

UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE  
ABERDEEN, IDAHO

and

THE IDAHO AGRICULTURAL EXPERIMENT STATION  
UNIVERSITY OF IDAHO  
MOSCOW, IDAHO

NOTICE OF RELEASE OF  
NORTHERN COLD DESERT WINTERFAT GERMPLASM  
SELECTED CLASS GERMPLASM

The Natural Resources Conservation Service, U.S. Department of Agriculture and the Idaho Agricultural Experiment Station announce the release of a selected ecotype of Northern Cold Desert winterfat (*Krascheninnikovia lanata* (Pursh) A.D.J. Meeuse & Smit) for the intermountain west region.

As a selected release, this plant will be referred to as Northern Cold Desert Germplasm winterfat to document its original collection location. It has been assigned the NRCS accession number 9067481. Northern Cold Desert Germplasm is released as a selected class of certified seed (manipulated).

This alternative release is justified because it is was selected for cold hardiness and should be better adapted to the northern regions of the natural range of winterfat and existing commercial sources of winterfat are inadequate.

**Collection Site Information:** Northern Cold Desert Germplasm is a composite of 9007812, 9007813, 9007816, 9007825 and 9007855. 9007812 was collected in 1974 southeast of Price, Carbon County, Utah. 9007813 was collected in 1974 near Castle Dale, Emery County, Utah. 9007816 was collected in 1975 six miles east of Kanab, Kane County, Utah on a loamy, deep, alkaline soil, 0-8 percent slope and elevation of 4925 feet. 9007825 was collected in 1976 at the Northfork Road, Highway 15, Washington County, Utah and was noted for its heavy, woody stems. 9007855 was received from the Upper Colorado Environmental Plant Center in 1977 and was originally collected in Rio Blanco County, Colorado. No other specific collection site information is available.

**Description:** Winterfat, *Krascheninnikovia lanata* is an erect shrub that can grow to three feet tall. 9067481 under irrigated conditions at Aberdeen, Idaho grows to about 2 feet wide by three feet tall. Under dryland conditions near Grantsville, Utah it grows to about 2 feet wide by 1.5 feet tall. 9067481 is mostly monocious. Leaves are alternate, narrowly linear, flat, with rolled under edges and densely hairy. Seed is a utricle

surrounded by silky, white hairs 1/8 to 1/4 inch long arranged in dense spreading tufts. It produces abundant seed.

**Method of Selection:** Northern Cold Desert Germplasm was selected from a collection of 45 accessions assembled and evaluated at the Aberdeen Plant Materials Center from 1978 to 1986. The five accessions were selected for their tolerance to cold temperatures and then were planted in a seed increase block that was not reproductively isolated. The seed from the increase block was bulked and given the accession number 9067481. Off-Center testing was conducted near Grantsville, Utah from 1995 to 2000 and near Boise, Idaho from 1998 to 2000 to evaluate the accession under field conditions.

**Ecological Considerations and Evaluation:** This release is from a species native to the intermountain region with one previous release made in 1985 ('Hatch'). This selection is from a species that is well documented as having beneficial qualities and no negative impacts on wild or domestic animals. The test plots supporting this release were in close proximity to natural and induced plant ecosystems. There was no evidence of negative impacts or invasion into those ecosystems. Northern Cold Desert Germplasm was documented as "OK to release" when evaluated through the "Worksheet for Conducting an Environmental Evaluation of NRCS Plant Releases".

**Anticipated Use:** The anticipated uses of Northern Cold Desert winterfat are rangeland restoration, erosion control, and for livestock and big game browse in arid to semi-arid and alkaline/saline areas. Its shape and root system provides excellent erosion control especially in areas where very little other vegetation can survive. Winterfat is especially useful as a winter browse for wildlife and livestock.

**Area of Adaptation:** Northern Cold Desert winterfat is potentially adapted to the colder, northern portions of the Intermountain western United States. Winterfat is most common on rangeland receiving 7 – 13 inches of annual precipitation. It can tolerate highly alkaline/saline areas as well as soils derived from limestone parent materials and very droughty conditions. Soil textures range from clay loams to gravelly loams, stony loams and rocky outcrops.

**Availability of Plant Materials:** G0 and G1 seed will be maintained by the Aberdeen Plant Materials Center. Growers may produce two generations (G2 and G3) from the G1 seed.

