Part IV. Plant Assessment Form

For use with "Criteria for Categorizing Invasive Non-Native Plants that Threaten Colorado's Wildlands and Agriculture"

By the Colorado Noxious Weed Advisory Committee

Electronic version: December 4, 2008

Table 1. Species and Evaluator Information

Species name (Latin binomial)**:**	Rubus armeniacus Focke
Synonyms:	Rubus discolor Weihe & Nees., Rubus procerus Muller, Rubus grabowskii Weihe ex Gunther et al., Rubus praecox Bertol.
Common names:	Himalayan blackberry
Evaluation date (mm/dd/yy)**:**	3/25/2010
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Section below for list committee use—please leave blank

List committee members:	enter text here
Committee review date:	enter text here
List date:	enter text here
Re-evaluation date(s):	enter text here

General comments on this assessment:

Himalyan blackberry is listed as a noxious weed species in the following states: Oregon; Washington (Class C).

The following species within the genus Rubus are reported to occur in Colorado, based on the cited sources. There appears to be some disagreement between sources on which of the native species in particular are found in the state. All chromosome numbers reported from Gleason and Cronquist 1991:

R. arcticus L. (arctic blackberry); Native (USDA 2010)

R. arcticus L. ssp. acaulis syn R. acaulis Michx. (Michx.) W.A. Weber (dawrf blackberry); Native; 2n = 14 (USDA 2010)

R. deliciosus Torr. syn Oreobatus deliciosus (James ex Torrey) Rydberg (delicious raspberry); Native; Relatively widespread (USDA 2010, Weber 1976)

R. idaeus L. (American red raspberry); Native and introduced (USDA 2010)

R. idaeus L. ssp. strigosus (Michx.) Focke (grayleaf red raspberry); Native; 2n = 14; Relatively widespread (Colorado Herbarium 2010, USDA 2010, Weber 1976)

R. lacianatus Willd. (cutleaf blackberry); Introduced (Weedy/Invasive - Washington State Class C Noxious); 2n = 28; Boulder Co. (Colorado Herbarium 2010, DiTomaso and Healy 2007; USDA 2010, Weber 1976)

R. neomexicanus A. Gray syn Oreobatus deliciosus (James ex Torrey) Rydberg subsp neomexicanus (Rydberg) Weber (New Mexico raspberry); Native; Baca Co. (Colorado Herbarium 2010, USDA 2010)

R. occidentalis L. (black raspberry); Native (Weedy); 2n = 14; Gilpin Co. (Colorado Herbarium, USDA 2010, Weber 1976)

R. parviflorus Nutt. syn R. parviflorus var. parviflorus (thimbleberry); Native; 2n = 14 (Ditomaso and Healy 2007; USDA 2010, Weber 1976)

R. pubescens Raf. syn R. pubescens Raf. var. pubescens (dwarf red blackberry); Native; 2n = 14; Boulder Co. (USDA 2010, Weber 1976)

Colorado Herbarium. 2010. Vascular Plant Species of Colorado: County Lists (Online). Boulder, CO: University of Colorado Museum of Natural History. Available at http://cumuseum.colorado.edu/Research/Botany/Databases/county_species.html. Accessed 3:53 PM 26 February, 2010.

DiTomaso, JM and EA Healy. 2007. Rubus spp. in Weeds of California and Other Western States, Vol. 2. Oakland, CA: University of California Agriculture and Natural Resources Communication Services. P. 1426.

Gleason, HA, and A Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd Ed. Bronx, NY: New York Botanical Garden. P. 248.

US Department of Agriculture, Natural Resources Conservation Service (NRCS). 2010. The PLANTS Database (Online). Baton Rouge, LA: National Plant Data Center. Available at http://plants.usda. gov. Accessed 5:19 PM 25 February 2010.

Weber, WA. 1976. Rocky Mountain Flora. Niwot, CO: University Press of Colorado. P. 300.

