Plant Assessment Form

For use with the "Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands" by the California Exotic Pest Plant Council and the Southwest Vegetation Management Association (Warner et al. 2003)

Printable version, February 28, 2003
(Modified for use in Arizona, 07/02/04)

Table 1. Species and Evaluator Information

Species name (Latin binomial)**:**	*Rubus armeniacus* Focke; *Rubus discolor* Weihe & Nees (USDA 2005)
Synonyms:	*Rubus armeniacus*: None listed in USDA (2005); *Rubus discolor: Rubus procerus* auct. non P.J. Muell. ex Genev (USDA 2005).
Common names:	Himalayan blackberry, Himilaya-berry (names apply to both species)
Evaluation date (mm/dd/yy)**:**	06/01/04
Evaluator #1 Name/Title:	Christopher S. Laws / Consv. Bio. Intern
Affiliation:	The University of Arizona
Phone numbers:	(520) 573–3994
Email address:	cslaws@email.arizona.edu
Address:	7881 W. Schoolhill Pl. Tucson, Arizona 85743
Evaluator #2 Name/Title:	Dana Backer
Affiliation:	The Nature Conservancy
Phone numbers:	(520) 622–3861
Email address:	dbacker@tnc.org
Address:	1510 E. Fort Lowell Rd., Tucson, Arizona 85713

List committee members:	06/23/04: W. Albrecht, D. Backer, J. Brock, J. Hall, C. Laws, L. Moser, B. Phillips, K. Watters 12/17/04: W. Albrecht, D. Backer, J. Crawford, D. Crisp, S. Harger, F. Northam, T. Olson, B. Phillips, S. Masek-Lopez
Committee review date:	06/23/04 and 12/17/04
List date:	12/17/04
Re-evaluation date(s):	

Taxonomic Comment

Some authorities maintain that the species of *Rubus* introduced to the United States and referred to as Himalayan blackberry is actually *R. armeniacus* Focke (Ceska 1999 in Francis 2003). To accommodate this possibility, we treat *R. armeniacus* and *R. discolor* together, though the literature in general refers to *R. discolor*.

Table 2. Scores, Designations, and Documentation Levels

Question		Score	Documentation Level	Section Scores	Overall Score & Designations
1.1	Impact on abiotic ecosystem processes	**B**	Observational	**"Impact"** **Section 1 Score:** **B**	**"Plant Score"** **Overall Score:** **Medium** **Alert Status:** **Alert**
1.2	Impact on plant community	**A**	Other published material		
1.3	Impact on higher trophic levels	**C**	Other published material		
1.4	Impact on genetic integrity	**U**	Other published material		
2.1	Role of anthropogenic and natural disturbance	**B**	Other published material	**"Invasiveness"** *For questions at left, an A gets 3 points, a B gets 2, a C gets 1, and a D or U gets=0. Sum total of all points for Q2.1-2.7:* **16 pts** **Section 2 Score:** **B**	
2.2	Local rate of spread with no management	**A**	Other published material		
2.3	Recent trend in total area infested within state	**C**	Observational		
2.4	Innate reproductive potential	**A**	Other published material		
2.5	Potential for human-caused dispersal	**C**	Observational		
2.6	Potential for natural long-distance dispersal	**A**	Other published material		
2.7	Other regions invaded	**A**	Observational		RED FLAG **NO** Something you should know.
3.1	Ecological amplitude	**C**	Observational	**"Distribution"** **Section 3 Score:** **C**	
3.2	Distribution	**D**	Observational		

