Taxon: Festuca californica Vasey **Family:** Poaceae

Common Name(s): California fescue **Synonym(s):** Festuca aristulata (Torr.) Piper
Festuca hitchcockiana E.B.Alexeev
Festuca parishii Hitchc.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 13 May 2019

WRA Score: 7.0 **Designation:** H(HPWRA) **Rating:** High Risk

Keywords: Perennial Bunchgrass, Low Palatability, Flammable, Shade Tolerant, Wind-Dispersed

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	Intermediate
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	y
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	n
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	n
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	n
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	y
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens		
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	y
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y

Qsn #	Question	Answer Option	Answer
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	y
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally		
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	n
607	Minimum generative time (years)	1 year = 1, 2 or 3 years = 0, 4+ years = -1	2
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)		
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed		
707	Propagules dispersed by other animals (externally)		
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence of domestication] "colonizer, recommended for stabilizing or restoring disturbed or degraded areas, suitable for erosion control and for wildlife food and cover, found in dry habitats and moist stream banks, damp red soil, thickets, prairies, wood borders, open dry ground, in both open and shaded places, open forests, dry rocky soil"

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**Intermediate**
	Source(s)	**Notes**
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). 2013. Manual of Grasses for North America. Utah State University Press, Logan, UT	"Festuca californica grows on dry, open slopes and moist streambanks in thickets and open woods, from sea level to 2000 m. Its range extends from Clackamas County, Oregon, to the Sierra Nevada and southern California; it is not known to extend into Mexico."
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 13 May 2019]	"Native Northern America NORTHWESTERN U.S.A.: United States [Oregon (w.)] SOUTHWESTERN U.S.A.: United States [California (n. & c.)]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 13 May 2019]	

Qsn #	Question	Answer
203	**Broad climate suitability (environmental versatility)**	**y**
	Source(s)	**Notes**
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). 2013. Manual of Grasses for North America. Utah State University Press, Logan, UT	"Festuca californica grows on dry, open slopes and moist streambanks in thickets and open woods, from sea level to 2000 m. Its range extends from Clackamas County, Oregon, to the Sierra Nevada and southern California; it is not known to extend into Mexico." [Elevation range exceeds 1000 m, demonstrating environmental versatility]

204	**Native or naturalized in regions with tropical or subtropical climates**	**n**
	Source(s)	**Notes**
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). 2013. Manual of Grasses for North America. Utah State University Press, Logan, UT	"Festuca californica grows on dry, open slopes and moist streambanks in thickets and open woods, from sea level to 2000 m. Its range extends from Clackamas County, Oregon, to the Sierra Nevada and southern California; it is not known to extend into Mexico."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

205	**Does the species have a history of repeated introductions outside its natural range?**	**n**
	Source(s)	**Notes**
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"This is one of the most beautiful native grasses, but not a reliable species for seed production."
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

301	**Naturalized beyond native range**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. (2019). Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 13 May 2019]	No evidence to date

302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

303	**Agricultural/forestry/horticultural weed**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

304	Environmental weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	No evidence

305	Congeneric weed	y
	Source(s)	**Notes**
	Weber, E. 2017. Invasive Plant Species of the World, 2nd Edition: A Reference Guide to Environmental Weeds. CABI Publishing, Wallingford, UK	"Festuca arundinacea … Where invasive, tall fescue is a strong competitor to native species and forms dense stands displacing native vegetation. It spreads mainly by its rhizomes."
	Csurhes, S. & Edwards, R. 1998. Potential environmental weeds in Australia: Candidate species for preventative control. Biodiversity Group, Environment Australia, Canberra, Australia	"Festuca rubra ... In Victoria, it is widespread (medium to large populations) and is a threat to dry coastal vegetation, dry sclerophyll forest and woodland (Carr et al. 1992)."

