Development of Coefficients of Conservatism for Wetland Vascular Flora of North and Central Mississippi

Depressional wetland adjacent to auxiliary channel on Panther Swamp NWR, Yazoo County.

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INTRODUCTION

It has become vitally important to perform quick and effective assessments of the ecological quality of natural areas as these areas are modified by an ever-expanding human population. Examples of recent modifications to native vegetation include: removal of native communities for production of agricultural commodities, grazing by domestic livestock, timber harvesting, draining of wetlands, establishment and expansion of urban areas (consisting of large areas uninhabitable to or that impede the dispersal of species) and accidental and intentional introduction of non-native species. Correspondingly, native plant communities have changed in response to the different types of disturbances. In areas were there is little human activity, species with low levels of tolerance to disturbance will be in proportionally larger numbers. Conversely, areas with higher levels of human activity display a greater proportion of species adapted to frequent or more intense disturbance. The pressure on natural areas increases with time, so effective and efficient methods are needed to assess the quality of remaining natural areas, to aid in identification of high quality remnants and thereby facilitate the prioritization of conservation and preservation activities.

Swink and Wilhem (1979, 1994) developed a floristic ranking system based on the fundamental principle that native plant taxa display a range of tolerances to disturbances and varying degrees of fidelity to a set of environmental parameters. This ranking system was based on what they called *species conservatism*. Each species was assigned a numerical score, called a coefficient of conservatism (CC), reflecting the species' level of conservatism relative to other species present in the region (Table 1). Because species are assigned scores in relation to other elements in the local flora (Wilhelm

Table 1. Descriptions of plant species characteristics used to assign Coefficients of Conservatism (modified from Lopez and Fennessy 2002).

Description of habitat and characteristics of species	Range of scores
Non-native species	0
Native taxa that are found in disturbed sites	1–3
Native taxa that are typically associated with a specific plant community, but tolerate moderate disturbance to that community	4–6
Native taxa in plant communities in an advanced successional stage that have undergone minor disturbance	7–8
Native plants with high degrees of fidelity to a narrow range of environmental characteristics (specialists, rare species)	9–10

and Ladd 1988), these scores become increasingly invalid as distance from the region of evaluation increases. Thus, CC scores must be developed regionally to ensure optimal information. Once CC scores are developed for a regional flora, they can be used in assessing the quality of vegetation in target ecosystems by calculating a mean CC for all species present (Swink and Wilhelm 1979), or by incorporation into one of the various floristic quality indices that have been developed for assessing terrestrial (Wilhelm and Ladd 1988, Ladd 1993, Taft et al. 1997) or wetland (Matthews 2003, Lopez and Fennessy 2002) ecosystems. Although this system of natural areas assessment has been used primarily in the Midwest, it presently is being developed and evaluated in other parts of North America (e.g., California, Connecticut, and Florida).

Application of Coefficients of Conservatism: Average CC of an Area

Wetland managers and assessment personnel need an efficient, economical, and accurate method of assessing the quality of wetland sites for potential impacts of development, gauging restoration efforts, and making other management decisions. The most accessible biotic component of wetlands is their vegetation. Vegetation composition reflects the degree of disturbances, human or natural. While native plant communities have evolved with natural disturbances relative to particular environments, a notable shift in the pattern of vegetation composition is usually associated with human influence (Magee et al. 1999). Following ecosystem disturbance, conservation-worthy species will be replaced gradually by more ruderal species. Assembling a list of species that occur in an area of interest and averaging their CC values generates a score that reflects the average conservatism ($\overline{CC}$) of the plant community, which in turn reflects the quality of native species present. By using the $\overline{CC}$, temporal changes in floristic quality can be measured. If there is an increase in more valuable species, the $\overline{CC}$ will increase to reflect the improved quality of the habitat.

Application of Coefficients of Conservatism: Floristic Quality Assessment Index

Wilhelm and Ladd (1988) further modified the use of the $\overline{CC}$ to account for the effect of area and therefore species richness. The average CC of the native species was multiplied by the square root of the number of native species; this score was then referred to as the *Natural Area Index* (NAI). Using the NAI and the $\overline{CC}$, differences among areas could be measured and used to make decisions on possible development projects and to protect areas of high floristic quality. The NAI was later referred to as the Floristic Quality Assessment Index (FQAI) (Andreas and Lichvar 1995, Lopez and Fennessy 2002).

$$\text{NAI} = \overline{CC} * \sqrt{N} = \frac{\sum CC}{N} * \sqrt{N} = \frac{\sum CC}{\sqrt{N}} = \text{FQAI}$$

The FQAI has been recommended in many facets: evaluating restoration and mitigation wetlands, measuring floristic quality differences between sites of concern, identifying natural areas of high quality, and as a low-cost method for long-term monitoring (Northern Great Plains Floristic Quality Assessment Panel, 2001). When used by trained

personnel with a uniformly exercised protocol for surveying plant species, and when used in conjunction with objectively assigned CC values, the FQAI and $\overline{CC}$ are efficient methods of vegetation assessment. This publication describes the first attempt at developing coefficients of conservatism for plant species in the state of Mississippi.

METHODS

Surveying Wetland Plant Species

A total of 53 wetlands were sampled during this study; 52 in north and central Mississippi and one in Pickensville, Alabama, just east of MS-AL state line (Figure 1). Of the 52 MS wetlands surveyed during summer of 2004, ten also were surveyed during summer of 2003, and eight were surveyed during spring of 2004. Palustrine wetlands dominated by emergent marsh vegetation were the primary wetland type sampled. Examples of wetland types surveyed include beaver impoundments, moist-soil managed wetlands, farm pond and city park pond littoral zones, sewage lagoons, and borrow pits. Wetland plant species were surveyed by placing fifty 0.5 m^2 plots such that they systematically covered the wetland vegetation at each site. Additional species observed along survey transects that did not occur in the survey plots also were recorded for most sites. For quality control purposes, many species identifications were confirmed by taxonomic experts or by consulting herbarium specimens housed in the MSU Herbarium (MISSA).

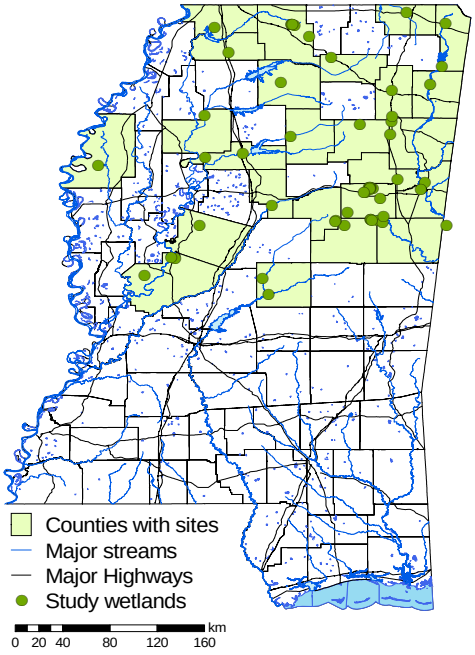

Figure 1. Study area within Mississippi. Counties with study wetlands are shaded, and individual wetlands are indicated by a shaded dot. Because of the proximity of some wetlands, not all are visible at this scale. Major highways and larger water bodies (streams and reservoirs) are shown for reference.

Assigning Coefficients of Conservatism

A total of eight professionals, with expertise in various wetland taxa, were asked separately to assign coefficients of conservatism to the plant species encountered. Scores received for each species were averaged, and the mean value was assigned as the CC. Examples of representative species for each CC value are in Table 2. This method of assigning coefficients was unlike many other states (Ohio, North and South Dakota, and Wisconsin), in which a special meeting was convened where a group of regional botanists came to a consensus regarding each species. This method was similar to that employed in Florida, wherein Cohen et al. (2004) developed CC values for evaluation of the Floristic Quality Assessment Index. In that study, a method of assigning CC values similar to ours was found to be an effective alternative method to the convening of a committee. Also, in

a study conducted in North Dakota (Mushet et al. 2002), it was shown that modifying the CC of some species to better reflect the best professional judgment of one particular surveyor did not appreciably change the outcome of the assessment. This suggested that assessments using coefficients of conservatism can withstand some bias on the part of the CC determiners and still accurately reflect differences in floristic quality among sites.

Table 2. Examples of species representative of the different ranks of the Coefficients of Conservatism.

