Final Recovery Planning Outline with Listing Status Review Triggers for the Illinois Endangered Winged Sedge (*Carex alata*)

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Approved by the Illinois Endangered Species Protection Board at the February 20, 2014 Special Meeting.

Common Name: Winged Sedge
Scientific Name: Carex alata (Torr.)
Family: Cyperacea
Synonyms: Broadwing Sedge

Status

Winged Sedge (*Carex alata*) is endangered in Illinois (17 Ill. Adm. Code 1050). It was first listed in 1980 as an endangered species due to restricted habitats or low populations in Illinois (Mankowski 2012).

The species is not listed as federally endangered or threatened.

NatureServe gives the species a global rank of G5 (secure) and it is not ranked at a national scale. It is ranked as S1 (critically imperiled) in Illinois. Other states with an S1 rank include Kentucky, Arkansas, Texas, and Connecticut. Other state rankings include SH (possibly extirpated) in New Hampshire, S2 (imperiled) in Missouri and Pennsylvania, S3 (vulnerable) in Indiana, Ohio, and North Carolina. Additional state rankings are illustrated in Figure 1 (NatureServe 2013; Figure 1).

Total Range

Winged Sedge ranges across the eastern United States and into Canada (Figure 1).

Illinois Distribution

In Illinois, the species is historically known from four counties in southern and southeastern Illinois: Jackson, Massac, Pope, and Wabash (Herkert and Ebinger 2002). There are historic museum and/or the Illinois Natural Heritage (Biotics 4) Database (Database) element occurrence records (EOs) from 4 counties (EOs have been established from only 1 of the 4 counties) and 3 Natural Division Sections (EOs have been established in only 1 of the 3 Sections) (Herkert and Ebinger 2002, INHD 2013; Tables 1 and 2, Figure 2).

Currently, there is only one EO record in the Database for broadwing sedge. At the time of initial listing, location information was brought forth to establish this singular location as an EO and no other EOs have been added since. The sole EO is in Pope County in the Bottomlands Section of the Coastal Plain Division and was most recently observed in 2001. The property with the occurrence is not formally protected by dedication as an Illinois Nature Preserve or registration as an Illinois Land and Water Reserve (INHD 2013).