**Prepared by:** This notice of Release of Northern Cold Desert winterfat was prepared by Loren St. John, Team Leader, Aberdeen Plant Materials Center, and Dan Ogle, Plant Materials Specialist, USDA Natural Resources Conservation Service, Boise, Idaho for joint release by the Natural Resources Conservation Service in Idaho, Nevada, Oregon, Utah and Washington; and the Idaho Agricultural Experiment Station, University of Idaho.

**Signatures for Release of:**

**Northern Cold Desert Germplasm winterfat (*Krascheninnikovia lanata*)**

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Richard W. Sims, State Conservationist, Idaho

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Date

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Nicholas Pearson, State Conservationist, Nevada

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Date

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Robert J. Graham, State Conservationist, Oregon

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Date

\_\_\_\_\_  
Philip Nelson, State Conservationist, Utah

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Date

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Leonard Jordan, State Conservationist, Washington

\_\_\_\_\_  
Date

\_\_\_\_\_  
Diane Gelburd, Director, Ecological Sciences Division

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Date

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Richard Heimsch, Director, Idaho Experiment Station

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Date

Release Documentation  
For  
9067481 Winterfat  
Loren St. John, Aberdeen Plant Materials Center

In 1978 a winterfat Initial Evaluation Planting (IEP) was established at the Aberdeen Plant Materials Center (PMC) to evaluate 45 winterfat accessions for adaptation and potential use in rangeland seeding and other revegetation efforts. Evaluation data from the IEP identified 5 outstanding accessions: 9007812; 9007813; 9007825; and 9007855 (parent accessions of 9067481).

In 1983 a winterfat Inter-Center Strain Trial (ICST) was established with transplants at the Coffee Point Off-Center Test Site (located approximately 25 miles northwest of Aberdeen). The ICST included the parent accessions of 9067481 and three other winterfat accessions. Table 1 is a summary of evaluation data collected in 1983, 1984 and 1986.

The vigor of the parent accessions of 9067481 as a group was above the average of all the accessions in 1983 and 1986 and was equal to the average of all accessions in 1984. Plant height of the parent accessions of 9067481 as a group was slightly shorter than the overall average in 1983 and was slightly taller in 1984. Plant width of the parent accessions as a group was above the overall average in 1983 and less than the overall average in 1984. Seed set of the parent accessions as a group was slightly below the overall average.

These same accessions and 'Hatch' winterfat were also direct-seeded at Coffee Point in 1983 and were evaluated for vigor in 1984 and 1985. The accession with the best vigor rating in 1984 was 9007813 and in 1985, 9007855 had the best vigor rating.

The United States Department of Agriculture, Forest Service, released Hatch winterfat in 1985. However, the performance of field plantings of Hatch in the colder regions of the West was less than expected and did not match the cold tolerance of the parent accessions of 9067481. The parent accessions survived the extremely cold winters of 1982 and 1983 at Aberdeen, Idaho where the minimum temperature in 1982 was -24° F and -30° F in 1983. In late January and early February, 1989 a climatic event resulting in a 50° F swing in temperature (32° F to -18° F) over a 48 hour period occurred. The parent accessions of 9067481 were not affected by this unusual climatic event.

A crossing block established from seed of 9007812, 9007813, 9007816, 9007825 and 9007855 was established at the Aberdeen PMC Fish and Game Farm in 1991 and a new accession number 9067481 was established for offspring from the crossing block. Transplants from seed harvested in 1997 from the crossing block were established at the Aberdeen PMC Home Farm in July, 1999.

Accession number 9067481 was seeded at the Grantsville, Utah ICST (approximately 30 miles southwest of Salt Lake City) in April, 1995. The test site is located in a 10 – 12 inch annual precipitation area. The trial was seeded with a hand-pushed belt seeder. Included in the trial were accessions of fourwing saltbush and winterfat. The trial was a complete randomized block

design with four replications. Each plot was 20 feet long consisting of 4 rows spaced 4 feet apart. The seeding rate for all accessions was 15 pure live seeds (PLS) per foot. No supplemental water was provided at any time. Table 2 summarizes evaluation data of the fourwing accessions included in the trial.

Data was collected on plant height, percent canopy cover, plant density and vigor during the evaluation period from 1995 to 2000. Individual plant canopy width data was collected during the May 9, 2000 evaluation.