401	Produces spines, thorns or burrs	n
	Source(s)	**Notes**
	Hitchcock, A.S. & Chase, A. (1971). Manual of the grasses of the United States, Volume 1. Dover Publications, New York, NY	[No evidence] "Culms tufted, rather stout, 60 to 120 cm. tall; sheaths somewhat scabrous, the collar pubescent or pilose; blades firm, usually involute, sometimes flat, scabrous; panicle open, 10 to 30 cm. long, the rather remote branches usually in pairs, spreading or drooping, naked below; spikelets mostly 4- or 5-flowered; glumes somewhat un equal, 5 to 8 mm. long; lemmas firm, faintly nerved, scaberulous, acuminate or short-awned."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Bostan, C., Butnariu, M., Butu, M., Ortan, A., Butu, A., Rodino, S., & Parvu, C. (2013). Allelopathic effect of Festuca rubra on perennial grasses. Romanian Biotechnological Letters, 18(2), 8190-8196	[Unknown. Other Festuca species may be allelopathic] "The allelopathy research can contribute to protecting the biodiversity and may develop new strategies for sustainable ecosystems controlled by allelochemicals. The present investigations have estimated the allelopahtic features at Festuca rubra and the ability of the allelopathic compounds to affect the germination and the quality of perennial grasses (Dactyilis glomerata, Lolium perenne and Poa pratensis). These perennial grasses were treated with alcolic extracts obtained from dry aerial parts of Festuca Rubra. Were quantified and also physico□chemical characterized the polyphenolic compounds and the alkaloids from the chemical structure of plants. The extracted compounds from the dry aerialparts of F. Rubra were quantified using HPLC method. In the aqueous extracts were quantified the following alkaloids: N-formyl-loline (NFL), N-acetyl-loline (NAL) and ergovaline (EGV). The results of the research have showed that the effect of the alkaloids lead to modifications in the quality index by reducing of the crude protein content and thus lead to lower feed value of these plants."

403	Parasitic	n
	Source(s)	**Notes**
	Hitchcock, A.S. & Chase, A. (1971). Manual of the grasses of the United States, Volume 1. Dover Publications, New York, NY	"Culms tufted, rather stout, 60 to 120 cm. tall" [Poaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	**Notes**
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	"Other possible uses are revegetation of disturbed areas and wildlife food and cover. Palatability is medium for all classes of ungulates. The species attracts certain butterflies and many native birds eat the seeds."
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	[Palatable, but not preferred] "Forage value and reproduction: The forage rating is the lowest of the perennial species here mentioned. The herbage is coarse, and is harsh after approaching maturity. Sheep feed on the plant only in early spring, and cattle to midsummer, but horses relish it fairly well throughout the normal grazing season. Another reason for the low forage rank is the large number of seed stalks."

405	Toxic to animals	n
	Source(s)	**Notes**
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	[No evidence] "Other possible uses are revegetation of disturbed areas and wildlife food and cover. Palatability is medium for all classes of ungulates. The species attracts certain butterflies and many native birds eat the seeds."

Qsn #	Question	Answer
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[No evidence] "suitable for erosion control and for wildlife food and cover"
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	[No evidence] "The herbage is coarse, and is harsh after approaching maturity. Sheep feed on the plant only in early spring, and cattle to midsummer, but horses relish it fairly well throughout the normal grazing season."

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	Sevenoaks Native Nursery. (2019). Festuca californica. https://www.sevenoaksnativenursery.com/2013/04/05/festuca-californica-february-2013/. [Accessed 13 May 2019]	"California fescue has very few diseases or pests and is a very dependable and ornamental grass for the native or rock garden and is a great companion plant for any oak."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	y
	Source(s)	**Notes**
	Livingston, A. C., & Varner, J. M. (2016). Fuel moisture differences in a mixed native and non-native grassland: implications for fire regimes. Fire Ecology, 12(1), 73-87	"California fescue is an exceptionally robust native grass, with a clump-like growth form that retains abundant dead thatch. It is considered important in regional fire regimes because it is a highly flammable native species (Hastings et al. 1997, Engber et al. 2011)." … "Due to its substantial mass and the dead fuel it retains, California fescue is considered a highly flammable fuel in oak woodland understories, capable of burning with high intensity where it is dominant (Hastings et al. 1997). In the Bald Hills, this species is considered to be an exceptional fuel, contributing to the fast moving, low intensity fires that prohibit young conifers from invading (Engber et al. 2011)."
	Hastings, M. S., Barnhart, S., & McBride, J. R. (1997). Restoration management of northern oak woodlands. USDA Forest Service General Technical Report PSW GTR-160. Pacific Northwest Research Station, Portland, OR	"In contrast, native California fescue (Festuca californica) produces high volumes of flammable grass fuel. Those locations occupied by California fescue burned with high intensity. Where surface fuels allowed fire to spread, Douglas-fir seedling mortality was near 100 percent."

