NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

Scientific name:	Hedera helix	USDA Plants Code: HEHE
Common names:	English ivy	
Native distribution:	Eurasia	
Date assessed:	February 3, 2009	
Assessors:	Steve Glenn, Gerry Moore	
Reviewers:	LIISMA SRC	
Date Approved:	02-11-2009	Form version date: 22 October 2008

New York Invasiveness Rank: Moderate (Relative Maximum Score 50.00-69.99)

Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Widespread	Moderate
6	Lower Hudson	Not Assessed	Not Assessed
7	Saint Lawrence/Eastern Lake Ontario	Not Assessed	Not Assessed
8	Western New York	Not Assessed	Not Assessed

Invasiveness Ranking Summary (see details under appropriate sub-section)		Total (Total Answered*) Possible	Total
1	Ecological impact	40 (40)	20
2	Biological characteristic and dispersal ability	25 (25)	20
3	Ecological amplitude and distribution	25 (25)	18
4	Difficulty of control	10 (10)	8
	Outcome score	100 (100)[b]	66[a]
	Relative maximum score †		66.00
	New York Invasiveness Rank §	Moderate (Relative Maximum Score 50.00-69.99)	

* For questions answered "unknown" do not include point value in "Total Answered Points Possible." If "Total Answered Points Possible" is less than 70.00 points, then the overall invasive rank should be listed as "Unknown."
†Calculated as 100(a/b) to two decimal places.
§Very High >80.00; High 70.00–80.00; Moderate 50.00–69.99; Low 40.00–49.99; Insignificant <40.00

A. DISTRIBUTION (KNOWN/POTENTIAL): Summarized from individual PRISM forms

A1.1. Has this species been documented to persist without cultivation in NY? (reliable source; voucher not required)	
☒	Yes – continue to A1.2
☐	No – continue to A2.1
A1.2. In which PRISMs is it known (see inset map)?	
☐	Adirondack Park Invasive Program
☐	Capital/Mohawk
☐	Catskill Regional Invasive Species Partnership
☒	Finger Lakes
☒	Long Island Invasive Species Management Area
☒	Lower Hudson
☐	Saint Lawrence/Eastern Lake Ontario
☐	Western New York

Documentation:
Sources of information:
Weldy & Werier, 2009; Brooklyn Botanic Garden, 2009.

A2.1. What is the likelihood that this species will occur and persist outside of cultivation, given the climate in the following PRISMs? (obtain from PRISM invasiveness ranking form)

Not Assessed	Adirondack Park Invasive Program
Not Assessed	Capital/Mohawk
Not Assessed	Catskill Regional Invasive Species Partnership
Not Assessed	Finger Lakes
Very Likely	Long Island Invasive Species Management Area
Not Assessed	Lower Hudson
Not Assessed	Saint Lawrence/Eastern Lake Ontario
Not Assessed	Western New York

Documentation:
Sources of information (e.g.: distribution models, literature, expert opinions):
Brooklyn Botanic Garden, 2009.

If the species does not occur and is not likely to occur with any of the PRISMs, then stop here as there is no need to assess the species.

A2.2. What is the current distribution of the species in each PRISM? (obtain rank *from PRISM invasiveness ranking forms*)

	Distribution
Adirondack Park Invasive Program	Not Assessed
Capital/Mohawk	Not Assessed
Catskill Regional Invasive Species Partnership	Not Assessed
Finger Lakes	Not Assessed
Long Island Invasive Species Management Area	Widespread
Lower Hudson	Not Assessed
Saint Lawrence/Eastern Lake Ontario	Not Assessed
Western New York	Not Assessed

Documentation:
Sources of information:
Brooklyn Botanic Garden, 2009.

A2.3. Describe the potential or known suitable habitats within New York. Natural habitats include all habitats not under active human management. Managed habitats are indicated with an asterisk.

Aquatic Habitats	Wetland Habitats	Upland Habitats
☐ Salt/brackish waters	☐ Salt/brackish marshes	☒ Cultivated*
☐ Freshwater tidal	☐ Freshwater marshes	☒ Grasslands/old fields
☐ Rivers/streams	☐ Peatlands	☐ Shrublands
☐ Natural lakes and ponds	☐ Shrub swamps	☒ Forests/woodlands
☐ Vernal pools	☒ Forested wetlands/riparian	☐ Alpine
☐ Reservoirs/impoundments*	☐ Ditches*	☒ Roadsides*
	☐ Beaches and/or coastal dunes	

Other potential or known suitable habitats within New York:
Salt marsh edges, coastal areas, urban areas

Documentation:
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006; Brooklyn Botanic Garden, 2009.