Table 2. Criteria, Section, and Overall Scores

1.1	Impact on abiotic ecosystem processes	B	Other Pub. Mat'l	**Impact** *Enter four characters from Q1.1-1.4 below:* **BACC** *Using matrix, determine score and enter below:* **B**		
1.2	Impact on plant community	A	Other Pub. Mat'l			
1.3	Impact on higher trophic levels	C	Rev'd, Sci. Pub'n			
1.4	Impact on genetic integrity	C	Other Pub. Mat'l			
2.1	Role of anthropogenic and natural disturbance	B (2 pts)	Other Pub. Mat'l	**Invasiveness** *Enter the sum total of all points for Q2.1-2.7 below:* **17** *Use matrix to determine score and enter below:* **A**		**Wildlands Plant Score** *Using matrix, determine Overall Score and Alert Status from the first, second, and third section scores and enter below:* **Moderate** **Red Alert**
2.2	Local rate of spread with no management	A (3 pts)	Other Pub. Mat'l			
2.3	Recent trend in total area infested within state	B (2 pts)	Other Pub. Mat'l			
2.4	Innate reproductive potential Wksht A	A (3 pts)	Other Pub. Mat'l			
2.5	Potential for human-caused dispersal	A (3 pts)	Other Pub. Mat'l			
2.6	Potential for natural long-distance dispersal	A (3 pts)	Other Pub. Mat'l			
2.7	Other regions invaded	C (1 pt)	Other Pub. Mat'l			
3.1	Ecological amplitude/Range	D	Other Pub. Mat'l	**Distribution** *Using matrix, determine score and enter below:* **D**		
3.2	Distribution/Peak frequency Wrksht B	D	Other Pub. Mat'l			

4.1	Poisonous to livestock	**D (0 pts)**	**Other Pub. Mat'l**
4.2	Detrimental to economic crops	**D (0 pts)**	**Rev'd, Sci. Pub'n**
4.3	Detrimental to management of agricultural system, rangeland and pasture	**D (0 pts)**	**Other Pub. Mat'l**
4.4	Human impacts Wrksht C	**C (1 pt)**	**Other Pub. Mat'l**

Ag/ Human Impacts
Total Points: 1
Score: D

Agriculture Plant Score
Overall Score: High
Alert Status: Red Alert

Table 3. Documentation

Question 1.1 Impact on abiotic ecosystem processes B Other Pub. Mat'l back
Identify ecosystem processes impacted: Dense stands can degrade soil conditions (sometimes leading to erosion) and produce large quantities of leaf and cane litter; stands can increase the chance of fire occurrence and frequencies, leading to impacts in ill-adapted systems.
Rationale: Himalayan blackberry stands can be explosively flammable. Infestations can reduce soil moisture levels through the production of large quantities of biomass. Blackberry roots are shallower (crown reaches 7.8 inches (20 cm) deep, roots may extend 4.9 feet (1.5 m) deep and up to 23.6 inches (60 cm) laterally) but do not serve the bank stabilizing role of many native riparian trees and shrubs. However, in some cases the species has been used for riparian erosion control due to its rapid establish and growth. Also, dense stands produce a large quantity of hard, dry litter underneath the canopy. Most impacts are normally not permanent, and if stands are managened will dissipate.
Sources of information: Francis, JK. 2000. Rubus discolor Weihe & Nees, Himalayan blackberry. San Juan, PR: U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry. Available at: www.fs.fed.us/ global/iitf/pdf/shrubs/Rubus%20 discolor.pdf. Accessed 12:20 AM 25 March 2010. King County, Washington. 2010. Himalayan blackberry and Evergreen blackberry, Rubus armeniacus (syn. Rubus discolor) and Rubus lacinatus. Available at http://www.kingcounty.gov/environment/ animalsAndPlants /noxious-weeds/weed-identification/blackberry.aspx. Accessed 12:45 PM 19 February 2010. Soll, J. 2004. Controlling Himalayan blackberry in the Pacific Northwest. Arlington, VA: The Native Conservancy. Available at: http://www.invasive.org/gist/moredocs/ rubarm01.pdf. Accessed 12:31 AM 25 March 2010. Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010. US Department of the Interior, Bureau of Land Management (BLM). 2007. Himalayan blackberry, Rubus discolor. Available at http://www.blm.gov/ca/st/en/fo/redding/weeds/redrudi.html. Last updated 27 April 2007. Accessed 10:42 AM 19 February 2010.
Question 1.2 Impact on plant community composition, structure, and interactions A Other Pub. Mat'l back
Identify type of impact or alteration: Often form dense, monotypic stands that severely shade understory species; substantially thick and hard layer of litter is normally produced as stands age.
Rationale: Shades and outcompetes native species for light, particularly some native woody species (e.g. Douglas firs and ponderosa pines) whose seeds have strong light requirements for germination. May also limit dispersal of native Rubus spp (found to be the case for R. ursinus, which is present in Ca. and Pacific NW) by pre-emptive competition. Overall, can decrease the diversity and production of healthy riparian and forest systems and result in monocultural stands of the non-native blackberry species.
Sources of information: Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies. org/pests/himalayanblackberry.html. Accessed

