Part IV. Plant Assessment Form

For use with "Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands" by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association

Table 1. Species and Evaluator Information

Species name (Latin binomial)**:**	Ailanthus altissima (P. Mill.) Swingle
Synonyms:	A. glandulosa Desf.
Common names:	Tree-of-Heaven, Chinese sumac, paradise-tree, copal-tree
Evaluation date (mm/dd/yy)**:**	05/05/03
Evaluator #1 Name/Title:	Cynthia L. Roye/ Associate State Park Resource Ecologist
Affiliation:	California State Parks Natural Resources Division
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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

List committee members:	Matt Brooks, Peter Warner, Joe DiTomaso, Doug Johnson
Committee review date:	9/4/03
List date:	enter text here
Re-evaluation date(s):	enter text here

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	**C**	**Rev'd, Sci. Pub'n**
1.2	Impact on plant community	**A**	**Rev'd, Sci. Pub'n**
1.3	Impact on higher trophic levels	**U**	**No Information**
1.4	Impact on genetic integrity	**D**	**Other Pub. Mat'l**

"Impact"

Enter four characters from Q1.1-1.4 below:

CAUD

Use matrix determine the score; enter below:

B

2.1	Role of anthropogenic and natural disturbance	**A 3**	**Rev'd, Sci. Pub'n**
2.2	Local rate of spread with no management	**A 3**	**Other Pub. Mat'l**
2.3	Recent trend in total area infested within state	**A 3**	**Other Pub. Mat'l**
2.4	Innate reproductive potential	**B 2**	**Other Pub. Mat'l**
2.5	Potential for human-caused dispersal	**B 2**	**Other Pub. Mat'l**
2.6	Potential for natural long-distance dispersal	**B 2**	**Other Pub. Mat'l**
2.7	Other regions invaded	**C 1**	**Other Pub. Mat'l**

"Invasiveness"

For questions at left, recall that an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Enter the sum total of all points for Q2.1-2.7 below:

16

Use matrix to determine score and enter below:

B

3.1	Ecological amplitude	**A**	**Other Pub. Mat'l**
3.2	Distribution	**C**	**Other Pub. Mat'l**

"Distribution"

Use matrix determine the score; enter below:

B

"Plant Score"

Using matrix, determine the Overall Score and Alert Status from the three section scores and enter them below:

Medium

No Alert

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes
Identify ecosystem processes impacted: Score C: Changes soil chemistry through allelopathy (ailanthone)
Rationale: Toxic levels maintained through the growing season although Heisey, R.M. states soil microbes rapidly detoxify ailanthone.
Sources of information: The Nature Conservancy Element Stewardship Abstract for Ailanthus altissima accessed online at http://tncweeds.ucdavis.edu/esadocs/ailalti.html; Hunter IN: Bossard et al. 2000; Miller, 1990; De Feo et al. 2003. Isolation of phytotoxic compounds from Tree-of-Heaven (Ailanthus altissima Swingle). J. Agric. Food Chem. 51:1177-1180; Heisey, R.M. 1996. American Journal of Botany 83:(2) 192-200.
Question 1.2 Impact on plant community composition, structure, and interactions
Identify type of impact or alteration: A; Displaces native plants.
Rationale: Produces many seeds, forms taproot readily, forms abundant root sprouts, clonal ramets. Can form monospecific stands, eliminating other vegetation. Combined with toxins, these strategies appear to give it a competitive advantage. Information about response to shade is contradictory. Per Grime (1965) Ailanthus has a high degree of shade tolerance per Grime 1965 (as cited by Hunter) but Kowarik, 1995, characterizes Ailanthus as a pioneering light-demanding species that may use clonal ramets to overcome lack of light.
Sources of information: Hunter, J. IN: Bossard et al. 2000; Virginia Natural Heritage Program; Kowarik, I. 1995. The clonal growth of Ailanthus altissima on a natural site in West Virginia. Journal of Vegetation Science 6(6) 853-856.
Question 1.3 Impact on higher trophic levels
Identify type of impact or alteration: Effect on upper trophic levels in California unknown.
Rationale: Is food for the ailanthus silkmoth, also known as the cynthia moth (Samia cynthia), that was introduced in an effort to establish a silk industry. Moths persist in spotty distribution along the Atlantic coast from Connecticut to Georgia and west to northern Kentucky. No information on interaction with native fauna found.
Sources of information: Moths of North America, USGS Northern Prairie Center, accessed over the Internet at:http://www.npwrc.usgs.gov/resource/distr/lepid/moths/usa/1004.htm

Question 1.4 Impact on genetic integrity
Identify impacts: None
Rationale: No closely related California natives or non-natives

