

<b>Taxon:</b> <i>Schoenoplectus californicus</i> (C. A. Mey.) Sojak	<b>Family:</b> Cyperaceae
<b>Common Name(s):</b> California bulrush giant bulrush southern bulrush	<b>Synonym(s):</b> <i>Elytrospermum californicum</i> C. A. <i>Scirpus californicus</i> (C. A. Mey.)

<b>Assessor:</b> Chuck Chimera	<b>Status:</b> Assessor Approved	<b>End Date:</b> 21 Jan 2016
<b>WRA Score:</b> 21.0	<b>Designation:</b> H(HPWRA)	<b>Rating:</b> High Risk

**Keywords:** Aquatic Sedge, Environmental Weed, Dense Cover, Rhizomatous, Water-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)	High
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	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range	y = 1*multiplier (see Appendix 2), n= question 205	y
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed		
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	y
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		
409	Is a shade tolerant plant at some stage of its life cycle		

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	y=1, n=0	y
501	Aquatic	y=5, n=0	y
502	Grass	y=1, n=0	n
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	y=1, n=-1	y
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
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)	y=1, n=-1	y
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		
705	Propagules water dispersed	y=1, n=-1	y
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	y=-1, n=1	y
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
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence of domestication] "Native to coastal areas of southern United States (south of South Carolina and California) south to Argentina and Chile in salt or freshwater marshes at low elevations"

102	Has the species become naturalized where grown?	
	Source(s)	Notes
	WRA Specialist. 2016. Personal Communication	NA

103	Does the species have weedy races?	
	Source(s)	Notes
	WRA Specialist. 2016. 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"	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 19 Jan 2016]	"Native: Northern America North-Central U.S.A.: United States - Kansas, - Oklahoma Northern Mexico: Mexico - Baja Sur, - Coahuila, - Durango, - San Luis Potosi South-Central U.S.A.: United States - New Mexico, - Texas Southeastern U.S.A.: United States - Alabama, - Arkansas, - Florida, - Georgia, - Louisiana, - Mississippi, - North Carolina, - South Carolina, - Tennessee Southern Mexico: Mexico - Chiapas, - Guanajuato, - Hidalgo, - Jalisco, - Mexico, - Michoacan, - Puebla, - Queretaro Southwestern U.S.A.: United States - Arizona, - California, - Nevada Southern America Brazil: Brazil Mesoamerica: El Salvador; Guatemala; Honduras Southern South America: Argentina; Chile; Paraguay; Uruguay Western South America: Bolivia; Ecuador; Peru"

202	Quality of climate match data	High
	Source(s)	Notes
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 19 Jan 2016]	

Qsn #	Question	Answer
203	<b>Broad climate suitability (environmental versatility)</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Floridata. 2015. <i>Schoenoplectus californicus</i> . <a href="http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120">http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120</a> . [Accessed 19 Jan 2016]	"Hardiness: USDA Zones 7 - 11."
	Flora of North America Editorial Committee. 2002. <i>Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae</i> . Oxford University Press, Oxford, UK	[Elevation range exceeds 1000 m, demonstrating environmental versatility] "Brackish to fresh marshes, shores, often emergent in water; 0–1400 m"
	Wagner, W.L., Herbst, D.R. & Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Elevation range exceeds 1000 m, demonstrating environmental versatility] "in Hawai'i naturalized or possibly indigenous, 0-1,220 m, on all of the main islands except Kaho'olawe."

204	<b>Native or naturalized in regions with tropical or subtropical climates</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Erickson, T.A. & Puttock, C.F. 2006. <i>Hawai'i Wetland Field Guide: An Ecological And Identification Guide to Wetlands And Wetland Plants of the Hawaiian Islands</i> . Bess Press Books, Honolulu, HI	"Distribution: California bulrush is native to coastal areas of the tropical and subtropical Americas, now distributed worldwide in brackish to freshwater marshes and shores..."
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 19 Jan 2016]	"Native: Northern America North-Central U.S.A.: United States - Kansas, - Oklahoma Northern Mexico: Mexico - Baja Sur, - Coahuila, - Durango, - San Luis Potosi South-Central U.S.A.: United States - New Mexico, - Texas Southeastern U.S.A.: United States - Alabama, - Arkansas, - Florida, - Georgia, - Louisiana, - Mississippi, - North Carolina, - South Carolina, - Tennessee Southern Mexico: Mexico - Chiapas, - Guanajuato, - Hidalgo, - Jalisco, - Mexico, - Michoacan, - Puebla, - Queretaro Southwestern U.S.A.: United States - Arizona, - California, - Nevada Southern America Brazil: Brazil Mesoamerica: El Salvador; Guatemala; Honduras Southern South America: Argentina; Chile; Paraguay; Uruguay Western South America: Bolivia; Ecuador; Peru"