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Walsh, R. A. (1994). Festuca californica. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://www.fs.fed.us/database/feis/plants/graminoid/festcal/all.html. [Accessed 11 May 2019]	"California fescue grows in both open and shaded areas [5,6,7,9]."

Qsn #	Question	Answer
	Stromberg, M.R., Corbin, J.D. & D Antonio, C.M. (2007). California Grasslands: Ecology and Management. University of California Press, Berkeley and Los Angeles, CA	"Festuca californica may be abundant in shaded understory situations, and Elymus elymoides is common at the edges of chaparral."
	Calscape. (2019). California Fescue - Festuca californica. https://calscape.org/Festuca-californica-(California-Fescue). [Accessed 11 May 2019]	"Sun - Sun, Part Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Klamath-Siskiyou Native Seeds. (2019). Festuca californica-California fescue. https://klamathsiskiyouseeds.com/product/festuca-californica-california-fescue/. [Accessed 13 May 2019]	"Growing in sun to part-shade, California fescue tolerates a wide variety of soil types, but prefers loamy or clay soils."
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	"It is most abundant in open ground and in open woods where it occupies a variety of soils."
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	"Preferred soils are medium to fine textured with a pH of 5.7 to 7.5. In one study, the species was rated tolerant to salt spray and moderately tolerant to soil salinity, similar to many other grasses including introduced tall fescue."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Perennial bunchgrass, herbaceous, with basal culm buds, densely tufted or densely clumped stems, glaucous, erect, rhizomes absent"

412	Forms dense thickets	
	Source(s)	**Notes**
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	"It is most abundant in open ground and in open woods where it occupies a variety of soils. Seldom does it form a dense stand over extensive areas."
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"Plants are tall and relatively easy to identify, but do not occur in dense patches."
	Livingston, A. C., & Varner, J. M. (2016). Fuel moisture differences in a mixed native and non-native grassland: implications for fire regimes. Fire Ecology, 12(1), 73-87	[Understory dominated by California fescue] "Oak woodland understory dominated by California fescue in the Bald Hills had more than double the herbaceous mass of mixed grasslands, and a positive correlation was found between herbaceous fuel mass and surface fire temperatures in this ecosystem (Engber et al. 2011)."

501	Aquatic	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	[Terrestrial] "Perennial bunchgrass… found in dry habitats and moist stream banks, damp red soil, thickets, prairies, wood borders, open dry ground, in both open and shaded places, open forests, dry rocky soil,"

502	Grass	y
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 13 May 2019]	Family: Poaceae (alt.Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Loliinae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network. 2019. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 13 May 2019]	Family: Poaceae (alt.Gramineae) Subfamily: Pooideae Tribe: Poeae Subtribe: Loliinae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	Quattrocchi, U. 2006. CRC World Dictionary of Grasses: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Perennial bunchgrass, herbaceous, with basal culm buds, densely tufted or densely clumped stems, glaucous, erect, rhizomes absent"

601	Evidence of substantial reproductive failure in native habitat	n
	Source(s)	**Notes**
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). 2013. Manual of Grasses for North America. Utah State University Press, Logan, UT	"Festuca californica grows on dry, open slopes and moist streambanks in thickets and open woods, from sea level to 2000 m. Its range extends from Clackamas County, Oregon, to the Sierra Nevada and southern California; it is not known to extend into Mexico."

602	Produces viable seed	y
	Source(s)	**Notes**
	Sevenoaks Native Nursery. (2019). Festuca californica. https://www.sevenoaksnativenursery.com/2013/04/05/festuca-californica-february-2013/. [Accessed 13 May 2019]	"California fescue grows quickly to a large graceful clump roughly 2 feet in diameter, and because it does not form rhizomes, remains fairly contained. However, in the right situation, it can spread from seed, and care must be taken where this is not desired."