B. INVASIVENESS RANKING

1. ECOLOGICAL IMPACT

1.1. Impact on Natural Ecosystem Processes and System-Wide Parameters (e.g. fire regime, geomorphological changes (erosion, sedimentation rates), hydrologic regime, nutrient and mineral dynamics, light availability, salinity, pH)

A.	No perceivable impact on ecosystem processes based on research studies, or the absence of impact information if a species is widespread (>10 occurrences in minimally managed areas), has been well-studied (>10 reports/publications), and has been present in the northeast for >100 years.	0
B.	Influences ecosystem processes to a minor degree (e.g., has a perceivable but mild influence on soil nutrient availability)	3
C.	Significant alteration of ecosystem processes (e.g., increases sedimentation rates along streams or coastlines, reduces open water that are important to waterfowl)	7
D.	Major, possibly irreversible, alteration or disruption of ecosystem processes (e.g., the species alters geomorphology and/or hydrology, affects fire frequency, alters soil pH, or fixes substantial levels of nitrogen in the soil making soil unlikely to support certain native plants or more likely to favor non-native species)	10
U.	Unknown	

Score 3

Documentation:
Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)
Abundant production of thick leaves results in a leaf litter that increases nitrogen levels in the soil and reduces light availability.
Sources of information:
Fellows, 2004; authors' pers. obs..

1.2. Impact on Natural Community Structure

A.	No perceived impact; establishes in an existing layer without influencing its structure	0
B.	Influences structure in one layer (e.g., changes the density of one layer)	3
C.	Significant impact in at least one layer (e.g., creation of a new layer or elimination of an existing layer)	7
D.	Major alteration of structure (e.g., covers canopy, eradicating most or all layers below)	10
U.	Unknown	

Score 7

Documentation:
Identify type of impact or alteration:
Vines can climb up trees, up to 30m, slowly killing the tree from the base upwards by enveloping branches and twigs. The added weight of vines also makes trees susceptible to blowing over during storms.
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006; Schnitzler & Heuzea, 2006.

1.3. Impact on Natural Community Composition

A.	No perceived impact; causes no apparent change in native populations	0
B.	Influences community composition (e.g., reduces the number of individuals in one or more native species in the community)	3
C.	Significantly alters community composition (e.g., produces a significant reduction in the population size of one or more native species in the community)	7
D.	Causes major alteration in community composition (e.g., results in the extirpation of one or several native species, reducing biodiversity or change the community composition towards species exotic to the natural community)	10

U. Unknown

Score 7

Documentation:
Identify type of impact or alteration:
Dense stands preclude the establishment and regeneration of native woody plant communities, threatening long-term persistence of forests. May kill trees. Infestations led to a marginally significant reduction in the germination rate of Coreopsis lancelota seeds (Biggerstaff & Beck, 2007).
Sources of information:
Fellows, 2004; Dlugosch, 2005; Vidra et al., 2006; Biggerstaff & Beck, 2007.

1.4. Impact on other species or species groups (cumulative impact of this species on the animals, fungi, microbes, and other organisms in the community it invades. Examples include reduction in nesting/foraging sites; reduction in habitat connectivity; injurious components such as spines, thorns, burrs, toxins; suppresses soil/sediment microflora; interferes with native pollinators and/or pollination of a native species; hybridizes with a native species; hosts a non-native disease which impacts a native species)

A. Negligible perceived impact 0
B. Minor impact 3
C. Moderate impact 7
D. Severe impact on other species or species groups 10
U. Unknown

Score 3

Documentation:
Identify type of impact or alteration:
Reduces animal feeding habitats. Serves as a reservoir for bacterial leaf scorch (Xylella fastidiosa), which infects and harms oaks, elms, and maples. Reported to reduce habitat for bald eagles by toppling nesting and roosting trees.
Sources of information:
Morisawa, 1999; Fellows, 2004.