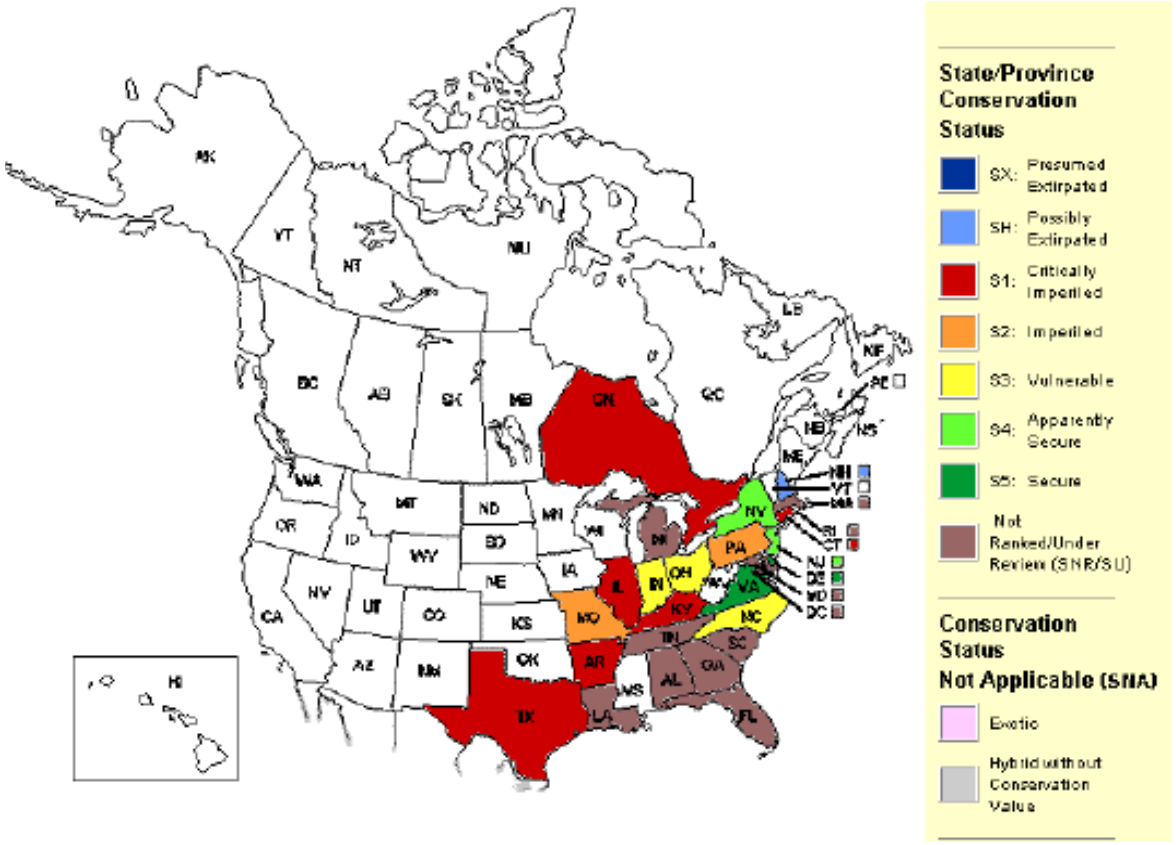

Figure 1. Distribution and NatureServe status of *Carex alata,* by state and province (NatureServe 2013).

Table 1. Illinois county distribution of *Carex alata*

	Historic (with no EO)	EO with historic obs	EO w/ recent (since 2002) obs
Jackson	x		
Massac	x		
Pope		x	
Wabash	x		

Table 2. Illinois Natural Division and Section distribution of *Carex alata*

DIVISION	SECTION	Historic (with no EO)	EOs with historic obs	EOs with recent (w/in last 10 yrs) obs
Wisconsin Driftless				
Rock River Hill Country	Freeport			
	Oregon			
Northeastern Morainal	Morainal			
	Lake Michigan Dunes			
	Chicago Lake Plain			
	Winnebago Drift			
Grand Prairie	Grand Prairie			
	Springfield			
	Western			
	Green River Lowland			
	Kankakee Sand Area			
Upper Mississippi River and Illinois River Bottomlands	Illinois River			
	Mississippi River			
Western Forest-Prairie	Galesburg			

	Carlinville			
Middle Mississippi Border	Glaciated			
	Driftless			
Southern Till Plain	Effingham Plain			
	Mt. Vernon Hill Country			
Wabash Border	Bottomlands	?		
	Southern Uplands			
	Vermilion River			
Ozark Division	Northern			
	Central			
	Southern			
Lower Mississippi River Bottomlands	Northern			
	Southern	?		
Shawnee Hills	Greater Shawnee Hills			
	Lesser Shawnee Hills			
Coastal Plain	Cretaceous Hills			
	Bottomlands	?	1	

Note: "Historic with no EO" location information is not precise and assignment to Natural Division Section is based on a combination of known county occurrence, habitat association, and other Natural Division Section occurrences.