CC value	Representative species
0	*Alternanthera philoxeroides, Briza minor, Commelina communis*
1	*Ambrosia artemisiifolia, Carex cherokeensis, Leptochloa panicoides*
2	*Allium canadense, Bidens aristosa, Cyperus pseudovegetus*
3	*Bacopa rotundifolia, Campsis radicans, Polygonum hydropiperoides*
4	*Berchemia scandens, Diodia virginiana, Habenaria repens*
5	*Betula nigra, Carex crus-corvi, Eleocharis quadrangulata*
6	*Ammania latifolia, Carex crinita, Quercus lyrata*
7	*Chelone glabra, Epilobium coloratum, Leersia lenticularis*
8	*Carex joorii, Carex stricta, Arnoglossum plantagineum*
9 – 10	no species in our surveys scored this high

RESULTS AND DISCUSSION

Of the 411 plant species identified in our surveys, non-native species accounted for 14% (59 species). The majority of plant species (82.5%) were assigned a CC of 4 or less, and only 7 species received a CC value of 8. There were no species assigned a CC of 9 or higher. The average CC value for the 411 plant species was 2.8. The frequency distribution of CC values (Figure 2) for wetland species in Mississippi does not compare well with coefficients developed for other regions. For example, of the 1,584 taxa recognized in the Dakotas, 20% (255 spp.) of species were assigned a CC of 10, accounting for the largest group of species, with species assigned a CC of 8 (236 spp.) a close second (NGPAP 2001). Also, plant species in the Dakotas had an overall average CC of 6.1.

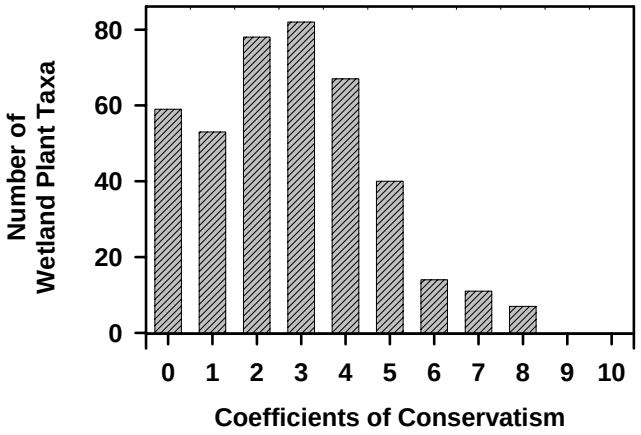

Figure 2. The frequency distribution of Coefficients of Conservatism for the 411 wetland plant species surveyed in north and central Mississippi. Coefficients were assigned by a panel of eight expert botanists. The majority of species were assigned a CC less than 5, with introduced species (CC = 0) comprising over 14% of all species surveyed.

When species were grouped by their growth forms and life history traits (Figure 3), perennial forbs (113 spp.) were the largest group of species, and along with *Carex* and other perennial graminoids species (19 and

66, respectively, a total of 85 species) accounted for 58.2% of total species richness. These results are not surprising, considering the diversity of graminoid species, especially those in the Cyperaceae family, which usually typifies wetland vegetation in almost all regions of the world. The second largest physiognomic group was annual forbs, with 76 species.

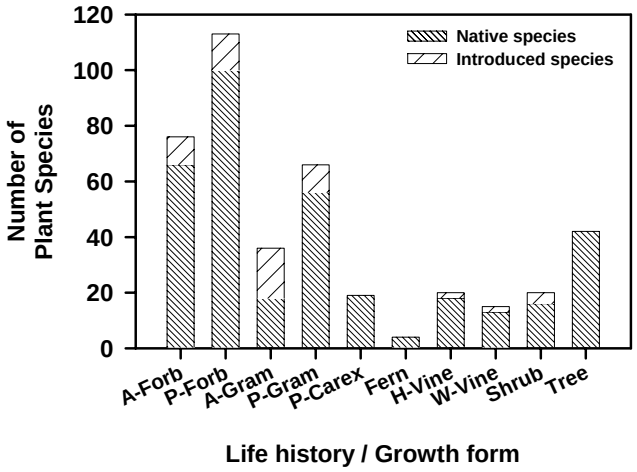

Figure 3. The frequency distribution of surveyed wetland plant species by their life history and growth form, as described in Table 3, separated into native and introduced species.

The most significant difference between this list and those published in other regions is the lack of species assigned a CC of 9 or 10. This can be explained by the absence of rare species, which typically are associated with rare or threatened habitats. The generation of the current list was not focused on the assessment of specific threatened or endangered habitats. As a result, sites of that caliber were not sampled. Sensitive wetlands of Mississippi, such as wet pine savannahs, although high in species richness and proportions of rare species, were not within the region of consideration. Spring seep wetlands, habitats for some rare wetland plant species throughout MS, were not included because they typically occur in mature forest situations, and our focus was on wetlands dominated by herbaceous vegetation.

Another noticeable feature of this data set, compared with other CC lists, is the relatively small number of species identified. Other groups have assembled CC databases that included almost all species located within the boundaries of their particular state or region. Our list is the accumulation of species that were identified while sampling a set of 53 wetlands. Sampling only the most general type of wetlands limits the effectiveness of this list and excludes many species that occur in the region sampled. Therefore, this list should be considered an initial attempt at developing coefficients of conservatism for the state. This list also should serve to facilitate testing and use of the Floristic Quality Assessment Index and similar assessment methodologies in the region.

Tracking the quality of restorations and management efforts is well within the capabilities of preserve and federal land wildlife managers when using the FQAI. As an example, if a wetland preserve ecologist were implementing different techniques for restoring previously disturbed wetlands, changes in $\overline{CC}$ values or FQAI over time could aid in determining which method is more effective in repopulating the areas with desirable species. Similarly, there is a need for efficient, repeatable methods for use in assessing and monitoring the results of wetland mitigations. With the assistance of methods utilizing coefficients of conservatism, high quality natural areas could be quantitatively evaluated and used as reference sites for determining the success of mitigation efforts.

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REFERENCES CITED

Andreas, B.K. and R.W. Lichvar. 1995. Floristic index for establishing assessment standards: A case study for northern Ohio. Technical Report WRP-DE-8, U.S. Army Engineers Waterways Experiment Station, Vicksburg, MS. 16 p. + 1 appendix.

Cohen, M.J., Carstenn, S. and C.R. Lane. 2004. Floristic quality indices for biotic assessment of depressional marsh condition in Florida. *Ecological Applications* 14(3):784-794.

Flora of North America Editorial Committee, eds. 1993. *Flora of North America North of Mexico*. Vol. 23. New York, NY.

Godfrey, R.K. and J.W. Wooten, 1979. *Aquatic and Wetland Plants of Southeastern United States, Monocotyledons*. The University of Georgia Press, Athens, GA. 712 p.

Godfrey, R.K. and J.K. Wooten, 1981. *Aquatic and Wetland Plants of Southeastern United States, Dicotyledons*. The University of Georgia Press, Athens, GA. 933 p.

Hitchcock, A.S. 1971. *Manual of the Grasses of the United States*, Vol.1 & 2, 2nd Edition. General Publishing Co., Toronto, Ontario. 1051 p.

Ladd, D.M. 1993. Coefficients of Conservatism for Missouri vascular flora. The Nature Conservancy, St. Louis, MO. 53 p.

Lopez, R.D. and M.S. Fennessy. 2002. Testing the Floristic Quality Assessment Index as an indicator of wetland condition. *Ecological Applications* 12(2):487-497.

Magee, T.K., Ernst, T.L., Kentula, M.E. and K.A. Dwire. 1999. Floristic comparison of freshwater wetlands in an urbanizing environment. *Wetlands* 19(3):517-534.

Matthews, J.W. 2003. Assessment of the Floristic Quality Index for use in Illinois, USA, wetlands. *Natural Areas Journal* 23: 53-60.

Mushet, D.M., Euliss, Jr., N.H. and T.L. Shaffer. 2002. Floristic quality assessment of one natural and three restored wetland complexes in North Dakota, USA. *Wetlands* 22(1):126-138.

Northern Great Plains Floristic Quality Assessment Panel. 2001. Floristic quality assessment for plant communities of North and South Dakota (excluding the Black Hills), and adjacent grasslands. Northern Prairie Wildlife Research, Jamestown, ND.

Radford, A.E., Ahles, H.E. and C.R. Bell. 1968. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press, Chapel Hill, NC. 1183 p.

