-High*	*Highly vulnerable*	*3.1*	*2.2*	*3.1*	*3*	*2.2*	*3.2*	*2*	*1.2*	*1*	*1.1*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*2.2*	*2*	*2.2*
Quercus texana	*Medium*	*Highly vulnerable*	*2*	*2.2*	*2.2*	*2.2*			*2*		*1*	*1.1*		*2*					*2.2*	*2.2*
Qurcus montana	*Low*	*Moderately vulnerable*						*1*	*1*		*1*	*1.1*						*3.1*	*3.1*	
Ranunculus harveyi	*Medium*	*Not assessed*		*2*																
Ranunculus rhomboideus	*Medium*	*Moderately vulnerable*	*2*	*2*	*2.2*	*2.2*	*1.2*	*2*	*1*	*1.2*	*2*							*1.2*	*2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Rhamnus alnifolia	*Medium-High*	*Highly vulnerable*	*2*	*2*	*1.2*	*3.1*	*2.2*	*2*	*1.2*		*2*			*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*1.2*	*2.2*
Rhexia mariana	*High*	*Moderately vulnerable*	*3.1*	*1*	*3.1*	*3.1*	*2.2*	*3.2*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*3*	*3*
Rhynchospora alba	*Medium-High*	*Moderately vulnerable*	*3.2*					*1*	*1*	*2*	*3*	*1.1*								
Rhynchospora glomerata	*Low-Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*3.2*	*2*	*3.2*	*2.2*	*1.2*	*1.2*	*1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Ribes hirtellum	*High*	*Highly vulnerable*	*3.1*	*2.2*	*2.2*	*2*	*2*	*3*			*3*								*2.2*	*2.2*
Rosa acicularis	*High*	*Extremely vulnerable*	*3.1*		*3.1*	*3.1*			*3*		*2*			*3*						
Rubus odoratus	*Low*	*Moderately vulnerable*						*1*			*2*								*2*	
Rubus pubescens	*Medium*	*Highly vulnerable*	*2.2*	*2.2*	*1.2*	*2*		*1.2*	*1.2*	*2.2*	*2*				*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*
Rubus schneideri	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*2*	*1.2*	*1.2*	*1*							*2.2*	*2*	*1.2*
Rudbeckia missouriensis	*Medium-High*	*Highly vulnerable*	*1.2*	*2.2*	*2*	*2.2*		*3*	*1.2*		*2*				*2.2*	*2.2*		*1.2*	*3*	*1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Sabatia campestris	*Medium*	*Moderately vulnerable*	*3.1*	*2.2*	*2.2*	*2.2*		*2*			*2*			*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*3*	*2.2*
Sagittaria australis	*Medium*	*Extremely vulnerable*	*2.1*	*1.1*	*2.1*	*3.1*			*2*		*2*	*1.1*	*1.1*			*1.2*	*1.1*	*3.1*	*1.1*	
Salix serissima	*Medium*	*Highly vulnerable*				*2*					*2*									
Salix syrticola	*High*	*Moderately vulnerable*	*3.1*		*3.1*	*3*					*2*								*1*	*2*
Salvia azurea	*Medium*	*Moderately vulnerable*	*3.2*	*1.2*	*2.2*	*1.2*	*1.2*	*3*	*1.2*	*1.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1*	*1.2*
Sambucus racemosa ssp. pubens	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2*	*2.2*	*1.2*	*1*	*2.2*	*1.2*	*2*							*1.2*	*1*	*1.2*
Sanguisorba canadensis	*Very High*	*Highly vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*2.2*	*2*		*2*			*3*	*2.2*	*2.2*	*1.2*	*1.2*	*3*	*2.2*
Sanicula smallii	*Low*	*Highly vulnerable*							*1*		*1*								*1*	
