

ANNOUNCING THE RELEASE OF

**Prairie Harvest Hackberry**  
SELECTED CLASS OF NATURAL GERMPLASM

by the  
UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE

and the  
UNITED STATES DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESEARCH SERVICE

and the  
MINNESOTA  
AGRICULTURAL EXPERIMENT STATION

and the  
NORTH DAKOTA  
AGRICULTURAL EXPERIMENT STATION

The United States Department of Agriculture, Natural Resources Conservation Service; United States Department of Agriculture, Agricultural Research Service; Minnesota Agricultural Experiment Station; and North Dakota Agricultural Experiment Station announce the naming and release of a seed propagated selected class natural germplasm of common hackberry, *Celtis occidentalis* L.

As a selected class pre-varietal release, this plant will be referred to as **Prairie Harvest Germplasm hackberry**. There has been no genetic manipulation and it is considered to be a “natural” track release. Accession number 9034956 (ND-3878) was assigned to the original seed collection. This alternative release procedure is justified because there are no dependably winterhardy northern source improved releases commercially available that are adapted for conservation use in this region.

Prairie Harvest Germplasm hackberry is released for use as a native species in windbreak plantings, riparian area plantings, wildlife plantings, ornamental/recreational plantings, and other conservation uses. It is a northern source seed propagated release expected to exhibit genetic diversity to broaden its area of adaptation to various site conditions and climatic extremes. Hackberry is promoted as an alternative choice tree species to add diversity in conservation plantings and decrease the high numbers of green ash (*Fraxinus pennsylvanica*) currently being planted. Green ash is being threatened by the emerald ash borer (*Agrilus planipennis*).

**Collection Site Information:** Seed was collected in October of 1982 from two mature hackberry trees growing in a wooded oxbow of the Red Lake River. The seed was collected by James Ayen, District Conservationist at the Soil Conservation Service field office in Crookston, Minnesota. The site is located in Polk County in northwestern Minnesota on land owned by Roger Wagner and family.

It is approximately 3 miles west of the town of Fisher. The legal description is NE ¼, Section 7, T150N, R48W. A total of 1,082 grams of fruit was hand harvested. Clean seed yield was 484 grams.

The landscape of the site is described as wooded alluvial land with occasional flooding. The soil texture is variable silts and clays. Associated tree species are eastern cottonwood, bur oak, basswood, American elm, willow, green ash, and boxelder. Associated shrub species included chokecherry, plum, hawthorn, junberry, false indigo, snowberry, and dogwood.

The Major Land Resource Area (MLRA) is 56 – Red River Valley of the North. Nearly all MLRA 56 is in farms and ranches, and about 80 percent is non-irrigated cropland. Major crops are sugar beets, corn, potatoes, spring wheat, and soybeans. Nearly 10 percent of the area in the northeast is wooded. This nearly level glacial plain is bordered on the east by outwash, gravelly beaches, and dunes. Most of the soils are Aquolls. They are deep, somewhat poorly drained and poorly drained, and sandy to clayey, and have a frigid temperature regime. Average annual precipitation is 18-22 inches. More than half of the precipitation falls during the growing season. Precipitation in winter is snow. The average annual temperature is 34 to 45 degrees F. The average freeze-free period is 105 to 135 days.

**Description:** Common hackberry is a large tree, 40 to 80 feet in height at maturity. It is native to the United States and occurs from Maine to North Dakota, Colorado, Wyoming, and south to Texas and Georgia. It is noted that in the Upper Midwest hackberry is neither common nor anywhere abundant (Rosendahl 1955). Although it is primarily a bottomland species, it is also found within upland communities depending on moisture conditions, on slopes, bluffs, and rocky hillsides. It is known to grow well in deep shade. Seedlings are often found beneath heavy canopies where other species cannot survive. Common hackberry can also survive long periods of drought due to its deep tap root. It will not occur on sites with a permanently high water table, but mature trees can survive periods of excessive flooding. Hackberry is not tolerant of salts or soils with a pH much greater than 8 (Wennerberg 2004). Growth can exceed more than one foot per year on good moisture sites. The USDA hardiness zones of common hackberry are 2 through 9.

The leaves are alternate, simple, with 3 principal veins. They are ovate to ovate-lanceolate, coarsely serrated, and 2 to 5 inches long and 1 to 3 inches wide. Young leaves are covered with long matted hairs. Mature leaves are darker green above and paler beneath. Flowers are small, greenish-yellow and emerge in April and May with the leaves. Fruits are small pea-sized greenish drupes that change to dark red or black upon maturity in September and October. Hackberry fall foliage is an attractive yellow. The trunk bark is deeply furrowed with corky ridges (Stephens 1973).