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes *Score:* **B** *Doc'n Level:* **Obs**.
Impact: Blocks sunlight, cools surface temperature, increase fuel load
Rationale: From Hoshovsky (1989): Himalayan blackberry creates thick impenetrable stands that create a substantial amount of litter and standing dead stems (Amor 1972). Hoshovsky (1989) inferred that these stands can become a fire hazard, but there was no mention of this in Tirmenstein (1989). Himalayan blackberry thickets produce large quantities of hard and dry litter as well as standing dead canes which do not readily decompose (Crisp 2000). This decomposition process may differ from the natural process. Dead biomass will increase the fuel load (inference). Dense thickets can compete with low-stature vegetation and can prevent the establishment of shade-intolerant trees (such as Douglas fir, ponderosa pine) (Soll 2004 and other authors). This implies that the thickets block sunlight from penetrating and the soil and microclimate may be cooler in temperature. Working Group members commented that these stands of blackberry are so thick that they block sunlight from penetrating and their massiveness consumes available moisture (personal observations by Working Group members).
Sources of information: See cited literature. Score based on Working Group member observations and inference from the literature.

Question 1.2 Impact on plant community composition, structure, and interactions *Score:* **A** *Doc'n Level:* **Other pub.**
Identify type of impact or alteration: *Rubus discolor* impacts structure (forming thickets), composition (excluding shade-intolerant species), and interactions (competition for resources).
Rationale: Through rapid growth and reproduction, *R. discolor* forms dense thickets that compete with other plants for moisture, light and nutrients (Crisp 2000, various Working Group member observations). From Hoshovsky (1989): Plant community composition is impacted because Himalayan blackberry is a scrambling, vining species that smothers local plant growth and replaces it with a dense monotypic thicket. Stems grow to 40 cm before arching over and trailing on the ground (Amor 1974, observed in Australia). Each stem tip that touches the ground then forms roots at the nodes, leading to rapid formation of dense stands that may inhibit native plant growth or competition. Although stems only survive for 2 to 3 years, they can reach a density of 525 canes per square meter. Re-entry of stems back into the central mass creates daughter plants that in turn produces an impenetrable conglomerate of dead stems and litter leading to thicket densities.A large quantity of litter and standing dead canes develops in old thickets (Amor 1972). Canes of *R. discolor* can grow to lengths of up to 7 m in a single season. At one site observed by Amor (1974), the mean horizontal projection of 50 first-year canes was 3.3 m. Ninety-six percent of these canes had daughter plants at their apices. In less than two years a cane cutting can produce a thicket 5 m in diameter (Amor 1973). Roots, while not deep maximum depth of 90 cm, can reach 10 m or more (Northcroft 1927). In the Pacific Northwest (Soll 2004), "once *R. discolor* becomes well established, it out competes low stature native vegetation and can prevent establishment of shade intolerant trees (such as Douglas fir, ponderosa pine and Oregon white oak), leading to the formation of apparently permanent thickets with little other vegetation present. In some places in Arizona (Oak Creek Canyon for example), it has >75% cover (B. Phillips, personal communication, 2004).

Sources of information: See cited literature. Also considered personal communication with B. Phillips (Zone Botanist, U.S. Department of Agriculture, Forest Service, Coconino, Kaibab, and Prescott National Forests, 2004).

Question 1.3 Impact on higher trophic levels *Score:* **C** *Doc'n Level:* **Other pub.**

Identify type of impact or alteration: Minor alterations; positive alterations (provide forage and cover) and negative alterations (impenetrable).

Rationale: From Tirmenstein (1989): The Himalayan blackberry provides food and cover for many wildlife species. Fruits of blackberries are eaten by numerous birds, including the northern bobwhite, scaled quail, ruffed grouse, sharp-tailed grouse, California quail, ring-necked pheasant, blue grouse, gray (Hungarian) partridge, band-tailed pigeon, gray catbird, northern cardinal, American robin, yellow-breasted chat, pine grosbeak, summer tanager, orchard oriole, brown thrasher, thrushes, and towhees (Van Dersal 1938, Core 1974, Bernard and Brown 1977). Mammals such, as the coyote, common opossum, red squirrel, raccoon, gray fox, red fox, skunks, squirrels, chipmunks, and black bear, also feed on blackberries (Van Dersal 1938, Core 1974).