Sarracenia purpurea	*Medium-High*	*Extremely vulnerable*	*3.1*		*3.1*	*2*	*1*	*2*			*3*		*1.1*					*3.1*	*3.1*	*2.2*
Sceptridium biternatum	*Medium*	*Presumed stable*	*1.2*	*2.2*	*2.2*	*2*	*1.2*	*2.2*	*1.2*		*2*	*1.1*	*1.1*	*3*	*2.2*	*2.2*	*1.2*	*1.2*	*2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Schizachne purpurascens	*Low*	*Highly vulnerable*		*1*							*1*	*1.1*	*1.1*	*1*						
Schoenoplectus hallii	*Medium*	*Moderately vulnerable*	*3.1*	*2.2*	*3.1*	*3*	*3*	*2.2*			*1*	*1.1*	*1.1*	*2.2*	*2.2*	*3.2*	*2.1*	*1.2*	*3*	*3*
Schoenoplectus purshianus	*High*	*Moderately vulnerable*	*3.1*		*3.1*	*3*						*1.1*	*1.1*						*3*	*3.1*
Schoenoplectus smithii	*Low*	*Moderately vulnerable*	*3.2*	*2.2*	*2.2*	*2.2*					*1.2*	*1.1*	*1.1*						*2.2*	*2.2*
Scirpus hattorianus	*Medium*	*Moderately vulnerable*	*3.2*	*2.2*	*2.2*	*1*		*3*	*1.2*		*2*	*1.1*	*1.1*				*1.2*	*1.2*	*2*	*2.2*
Scirpus microcarpus	*Medium-High*	*Highly vulnerable*	*2.2*	*2.2*	*2.2*	*2*		*2.2*			*2.2*	*1.1*	*1.1*						*2*	*2*
Scirpus polyphyllus	*Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*1.2*	*3.1*	*1.2*	*2*	*1*		*3*	*1.1*	*1.1*						*2.2*	
Scleria muhlenbergii	*High*	*Moderately vulnerable*				*3*						*1.1*	*1.1*							
Scleria pauciflora	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*2*	*1.2*	*1.2*	*2.2*	*1.1*	*1.1*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*2*	*2*
Shepherdia canadensis	*High-Very High*	*Moderately vulnerable*	*3.1*	*2*	*3*	*3*		*2*	*1.2*		*2*							*1.2*	*2*	*3*

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Silene ovata	*Medium*	*Highly vulnerable*	*2.1*	*1.1*	*2.1*	*2.1*	*1.1*	*2.1*	*3.1*		*2*		*1.1*	*3*		*3.1*			*2*	*3.1*
Silene regia	*Medium*	*Moderately vulnerable*	*2.1*	*2.1*	*2.2*	*2.2*		*2*	*2.2*		*2*	*1.2*	*1.2*	*2*	*2.2*	*2.1*	*2.2*	*2.2*	*3*	*1*
Sisyrinchium atlanticum	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*2*	*1*		*2*			*2.2*	*2.2*	*2.2*	*2.2*	*1.2*	*2*	*2.2*
Sisyrinchium montanum	*Medium-High*	*Moderately vulnerable*	*2.2*	*2.2*	*1.2*	*2*		*2*	*2*	*1.2*	*2*						*2.2*	*2.2*	*2*	*2.2*
Solidago sciaphila	*Low*	*Moderately vulnerable*	*2.2*	*2.2*	*1*	*2.2*	*1.2*	*2.2*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*		*1.2*			*1.2*	*1*	*1.2*
Sorbus americana	*Low-High*	*Moderately vulnerable*	*3*	*3*				*3*												
Sparganium americanum	*Unknown*	*Moderately vulnerable*	*3.1*		*3.1*	*3.1*					*2*									*3.1*
Sparganium emersum	*Medium*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*2*	*1*	*2.2*	*1.2*		*3*						*1.2*	*1.2*	*1.2*	*1.2*
Spiranthes lucida	*Medium-High*	*Highly vulnerable*	*3.1*	*2.2*	*3.1*	*3*	*1.2*	*2.2*	*1.2*		*2.2*				*2.2*	*2.2*		*1.2*	*2*	*1.2*
Spiranthes vernalis	*High*	*Highly vulnerable*	*2.2*	*2.2*	*3.1*	*3.2*	*2.2*	*2.2*	*1*	*1.2*	*2*	*2.2*	*2.2*	*3*	*2.2*	*2.2*	*2.2*	*2.2*	*2*	*2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Stellaria pubera	*Medium*	*Highly vulnerable*	*2.2*	*2.2*	*1.2*	*2*		*1.2*	*1.2*		*2*					*1.2*	*1.2*	*1.2*	*2*	*1.2*
