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)**:**	*Taeniatherum caput-medusae*
Synonyms:	enter text here
Common names:	Medusahead
Evaluation date (mm/dd/yy)**:**	3/8/03
Evaluator #1 Name/Title:	Joe DiTomaso
Affiliation:	UC Davis
Phone numbers:	530-754-8715
Email address:	DiTomaso@vegmail.ucdavis.edu
Address:	Weed Science Program, Robbins Hall, Univ. California, Davis CA 95616
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 review committee use—please leave blank

Review committee members:	Carla Bossard, John Randall, Peter Warner, Doug Johnson, John Hall, Dana Backer, Cindy Roye, Matt Brooks
Committee review date:	2/10/03
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	**A**	**Rev'd, Sci. Pub'n**
1.2	Impact on plant community	**A**	**Rev'd, Sci. Pub'n**
1.3	Impact on higher trophic levels	**A**	**Rev'd, Sci. Pub'n**
1.4	Impact on genetic integrity	**D**	**No Information**

"Impact"

Enter four characters from Q1.1-1.4 below:

AAAD

Use matrix determine the score; enter below:

A

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**	**Rev'd, Sci. Pub'n**
2.4	Innate reproductive potential	**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	**A 3**	**Rev'd, Sci. Pub'n**
2.7	Other regions invaded	**C 1**	**Rev'd, Sci. Pub'n**

"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:

17

Use matrix to determine score and enter below:

A

"Plant Score"

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

High

No Alert

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

"Distribution"

Use matrix determine the score; enter below:

A

Worksheet A. Complete this worksheet to answer Question 2.4.

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 0**
B (4-5 pts)	

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes
Identify ecosystem processes impacted: Increases litter density, utilized shallow soil moisture, and increases frequency of fire.
Rationale: The dense litter cover enhances medusahead germination, may exclude native species, ties up soil nutrients, and contributes to fire danger in the summer. High silica content reduced the rate of tissue decomposition and can lead to 2-5 inches of litter build-up. This heavy thatch delays soil warming in spring, allow nutrient cycling, and prevents seed penetration into the soil surface.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Bovey, R.W., D. LeTourneau and L.C. Erickson. 1961. The chemical composition of medusahead and downy brome. Weeds 9:307-311; Hironaka, M. 1994. Medusahead: natural successor to the cheatgrass type in the northern Great Basin. Pages 89-91, In Proc. Sym. On Ecology, Management, and Restoration of Intermountain Annual Rangelands. Ogden, UT; Evans, R.A. and J.A. Young. 1970. Plant litter and establishment of alien annual weed species in rangeland communities. Weed Science 18:697-703
Question 1.2 Impact on plant community composition, structure, and interactions
Identify type of impact or alteration: Medusaahead is considered to be the most threatening of the invasive annual grass species to rangeland production and wildand plant diversity in California, Idaho and Oregon. Can form near monotypic stands with this thick thatch layer.
Rationale: Medusahead effectively removes available soil water at depths where native grass roots grow. These characteristics confer an advantage in fall establishment and allows medusahead to compete successfully for soil moisture.
Sources of information: George, M.R. 1992. Ecology and management of medusahead. Range Sci Rept. Dept. Agron. And Range Sci. Agr. Exp. Stat. Series #32, 3 pp.; Harris, G.A. 1977. Root phenology as a factor of competition among grass seedlings. J. Range Manage. 30:172-177; Young, J.A. 1992. Ecology and management of medusahead (*Taeniatherum caput-medusae* ssp. *asperum* [Simk.] Melderis). Great Basin Naturalist 52:245-252; Harris, G.A. and A. M. Wilson. 1970. Competition for moisture among seedlings of annual and perennial grasses as influenced by root elongation at low temperature. Ecology 51:530-534; Lusk, W.C., M.B. Jones, D.T. Torell, and C.M. McKell. 1961. Medusahead palatability. J. Range Management 14:248-251
Question 1.3 Impact on higher trophic levels
Identify type of impact or alteration: It has low palatability to wildlife and can reduce grazing capacity by as much as 50% due to the high silica content. The long awned seeds often injure animals foraging later in the season when the inflorescence is present.
Rationale: Provides very little food to livestock and wildlife because of the high silica content and long awns.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Goebel, C.J. and G. Berry. 1976 Selectivity of range grass seeds by local birds. J. Range Manage. 29:393-395; Young, J.A. 1992. Ecology and management of medusahead (*Taeniatherum caput-medusae* ssp. *asperum* [Simk.] Melderis). Great Basin Naturalist 52:245-252
Question 1.4 Impact on genetic integrity
Identify impacts: None
Rationale: Not expected to impact genetic integrity of native species. No natives within this genus in North America. Somewhat related to *Elymus*, but no evidence that they hybridize.
Sources of information: Unknown
Question 2.1 Role of anthropogenic and natural disturbance in establishment
Describe role of disturbance: Can readily move into disturbed grass or scrublands, either mechanical disturbance or overgrazing. Can also move into undisturbed areas.
Rationale: Medusahead threatens rangelands with sparse native plant communities, as well as more complex communities degraded by overgrazing, fire, or cultivation, particularly Artemisia/Agropyron/Poa dominated communities. Reported that 30 years of protection from livestock grazing did not prevent medusahead invasion in Lassen County. Unpublished data by DiTomaso indicate that it can move into native undisturbed scrubland.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Wagner, J.A., R.E. Delmas and J.A. Young. 2001. 30 years of medusahead: return to Fly Brown Flat. Rangelands 23(3):6-9; Dahl, B.E. and E.W. Tisdale. 1975. Environmental factors related to medusahead distribution. J. Range Manage. 28:463-468
Question 2.2 Local rate of spread with no management
Describe rate of spread: Can spread very rapidly once it gets a foothold. Populations can double in far less than 10 years.

