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)**:**	Bromus diandrus
Synonyms:	B. rigidus, B. rigidus var gussonei, B. gussonei
Common names:	Ripgut brome, great brome, ripgut grass
Evaluation date (mm/dd/yy)**:**	07/20/04
Evaluator #1 Name/Title:	Guy Kyser / Staff Research Associate
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Section below for list committee use—please leave blank

List committee members:	Joe DiTomaso, Peter Warner, Alison Stanton, Jake Sigg, John Randall, Cynthia Roye
Committee review date:	8/27/2004
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:
Bromus diandrus is a medium threat according to the rubric, although I began the survey with the prejudice that it should rank higher. I looked at the effect of raising 1.2 to an "A" or of raising Section 2 to an "A" - unlikely in that it would require 4 more points - and in either case the rating would stay the same.

Much of the information referenced here comes from Kon & Blacklow's 1989 review; in most cases they credit multiple previous authors. I will refer to Kon & Blacklow rather than repeat their citations.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	**B**	**Rev'd, Sci. Pub'n**
1.2	Impact on plant community	**B**	**Rev'd, Sci. Pub'n**
1.3	Impact on higher trophic levels	**B**	**Rev'd, Sci. Pub'n**
1.4	Impact on genetic integrity	**D**	**Other Pub. Mat'l**

"Impact"

Enter four characters from Q1.1-1.4 below:

BBBD

Use matrix determine the score; enter below:

B

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

12

Use matrix to determine score and 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

3.1	Ecological amplitude/Range	**A**	**Other Pub. Mat'l**
3.2	Distribution/Peak frequency Wksht C	**A**	**Other Pub. Mat'l**

"Distribution"

Use matrix determine the score; enter below:

A

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes B Rev'd, Sci. Pub'n back
Identify ecosystem processes impacted: hydrology; fire occurrence/severity
Rationale: B. diandrus has high water use efficency allowing late season growth, and it produces abundant potential fuel which can increase frequency or severity of fires. Generally does not form monotypic stands, so it does not cause the type of impact characteristic of other annual grasses, such as medusahead. These effects are reversible.
Sources of information: Bicak, C. J. and D. Sternberg. 1993. Water relations of an annual grass, Bromus diandrus, in the Central Valley of California. Bull. Southern California Acad. Sci. 92:54-63. DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu). Gordon, D. R. and K. J. Rice. 1993. Competitive effects of grassland annuals on soil water and blue oak (Quercus douglasii) seedlings. Ecology 74:68-82. Gordon, D. R. and K. J. Rice. 1992. Partitioning of space and water between two California annual grassland species. American Journal of Botany 79:967-976. Holmes, T. H. and K. J. Rice. 1996. Patterns of growth and soil-water utilization in some exotic annuals and native perennial bunchgrasses of California. Annals of Botany 78:233-243. Kon, K.F., and Blacklow, W.M. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.
Question 1.2 Impact on plant community composition, structure, and interactions B Rev'd, Sci. Pub'n back
Identify type of impact or alteration: interferes with establishment and survival of native plant seedlings.
Rationale: B. diandrus competes with other plants for water and nutrients, often establishs dense stands, and hosts various plant diseases. However it generally does not form exclusionary monocultures.
Sources of information: Gordon, D. R. and K. J. Rice. 1993. Competitive effects of grassland annuals on soil water and blue oak (Quercus douglasii) seedlings. Ecology 74:68-82. Kon, K.F., and Blacklow, W.M. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61. Rice, K. J. and E. S. Nagy. 2000. Oak canopy effects on the distribution patterns of two annual grasses: the role of competition and soil nutrients. American Journal of Botany 87:1699-1706
Question 1.3 Impact on higher trophic levels B Rev'd, Sci. Pub'n back
Identify type of impact or alteration: physical injury to ruminants; decreased quality of late season forage, but if good forage in spring.

Rationale: B. diandrus' sharp florets can cause damage to eyes, mouth, feet, and intestines of grazing animals, plus it is poor late season forage. Impacts to faunal populations are probably persistent but low intensity.

Sources of information:

DiTomaso, J.M., and E.A. Healy. 2005. Weeds of California (in press).

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 1.4 Impact on genetic integrity D Other Pub. Mat'l back

Identify impacts: Some native Bromus species, but not known to hybridize with natives.

Rationale:

Sources of information: Hickman, J. (ed.) 1993. The Jepson Manual. UC Press

Question 2.1 Role of anthropogenic and natural disturbance in establishment B Rev'd, Sci. Pub'n back

Describe role of disturbance: Soil disturbance, both anthropogenic (cultivation, construction, livestock) and natural (rooting and other disturbances by animals), contributes to establishment. May establish in undisturbed areas on gaps, burrow mounds, etc.

Rationale: B. diandrus may establish in natural areas on gaps, burrow mounds, etc.

Sources of information:

DiTomaso, J.M., and E.A. Healy. 2005. Weeds of California (in press).

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 2.2 Local rate of spread with no management B Observational back

Describe rate of spread: As discussed above - B. diandrus is opportunistic and occupies gaps and disturbed areas. It spreads locally, but slowly.

Rationale:

Sources of information:

DiTomaso, J.M., and E.A. Healy. 2005. Weeds of California (in press).

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present

(jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 2.3 Recent trend in total area infested within state C Other Pub. Mat'l back

Describe trend: B. diandrus already occupies pretty much its entire potential range in California thus is not increasing in area, nor is management making much of an impact.