Stenanthium gramineum	*High*	*Highly vulnerable*	*2.2*	*1.2*	*2.2*	*2.1*	*1.2*	*3.1*	*2*	*1.2*	*2*	*2.2*	*2.2*	*3*	*1.2*	*1.2*	*1.2*	*1.2*	*3*	*3.1*
Stylisma pickeringii	*High*	*Highly vulnerable*	*2.2*	*2.2*		*2.2*	*1.2*	*2*			*2*			*2.2*	*2.2*	*2.2*	*1.2*	*1.2*	*3*	*2*
Styrax americana	*Medium*	*Moderately vulnerable*	*3.1*	*1.2*	*3.1*	*2*	*2.2*	*3.1*	*1.1*	*1.2*	*2*	*1.2*	*1.2*	*3.1*	*1.2*	*3.1*	*1.2*	*1.2*	*2*	*1.2*
Styrax grandifolius	*Low*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*1.2*		*3*	*1.2*		*2.2*			*2.2*			*2.2*	*2.2*	*2.2*	*2.2*
Sullivantia sullivantii	*Medium*	*Highly vulnerable*	*2.2*	*2.2*	*2*	*1.2*	*1.2*	*1.2*	*1.2*	*1.2*	*1*							*1.2*	*1.2*	*1.2*
Symphoricarpos albus var. albus	*Medium*	*Moderately vulnerable*	*3.1*		*3.1*			*2*	*2*		*2*									
Synandra hispidula	*Medium*	*Moderately vulnerable*	*1.2*	*1.2*	*2.2*	*2*		*2.2*	*1.2*		*2*				*2.2*	*2.2*		*1.2*	*2*	*1.2*
Tetraneuris herbacea	*High*	*Extremely vulnerable*	*2.2*	*3*	*2.2*	*2.2*	*1.2*	*2.2*	*3*	*1.2*	*2*		*1.2*	*3*	*1.2*		*1.2*	*1.2*	*1.2*	*1.2*
Thelypteris noveboracensis	*Medium*	*Moderately vulnerable*	*3.1*	*2*	*3.1*	*2.1*	*1.1*	*1.1*	*1.1*	*1.1*	*2*	*1.1*	*1.1*	*1.1*	*1.2*		*2.1*	*2.1*	*2.1*	

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Tilia heterophylla	*Medium*	*Highly vulnerable*	*2*	*2.2*	*2.2*	*2*	*2*												*2*	*2*
Tofieldia glutinosa	*Medium-High*	*Moderately vulnerable*	*3.1*	*2.2*	*3.1*	*2*	*2*	*3*	*2.2*		*2*					*2.2*		*1.2*	*1.2*	*3.1*
Torreyochloa pallida	*Medium-High*	*Moderately vulnerable*	*3.1*	*2.2*	*3.1*	*2*	*2*	*2.2*	*1.2*		*2*	*1.1*	*1.1*		*2.2*	*2.2*		*1.2*	*2*	*2.2*
Tracaulon arifolium	*Medium*	*Moderately vulnerable*	*1.2*	*3.2*	*2.2*	*2*	*2*	*2.2*			*2*					*1.2*		*1.2*	*1.2*	*2*
Tradescantia bracteata	*High*	*Moderately vulnerable*	*2.2*	*2.2*	*2.2*	*3.1*		*3*	*2.2*		*3*		*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*3*	*3*
Trichophorum cespitosum	*Medium*	*Highly vulnerable*	*2*	*2*			*1*				*3*	*1.1*	*1.1*							*1*
Trientalis borealis	*Medium*	*Highly vulnerable*	*2*	*1*	*2.2*	*2*	*1*	*3*	*1*	*1.2*	*2*					*1.2*	*1.2*	*1.2*	*2*	*1.2*
Trifolium reflexum	*High*	*Presumed stable*	*2*		*2.1*	*3.1*		*2*	*2*	*1.1*	*2*	*1.2*	*1.2*	*2*	*2.1*	*3.1*	*2.1*	*1.2*	*2*	*1.2*
Triglochin maritima	*Medium-High*	*Moderately vulnerable*	*2*	*2.2*	*2.2*	*3*	*2*	*2.2*	*1.2*		*2*								*2.2*	*2.2*
Triglochin palustris	*Medium-High*	*Moderately vulnerable*	*2*	*2.2*	*3.1*	*2*	*2*	*2.2*	*1.2*		*3*								*2.2*	*3.1*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Trillium cernuum	*Medium*	*Highly vulnerable*	*2*	*2*	*1.2*				*1*	*1.2*	*1*			*3*		*2.2*	*1.2*	*1.2*	*1.2*	*1.2*
Trillium erectum	*Unknown*	*Highly vulnerable*																		