Qsn #	Question	Answer
205	Does the species have a history of repeated introductions outside its natural range?	y
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 20 Jan 2016]	[Presumably introduced and naturalized in at least three locations outside native range] "Naturalized: Australasia New Zealand: New Zealand Pacific North-Central Pacific: United States - Hawaii South-Central Pacific: Cook Islands"

301	Naturalized beyond native range	y
	<b>Source(s)</b>	<b>Notes</b>
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"Ecological, taxonomic, and physiological notes are given on <i>Schoenoplectus californicus</i> . This species has been recently recorded as naturalized in New Zealand, despite the possibility that it may have been present in the country since c. 1900 and overlooked through confusion with the indigenous <i>S. tabernaemontani</i> ."
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"in Hawai'i naturalized or possibly indigenous, 0-1,220 m, on all of the main islands except Kaho'olawe. First collected on Moloka'i in 1912 (Forbes 409.Mo, BISH)."
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. <a href="http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm">http://botany.si.edu/pacificislandbiodiversity/hawaiianflora/index.htm</a> . [Accessed 19 Jan 2016]	"In the Hawaiian Islands, naturalized on Ni'ihau, Kaua'i, O'ahu, Moloka'i, Lana'i, Maui, Hawai'i." [Designated as naturalized. Prior references considered this species questionably native]

302	Garden/amenity/disturbance weed	n
	<b>Source(s)</b>	<b>Notes</b>
	Williams, P. A., & Champion, P. (2008). Biological success and weediness of existing terrestrial pest plants and aquatic weeds in Northland. Landcare Research Contract Report LC0708/080, Landcare Research, Lincoln	"Invasive in tidal estuarine areas." [Where invasive, may have detrimental effects on the natural environment. See 3.04]

Qsn #	Question	Answer
303	<b>Agricultural/forestry/horticultural weed</b>	
	<b>Source(s)</b>	<b>Notes</b>
	IMS Dredge. 2012. IMS Aquatic Weed Harvester Destroying Totora In Laguna de Colta, Ecuador. <a href="http://www.imsdredge.com/news-release-nov-2012.htm">http://www.imsdredge.com/news-release-nov-2012.htm</a> . [Accessed 21 Jan 2016]	[Commercial website describes mechanical control in a recreational lake, suggesting amelioration of detrimental social and perhaps financial impacts] "The officials were faced with a vegetation problem in Laguna de Colta, a recreational lake at 10,825 ft. (3,300 m) above sea level that had become infested with totora ( <i>Scirpus californicus</i> ), over 40 percent of its area. The other 60 percent of the lake was full of submerged mats of vegetation that were literally strangling all aquatic life. Forty percent of the vegetation is 5 ft. (1.5m), and 60 percent is 9 ft. (2.7m) tall. "