Total Possible 40
Section One Total 20

2. BIOLOGICAL CHARACTERISTICS AND DISPERSAL ABILITY

2.1. Mode and rate of reproduction (provisional thresholds, more investigation needed)

A. No reproduction by seeds or vegetative propagules (i.e. plant sterile with no sexual or asexual reproduction). 0
B. Limited reproduction (fewer than 10 viable seeds per plant AND no vegetative reproduction; if viability is not known, then maximum seed production is less than 100 seeds per plant and no vegetative reproduction) 1
C. Moderate reproduction (fewer than 100 viable seeds per plant - if viability is not known, then maximum seed production is less than 1000 seeds per plant - OR limited successful vegetative spread documented) 2
D. Abundant reproduction with vegetative asexual spread documented as one of the plants prime reproductive means OR more than 100 viable seeds per plant (if viability is not known, then maximum seed production reported to be greater than 1000 seeds per plant.) 4
U. Unknown

Score 4

Documentation:
Describe key reproductive characteristics (including seeds per plant):

Capable of rampant vegetative growth. The trailing plants do not produce flowers or fruits, however climibing plants will produce abundant fruit. Also stem fragments root easily.
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006.

2.2. Innate potential for long-distance dispersal (e.g. bird dispersal, sticks to animal hair, buoyant fruits, pappus for wind-dispersal)

A.	Does not occur (no long-distance dispersal mechanisms)	0
B.	Infrequent or inefficient long-distance dispersal (occurs occasionally despite lack of adaptations)	1
C.	Moderate opportunities for long-distance dispersal (adaptations exist for long-distance dispersal, but studies report that 95% of seeds land within 100 meters of the parent plant)	2
D.	Numerous opportunities for long-distance dispersal (adaptations exist for long-distance dispersal and evidence that many seeds disperse greater than 100 meters from the parent plant)	4
U.	Unknown	

Score 2

Documentation:
Identify dispersal mechanisms:
Endozoochory- dispersed by avian frugivores; one study found high potential germination viability of seeds post avian gut passage. However, only the climbing stems in a population have the potential to produce fruit and seed.
Sources of information:
Fellows, 2004; Hernandez, 2005; Swearingen & Diedrich, 2006.

2.3. Potential to be spread by human activities (both directly and indirectly – possible mechanisms include: commercial sales, use as forage/revegetation, spread along highways, transport on boats, contaminated compost, land and vegetation management equipment such as mowers and excavators, etc.)

A.	Does not occur	0
B.	Low (human dispersal to new areas occurs almost exclusively by direct means and is infrequent or inefficient)	1
C.	Moderate (human dispersal to new areas occurs by direct and indirect means to a moderate extent)	2
D.	High (opportunities for human dispersal to new areas by direct and indirect means are numerous, frequent, and successful)	3
U.	Unknown	

Score 3

Documentation:
Identify dispersal mechanisms:
Used as an ornamental with 400+ cultivars; also planted for weed control. Cooperative Extension offices continue to recommend English ivy for use as a low maintenance alternative to lawns. A further complication: one study in the Pacific Northwest (Clarke et al., 2006) found 'English ivy' to be complex of several distinct taxa including H. hibernica. Indirect spread can occur through the disposal of yard waste.
Sources of information:
Morisawa, 1999; Fellows, 2004; Clarke et al., 2006; Swearingen & Diedrich, 2006.

2.4. Characteristics that increase competitive advantage, such as shade tolerance, ability to grow on infertile soils, perennial habit, fast growth, nitrogen fixation, allelopathy, etc.

A.	Possesses no characteristics that increase competitive advantage	0
B.	Possesses one characteristic that increases competitive advantage	3
C.	Possesses two or more characteristics that increase competitive advantage	6

U. Unknown

Score 6

Documentation:
Evidence of competitive ability:
Perennial woody evergreen; grows easily in many types of soil including a wide range of soil pH (but prefers slightly acidic soils) and in sun or shade. English ivy is also fairly drought tolerant once it is established. One study found Hedera leaves capable of acclimating to strong light conditions (Hoflacher & Bauer, 1982) perhaps inhancing capability to exploit gap openings.
Sources of information:
Hoflacher & Bauer, 1982; Morisawa, 1999; Fellows, 2004; Swearingen & Diedrich, 2006.