10:47 AM 19 February 2010.

King County, Washington. 2010. Himalayan blackberry and Evergreen blackberry, Rubus armeniacus (syn. Rubus discolor) and Rubus lacinatus. Available at http://www.kingcounty.gov/environment/ animalsAndPlants/noxious-weeds/weed-identification/blackberry.aspx. Accessed 12:45 PM 19 February 2010.

US Department of the Interior, Bureau of Land Management (BLM). 2007. Himalayan blackberry, Rubus discolor. Available at http://www.blm.gov/ca/st/en/fo/redding/weeds/redrudi.html. Last updated 27 April 2007. Accessed 10:42 AM 19 February 2010.

Question 1.3 Impact on higher trophic levels C Rev'd, Sci. Pub'n back

Identify type of impact or alteration: Blackberry stands can be very dense (525 canes/m2), and act as barriers to water access. Spines can cause injury to larger wildlife. The plants do have notably positive wildlife value for forage (in particular their fruits are important food sources for birds), nesting, and shelter they provide. Dense stands can attract rats, which can have significant impacts on bird populations.

Rationale: Overall, cumulative impact on higher trophic levels should be considered moderate since forage and shelter values provide some benefit. However, undocumented negative effects arising from displacement of native plant species and resulting impacts on forage and shelter for wildlife and overall species and population viability could be considerable. For example, Himalayan blackberry has displaced plant species that constituted the historic breeding habitat of the tricolored blackbird (Agelaius tricolor) in California; however, Cook and Toft (2005) reported that the blackbird species actually has higher reproductive success when nesting in the non-native blackberry that its historic breeding cohorts.

Sources of information:

Alaska Natural Heritage Program (ANHP). 2005. Himalayan blackberry, Rubus discolor Weihe & Nees. Anchorage, AK: Environment and Natural Resources Institute, University of Alaska Anchorage. Available at: http://akweeds.uaa.alaska.edu/ pdfs/potential_species/bios/Species_bios_RUDI.pdf. Accessed 11:56 PM 24 March 2010.

Cook, LF and CA Toft. 2005. Dynamics of extinction: population decline in the colonially nesting tricolored blackbird Agelaius tricolor. Bird Conservation International 15: 73-88.

DiTomaso, JM and EA Healy. 2007. Rubus spp. in Weeds of California and Other Western States, Vol. 2. Oakland, CA: University of California Agriculture and Natural Resources Communication Services. P. 1426.

Hickman, JC. Ed. 1993. The Jepson Manual: Higher Plants of California (Online). Available at http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html. Accessed 11:32 AM 19 February 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

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

Identify impacts: Hybridization with other blackberry species is relatively common, though chances of this occuring with native species is less than with other introduced, weedy blackberries.

Rationale: Hybridization between Rubus species is not uncommon; also, plants are insect-pollinated and self-fertile. Chromosome number of R. armeniacus reported to be 2n = 28, so presumably hybridization would be most likely to occur with R. lacianatus (Cutleaf blackberry, another non-native weedy species) rather than native Rubus species that have half the number of chromosomes. However, the distribution of R. lacianatus is reported

to be even more restricted than that of R. armeniacus so hybridization may ultimately have a negligible effect.