Deer, rabbits, and mountain beaver consume the buds, stems, and leaves of blackberries (Van Dersal 1938, Core 1974). The Himalayan blackberry is considered a primary elk browse in parts of California, where it is used primarily during the winter months (Harper 1962). Porcupines and beaver feed on the cambium, buds, and stems of many species of blackberries (Van Dersal 1938).

The dense thickets (Pacific Northwest) can limit movement of large animals from meadow to forest and vice versa, reducing the utility of small openings and meadows as foraging areas (Hoshovsky 1989, Soll 2004). These impenetrable thickets can physically block animals (Crisp 2000, Soll 2004). Thorny stems can cause injury to grazing animals (Crisp 2000).

Sources of information: See cited literature. Score reflects a net accounting between the positive and negative impacts and is also a reflection of the Working Group member observations and various unpublished plant profiles.

Question 1.4 Impact on genetic integrity *Score:* **U** *Doc'n Level:* **Other pub.**

Identify impacts: *Rubus discolor* hybridizes with *R. thyrsiger, R. calvatus,* and *R. schlechtendalii* (Tirmenstein 1989).

Rationale: There are native *Rubus* species in Arizona, but there are no known studies or documentation of hybridization between the native and the non-native *Rubus* species in Arizona.

Sources of information: See cited literature; also see Kearney and Peebles (1960) for identification of native *Rubus* species.

Question 2.1 Role of anthropogenic and natural disturbance in establishment *Score:* **B** *Doc'n Level:* **Other pub.**

Describe role of disturbance: Occasionally establishes in undisturbed areas but readily establishes with disturbance.

Rationale: Himalayan blackberry prefers disturbed, open, and abandoned sites that are exposed to sunlight. The seeds are shade intolerant; in Australia Amor (1974) observed that seeds receiving less than 44% full sunlight died.

From Tirmenstein (1989): "Rapid vegetative spread occurs even in the absence of disturbance. Open spaces that are degraded, fire-damaged, or recently abandon are susceptible to invasion for their lack of mature shrubs, trees, or grass, that would otherwise shade-out blackberry seeds. Flooded riparian areas become susceptible when stream and river soil becomes exposed to sunlight. Himalayan blackberry

responds favorably to fire due to on-site seed banks unaffected by fire, and its ability to reproduce and regenerate vegetatively by roots, rootstocks, and rhizomes (Dale 1986, Hitchcock and Cronquist 1973, Lyon and Stickney 1976)."

Roadsides, degraded pastures, right-of-ways, creek gullies, fencelines, and abandoned lots become suitable germination areas for *Rubus discolor*.

Sources of information: See cited literature; also see Soll (2004) and Crisp (2000).

Question 2.2 Local rate of spread with no management *Score:* **A** *Doc'n Level:* **Other pub.**

Describe rate of spread: Doubles in < 10 years.

Rationale: A survey conducted in 1992 in the Garden Creek area of Grand Canyon National Park reported that Himalayan blackberry colonized ~four acres of riparian habitat and by 1996 it had spread to ~1.5 miles of riparian zone along Garden Creek (Makarick 2001). Rapid vegetative spread occurs even in the absence of disturbance (Tirmenstein 1989). Increasing spread has also been observed in Oak Creek (B. Phillips, personal communication, 2004). The plant itself can have trailing canes that spread 20 to 40 feet, frequently rooting at the tips (Soll 2004).

Sources of information: See cited literature. Also considered personal communication with B. Phillips (Zone Botanist, U.S. Department of Agriculture, Forest Service, Coconino, Kaibab, and Prescott National Forests, 2004).

Question 2.3 Recent trend in total area infested within state *Score:* **C** *Doc'n Level:* **Obs.**

Describe trend: Stable. Restricted to riparian areas in northern Arizona (at this time).

Rationale: Himalayan blackberry is actively managed where it is found (L. Makarick, personal communication, 2004). Although Himalayan blackberry maybe increasing within its range, the Working Group does not think it is expanding its range.