304	<b>Environmental weed</b>	<b>y</b>
	<b>Source(s)</b>	<b>Notes</b>
	Weedbusters. 2009. Plant Me Instead! Bay of Plenty Region. <a href="http://www.bayofplentynz.info/media/43897/plantmeinstead.pdf">www.bayofplentynz.info/media/43897/plantmeinstead.pdf</a>	"A rush up to 3m tall growing on edges of ponds and lakes up to depth of 1m. Tall, dark green stems that are somewhat triangular in cross-section, and forms an open flowerhead of woolly, bristly tan or brown flowers. Invasive and crowds out native species."
	Brimacombe, K. A. (2003). Research on native plants for coastal wetland restoration on O'ahu, MSc Thesis. University of Hawaii at Manoa, Honolulu	"Introduced species such as California grass ( <i>Brachiaria mutica</i> ), Indian fleabane ( <i>Pluchea indica</i> ), cattail ( <i>Typha latifolia</i> ), saltwort or pickleweed ( <i>Batis maritima</i> ), and California bulrush ( <i>Schoenoplectus californicus</i> ) are aggressive, quick-growing species that often form dense, monotypic stands that can choke out open water and cover mudflats, areas necessary for native waterbirds' existence (Chang 1990; USFWS 2001)."
	Williams, P. A., & Champion, P. (2008). Biological success and weediness of existing terrestrial pest plants and aquatic weeds in Northland. Landcare Research Contract Report LC0708/080, Landcare Research, Lincoln	"It is apparently displaced by Manchurian wild rice, but may displace indigenous sedges such as <i>Schoenoplectus tabernaemontani</i> , <i>S. pungens</i> and <i>Bolboschoenus fluviatilis</i> , but not adult mangroves ( <i>Avicennia marina</i> )." ... "Suppression Overtops and suppresses some other marginal species."
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	" <i>Schoenoplectus californicus</i> (C.A.Mey.) Sojak Cyperaceae See: <i>Scirpus californicus</i> (C. A. Mey.) Steud. Cultivated Aquatic - Refs: 18 1132-Q, 1070-W, 1049-N, 964-W, 919- N, 853-W, 839-N, 483-Q, 401-CS, 354- N, 310-N, 280-N, 246-E, 237-W, 155-E, 85-N, 54-W, 15-N"
	MAF Biosecurity New Zealand. 2008. National Pest Plant Accord. <a href="http://www.biosecurity.govt.nz/files/pests/plants/nppa/nppa-accord-manual.pdf">http://www.biosecurity.govt.nz/files/pests/plants/nppa/nppa-accord-manual.pdf</a> . [Accessed 21 Jan 2016]	" <i>Schoenoplectus californicus</i> · Californian bulrush" ... "It forms tall dense beds that colonise mobile sand deposits and river margins, where it may displace smaller native species."
	T.E.R:R.A.I.N. 2016. <i>Schoenoplectus californicus</i> (California bulrush). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html</a> . [Accessed 21 Jan 2016]	" <i>Schoenoplectus californicus</i> is a very aggressive invasive perennial sedge with knotty rhizomes and inhabits marshy areas, coastal river banks and estuaries." ... "It spreads in many ways including water, wind, contaminated soil and feed, machinery, wildlife and it forms dense beds that colonise mobile sand deposits and river margins where it displaces native sedges by out competing and suppressing their growth."

305	<b>Congeneric weed</b>	<b>y</b>
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Qsn #	Question	Answer
	Source(s)	Notes
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	"Schoenoplectus is a genus of 77 species worldwide (Smith, 2002b), of which 20 are cited as weeds in Appendix 2. Schoenoplectus mucronatus (L.) Palla [= Scirpus mucronatus L.], considered to be among the world's worst weeds (Holm et al., 1997), is a pest in rice and other row and tree crops in Bangladesh, France, India, Malaysia, the Philippines, Portugal, Spain, and the U.S.A. (Holm et al., 1997). Schoenoplectus mucronatus is a greater problem in paddy fields where hand labor is the primary method of weed control than in rice production involving mechanical tillage and the use of herbicides. Schoenoplectus grossus (L. f.) Palla [= Scirpus grossus L. f.] is a weed of rice, riverbeds, reservoirs, and irrigation systems in southeastern Asia including regions of Vietnam, India, and the Philippines, and S. tabernaemontani is also listed as a weed of rice in China (Zhirong et al., 1990). Schoenoplectus juncooides (Roxb.) Palla is reportedly naturalized in rice fields in Europe (DeFilipps, 1980a). Schoenoplectus acutus and S. americanus (Pers.) Volkart ex Schinz & R. Keller are weeds in wetland areas of North America (WSSA, 1989; Callahan et al., 1995), while S. californicus (C. A. Mey.) Sojak is reported as a weed in North America and Brazil (WSSA, 1989; Kissmann, 1997)."

401	Produces spines, thorns or burrs	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[No evidence] "Perennials with coarse, creeping rhizomes up to 2 cm in diameter, clothed with dark brown scales; culms arising in a row along the rhizome, trigonous at least in apical part, the lower part obtusely trigonous or subterete, green, glaucous, smooth or occasionally weakly roughened, 90- 380 cm tall, 1-2.5 cm in diameter below. Leaves reduced to 3-4 bladeless sheaths; basal sheaths dark brown, the abaxial side split into pinnate fibers."

