

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

Species name (Latin binomial):	Cynodon dactylon (L.) Pers.
Synonyms:	enter text here
Common names:	Bermuda grass, couch grass, devil grass, wire grass, vine grass
Evaluation date (mm/dd/yy):	05/26/04
Evaluator #1 Name/Title:	John J. Knapp/ Invasive Plant Program Manager
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Section below for list committee use—please leave blank

List committee members:	Carla Bossard, John Randall, Carri Piroso, Dan Gluesenkamp, Gina Skurka, Brianna Richardson
Committee review date:	7/8/05
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:

Cal-IPC's concern is effect in desert washes, not in home gardens.

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

“Impact”
Enter four characters from Q1.1-1.4 below:
BBCD
Use matrix determine the score; enter below:
B

2.1	Role of anthropogenic and natural disturbance	C 2	Rev'd, Sci. Pub'n
2.2	Local rate of spread with no management	B 2	Other Pub. Mat'l
2.3	Recent trend in total area infested within state	C 2	Other Pub. Mat'l
2.4	Innate reproductive potential Wksht A	A 3	Rev'd, Sci. Pub'n
2.5	Potential for human-caused dispersal	A 3	Rev'd, Sci. Pub'n
2.6	Potential for natural long-distance dispersal	C 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:
15
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	D	Observational

“Distribution”
Use matrix determine the score; enter below:
B

Table 3. Documentation

<p>Question 1.1 Impact on abiotic ecosystem processes</p>	<p>B Rev'd, Sci. Pub'n back</p>
<p>Identify ecosystem processes impacted: <i>C. dactylon</i> is considered a potent allelopathic plant. In Arizona, <i>C. dactylon</i> increases substrate stability during floods. Can reduce soil nutrient levels and block light penetration to soil surface.</p>	
<p>Rationale: enter text here</p>	
<p>Sources of information: Labrada, R., J.C. Caseley, and C. Parker. 1994. Weed management for developing countries. FAO Plant Production Paper 120. Rome: Food and Agriculture Organization for the United Nations.</p> <p>D'Antonio, C.M. and P. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. <i>Annual Review of Ecology and Systematics</i> 23: 63-87.</p> <p>Cohn, EJ, OW Van Auken, and JK Bush. 1989. Competitive interactions between <i>Cynodon dactylon</i> and <i>Acacia smallii</i> seedlings at different nutrient levels. <i>The American Midland Naturalist</i>. 121:265-272.</p>	
<p>Question 1.2 Impact on plant community composition, structure, and interactions</p>	<p>B Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: <i>C. dactylon</i> forms large dense ground cover mats that can inhibit native flora survival by increasing the density and depth at ground level, thus fragmenting habitat. <i>C. dactylon</i> has been identified as posing a threat to temperate grasslands in North America. Riparian communities in Arizona are severely degraded by <i>C. dactylon</i>.</p>	
<p>Rationale: A single shoot from a rhizome may cover 2.5 m² of soil surface in 150 days after emergence.</p>	
<p>Sources of information: Labrada, R., J.C. Caseley, and C. Parker. 1994. Weed management for developing countries. FAO Plant Production Paper 120. Rome: Food and Agriculture Organization for the United Nations.</p> <p>Grace, J.B., M.D. Smith, S.L. Grace, S.L. Collins, and T.J. Stohlgren. 2001. Interactions between fire and invasive plants in temperate grasslands of North America. Pp. 40-65 in: Galley, K.E.M. and T.P. Wilson, eds. <i>Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species</i>. Tallahassee, Florida: Tall Timbers Research Station Miscellaneous Publication No. 11.</p> <p>Arizona-Sonoma Desert Museum Programs and Research. 1996-2003. Biological survey of Ironwood Forest National Monument: exotic plants assessment. http://www.desertmuseum.org/programs/ifnm_exotic.html.</p> <p>Dudley, T. 1998. Exotic plant invasions in California riparian areas and wetlands. <i>Fremontia</i> 26(4): 24-29.</p>	
<p>Question 1.3 Impact on higher trophic levels</p>	<p>C Other Pub. Mat'l back</p>
<p>Identify type of impact or alteration: Under drought conditions with high temperatures, <i>C. dactylon</i> may contain hydrocyanic acid (prussic acid), and when ingested it can be poisonous to cattle, sheep, and goats (other herbivores?). <i>C. dactylon</i> has been reported as a host for viral stripe diseases (affecting corn and rice) and several fungal diseases including <i>Bipolaris</i>, <i>Gaeumannomyces</i>, <i>Leptosphaeria</i>, <i>Marasmius</i>, <i>Phyllachora</i>, <i>Puccinia</i>, <i>Sporisorium</i> and <i>Ustilago</i>; however, the impact of these diseases to native flora is unknown. Habitat of the Southwestern willow flycatcher is dominated by <i>C. dactylon</i>. Produces contact dermatitis and is an important cause of hay fever.</p>	
<p>Rationale: enter text here</p>	