Rationale: The statewide population is relatively stable.

Sources of information:

CalFlora. 2004. Accessed July 2004 at http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=1200.

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Question 2.4 Innate reproductive potential B Rev'd, Sci. Pub'n back

Describe key reproductive characteristics: Reaches reproductive maturity in 1 year; dense infestations produce >1000 seed/square meter; populations produce seed every year; seed is produced only during a short period; seed has a soil viability of less than 3 years; can both self- and cross-pollinate; cannot reproduce vegetatively.

Rationale: Moderate reproductive potential: seeds heavily, but with a short seed life, and no vegetative reproduction.

Sources of information:

Cheam, A.H. 1987. Longevity of Bromus diandrus Roth seed in soil at three sites in Western Australia. Plant Protection Quarterly 2:137-139.

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 2.5 Potential for human-caused dispersal B Rev'd, Sci. Pub'n back

Identify dispersal mechanisms: Sharp awned florets stick to clothing, to fur of domestic animals, and in crevices in machinery; can be spread as contaminant in crop seed

Rationale: Moderate human dispersal: is dispersed by accident, not by any systematic process.

Sources of information:

DiTomaso, J.M., and E.A. Healy. 2005. Weeds of California (in press).

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61

Question 2.6 Potential for natural long-distance dispersal B Observational back

Identify dispersal mechanisms: Florets stick to fur, feathers, and feet of animals and birds. No mechanisms to promote effective abiotic dispersal.

Rationale: Natural dispersal over long distances can occur but would require seeds attaching to wide-ranging animals such as deer, puma, etc.

Sources of information:

DiTomaso, J.M., and E.A. Healy. 2005. Weeds of California (in press).

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in Yolo, Yuba, and San Benito counties, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 2.7 Other regions invaded C Other Pub. Mat'l back

Identify other regions: none known

Rationale: B. diandrus seems limited to habitats similar to those it occupies in California; moreover, it appears already to occupy most of the appropriate sites here.

Sources of information:

CalFlora. 2004. Accessed July 2004 at http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=1200.

Kon, K. F. and W. M. Blacklow. 1989. The biology of Australian weeds. 19. Bromus diandrus Roth and B. rigidus Roth. Plant Protection Quarterly 4:52-61.

Question 3.1 Ecological amplitude/Range A Other Pub. Mat'l back

Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: B. diandrus is documented in 45 out of 52 counties and is probably present in the remainder. Found in most California habitats with the exception of alpine, rainforest, and marsh / aquatic. Herbarium specimens include collections from desert, coastal, forest, woodland, scrub, and grassland communities.

Rationale:

Sources of information:

CalFlora. 2004. Accessed July 2004 at http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=1200

DiTomaso, J.M., and G.B. Kyser. 2004. Observations in northern and central California, 1998 to present

(jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).
Question 3.2 Distribution/Peak frequency A Other Pub. Mat'l back
Describe distribution: B. diandrus is most prevalent in scrub, grassland, and woodland.
Rationale:
Sources of information: CalFlora. 2004. Accessed July 2004 at http://www.calflora.org/cgi-bin/species_query.cgi?where-calrecnum=1200. DiTomaso, J.M., and G.B. Kyser. 2004. Observations in northern and central California, 1998 to present (jmditomaso@ucdavis.edu, gbkyser@ucdavis.edu).

Worksheet A

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Reaches reproductive maturity in 2 years or less	**Yes: 1 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	**Yes: 1 pt**
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	**No: 0 pt**
Fragments easily and fragments can become established elsewhere	**No: 0 pts**
Resprouts readily when cut, grazed, or burned	**No: 0 pt**
5 pts	**Total Unknowns**
B (4-5 pts)	

Note any related traits: Seed is relatively large and highly viable.

Worksheet C - California Ecological Types

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(*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	**D. presen**
Dunes	coastal	**C. 5-20%**
	desert	**D. presen**
	interior	**B. 21-50%**
Scrub and Chaparral	coastal bluff scrub	**A. >50%**
	coastal scrub	**A. >50%**
	Sonoran desert scrub	**C. 5-20%**
	Mojavean desert scrub (incl. Joshua tree woodland)	**B. 21-50%**
	Great Basin scrub	**A. >50%**
	chenopod scrub	**B. 21-50%**
	montane dwarf scrub	**Unknown**
	Upper Sonoran subshrub scrub	**A. >50%**
	chaparral	**A. >50%**
Grasslands, Vernal Pools, Meadows, and other Herb Communities	coastal prairie	**A. >50%**
	valley and foothill grassland	**A. >50%**
	Great Basin grassland	**A. >50%**
	vernal pool	**D. presen**
	meadow and seep	**Unknown**
	alkali playa	**Unknown**
	pebble plain	**Unknown**
Bog and Marsh	bog and fen	**score**
	marsh and swamp	**score**
Riparian and Bottomland	riparian forest	**D. presen**
	riparian woodland	**C. 5-20%**
	riparian scrub (incl.desert washes)	**B. 21-50%**
Woodland	cismontane woodland	**A. >50%**
	piñon and juniper woodland	**A. >50%**
	Sonoran thorn woodland	**Unknown**
Forest	broadleaved upland forest	**A. >50%**
	North Coast coniferous forest	**Unknown**
	closed cone coniferous forest	**B. 21-50%**
	lower montane coniferous forest	**A. >50%**
	upper montane coniferous forest	**C. 5-20%**
	subalpine coniferous forest	**D. presen**
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).