Sources of information: Score based on personal communication with L. Makarick (Below the Rim Vegetation Program Manager, Grand Canyon National Park, Science Center, Flagstaff, Arizona, 2004), Working Group member observations, and inference.

Question 2.4 Innate reproductive potential *Score:* **A** *Doc'n Level:* **Other pub.**

Describe key reproductive characteristics: Reproduces vegetatively, sexually, and asexually; produces large numbers of seeds, fragments easily.

Rationale: *Rubus discolor* regenerates vegetatively, stems develop typically from the creeping stems and perennial rootstocks. *Rubus discolor* spreads aggressively by its trailing stems which root at the nodes.

From Tirmenstein (1989): "The Himalayan blackberry is capable of extensive and vigorous vegetative regeneration (Willoughby and Davilla 1984). Sexual reproduction may also be important. Reproductive versatility is well represented in the *Rubus* genus, with sexual reproduction, parthenogenesis (development of the egg withoutfertilization), pseudogamy (a form of apomixis in which pollination is required), and parthenocarpy (production of fruit without fertilization), occurring widely (Crane 1940). The following types of reproduction have been documented in blackberries: (1) sexual reproduction, (2) nonreduction at meiosis on the female, male, or both sides, (3) apomixis (seeds contain embryos of maternal, rather than sexual origin) with segregation, (4) apomixis without segregation, and (5) haploid parthenogenesis (Crane 1940). These modes of asexual reproduction contribute significantly to the aggressive, vigorous spread of blackberries.Seeds of most blackberries can remain viable when stored in the soil for a period of at least several years (Bernard and Brown 1977). However, the specific length of viability has not been documented for the Himalayan blackberry."

Blackberries also readily propagate from root pieces and cane cuttings (Amor 1974). In Victoria, Australia stands of Himalayan blackberry were estimated to produce 7,000 to 13,000 seeds/m^2 / year (Amor 1974).
Sources of information: See cited literature.

Question 2.5 Potential for human-caused dispersal *Score:* **C** *Doc'n Level:* **Obs.**
Identify dispersal mechanisms: Historically, *R. discolor* was used for erosion control and cultivated for its berries.
Rationale: Historically this plant was planted at homesteads and used locally. Currently, the plants are localized in Arizona and are harvested on site (Working Group discussion). Blackberry was once used for erosion control on infertile, barren, and disturbed sites (Van Dersal 1938, Brinkman 1974 in Tirmenstein 1989) but is no longer recommended for such purpose. No specific cases of intentional plantings were found for this purpose in Arizona.
Sources of information: See cited literature. Score based on Working Group discussion.

Question 2.6 Potential for natural long-distance dispersal *Score:* **A** *Doc'n Level:* **Other pub.**
Identify dispersal mechanisms: Consumption by a wide variety of animals and birds (see question 1.3). Berries are buoyant.
Rationale: Blackberry is an important food source for a wide range of animals (most mammals are known to eat the fruit, as are many birds) (Barber 1976 and Van Dersal 1938 in Tiermenstein 1989).
Sources of information: See cited literature.

Question 2.7 Other regions invaded *Score:* **A** *Doc'n Level:* **Obs.**
Identify other regions: Ecological types invaded in California but not in Arizona include meadows, marshes, riparian scrub (desert washes), lower montane coniferous forests.
Rationale: According to the draft California plant assessment for *Rubus armeniacus and R. discolor* by P. Warner (reviewed by the California list committee on August 27, 2004), Himalayan blackberry invades the above mentioned ecological types in California, as well as many other ecological types that are either not in Ariozna or are the same ecological types as those invaded in Arizona.
Sources of information: See the draft California *Rubus armeniacus and R. discolor* plant assessment by P. Warner (available online at: http://www.cal-ipc.org/list_revision/completed_pafs.html; information current as of August 27, 2004). Note: Warner considered *R. discolor* a synonym of *Rubus armeniacus.*