Trillium viride	*Medium-High*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*1.2*	*2.2*	*3*	*1.2*	*2*	*2.2*		*3*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*	*2.2*
Ulmus thomasii	*High*	*Moderately vulnerable*	*2*	*2*	*1.2*	*3.1*		*2*	*1.2*	*3*	*1.2*			*2.2*	*2.2*	*2.2*	*3.1*	*1.2*	*1.2*	*1.2*
Urtica chamaedryoides	*Low-Medium*	*Presumed stable*				*2*		*2*			*2*									
Utricularia cornuta	*High*	*Moderately vulnerable*	*2*	*2*	*2.2*	*3*		*2.2*			*2.2*								*2*	*2.2*
Utricularia intermedia	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*2*	*2*			*2*								*2.2*	*2.2*
Utricularia minor	*High*	*Highly vulnerable*	*2*	*2*	*1.2*	*3*		*1.2*	*1.2*		*2*					*2.2*		*1.2*	*1.2*	*1.2*
Utricularia subulata	*High*	*Not assessed*				*3*														
Vaccinium corymbosum	*High*	*Presumed stable*	*2*	*2*	*2.2*	*2*	*2*	*3*			*3*								*2*	*2.2*
Vaccinium macrocarpon	*High*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*3*	*3*			*3*								*2.2*	*2.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Vaccinium oxycoccos	*High*	*Highly vulnerable*	*2*	*2*	*3.1*	*2*	*3*	*3*		*2.2*	*3*							*1.2*	*2.2*	*2.2*
Vaccinium stamineum	*Low-Medium*	*Moderately vulnerable*	*1*	*1*	*3.1*	*2.1*		*2.1*	*2.1*	*1*	*1*	*1.1*	*1.1*	*1*	*1.1*	*1.2*	*1.1*	*1.1*	*1.2*	*1.1*
Valeriana uliginosa	*Medium*	*Highly vulnerable*				*2*	*2*				*2*								*2*	*2*
Valerianella chenopodifolia	*Very High*	*Moderately vulnerable*																	*3*	*3*
Valerianella umbilicata	*Medium*	*Moderately vulnerable*				*2.2*													*3*	*2*
Vandenboschia boschiana	*Medium-High*	*Highly vulnerable*	*2*	*2*	*2.1*	*3.1*	*2.1*		*2.1*			*1.1*	*1.1*	*2.2*	*2.1*	*2.1*	*1.1*	*2.1*	*3*	*2.1*
Veronica americana	*Medium*	*Highly vulnerable*	*2*	*2*	*2.2*	*2*	*2*	*2.2*	*1.2*	*1.2*	*2*		*2.2*		*2.2*			*1.2*	*3.1*	*3.1*
Veronica scutellata	*Medium*	*Highly vulnerable*	*1*	*2*	*2.2*	*2*	*1*				*2*	*2.2*							*2*	*2.2*
Viburnum molle	*Medium*	*Presumed stable*	*1*	*2*	*2.2*	*2.2*	*1.2*	*2*	*1.2*	*1.2*	*2*				*1.2*	*1.2*	*1.2*	*1.2*	*2*	*2.2*
Viola blanda	*Medium*	*Highly vulnerable*	*2*	*1*		*2.2*		*2*	*1.2*		*2*		*2.2*	*2*	*2.2*	*2.2*		*1.2*	*1.2*	*1.2*

Species	S-rank threat level	CCVI	Extent	Fragmentation	Composition-Structure	Disturbance-Hydrology	Pollution	Competitors	Predators	Pathogens	Invasives/Exotics	Pollination vectors	Dispersal vectors	Genetics/Reproduction	Dispersal	Recruitment	Mortality	Harvest/killing	Disturbance	Structure/infrastructure
Viola canadensis	*Medium*	*Highly vulnerable*			*2*			*2*	*2*					*1.1*						
Viola primulifolia	*Medium-High*	*Highly vulnerable*	*1*	*2*	*1*	*2*	*1.2*		*2.2*		*2*								*2*	*1.2*
Woodsia ilvensis	*High*	*Presumed stable*	*1*	*2*	*1*	*1.2*	*1.2*	*2.2*	*1.2*	*1.2*	*3*	*1.1*	*1.1*					*1.2*	*2*	*1.2*
Zigadenus elegans	*Medium*	*Highly vulnerable*	*1*	*2*	*1*									*2*					*1*	