Reed, Jr., P. B., R. Theriot, W. Sipple, and N. Melvin. 1996. National list of plant species that occur in wetlands: National summary. U.S. Fish & Wildlife Service. Downloaded from http://www.nwi.fws.gov/bha/ on 23 October 2005.

Swink, F.A. and G.S. Wilhelm. 1979. Plants of the Chicago Region, 3rd Ed. Morton Arboretum, Lisle, IL.

Swink, F.A. and G.S. Wilhelm. 1994. Plants of the Chicago Region, 4th Ed. Indiana Academy of Sciences, 921 p.

Taft, J.B. Wilhelm, G.S., Ladd, D.M. and L.A. Masters. 1997. Floristic quality assessment for vegetation in Illinois, a method for assessing vegetation integrity. *Erigenia* 15:3-95.

USDA, NRCS. 2004. The PLANTS Database, Version 3.5 (http://plants.usda.gov) National Plant Data Center, Baton Rouge, LA 70874-44190 USA

Wilhelm, G. and D. Ladd. 1988. Natural areas assessment in the Chicago region: Transactions of the 53rd North American Wildlife and Natural Resources Conference, vol. 3, p. 361-375.

Table 3. Coefficients of Conservatism values for Wetland Vascular Flora of North and Central Mississippi.

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Acalypha rhomboidea Raf.	4	N	Virginia three seeded mercury	Forb	A	Euphorbiaceae	FAC-
Acer negundo L.	4	N	boxelder	Tree	P	Aceraceae	FACW
Acer rubrum L.	4	N	red maple	Tree	P	Aceraceae	FAC
Acmella oppositifolia (Lam.) R.K. Jansen	4	N	oppositleaf spotflower	Forb	P	Asteraceae	FACW
Agalinis divaricata (Chapm.) Pennell	2	N	pineland false foxglove	Forb	A	Scorphulariaceae	FACU
Agalinis fasciculata (Ell.) Raf.	1	N	beach false foxglove	Forb	A	Scrophulariaceae	FAC+
Agrostis gigantea Roth	0	I	redtop	Gram	P	Poaceae	NI
Agrostis hyemalis (Walt.) B.S.P.	2	N	winter bentgrass	Gram	P	Poaceae	FAC
Allium canadense L.	2	N	meadow garlic	Forb	P	Liliaceae	FACU-
Alnus serrulata (Ait.) Willd.	4	N	hazel alder	Tree	P	Betulaceae	FACW+
Alopecurus carolinianus Walt.	3	N	Carolina foxtail	Gram	P	Poaceae	FACW
Alternanthera philoxeroides (Mart.) Griseb.	0	I	alligatorweed	Forb	P	Amaranthaceae	OBL
Amaranthus australis (Gray) Sauer	2	N	southern amaranth	Forb/Shrub	A	Amaranthaceae	OBL
Ambrosia artemisiifolia L.	1	N	annual ragweed	Forb	A	Asteraceae	FACU
Ambrosia trifida L.	1	N	giant ragweed	Forb	A	Asteraceae	FAC
Ammannia coccinea Rottb.	5	N	valley redstem	Forb	A	Lythraceae	FACW+
Ammannia latifolia L.	6	N	pink redstem	Forb	A	Lythraceae	OBL
Ampelopsis arborea (L.) Koehne	2	N	peppervine	H-Vine	P	Vitaceae	FAC+
Ampelopsis cordata Michx.	2	N	heartleaf peppervine	W-Vine	P	Vitaceae	FAC+
Anagallis minima (L.) Krause	3	N	Chaffweed	Forb	A	Primulaceae	FACW+
Apios americana Medik.	4	N	groundnut	H-Vine	P	Fabaceae	FACW
Apocynum cannabinum L.	2	N	Indian hemp	Forb	P	Apocynaceae	FAC-
Arnoglossum plantagineum Raf.	8	N	groovestem Indian plantain	Forb	P	Asteraceae	FACU
Arthraxon hispidus (Thunb.) Makino	0	I	small carpgrass	Gram	A	Poaceae	FACU+
Arundinaria gigantea (Walt.) Muhl.	4	N	giant cane	Shrub	P	Poaceae	FACW
Axonopus fissifolius (Raddi) Kuhlm	3	N	common carpetgrass	Gram	A	Poaceae	FACW-
Azolla caroliniana Wild.	4	N	Carolina mosquitofern	Fern	A	Azollaceae	OBL
Baccharis halimifolia L.	2	N	eastern baccharis	Tree	P	Asteraceae	FAC
Bacopa rotundifolia (Michx.) Wettst.	3	N	disk waterhyssop	Forb	P	Scorphulariaceae	OBL
Berchemia scandens (Hill) K. Koch	4	N	Alabama supplejack	H-Vine	P	Rhamnaceae	FACW
Betula nigra L.	5	N	river birch	Tree	P	Betulaceae	FACW
Bidens aristosa (Michx.) Britt.	2	N	bearded beggarticks	Forb	A	Asteraceae	FACW
Bidens discoidea (Torr.&Gray) Britt.	3	N	small beggarticks	Forb	A	Asteraceae	FACW
Bidens frondosa L.	2	N	devil's baggartick	Forb	A	Asteraceae	FACW
Bidens laevis(L.) B.S.P.	2	N	smooth beggartick	Forb	A	Asteraceae	OBL
Boehmeria cylindrica (L.) Sw.	3	N	smallspike false nettle	Forb	P	Urticaceae	FACW+
Boltonia diffusa Ell.	3	N	small doll's head daisy	Forb	P	Asteraceae	FAC
Brasenia schreberi J.F. Gmel.	5	N	watershield	Forb	P	Cabombaceae	OBL
Briza minor L.	0	I	little quaking grass	Gram	P	Poaceae	FAC
Bromus japonicus Thunb. ex Murr.	0	I	Japanese brome	Gram	A	Poaceae	FACU
Brunnichia ovata (Walt.) Shinners	3	N	American buckwheat	W-Vine	P	Polygonaceae	FACW
Bulbostylis ciliatifolia (Ell.) Fern. var. *ciliatifolia*	5	N	capillary harisedge	Gram	A	Cyperaceae	FACU
Callicarpa americana L.	1	N	American beautyberry	Shrub	P	Verbenaceae	FACU-
Callitriche heterophylla Pursh.	3	N	twoheaded water-starwort	Forb	A	Callitrichaceae	OBL
Campsis radicans (L.) Seem ex Bureau	3	N	trumpet creeper	H-Vine	P	Bignoniaceae	FAC
Cardamine pennsylvanica Muhl. ex Wild	3	N	Pennsylvania bittercress	Forb	P	Brassicaceae	FACW+
Cardiospermum halicacabum L.	1	N	love in a puff	H-Vine	P	Sapindaceae	FAC
Carex albolutescens Schwein.	1	N	greenwhite sedge	Gram	P	Cyperaceae	FAC+
Carex atlantica Baily sub. *capillacea* (Baily) Reznick	7	N	prickly bog sedge	Gram	P	Cyperaceae	FACW
Carex aureolensis Steud.	4	N		Gram	P	Cyperaceae	OBL
Carex caespitosa L. var. *ramosa* Dewey	7	N		Gram	P	Cyperaceae	NI
Carex cherokeensis Schwein.	1	N	Cherokee sedge	Gram	P	Cyperaceae	FACW-
Carex crinita Lam.	6	N	fringed sedge	Gram	P	Cyperaceae	FACW+
Carex crus-corvi Shuttw. Ex Kunze	5	N	ravenfoot sedge	Gram	P	Cyperaceae	OBL
Carex festucacea Schkuhr ex Wild.	2	N	fescue sedge	Gram	P	Cyperaceae	FACW
Carex granularis Muhl. ex Wild.	2	N	meadow sedge	Gram	P	Cyperaceae	FACW
Carex joorii Baily	8	N	Cypress swamp sedge	Gram	P	Cyperaceae	OBL
Carex longii Mackenzie	2	N	Long's sedge	Gram	P	Cyperaceae	OBL
Carex lupulina Muhl. ex Wild.	5	N	hopsedge	Gram	P	Cyperaceae	OBL
Carex lurida Wahlenb.	3	N	shallow sedge	Gram	P	Cyperaceae	OBL
Carex pigra Naczi	4	N		Gram	P	Cyperaceae	NI
Carex squarrosa L.	5	N	squarrose sedge	Gram	P	Cyperaceae	FACW
Carex stricta Lam.	8	N	upright sedge	Gram	P	Cyperaceae	OBL
Carex tribuloides Wahlenb.	3	N	blunt broom sedge	Gram	P	Cyperaceae	FACW+
Carex typhina Michx.	5	N	cattail sedge	Gram	P	Cyperaceae	OBL
Carex vulpinoidea Michx.	3	N	fox sedge	Gram	P	Cyperaceae	OBL