Question 3.1 Ecological amplitude *Score:* **C** *Doc'n Level:* **Obs.**
Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Native to western Europe; first introduced to North America in 1885 as a cultivated crop. By 1945 it had naturalized along the west coast (Bailey 1945 in Hoshovsky 1989). Occurs mainly in areas with an average annual rainfall greater than 76 cm, at altitudes up to 1800 m, and on both acidic and alkaline soils (Amor 1974 in Hoshovsky 1989). Blackberries grow well on a variety of barren, infertile soil types (Brinkman 1974). These shrubs tolerate a wide range of soil pH and texture, but do require adequate soil moisture (Core 1974). The Himalayan blackberry appears to be tolerant of periodic flooding by brackish or fresh water (Willoughby and Davilla 1984). Introduced to the area of West Fork of Oak Creek Canyon between 1915 and 1945 (K Watters, personal communication, 2004).
Rationale: In Arizona occurs to >1800m in elevation (Kearney and Peebles 1960). Records in SEINet (2004) indicate it can be found along streams characteristic of southwestern interior riparian and montane riparian. Earliest record in SEINet (2004) is 1969. Occurs along the West Fork of Oak Creek,

several sites in Verde Valley, and along Fossil Creek in Camp Verde (B. Phillips and L. Moser, personal communications, 2004). In the Grand Canyon National Park populations exist in Indian Gardens and Garden Creek (Makarick 2001).
Sources of information: See cited literature. Also considered personal communications with L. Moser (Botanist, U.S. Department of Agriculture, Forest Service, Coconino National Forest, Flagstaff, Arizona, 2004), B. Phillips (Zone Botanist, U.S. Department of Agriculture, Forest Service, Coconino, Kaibab, and Prescott National Forests, 2004), and K. Watters (Research Technician, Grand Canyon National Park, Flagstaff, Arizona, 2004) and information from SEINet (Southwest Environmental Information Network), Arizona herbaria specimen database (available online at: http://seinet.asu.edu/collections; accessed October 2004).

Question 3.2 Distribution	*Score:* **D** *Doc'n Level:* **Obs.**
Describe distribution: In Arizona Himalayan blackberry is limited to a low percentage of occurrences within riparian ecological types.	
Rationale: See Worksheet B.	
Sources of information: Considered personal communications with B. Phillips (Zone Botanist, U.S. Department of Agriculture, Forest Service, Coconino, Kaibab, and Prescott National Forests, 2004), L. Makarick (Below the Rim Vegetation Program Manager, Grand Canyon National Park, Science Center, Flagstaff, Arizona, 2004), and K. Watters (Research Technician, Grand Canyon National Park, Flagstaff, Arizona, 2004).	

Worksheet A. Reproductive Characteristics

Complete this worksheet to answer Question 2.4.

Reaches reproductive maturity in 2 years or less	**Yes**	**No**	**1 pt.**
Dense infestations produce >1,000 viable seed per square meter	**Yes**	**No**	**2 pt.**
Populations of this species produce seeds every year.	**Yes**	**No**	**1 pt.**
Seed production sustained for 3 or more months within a population annually	**Yes**	**No**	**1 pt.**
Seeds remain viable in soil for three or more years	**Yes**	**No**	**2 pt.**
Viable seed produced with *both* self-pollination and cross-pollination	**Yes**	**No**	**1 pt.**
Has quickly spreading vegetative structures (rhizomes, roots, etc.) that may root at nodes	**Yes**	**No**	**1 pt.**
Fragments easily and fragments can become established elsewhere	**Yes**	**No**	**2 pt.**
Resprouts readily when cut, grazed, or burned	**Yes**	**No**	**1 pt.**

Total pts: 9 Total unknowns: 1

Score : A

Note any related traits:

Worksheet B. Arizona Ecological Types

(*sensu* Brown 1994 and Brown et al. 1998)