The growth form for Prairie Harvest Germplasm hackberry is generally single stemmed and upright with evenly spreading branches. This is a seed propagated cultivar and diversity in types and forms can be expected. Seed production has been rated as good, although local weather patterns and moisture conditions are a major influence. Hackberry is the only known host for the hackberry nipple gall psyllid (*Pachypsylla celtidismamma*). This insect-caused condition is unsightly, but generally does not affect plant performance. Prairie Harvest Germplasm has exhibited fewer problems with nipple gall than other hackberry seed sources. Common hackberry is the host plant for numerous pollinators including the hackberry butterfly (*Asterocampa celtis*), snout butterfly (*Libytheana carinenta*), tawny emperor (*Asterocampa clyton*), mourning cloak (*Nymphalis antiopa*), and the eastern comma (*Polygonia comma*).

Hackberry seedlings sometimes exhibit dormancy when planted in the spring. The seedlings may not leaf out until later in the year, which causes severe stress on the young plants and may result in death. Sweating prior to planting will help overcome the dormancy problem, and help improve plant survival (Knudson 2007).

**Method of Selection:** The original seed collection was part of a large windbreak tree research project sponsored by the Great Plains Agricultural Council, called the GP-13 Provenance Test of Hackberry. Seed was collected throughout the prairie states and provinces from Manitoba to Oklahoma. Seed was planted from 186 accessions, or seed sources, in the field at Oakes, North Dakota, in October 1988, in cooperation with Lincoln-Oakes Nurseries. In October 1989, approximately 28,000 trees were lifted. The seedlings were graded and sorted into lots for the 15 test sites planted in the spring of 1990. One of these test sites was located on property leased from the Nelson Estate by the USDA Agricultural Research Service (ARS), Northern Great Plains Research Laboratory at Mandan, North Dakota. The site is located 4.4 miles southwest of Mandan. The Provenance Test site consists of 180 accessions, five replications, with four-tree plots. 'Oahe' hackberry is a seed propagated cultivar released in 1982 for conservation use by the Natural Resources Conservation Service (NRCS) and ARS. The origin is from a native stand in central South Dakota. Oahe is the only recommended hackberry cultivar in this region and was used as the standard of comparison in this study. It is not consistently winterhardy in North Dakota or the northern half of Minnesota.

Initial survival and establishment were good. Deer and rabbit browse was severe the first several years of establishment, and resulted in a multi-stemmed growth habit for most of the entries. Data was collected in 1994 (Table 1), 2005 (Table 2), and 2007. Height measurements were collected in 1994 at year five of the planting and are recorded in Table 1. Taller northern accessions that were doing well in the study were compared to Prairie Harvest Germplasm and Oahe. Prairie Harvest Germplasm was taller than the other four accessions in three out of four replications. Overall average height, 3.3 ft, was greater than the other four accessions of 3.0 ft, 2.9 ft, 2.3 ft, and 2.2 ft. It was significantly taller ( $P=.05$ ) than the accession from Barnes County and one of the Oahe sources. Selected accessions of the higher rated northern sources were again measured in 2005, and compared to Oahe and Prairie Harvest Germplasm as listed in Table 2. Form was also rated at this time as a function of plant vigor, number of stems, and lack of die-back. Lower numerical values indicated better form ratings. Total average height at 16 years of age was 22.6 ft for Prairie Harvest Germplasm. This is a 20 percent increase in height compared to an average of the two Oahe accessions. Prairie Harvest Germplasm at 16 years of age was significantly taller ( $P=.05$ ) than all other accessions measured except ND-3829 from Cass County. Plant form rating was more consistent among the selected accessions, although Prairie Harvest Germplasm had the best average rating of 4.0 compared to the poorest rating which was 5.4 for one of the Oahe accessions. One hundred selected accessions were measured for total height in 2007 (Iddrisu 2007). The tallest accession measured was Prairie Harvest at 25.2 ft. The next tallest accession was 23.8 ft. The two Oahe accessions averaged 18.8 ft. Prairie Harvest Germplasm had a 25 percent increase in total average height compared to Oahe at 16 years of age.

**Ecological Considerations:** Common hackberry is native to the United States and is considered a desirable species where tall tree cover is a management objective. Hackberry is tap rooted and does not spread vegetatively. The small seeds are used by numerous bird species and may be spread off-site. Small mammals also consume the fruit. No off-site movement of the species was observed at the evaluation location, and invasiveness was not a problem.

Common hackberry is considered an "ice cream" species for deer and rabbits to browse. This is probably the most limiting factor in establishment of the species. Tree protectors or animal repellants should be used when planting hackberry in areas of high deer or rabbit populations. Prairie Harvest Germplasm hackberry is documented as "OK to Release" when rated through the worksheet for "Environmental Evaluation of Plant Material Releases."

**Conservation Use:** The primary conservation use of Prairie Harvest Germplasm hackberry is as a northern seed source for farmstead and field windbreaks, riparian area plantings, and in wildlife habitat and recreational plantings. The hardiness and longevity of this tall tree species make it an excellent alternative species to green ash. Common hackberry provides good cover and habitat for species such as deer, upland games birds, small non-game birds, and small mammals.