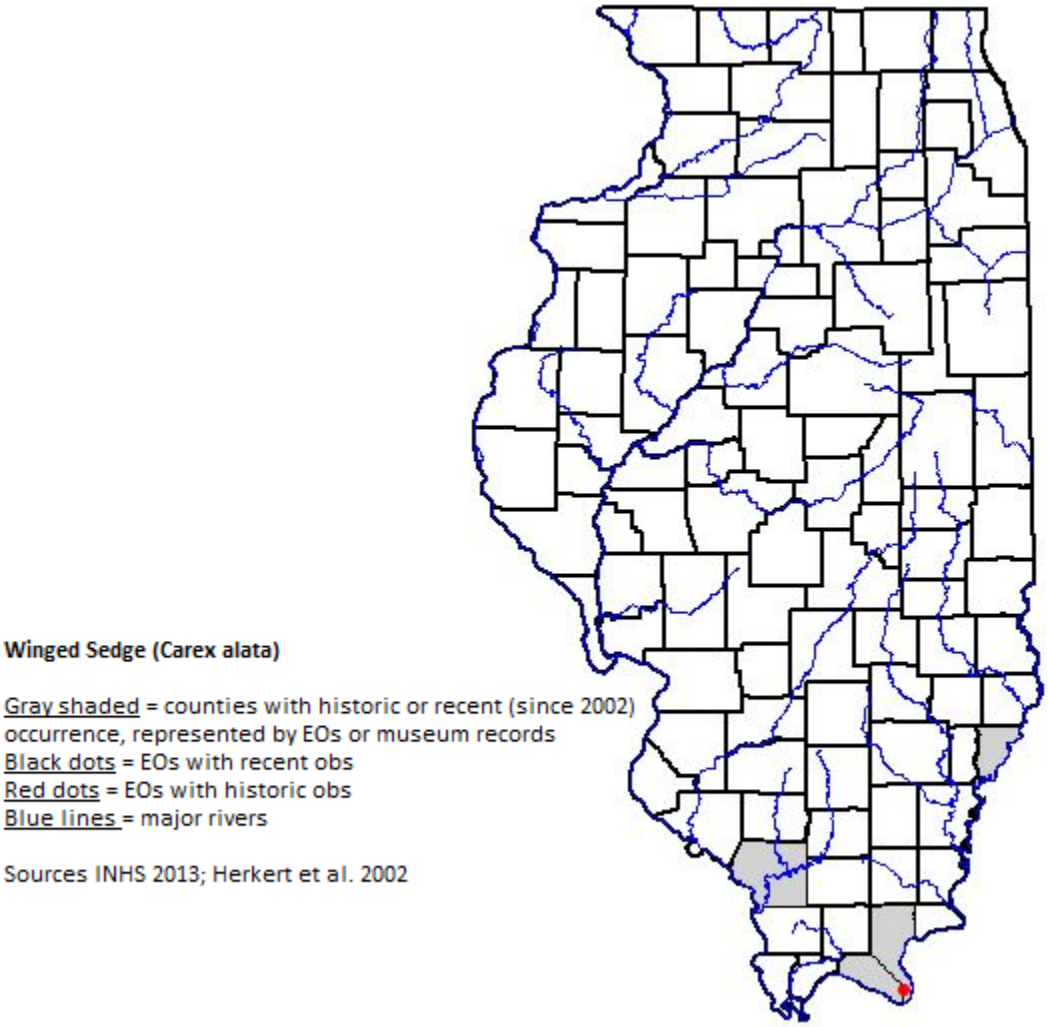

Figure 2. Historic and current distribution of *Carex alata* in Illinois.

Table 3. Select Illinois Natural Heritage (Biotics 4) Database information for *Carex alata*: Last observation date; total number of element occurrences (EOs); number of EOs observed since 2002; number of EOs protected as Illinois Nature Preserves or Illinois Land and Water Reserves; number of topographic quadrangles captured by total EOs; number of counties captured by total EOs; and, number of counties captured by EOs observed since 2002.

Last Observation	Total # EOs	# EOs observed since Jan 2002	# of EOs protected as NP/LWR	# topo quads	# Counties	# Counties since 2002
6/13/2001	1	0	0	2	1	0