Major Ecological Types	Minor Ecological Types	Code*
Dunes	dunes	
Scrublands	Great Basin montane scrub	
	southwestern interior chaparral scrub	
Desertlands	Great Basin desertscrub	
	Mohave desertscrub	
	Chihuahuan desertscrub	
	Sonoran desertscrub	
Grasslands	alpine and subalpine grassland	
	plains and Great Basin shrub-grassland	
	semi-desert grassland	
Freshwater Systems	lakes, ponds, reservoirs	
	rivers, streams	
Non-Riparian Wetlands	Sonoran wetlands	
	southwestern interior wetlands	
	montane wetlands	
	playas	
Riparian	Sonoran riparian	
	southwestern interior riparian	**D**
	montane riparian	**D**
Woodlands	Great Basin conifer woodland	
	Madrean evergreen woodland	
Forests	Rocky Mountain and Great Basin subalpine conifer forest	
	montane conifer forest	
Tundra (alpine)	tundra (alpine)	

*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).

Literature Cited

Amor, R.L. 1972. A study of the ecology and control of blackberry (*Rubus fuiticosus* L. agg.). J. Austral. Inst. Agric. Sci. 38:294.

Amor, R.L. 1973. Ecology and control of blackberry (*Rubus fruticosus* L. agg.): I. *Rubus* spp. as weeds in Victoria. Weed Res. 13:218–223.

Amor, R.L. 1974. Ecology and control of blackberry (*Rubus fruiticosus* L. agg.): II. Reproduction. Weed Res. 14:231–238.

Bailey, L. 1945. The genus *Rubus* in North America. Gentes Herbarium 5:851–854.

Barber, W.H., Jr. 1976. An Autecological Study of Salmonberry (*Rubus spectabilis,* Pursh*)* in Western Washington. Master's thesis. University of Washington, Seattle. 154 p.

Bernard, S.R, and K.F. Brown. 1977. Distribution of Mammals, Reptiles, and Amphibians by BLM Physiographic Regions and A.W. Kuchler's Associations for the Eleven Western States. Tech. Note 301. U.S. Department of the Interior, Bureau of Land Management, Denver, Colorado. 169 p.

Brinkman, K.A. 1974. *Rubus* L. blackberry, raspberry. Pages 738–743 in C.S. Schopmeyer (ed.), Seeds of Woody Plants in the United States. Agriculture Handbook No. 450. U.S. Department of Agriculture, Forest Service, Washington, DC.

Brown, D.E. (ed.). 1994. Biotic Communities: Southwestern United States and Northwestern Mexico. University of Utah Press, Salt Lake City. 342 p. [Plus companion 60-inch by 48-inch map, Biotic Communities of the Southwest].

Brown, D., F. Reichenbacher, and S. Franson, S. 1998. A Classification of North American Biotic Communities. University of Utah Press, Salt Lake City. 141 p.

Ceska, A. 1999. *Rubus armeniacus*—a correct name for Himalayan blackberries. Botantical Electronic News ISSN 1188–603X. 3 p. Available online at: http://www.ou.edu.cas/botany-micro/ben/ben230.html.

Core, E.L. 1974. Brambles. Pages 16–19 in J.D. Gill and W.M. Healy (compilers), Shrubs and Vines for Northeastern Wildlife. Gen. Tech. Rep. NE-9. U.S. Department of Agriculture, Forest Service, Broomall, Pennsylvania.

Crane, M.B. 1940. Reproductive versatility in *Rubus.* I. Morphology and inheritence. Journal of Genetics 40:109–118.

Crisp, D. 2000. Species Action Plan, Himalayann Blackberry, *Rubus procerus*.

Dale, N. 1986. Flowering Plants: The Santa Monica Mountains, Coastal and Chaparral Regions of Southern California. Capra Press, Santa Barbara, California. In cooperation with the California Native Plant Society. 239 p.

