NEW YORK
NON-NATIVE PLANT INVASIVENESS RANKING FORM

Scientific name:	Robinia pseudoacacia	USDA Plants Code: ROPS
Common names:	Black locust	
Native distribution:	United States in the central and southern Appalachians and the Ozarks	
Date assessed:	January 5, 2009; edited March 17, 2010	
Assessors:	Gerry Moore	
Reviewers:	LIISMA SRC	
Date Approved:	21 Jan 2009	Form version date: 22 October 2008

New York Invasiveness Rank: Very High (Relative Maximum Score >80.00)

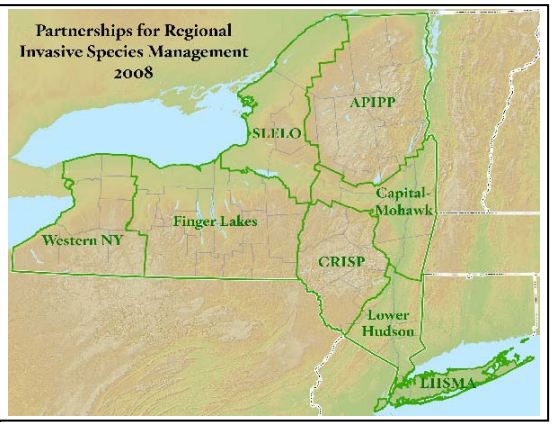
Distribution and Invasiveness Rank (*Obtain from PRISM invasiveness ranking form*)			
	Status of this species in each PRISM:	Current Distribution	PRISM Invasiveness Rank
1	Adirondack Park Invasive Program	Not Assessed	Not Assessed
2	Capital/Mohawk	Not Assessed	Not Assessed
3	Catskill Regional Invasive Species Partnership	Not Assessed	Not Assessed
4	Finger Lakes	Not Assessed	Not Assessed
5	Long Island Invasive Species Management Area	Widespread	Very High
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 (30)	30
2	Biological characteristic and dispersal ability	25 (25)	16
3	Ecological amplitude and distribution	25 (25)	19
4	Difficulty of control	10 (10)	8
	Outcome score	100 (90)[b]	73[a]
	Relative maximum score †		81.11
	New York Invasiveness Rank §	Very High (Relative Maximum Score >80.00)	

* 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, 2008; 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:
Weldy & Werier, 2008; 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:

Documentation:
Sources of information:
Maybury, 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 10

Documentation:

Identify ecosystem processes impacted (or if applicable, justify choosing answer A in the absence of impact information)

A nitrogen-fixing species. A Massachusetts study, in a nutrient poor landscape with few invasive species, found that this species facilitated the invasion of other non-native plants, probably through increasing soil nitrogen (Von Holle et al. 2006). Also the elevated soil ammonium levels have been found to continue for many years after the locust trees are removed (Von Holle 2005). These areas (now usually with black cherry in the overstory) continue to have higher non-native species richness than native pine-oak stands in the same area (Von Holle 2005). In another study, it was shown that where black locust has shaded out the ground layer vegetation, fire regimes may have been altered (Wieseler 2005). Similar observation have been made by the authors in the Pine Barrens of New Jersey.

Sources of information:

Von Holle, 2006; Wieseler, 2005; Maybury, 2006; author's personal observations.

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 10

Documentation:

Identify type of impact or alteration:

This species can occur in desne stands and also can change the density of layers below -- either by decreasing the density of natives and sometimes increasing the density of non-natives. Can create a new tree layer in grasslands, field and hedgerows (LIISMA SRC, obs), such as the William Floyd Estate on Long Island. In the Albany Pine Bush black locust stands are dense with heavy shade, with little growing below. Just outside of the locust stands native shrubs are present.

Sources of information:

Converse, 1984; Wieseler, 2005; Maybury, 2005; authors' personal observations; S.Young (NYNHP) personal obs.

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 10

Documentation:
Identify type of impact or alteration:
Stands of this species have been shown to reduce native plants through shading and soil chemistry alterations (Wisconsin DNR , 2004; Wieseler, 2004; Minnesota DNR, 2006), which also change the species composition towards other non-native species (Von Holle et al., 2006). Similar impacts appear to occur in the Albany Pine Bush.
Sources of information:
Wieseler, 2004; Wisconsin DNR, 2004; Von Holle et al., 2006; Minnesota DNR, 2006; author's personal observations.