**Potential Area of Adaptation:** This northern seed source has performed well as documented in a replicated trial in central North Dakota compared to 179 other accessions over an eighteen year period. There were no signs of winter injury or tip die-back. The primary area of adaptation targeted for Prairie Harvest Germplasm is North Dakota and the northern half of Minnesota on soils/sites recommended for the species, as referenced in the North Dakota and Minnesota NRCS Field Office Technical Guide. Secondary adaptation is anticipated to be across the regions of the Upper Midwest and Northern Great Plains. The best plant performance for hackberry has generally been on Conservation Tree and Shrub Groups 1, 3, 4, and 5. Timely and consistent weed control improves overall plant performance.

**Availability of Plant Materials:** Small quantities of breeder seed and seedling plants will be made available from the USDA Plant Materials Center at Bismarck, North Dakota, for nursery operators to establish seed orchards of Prairie Harvest Germplasm hackberry. Seed for nursery seedling production will also be made available in limited quantities until seed is available elsewhere. It is anticipated various conservation nurseries in the region will have conservation grade bareroot seedlings and smaller potted stock available in quantity for commercial sale beginning in 2010 or 2011. Limited numbers of larger stock are currently available.

**References:**

Iddrisu, Mohammed. 2007. Personal communication.

Knudson, Mike. 2007. Tree sweating – when is it needed? IN: Plant Chat, Volume 7, Issue 2. USDA NRCS, 1 p.

Rosendahl, C. O. 1955. Trees and Shrubs of the Upper Midwest. The University of Minnesota Press, Minneapolis, Minnesota. 411 p.

Stephens, H. A. 1973. Woody Plants of the North Central Plains. The University Press of Kansas, Lawrence, Kansas. 530 p.

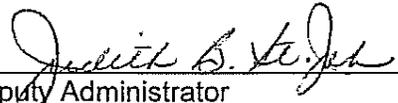
Wennerberg, Sarah. 2004. Plant Guide – Common Hackberry. USDA-NRCS, National Plant Data Center, Baton Rouge, LA. Available at: <http://plants.usda.gov>. Accessed 1 March 2009.

**Prepared by:** Dwight A. Tober, Plant Materials Specialist, USDA-NRCS, P. O. Box 1458, Bismarck, North Dakota 58502; and Michael J. Knudson, Forester, USDA-NRCS Plant Materials Center, 3308 University Drive, Bismarck, North Dakota 58504.

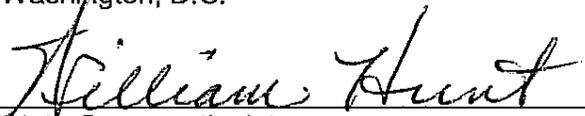
Approvals for the release of Prairie Harvest Germplasm hackberry (*Celtis occidentalis* L.):

for  National Program Leader - Plant Materials  
Director, Ecological Sciences Division  
United States Department of Agriculture  
Natural Resources Conservation Service  
Washington, D.C.

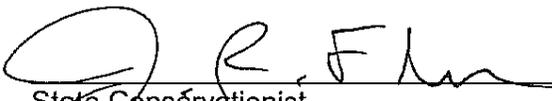
9/10/09  
Date

  
Deputy Administrator  
United States Department of Agriculture  
Agricultural Research Service  
Washington, D.C.

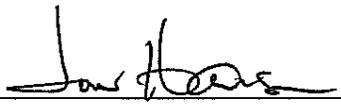
8/11/09  
Date

  
State Conservationist  
United States Department of Agriculture  
Natural Resources Conservation Service  
Saint Paul, Minnesota

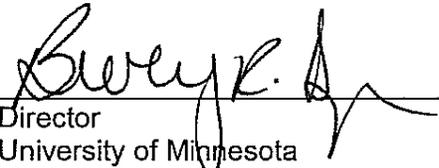
8/3/09  
Date

  
State Conservationist  
United States Department of Agriculture  
Natural Resources Conservation Service  
Bismarck, North Dakota

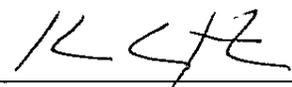
6-25-09  
Date

  
Director  
United States Department of Agriculture  
Agricultural Research Service  
Mandan, North Dakota

7-6-09  
Date

  
Director  
University of Minnesota  
Agricultural Experiment Station  
St. Paul, Minnesota

8-4-09  
Date

  
Director  
North Dakota State University  
Agricultural Experiment Station  
Fargo, North Dakota

7/27/09  
Date

**Table 1. Selected hackberry height comparisons measured in feet from the Provenance Evaluation Planting at Mandan, ND. Planted in 1990 and measured in 1994.**

