

Part IV. Plant Assessment Form

For use with “Criteria for Categorizing Invasive Non-Native Plants that Threaten Colorado’s Wildlands and Agriculture”
By the Colorado Noxious Weed Advisory Committee

Electronic version: December 4, 2008

Table 1. Species and Evaluator Information

| | |
|---------------------------------------|---|
| Species name (Latin binomial): | Ailanthus altissima |
| Synonyms: | enter text here |
| Common names: | Tree of heaven |
| Evaluation date (mm/dd/yy): | 10/16/08 |
| Evaluator #1 Name/Title: | K. George Beck/professor |
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| Address: | 116 Weed Research Lab, CSU, Ft. Collins, CO 80523 |
| Evaluator #2 Name/Title: | enter text here |
| Affiliation: | enter text here |
| Phone numbers: | enter text here |
| Email address: | enter text here |
| Address: | enter text here |

Section below for list committee use—please leave blank

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|--------------------------------|-----------------|
| List committee members: | enter text here |
| Committee review date: | enter text here |
| List date: | enter text here |
| Re-evaluation date(s): | enter text here |

General comments on this assessment:

While tree of heaven exists in Colorado, few if any escapes from ornamental plantings are known to occur. When presenting information about its biology and ecology at the 2006 CWMA winter conference and asking the audience with experience with *Ailanthus* if they knew of any escapes or problems, all that visited with me thought it was not a problem. *Ailanthus altissima* impacts in Colorado are largely unknown and not documented and this assessment program was not intended to evaluate plants not already present. The only documented infestations in similar ecosystems to Colorado was found in a report from the Department of Energy land holdings where tree of heaven has escaped to establish locally and occasional isolated individuals were found in arroyos and riparian areas at the Sandia National Laboratory in New Mexico. Much of the information that was used to make this assessment was found in an excellent review on the species by the USDA-Forest Service Fire Effects Information System.

A tour of the city of Boulder, revealed that it had widely escaped cultivation potentially causing structural damage to buildings and even posing a threat because of growing in natural gas meters. This realized and potential damage is reason enough to declare it noxious, even though its invasiveness in Colorado is questionable. At a minimum populations should be monitored in any known escapes to natural areas.

Table 2. Criteria, Section, and Overall Scores

| | | | | | |
|---------------------|---|------------------|--------------------------|--|---|
| 1.1 | Impact on abiotic ecosystem processes | C | Other Pub. Mat'l | <p>Impact</p> <p><i>Enter four characters from Q1.1-1.4 below:</i></p> <p>CCUU</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>C</p> | <p>Wildlands Plant Score</p> <p><i>Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:</i></p> <p>Limited No Alert</p> |
| 1.2 | Impact on plant community | C | Other Pub. Mat'l | | |
| 1.3 | Impact on higher trophic levels | U | No Information | | |
| 1.4 | Impact on genetic integrity | U | No Information | | |
| 2.1 | Role of anthropogenic and natural disturbance | B (2 pts) | Rev'd, Sci. Pub'n | <p>Invasiveness</p> <p><i>Enter the sum total of all points for Q2.1-2.7 below:</i></p> <p>11</p> <p><i>Use matrix to determine score and enter below:</i></p> <p>B</p> | |
| 2.2 | Local rate of spread with no management | U (0 pts) | No Information | | |
| 2.3 | Recent trend in total area infested within state | U (0 pts) | No Information | | |
| 2.4 | Innate reproductive potential Wksht A | A (3 pts) | Rev'd, Sci. Pub'n | | |
| 2.5 | Potential for human-caused dispersal | B (2 pts) | Rev'd, Sci. Pub'n | | |
| 2.6 | Potential for natural long-distance dispersal | C (1 pt) | Rev'd, Sci. Pub'n | | |
| 2.7 | Other regions invaded | A (3 pts) | Rev'd, Sci. Pub'n | | |
| 3.1 | Ecological amplitude/Range | U | No Information | <p>Distribution</p> <p><i>Using matrix, determine score and enter below:</i></p> <p>D</p> | |
| 3.2 | Distribution/Peak frequency Wrksht B | D | Anecdotal | | |

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|---------------------|---|------------------|--------------------------|
| 4.1 | Poisonous to livestock | D (0 pts) | Rev'd, Sci. Pub'n |
| 4.2 | Detrimental to economic crops | U (0 pts) | No Information |
| 4.3 | Detrimental to management of agricultural system, rangeland and pasture | D (0 pts) | Rev'd, Sci. Pub'n |
| 4.4 | Human impacts Wrksht C | U (0 pts) | Other Pub. Mat'l |

Agricultural / Human Impact

Enter the sum total of all points for Q4.1-4.4 below:

0

Use matrix to determine score and enter below:

D

Agricultural Plant Score

Using matrix, determine Overall Score and Alert Status from the second, third and fourth section scores and enter below:

Moderate

No Alert

Table 3. Documentation

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| Question 1.1 Impact on abiotic ecosystem processes | C Other Pub. Mat'l back |
| Identify ecosystem processes impacted: The only known infestations in ecosystems similar to Colorado are at the Sandia National Laboratory in New Mexico where it has escaped and "established locally or as isolated individuals" and is apparently causing little if any impacts to native plant communities | |
| Rationale: Populations of Ailanthus are clearly invasive in eastern U.S. forests and in the Mediterranean climates of California in mesic and riparian areas. While not documented in the literature, it may be that Ailanthus does not expand to dominate plant communities in the arid to semi-arid west (southwest US) where alkaline soils predominate. | |
| Sources of information: US Forest Service Fire Effects Information System review of Ailanthus altissima; survey of ecological resources on Department of Energy land holdings. | |
| Question 1.2 Impact on plant community composition, structure, and interactions | C Other Pub. Mat'l back |
| Identify type of impact or alteration: While difficult to tell from the DOE report, there appears to be little impact to native plant communities where tree of heaven has established at SNL in New Mexico. | |
| Rationale: Same as 1.1 | |
| Sources of information: Same as 1.1 | |
| Question 1.3 Impact on higher trophic levels | U No Information back |
| Identify type of impact or alteration: There is little information available on higher trophic interactions. In the eastern US, it is browsed by whitetail deer but such were just observations and not derived experimentally. | |
| Rationale: No information available on whether it causes negative effects in Colorado or the desert southwest. | |
| Sources of information: enter text here | |
| Question 1.4 Impact on genetic integrity | U No Information back |
| Identify impacts: No information was found in the literature. | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 2.1 Role of anthropogenic and natural disturbance in establishment | B Rev'd, Sci. Pub'n back |
| Describe role of disturbance: Ailanthus altissima is considered an early successional species and will invade habitats disturbed naturally or by humans. | |

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| Rationale: Scientific literature very clear on its early successional status. | |
| Sources of information: FEIS and research articles reviewed for Ailanthus. | |
| Question 2.2 Local rate of spread with no management | U No Information back |
| Describe rate of spread: Local rate of spread in Colorado arroyos and riparian areas is unknown. Not enough information is available in the SNL report to make even an educated guess as to how it would behave in similar habitats/ecosystems in Colorado. | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 2.3 Recent trend in total area infested within state | U No Information back |
| Describe trend: Same as 2.2 | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 2.4 Innate reproductive potential | A Rev'd, Sci. Pub'n back |
| Describe key reproductive characteristics: Ailanthus reproduces by seed and asexually, but the primary means of local spread is vegetatively by root sprouts. It produces viable seed by about 10 years of age and a single tree may produce 325,000 to over a million seeds annually. Seed dispersal typically is within a few meters to a few hundred meters | |
| Rationale: enter text here | |
| Sources of information: FEIS and scientific literature articles reviewed | |
| Question 2.5 Potential for human-caused dispersal | B Rev'd, Sci. Pub'n back |
| Identify dispersal mechanisms: Tree of heaven has been planted as an ornamental in the U.S. | |
| Rationale: According to the literature, tree of heaven is not planted purposely much anymore but no quantitative data are available to document. | |
| Sources of information: FEIS and scientific literature articles reviewed | |

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| Question 2.6 Potential for natural long-distance dispersal | C Rev'd, Sci. Pub'n back |
| Identify dispersal mechanisms: Fruits are light, winged, and wind dispersed. | |
| Rationale: Experimentally was shown that fruits dispersed 111 meters in a 4 to 5 mph breeze; greatest distance of movement by seed based upon field observation in Staten Island was about 300 feet. | |
| Sources of information: FEIS and scientific literature articles reviewed | |
| Question 2.7 Other regions invaded | A Rev'd, Sci. Pub'n back |
| Identify other regions: Riparian forests, Gambel oak shrublands, pinyon-jiniper woodlands | |
| Rationale: Other published literature indicates that it "associates" with the above mentioned plant community types | |
| Sources of information: FEIS and scientific literature articles reviewed | |
| Question 3.1 Ecological amplitude/Range | U No Information back |
| Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: No information on invaded ecosystems in Colorado | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 3.2 Distribution/Peak frequency | D Anecdotal back |
| Describe distribution: Ailanthus altissima is known to have been planted in urban areas in Colorado. | |
| Rationale: No surveys of wildlands looking for tree of heaven has occurred in Colorado | |
| Sources of information: Anecdotal | |
| Question 4.1 Poisonous to Livestock | U Rev'd, Sci. Pub'n back |
| Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts: Not toxic to grazing goats but no other information is available | |
| Rationale: Experimentally derived data indicate that tree of heaven is nutritious for goats | |