Sources of information:

Alaska Natural Heritage Program (ANHP). 2005. Himalayan blackberry, Rubus discolor Weihe & Nees. Anchorage, AK: Environment and Natural Resources Institute, University of Alaska Anchorage. Available at: http://akweeds.uaa.alaska.edu/ pdfs/potential_species/bios/Species_bios_RUDI.pdf. Accessed 11:56 PM 24 March 2010.

DiTomaso, JM and EA Healy. 2007. Rubus spp. in Weeds of California and Other Western States, Vol. 2. Oakland, CA: University of California Agriculture and Natural Resources Communication Services. P. 1426.

EDDMapS. 2009a. Cutleaf blackberry, Rubus lacianatus Willd. Athens, GA: University of Georgia, Warnell School of Forestry and Natural Resources, Center for Invasive Species and Ecosystem Health. Last updated 10:46 AM 8 April 2009. Available at: http://www.eddmaps.org/distribution/usstate.cfm?sub=6343. Accessed 11:03 AM 25 March 2010.

Gleason, HA, and A Cronquist. 1991. Manual of Vascular Plants of Northeastern United States and Adjacent Canada, 2nd Ed. Bronx, NY: New York Botanical Garden. P. 248.

Hickman, JC. Ed. 1993. The Jepson Manual: Higher Plants of California (Online). Available at http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html. Accessed 11:32 AM 19 February 2010.

Question 2.1 Role of anthropogenic and natural disturbance in establishment B Other Pub. Mat'l back

Describe role of disturbance: Blackberry species establish and spread more rapidly under moderate disturbances, both anthropogenic (fires, cultivation, construction, etc.) and natural (wiildfire, floods, wildlife activity, etc.), but can spread into relatively undisturbed forest understories - though their further spread and invasiveness is normally diminished under these circumstances.

Rationale: Establishes readily at highly to moderately disturbed sites, especially those affected by flooding or by human disturbancess, including overgrazed riparian corridors, fallow agricultural areas, logging sites and in burned areas (species re-sprouting is especially vigorous after fire). Blackberry establishes and grows best under full to partial sun conditions, and can be very sensitive to dense shading.

Sources of information:

Francis, JK. 2000. Rubus discolor Weihe & Nees, Himalayan blackberry. San Juan, PR: U.S. Department of Agriculture, Forest Service, International Institute of Tropical Forestry. Available at: www.fs.fed.us/ global/iitf/pdf/shrubs/Rubus%20 discolor.pdf. Accessed 12:20 AM 25 March 2010.

Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/ rubuarm.PDF. Accessed 9:23 AM 25 March 2010.

Pacific Island Ecosystems at Risk (PIER). 2009. Rubus discolor Weihe & Ness. Available at http:// www.hear.org/pier/species/rubus_discolor.htm. Last updated 24 August 2009. Accessed 10:48 AM 19 February 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