2.5. Growth vigor

A. Does not form thickets or have a climbing or smothering growth habit 0
B. Has climbing or smothering growth habit, forms a dense layer above shorter vegetation, forms dense thickets, or forms a dense floating mat in aquatic systems where it smothers other vegetation or organisms 2
U. Unknown

Score 2

Documentation:
Describe growth form:
Has climbing and smothering habit.
Sources of information:
Author's personal observations; Fellows, 2004; Dlugosch, 2005; Vidra et al., 2006; Biggerstaff & Beck, 2007; authors' pers. obs.

2.6. Germination/Regeneration

A. Requires open soil or water and disturbance for seed germination, or regeneration from vegetative propagules. 0
B. Can germinate/regenerate in vegetated areas but in a narrow range or in special conditions 2
C. Can germinate/regenerate in existing vegetation in a wide range of conditions 3
U. Unknown (No studies have been completed)

Score 3

Documentation:
Describe germination requirements:
One study found Hedera able to germinate on forest litter.
Sources of information:
Laskurain et al., 2004.

2.7. Other species in the genus invasive in New York or elsewhere

A. No 0
B. Yes 3
U. Unknown

Score 0

Documentation:
Species:

Total Possible 25
Section Two Total 20

3. ECOLOGICAL AMPLITUDE AND DISTRIBUTION

3.1. Density of stands in natural areas in the northeastern USA and eastern Canada (use same definition as Gleason & Cronquist which is: "The part of the United States

covered extends from the Atlantic Ocean west to the western boundaries of Minnesota, Iowa, northern Missouri, and southern Illinois, south to the southern boundaries of Virginia, Kentucky, and Illinois, and south to the Missouri River in Missouri. In Canada the area covered includes Nova Scotia, Prince Edward Island, New Brunswick, and parts of Quebec and Ontario lying south of the 47th parallel of latitude")

A.	No large stands (no areas greater than 1/4 acre or 1000 square meters)	0
B.	Large dense stands present in areas with numerous invasive species already present or disturbed landscapes	2
C.	Large dense stands present in areas with few other invasive species present (i.e. ability to invade relatively pristine natural areas)	4
U.	Unknown	

Score: 2

Documentation:
Identify reason for selection, or evidence of weedy history:
Large stands observed in the New York metropolitan area, usually in disturbed urban areas and woodlots with other invasives present.
Sources of information:
Authors' personal observations.

3.2. Number of habitats the species may invade

A.	Not known to invade any natural habitats given at A2.3	0
B.	Known to occur in two or more of the habitats given at A2.3, with at least one a natural habitat.	1
C.	Known to occur in three or more of the habitats given at A2.3, with at least two a natural habitat.	2
D.	Known to occur in four or more of the habitats given at A2.3, with at least three a natural habitat.	4
E.	Known to occur in more than four of the habitats given at A2.3, with at least four a natural habitat.	6
U.	Unknown	

Score: 4

Documentation:
Identify type of habitats where it occurs and degree/type of impacts:
See A2.3.
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006; Brooklyn Botanic Garden, 2009.

3.3. Role of disturbance in establishment

A.	Requires anthropogenic disturbances to establish.	0
B.	May occasionally establish in undisturbed areas but can readily establish in areas with natural or anthropogenic disturbances.	2
C.	Can establish independent of any known natural or anthropogenic disturbances.	4
U.	Unknown	

Score: 2

Documentation:
Identify type of disturbance:
While some of the literature claims minor disturbance needed, it can occasionally invade intact undisturbed ecosystems. One study found Hedera leaves capable of acclimating to strong light conditions (Hoflacher & Bauer, 1982), perhaps enhancing capability to exploit gap openings. One study (Laskurain et al., 2004) found Hedera able to emerge on litter and maintain a conspicuous seedling bank.
Sources of information:

Hoflacher & Bauer, 1982; Fellows, 2004; Laskurain et al., 2004.

3.4. Climate in native range

A. Native range does not include climates similar to New York 0
B. Native range possibly includes climates similar to at least part of New York. 1
C. Native range includes climates similar to those in New York 3
U. Unknown

Score 3

Documentation:
Describe what part of the native range is similar in climate to New York:
Europe, western Asia.
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006.