Replication	Tree Plot	ND-3782 (Oahe)	ND-3783 (Oahe)	ND-3829 (Cass Co.)	ND-3834 (Barnes Co.)	Prairie Harvest (Polk Co.)
<b>1</b>	1	2.3	1.8	3.3	1.5	<b>2.8</b>
	2	missing	2.3	1.9	2.5	<b>1.5</b>
	3	2.8	2.3	2.1	2.8	<b>2.0</b>
	4	2.5	1.9	2.7	2.1	<b>3.1</b>
	<b>Average</b>	2.5	2.1	2.5	2.2	<b>2.3</b>
<b>2</b>	1	2.1	3.0	2.1	2.8	<b>3.2</b>
	2	1.8	1.8	1.5	2.5	<b>2.8</b>
	3	2.5	2.1	2.6	2.0	<b>2.5</b>
	4	2.9	1.6	3.0	2.0	<b>3.3</b>
	<b>Average</b>	2.3	2.1	2.3	2.3	<b>2.9</b>
<b>3</b>	1	3.1	2.7	2.7	2.1	<b>2.1</b>
	2	3.0	3.1	2.5	3.1	<b>3.4</b>
	3	2.8	2.0	2.8	2.4	<b>3.5</b>
	4	2.5	2.2	2.9	1.6	<b>3.1</b>
	<b>Average</b>	2.9	2.5	2.7	2.3	<b>3.0</b>
<b>4</b>	1	3.7	2.7	4.3	3.2	<b>4.4</b>
	2	4.0	2.6	3.6	2.5	<b>5.3</b>
	3	4.5	1.6	5.0	1.2	<b>4.6</b>
	4	4.4	2.2	4.2	2.2	<b>4.8</b>
	<b>Average</b>	4.1	2.3	4.3	2.3	<b>4.8</b>
<b>Replication Average</b>		<b>3.0ab</b>	<b>2.2b</b>	<b>2.9ab</b>	<b>2.3b</b>	<b>3.3a</b>

*Statistical Analysis: LSD All-Pairwise Comparisons Test of averages for accessions. Means with the same letter are not significantly different (P=.05).*

**Table 2. Selected hackberry comparisons from the Provenance Evaluation Planting at Mandan, ND. Height is measured in feet. Form is a functional rating of vigor, number of stems, and lack of die-back. (1 = best; 9 = poorest). Planted in 1990 and evaluated in 2005.**

<u>Accession</u>	<u>Tree Plot</u>	<u>REP 1</u>		<u>REP 2</u>		<u>REP 3</u>		<u>REP 4</u>	
		<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>
<b>Prairie Harvest (Polk Co.)</b>	1	21.7	4.0	24.5	2.0	20.0	5.0	22.7	4.0
	2	19.5	3.0	24.0	5.0	25.2	4.0	28.0	4.0
	3	18.2	4.0	20.7	3.0	23.0	4.0	26.5	3.0
	4	21.7	4.0	24.7	4.0	17.5	6.0	24.2	5.0
<b>Rep. Average</b>		20.3	3.8	23.5	3.5	21.4	4.8	25.4	4.0
<b>Acc. Average</b>		<b>22.6</b>	<b>4.0</b>						
<b>ND-3782 (Oahe)</b>	1	17.0	5.0	19.0	5.0	20.0	6.0	16.5	6.0
	2	16.5	3.0	17.5	4.0	19.0	5.0	21.2	5.0
	3	missing	missing	17.0	5.0	19.0	3.0	19.0	7.0
	4	20.0	5.0	18.2	5.0	18.0	5.0	17.5	3.0
<b>Rep. Average</b>		17.8	4.3	17.9	4.8	19.0	4.8	18.6	5.3
<b>Acc. Average</b>		<b>18.3</b>	<b>4.8</b>						
<b>ND-3783 (Oahe)</b>	1	19.5	6.0	19.0	7.0	12.7	5.0	20.7	5.0
	2	17.5	5.0	19.0	4.0	14.0	6.0	missing	missing
	3	21.5	6.0	19.0	5.0	18.0	6.0	17.0	6.0
	4	17.0	3.0	18.5	6.0	17.5	5.0	21.7	6.0
<b>Rep. Average</b>		18.9	5.0	18.9	5.5	15.6	5.5	19.8	5.7
<b>Acc. Average</b>		<b>18.3</b>	<b>5.4</b>						
<b>ND-3829 (Cass Co.)</b>	1	21.2	5.0	20.5	4.0	20.0	4.0	23.5	5.0
	2	19.0	3.0	19.0	4.0	21.5	3.0	25.0	6.0
	3	21.0	5.0	20.2	4.0	22.2	5.0	24.0	5.0
	4	21.7	4.0	21.6	4.0	22.5	5.0	25.0	6.0
<b>Rep. Average</b>		20.7	4.3	20.3	4.0	21.6	4.3	24.4	5.5
<b>Acc. Average</b>		<b>21.8</b>	<b>4.5</b>						
<b>ND-3834 (Barnes Co.)</b>	1	21.5	3.0	21.0	4.0	20.5	5.0	21.0	5.0
	2	19.0	3.0	19.5	5.0	20.5	5.0	19.7	5.0
	3	19.5	3.0	20.0	4.0	16.7	4.0	19.7	6.0
	4	21.7	4.0	20.0	4.0	18.0	7.0	20.0	3.0
<b>Rep. Average</b>		20.4	3.3	20.1	4.3	18.9	5.3	20.1	4.8
<b>Acc. Average</b>		<b>19.9</b>	<b>4.4</b>						