Question 2.2 Local rate of spread with no management	A Other Pub. Mat'l back
Describe rate of spread: Local of spread is likely to be high irregardless of management efforts due to the large quantity of seeds the species is capable of producing, not to mention its proficiency in and high rate of vegetative spread.	
Rationale: Himalayan blackberry is capable of rapid vegetative reproduction by cane growth and rooting at tips, leading to increases in plant girth of up to 3.3 m/year. A relatively small stand can expand in area many times within a few years. Root and cane fragments are readily propagated and grow quickly, e.g. a cane cutting can lead to a thicket 5 m in diameter within two years of being planted.	
Sources of information: Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies. org/pests/himalayanblackberry.html. Accessed 10:47 AM 19 February 2010. Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/rubuarm.PDF. Accessed 9:23 AM 25 March 2010. US Department of the Interior, Bureau of Land Management (BLM). 2007. Himalayan blackberry, Rubus discolor. Available at http://www.blm.gov/ca/st/en/fo/redding/weeds/redrudi.html. Last updated 27 April 2007. Accessed 10:42 AM 19 February 2010.	
Question 2.3 Recent trend in total area infested within state	B Other Pub. Mat'l back
Describe trend: There is very little reliable, published data on the current distribution of Himalayan blackberry in Colorado. The little information that is available suggests the species is increasing in its overall statewide area infested, though likely not rapidly.	
Rationale: The species was not reported to occur in Colorado in Weber's 1976 Rocky Mountain Flora, though is reported to occur in at least two counties (Mesa and Boulder) in more recent flora's and surveys. Specifically, Weber and Wittman (2000) report the species's occurrence in the Unaweap Seep Research Natural Area in Mesa County.	
Sources of information: EDDMapS. 2009b. Himalayan blackberry, Rubus armeniacus Focke. Athens, GA: University of Georgia, Warnell School of Forestry and Natural Resources, Center for Invasive Species and Ecosystem Health. Last updated 10:46 AM 8 April 2009. Available at: http://www.eddmaps.org/distribution/usstate.cfm?sub=6338. Accessed 11:16 AM 25 March 2010. Weber, WA. 1976. Rocky Mountain Flora. Niwot, CO: University Press of Colorado. P. 300. Weber, WA and RC Wittmann. 2000. Catalog of the Colorado Flora: A Biodiversity Baseline. Electronic Version, Rev. 11 March 2000. Boulder, CO: University Press of Colorado. Available at: http://cumuseum.colorado.edu/Research/Botany/Databases/catalog.html. Accessed 5:50 PM 25 March 2010.	
Question 2.4 Innate reproductive potential	A Other Pub. Mat'l back
Describe key reproductive characteristics: Can reproduce both sexually and asexually - though the later method appears to contribute more than the former to the species local invasiveness, sexual reproduction contributes	

significantly to the species' ability to spread over a larger geographic range.

Rationale: R. armeniacus is a prolific seed producer (7,000 - 13,000 seeds/sq. m) but also commonly (perhaps even more so) spreads by vegetative reproduction via nodal and apical rooting (estimated to occur in up to 96% of plants in some populations) as well as regeneration from root and cane fragments. Various forms of asexual production exist in the species (parthenogenesis, pseudogamy, and parthenocarpy). Seeds can remain dormant in the soil for years and still remain viable. Resprouting is very problematic with this species, especially after fires. Fruits ripen later than those of native Rubus species, and over a longer interval (midsummer through fall).

Sources of information:

DiTomaso, JM and EA Healy. 2007. Rubus spp. in Weeds of California and Other Western States, Vol. 2. Oakland, CA: University of California Agriculture and Natural Resources Communication Services. P. 1426.

Global Invasive Species Database (GISD). 2005. Rubus discolor. Available at http://www.issg.org/database/species/management_info.asp?si=994&fr=1&sts. Accessed 11:04 AM 29 February 2010.

Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies.org/pests/himalayanblackberry.html. Accessed 10:47 AM 19 February 2010.

Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/rubuarm.PDF. Accessed 9:23 AM 25 March 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

Question 2.5 Potential for human-caused dispersal A Other Pub. Mat'l back

Identify dispersal mechanisms: Species is spread widely and locally by humans through collection of fruits, plant material (removal efforts) and the improper disposal of wastes (including seeds, canes and root fragments - which can readily regenerate).

Rationale: Himalayan blackberry was intentionally introduced because humans enjoyed its fruit. Many people do not distinguish between non-native, noxious species of blackberry and native species, therefore we commonly plant, collect and eat and disperse propagules of all sorts of blackberries. Invasive blackberry species can also spread rapidly through the improper disposal of canes and root fragments collected during well-intentioned efforts at removing or controlling stands.

