

# 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

Electronic version, February 28, 2003

**Table 1. Species and Evaluator Information**

<b>Species name (Latin binomial):</b>	Anthoxanthum odoratum L.
<b>Synonyms:</b>	
<b>Common names:</b>	sweet vernal grass, vanilla grass
<b>Evaluation date (mm/dd/yy):</b>	12/27/04
<b>Evaluator #1 Name/Title:</b>	Elizabeth Brusati, project manager
<b>Affiliation:</b>	California Invasive Plant Council
<b>Phone numbers:</b>	510-843-3902
<b>Email address:</b>	edbrusati@cal-ipc.org
<b>Address:</b>	1442A Walnut St. #462, Berkeley, CA 94709
<b>Evaluator #2 Name/Title:</b>	Peter J. Warner; ecologist
<b>Affiliation:</b>	California State Parks
<b>Phone numbers:</b>	707-937-9172; 707-937-2278
<b>Email address:</b>	corylus@earthlink.net
<b>Address:</b>	P. O. Box 603, Little River, CA 95456

Section below for list committee use—please leave blank

<b>List committee members:</b>	Carla Bossard, John Randall, Cynthia Roye, Jake Sigg, Peter Warner
<b>Committee review date:</b>	2/11/05
<b>List date:</b>	enter text here
<b>Re-evaluation date(s):</b>	enter text here

**General comments on this assessment:**

More quantitative data and observational evidence on the distribution and impacts of this common plant in California are needed to strengthen this assessment.

**Table 2. Criteria, Section, and Overall Scores**

<a href="#">1.1</a>	Impact on abiotic ecosystem processes	<b>U</b>	<b>No Information</b>
<a href="#">1.2</a>	Impact on plant community	<b>B</b>	<b>Rev'd, Sci. Pub'n</b>
<a href="#">1.3</a>	Impact on higher trophic levels	<b>D</b>	<b>Observational</b>
<a href="#">1.4</a>	Impact on genetic integrity	<b>D</b>	<b>Rev'd, Sci. Pub'n</b>

**Impact**

*Enter four characters from Q1.1-1.4 below:*

**UBDD**

*Using matrix, determine score and enter below:*

**B**

<a href="#">2.1</a>	Role of anthropogenic and natural disturbance	<b>3 (2 pts)</b>	<b>Rev'd, Sci. Pub'n</b>
<a href="#">2.2</a>	Local rate of spread with no management	<b>3 (2 pts)</b>	<b>Observational</b>
<a href="#">2.3</a>	Recent trend in total area infested within state	<b>3 (2 pts)</b>	<b>Observational</b>
<a href="#">2.4</a>	Innate reproductive potential <a href="#">Wksht A</a>	<b>3 (2 pts)</b>	<b>Other Pub. Mat'l</b>
<a href="#">2.5</a>	Potential for human-caused dispersal	<b>3 (2 pts)</b>	<b>Observational</b>
<a href="#">2.6</a>	Potential for natural long-distance dispersal	<b>3 (1 pt)</b>	<b>Other Pub. Mat'l</b>
<a href="#">2.7</a>	Other regions invaded	<b>3 (1 pt)</b>	<b>Rev'd Sci Pubn.</b>

**Invasiveness**

*Enter the sum total of all points for Q2.1-2.7 below:*

**12**

*Use matrix to determine score and enter below:*

**B**

**Plant Score**

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

**Medium**

**No Alert**

<a href="#">3.1</a>	Ecological amplitude/Range	<b>B</b>	<b>Other Pub. Mat'l</b>
<a href="#">3.2</a>	Distribution/Peak frequency <a href="#">Wksht C</a>	<b>B</b>	<b>Observational</b>