3.5. Current introduced distribution in the northeastern USA and eastern Canada (see question 3.1 for definition of geographic scope)

A. Not known from the northeastern US and adjacent Canada 0
B. Present as a non-native in one northeastern USA state and/or eastern Canadian province. 1
C. Present as a non-native in 2 or 3 northeastern USA states and/or eastern Canadian provinces. 2
D. Present as a non-native in 4–8 northeastern USA states and/or eastern Canadian provinces, and/or categorized as a problem weed (e.g., "Noxious" or "Invasive") in 1 northeastern state or eastern Canadian province. 3
E. Present as a non-native in >8 northeastern USA states and/or eastern Canadian provinces. and/or categorized as a problem weed (e.g., "Noxious" or "Invasive") in 2 northeastern states or eastern Canadian provinces. 4
U. Unknown

Score 4

Documentation:
Identify states and provinces invaded:
CT, DC, DE, IL, IN, KY, MA, MD, MI, OH, PA, NJ, NY, VA, WV.
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.
Brooklyn Botanic Garden, 2009; U.S.D.A., 2009.

3.6. Current introduced distribution of the species in natural areas in the eight New York State PRISMs (Partnerships for Regional Invasive Species Management)

A. Present in none of the PRISMs 0
B. Present in 1 PRISM 1
C. Present in 2 PRISMs 2
D. Present in 3 PRISMs 3
E. Present in more than 3 PRISMs or on the Federal noxious weed lists 4
U. Unknown

Score 3

Documentation:
Describe distribution:
See A1.1. Likely to have less seed set in colder climates where climbing stems are subject to winter burn and not able to set fruit.
Sources of information:
Weldy & Werier, 2009; Brooklyn Botanic Garden, 2009.

Total Possible	25
Section Three Total	18

4. DIFFICULTY OF CONTROL

4.1. Seed banks

A. Seeds (or vegetative propagules) remain viable in soil for less than 1 year, or does not make viable seeds or persistent propagules. 0
B. Seeds (or vegetative propagules) remain viable in soil for at least 1 to 10 years 2
C. Seeds (or vegetative propagules) remain viable in soil for more than 10 years 3
U. Unknown

Score 2

Documentation:
Identify longevity of seed bank:
No definitive seed-banking studies located. One study found Hedera able to emerge on litter and maintain a "conspicuous seedling bank"- intimating a possible seed-banking capacity with seeds remaining viable for at least over one year.
Sources of information:
Laskurain et al., 2004.

4.2. Vegetative regeneration

A. No regrowth following removal of aboveground growth 0
B. Regrowth from ground-level meristems 1
C. Regrowth from extensive underground system 2
D. Any plant part is a viable propagule 3
U. Unknown

Score 2

Documentation:
Describe vegetative response:
Underground roots and stem fragments root easily.
Sources of information:
Fellows, 2004; Swearingen & Diedrich, 2006.

4.3. Level of effort required

A. Management is not required: e.g., species does not persist without repeated anthropogenic disturbance. 0
B. Management is relatively easy and inexpensive: e.g. 10 or fewer person-hours of manual effort (pulling, cutting and/or digging) can eradicate a 1 acre infestation in 1 year (infestation averages 50% cover or 1 plant/100 ft^2). 2
C. Management requires a major short-term investment: e.g. 100 or fewer person-hours/year of manual effort, or up to 10 person-hours/year using mechanical equipment (chain saws, mowers, etc.) for 2-5 years to suppress a 1 acre infestation. Eradication is difficult, but possible (infestation as above). 3
D. Management requires a major investment: e.g. more than 100 person-hours/year of manual effort, or more than 10 person hours/year using mechanical equipment, or the use of herbicide, grazing animals, fire, etc. for more than 5 years to suppress a 1 acre infestation. Eradication may be impossible (infestation as above). 4
U. Unknown

Score 4

Documentation:
Identify types of control methods and time-term required:
Repeated mechanical removal or burning of vines may be successful; but follow up action will likely be nessesary as initial cutting can cause extensive resprouting. Foliar applications of herbicides often don't work- the cuticle on the leaves often prevents herbicides, especially

hydrophilic compounds such as glyphosate, from permeating the leaves (the use of a non-ionic surfactant may inhance foliar applications, but repeat applications are still likely to be necessary).