Qsn #	Question	Answer
	Walsh, R. A. (1994). Festuca californica. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://www.fs.fed.us/database/feis/plants/graminoid/fescal/all.html. [Accessed 11 May 2019]	"California fescue sprouts from perennating buds at the base of the culms. It also reproduces by seed [5]."
	Steinfeld, D., & Archibald, C. (1998). Propagating native grass seed and seedlings. In Symposium Proceedings: Native Plants Propagating and Planting, December 9-10, 1998 (p. 32-37). Oregon State University, Nursery Technology Cooperative, Department of Forest Science	"some species like California fescue (Festuca californica) and June grass (Koeleria cristata) do not produce seed the first year regardless of the season sown (see Table 1)." … "The seed harvesting season begins as early as mid May and lasts as late as mid September with the bulk of the harvest occurring between mid June and mid July. Speed and timing of seed ripening will vary from year to year and is strongly influenced by spring and summer temperatures. First to ripen are California fescue (Festuca californica), green fescue (Festuca viridula) and most of the Poa species."

603	Hybridizes naturally	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown. Hybridization documented in genus

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"Pollination: The pollination biology of this species has not been studied, but most perennial Festuca species are highly cross-pollinated."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Zomlefer, W.B. 1994. Guide to Flowering Plant Families. The University of North Carolina Press, Chapel Hill & London	"The reduced flowers are anemophilous, although pollen-gathering insects have been reported for some grass species" [Poaceae family description]

606	Reproduction by vegetative fragmentation	n
	Source(s)	**Notes**
	Walsh, R. A. (1994). Festuca californica. In: Fire Effects Information System, [Online]. USDA, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory. https://www.fs.fed.us/database/feis/plants/graminoid/fescal/all.html. [Accessed 11 May 2019]	"California fescue is a native, perennial bunchgrass [5,9]." … "California fescue does not produce rhizomes [5]." … "California fescue sprouts from perennating buds at the base of the culms. It also reproduces by seed [5]."

607	Minimum generative time (years)	2
	Source(s)	**Notes**
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"Average yields/ Stand longevity: 50–100 pounds per acre. This species does not produce seed its first growing season. Yields vary, but fields can produce over 100 lbs/acre once mature. In well drained soils, plants can be long-lived."

Qsn #	Question	Answer
	Steinfeld, D., & Archibald, C. (1998). Propagating native grass seed and seedlings. In Symposium Proceedings: Native Plants Propagating and Planting, December 9-10, 1998 (p. 32-37). Oregon State University, Nursery Technology Cooperative, Department of Forest Science	"some species like California fescue (Festuca californica) and June grass (Koeleria cristata) do not produce seed the first year regardless of the season sown (see Table 1)." [Produces seeds in second year of growth onward]

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown. Other grass species, including those in the genus Festuca, have been dispersed by vehicles or other machinery

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"This is one of the most beautiful native grasses, but not a reliable species for seed production."
	Plant World Seeds. (2019). Festuca caliornica. https://www.plant-world-seeds.com/store/view_seed_item/4485. [Accessed 13 May 2019]	"This truly beautiful, mid-sized, semi-evergreen bunch grass, native to California and Oregon pushes out graceful, fountain-like, blue-green foliage. The showy, delicate, panicles of flowers rise as high again above the foliage. An excellent groundcover for slopes, it is easily grown in a variety of soils whether in sun or shade. Although drought tolerant, it looks better with some summer water." [This and other websites sell seeds commercially]

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	No evidence. Possible if cultivated in proximity to agricultural crops.

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	Neisser, D. (2016). Festuca Californica Mapping at JRBP Is there a serpentine alliance? Bio 105B Project Summary. Stanford University, Stanford, CA	"FC has a long culm, open inflorescence rising quite a bit above the plant foliage, lightweight seeds, and a small lemma awn - all adaptations for windblown dispersal."