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| Sources of information: FEIS and scientific literature articles reviewed | |
| Question 4.2 Detrimental to Economic Crops | U No Information back |
| Describe impacts to all aspects of cropping systems (see guidelines): no information available in the literature as to whether it will invade crops of importance in Colorado. The only conceivable crops that could be invaded would be orchards but no mention of such has occurred anywhere in the world. | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 4.3 Detrimental to Mgmt of Agricultural System, Rangeland and Pasture | U No Information back |
| Describe impacts to water diversion systems, increased water use, reduced forage for livestock: enter text here | |
| Rationale: enter text here | |
| Sources of information: enter text here | |
| Question 4.4 Human Health Impacts | U Other Pub. Mat'l back |
| Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Roadside workers in the eastern US reportedly acquired myocarditis (inflammation of the heart) by being exposed to the sap of tree of heaven while clearing an infestation. The conclusion was strictly based upon a physicians observations. Tree of heaven, ironically, has been used for many (its use predates the Chinese language) for medicinal purposes so why this late entry reporting its toxicity has occurred is quite interesting. Such an effect should be demonstrated through experimentation on lab animals to verify whether such a risk is real. There are no known impact data available but the literature indicates that it is not widely sold or planted in the US at the present. No quantitative information available but the implications are that industry would not be impacted. | |
| Rationale: The literature citation suggests caution at least until toxicity is verified experimentally. | |
| Sources of information: FEIS and scientific literature articles reviewed | |

Worksheet A

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| Reaches reproductive maturity in 2 years or less | No: 0 pt |
| Dense infestations produce >1,000 viable seed per square meter | Yes: 2 pts |
| Populations of this species produce seeds every year. | Yes: 1 pt |

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| Seed production sustained over 3 or more months within a population annually | Unknown: 0 pts |
| Seeds remain viable in soil for three or more years | No: 0 pts |
| Viable seed produced with <i>both</i> self-pollination and cross-pollination | No: 0 pt |
| Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes | Yes: 1 pt |
| Fragments easily and fragments can become established elsewhere | Yes: 2 pts |
| Resprouts readily when cut, grazed, or burned | Yes: 1 pt |
| | 7 pts 1 unknown |
| | A (6+ pts) |
| Note any related traits: enter text here | |

Worksheet B - Colorado Ecological Types and Land Use

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| Major Ecological and Land Use Types | Minor Ecological and Land Use Types | Code* |
|--|---|------------------|
| Freshwater and Aquatic Systems | lakes, ponds, reservoirs | score |
| | rivers, streams, canals | score |
| Riparian and wetlands | Riparian forest | score |
| | Riparian shrublands | score |
| | Wet meadows | score |
| Grasslands | Shortgrass prairie | score |
| | Tallgrass prairie | score |
| | Sandsage prairie | score |
| | Montane meadows | score |
| Irrigated Agriculture | Hay meadows | score |
| | Irrigated crops (alfalfa, corn, sugar beets) | score |
| Dryland Agriculture | Dryland crops (wheat, corn, millet, dryland grass hay, sunflowers, mustard for biodiesel) | score |
| Developed Lands | Urban, exurban, industrial | D. presen |
| Arid Shrublands | Sagebrush shrublands | score |
| | Foothills shrublands | score |
| | Gambel oak shrublands | score |
| Woodlands | Pinyon - juniper | score |
| | Ponderosa pine | score |
| | Limber pine | score |
| Forest | Lodgepole pine | score |
| | Spruce-fir | score |
| Alpine | Boulder and rock fields | score |
| | Dwarf shrublands | score |
| | Tundra | score |
| Barrens (lower elevation) | Dunes | score |
| | Rock outcrops | score |
| | Canyonlands | score |

* A. means >50% of type occurrences are invaded; B means >20% to 50%; C. means >5% to 20%; D. means present but ≤5%; U. means unknown (unable to estimate percentage of occurrences invaded).

Worksheet C – Human Impacts

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| Human health impacts; irritants (sap), spines, poisonous, and/or smoke impacts | Yes: 1 pt |
| Property values are decreased due to increased risk of fire | Unknown: 0 pts |
| Decreased property value due to moderate to heavy infestations | Unknown: 0 pts |
| Decreased land value for recreational use; boating, fishing, camping, etc. | Unknown: 0 pts |
| Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed | Yes: 2 pt |
| | 3 pts 3 unknowns |
| | U (2+ unknowns) |
| Note any related traits: enter text here | |