A combination of cutting followed by application of herbicide to rooted, living cut surfaces is likely to be the most effective approach- control of H. helix that had been cut and then sprayed has been achieved with triclopyr (e.g., Garlon® 3A and Garlon® 4), glyphosate (e.g., Accord®, Glypro®, Rodeo®), and 2,4-D.

Mulching may be an effective choice for smaller infestations when herbicides are not appropriate. Cover the entire infestation with several inches of mulch. This may include wood chips, grass clippings, hay or similar degradable plant material. Covering the area with cardboard or tarps may improve the effectiveness and longevity of this method. The mulch should stay in place for at least two growing seasons and may need to be augmented several times. Mulching can also be done following herbicide treatment.

There are no biological controls currently available for English ivy.

Note: Hedera helix and its cultivars have been generally given a minimum USDA Hardiness Zone rating of 6a, with a few cultivars rated to 5a (Flint, 1983). The current stations for Hedera helix in New York are in the northern Finger Lakes PRISM (Monroe County) and the Lower Hudson and Long Island PRISMs (Brooklyn Botanic Garden. 2009; Weldy & Werier, 2009)- all areas within zone 6. Additionally, the northeasternmost station is reported from coastal Massachussetts- zone 7a (USDA, 2009). While Hedera helix has an invasiveness ranking of "high", the apparent cold-hardiness barrier may mitigate this ranking for upstate NY regions with a USDA hardiness rating of 5a or colder.

Sources of information:
Flint, 1983; Morisawa, 1999; Fellows, 2004; Swearingen & Diedrich, 2006; Brooklyn Botanic Garden. 2009; USDA, 2009; Weldy & Werier, 2009.

Total Possible	10
Section Four Total	8

Total for 4 sections Possible	100
Total for 4 sections	66

C. STATUS OF CULTIVARS AND HYBRIDS:

At the present time (May 2008) there is no protocol or criteria for assessing the invasiveness of cultivars independent of the species to which they belong. Such a protocol is needed, and individuals with the appropriate expertise should address this issue in the future. Such a protocol will likely require data on cultivar fertility and identification in both experimental and natural settings.

Hybrids (crosses between different parent species) should be assessed individually and separately from the parent species wherever taxonomically possible, since their invasiveness may differ from that of the parent species. An exception should be made if the taxonomy of the species and hybrids are uncertain, and species and hybrids can not be clearly distinguished in the field. In such cases it is not feasible to distinguish species and hybrids, and they can only be assessed as a single unit.

Some cultivars of the species known to be available: 400+ cultivars that differ according to leaf size, leaf variegation, plant habit, etc. The most common hardy cultivars grown include ‘Baltica’, ‘Bulgaria’, ‘Hibernica’ and ‘Thorndale.’ J. Lehrer

References for species assessment:

Biggerstaff, M.S., & C. W. Beck. 2007. Effects of English ivy (Hedera helix) on seed bank formation and germination. American Midland Naturalist. 157(2):250-257.

Brooklyn Botanic Garden. 2009. AILANTHUS database. [Accessed on 3 February 2009].

Clarke, M. M., S. H. Reichard, & C. W. Hamilton. 2006. Prevalence of different horticultural taxa of ivy (Hedera spp., Araliaceae) in invading populations. Biological Invasions. 8(2):149-157.

Dlugosch, K. M. 2005. Understory community changes associated with English ivy invasions in Seattle's urban parks. Northwest Science. 79(1):53-60.

Fellows, M. 2004. Hedera helix. U.S. Invasive Species Impact Rank (I-Rank). NatureServe Explorer. <www.natureserve.org>. [Accessed on 3 February 2009].

Flint, H. L. 1983. Landscape plants for eastern North America. JohnWiley & Sons, NY. 677 pp.

Hernandez, A. 2005. Blackcaps, Sylvia atricapilla and blackbirds, Turdus merula feeding their nestlings and fledglings on fleshy fruit. Folia Zoologica. 54(4):379-388.

Hoflacher, H & H. Bauer. 1982. Light acclimation in leaves of the juvenile and adult life phaes of ivy (Hedera helix). Physiologia Plantarum. 56(2):177-182.

Laskurain, N. A., A. Escudero, J. M. Olano, & J. Loidi. 2004. Seedling dynamics of shrubs in a fully closed temperate forest: greater than expected. Ecography. 27(5):650-658.