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Carya tomentosa (L.) Nutt. ex Ell.	3	N	mockernut hickory	Tree	P	Juglandaceae	NI
Celtis laevigata Wild.	4	N	sugarberry	Tree/Shrub	P	Ulmaceae	FACW
Cephalanthus occidentalis L.	5	N	bottonbush	Tree	P	Rubiaceae	OBL
Ceratophyllum demersum L.	2	N	coon's tail	Forb	P	Ceratophyllaceae	OBL
Chamaecrista fasciculata (Michx.) Green var. *fasciculata*	3	N	sleeping plant	Forb	A	Fabacaea	FACU
Chamaecrista nictitans (L.) Moench	3	N	patridge pea	Shrub/Forb	P	Fabaceae	FACU
Chamaesyce maculata (L.) Small	2	N	spotted sandmat	Forb	A	Euphorbiaceae	FACW
Chamaesyce nutans Lag. Small	1	N	eyebane	Forb	A	Euphorbiaceae	FACU
Chasmanthium latifolium (Michx.) Yates	6	N	Indian woodoats	Gram	P	Poaceae	FAC-
Chasmanthium laxum (L.) Yates	5	N	woodoats	Gram	P	Poaceae	FACW-
Chelone glabra L.	7	N	turtle head	Forb	P	Scrophulariaceae	OBL
Cicuta maculata L.	4	N	spotted water hemlock	Forb	P	Apiaceae	OBL
Cinna arundinacea L.	6	N	sweet wood reed	Gram	P	Poaceae	FACW
Cirsium vulgare (Savi.) Ten.	0	I	bullthistle	Forb	P	Asteraceae	FAC
Clematis virginiana L.	3	N	devil's darning needles	W-Vine	P	Ranunculaceae	FAC+
Commelina carolinana Walt.	4	N	Carolina dayflower	Forb	A	Commelinaceae	FAC
Commelina communis L.	0	I	Asiatic dayflower	Forb	A	Commelinaceae	FAC
Commelina virginica L.	5	N	Virginia dayflower	Forb	A	Commelinaceae	FACW
Conoclinium coelestinum (L.) DC.	3	N	blue mistflower	Forb	P	Asteraceae	FAC
Conyza canadensis (L.) Cronq. var. *canadensis*	2	N	Canadian horseweed	Forb	A	Asteraceae	FACU
Coreopsis falcata Boynt.	4	N	sickle tickseed	Forb	P	Asteraceae	FACW
Coreopsis tinctoria Nutt.	1	N	golden tickseed	Forb	A	Asteraceae	FAC
Cornus amomum P. Mill.	4	N	silky dogwood	Shrub	P	Cornaceae	FACW+
Cornus foemina P. Mill.	4	N	stiff dogwood	Tree/Shrub	P	Cornaceae	FACW-
Croton capitatus Michx.	2	N	doveweed	Forb	A	Euphorbiaceae	FACW+
Cuphea carthagenensis (Jacq.) J.F. Macbr.	3	N	Colombian waxweed	Forb	A	Lythraceae	FACW
Cuscuta compacta Juss. ex Choisy	3	N	compact dodder	H-Vine	P	Cuscutaceae	NI
Cynodon dactylon (L.) Pers.	0	I	Bermudagrass	Gram	P	Poaceae	FACU
Cynosciadium digitatum DC.	3	N	finger dogshade	Forb	A	Apiaceae	FACW
Cyperus acuminatus Torrey & Hooker	4	N	tapetip flatsedge	Gram	A	Cyperaceae	OBL
Cyperus compressus L.	0	I	poorland flatsedge	Gram	A	Cyperaceae	FACW
Cyperus croceus Vahl.	2	N	Baldwin's flatsedge	Gram	P	Cyperaceae	FAC
Cyperus echinatus (L.) Wood	2	N	glove flatsedge	Gram	P	Cyperaceae	FAC
Cyperus erythrorhizos Muhl.	2	N	redroof flatsedge	Gram	A	Cyperaceae	OBL
Cyperus esculentus L.	0	I	chufa flatsedge	Gram	P	Cyperaceae	FAC
Cyperus flavescens L.	1	N	yellow flatsedge	Gram	A	Cyperaceae	OBL
Cyperus iria L.	0	I	ricefield flatsedge	Gram	A	Cyperaceae	FACW
Cyperus odoratus Vahl.	2	N	fragrant spikesedge	Gram	A	Cyperaceae	FACW
Cyperus pseudovegetus Steud.	2	N	marsh flatsedge	Gram	P	Cyperaceae	FACW
Cyperus retrorsus Chapman	2	N	pine barren flatsedge	Gram	P	Cyperaceae	FACU+
Cyperus squarrosus L.	1	N	bearded flatsedge	Gram	A	Cyperaceae	OBL
Cyperus strigosus L.	2	N	strawcolored flatsedge	Gram	P	Cyperaceae	FACW
Desmanthus illinoensis (Michx.) MacM. Ex B.L. Robbins & Fern	2	N	prairie bundle flower	Shrub	P	Fabaceae	FAC
Desmodium paniculatum (L.) DC.	4	N	panicledleaf ticktrefoil	Forb	P	Fabaceae	FACU
Dichanthelium clandestinum (L.) Gould	5	N	deertongue	Gram	P	Poaceae	FACW
Dichanthelium dichotomum (L.) Gould var. *dichotomum*	6	N	cypress witchgrass	Gram	P	Poaceae	FAC
Dichanthelium laxiflorum (Lam.) Gould	4	N	openflower rosette grass	Gram	P	Poaceae	FAC
Dichanthelium sabulorum (Lam.) Gould & C.A. Clark var. *thinium* (Hitchc. & Chase) Gould & C.A. Clark	5	N	hemlock rosette grass	Gram	P	Poaceae	FACU
Dichanthelium spretum (J.A. Schultes) Freckman	8	N	Eaton's rosettegrass	Gram	P	Poaceae	NI
Digitaria filiformis (L.) Koel.	0	I	slender crabgrass	Gram	A	Poaceae	NI
Digitaria ischaemum (Schreb.) Schreb ex Muhl.	0	I	smooth crabgrass	Gram	A	Poaceae	UPL
Digitaria sanguinalis (L.) Scop.	0	I	hairy crabgrass	Gram	A	Poaceae	FAC-
Dioclea multiflora (Torr.& Gray) C. Mohr	3	N	Boykin's clusterpea	W-Vine	P	Fabaceae	FAC+
Diodia virginiana L.	4	N	Virginia bottonweed	Shrub	A	Rubiaceae	FACW
Diospyros virginiana L.	2	N	common persimmon	Tree	P	Ebenaceae	FAC
Dulichium arundinaceum (L.) Britt.	6	N	threeway sedge	Gram	P	Cyperaceae	OBL
Echinochloa colona (L.) Link	0	I	jungle rice	Gram	A	Poaceae	FACW
Echinochloa crus-galli (L.) Beauv.	0	I	barnyard grass	Gram	A	Poaceae	FACW-
Echinochloa walteri (Pursh) Heller	4	N	coast cockspur grass	Gram	A	Poaceae	OBL
Echinodorus cordifolius (L.) Griseb.	4	N	creeping burrhead	Forb	P	Alistmataceae	OBL
Eclipta prostrata (L.) L.	3	N	false daisy	Forb	A	Asteraceae	FACW-
Eichhornia crassipes (Mart.) Solms	0	I	common water hyacinth	Forb	P	Pontederiaceae	OBL
Eleocharis obtusa (Wild.) J.A. Schultes	4	N	blunt spikerush	Gram	A	Cyperaceae	OBL