Accession No. 9067481 was consistently taller than Hatch and 9063535 throughout the entire evaluation period and was approximately the same height as 9028608 Pamirian winterfat (*Kraschennikovia ceratoides*, a non-native species introduced from Kzackastan for testing). The final evaluation showed 9067481 to average 45.0 cm in height as compared to 9028608 (47.0 cm), Hatch (37.3 cm) and 9063535 (26.8 cm).

Canopy cover data shows that 9067481 had greater cover than 9063535 and Hatch but less than 9028608 at the final evaluation. Percent canopy cover for Hatch was substantially lower than the other accessions throughout the evaluation period.

Individual canopy width evaluated on May 9, 2000 found a small difference between 9067481 (60.3 cm) and 9028608 (57.5 cm) but was substantially greater than Hatch (42.5 cm) and 9063535 (35.0 cm).

The difference in plant density between 9067481 and 9028608 was negligible throughout the evaluation period. At the final evaluation 9067481 and 9028608 had identical plant density (1.08 plants per meter<sup>2</sup>) as compared to 9063535 (0.94 plants per meter<sup>2</sup>) and Hatch (0.30 plants per meter<sup>2</sup>).

Vigor, a subjective rating of plant health and growth was also evaluated. The difference in vigor between 9067481 and 9028608 was also negligible during the evaluation period but both accessions had better vigor than 9063535 and Hatch during the evaluation.

Accession number 9067481 was also seed at the Range 26 ICST located approximately 30 miles south of Boise, Idaho in February, 1998. The test site is located in a 7 – 10 inch annual precipitation area. The trial was seeded with a hand-pushed belt seeder. Included in the trial were accessions of fourwing saltbush and winterfat. The trial is a complete randomized block design with four replications. Each plot is 20 feet long consisting of 4 rows spaced 4 feet apart. The seeding rate was 15 PLS per foot. No supplemental water was provided at any time.

Due to very dry conditions following planting (2.27 – 5.51 inches annually) plant establishment and growth is limited. The following summarizes the data collected in 2000:

9067481	35 plants	32.8 cm height
Hatch	18	21.5
9063535	4	12.8

Accession no. 9067481 established nearly twice the number of plants as the next best performing accession (Hatch) and was also 11 cm taller than Hatch.

Table 1.  
1983 Winterfat Inter-Center Strain Trial  
Coffeepoint, Idaho  
Summary of Evaluation Data

Accession	Vigor <sup>1/</sup>		1986	Plant Height (cm)		Plant Width (cm)		Seed Set <sup>1/</sup> (1986)
	1983	1984		1983	1984	1983	1984	
<b>9007812 *</b>	<b>5.0</b>	<b>7.5</b>	<b>6.8</b>	<b>13.7</b>	<b>8.8</b>	<b>11.7</b>	<b>10.5</b>	<b>2.0</b>
<b>9007813 *</b>	<b>8.8</b>	<b>9.0</b>	<b>9.0</b>	<b>7.6</b>	<b>-</b>	<b>5.0</b>	<b>-</b>	<b>9.0</b>
<b>9007816 *</b>	<b>1.8</b>	<b>7.3</b>	<b>6.8</b>	<b>14.5</b>	<b>7.3</b>	<b>15.0</b>	<b>8.5</b>	<b>9.0</b>
<b>9007825 *</b>	<b>2.2</b>	<b>8.0</b>	<b>9.0</b>	<b>18.0</b>	<b>28.0</b>	<b>14.0</b>	<b>14.0</b>	<b>9.0</b>
<b>9007855 *</b>	<b>7.2</b>	<b>7.6</b>	<b>6.8</b>	<b>10.8</b>	<b>10.0</b>	<b>10.0</b>	<b>8.5</b>	<b>4.0</b>
9007852	6.4	8.8	8.6	10.6	5.0	7.0	9.0	9.0
9028608 <sup>2/</sup>	7.6	7.4	7.4	21.6	15.4	10.0	13.4	1.0
PI-478840	6.2	8.0	8.0	11.6	18.0	10.0	20.0	9.0
Average	5.7	7.9	7.8	13.6	13.2	10.3	12.0	6.5

<sup>1/</sup> Rated 1-9 with 1 Best, 9 Worst.

<sup>2/</sup> Accession number 9028608 *Krascheninnikovia ceratoides* (Pamirian winterfat), is a non-native species introduced for testing from Kazakstan.

\* These accessions were later combined and designated no. 9067481.