402	Allelopathic	
	Source(s)	Notes

Qsn #	Question	Answer
	Takao, L. K., Ribeiro, J. P. N., & Lima, M. I. S. (2011). Potencial alelopático de macrófitas aquáticas de um estuário cego. <i>Acta Botanica Brasilica</i> , 25(2), 324-330	[ <i>Schoenoplectus californicus</i> extracts decreased the speed of germination & may possess allelopathic properties] "(Allelopathic potential of aquatic macrophytes from a blind estuary). Aquatic macrophytes represent one of the most productive communities and through metabolic activity are capable of producing great interference in the environment. Allelopathic interactions are apparently increased under biotic and abiotic stress and may exist in estuaries due to competition, salinity variation and other factors. The aim of this study was to evaluate the allelopathic properties of leaf extracts of 25 aquatic macrophyte species from a blind estuary. We tested leaf extract effects in four concentrations on the germination of lettuce. We ranked and compared the donor species according to the dose response over the variety of treatments through unique values of allelopathic indexes. Eleven of 25 species decreased the germination percentage, all of them decreased the speed of germination and increased the germination informational entropy of the target species seeds in at least one of the tested concentrations. <i>Crinum americanum</i> L., <i>Sagittaria montevidensis</i> Cham. & Schl. and <i>Ipomoea cairica</i> (L.) Sweet presented the highest allelopathic index values. In general, the lowest germination percentages concurred with the lowest germination speed and highest germination informational entropies of lettuce seeds, showing an assemblage of alterations occurring simultaneously with the increase of extract concentrations."

403	Parasitic	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with coarse, creeping rhizomes up to 2 cm in diameter,. clothed with dark brown scales; culms arising in a row along the rhizome, trigonous at least in apical part, the lower part obtusely trigonous or subterete, green, glaucous, smooth or occasionally weakly roughened, 90- 380 cm tall, 1-2.5 cm in diameter below." [Cyperaceae. No evidence]

404	Unpalatable to grazing animals	n
	Source(s)	Notes
	USDA NRCS. 2008. Plant Fact Sheet - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS Louisiana Plant Materials Center. <a href="http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf">http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf</a> . [Accessed 19 Jan 2016]	"Nutria is the greatest cause of problems in California bulrush establishment. Nutria will excavate plants to feed on the roots. Where nutria are a problem, well anchored wire cages are required to allow plants to become established."
	USDA Natural Resources Conservation Service. 2016. Conservation Plant Characteristics - <i>Schoenoplectus californicus</i> . <a href="http://plants.usda.gov/java/charProfile?symbol=SCCA11">http://plants.usda.gov/java/charProfile?symbol=SCCA11</a> . [Accessed 21 Jan 2016]	"Palatable Graze Animal: Medium"



Qsn #	Question	Answer
	<p>USDA NRCS. 2006. Plant Guide - California Bulrush - <i>Schoenoplectus californicus</i>. USDA NRCS National Plant Data Center &amp; the Idaho Plant Materials Center. <a href="http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf">http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf</a>. [Accessed 19 Jan 2016]</p>	<p>[Palatable to humans &amp; waterfowl] "Young shoots coming up in the spring can be eaten raw or cooked. Bulrush pollen is eaten as flour in bread, mush or pancakes. Later in the season, the seeds can be beaten off into baskets or pails, ground into a similar meal and used as flour. The large rhizomes are eaten raw or cooked; sometimes they were dried in the sun, then pounded into a kind of flour." ... "The seeds, being less hairy and larger than cattail, are one of the most important and commonly used foods of ducks and of certain marshbirds and shorebirds (Martin et al. 1951). Bulrushes provide choice food for wetland birds: American widgeon, bufflehead, mallard, pintail, shoveler, blue-winged teal, cinnamon teal, greater scaup, lesser scaup, avocet, marbled godwit, clapper rail, Virginia rail, sora rail, long-billed dowitcher, and tricolored blackbird. canada geese and white-fronted geese prefer the shoots and roots."</p>
	<p>de Lange, P. J., Gardner, R. O., Champion, P. D., &amp; Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i>, 36(3), 319-327</p>	<p>[Unpalatable to cattle] "It also grows here in drains and poorly drained pasture prone to seasonal flooding and can prove nearly as troublesome as <i>Z. latifolia</i>, since it blocks drains and is unpalatable to cattle."</p>