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Eleocharis quadrangulata (Michx.) Roemer & J.A. Schultes	5	N	squarestem spikerush	Gram	P	Cyperaceae	OBL
Elephantopus carolinianus Raeusch.	1	N	Carolina elephantsfoot	Forb	P	Asteraceae	FAC
Elymus canadensis L.	3	N	Canada wildrye	Gram	P	Poaceae	FAC
Elymus virginicus L.	4	N	Virginia wildrye	Gram	P	Poaceae	FAC
Epilobium coloratum Biehler	7	N	purple willow	Forb	P	Onagraceae	OBL
Eragrostis hypnoides (Lam.) B.S.P.	5	N	teal lovegrass	Gram	A	Poaceae	OBL
Eragrostis pectinacea (Michx.) Nees ex Steud	2	N	tufted lovegrass	Gram	A	Poaceae	FAC
Eragrostis spectabilis (Pursh) Steud.	2	N	purple lovegrass	Gram	P	Poaceae	FACU
Erechtites hieraciifolia (L.) Raf. ex DC.	1	N	burnweed	Forb	A	Asteraceae	FAC-
Eryngium prostratum Nutt. ex DC.	2	N	creeping eryngo	Forb	P	Apiaceae	FACW
Eupatorium capillifolium (Lam.) Small	3	N	dogfennel	Forb	P	Asteraceae	FACU
Eupatorium fistulosum Barratt	4	N	trumpetweed	Forb	P	Asteraceae	FAC+
Eupatorium perfoliatum L.	3	N	common boneset	Forb	P	Asteraceae	FACW+
Eupatorium serotinum Michx.	2	N	lateflowering throughwort	Forb	P	Asteraceae	FAC
Euphobia maculata L.	1	N	spotted sandmat	Forb	P	Euphorbiaceae	FACW
Euthamia tenuifolia (Pursh) Nutt. var. *tenuifolia*	4	N	slender goldentop	Forb	P	Asteraceae	FAC
Fimbristylis autumnalis (L.) Roemer & J.A. Schultes	2	N	slender fimbry	Gram	A	Cyperaceae	OBL
Fimbristylis caroliniana (Lam.) Fern.	4	N	Carolina fimbry	Gram	P	Cyperaceae	FACW+
Fimbristylis miliacea (L.) Vahl.	0	I	grassvine fimbry	Gram	A	Cyperaceae	OBL
Fimbristylis tomentosa Vahl.	4	N	woody fimbry	Gram	A	Cyperaceae	FACW
Forestiera acuminata (Michx.) Poir.	6	N	eastern swampprivet	Tree	P	Oleaceae	OBL
Fragaria virginiana Duchesne	5	N	Virginia strawberry	Forb	P	Rosaceae	FAC-
Fraxinus americana L.	4	N	white ash	Tree	P	Oleaceae	FACU
Fraxinus pennsylvanica Marsh.	4	N	green ash	Tree	P	Oleaceae	FACW
Galactia regularis (L.) B.S.P.	3	N	eastern milkpea	H-Vine	P	Fabaceae	NI
Galactia volubilis (L.) Britt.	3	N	downy milkpea	H-Vine	P	Fabaceae	FACU
Galium obtusum Bigelow	3	N	bluntleaf bedstraw	Forb	P	Rubiaceae	FACW-
Galium tinctorium L.	1	N	stiff marsh bedstraw	Forb	P	Rubiaceae	FACW
Galium triflorum Michx.	4	N	fragrant bedstraw	Forb	P	Rubiaceae	FACU
Gamochaeta purpureum (L.) Cabrera	2	N	spoonleaf purple everlasting	Forb	A	Asteraceae	UPL
Geranium carolinianum L.	1	N	Carolina geranium	Forb	A	Geraniaceae	NI
Gleditsia triacanthos L.	4	N	honeylocust	Tree	P	Fabaceae	FAC-
Glottidium vesicarium (Jacq.) Harper	0	I	rattle bush	Forb	A	Fabaceae	FAC+
Gossypium hirsutum L.	0	I	Upland cotton	Shrub	A	Malvaceae	UPL
Gratiola virginiana L.	3	N	roundfruit hedgehyssop	Forb	A	Scrophulariaceae	OBL
Habenaria repens Nutt.	4	N	bog orchid	Forb	P	Orchidaceae	OBL
Helenium amarum (Raff.) H. Rock	2	N	yellowdicks	Forb	A	Asteraceae	FACU-
Helenium autumnale L.	3	N	common sneezeweed	Forb	P	Asteraceae	FACW
Helenium flexuosum Raf.	1	N	purplehead sneezeweed	Forb	P	Asteraceae	FACW
Helianthus angustifolius L.	5	N	swamp sunflower	Forb	P	Asteraceae	FAC+
Heliotropium indicum L.	0	I	Indian heliotrope	Forb	A	Borganiaceae	FAC+
Heteranthera dubia (Jacq.) MacM.	5	N	grassleaf mudplantain	Forb	P	Pontederiaceae	OBL
Heteranthera reniformis R.& P.	5	N	kidneyleaf mudplantain	Forb	P	Pontederiaceae	OBL
Hibiscus laevis All.	3	N	halberdleaf rosemallow	Forb	P	Malvaceae	OBL
Hibiscus moscheutos L.	3	N	crimsoneyed rosemallow	Shrub	P	Malvaceae	OBL
Hydrocotyle ranunculoides L.F.	2	N	floating marshpennywort	Forb	P	Apiaceae	OBL
Hydrolea uniflora Raf.	3	N	oneflower false fiddleleaf	Forb	P	Hydrophyllaceae	OBL
Hypericum hypericoides (L.) Crantz	3	N	St. Andrew's cross	Shrub	P	Clusiaceae	FAC
Hypericum mutilum L.	2	N	dwarf St. Johnswort	Forb	A	Clusiaceae	FACW
Impatiens capensis Meerb.	6	N	jewelweed	Forb	A	Balsaminaceae	FACW
Ipomoea cordatotriloba Dennst.	2	N	tievine	H-Vine	P	Convolvulaceae	FACU
Ipomoea hederacea Jacq.	1	N	ivyleaf morning-glory	H-Vine	A	Convolvulaceae	FAC-
Ipomoea lacunosa L.	4	N	whitestar	H-Vine	A	Convolvulaceae	FAC+
Ipomoea wrightii Gray	0	I	Wright's morning-glory	H-Vine	A	Convolvulaceae	FACW-
Itea virginica L.	4	N	Virginia sweetspire	Shrub	P	Grossulariaceae	FACW+
Iva annua L.	1	N	annual marshelder	Forb	A	Asteraceae	FAC
Jacquemontia tamnifolia (L.) Griseb.	2	N	hairy clustervine	H-Vine	A	Convolvulaceae	FACU-
Juncus acuminatus Michx.	3	N	tapertip rush	Gram	P	Juncaceae	OBL
Juncus coriaceus Mackenzie	4	N	leathery rush	Gram	P	Juncaceae	FACW
Juncus dichotomus Ell.	1	N	forked rush	Gram	P	Juncaceae	FACW
Juncus diffusissimus Buckley	2	N	slimpod rush	Gram	P	Juncaceae	FACW
Juncus effusus L.	3	N	common rush	Gram	P	Juncaceae	FACW+
Juncus elliottii Chapman.	1	N	Elliot's rush	Gram	P	Juncaceae	OBL
Juncus marginatus Rostk.	2	N	grassleaf rush	Gram	P	Juncaceae	FACW
Juncus megacephalus M.A. Curtis	2	N	bighead rush	Gram	P	Juncaceae	OBL
Juncus nodatus Coville	2	N	stout rush	Gram	P	Juncaceae	OBL
Juncus polycephalus Michx.	3	N	manyhead rush	Gram	P	Juncaceae	OBL
Juncus scirpoides Lam.	3	N	needlepod rush	Gram	P	Juncaceae	FACW+