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 U

Documentation:
Identify type of impact or alteration:
May significantly influence the insect communities. Fewer arthropod species were found on Robinia pseudoacacia than on a native locust, Robinia neomexicana, in a 2-year study in Arizona, and only 12 species (out of 251 found on the native) were also found on Robinia pseudoacacia (Degomez & Wagner 2001). However, this study does not apply to New York, which has no native species of Robinia. The stipules are usually modified into spines in young material but the plant is not exceptionally spiny even then. The species can be fatal to livestock if bark, seeds or leaves are ingested, but studies not done on the effects of wildlife (Hickman, 1993). Studies also needed on species' effects on soil microflora.
Sources of information:
Degomez & Wagner, 2001; Maybury, 2006; authors' personal observations.

Total Possible 30
Section One Total 30

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):
Individual trees can produce hundreds of pods with thousands of seeds. Species can vegetatively reproduce through extensive root suckering. Some trees belong to a variety (R. p. var rectissima) that produces almost no seed.
Sources of information:
Wisconsin DNR, 2004; Minnesota DNR, 2006; Maybury, 2006; author's personal observations.

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:
No obvious long distance mechanisms for this species have been reported. The fruit and seeds do not appear to have adaptations for long distance dispersal. Seeds can be taken by some songbirds and mammals and pass through digestive systems undigested (Van Dersal, 1938). Small seeds probably are occasionally transported long distances by animals through epizoochory.
Sources of information:
Maybury, 2006; author's personal observations.

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 2

Documentation:
Identify dispersal mechanisms:
Commonly and widely planted in the past for various reasons. Although not as commonly sold today, the NYS DEC's Saratoga tree nursery sells ~10,000 trees/year, mostly for gravel pit reclamation. A gold-leaved cultivar ('Frisia') is occasionally sold as a novelty. Could be indirectly transported through moving of compost.
Sources of information:
Maybury, 2006; authors' and LIISMA SRC personal observations; S. Young pers. comm..

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, shade tolerance, able to grow on infertile soils, nitrogen fixation.
Sources of information:
Haubensak & Smyth, 2005; Maybury, 2006; author's personal observations.

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:
Can form thickets through root suckering.
Sources of information:
Maybury, 2006; author's personal observations.

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 2

Documentation:
Describe germination requirements:
Seed germination is generally low, seeds will not germinate without disturbance that cracks the thick, hard seed coat; root suckering can occur in vegetated areas.
Sources of information:
Wisconsin DNR, 2004; Maybury, 2006

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:
Other species that occur are the non-native R. viscosa and R. hispida but neither are known to be invasive. Weldy & Werier, 2008; Brooklyn Botanic Garden, 2009.

Total Possible 25
Section Two Total 16

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 noted but usually in areas with disturbance and other invasive species present. Elsehwere, it has been reported to invade undisturbed habitats (e.g., sand prairies) (Converse, 1984).
Sources of information:
Converse, 1984.

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 A.2.3.

Sources of information:
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:
Generally noted in disturbed areas, occasionally found in areas lacking any significant disturbance.
Sources of information:
Maybury, 2005; author's personal observations

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:
Southern and central Appalachians.
Sources of information:
Brooklyn Botanic Garden, 2009.

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:
All eastern states and Canadian provinces, except parts of Pennsylvania, Virginia and West Virginia where it is native.
Sources of information: See known introduced range in plants.usda.gov, and update with information from states and Canadian provinces.
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 4

Documentation:
Describe distribution:
Present in all PRISMs; see A1.1.
Sources of information:
Weldy & Werier, 2008; Brooklyn Botanic Garden, 2009.

Total Possible 25
Section Three Total 19

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:
Seeds viable for over one year in soil but no evidence for viability over ten years.
Sources of information:
Hill Ris Lambers et al., 2005

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:
Regrowth through ground level meristem and root suckering.
Sources of information:
Maybury, 2006; author's personal observations.

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	3

possible (infestation as above).

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:
Removal of large trees requires major investment in time (Maybury, 2006). Plant "killed" by herbicide can continue to resprout several years after treatments (Converse, 1984; Wieseler, 2005).
Sources of information:
Converse, 1984; Wieseler, 2005; Maybury, 2006.

Total Possible	10
Section Four Total	8
Total for 4 sections Possible	90
Total for 4 sections	73

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: 'Frisia'

References for species assessment:

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References for ranking form:

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