Rationale: Current estimates for medusahead distribution in the Great Basin or northeastern California, extending across Modoc and Lassen Counties, are approximately 5 million acres.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis
Question 2.3 Recent trend in total area infested within state
Describe trend: In 1950, it occurred in 6 counties and by 1990s was in 20 counties and as far south as Riverside County. Today, observations estimate it occupies more than a million acres of annual-dominated grassland, oak woodland, and chaparral communities in California.
Rationale: Although is has been suggested that all suitable sites in California are occupied, this is probably only true in the northeastern part of the state. Medusahead appears to be rapidly spreading in the southern Sierra Nevada foothills and the coast ranges.
Sources of information: Young, J.A. 1992. Ecology and management of medusahead (*Taeniatherum caput-medusae* ssp. *asperum* [Simk.] Melderis). Great Basin Naturalist 52:245-252
Question 2.4 Innate reproductive potential
Describe key reproductive characteristics: Germination rates are very high and dormancy is short. Plant density after establishment may range from 500 plants per square foot on scublands to 2000 plants per square foot on valley bottom soils.
Rationale: Like most winter annual grasses. Produces high number of seeds every year. Seedbanks, however, appear to persist for only about 2 years, with very little surviving 3 or more years.
Sources of information: Kan, T. and O. Pollack. 2000. *Taeniatherum caput-medusae*. In, Invasive Plants of California's Wildlands. Eds. C. Bossard, J. Randall, M. Hoshovsky. UC Press, Berkeley; Murphy, A.H. and D. Turner. 1959. A study of the germination of medusahead seed. Calif. Dept. Agric. Bull. 48:6-10; Nelson, J.R. and A.M. Wilson. 1969. Influence of age and awn removal and dormancy of medusahead seed. J. Range Manage. 22:289-290; Sharp, L.A., M. Hironaka and E.W. Tisdale. 1957. Viability of medusahead seed collected in Idaho. J. Range Manage. 10:123-126; Young, J.A., R.A. Evans, and B.L. Kay. 1070. Phenology of reproduction of medusahead. Weed Sci. 18:451-454
Question 2.5 Potential for human-caused dispersal
Identify dispersal mechanisms: Long distance dispersal is primarily by travel in coats of livestock, especially sheep. Sees can also be dispersed by attaching to machinery, vehicles, and clothing.
Rationale: Long awns attach to many things, including animals, humans and objects.
Sources of information: Furbish, P. 1953. Control of medusahead on California ranges. J. Forestry 51:118-121
Question 2.6 Potential for natural long-distance dispersal
Identify dispersal mechanisms: Local dispersal from established patches is by wind and water, but primarily by animals. As with livestock, medusahead can attach to the hair and fur of wildlife and disperse long distances.
Rationale: Awns facilitate long distance dispersal.
Sources of information: Kan, T. and O. Pollack. 2000. *Taeniatherum caput-medusae*. In, Invasive Plants of California's Wildlands. Eds. C. Bossard, J. Randall, M. Hoshovsky. UC Press, Berkeley; Furbish, P. 1953. Control of medusahead on California ranges. J. Forestry 51:118-121
Question 2.7 Other regions invaded
Identify other regions: First introduced to Oregon as a seed contaminant around 1887. Major problem in the interior valleys of Oregon, but also a problem in Nevada, Idaho, Utah, Washington and Colorado.
Rationale: Although invasive in other areas of the west, it occupies similar sites in California as it does in these other states.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Kan, T. and O. Pollack. 2000. *Taeniatherum caput-medusae*. In, Invasive Plants of California's Wildlands. Eds. C. Bossard, J. Randall, M. Hoshovsky. UC Press, Berkeley; Young, J.A. 1992. Ecology and management of medusahead (*Taeniatherum caput-medusae* ssp. *asperum* [Simk.] Melderis). Great Basin Naturalist 52:245-252; Maurer, T., M.J. Russo and A. Godell. 1988. Medusahead. The Nature Conservancy. Element of Stewardship Abstract http://tncweeds.ucdavis.edu/esadocs/Taencapu.html
Question 3.1 Ecological amplitude
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: First introduced to the US in Oregon in 1884. Reached the Sacramento Valley of California by 1900.
Rationale: Most widespread in the grassland and scrubland of the Great Basin region.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Maurer, T., M.J. Russo and A. Godell. 1988. Medusahead. The Nature Conservancy. Element of

Stewardship Abstract http://tncweeds.ucdavis.edu/esadocs/Taencapu.html
Question 3.2 Distribution
Describe distribution: Today, observations estimate it occupies more than a million acres of annual-dominated grassland, oak woodland, and chaparral communities in California. It is most common in Northeastern California, but is expanding range along the coastal and Sierra Nevada foothills.
Rationale: Primarily found in open areas with high light.
Sources of information: Miller, A.C., D. Clausnitzer and M.M. Borman. 1999. Medusahead. In, Biology and Management of Noxious Rangeland Weeds. Eds. R.L. Sheley and J.K. Petroff. Oregon State Univ. Press, Corvallis; Kan, T. and O. Pollack. 2000. *Taeniatherum caput-medusae*. In, Invasive Plants of California's Wildlands. Eds. C. Bossard, J. Randall, M. Hoshovsky. UC Press, Berkeley

Complete the worksheet that corresponds to your state using the letter codes and instructions in Section 3.

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