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Juncus tenuis Wild.	1	N	poverty rush	Gram	P	Juncaceae	FAC
Juncus torreyi Coville	1	N	Torry's rush	Gram	P	Juncaceae	FACW
Juncus validus Coville	5	N	roundhead rush	Gram	P	Juncaceae	FACW+
Juniperus virginiana L.	1	N	eastern redcedar	Tree	P	Cupressaceae	FACU-
Justicia americana (L.) Vahl.	1	N	American water-willow	Forb	P	Acanthaceae	OBL
Justicia ovata (Walt.) Lindau.	2	N	looseflower water-willow	Forb	P	Acanthaceae	OBL
Krigia caespitosa (Raf.) Champers	1	N	weedy dwarf dandelion	Forb	A	Asteraceae	FACU+
Kummerowia striata (Thunb.) Schindl.	0	I	Japanese clover	Forb	A	Fabaceae	FACU
Kyllinga odorata Vahl.	0	I	fragrant spikesedge	Gram	A	Cyperaceae	FACW
Kyllinga pumila Michx.	1	N	low spikesedge	Gram	A	Cyperaceae	FACW
Leersia lenticularis Michx.	7	N	catchfly grass	Gram	P	Poaceae	OBL
Leersia oryzoides (L.) Sw.	3	N	rice cutgrass	Gram	P	Poaceae	OBL
Leersia virginica Wild.	6	N	whitegrass	Gram	P	Poaceae	FACW
Lemna minor L.	3	N	common duckweed	Forb	P	Lemnaceae	OBL
Leptochloa filiformis (Lam.) Beauv.	2	N	red sprangletop	Gram	A	Poaceae	FACW
Leptochloa panicoides (J. Presl.) A.S. Hitchc.	1	N	Amazon sprangletop	Gram	A	Poaceae	FACW
Lespedeza cuneata (Dum.-Cours) G.Don	0	I	Chinese lespedeza	Shrub	P	Fabaceae	NI
Lespedeza repens (L.) W. Bart	1	N	creeping lespedeza	Forb	P	Fabaceae	NI
Leucospora multifida (Michx.) Nutt.	2	N	narrowleaf paleseed	Forb	A	Scrophulariaceae	OBL
Ligustrum sinense Lour.	0	I	Chinese privet	Shrub	P	Oleacaeae	FAC
Limnobium spongia (Boc) L.C. Rich ex Steud	4	N	American spongeplant	Frob	P	Hydrocharitaceae	OBL
Lindernia dubia (L.) Pennell	4	N	yellowseed false-pimpernel	Forb	A	Scrophulariaceae	OBL
Lindernia dubia (L.) Pennell var. *anagallidea* (Michx,) Cooperrider	3	N	false-pimpernel	Forb	A	Scrophulariaceae	OBL
Liquidambar styraciflua L.	3	N	sweetgum	Tree	P	Hamamelidaceae	FAC+
Liriodendron tulipifera L.	2	N	tuliptree	Tree	P	Magnoliaceae	FAC
Lobelia cardinalis L.	2	N	cardinalflower	Forb	P	Campanulaceae	FACW+
Lobelia siphilitica L.	5	N	great blue lobelia	Forb	P	Campanulaceae	OBL
Lolium arundinaceum (Schreb.) S.J. Darbyshire	0	I	tall fescue	Gram	P	Poaceae	FAC-
Lolium perenne L. ssp. multiflorum (Lam.) Husnot	0	I	Italian ryegrass	Gram	A	Poaceae	FACU
Lolium pratense (Huds) S.J. Darbyshire	0	I	meadow ryegrass	Gram	P	Poaceae	FACU
Lonicera japonica Thunb.	0	I	Japanese honeysuckle	H-Vine	P	Caprifoliaceae	FAC-
Ludwigia alternifolia L.	5	N	seedbox	Forb	P	Onagraceae	OBL
Ludwigia decurrens Walt.	4	N	winged primrose-willow	Forb	A	Onagraceae	OBL
Ludwigia glandulosa Wah.	3	N	cylindricfruit primrose-willow	Forb	P	Onagraceae	OBL
Ludwigia leptocarpa (Nutt.) Hara	2	N	anglestem primrose-willow	Forb/shrub	P	Onagraceae	OBL
Ludwigia palustris (L.) Ell.	3	N	marsh seedbox	Forb	P	Onagraceae	OBL
Ludwigia peploides (Kunth.) Raven	1	N	floating primrose-willow	Forb	P	Onagraceae	OBL
Ludwigia repens J.R. Frost.	3	N	creeping primrose-willow	Forb	P	Onagraceae	OBL
Lycopus americanus Muhl. ex W. Bart.	2	N	American water horehound	Forb	P	Lamiaceae	OBL
Lycopus rubellus Moench.	5	N	taperleaf water horehound	Forb	P	Lamiaceae	OBL
Lycopus virginicus L.	4	N	Virginia water horehound	Forb	P	Lamiaceae	OBL
Lysimachia nummularia L.	0	I	creeping Jenny	Forb	P	Primulaceae	FACW+
Lythrum alatum Pursh.	3	N	winged lythrum	Shrub	P	Lythraceae	FACW+
Lythrum lineare L.	3	N	wand lythrum	Forb	P	Lythraceae	OBL
Maclura pomifera (Raf.) Schnied.	2	N	osage orange	Tree	P	Moraceae	FACU
Magnolia virginiana L.	5	N	sweetbay	Tree	P	Magnoliaceae	FACU
Mecardonia acuminata (Walt.) Small	3	N	axilflower	Forb	P	Scrophulariaceae	FACW
Melothria pendula L.	1	N	Guadeloupe cucumber	Vine	P	Curcurbitaceae	FACW-
Micranthemum umbrosum (J.F. Gmel.) Blake	4	N	shade mudflower	Forb	A	Scrophulariaceae	OBL
Microstegium vimineum (Trin.) A. Camus	0	I	Nepalese browntop	Gram	A	Poaceae	UPL
Mikania scandens (L.) Wild.	3	N	climbing hempvine	W-Vine	P	Asteraceae	FACW+
Mimulus alatus Ait.	5	N	sharpwing monkeyflower	Forb	P	Scrophulariaceae	OBL
Mitreola petiolata (J.F. Gmel.) Torr.& Gray	3	N	lay hornpod	Forb	A	Loganiaceae	FAC+
Morella cerifera (L.) Small	3	N	wax myrtle	Tree	P	Myricaceae	UPL
Morus rubra L.	5	N	red mulberry	Tree	P	Moraceae	FAC
Muhlenbergia schreberi J.F. Gmel.	2	N	nimblewill	Gram	P	Poaceae	FAC
Murdannia keisak (Hassk.) Hand.-Maz.	0	I	watermoving herb	Forb	P	Commelinaceae	OBL
Myosotis macrosperma Engelm.	4	N	largeseed forgetmenot	Forb	A	Boraginaceae	FAC
Myriophyllum aquaticum (Vell.) Verde.	0	I	parrot feather watermilfoil	Forb	P	Haloragaceae	OBL
Najas guadalupensis (Sprang.) Magnus	2	N	southern waternymph	Forb	A	Najadaceae	OBL
Nuphar lutea (L.) Sm.	3	N	spatterdock	Forb	P	Nymphaeaceae	OBL
Nymphaea ordorata Ait.	6	N	American white waterlily	Forb	P	Nymphaeaceae	OBL
Nyssa aquatica L.	6	N	water tupelo	Tree	P	Nyssaceae	OBL
Nyssa sylvatica var. *biflora* Marshall	7	N	swamp tupelo	Tree	P	Nyssaceae	OBL
Oenothera speciosa Nuttall.	1	N	pinkladies	Shrub	P	Onagraceae	NI
Oldenlandia uniflora L.	2	N	clustered mille graines	Shrub	A	Rubiaceae	FACW-
Oryza punctata Kotzchy ex. Steud.	0	I	redrice	Gram	A	Poaceae	NI
Oryza sativa L.	0	I	rice	Gram	A	Poaceae	FAC
Osmunda cinnamomea L.	6	N	cinnamon fern	Fern	P	Osmundaceae	FACW+