405	Toxic to animals	n
	Source(s)	Notes
	<p>USDA NRCS. 2006. Plant Guide - California Bulrush - <i>Schoenoplectus californicus</i>. USDA NRCS National Plant Data Center &amp; the Idaho Plant Materials Center. <a href="http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf">http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf</a>. [Accessed 19 Jan 2016]</p>	<p>[No evidence. Eaten by humans and waterfowl] "Young shoots coming up in the spring can be eaten raw or cooked. Bulrush pollen is eaten as flour in bread, mush or pancakes." ... "The seeds, being less hairy and larger than cattail, are one of the most important and commonly used foods of ducks and of certain marshbirds and shorebirds (Martin et al. 1951). Bulrushes provide choice food for wetland birds: American widgeon, bufflehead, mallard, pintail, shoveler, blue-winged teal, cinnamon teal, greater scaup, lesser scaup, avocet, marbled godwit, clapper rail, Virginia rail, sora rail, long-billed dowitcher, and tricolored blackbird. canada geese and white-fronted geese prefer the shoots and roots."</p>
	<p>Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL</p>	<p>No evidence</p>
	<p>Cornell University. 2016. Plants Poisonous to Livestock and other Animals. <a href="http://poisonousplants.ansci.cornell.edu/index.html">http://poisonousplants.ansci.cornell.edu/index.html</a>. [Accessed 19 Jan 2016]</p>	<p>No evidence</p>

406	Host for recognized pests and pathogens	
	Source(s)	Notes
	<p>CABI and EPPO. 2004. Data Sheets on Quarantine Pests: <i>Eotetranychus lewisi</i>. <a href="http://www.eppo.int/QUARANTINE/data_sheets/insects/EOTELE_ds.pdf">http://www.eppo.int/QUARANTINE/data_sheets/insects/EOTELE_ds.pdf</a>. [Accessed 21 Jan 2016]</p>	<p>"On most plants, <i>E. lewisi</i> feeds on the underside of the leaves, preferring the regions close to the main leaf veins but eventually the population occupies the whole of the underside of the leaf. On citrus, the eggs are laid in depressions on the surface of the fruit and the mites feed on the developing fruit and do not usually damage the leaves." [<i>Scirpus californicus</i> listed among host plants]</p>

Qsn #	Question	Answer
407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	Notes
	USDA NRCS. 2006. Plant Guide - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS National Plant Data Center & the Idaho Plant Materials Center. <a href="http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf">http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf</a> . [Accessed 19 Jan 2016]	[No evidence] "Ethnobotanic: Bulrush is similar to the cattail in edibility, although it is purportedly sweeter. Young shoots coming up in the spring can be eaten raw or cooked. Bulrush pollen is eaten as flour in bread, mush or pancakes. Later in the season, the seeds can be beaten off into baskets or pails, ground into a similar meal and used as flour. The large rhizomes are eaten raw or cooked; sometimes they were dried in the sun, then pounded into a kind of flour."
	Wagstaff, D.J. 2008. International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

408	Creates a fire hazard in natural ecosystems	
	Source(s)	Notes
	Salvia, M., Ceballos, D., Grings, F., Karszenbaum, H., & Kandus, P. (2012). Post-fire effects in wetland environments: landscape assessment of plant coverage and soil recovery in the Paraná River Delta marshes, Argentina. <i>Fire Ecology</i> , 8(2), 17-37	"During 2008, under a region-wide drought, there were a large number of simultaneous fires in the Paraná River Delta region: the most affected vegetation was in marshes dominated by <i>Schoenoplectus californicus</i> (C.A.Mey.) Soják or <i>Cyperus giganteus</i> Vahl." [May increase fire risk during drought conditions]

409	Is a shade tolerant plant at some stage of its life cycle	
	Source(s)	Notes
	Lady Bird Johnson Wildflower Center. 2016. Native Plant Database - <i>Schoenoplectus californicus</i> . <a href="http://www.wildflower.org/plants/result.php?id_plant=SCCA11">http://www.wildflower.org/plants/result.php?id_plant=SCCA11</a> . [Accessed 21 Jan 2016]	"Light Requirement: Sun "
	Floridata. 2015. <i>Schoenoplectus californicus</i> . <a href="http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120">http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120</a> . [Accessed 21 Jan 2016]	"Light: Bulrushes grow in full sun, but some can tolerate some light shade."
	Dave's Garden. 2016. California Bulrush, Giant Bulrush - <i>Schoenoplectus californicus</i> . <a href="http://davesgarden.com/guides/pf/go/60311/">http://davesgarden.com/guides/pf/go/60311/</a> . [Accessed 21 Jan 2016]	"Sun Exposure: Full Sun Sun to Partial Shade Light Shade Partial to Full Shade"