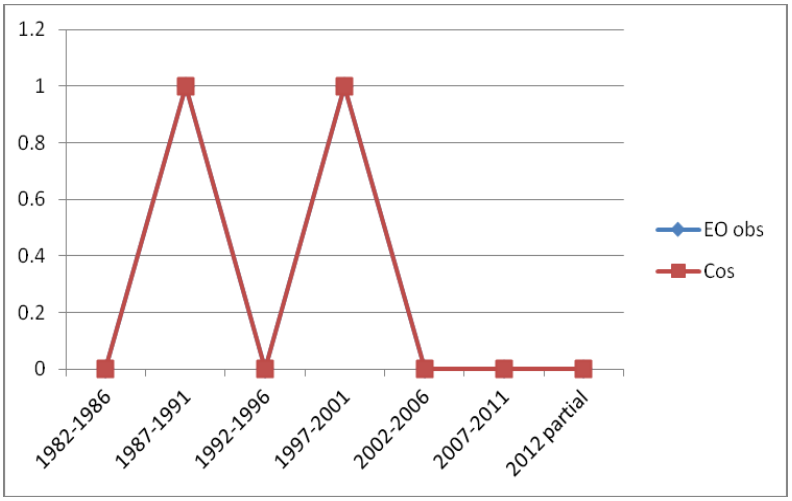

Figure 3. The number of *Carex alata* EOs in Illinois with observation during respective 5-year intervals and for 2012 (partial).

Description, Biology, and Habitat

Description

Winged Sedge is a perennial, cespitose sedge that grows from short, black fibrillose roots or short inconspicuous rhizomes (Herkert and Ebinger 2002; Flora of North America). The culms are up to 1.2 meters tall, triangular, scabrous on the angles beneath the inflorescence, light brown near the base with old leaf bases persistent (Mohlenbrock 1999). Sterile shoots are sometimes present and shorter than flowering stems. Culms have 3-7 ascending leaves per stem that are 2.0-5.5 mm wide, up to 50 mm long, flat, firm, dark green, and scabrous along the margins. The leaf sheaths are tight, green-nerved ventrally and prolonged at the yellow summit. The ligule is longer than wide and U- or V-shaped. The inflorescence is straight, or nearly so, with 3-8 spikes densely overlapping along the axis. Spikes are 8-15 mm long, 6-12 mm wide, ovoid to ellipsoid, rounded at the tip, somewhat clavate at the base, silvery brown to green and usually crowded in an inflorescence up to 4 cm long. Perigynia are numerous per spike with appressed or slightly spreading tips; the staminate portion is usually inconspicuous. Perigynia are 3.7-5.0 mm long, 2.5-4.0 mm wide, 1.2-1.7 times as long as wide, widest above the middle, broadly obovate to nearly circular in outline, flat, or nearly so, on both sides, light brown to greenish, usually nerveless on the outer face and three-nerved on the inner face and broadly winged nearly to the base. The beak is 0.7-0.9mm long, serrulate and bidentate. The achene is lenticular, 1.6-1.9 mm long, a bout 1mm wide, yellow-brown, apiculate and stipitate with two stigmas. Flowering occurs in May in Illinois (Mohlenbrock 2002).

Species Biology

Winged Sedge readily germinates when subjected to a cold, moist stratification and is easy to propagate from seed (Mason pers. communication). Seeds refrigerated in moist sand over winter have a high percentage of germination. Plants grown from seeds sown in late winter in a greenhouse were ready for transplanting in late July. Once established

in open mesic communities that are not subjected to inundation, Winged Sedge appears to do quite well with natural recruitment occurring.

Habitat

This species occurs in swamps and floodplain forests in southeastern Illinois (Herkert and Ebinger 2002). Also occurs along man-made ponds, sloughs, marshes, railroad ditches, pastures, and fields (Landon et al. 2000). In Missouri it is noted as being associated with sink-hole ponds and forms large tussocks, often in the crotches of *Cephalanthus* (buttonbush) bushes (Steyermark 1963).

Reasons for Status and Threats

Winged Sedge is restricted to habitat of floodplain forest and swamp margins and appears to have never been more than a rare species. Threats include conversion of habitat, alteration of hydrology (including draining or inundation), woody encroachment, and alteration of canopy that may cause excessive shading or sun. It should be communicated to local land managers that local hydrology should not be altered or subjected to extreme fluctuation and that saturated soils should also not be drained in areas where Winged Sedge occurs.