Sources of information:

Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/rubuarm.PDF. Accessed 9:23 AM 25 March 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

Question 2.6 Potential for natural long-distance dispersal	A Other Pub. Mat'l back
Identify dispersal mechanisms: Species' fruits are commonly ingested and distributed by birds and other animals; stem and root fragments can be widely distributed by natural disturbances and easily regenerate.	
Rationale: Mammals and birds are routinely responsible for ingesting and distributing seeds (scarification due to passage of seeds through the digestive tracts of birds in particular has been found to significantly improve subsequent seed germination); cane and root fragments created during disturbances remain viable and will readily regenerate at suitable sites.	
Sources of information: Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies. org/pests/himalayanblackberry.html. Accessed 10:47 AM 19 February 2010. Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/ rubuarm.PDF. Accessed 9:23 AM 25 March 2010. Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.	
Question 2.7 Other regions invaded	C Other Pub. Mat'l back
Identify other regions: Given the sparse nature of current distribution information for Colorado it is tenuous to make this particular assessment. In both the Pacific Northwest and California, where the species is widespread, infestations tend to be concentrated in coastal and riparian woodlands as well as wet grasslands. Given current distribution reports in Colorado it is likely that the species has already invaded suitable ecological types.	
Rationale: Himalayan blackberry is widespread throughout California and the Pacific Northwest into British Columbia, as well as the NE United States, Hawai'i, and Europe. Plant is normally found below 5, 250 ft (1600 m) but in some cases is common above 6,000 ft. Himalayan blackberry prefers moist (average rainfall greater than 29"), disturbed habitats, such as riparian zones, marshes, and surrounding ponds and reservoirs; though is also commonly found in moist woodlands and forests. Appears to be widely tolerant of soil texture and pH levels, and withstand (and even thrive) under conditions of periodic flooding. However, blackberry establishment and spread is strongly sensitive to dense shade. In drier, interior climates Himalayan blackberry stands are restricted to especially moist (i.e. riparian habitats or along the edges of irrigated fields) sites. Seeds generally require warm stratification at 68-86 degrees F for 90 days, followed by cold stratification at 36-41 degrees F for anotehr 90 days.	
Sources of information: Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies. org/pests/himalayanblackberry.html. Accessed 10:47 AM 19 February 2010. Hickman, JC. Ed. 1993. The Jepson Manual: Higher Plants of California (Online). Available at http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html. Accessed 11:32 AM 19 February 2010. Hoshovsky, MC. 2000. Rubus discolor. In Boasard, CC, JM Randall and MC Hoshovsky, Eds. Invasive Plants of California Wildlands (Online). Berkeley, CA: University of California Press. Available at http://www.cal-ipc.org/ip/management /ipcw/pages/detailreport.cfm@usernumber=71&sureynumber=182.php. Accessed 12:38	

PM 19 February 2010.

Klinkenberg, R. 2010. Rubus armeniacus, Himalayan blackberry. In Klinkenberg, B, Ed. E-Flora BC: Electronic Atlas of the Plants of British Columbia (Online). Vancouver: Lab for Advanced Spatial Analysis, Department of Geography, University of British Columbia. Accessed 11:48 AM 19 February 2010.

Pacific Island Ecosystems at Risk (PIER). 2009. Rubus discolor Weihe & Ness. Available at http://www.hear.org/pier/species/rubus_discolor.htm. Last updated 24 August 2009. Accessed 10:48 AM 19 February 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

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

Describe ecological amplitude, identifying date of source information and approximate date of introduction to the state, if known: Species was not reported in Weber's 1976 Flora, indicating that the species was introduced to Colorado around this date (was introduced into North America in the late 19th century). Reports suggest occurrence in wet meadows in Mesa County, as well as likely mid-elevation, moist pine, spruce forests as well as riaprian shrublands in the Foothills region.

Rationale: Preferred ecological habitats appear to be restricted to moist (average rainfall greater than 29"), slightly disturbed sites. Himalayan blackberry is generally found at elevations less than 5, 250 ft (1600 m), but has been reported as thriving at elevations over 6,000 at sites in the western US.

Sources of information:

Hickman, JC. Ed. 1993. The Jepson Manual: Higher Plants of California (Online). Available at http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html. Accessed 11:32 AM 19 February 2010.