Sources of information: Anderson, W.P. 1999. Perennial weeds: characteristics and identification of selected species. Ames, Iowa: Iowa State University Press.	
Wilken, D. and Hannah, L. 1998. Cynodon dactylon. Channel Island National Park Service Literature Review. Unpublished.	
Fuller T.C., McClintock E. Poisonous Plants of California. 1986. University of California Press: Berkeley. Pg. 293.	
Question 1.4 Impact on genetic integrity	D Other Pub. Mat'l back
Identify impacts: No hybridization is known to occur with native California taxa.	
Rationale: No native California taxa occur in the genus Cynodon.	
Sources of information: Hickman, J.C. (ed.). 1993. The Jepson manual of higher plants of California. P. 1248. University of California Press, Berkeley.	
Question 2.1 Role of anthropogenic and natural disturbance in establishment	C Rev'd, Sci. Pub'n back
Describe role of disturbance: Waste places, grazed areas, roads, trails and cultivation are disturbances that lead to C. dactylon establishment.	
Rationale: Typically requires disturbance. Occasionally found in undisturbed areas, but is considered primarily a landscape of crop weed.	
Sources of information: Ivens, G.W. 1967. East African weeds and their control. Nairobi: Oxford University Press.	
Johnson, B.J. 1992. Common bermudagrass (Cynodon dactylon) suppression in Zoysia spp. with herbicides. Weed Technology 6: 813-819.	
Wilken, D. and Hannah, L. 1998. Cynodon dactylon. Channel Island National Park Service Literature Review. Unpublished.	
Question 2.2 Local rate of spread with no management	B Other Pub. Mat'l back
Describe rate of spread: In Arizona, spreads slowly once established.	
Rationale: enter text here	
Sources of information:	
Arizona-Sonoma Desert Museum Programs and Research. 1996-2003. Biological survey of Ironwood Forest National Monument: exotic plants assessment. http://www.desertmuseum.org/programs/ifnm_exotic.html .	

Question 2.3 Recent trend in total area infested within state	C Other Pub. Mat'l back
Describe trend: First occurrence in 1880, and by 1900, it was widespread throughout central and southern California, and is now grown in cultivation in California. Its current trend is unknown. Not listed as noxious weed in California. Controlled along roadsides, urban areas, and restoration trials in decommissioned hayfields.	
Rationale: enter text here	
Sources of information: Wilken, D. and Hannah, L. 1998. <i>Cynodon dactylon</i> . Channel Island National Park Service Literature Review. Unpublished. Knapp, D. 2003. Personal communication.	
Question 2.4 Innate reproductive potential	A Rev'd, Sci. Pub'n back
Describe key reproductive characteristics: In California, flowering occurs from March to August. <i>C. dactylon</i> is wind-pollinated, and can produce 230 seeds per panicle during the first three months after the initial seed set, but is considered a very sparse seed producer except for some biotypes as in California, where the cultivated biotype has a seedset of 95%. Seed in Australia remains viable in the soil for 3-4 years. The axillary buds at the nodes of rhizomes and stolons provide the principal means of spreading and dispersal. Rhizomes can be superficial or very deep from a few centimeters to over a meter in depth, which allows it to survive a wide range of climatic conditions from flooding to droughts. It is also adapted to a wide range of soil conditions from sand to heavy clay, but grows best in moist well drained soils. Seed can remain dormant in the soil, and they maintain their viability well.	
Rationale: enter text here	
Sources of information: Labrada, R., J.C. Caseley, and C. Parker. 1994. Weed management for developing countries. FAO Plant Production Paper 120. Rome: Food and Agriculture Organization for the United Nations. Holm, L.G., Doll, J., Holm, E., Pancho, J.V., and Herberger, J.P. 1997. World weeds: natural history and distribution. John Wiley and Sons, New York, USA. Ivens, G.W. 1967. East African weeds and their control. Nairobi: Oxford University Press. Wilken, D. and Hannah, L. 1998. <i>Cynodon dactylon</i> . Channel Island National Park Service Literature Review. Unpublished. Grichar, W. and T. Bosewell. 1989. Bermudagrass (<i>Cynodon dactylon</i>) control with postemergence herbicides in peanut (<i>Arachis hypogaea</i>). Weed Technology 3: 267-271. Brown, K. and K. Brooks. 2002. Bushland weeds – a practical guide to their management. Environmental Weeds Action Network. Greenwood, Australia.	
Question 2.5 Potential for human-caused dispersal	A Rev'd, Sci. Pub'n back
Identify dispersal mechanisms: Seed can be dispersed by cattle and bison with enhanced germination, and the vegetative reproductive parts can be caught on the mud on the hooves of mammals at watering holes. It can be transported far distances as a contaminant in hay, livestock feed, and soil, and by mowing equipment and vehicles. It is commonly planted in athletic fields, roadsides, airports, lawns in saline conditions in the Southern U.S., and it becomes naturalized in agricultural fields, irrigation canals, orchards, roadsides and waste places. Vegetative structures have been seen clinging to the head and legs of bison on Catalina Island. Transport of soil contaminated with seed to new locations, and horses and cattle disperse it internally also.	