<u>Accession</u>	<u>Tree Plot</u>	<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>	<u>Height</u>	<u>Form</u>
<b>ND-3837</b> <b>(Benson Co.)</b>	1	17.0	3.0	18.8	5.0	very short	NA	15.0	5.0
	2	15.5	6.0	18.0	5.0		NA	17.0	5.0
	3	14.0	6.0	18.5	6.0		NA	17.7	5.0
	4	17.0	5.0	20.0	6.0		NA	16.5	5.0
<b>Rep. Average</b>		15.9	5.0	18.8	5.5	NA	NA	16.6	5.0
<b>Acc. Average</b>		<b>17.1</b>	<b>5.2</b>						
<b>ND-3854</b> <b>(Ramsey Co.)</b>	1	20.7	5.0	17.5	4.0	16.7	4.0	17.5	6.0
	2	18.0	4.0	19.0	5.0	21.0	4.0	17.5	5.0
	3	19.0	4.0	19.5	5.0	20.0	5.0	19.7	5.0
	4	19.0	5.0	16.5	6.0	17.0	6.0	18.7	5.0
<b>Rep. Average</b>		19.2	4.5	18.1	5.0	18.7	4.8	18.4	5.3
<b>Acc. Average</b>		<b>18.6</b>	<b>4.9</b>						

**SUMMARY**

	<b>Height</b>	<b>Form</b>
<b>Prairie Harvest</b>	<b>22.6a</b>	<b>4.0d</b>
<b>ND-3782 (Oahe)</b>	18.3cd	4.8bc
<b>ND-3783 (Oahe)</b>	18.3cd	5.4a
<b>ND-3829 (Cass Co.)</b>	21.8ab	4.5cd
<b>ND-3834 (Barnes Co.)</b>	19.9bc	4.4cd
<b>ND-3837 (Benson Co.)</b>	17.1d	5.3ab
<b>ND-3854 (Ramsey Co.)</b>	18.0cd	4.8abc

*Statistical Analysis: LSD All-Pairwise Comparisons Test of averages for accessions. Means with the same letter are not significantly different (P=0.05).*

Part 540.8 – Exhibits for Part 540, Subpart B

Exhibit 540-31

Environmental Evaluation of Plant Materials Releases

Name of person scoring: Dwight Tober Date of scoring: June 3, 2009

Scientific Name: Celtis occidentalis Common Name: hackberry

Release Name: Prairie Harvest Germplasm

Is the plant native to the US?  Yes  No

Is the plant native to the area of intended use?  Yes  No

Authority used to determine native status: O. A. Stevens

What is the intended area of use for this plant? Northern Plains  
(primarily ND and northern MN)

What is the intended use for this plant? windbreaks, other conservation uses

Areas in which the release is known to be invasive or has a high probability of being invasive: none

Summary of Criteria from Section A	Score
Part 1. Impact on Habitats, Ecosystems, and Land Use	<u>6 - low</u>
Part 2. Ease of Management	<u>9 - easy</u>
Part 3. Conservation Need and Plant Use	<u>12 - high</u>
Part 4. Biological Characteristics	<u>26 - mod</u>

Final Determination of Release Based on the Environmental Evaluation:

- OK to Release
- OK to Release but qualify use and intended area of use\*
- Do Not Release - NPL determines if release is made\*
- Do Not Release - document and destroy materials

I certify that this Environmental Evaluation was conducted with the most accurate and current information possible.

Dwight Tober 6-3-09  
Signature of Person Scoring Date

Signature of NPL indicating that it is OK to make the release:

[Signature] 9/10/09  
National Program Leader, PM Date

\* An Environmental Assessment (EA) and/or Environmental Impact Statement (EIS) may be required prior to release. If required, attach the EA and/or EIS to this worksheet and to the release notice.

**Section A. Scoring of Criteria for Impact, Management, Need and Biological Characteristics**

Circle the appropriate number for each of the following criteria. Add up the scores for each part and record at the end of each part. Comments which clarify answers or provide supporting information may be included in the right margin of the worksheet or attached on a separate sheet of paper.