Hoshovsky, MC. 1989. Element Stewardship Abstract for Rubus discolor, Himalayan blackberry. Arlington, VA: The Native Conservancy. Available at: http://www.imapinvasives.org/GIST/ESA/esapages/documnts/rubuarm.PDF. Accessed 9:23 AM 25 March 2010.

Soll, J. 2004. Controlling Himalayan blackberry in the Pacific Northwest. Arlington, VA: The Native Conservancy. Available at: http://www.invasive.org/gist/moredocs/ rubarm01.pdf. Accessed 12:31 AM 25 March 2010.

Weber, WA. 1976. Rocky Mountain Flora. Niwot, CO: University Press of Colorado. P. 300.

Question 3.2 Distribution/Peak frequency D Other Pub. Mat'l back

Describe distribution: Refer to previously described information on distribution.

Rationale:

Sources of information:

Question 4.1 Poisonous to Livestock D Other Pub. Mat'l back

Describe impacts in terms of high probability of death, long-term health impacts, or short-term health impacts:

Literature evidence seems to indicate that blackberries (fruits and foliage) are entirely palatable to livestock (though the foliage is not likely to be very nutritious), and goats in particular actually favor the species over other forage options for grazing.
Rationale:
Sources of information: Global Invasive Species Database (GISD). 2005. Rubus discolor. Available at http://www.issg.org/database/species/management_info.asp?si=994&fr=1&sts. Accessed 11:04 AM 29 February 2010. Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.
Question 4.2 Detrimental to Economic Crops D Rev'd, Sci. Pub'n back
Describe impacts to all aspects of cropping systems (see guidelines): Himalayan blackberry is a significant innoculum reservoir for Pierce's disease bacterium (Xylella fastidiosa), which is carried by several sharpshooter species (Graphocephala spp) and can fatally infect wive grapes as well as several other commercially-important woody species.
Rationale: Despite the potential for R. armeniacus to harbor and spread Pierce's disease bacterium (given the degree of this issue in California wine country), it's lack of a wide distribution may negate this possible detrimental impact to the viticulture industry in Colorado.
Sources of information: Baumgartner, K and JG Warren. 2005. Persistence of Xylella fastidiosa in riparian hosts near northern California vineyards. Plant Disease 89: 1097-1102. DOI: 10.1094/PD-89-1097.
Question 4.3 Detrimental to Mgmt of Agricultural System, Rangeland and Pasture D Other Pub. Mat'l back
Describe impacts to water diversion systems, increased water use, reduced forage for livestock: Impacts are very minor (restricted to some reduced access to invaded pastures), and may actually be positive in reagrds to forage.
Rationale: Goats are actually reported to prefer blackberry plants (especially younger stems and re-growth) over other forage options; however, due to its density and the abundance of thorns on its stems, many livestock species will avoid grazing nearby, reducing usable pasture area. Is reported to have invaded pastures and tree plantations in Victoria, Australia.
Sources of information: Amor, RL. 1973. Ecology and control of blackberry (Rubus fructicosus L. Agg.) I. Rubus ssp. as weeds in Victoria. Weed Research 13: 218-223. Global Invasive Species Database (GISD). 2005. Rubus discolor. Available at http://www.issg.org/database/species/management_info.asp?si=994&fr=1&sts. Accessed 11:04 AM 29 February 2010. Hoshovsky, MC. 2000. Rubus discolor. In Boasard, CC, JM Randall and MC Hoshovsky, Eds. Invasive Plants of

California Wildlands (Online). Berkeley, CA: University of California Press. Available at http://www.cal-ipc.org/ip/management /ipcw/pages/detailreport.cfm@usernumber=71&sureynumber=182.php. Accessed 12:38 PM 19 February 2010.

Question 4.4 Human Health Impacts C Other Pub. Mat'l back

Describe key human impacts such as; irritants, property values, recreational values, and industry impacts: Large, conspicuous thorns can easily scratch passerbys, resulting in minor injury. Known to attract rats, which could have possible human health impacts. Dense thickets in riparian areas make access to affected recreational areas very difficult. However, due to the importance and attractiveness of fruits as a food source for many wildlife and bird species, Himalayan blackberry can provide some value for fauna.