705	Propagules water dispersed	
	Source(s)	**Notes**
	Barkworth, M.E., Anderton, L.L., Capels, K.M., Long, S., Piep, M.B. (eds.). 2013. Manual of Grasses for North America. Utah State University Press, Logan, UT	"Festuca californica grows on dry, open slopes and moist streambanks in thickets and open woods, from sea level to 2000 m." [Occurrence along streams suggests water may secondarily disperse seeds]

706	Propagules bird dispersed	

Qsn #	Question	Answer
	Source(s)	**Notes**
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	"The species attracts certain butterflies and many native birds eat the seeds." [Birds likely would act as seed predators, but may disperse some intact seeds]

707	Propagules dispersed by other animals (externally)	
	Source(s)	**Notes**
	Mouissie, A. M., Lengkeek, W., & Van Diggelen, R. (2005). Estimating adhesive seed-dispersal distances: field experiments and correlated random walks. Functional Ecology, 19(3): 478-486	[Unknown. Other Festuca species may be externally dispersed] "After 3 h grazing, five species had attached to the sheep. The Poaceae M. caerulea, A. capillaris and F. rubra had attached in considerable numbers 40-80 seeds per species)."

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	"Sheep feed on the plant only in early spring, and cattle to midsummer, but horses relish it fairly well throughout the normal grazing season." [Seeds could potentially be dispersed if ingested during feeding on foliage]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Sampson, A., Chase, A., & Hedrick, D. (1951). California grasslands and range forage grasses. Bulletin 724. California Agricultural Experiment Station, University of California	"Another reason for the low forage rank is the large number of seed stalks. The amount of seed produced is generally large."
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	"Seed set is low in some years which may be the result interference in pollination from rains during early spring flowering."

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	Darris, D. & Johnson, S. (2007). Plant Fact Sheet - California fescue - Festuca californica Vasey. USDA NRCS Plant Materials Center, Corvallis, OR. https://plants.usda.gov/factsheet/pdf/fs_feca.pdf. [Accessed 13 May 2019]	"California fescue appears to have minor seed dormancy, at least in some populations. Others report no dormancy, but two weeks of cold moist chilling (stratification treatment) can result in more uniform and quicker germination. Spring sowing of untreated seed can have staggered germination; seedlings may emerge over a period of two to eight weeks."
	Royal Botanic Gardens Kew. (2019) Seed Information Database (SID). Version 7.1. Available from: http://data.kew.org/sid/. [Accessed 13 May 2019]	"Storage Behaviour: Orthodox Storage Conditions: 79% viability following drying to mc's in equilibrium with 15% RH and freezing for 1 month at -20°C at RBG Kew, WP"

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown, but grass specific herbicides would probably be effective in certain situations

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	USDA NRCS. (2015). Native Seed Production Manual for the Pacific Northwest. USDA-NRCS, Oregon Plant Materials Center, Corvallis	"This species is sensitive to low mowing and crowns can be easily damaged so the remaining stubble should be left at a height of 3 to 4 inches."
	Livingston, A. C., & Varner, J. M. (2016). Fuel moisture differences in a mixed native and non-native grassland: implications for fire regimes. Fire Ecology, 12(1), 73-87	[Unknown if able to resprout after low intensity fires] "Due to its substantial mass and the dead fuel it retains, California fescue is considered a highly flammable fuel in oak woodland understories, capable of burning with high intensity where it is dominant (Hastings et al. 1997). In the Bald Hills, this species is considered to be an exceptional fuel, contributing to the fast moving, low intensity fires that prohibit young conifers from invading (Engber et al. 2011)."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2019). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Broad climate suitability, and elevation range exceeds 1000 m, demonstrating environmental versatility
• Other Festuca species are invasive
• Shade tolerant
• Tolerates many soil types
• May form dense cover in certain habitats (ability to exclude other vegetation unknown)
• Reproduces by seeds
• Reaches maturity in second year
• Seeds dispersed by wind, possibly by water, and intentionally by people
• Gaps in biological and ecological information may reduce accuracy of risk prediction

Low Risk Traits
• No reports of invasiveness or naturalization, but no evidence of widespread introduction outside native range
• Unarmed (no spines, thorns, or burrs)
• Palatable to grazing animals (particularly horses)
• Valued restoration and ornamental grass within native range
• Not reported to spread vegetatively