**Part 1: Impact on Habitats, Ecosystems, and Land Use**

*This section assesses the ability of the species or release to adversely affect habitats, ecosystems, and agricultural areas.*

- 1) **Ability to invade natural systems where the species does not naturally occur**
  - a) Species not known to spread into natural areas on its own 0
  - b) Establishes only in areas where major disturbance has occurred in the last 20 years (e.g., natural disasters, highway corridors) 3
  - c) Often establishes in mid- to late-successional natural areas where minor disturbances occur (e.g., tree falls, streambank erosion), but no major disturbance in last 20-75 years (6)
  - d) Often establishes in intact or otherwise healthy natural areas with no major disturbance for at least 75 years 10
  
- 2) **Negative impacts on ecosystem processes (e.g., altering fire occurrence, rapid growth may alter hydrology)**
  - a) No perceivable negative impacts (0)
  - b) Minor negative impacts to ecosystem processes 2
  - c) Known significant negative impacts to ecosystems processes 6
  - d) Major, potentially irreversible, alteration or disruption of ecosystem processes 10
  
- 3) **Impacts on the composition of plant communities where the species does not naturally occur**
  - a) No negative impact; causes no perceivable changes in native populations (0)
  - b) Noticeable negative influences on community composition 5
  - c) Causes major negative alterations in community composition 10
  
- 4) **Allelopathy**
  - a) No known allelopathic effects on other plants (0)
  - b) Demonstrates allelopathic effects on seed germination of other plants 3
  - c) Demonstrates allelopathic effects to mature stages of other plants 5

## Part 540.8 – Exhibits for Part 540, Subpart B

Exhibit 540-31

- 5) **Impact on habitat for wildlife or domestic animals (aquatic and terrestrial), including threatened and endangered species (coordinate with USFWS and state Heritage Programs as appropriate)**
- a) No negative impact on habitat, or this criteria not applicable based on intended use for the plant 0
  - b) Minor negative impact on habitat (e.g., decreased palatability; lower wildlife value; decreased value for undesirable animal species) 2
  - c) Significant negative impact on habitat (e.g., foliage toxic to animals; significantly lower value for wildlife; excludes desirable animal species from an area) 5
- 6) **Impact on other land use**
- a) No negative impacts on other land uses 0
  - b) Minor impacts (plant could invade adjacent areas and decrease its value) 3
  - c) Significant impacts (plant may alter the system or adjacent lands significantly enough to prevent certain uses) 5
- Total Possible Points 45**  
**Total Points for Part 1 6**

### Part 2. Ease of Management

*This part evaluates the degree of management which might be needed to control the species or release if it becomes a problem, or eradicate the species or release if it is no longer desirable.*

- 1) **Level of effort required for control**
- a) Effective control can be achieved with mechanical treatment 0
  - b) Can be controlled with one chemical treatment 2
  - c) One or two chemical or mechanical treatments required or biological control is available or practical 5
  - d) Repeated chemical or mechanical control measures required 10
- 2) **Effectiveness of community management to potentially control the plant release**
- a) No management is needed, the plant release is short-lived and will significantly decrease or disappear within 5 years under normal conditions without human intervention 0
  - b) Routine management of a community or restoration/preservation practices (e.g., prescribed burning, flooding, controlled disturbance, pasture renovation) effectively controls the release 2
  - c) Cultural techniques beyond routine management can be used to control the release 4
  - d) The previous options are not effective for managing or controlling the release 10

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- 3) **Side effects of chemical or mechanical control measures**
- a) Control measures used on release will have little or no effect on other plants 0
  - b) Control measures used on release will cause moderate effects on other plants 3
  - c) Control measures used on release will cause major effects on other plants 5

\*\*If spreads by seed, or both seed and vegetative means, go to #4

\*\*If spreads by vegetative means only, go to #5

- 4) **Seed banks**
- a) Seeds viable in the soil for 1 year or less 0
  - b) Seeds remain viable in the soil for 2-3 years 1
  - c) Seeds remain viable in the soil for 4-5 years 3
  - d) Seeds remain viable in the soil for more than 5 years 5
- 5) **Vegetative regeneration under natural conditions**
- a) Regeneration from resprouting of cut stumps 1
  - b) Regeneration from pieces of the root left in the soil 3
  - c) Regeneration from root or stem parts left in the soil 5
- 6) **Resprouts after cutting above-ground parts**
- a) Does not resprout or resprouts but the release is sterile and does not produce seed 0
  - b) Resprouts and produces seed in future years 3
  - c) Resprouts and produces seed in same year 5

**Total Possible Points 40**  
**Total Points for Part 2 9**

### Part 3. Conservation Need and Plant Use

*This part evaluates the importance of the species or release to meet a conservation need.*

- 1) **Potential Use(s) of the Plant Release**
- a) Used for low-priority issues or single use 1
  - b) Has several uses within conservation 2
  - c) Has many uses within conservation as well as outside of conservation 4
  - d) Has high-priority use within conservation 5
- 2) **Availability of Other Plants to Solve the Same Need**
- a) Many other plants available 1
  - b) Few other plants available 3
  - c) No other plants available 5

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### 3) Consequences of Not Releasing This Plant

- |   |   |
|---|---|
| a) No impact to conservation practices                    | 0 |
| b) Minor impact on one or more conservation practice      | 1 |
| c) Serious impact on one conservation practice            | 3 |
| d) Serious impact on more than one conservation practices | 5 |