Table 2  
 Grantsville Inter-Center Strain Trial  
 Summary of 1995-2000 Winterfat Evaluation Data  
 Mean of four replications

Plant Height (cm)												
Accession No.	Common Name	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	33.5	25.5	43.3	33.5	40.5	39.8	45.8	42.0	43.5	44.8	47.0
<b>9067481</b>	<b>Winterfat</b>	<b>34.0</b>	<b>22.5</b>	<b>42.8</b>	<b>36.3</b>	<b>39.8</b>	<b>38.5</b>	<b>43.8</b>	<b>41.5</b>	<b>37.0</b>	<b>45.0</b>	<b>45.0</b>
9063535	Winterfat	23.8	16.3	34.5	24.3	24.0	27.0	30.8	30.0	28.8	32.0	26.8
Hatch	Winterfat	25.8	19.3	36.0	26.8	34.3	29.5	37.0	32.8	34.5	43.8	37.3

Percent Canopy Cover and Individual Plant Canopy Width (cm)											
Accession No.	Common Name	5/17/95	9/26/95	5/7/96	5/7/97	5/6/98	5/6/99	5/9/00	Canopy Width		
		5/9/00									
9028608	Pamirian Winterfat	27.0	41.3	53.0	44.5	45.8	45.8	64.3	57.5		
<b>9067481</b>	<b>Winterfat</b>	<b>19.5</b>	<b>34.0</b>	<b>37.8</b>	<b>37.3</b>	<b>43.5</b>	<b>43.5</b>	<b>49.3</b>	<b>60.3</b>		
9063535	Winterfat	16.5	23.3	26.8	23.3	31.0	31.0	46.0	35.0		
Hatch	Winterfat	9.5	12.3	10.8	9.8	11.5	11.5	10.8	42.5		

Plant Density (plants per m <sup>2</sup> )													
Accession No.	Common Name	5/17/95	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	2.75	2.48	1.58	1.40	1.21	1.06	1.01	0.91	1.01	1.01	0.93	1.08
<b>9067481</b>	<b>Winterfat</b>	<b>2.89</b>	<b>2.49</b>	<b>1.67</b>	<b>1.37</b>	<b>1.16</b>	<b>1.10</b>	<b>1.14</b>	<b>1.03</b>	<b>1.04</b>	<b>1.14</b>	<b>0.84</b>	<b>1.08</b>
9063535	Winterfat	1.50	1.60	1.16	1.04	0.96	0.96	1.08	0.93	0.96	1.08	0.82	0.94
Hatch	Winterfat	0.79	0.84	0.69	0.47	0.39	0.36	0.44	0.39	0.34	0.44	0.24	0.30

Vigor <sup>1</sup>													
Accession No.	Common Name	5/17/95	9/26/95	5/7/96	7/17/96	5/7/97	7/15/97	5/6/98	7/16/98	5/6/99	7/15/99	5/9/00	7/11/00
9028608	Pamirian Winterfat	1.8	1.8	1.5	2.0	1.8	2.0	1.8	4.0	2.3	2.5	2.3	2.0
<b>9067481</b>	<b>Winterfat</b>	<b>2.3</b>	<b>1.8</b>	<b>2.3</b>	<b>2.0</b>	<b>2.8</b>	<b>2.0</b>	<b>1.5</b>	<b>2.3</b>	<b>2.0</b>	<b>2.8</b>	<b>1.8</b>	<b>2.3</b>
9063535	Winterfat	2.5	2.8	3.0	3.3	4.3	3.8	3.5	4.8	4.3	4.0	3.8	3.0
Hatch	Winterfat	3.3	4.5	5.0	4.8	5.5	4.0	5.0	4.3	5.3	5.8	6.0	4.5

<sup>1</sup> Subjective rating of plant health and growth. Rated 1-9 with 1 best, 9 worst.

## **Exhibit 540-31 Worksheet for Documenting an Environmental Evaluation of NRCS Plant Releases**

### **Introduction**

This worksheet is used to conduct and document an Environmental Evaluation of Plant Materials releases. Criteria relating to the biological characteristics of a plant, the potential impact on ecosystems, the ease of managing the plant, and conservation need are scored. These scores and their interpretation are used with a decision flowchart to determine the appropriate course of action for making a release. As with any such ranking system, it is necessary to use sound judgement and experience when interpreting the final results.