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Osmunda regalis L.	6	N	royal fern	Fern	P	Osmundaceae	OBL
Oxalis corniculata L.	6	N	creeping woodsorel	Forb	A	Oxalidaceae	FACU
Oxypolis rigidior (L.) Raff.	8	N	stiff cowbane	Forb	P	Apiaceae	OBL
Panicum dichotomiflorum Michx.	2	N	fall panicgrass	Gram	P	Poaceae	FACW
Panicum rigidulum Bosc. ex Nees	3	N	redtop panicgrass	Gram	P	Poaceae	FACW
Panicum verrucosum Muhl.	3	N	warty panicgrass	Gram	P	Poaceae	FACW
Panicum virgatum L.	2	N	switchgrass	Gram	P	Poaceae	FAC+
Parthenocissus quinquefolia (L.) Planch.	1	N	Virginia creeper	H-Vine	P	Vitaceae	FAC
Paspalum dilatatum Poir.	0	I	dallisgrass	Gram	P	Poaceae	FAC+
Paspalum distichum L.	4	N	knotgrass	Gram	P	Poaceae	OBL
Paspalum laeve Michx.	4	N	field paspalum	Gram	P	Poaceae	FACW-
Paspalum notatum Fluegge	0	I	bahiagrass	Gram	P	Poaceae	FACU+
Paspalum urvillei Stued.	0	I	Vassey' grass	Gram	P	Poaceae	FAC
Passiflora incarnata L.	2	N	purple passionflower	H-Vine	P	Passifloraceae	NI
Penthorum sedoides L.	5	N	ditch stonecrop	Forb	P	Crassulaceae	OBL
Phalaris caroliniana Walt.	2	N	Caroliniana canarygrass	Gram	A	Poaceae	FACW
Phyla lanceolata (Michx.) Greene	3	N	lanceleaf frogfruit	H-Vine	P	Verbenaceae	FACW+
Phyllanthus caroliniensis Walt.	4	N	Carolina leaf-flower	Forb	A	Euphorbiaceae	FAC+
Physalis heterophylla Nees	2	N	clammy groundcherry	Forb	P	Solanaceae	NI
Phytolacca americana L.	2	N	American pokeweed	Forb	P	Phytolaccaceae	FACU+
Pinus taeda L.	1	N	loblolly pine	Tree	P	Pinaceae	FAC
Plantago aristata Michx.	1	N	longbracted plantain	Forb	A	Plantaginaceae	NI
Plantago lanceolata L.	0	I	narrowleaf plantain	Forb	A	Plantaginaceae	FAC
Platanus occidentalis L.	2	N	American sycamore	Tree	P	Platanaceae	FACW-
Pluchea camphorata (L.) DC.	5	N	camphor pluchea	Forb	A	Asteraceae	FACW
Poa annua L.	0	I	annual bluegrass	Gram	A	Poaceae	FAC
Podophyllum peltatum L.	2	N	mayapple	Forb	P	Berberidaceae	FACU
Polygonum amphibium L.	3	N	water knotweed	Forb	P	Polygonaceae	FACW
Polygonum caespitosum Blume	0	I	oriental ladysthumb	Forb	A	Polygonaceae	FACW
Polygonum densiflorum Meisn.	5	N	denseflower knotweed	Forb	P	Polygonaceae	OBL
Polygonum hirsutum Walt.	1	N	hairy smartweed	Forb	P	Polygonaceae	OBL
Polygonum hydropiper L.	0	I	marshpepper knotweed	Forb	A	Polygonaceae	OBL
Polygonum hydropiperoides Michx.	3	N	swamp smartweed	Forb	P	Polygonaceae	OBL
Polygonum lapathifolium L.	0	I	curlytop knotweed	Forb	A	Polygonaceae	FACW
Polygonum pensylvanicum L.	4	N	Pennsylvania smartweed	Forb	A	Polygonaceae	FACW
Polygonum punctatum Ell.	3	N	dotted smartweed	Forb	A	Polygonaceae	FACW+
Polygonum sagittatum L.	7	N	arrowleaf tearthumb	H-Vine	P	Polygonaceae	OBL
Polygonum setaceum Baldw.	3	N	bog smartweed	Forb	P	Polygonaceae	FACW
Polypremum procumbens L.	1	N	juniper leaf	Forb	A	Buddlejaceae	FACU-
Populus deltoides Bartr. ex Marsh.	2	N	eastern cottonwood	Tree	P	Saliacaceae	FAC+
Potamogeton diversifolius Raf.	2	N	weatherthread pondweed	Forb	P	Potamogetonaceae	OBL
Potamogeton nodosus Poir.	2	N	longleaf pondweed	Forb	P	Potamogetonaceae	OBL
Potamogeton pusillus L.	2	N	small pondweed	Forb	P	Potamogetonaceae	FAC+
Proserpinaca palustris L.	4	N	marsh mermaidweed	Forb	P	Haloragaceae	OBL
Ptilimnium capilliaceum (Michx.) Raf.	3	N	herbwilliam	Forb	A	Apiaceae	OBL
Pueraria montana (Lour.) Merr. var. *lobata* (Wild.) Maesen & S. Almeida	0	I	kudzu	W-Vine	P	Fabaceae	NI
Pycnanthemum muticum (Michaux) Person	4	N	clustered mountainmint	Forb	P	Lamiaceae	FAC-
Pyrrhopappus carolinianus (Walt.) DC.	1	N	Carolina desert-chicory	Forb	A	Asteraceae	FACU
Quercus alba L.	4	N	white oak	Tree	P	Fagaceae	FACU
Quercus falcata Michx.	4	N	southern red oak	Tree	P	Fagaceae	FACU-
Quercus laurifolia Michx.	5	N	laurel oak	Tree	P	Fagaceae	FACW
Quercus lyrata Walt.	6	N	overcup oak	Tree	P	Fagaceae	OBL
Quercus nigra L.	3	N	water oak	Tree	P	Fagaceae	FAC
Quercus phellos L.	3	N	willow oak	Tree	P	Fagaceae	FACW-
Ranunculus pusillus Poir.	2	N	low spearwort	Forb	A	Ranunculaceae	FACW+
Ranunculus sardous Crantz	0	I	hairy buttercup	Forb	P	Ranunculaceae	FAC+
Rhexia mariana L.	3	N	Maryland meadowbeauty	Forb	P	Melastomataceae	FACW+
Rhexia virginica L.	2	N	handsome harry	Forb	P	Melastomataceae	FACW+
Rhus copallinum L.	2	N	flameleaf sumac	Tree	P	Anacardiaceae	NI
Rhynchospora corniculata (Lam.) Gray	4	N	shortbristle horned beaksedge	Gram	P	Cyperaceae	OBL
Rhynchospora globularis (Chapman) Small	4	N	globe beaksedge	Gram	A	Cyperaceae	FACW
Rhynchospora glomerata (L.) Vahl.	3	N	clustered beaksedge	Gram	P	Cyperaceae	OBL
Rhynchospora rariflora (Michx.) Ell.	7	N	fewflower beaksedge	Forb	P	Cyperaceae	OBL
Rosa multiflora Thunb. ex Murr.	0	I	rose	W-Vine	P	Rosaceae	UPL
Rotala ramosior (L.) Koehne	3	N	lowland rotala	Forb	A	Lythraceae	OBL
Rubus argutus Link	4	N	sawtooth blackberry	Shrub	P	Rosaceae	FACU+
Rubus hispidus L.	3	N	bristly dewberry	Shrub	P	Rosaceae	FACW
Rubus trivialis Michx.	4	N	southern dewberry	Shurb	P	Rosaceae	FAC
Rumex acetosella L.	0	I	common sheep sorrel	Forb	P	Polygonaceae	FACU+
Rumex crispus L.	0	I	curly dock	Forb	P	Polygonaceae	FAC
Rumex pulcher L.	0	I	fiddle dock	Forb	P	Polygonaceae	FACW