Total Possible Points 15

Total Points for Part 3 12

### Part 4. Biological Characteristics

*This part evaluates the biological properties which indicate the natural ability of the species or release to propagate and maintain itself under natural conditions. Note: these criteria relate to the species under natural conditions, as opposed to the species under managed conditions used to increase the species, i.e. seed increase programs, or specific propagation methods which do not normally occur in nature.*

#### 1) Typical mode of reproduction under natural conditions

- |  |   |
|--|---|
| a) Plant does not increase by seed or vegetative means (skip to #11) | 0 |
| b) Reproduces almost entirely by vegetative means                    | 1 |
| c) Reproduces only by seeds  | 3 |
| d) Reproduces vegetatively and by seed                               | 5 |

#### 2) Reproduction (by seed or vegetative) in geographic area of intended use

- |  |   |
|--|---|
| a) Reproduces only outside the geographic area of intended use           | 1 |
| b) Reproduces within the geographic area of intended use                 | 3 |
| c) Reproduces in all areas of the United States where plant can be grown | 5 |

#### 3) Time required to reach reproductive maturity by seed or vegetative methods

- |                                |   |
|--------------------------------|---|
| a) Requires more than 10 years | 1 |
| b) Requires 5-10 years         | 2 |
| c) Requires 2-5 years          | 3 |
| d) Requires 1 year             | 5 |

\*\* If reproduces only by seed, skip to #5

#### 4) Vegetative reproduction (by rhizomes, suckering, or self-layering)

- |  |   |
|--|---|
| a) Vegetative reproduction rate maintains population (plant spreads but older parts die out)                 | 1 |
| b) Vegetative reproduction rate results in moderate increase in population size (plant spreads <3' per year) | 3 |
| c) Vegetative reproduction rate results in rapid increase in population size (plant spreads >3' per year)    | 5 |

\*\* If reproduces only vegetatively, skip to #11

- |   |    |
|---|----|
| <b>5) Ability to complete sexual reproductive cycle in area of intended use</b>   |    |
| a) Not observed to complete sexual reproductive cycle in the geographic area of intended use, but completes sexual reproduction in distant areas of the United States | 1  |
| b) Not observed to complete sexual reproductive cycle in the geographic area of intended use, but completes sexual reproduction in adjoining geographic areas         | 3  |
| c) Observed to complete the sexual reproductive cycle in the geographic area of intended use  | ⑤  |
| <br><b>6) Frequency of sexual reproduction for mature plant</b>   |    |
| a) Almost never reproduces sexually   | 0  |
| b) Once every five or more years  | 1  |
| c) Every other year   | 3  |
| d) One or more times a year   | ⑤  |
| <br><b>7) Number of viable seeds per mature plant each reproductive cycle</b>   |    |
| a) None (does not produce viable seed)  | 0  |
| b) Few (1-10)   | 1  |
| c) Moderate (11-1,000)  | 3  |
| d) Many-seeded (>1,000)   | ⑤  |
| <br><b>8) Dispersal ability</b>   |    |
| a) Limited dispersal (<20') and few plants produced (<100)  | ①  |
| b) Limited dispersal (<20') and many plants produced (>100)   | 3  |
| c) Greater dispersal (>20') and few plants produced (<100)  | 7  |
| d) Greater dispersal (>20') and many plants produced (>100)   | 10 |
| <br><b>9) Germination requirements</b>  |    |
| a) Requires open soil and disturbance to germinate  | ①  |
| b) Can germinate in vegetated areas but in a narrow range or in special conditions  | 5  |
| c) Can germinate in existing vegetation in a wide range of conditions   | 10 |
| <br><b>10) Hybridization</b>  |    |
| a) Has not been observed to hybridize outside the species   | ①  |
| b) Hybridizes with other species in the same genera   | 3  |
| c) Hybridizes with other genera   | 5  |

## Part 540.8 – Exhibits for Part 540, Subpart B

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### 11) Competitive ability (of established plants)

- a) Poor competitor for limiting factors
- b) Moderately competitive for limiting factors
- c) Highly competitive for limiting factors

0  
5

10

Total Possible Points 70

Total Points for Part 4 26

### References

Many of the criteria used in this rating system were adapted from the following sources:

Hiebert, Ron D. and James Stubbendieck. 1993. Handbook for Ranking Exotic Plants for Management and Control. US Department of the Interior, National Park Service, Denver, CO.

Randall, John M., Nancy Benton, Larry E. Morse, and Gwendolyn A. Thornhurst. 1999. Criteria for Ranking Alien Wildland Weeds. The Nature Conservancy, Arlington, VA.