Rationale:

Sources of information:

Hawaiian Invasive Species Partnership (HISP). 2008. Himalayan blackberry (Rubus discolor; syn. Rubus armeniacus). Available at http://www.hawaiiinvasivespecies. org/pests/himalayanblackberry.html. Accessed 10:47 AM 19 February 2010.

Hickman, JC. Ed. 1993. The Jepson Manual: Higher Plants of California (Online). Available at http://ucjeps.berkeley.edu/interchange/I_treat_indexes.html. Accessed 11:32 AM 19 February 2010.

King County, Washington. 2010. Himalayan blackberry and Evergreen blackberry, Rubus armeniacus (syn. Rubus discolor) and Rubus lacinatus. Available at http://www.kingcounty.gov/environment/animalsAndPlants/ noxious-weeds/weed-identification/blackberry.aspx. Accessed 12:45 PM 19 February 2010.

Tirmenstein, D. 1989. Rubus discolor. In Fire Effects Information System (Online). US Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available at http://www.fs.fed.us/database/feis. Accessed 11:26 AM February 2010.

US Department of the Interior, Bureau of Land Management (BLM). 2007. Himalayan blackberry, Rubus discolor. Available at http://www.blm.gov/ca/st/en/fo/ redding/weeds/redrudi.html. Last updated 27 April 2007. Accessed 10:42 AM 19 February 2010.

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	**Yes: 1 pt**
Seeds remain viable in soil for three or more years	**Yes: 2 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	**Yes: 1 pt**
Fragments easily and fragments can become established elsewhere	**Yes: 2 pts**
Resprouts readily when cut, grazed, or burned	**Yes: 1 pt**
12 pts	**Total Unknowns**

	A (6+ pts)
Note any related traits: See speceific details in section above on "Innate Reproductive Potential."	

Worksheet B - Colorado Ecological Types and Land Use

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Major Ecological and Land Use Types	Minor Ecological and Land Use Types	Code*
Freshwater and Aquatic Systems	lakes, ponds, reservoirs	**score**
	rivers, streams, canals	**score**
Riparian and wetlands	Riparian forest	**D. present**
	Riparian shrublands	**D. present**
	Wet meadows	**D. present**
Grasslands	Shortgrass prairie	**score**
	Tallgrass prairie	**score**
	Sandsage prairie	**score**
	Montane meadows	**score**
Irrigated Agriculture	Hay meadows	**score**
	Irrigated crops (alfalfa, corn, sugar beets)	**score**
Dryland Agriculture	Dryland crops (wheat, corn, millet, dryland grass hay, sunflowers, mustard for biodiesel)	**score**
Developed Lands	Urban, exurban, industrial	**score**
Arid Shrublands	Sagebrush shrublands	**score**
	Foothills shrublands	**score**
	Gambel oak shrublands	**score**
Woodlands	Pinyon - juniper	**score**
	Ponderosa pine	**D. present**
	Limber pine	**D. present**
Forest	Lodgepole pine	**score**
	Spruce-fir	**D. present**
Alpine	Boulder and rock fields	**score**
	Dwarf shrublands	**score**
	Tundra	**score**
Barrens (lower elevation)	Dunes	**score**
	Rock outcrops	**score**
	Canyonlands	**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).

Worksheet C – Human Impacts

Human health impacts; irritants (sap), spines, poisonous, and/or smoke impacts	**Yes: 1 pt**
Property values are decreased due to increased risk of fire	**Unknown: 0 pts**
Decreased property value due to moderate to heavy infestations	**Unknown: 0 pts**
Decreased land value for recreational use; boating, fishing, camping, etc.	**Yes: 1 pt**
Impact of listing detrimental to industry; agriculture, horticulture, nursery, and/or seed	**No: 0 pt**
	2 pts **2 unknowns**
	C (1-2)
Note any related traits: enter text here	