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	Notes

Qsn #	Question	Answer
	USDA NRCS & LSU AgCenter Research Extension. 2000. PLANT GUIDE: <i>Schoenoplectus californicus</i> California Bulrush. <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a> . [Accessed 21 Jan 2016]	"California bulrush is adapted to a wide range of soils from coarse sands to clays and mucks. Plant establishment and productivity appear to be superior on heavier mineral soils such as mucky clays, silty clays, silty clay loams, and fine sands. Soils with high levels of organic matter pose structural problems and have been problematic in establishing stands of California bulrush." ... "Turbidity appears to have little effect on survival or productivity of California bulrush, and no information is available on sulfide toxicity or pH ranges for California bulrush, although neither appears to be problematic."
	Lady Bird Johnson Wildflower Center. 2016. Native Plant Database - <i>Schoenoplectus californicus</i> . <a href="http://www.wildflower.org/plants/result.php?id_plant=SCCA11">http://www.wildflower.org/plants/result.php?id_plant=SCCA11</a> . [Accessed 21 Jan 2016]	"Soil Description: Standing water or wet, mucky soils."
	Theodore Payne Foundation for Wildflowers and Native Plants. 2016. California Native Plant Database - <i>Scirpus californicus</i> . <a href="http://www.theodorepayne.org/mediawiki/index.php?title=Scirpus_californicus">http://www.theodorepayne.org/mediawiki/index.php?title=Scirpus_californicus</a> . [Accessed 21 Jan 2016]	"Soil Preference: Adaptable"

411	Climbing or smothering growth habit	n
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with coarse, creeping rhizomes up to 2 cm in diameter..."

412	Forms dense thickets	y
	Source(s)	Notes
	USDA NRCS. 2008. Plant Fact Sheet - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS Louisiana Plant Materials Center. <a href="http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf">http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf</a> . [Accessed 19 Jan 2016]	"California bulrush is a native, herbaceous, rhizomatous perennial which forms dense colonies on mud flats, in open water and at shore water interface."
	Brimacombe, K. A. (2003). Research on native plants for coastal wetland restoration on O'ahu, MSc Thesis. University of Hawaii at Manoa, Honolulu	"Introduced species such as California grass ( <i>Brachiaria mutica</i> ), Indian fleabane ( <i>Pluchea indica</i> ), cattail ( <i>Typha latifolia</i> ), saltwort or pickleweed ( <i>Batis maritima</i> ), and California bulrush ( <i>Schoenoplectus californicus</i> ) are aggressive, quick-growing species that often form dense, monotypic stands that can choke out open water and cover mudflats, areas necessary for native waterbirds' existence (Chang 1990; USFWS 2001)."
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"Within its estuarine habitat <i>S. californicus</i> often forms tall, pure stands, but whether it displaces indigenous New Zealand communities is not known. However, casual observation of the Wairoa River population suggests that only adult white mangrove ( <i>Avicennia marina</i> subsp. <i>australasica</i> (Walp.) Everett) can persist amongst it, and that it is not readily invaded by other species."

501	Aquatic	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Stemmermann, L. 1981. A Guide to Pacific Wetland Plants. U.S. Army Corps of Engineers, Honolulu, HI	"Habitat: (FM, SM:O) Found in streams and lowland marshes" [Habitat Codes: FM - Freshwater Marsh; SM - Saltwater Marsh; O - Obligate Wetland Plant]
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"This large aquatic reed currently occupies extensive areas along the Wairoa and Waikato Rivers on the west coast of the northern North Island, and has also been planted in artificial wetlands. It grows vigorously and produces viable seed."

<b>502</b>	<b>Grass</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. <a href="http://www.ars-grin.gov/npgs/index.html">http://www.ars-grin.gov/npgs/index.html</a> . [Accessed 19 Jan 2016]	"Family: Cyperaceae Subfamily: Cyperoideae Tribe: Fuireneae"

<b>503</b>	<b>Nitrogen fixing woody plant</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with coarse, creeping rhizomes up to 2 cm in diameter..." [Cyperaceae]

<b>504</b>	<b>Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with coarse, creeping rhizomes up to 2 cm in diameter, clothed with dark brown scales; culms arising in a row along the rhizome"
	Gordon, D. R., Mitterdorfer, B., Pheloung, P. C., Ansari, S., Buddenhagen, C., Chimera, C., ... & Williams, P. A. 2010). Guidance for addressing the Australian Weed Risk Assessment questions. <i>Plant Protection Quarterly</i> , 25(2): 56-74	"This question addresses taxa that have specialized organs and should not include plants with just rhizomes/ stolons"