### **Understanding this worksheet**

The primary purpose for this worksheet is to determine if the plant release has the potential to adversely affect the environment or natural surroundings. It is possible for a plant to rate low on Part 1 (Impact on Habitats), and thus be released without further consideration, and still have a high rating on Part 4 (Biological Characteristics) indicating that the plant has the ability to propagate and maintain itself naturally. Good conservation plants usually need to persist to be able to solve the conservation problem or need for which they were intended. This is even more important for plants used in critical areas, i.e. severely eroding sites. In light of this fact, the most important criteria being used in this worksheet to determine release include those in Part 1 (Impact on Habitats) and Part 2 (Ease of Management). Parts 3 (Conservation Need) and 4 (Biological Characteristics) are used when the decision is not so clear and there is the potential for a high impact on habitats and control may be moderate to difficult.

### **Instructions**

Rate the plant or release based on the following criteria by circling your assessment. If the criteria does not apply to the species or release, then do not rate for that criteria. If you do not have enough information on the species or plant release to complete at least Parts 1, 2 and 4 in Section A, then additional data must be accumulated through literature searches, cooperators, or studies to be able to complete these sections. Additional notes which may be used to clarify or interpret the ranking should be included in the margins of this worksheet. For plant releases which may be considered nearly unacceptable for release it may be helpful to have other PM staff or cooperators complete copies of this worksheet to provide additional documentation.

All rating criteria must be completed, even if it is found in Section A, Part 1 that the plant has a low impact on the environment. Evaluation of all criteria will provide documentation that a thorough evaluation was completed for the plant at the time of release. This documentation may be needed in the future if questions are raised about the potential invasiveness or control of the plant.

When finished with ranking, interpretation, and decision making, record the final decision on the next page of this worksheet. A completed worksheet must be included with the release documentation and a copy sent to the NPMC for filing.



## **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**

<b>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)</b>	
a) No negative impact on habitat, or this criteria not applicable based on intended use for the plant	<b>0</b>
b) Minor negative impact on habitat (e.g., decreased palatability; lower wildlife value; decreased value for undesirable animal species)	<b>2</b>
c) Significant negative impact on habitat (e.g., foliage toxic to animals; significantly lower value for wildlife; excludes desirable animal species from an area)	<b>5</b>
<b>6) Impact on other land use</b>	
a) No negative impacts on other land uses	<b>0</b>
b) Minor impacts (plant could invade adjacent areas and decrease its value)	<b>3</b>
c) Significant impacts (plant may alter the system or adjacent lands significantly enough to prevent certain uses)	<b>5</b>
	<b>Total Possible Points 45</b>
	<b>Total Points for Part 1 <u>0</u></b>

## **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.*

<b>1) Level of effort required for control</b>	
a) Effective control can be achieved with mechanical treatment	<b>0</b>
b) Can be controlled with one chemical treatment	<b>2</b>
c) One or two chemical or mechanical treatments required or biological control is available or practical	<b>5</b>
d) Repeated chemical or mechanical control measures required	<b>10</b>
<b>2) Effectiveness of community management to potentially control the plant release</b>	
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	<b>0</b>
b) Routine management of a community or restoration/preservation practices (e.g., prescribed burning, flooding, controlled disturbance, pasture renovation) effectively controls the release	<b>2</b>
c) Cultural techniques beyond routine management can be used to control the release	<b>4</b>
d) The previous options are not effective for managing or controlling the release	<b>10</b>

- 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 10**

**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

<b>3) Consequences of <u>Not</u> Releasing This Plant</b>	
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
<b>Total Possible Points</b>	<b>15</b>
<b>Total Points for Part 3</b>	<b><u>13</u></b>

#### **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.*

<b>1) Typical mode of reproduction under natural conditions</b>	
a) Plant does not increase by seed or vegetative means ( <u>skip to #11</u> )	0
b) Reproduces almost entirely by vegetative means	1
c) Reproduces only by seeds	3
d) Reproduces vegetatively and by seed	5
<b>2) Reproduction (by seed or vegetative) in geographic area of intended use</b>	
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
<b>3) Time required to reach reproductive maturity by seed or vegetative methods</b>	
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

<b>4) Vegetative reproduction (by rhizomes, suckering, or self-layering)</b>	
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

- 5) Ability to complete sexual reproductive cycle in area of intended use**
- 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
- 6) Frequency of sexual reproduction for mature plant**
- 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
- 7) Number of viable seeds per mature plant each reproductive cycle**
- 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
- 8) Dispersal ability**
- 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
- 9) Germination requirements**
- 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
- 10) Hybridization**
- a) Has not been observed to hybridize outside the species 0
  - b) Hybridizes with other species in the same genera 3
  - c) Hybridizes with other genera 5