**Distribution**

*Using matrix, determine score and enter below:*

**B**

**Table 3. Documentation**

<b>Question 1.1</b> Impact on abiotic ecosystem processes	U No Information <a href="#">back</a>
Identify ecosystem processes impacted: no information	
Rationale: enter text here	
Sources of information: enter text here	
<b>Question 1.2</b> Impact on plant community composition, structure, and interactions	B Rev'd, Sci. Pub'n <a href="#">back</a>
Identify type of impact or alteration: Outcompetes other grasses (1). Live plants have allelopathic effect (2) but root material may improve growth of some other grasses (3). Develops dense surface root mat (1). Invades disturbed areas and prevents re-establishment of native species (4).	
Not observed to completely displace either native or non-native plants, even as a dominant species in heavily invaded areas (5).	
Rationale: Anthoxanthum shoots depressed germination of grass seed but tended to promote germination of legumes (2). Decomposing roots of Anthoxanthum increased growth of subsequent plants (of other species) (3). However, personal observations (5) suggest that this plant does not severely alter species composition, even in heavily infested coastal prairie.	
Sources of information: 1. Pitcher D., and M. J. Russo. 1988. Element Stewardship Abstract for Anthoxanthus odoratum. The Nature Conservancy, Washington, D.C. <a href="http://tncweeds.ucdavis.edu/esadocs/documnts/anthodo.html">http://tncweeds.ucdavis.edu/esadocs/documnts/anthodo.html</a> .	
2. Scott D. 1975. Allelopathic interactions of resident tussock grassland species on germination of oversown seed. New Zealand Journal of Experimental Agriculture 3: 135-141.	
3. Newbery D. McC. 1979. The effects of decomposing roots on the growth of grassland plants. Journal of Applied Ecology 16: 613-622.	
4. U.S. Forest Service, Institute of Pacific Islands Forestry. Pacific Islands Ecosystems at Risk. <a href="http://www.hear.org/pier/species/anthoxanthum_odoratum.htm">http://www.hear.org/pier/species/anthoxanthum_odoratum.htm</a>	
5. Warner, P.J. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; <a href="mailto:corylus@earthlink.net">corylus@earthlink.net</a>	
<b>Question 1.3</b> Impact on higher trophic levels	D Observational <a href="#">back</a>
Identify type of impact or alteration: Planted as a forage crop, so is probably palatable to livestock. Browsing of coastal prairie plants suggest that the plant is used by wild animals, perhaps rabbits, voles, mice, and deer (1).	
Rationale: very casual observations and anecdotes suggest that this plant does not negatively affect native animal species, but is a palatable plant.	
Sources of information: 1. Warner, P.J. Personal observations, Salt Pt. State Park (Sonoma Co.), and Mendocino Co. (various locations), 1996-2005. 707/937-2278; <a href="mailto:corylus@earthlink.net">corylus@earthlink.net</a>	

<b>Question 1.4</b> Impact on genetic integrity	D Rev'd, Sci. Pub'n <a href="#">back</a>
Identify impacts: none	
Rationale: no native Anthoxanthum spp.	
Sources of information: Hickman, J. C. (ed.) 1993. The Jepson Manual, Higher Plants of California. University of California Press. Berkeley, CA enter text here	
<b>Question 2.1</b> Role of anthropogenic and natural disturbance in establishment	B Rev'd, Sci. Pub'n <a href="#">back</a>
Describe role of disturbance: Needs to germinate in disturbed areas (1). However, it does germinate and spread into marginally optimal habitats that lack regular disturbance, such as observed at forest edges in Mendocino County (2).	
Rationale: Adult transplants in New Zealand could survive without disturbance, but seedlings could not germinate without it. Germination occurred near back-country huts and rivers (1). But, Anthoxanthum appears to germinate well in relatively undisturbed sites, perhaps where competition from other herbaceous perennials and annuals is minimal (2).	
Sources of information: 1. Jesson, L., D. Kelly, and A. Sparrow. 2000. The importance of dispersal, disturbance, and competition for exotic plant invasions in Arthur's Pass National Park, New Zealand. New Zealand Journal of Botany 38(3): 451-468. enter text here	
2. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; corylus@earthlink.net	
<b>Question 2.2</b> Local rate of spread with no management	B Observational <a href="#">back</a>
Describe rate of spread: Other than very limited observational evidence, no information. However, Anthoxanthum does spread into uninvaded areas at a relatively slow rate, based on observations with hand-pulling and subsequent reintroduction into those areas (some of which could be due to regeneration from rhizomes, and not from seeds only) (1).	
Rationale: very much a guess based on limited personal observations.	
Sources of information: 1. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; corylus@earthlink.net	
<b>Question 2.3</b> Recent trend in total area infested within state	B Observational <a href="#">back</a>
Describe trend: Anthoxanthum has been well established in California for a very long time, perhaps over 100 years. Most suitable habitat appears to have been exploited, so the trend appears virtually stable (1). However, one observation suggests that upland, moist sites may have been invaded more recently (2), but is this based upon long-time observations, or other evidence, that it was not present until recently?	