Morisawa, T. 1999. Weed notes: Hedera helix L.The Nature Conservancy Wildland Weeds Management and Research.<http://tncweeds.ucdavis.edu> [Accessed on 3 February 2009].

Schnitzler, A. & P. Heuzea. 2006. Ivy (Hedera helix L.) dynamics in riverine forests: Effects of river regulation and forest disturbance. Forest Ecology & Management. 236(1):12-17.

Swearingen, J. & S. Diedrich. 2006. Plant Conservation Alliance - English Ivy (Hedera helix). <http://www.nps.gov/plants/alien/fact/hehe1.htm> [Accessed on 3 February 2009].

United States Department of Agriculture, National Resources Conservation Service. 2009. The PLANTS Database. National Plant Data Center, Baton Rouge, Louisiana [Accessed on 3 February 2009].

Vidra, R. L., T. H. Shear, & T. R. Wentworth. 2006. Testing the paradigms of exotic species invasion in urban riparian forests. Natural Areas Journal. 26(4):339-350.

Weldy, T. & D. Werier. 2009. New York Flora Atlas. [S. M. Landry and K. N. Campbell (original application development), Florida Center for Community Design and Research. University of South Florida]. New York Flora Association, Albany, New York. [Accessed on 3 February 2009].

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Acknowledgments: The NY form incorporates components and approaches used in several other systems, cited in the references below. Valuable contributions by members of the Long Island Invasive Species Management Area's Scientific Review Committee were incorporated in revisions of this form. Original members of the LIISMA SRC included representatives of the Brooklyn Botanic Garden; The Nature Conservancy; New York Natural Heritage Program, New York Sea Grant; New York State Office of Parks, Recreation and Historic Preservation; National Park Service; Brookhaven National Laboratory; New York State Department of Environmental Conservation Region 1; Cornell Cooperative Extension of Suffolk/Nassau Counties; Long Island Nursery and Landscape Association; Long Island Farm Bureau; SUNY Farmingdale Ornamental Horticulture Department; Queens College Biology Department; Long Island Botanical Society; Long Island Weed Information Management System database manager; Suffolk County Department of Parks, Recreation and Conservation; Nassau County Department of Parks, Recreation and Museums; Suffolk County Soil & Water Conservation District.

References for ranking form:

Carlson, Matthew L., Irina V. Lapina, Michael Shephard, Jeffery S. Conn, Roseann Densmore, Page Spencer, Jeff Heys, Julie Riley, Jamie Nielsen. 2008. Invasiveness ranking system for non-native plants of Alaska. Technical Paper R10-TPXX, USDA Forest Service, Alaska Region, Anchorage, AK XX9. Alaska Weed Ranking Project may be viewed at: http://akweeds.uaa.alaska.edu/akweeds_ranking_page.htm.

Heffernan, K.E., P.P. Coulling, J.F. Townsend, and C.J. Hutto. 2001. Ranking Invasive Exotic Plant Species in Virginia. Natural Heritage Technical Report 01-13. Virginia Dept. of Conservation and Recreation, Division of Natural Heritage, Richmond, Virginia. 27 pp. plus appendices (total 149 p.).

Morse, L.E., J.M. Randall, N. Benton, R. Hiebert, and S. Lu. 2004. An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity. Version 1. NatureServe, Arlington, Virginia. http://www.natureserve.org/getData/plantData.jsp

Randall, J.M., L.E. Morse, N. Benton, R. Hiebert, S. Lu, and T. Killeffer. 2008. The Invasive Species Assessment Protocol: A Tool for Creating Regional and National Lists of Invasive Nonnative Plants that Negatively Impact Biodiversity. Invasive Plant Science and Management 1:36–49

Warner, Peter J., Carla C. Bossard, Matthew L. Brooks, Joseph M. DiTomaso, John A. Hall, Ann M.Howald, Douglas W. Johnson, John M. Randall, Cynthia L. Roye, Maria M. Ryan, and Alison E. Stanton. 2003. Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands. Available online at www.caleppc.org and www.swvma.org. California Exotic Pest Plant Council and Southwest Vegetation Management Association. 24 pp.

Williams, P. A., and M. Newfield. 2002. A weed risk assessment system for new conservation weeds in New Zealand. Science for Conservation 209. New Zealand Department of Conservation. 1-23 pp.