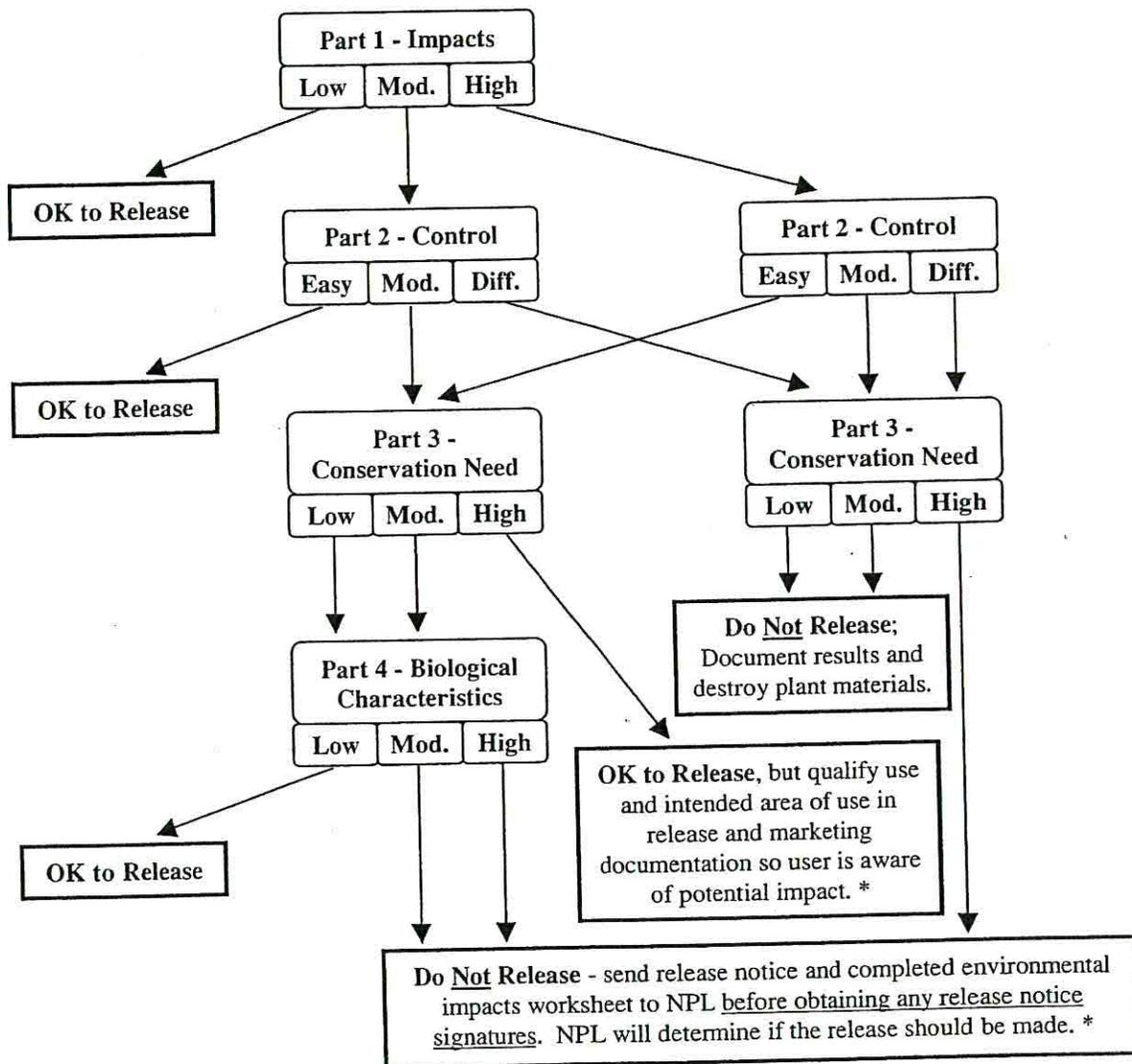
### Section B. Scoring and Interpretation

Based on the scores from above, circle the points range you scored to determine the appropriate interpretation. The interpretation will be used to determine the course of action for the release.

Part	Points Scored	Interpretation
Part 1. Impacts on Habitats, Ecosystems, and Land Use	0-15	<u>Low</u> chance plant is going to affect the environment
	16-25	<u>Moderate</u> chance plant is going to affect the environment
	26-45	<u>High</u> chance plant is going to affect the environment
Part 2. Ease of Management	0-20	<u>Easy</u> to control
	21-30	<u>Moderate</u> to control
	31-40	<u>Difficult</u> to control
Part 3. Conservation Need and Plant Use	0-5	<u>Low</u> need
	6-9	<u>Moderate</u> need
	10-15	<u>High</u> need
Part 4. Biological Characteristics	0-25	<u>Low</u> chance plant is going to propagate and increase itself
	26-40	<u>Moderate</u> chance plant is going to propagate and increase itself
	41-70	<u>High</u> chance plant is going to propagate and increase itself

**Section C. Action to Take for Releasing Plants**

Based on the interpretation above, follow the decision tree below. Start with your interpretation rating for Part 1 (Low, Moderate, or High) and follow the appropriate arrow to the next level until you reach a decision box. Once you reach a decision box you may stop and record the decision on the first page of this worksheet.



\* Indicates that an Environmental Assessment or Environmental Impact Statement may need to be prepared prior to release (see NPMM Part 540.73(a)(3)).