Rationale: Assessment based on history of establishment and land uses for grazing, along with observations (1).	
Sources of information: 1. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; corylus@earthlink.net 2. Hayes, G. Personal communication to P. Warner, 2004. grey@elkhornslough.org.	
<b>Question 2.4</b> Innate reproductive potential	B Other Pub. Mat'l <a href="#">back</a>
Describe key reproductive characteristics: Short-lived, perennial, outcrossing grass (1). Significant differences in morphological traits can develop as adaptations to soil conditions (1). Reproduces from seeds. Self-incompatible. In North Carolina, produced 58 - 1257 seeds/plant (2). Some seeds able to germinate after a year's dormancy (2). Other studies found that buried seeds were not viable after 10 months (2). Seeds have awns that allow them to move within the soil (2). Biology depends upon habitat of a particular population, with higher turnover rates and shorter life of individuals in ecologically marginal populations (2).	
Rationale: enter text here	
Sources of information: 1. Kiang Y.T. 1982. Local differentiation of Anthoxanthum odoratum L. populations on roadsides. American Midland Naturalist 107(2): 340-350 2. Pitcher and Russo 1988.	
<b>Question 2.5</b> Potential for human-caused dispersal	B Doc'n level <a href="#">back</a>
Identify dispersal mechanisms: Near-certain transport along roads (1,2), by mowing equipment, on hiker's shoes (2).	
Rationale: I found no information on this, but the literature mentions it occurring along roadsides and in pastures, so presumably seeds could be transported on road equipment or other vehicles. The fact that it occurs near backcountry huts in New Zealand implies that it was transported by hikers (1). Very likely, this species is spread primarily through human impacts, such as mowing and hiking, and especially along roads and trails (2).	
Sources of information: 1. Jesson et al. 2000. 2. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; corylus@earthlink.net	
<b>Question 2.6</b> Potential for natural long-distance dispersal	C Other Pub. Mat'l <a href="#">back</a>
Identify dispersal mechanisms: Seed dispersed by wind, water, and animals, but no information on the distance of dispersal.	
Rationale: U.S. Forest Service, Institute of Pacific Islands Forestry. Pacific Islands Ecosystems at Risk. <a href="http://www.hear.org/pier/species/anthoxanthum_odoratum.htm">http://www.hear.org/pier/species/anthoxanthum_odoratum.htm</a>	