Low population numbers is also a threat to *Carex alata* in Illinois. The species is currently known from a single EO and most recent observation reports only 15-20 plants at the site.

Recovery Objectives and Criteria

The Illinois Endangered Species Protection Board is required by law to review, and revise as necessary, the Illinois List of Endangered and Threatened Species at least every five years. We propose that measures of population size and distribution, as documented in the Illinois Department of Natural Resources (Biotics 4) Database, be used to trigger a detailed review of the species' status by the Illinois Endangered Species Protection Board. The measures were developed relative to the status and distribution of the species at the time of original listing and the definitions of "endangered" and "threatened". Achieving the levels of population size and distribution proposed in this outline shall not prompt an "automatic" change in the status of the species in Illinois, and the Endangered Species Protection Board may review the status or status review criteria of the species at any time. Other factors, including known threats, productivity, recruitment and extent and condition of protected habitat, should be considered with population size and distribution data to judge whether a change in status is warranted.

Definitions of "endangered" and "threatened" under the Illinois Endangered Species Protection Act.

Endangered in Illinois – in danger of extinction in the wild in Illinois due to one or more causes including but not limited to, the destruction, diminution or disturbance of habitat, overexploitation, predation, pollution, disease, or other natural or manmade factors affecting its prospects of survival.

Threatened in Illinois – likely to become endangered in the wild in Illinois within the foreseeable future.

Listing Status Review Triggers

Endangered – Over the last 5-years, the Natural Heritage (Biotics 4) Database has element occurrence reports for the species that fall below the levels identified in the "Threatened" Listing Status Review Trigger.

Threatened – Over the last 5 years, the Natural Heritage (Biotics 4) Database has element occurrence reports for the species of at least 5 EOs with observations that demonstrate natural recruitment across 2 counties and within 1 Natural Division Section known for historic distribution and at least 3 of the 5 EOs should have observations in more than one

year during the last 10 years. At least 3 EOs must be protected. For EOs that have undergone population manipulation, they must have been liberated from population interventions for at least 3 years and meet the above criteria.

Secure – Remove from the IL List – Over the last 5 years, the Natural Heritage (Biotics 4) Database has element occurrence reports for the species of at least 9 EOs with observations that demonstrate natural recruitment across 3 counties and within 3 Natural Division Sections known for historic distribution and at least 5 of the 9 EOs should have observations in more than one year during the last 10 years. At least 6 EOs must be protected. For EOs that have undergone population manipulation, they must have been liberated from population interventions for at least 3 years and meet the above criteria.

Recommended Recovery Strategies

Recommended recovery strategies include a combination of monitoring, management, and protection for known populations and a prescription for testing a translocation program for the species to establish new populations. Translocations will be compliant with the INPC/IESPB/IDNR Plant Translocation and Restoration Policy (current version) and will be conducted according to site-specific prescriptions that will include a schedule of review to evaluate the success or failure of individual translocations, the need for prescription adjustments, and whether they should be continued. Translocations will need to be successful and liberated from population manipulation as described above in the Listing Status Review Triggers before they will be considered "wild" occurrences in the statewide population.

Recovery Strategy 1: Assess current status and distribution

a. Conduct surveys at 1/5 of known EOs annually to confirm presence/absence and population numbers of all EOs, within each 5-year cycle. Surveys should cover information necessary to complete an Element Occurrence Reporting form and include the following specific information: the total number of individuals at a location (indicate count or estimate); the number or percent of individuals from younger age classes that demonstrate natural recruitment (indicate count or estimate); the area surveyed and what % of proximate suitable habitat the survey area represents (include a map); and, search effort (person hours).
b. Conduct surveys at three historic locales with no EOs to confirm presence/absence and population numbers (if present), within a 5-year period.
c. Survey for additional suitable habitat and new occurrences in counties/Natural Division Sections known for historic and current populations where EOs have been established.
d. Report results annually to the Illinois Natural Heritage (Biotics 4) Database.
e. At the end of the initial 5-year period, assess whether additional surveys are warranted for areas identified in (b) and (c) or if these locales should be considered low priority areas in allocating future resources.