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

- |  |    |
|--|----|
| a) Poor competitor for limiting factors        | 0  |
| b) Moderately competitive for limiting factors | 5  |
| c) Highly competitive for limiting factors     | 10 |

**Total Possible Points 70**

**Total Points for Part 4 36**

**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.

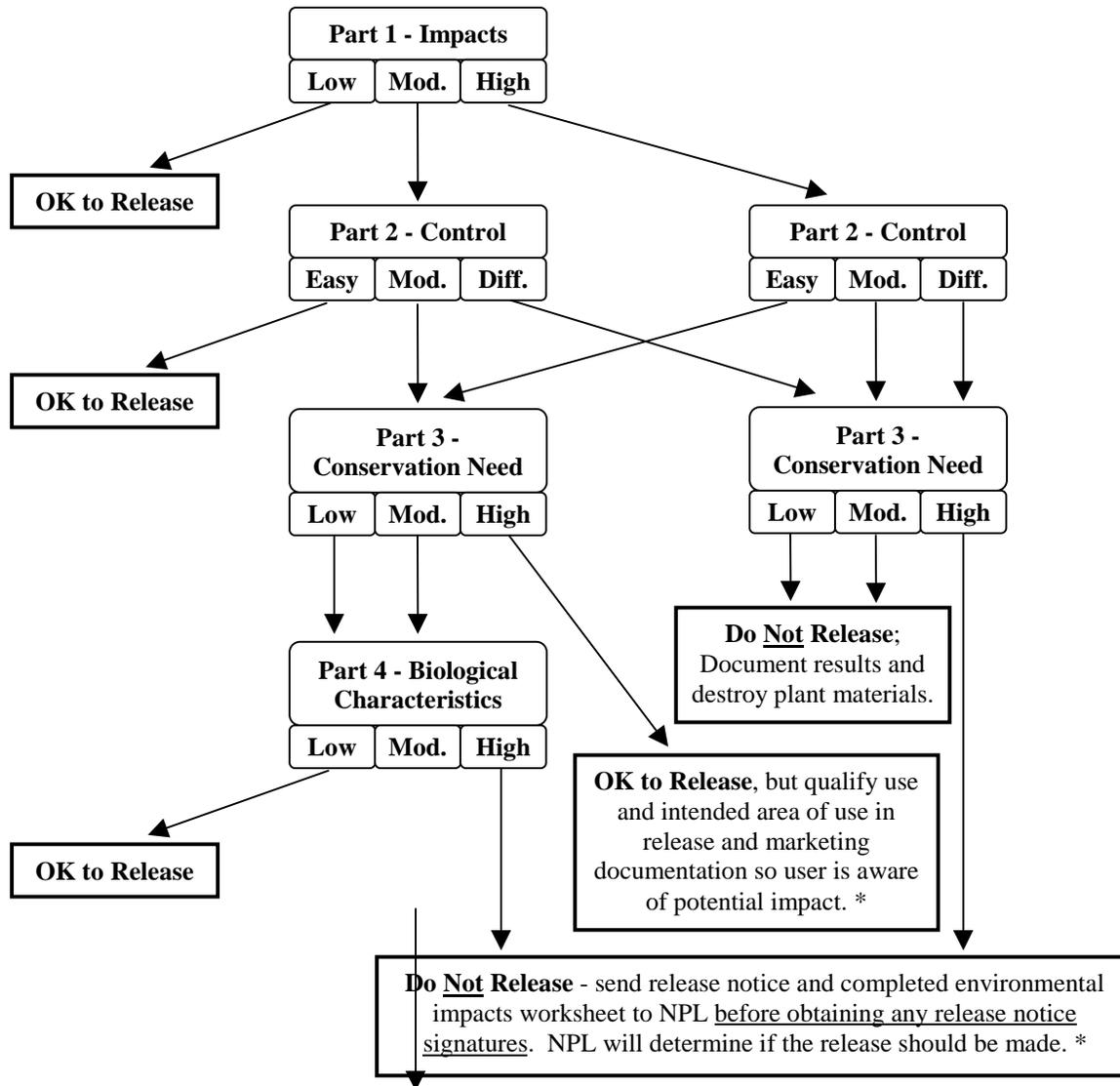
**Section B. Scoring and Interpretation**

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.

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