Sources of information: Hunter, J. IN Bossard et al. 2000.
Question 2.1 Role of anthropogenic and natural disturbance in establishment
Describe role of disturbance: B. Found primarily in disturbed areas, of both human and natural origin. Is capable of clonal growth into undisturbed forest.
Rationale: Found is areas disturbed by humans such as along road cuts and in cities, where it was planted as a landscape tree, as well as in areas of natural disturbance such as riparian areas. Has spread into natural (undisturbed) forest in West Virginia through clonal ramets.
Sources of information: Hunter IN: Bossard et al. eds. 2000. Wildland Weeds of California; The Nature Conservancy Element Stewardship Abstract, Hoshovsky 1988; Roye, 2002. Personal observation. Woodson Bridge SRA and roadsides along Interstate 80 in the Sierra Nevada foothills, Roye, 2003 Personal Pbservatopn along Hwy 299West of Weaverville. California State Parks. 2002. Natural Resources Condition Assessment, unpublished, Sacramento, CA; Kowarik, I. 1995. Clonal growth in Ailanthus altissima on an natural site in West Virginia. Journal of Vegetation Science. 6(6): 853-856.
Question 2.2 Local rate of spread with no management
Describe rate of spread: High
Rationale: Within a short period of time one tree can "scatter seed for blocks around and can create a thicket of sprouts from its wide-spreading roots." An Internet pictorial of the spread of this plant in Massachussetts paints a compelling picture of its spread (0http://omega.cc.umb.edu/~conne/jennjim/ailanthus.html)
Sources of information: Hunter IN:Bossard et al. 2000; Forest Preserve District of Cook County Illinois; Conservation of New England Past &nd Future. A graduate level course offered by Dr. Robert Stevenson through the Biology Department of the University of Massachusetts at Boston. Accessed over the Internet at: http://omega.cc.umb.edu/~conne/jennjim/ailanthus.html
Question 2.3 Recent trend in total area infested within state
Describe trend: Increasing
Rationale: Although picture of spread in California is not well-documented, the plant is now in over 20 California counties.
Sources of information: Hunter IN Bossard et al.;Hoshovsky, M.C. 1988. TNC Element Abstract as accessed on the Internet at:http://tncweeds.ucdavis.edu/esadocs/documnts/ailaalt.pdf
Question 2.4 Innate reproductive potential
Describe key reproductive characteristics: Score 5 =B; dioecious, prolific seeder with one tree producing up to 1,000,000 seeds per year, sprouts from roots. THIS REPRESENTS A CHANGE FROM THE INTERNAL SCORE ASSIGNED BY COMMITTEE FEBRUARY 2003. I WAS UNABLE TO DOCUMENT A HIGHER SCORE. THE OVERALL RANKING OF THE PLANT (MEDIUM) DID NOT CHANGE.

Rationale: dioecious, prolific seeder with one mature tree producing up to 1,000,000 seeds per year, sprouts from roots. These seeds are easily airborne and can be transported by water and birds as well. Germination of seeds is rangyes from 14-75 percent but seedling establishment is rare. Most new shoots are root sprouts, mature trees send up extensive root suckers and sprouts from cut stumps. Sapling growth can reach 3-4 feet a year and can outgrow nearly any native tree, outcompeting natives for light. The roots give off a toxin that acts as a herbicide that can kill or inhibit the growth of other plants. Tree-of-heaven is somewhat shade-tolerant and can grow quickly when released by gaps in the forest canopy caused by windfalls, logging or defoliation due to insect pests such as gypsy moth (http://www.dnr.state.oh.us/dnap/invasive/17treeofheaven.htm)Hoshovsky, M. 1988. Element Stewardship Abstract for Tree-of-Heaven. The Nature Conservancy.
Sources of information: Hoshovsky, M. 1999. Element Stewardship Abstract for Tree-of-Heaven. The Nature Conservancy ; http://www.dnr.state.oh.us/dnap/invasive/17treeofheaven.htm
Question 2.5 Potential for human-caused dispersal
Identify dispersal mechanisms: B; Widely planted in California until the 1890s. Tolerant of very poor soil conditions including a pH of less than 4.1, high salt concentrations and phosphorus levels as low as 1.8 ppm. Has ben used to revegetate mine spoils. Has lost popularity as horticultural tree because of unpleasant odor and difficulty of control of spread. but still widely available per USDA PLANTS National Databaseand per search of Internet for seeds.
Rationale: Has lost popularity as horticultural tree because of unpleasant odor and difficulty of control of spread. was recently added to the California Department of Food and Agriculture Noxious Weeds List so availability could be reduced in those counties where the Agricultural Commissioner perceives it as a problem.
Sources of information: USDA PLANTS National Datsa base as accessed at:http://plants.usda.gov/cgi_bin/plant_attreibute.cgi?symbol=AIAL, 1/2/2003. Hunter IN: Bossard et al. 2000.
Question 2.6 Potential for natural long-distance dispersal
Identify dispersal mechanisms: B; Has light-weight winged samaras that could travel by wind and water but more frequently reproduces by sprouting.
Rationale: Germination is 14-75 percent.
Sources of information: Hunter IN: Bossard et al. 2000. Matt Brooks, observational.
Question 2.7 Other regions invaded
Identify other regions: C; Weedy in similar situations to those invaded in California
Rationale: primarily found in urban areas and disturbed places but also becoming an agricultural pest per PCA Alien Plant Working Group as accessed at:http://www/nps.gpv/plants/alien/fact/aial1.htm, 1/13/03.
Sources of information: PCA Alien Plant Working Group as accessed