Recovery Strategy 2: Promote management and protection of known populations.

a. Work with landowners to gain commitment for developing management plans to promote compatible land uses and minimize threats for properties with extant populations.
b. Work with landowners to promote enrollment of properties with extant populations into land protection programs such as dedication as an Illinois Nature Preserve, registration as an Illinois Land and Water Reserve, or a similar conservation easement program.

Recovery Strategy 3: Assess need and potential for augmenting existing populations and/or establishing reintroduced/introduced populations within appropriate habitat.

a. Review status and distribution against Listing Status Review Triggers to determine if augmenting existing populations and/or reestablishing/establishing new populations is necessary.

b. Determine whether local ecotype stock is available for collection of seed and either direct dispersal to receiving sites or for propagation and later planting of propagules to receiving sites. If local ecotype stock is not available, conduct genetic analysis of proposed translocation stock to determine genetic health and compatibility. If propagation of stock is prescribed, methods with demonstrated success should be used – at this time, methods should follow those used for propagation and planting of *Silene regia* by Edgin (Edgin 2012).
c. Perform an assessment of potential translocation areas based on results from Recovery Strategy 1 and relative to Recovery Strategy 3a and assess for potential impacts to other listed species in the proposed receiving sites.
d. Relative to determinations about origin of proposed translocation stock from 3b, and consistent with the INPC/IESPB/IDNR Plant Translocation and Restoration Policy, conduct translocations at sites that have formal protection agreements in place.
e. Translocated occurrences will be monitored annually for at least the first 3 years. Results of the first 3 years monitoring will be reviewed to determine survivorship at the receiving site and success of translocation methods and whether translocation efforts should be continued, ceased, or otherwise adjusted.
f. Report results annually to the Illinois Natural Heritage (Biotics 4) Database.

Recovery Outline Review & Revision

This outline will be reviewed annually by the authors and staff involved with implementation. The need for revisions may be identified at any time. All substantive revisions to this outline, including but not limited to recovery objectives and recovery strategies, should be considered a new recovery plan and follow the protocol described in "The Illinois Department of Natural Resources' Recovery Planning in the Office of Resource Conservation" (current version). As such, recovery planning may be initiated by any staff and follows an established process to ensure proper review and potential conflicts are identified. Updated information – such as new data on distribution and abundance, research results relevant to recovery considerations, changes in taxonomy or nomenclature, and corrections to factual errors in this document – may be posted as addendums to the recovery outline without changing the original document.

Estimated Timing of Strategies

Implementation is expected to take 10 or more years: Strategies will be somewhat implemented in phases and results from the first 5-year interval will greatly inform the overall estimate. Many activities such as landowner contacts, site-specific habitat management plan development, contract administration, etc., will be ongoing throughout the year. A basic schedule of some key implementation activities is presented below.

January February	Conduct annual review of recovery outline strategies to confirm priority activities for calendar year. Recovery activities of INPC and IDNR staff are included in respective annual plan of work processes.
March	Confirm information and resources are in place to conduct annual field work.
April May June July	Primary window for spring plantings for translocations (April-May). Primary window for surveys of element occurrences and potential habitat (flowering is in May).
August September	If fall plantings are prescribed for translocations, September is the target window.
October November	Ensure element occurrence survey reports have been submitted to the Biotics 4 Database. Compile information on annual surveys, translocation activities, and habitat protection.
December	Complete and post biennial progress reports on *Carex alata* recovery.

Estimated Costs of Strategies

Estimated total cost for establishing 300 plants on 6 protected sites (what is currently estimated as necessary to achieve the population threshold for the Listing Status Review Trigger for "Secure – Remove from the IL List") is between $5,000 and $7,500 plus labor for transplanting. The estimate for staff time for monitoring, habitat searches, and reporting is approximately 0.75 day/occurrence.

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