Francis, J.K. 2003. *Rubus discolor* Weihe & Nees, Himalayan Blackberry. U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry, San Juan, Puerto Rico. In

cooperation with the University of Puerto Rico, Rio Piedras. Available online at: http://www.fs.fed.us/gov/iitf/pdf/shrubs/Rubus%20discolor.pdf; accessed October 2004.

Harper, J.A. 1962. Daytime feeding habits of Roosevelt elk on Boyes Prairie, California. Journal of Wildlife 26:97–100.

Hitchcock, L.C., and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press, Seattle. 730 p.

Hoshovsky, M. 1989. *Rubus discolor*, Himalaya berry. Element Stewardship Abstract. The Nature Conservancy. Available online at: http://tncweeds.ucdavis.edu/esadocs.

Kearney, T.H., and R.H. Peebles (and collaborators). 1960. Arizona Flora. 2nd edition with supplement by J.T. Howell and E. McClintock and collaborators. University of California Press, Berkeley. 1085 p.

Lyon, L.J, and P.F. Stickney. 1976. Early vegetal succession following large northern Rocky Mountain wildfires. Pages 355–373 in Proceedings, Tall Timbers Fire Ecology Conference and Intermountain Fire Research Council Fire and Land Management Symposium. No. 14. October 8–10, 1974, Missoula, Montana. Tall Timbers Research Station, Tallahassee, Florida.

Makarick, L. 2001. Final Project Report: NRPP Intermountain Region Natural Resource Management Fund. Himalayan Blackberry Control at Garden Creek, Grand Canyon National Park, Arizona. PMIS#56966, FY2000–01.

Northcroft, E.G. 1927. The blackberry pest. I. Biology of the plant. N.Z. J. Agric. 34:376–388.

Soll, J. 2004. Controlling Himalayan blackberry in the Pacific Northwest. The Nature Conservancy. Available online at: http://tncweeds.ucdavis.edu/moredocs/rubdis01.pdf; accessed October 2004.

Tirmenstein, D. 1989. *Rubus discolor*. In Fire Effects Information System. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available online at: http://www.fs.fed.us/database/feis/; accessed June 2004.

[USDA] U.S. Department of Agriculture, Natural Resources Conservation Service. 2005. The PLANTS Database, Version 3.5. Available online at: http://plants.usda.gov. Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, Louisiana.

Van Dersal, W.R. 1938. Native Woody Plants of the United States, Their Erosion-Control and Wildlife Values. U.S. Department of Agriculture, Washington, DC. 362 p.

Warner, P.J., C. Bossard, M.L. Brooks, J.M. DiTomaso, J.A. Hall, A. M. Howald, D.W. Johnson, J.M. Randall, C.L. Roye, M.M. Ryan, and A.E. Staton. 2003. Criteria for Categorizing Invasive Non-Native Plants that Threaten Wildlands. Available online at: www.caleppc.org and www.swvma.org. California Exotic Pest Plant Council and Southwest Vegetation Management Association. 24 p.

Willoughby, J.W., and W. Davilla. 1984. Plant species composition and life form spectra of tidal streambanks and adjacent riparian woodlands along the lower Sacramento River. Pages 642–651 in R.E. Warner and K.M. Hendrix (eds.), California Riparian Systems: Ecology, Conservation, and Productive Management: Proceedings of a Conference. September 17–19, 1981, Davis, California. University of California Press, Berkeley.

Other References of Interest Not Cited in the Text

Bailey, L. 1923. Certain cultivated *Rubus*. Gentes Herbarium 1:196–197.

DiTomaso, J.M. 2002. Wild Blackberries: Integrated Pest Management for Home Gardeners and Landscape Professionals. Publ. No. 7434. University of California Cooperative Extension.

Hoshovsky, M.C. 2000. *Rubus discolor*. Pages 277–281 in C.C. Bossard, J.M. Randall, and M.C. Hoshovsky (eds.), Invasive Plants of California's Wildlands. University of California Press, Berkeley.