at:http://www/nps.gpv/plants/alien/fact/aial1.htm, 1/13/03.
Question 3.1 Ecological amplitude
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Introduced to California during the 19th century, especially by gold miners.Score = A; Invades four major California types, six minor types.
Rationale: Persists adjacent to dwellings or homesteads near water sources (springs) in climates where it would not otherwise persist and may not easily invade such as desert springs. Dice, 2003. Personal Communication
Sources of information: Hunter IN: Bossard et al. 2000. Roye, 2002. Personal Observation. Woodson Bridge SRA and roadsides along Interstate 80 in Sierra Nevada foothills. Roye, 2003. Personal Observation. Along Hwy 299 West of Weaverville. California State Parks. 2002. Natural Resources Condition Assessment, unpublished, Sacramento, CA.
Question 3.2 Distribution
Describe distribution: Most noticeable in disturbed areas adjacent to roads. Estimated to invade 5-20 % of the occurrences of invaded types, statewide.
Rationale: Most noticeable in disturbed areas adjacent to roads. Estimated to invade 5-20 % of the occurrences of invaded types, statewide.
Sources of information: Committee discussion, February 2003.

Worksheet A

Complete this worksheet to answer Question 2.4.

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**
Seed production sustained over 3 or more months within a population annually	**No: 0 pt**
Seeds remain viable in soil for three or more years	**No: 0 pts**
Viable seed produced with *both* 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	**Unknown: 0 pts**
Resprouts readily when cut, grazed, or burned	**Yes: 1 pt**
5 pts	**1 unknown**
B (4-5 pts)	

Note any related traits: An abundance of sprouts can develop from wide-spreading shallow root system following death or injury to main stem. (Miller, J.H. 1990. IN: Burns, R.M. and B.H. Honkala. Silvics of North America, Vol. 2, Hardwoods. Agricultutal Handbook 654, USDA, Washington, D.C.)

Worksheet C - California Ecological Types

(*sensu* Holland 1986)

Major Ecological Types	Minor Ecological Types	Code*
Marine Systems	marine systems	**score**
Freshwater and Estuarine Aquatic Systems	lakes, ponds, reservoirs	**score**
	rivers, streams, canals	**score**
	estuaries	**score**
Dunes	coastal	**score**
	desert	**score**
	interior	**score**
Scrub and Chaparral	coastal bluff scrub	**score**
	coastal scrub	**score**
	Sonoran desert scrub	**score**
	Mojavean desert scrub (incl. Joshua tree woodland)	**score**
	Great Basin scrub	**score**
	chenopod scrub	**score**
	montane dwarf scrub	**score**
	Upper Sonoran subshrub scrub	**score**
Grasslands, Vernal Pools, Meadows, and other Herb Communities	coastal prairie	**score**
	valley and foothill grassland	**D. presen**
	Great Basin grassland	**score**
	vernal pool	**score**
	meadow and seep	**D. presen**
	alkali playa	**score**
	pebble plain	**score**
Bog and Marsh	bog and fen	**score**
	marsh and swamp	**score**
Riparian and Bottomland	riparian forest	**C. 5-20%**
	riparian woodland	**C. 5-20%**
	riparian scrub (incl.desert washes)	**C. 5-20%**
Woodland	cismontane woodland	**C. 5-20%**
	piñon and juniper woodland	**score**
	Sonoran thorn woodland	**score**
Forest	broadleaved upland forest	**score**
	North Coast coniferous forest	**score**
	closed cone coniferous forest	**score**
	lower montane coniferous forest	**D. presen**
	upper montane coniferous forest	**score**
	subalpine coniferous forest	**score**
Alpine Habitats	alpine boulder and rock field	**score**
	alpine dwarf scrub	**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).