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Saccharum giganteum (Walt.) Pers.	3	N	sugarcane plumegrass	Gram	P	Poaceae	FACW
Sagina decumbens (Ell.) Torr.& Gray	1	N	trailing pearlwort	Forb	A	Caryophyllaceae	FACU
Sagittaria graminea Michx.	3	N	grassy arrowhead	Forb	P	Alismataceae	OBL
Sagittaria latifolia Wild.	3	N	broadleaf arrowhead	Forb	P	Alismataceae	OBL
Salix nigra Marsh.	3	N	black willow	Tree	P	Saliacaceae	OBL
Sambucus nigra L. ssp. *canadensis* (L.) R. Bolli	1	N	common elderberry	Tree	P	Caprifoliaceae	UPL
Saururus cernuus L.	1	N	lizard's tail	Forb	P	Saururaceae	OBL
Schizachyrium scoparium (Michx.) Nash var. *scoparium*	2	N	little bluestem	Gram	P	Poaceae	FACU
Scirpus cyperinus (L.) Kunth	4	N	woolgrass	Gram	P	Cyperaceae	FAC+
Scutellaria integrifolia L.	5	N	helmet flower	Forb	P	Lamiaceae	UPL
Scutellaria lateriflora L.	4	N	blue skullcap	Forb	P	Lamiaceae	FACW+
Scutellaria parvula Michx.	5	N	small skullcap	Forb	P	Lamiaceae	FACU-
Senna obtusifolia (L.) Irwin & Barnelay	0	I	Java-bean	Forb/Shrub	P	Fabaceae	NI
Sesbania herbacea (P. Mill.) McVaugh	2	N	bigpod sesbania	Forb	A	Fabaceae	FACW-
Setaria parviflora (Poir.) Kerguelen	3	N	marsh bristlegrass	Gram	P	Poaceae	OBL
Setaria pumila (Poir.) Boemer & J.A. Schultes	0	I	yellow bristlegrass	Gram	A	Poaceae	OBL
Sida spinosa L.	1	N	prickly fanpetals	Forb/Shrub	P	Malvaceae	OBL
Sisyrinchium angustifolium P. Mill.	4	N	narrowleaf blue-eyed grass	Forb	P	Iridaceae	OBL
Sisyrinchium fuscatum Brickn	4	N	coastalplain blue-eyed grass	Forb	P	Iridaceae	FACU
Smilax bona-nox L.	3	N	saw greenbrier	W-Vine	P	Smilaceae	FAC
Smilax glauca Walt.	3	N	cat greenbrier	W-Vine	P	Smilaceae	FAC
Smilax rotundifolia L.	4	N	roundleaf greenbrier	W-Vine	P	Smilaceae	FAC
Solanum carolinense L.	3	N	Carolina horsenettle	Shrub	P	Solanaceae	FACU
Solanum ptychanthum Dunal	1	N	West Indian nightshade	Forb	A	Solanaceae	FAC
Solidago altissima L.	3	N	goldenrod	Forb	P	Asteraceae	FACU+
Solidago canadensis L. var. scabra	1	N	Canada goldenrod	Forb	P	Asteraceae	FACU
Solidago gigantea Ait.	4	N	giant goldenrod	Forb	P	Asteraceae	FACU
Solidago patula Muhl. ex Wild.	4	N	roundleaf goldenrod	Forb	P	Asteraceae	OBL
Sorghum bicolor (L.) Moench ssp. *bicolor*	0	I	grain sorghum	Gram	A	Poaceae	FACU
Sorghum halepense (L.) Pers.	0	I	Johnsongrass	Gram	P	Poaceae	FACU
Sparganium americanum Nutt.	7	N	American bur-reed	Forb	P	Sporganiaceae	OBL
Sphenoclea zeylanica Gaertn.	0	I	chickenspike	Forb	A	Sphenocleaceae	OBL
Sphenopholis obtusata (Michx.) Scribn.	3	N	prairie wedgescale	Gram	P	Poaceae	FAC+
Sphenopholis pensylvanica (L.) A.S. Hitche.	7	N	swmap wedgescale	Gram	P	Poaceae	OBL
Spirodela polyrrhiza (L.) Schleid.	0	I	common duckmeat	Forb	P	Lemnaceae	OBL
Spirodela punctata (G.F.W. Mey) C.H. Thompson	0	I	dotted duckmeat	Forb	P	Lemnaceae	OBL
Steinchisma hians (Ell.) Nash	5	N	gaping grass	Gram	P	Poaceae	OBL
Styrax americanus Lam.	8	N	American snowbell	Tree	P	Styracaceae	FACW
Symphyotrichum dumosum (L.) Nesom var. *dumosum*	3	N	rice button aster	Forb	P	Asteraceae	FAC
Taxodium distichum (L.) L.C.Rich	5	N	bald cypress	Tree	P	Taxodiaceae	OBL
Teucrium canadense L.	3	N	Canada germander	Forb	P	Lamiaceae	FACW-
Thalia dealbata Fraser ex Roscoe	8	N	Powdery alligator-flag	Forb	P	Marantaceae	OBL
Toxicodendron radicans (L.) Kuntze	1	N	eastern poison ivy	W-Vine	P	Anacardiaceae	FAC
Trachelospermum difforme (Walt.) Gray	4	N	climbing dogsbane	W-Vine	P	Apocynaceae	FACW
Trepocarpus aethusae Nutt. ex DC.	2	N	whitenymph	Forb	A	Apiaceae	FACW
Triadenum walteri (J.G.Gmel.) Gleason	4	N	greater marsh St. Johnswort	Forb	P	Clusiaceae	OBL
Tridens strictus (Nutt.) Nash	3	N	longspike tridens	Gram	P	Poaceae	FACW
Trifolium pratense L.	0	I	red clover	Forb	P	Fabaceae	FACU-
Trifolium repens L.	1	N	white clover	Forb	P	Fabaceae	FACU
Tripsacum dactyloides(L.) L.	3	N	eastern gamagrass	Gram	P	Poaceae	FAC+
Typha latifolia L.	4	N	broadleaf cattail	Forb	P	Typhaceae	OBL
Ulmus alata Michx.	3	N	winged elm	Tree	P	Ulmaceae	FACU
Ulmus americana L.	2	N	American elm	Tree	P	Ulmaceae	FACW
Ulmus rubra Muhl.	4	N	slippery elm	Tree	P	Ulmaceae	FACW
Urochloa platyphylla (Munro ex Wright) R. Webster	2	N	broadleaf signalgrass	Gram	A	Poaceae	FAC+
Utricularia gibba L.	5	N	humped bladderwort	Forb	A	Lentibulariceae	OBL
Utricularia purpurea Walt.	5	N	eastern purple bladderwort	Forb	A	Lentibulariceae	OBL
Valerianella radiata (L.) Dufr.	1	N	beaked cornsalad	Forb	A	Valerianaceae	FAC-
Valerianella umbilicata (Sullivant) Wood	2	N	navel cornsalad	Forb	A	Valerianaceae	FAC
Verbena brasiliensis Vell.	0	I	Brazilian vervain	Shrub	A	Verbenaceae	FAC-
Verbena urticifolia L.	1	N	white vervain	Forb	A	Verbenaceae	FAC+
Vernonia altissima Nutt.	1	N	ironweed	Forb	P	Asteraceae	FAC+
Vernonia gigantea (Walt.) Trel.	1	N	giant ironweed	Forb	P	Asteraceae	FAC+
Veronica arvensis L.	1	N	corn speedwell	Forb	A	Scrophulariaceae	NI
Viburnum nudum L.	5	N	possumhaw	Tree	P	Caprifoliaceae	FACW+
Vicia minutiflora F.G. Dietr.	2	N	pygmy flower vetch	H-Vine	A	Fabaceae	FAC
Vitis cinerea (Engelm.) Millard	4	N	graybark grape	W-Vine	P	Vitaceae	FAC+

Species[1]	CC	Origin[2]	Common name	Growth habit[3]	Life history[3]	Family	Wetland Indicator Status[4]
Vitis rotundifolia Michx.	4	N	muscadine	W-Vine	P	Vitaceae	FAC+
Vitis vulpina L.	2	N	forest grape	W-Vine	P	Vitaceae	FAC+
Wolffia brasiliensis Weddell	2	N	Brazilian watermeal	Forb	P	Lemnaceae	OBL
Wolffia punctata Griseb	2	N	watermeal	Forb	P	Lemnaceae	OBL
Woodwardia areolata (L.) T.Moore	5	N	netted chainfern	Fern	P	Blechnaceae	FAC-
Xanthium strumarium L.	1	N	rough cocklebur	Forb	A	Asteraceae	FACU
Zizaniopsis miliacea (Michx.) Doell & Aschers	5	N	giant cutgrass	Gram	P	Poaceae	FACU

[1] For the most up to date nomenclature, the PLANTS Database (USDA NRCS 2004) was followed, with a few exceptions: *Carex* spp. followed the Flora of North America vol. 23 (Cyperaceae) (1993) and *Solidago* spp. followed Radford et al. (1968). Species identifications were made first with Godfrey and Wooten (1979, 1981) for most obligate wetland species, Cyperaceae, and Poaceae. Other species were first identified with Radford et al. (1968) and Hitchcock (1971).

[2] Origin: N = native, I = Introduced. Determination of species origin and wetland indicator status was a compilation of personal communication with professionals and numerous sources, including botanical key descriptions and the PLANTS Database (USDA). It should be noted that the PLANTS Database should not be the only source when determining origin, because of unresolved inconsistencies in their database; the Flora of North America was considered the definitive source for this information where possible.

[3] Growth habit and life history traits were designated using the PLANTS Database. Seven growth habits were identified: Forb, Graminoid (Gram), Fern, Herbaceous Vine (H-Vine), Woody Vine (W-Vine), Shrub, Tree. Life histories are abbreviated as A (annual) or P (perennial).

[4] Wetland indicator status for the Southeast Region (Reed et al. 1996): OBL (obligate wetland species), occur almost always in wetlands under natural conditions (estimated probability >99%); FACW (facultative wetland species), usually occur in wetlands (67-99% probability); FAC (facultative species), equally likely to occur in wetlands or non-wetlands (34-66% probability); FACU (facultative upland), only occasionally found in wetlands (1-33% probability); UPL (obligate upland), occur almost always under natural conditions in non-wetlands in the region specified (estimated >99% probability); NI, no wetland indicator status assigned for Region 2. Sign following abbreviation indicates greater (+) or lesser (-) affinity for wetlands.