Rationale: enter text here	
Sources of information: Holm, L.G., Doll, J., Holm, E., Pancho, J.V., and Herberger, J.P. 1997. World weeds: natural history and distribution. John Wiley and Sons, New York, USA. Anderson, W.P. 1999. Perennial weeds: characteristics and identification of selected species. Ames, Iowa: Iowa State University Press. Ivens, G.W. 1967. East African weeds and their control. Nairobi: Oxford University Press. Johnson, B.J. 1992. Common bermudagrass (Cynodon dactylon) suppression in Zoysia spp. with herbicides. Weed Technology 6: 813-819. Wilken, D. and Hannah, L. 1998. Cynodon dactylon. Channel Island National Park Service Literature Review. Unpublished. Knapp, J.J. 2004. Catalina Invasive Plant Ranking Plan for the Catalina Island Conservancy. Unpublished. Arizona-Sonoma Desert Museum Programs and Research. 1996-2003. Biological survey of Ironwood Forest National Monument: exotic plants assessment. http://www.desertmuseum.org/programs/ifnm_exotic.html . Knapp, J.J. 2004. Personal observation from 2002-2004, C. dactylon stolons matted to the face of bison on Catalina Island. (310) 510-1299, jknapp@catalinaconservancy.org .	
Question 2.6 Potential for natural long-distance dispersal	C Other Pub. Mat'l back
Identify dispersal mechanisms: Rhizomes and seeds can be dispersed by wind and water, and seeds survive submerged for 50 days. Ants act as short distance vectors.	
Rationale: enter text here	
Sources of information: Holm, L.G., Doll, J., Holm, E., Pancho, J.V., and Herberger, J.P. 1997. World weeds: natural history and distribution. John Wiley and Sons, New York, USA. Brown, K. and K. Brooks. 2002. Bushland weeds – a practical guide to their management. Environmental Weeds Action Network. Greenwood, Australia. Elkhorn Slough National Estuarine Research Reserve. 2000. Weed control by species. Elkhorn Slough National Estuarine Research Reserve. Pp. 1-57.	
Question 2.7 Other regions invaded	C Other Pub. Mat'l back
Identify other regions: C. dactylon occur in regions from 45 degrees north and south latitudes. In arid regions, it invades river banks and stream beds. It is ranked second among the worst weeds of the world in agricultural areas. It is considered a damaging and aggressively invasive plant in other parts of the world, and is suspected of being so on the Galapagos Islands. Between 1983-1994, bermuda grass jumped from being absent on the Weed Science Society's list of the worst weeds to ranking 10th. Most problems were in the southern states.	
Rationale: Scoring as C because already widespread in California.	
Sources of information: Holm, L.G., Doll, J., Holm, E., Pancho, J.V., and Herberger, J.P. 1997. World weeds:	

natural history and distribution. John Wiley and Sons, New York, USA.

Anderson, W.P. 1999. Perennial weeds: characteristics and identification of selected species. Ames, Iowa: Iowa State University Press.

Tye, A. 2001. Invasive plant problems and requirements for weed risk assessment in the Galapagos Islands. Pp. 153-175. Groves, R.H., F.D. Panetta and J.G. Virtue (eds.). Weed Risk Assessment. CSIRO Publishing: Collingwood, Victoria, Australia

Webster, T. M. and H. D. Coble. 1997. Changes in the weed species composition of the southern United States: 1974-1995. Weed Technology 11(2): 308-317

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: In California, the first record appeared in both San Jose and San Bernardino in 1880. It occurs on the all northern Channel Islands and nearly all counties west of the Sierra Nevada.

Rationale: enter text here

Sources of information: Wilken, D. and Hannah, L. 1998. Cynodon dactylon. Channel Island National Park Service Literature Review. Unpublished.

Question 3.2 Distribution/Peak frequency D Observational [back](#)

Describe distribution: Not common in wildlands.

Rationale: enter text here

Sources of information: Knapp, observational.

Worksheet A[back](#)

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	Yes: 1 pt
Seeds remain viable in soil for three or more years	Yes: 2 pts
Viable seed produced with <i>both</i> self-pollination and cross-pollination	Unknown: 0 pts
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
	11 pts 2 unknowns
	A (6+ pts)
Note any related traits: enter text here	

Worksheet C - California Ecological Types

[back](#)

(*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	D. presen
	desert	score
	interior	score
Scrub and Chaparral	coastal bluff scrub	score
	coastal scrub	D. presen
	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
Grasslands, Vernal Pools, Meadows, and other Herb Communities	coastal prairie	D. presen
	valley and foothill grassland	score
	Great Basin grassland	score
	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)	D. presen
Woodland	cismontane woodland	score
	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	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).