Sources of information: enter text here	
<b>Question 2.7</b> Other regions invaded	C Doc'n level <a href="#">back</a>
Identify other regions: Native to Eurasia. Has invaded New Zealand (1), Taiwan (2), Chile (open areas, dry soils, humid rock, seaside areas, etc. (3). In US, ranges from northern Florida to southern Canada along east coast, and west to Mississippi River. On west coast, occurs from northern California to Vancouver Island (4). Present on TNC preserves in Oregon, west of the Cascades to the coast (4). In Hawaii, naturalized in pastures, disturbed areas in wet forest, and subalpine shrubland (5).	
Rationale: From the literature, Anthoxanthum has probably invaded most, if not all, suitable habitats here in California. However, more evidence of ecotypes invaded (especially upland sites away from the immediate coast) could alter this assessment.	
Sources of information: 1. Jesson et al. 2000 2. Kuoh, C.-S., G.-I. Liao, and M-Y. Chen. 1999. Two new naturalized grasses in Taiwan. <i>Taiwania</i> 44(4): 514-519. 3. Baeza, C. M., T. F. Stuessy, and C. Marticorena. 2002. Notes on the Poaceae of the Robinson Crusoe (Juan Fernandez) Islands, Chile. <i>Brittonia</i> 54(3): 154-163. 4. Pitcher and Russo 1988 5. U.S. Forest Service, Institute of Pacific Islands Forestry, Pacific Islands Ecosystems at Risk	
<b>Question 3.1</b> Ecological amplitude/Range	C Rev'd Sci Pubn. <a href="#">back</a>
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Introduced to North America as meadow grass in 1700's and escaped from cultivation (1). Observational evidence suggests that this taxon is restricted to coastal areas, primarily north of the San Francisco Bay Area. Anthoxanthum is widespread in coastal prairie habitats, and also invades moist, open sites in closed cone pine and north coast coniferous forests (2).	
Rationale: Assessment based on limited observations in 3 counties along northern California coast.	
Sources of information: 1. Pitcher and Russo. 1988 2. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005. 707/937-2278; corylus@earthlink.net	
<b>Question 3.2</b> Distribution/Peak frequency	B Observational <a href="#">back</a>
Describe distribution: Anthoxanthum is virtually ubiquitous in coastal prairie habitat from the Russian River north through Mendocino County, and probably further north (1). Although not as common further south, it does invade upland grassland habitats and disturbed sites in the Santa Cruz Mountains (2).	
Rationale: Assessment based on limited and undocumented observations - a cautious guess.	
Sources of information: 1. Warner, PJ. Personal observations. Marin, Sonoma, Mendocino Counties, 1996-2005.	

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2. Hayes, G. Personal communication to P. Warner, 2004. grey@elkhornslough.org.

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Reaches reproductive maturity in 2 years or less	<b>Yes: 1 pt</b>
Dense infestations produce >1,000 viable seed per square meter	<b>Yes: 2 pts</b>
Populations of this species produce seeds every year.	<b>Yes: 1 pt</b>
Seed production sustained over 3 or more months within a population annually	<b>No: 0 pt</b>
Seeds remain viable in soil for three or more years	<b>No: 0 pts</b>
Viable seed produced with <i>both</i> self-pollination and cross-pollination	<b>No: 0 pt</b>
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	<b>No: 0 pt</b>
Fragments easily and fragments can become established elsewhere	<b>No: 0 pts</b>
Resprouts readily when cut, grazed, or burned	<b>Yes: 1 pt</b>
	<b>5 pts</b>
	<b>Total Unknowns</b>
	<b>B (4-5 pts)</b>
<b>Note any related traits:</b> Seeds produced annually from most plants; responds vigorously to grazing, mowing, or burning.	

## Worksheet C - California Ecological Types

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(*sensu* Holland 1986)

Major Ecological Types	Minor Ecological Types	Code*
<b>Marine Systems</b>	marine systems	score
<b>Freshwater and Estuarine Aquatic Systems</b>	lakes, ponds, reservoirs	score
	rivers, streams, canals	score
	estuaries	score
<b>Dunes</b>	coastal	score
	desert	score
	interior	score
<b>Scrub and Chaparral</b>	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
	chaparral	score
<b>Grasslands, Vernal Pools, Meadows, and other Herb Communities</b>	coastal prairie	<b>B. 21-50</b>
	valley and foothill grassland	score
	Great Basin grassland	score
	vernal pool	score
	meadow and seep	score
	alkali playa	score
	pebble plain	score
<b>Bog and Marsh</b>	bog and fen	score
	marsh and swamp	score
<b>Riparian and Bottomland</b>	riparian forest	score
	riparian woodland	score
	riparian scrub (incl. desert washes)	score
<b>Woodland</b>	cismontane woodland	score
	piñon and juniper woodland	score
	Sonoran thorn woodland	score
<b>Forest</b>	broadleaved upland forest	score
	North Coast coniferous forest	<b>C. 5-20%</b>
	closed cone coniferous forest	<b>C. 5-20%</b>
	lower montane coniferous forest	score
	upper montane coniferous forest	score
	subalpine coniferous forest	score
<b>Alpine Habitats</b>	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).