<b>601</b>	<b>Evidence of substantial reproductive failure in native habitat</b>	<b>n</b>
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. 2002. <i>Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae</i> . Oxford University Press, Oxford, UK	[No evidence. Widespread native & introduced range] "Brackish to fresh marshes, shores, often emergent in water; 0–1400 m; Ala., Ariz., Ark., Calif., Fla., Ga., Kans., La., Miss., Nev., N.Mex., N.C., Okla., S.C., Tenn., Tex.; Mexico; West Indies; Central America; South America (s to Argentina, Chile); Pacific Islands (Cook Islands, Easter Island, Hawaii); introduced, New Zealand."

<b>602</b>	<b>Produces viable seed</b>	<b>y</b>
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes dark brown, smooth, broadly obovate-elliptic, lenticular, 1.8-2 mm long, 1.2-1.4 mm wide, apiculate."
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"Seeds of New Zealand plants sampled from Port Waikato, though viable, have not been observed to germinate in the wild (P. D. Champion pers. obs.). Tur & Rossi (1976) found that germination of <i>S. californicus</i> seed on the margins of the Rio de la Plata, Argentina (c. 35°S) varied from year to year and that there was an apparently short period of viability during late summer. Germination of <i>S. californicus</i> seed in New Zealand field populations needs further investigation."
	Banack, S. A., Rondón, X. J., & Díaz-Huamanchumo, W. (2004). Indigenous cultivation and conservation of totora ( <i>Schoenoplectus californicus</i> , Cyperaceae) in Peru. <i>Economic Botany</i> , 58(1), 11-20	"Totora reproduces both by rhizomes and from seed (Heiser 1974)."

603	Hybridizes naturally	y
	<b>Source(s)</b>	<b>Notes</b>
	Flora of North America Editorial Committee. 2002. <i>Flora of North America: Volume 23: Magnoliophyta: Commelinidae (in Part): Cyperaceae</i> . Oxford University Press, Oxford, UK	" <i>Schoenoplectus californicus</i> forms sterile hybrids with <i>S. acutus</i> in California (see 1. <i>S. tabernaemontani</i> ) (S. G. Smith 1995)."
	Shiels, D. R., Hurlbut, D. L., Lichtenwald, S. K., & Monfils, A. K. (2014). Monophyly and phylogeny of <i>Schoenoplectus</i> and <i>Schoenoplectiella</i> (Cyperaceae): Evidence from chloroplast and nuclear DNA sequences. <i>Systematic Botany</i> , 39(1), 132-144	"There have been no reports of hybridization between <i>S. californicus</i> and any members of the <i>Schoenoplectus pungens</i> species complex."

604	Self-compatible or apomictic	
	<b>Source(s)</b>	<b>Notes</b>
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). <i>Sedges, uses, diversity, and systematic of the Cyperaceae</i> , Missouri Botanical Garden Press, St. Louis, MO	"Although there is a paucity of information, it is suspected that most sedges are cross-pollinated (allogamous)."
	Sweetman, A. C., Kettenring, K. M., & Mock, K. E. (2013). The pattern and structure of genetic diversity of <i>Schoenoplectus maritimus</i> : Implications for wetland revegetation. <i>Aquatic Botany</i> , 104, 47-54	[Self-incompatibility documented in genus] " <i>S. maritimus</i> ... The species is self-incompatible, and stands with few genetic individuals can have reduced fecundity due to pollen limitation (Charpentier and Stuefer, 1999; Charpentier et al., 2000)."

605	Requires specialist pollinators	n
	<b>Source(s)</b>	<b>Notes</b>

Qsn #	Question	Answer
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Inflorescences dense, anthelate, compound or partially decomposed, recurved or nodding, rays 4-10, the primary ones 2-20 cm long, each with 1-4 spikelets on ultimate rays; involucre bracts 2-3, the lowest one erect, subulate, 2-8 cm long; spikelets rusty or dark brown, ovoid-ellipsoid to cylindrical, 5-10 mm long, 2.5- 3 mm wide, acute; glumes brown or pale brown, ovate, 2.5-2.8 mm long, 1.7-2 mm wide, flecked with reddish brown resinous spots, the broad hyaline margins subentire, the midnerve prolonged into a mucro 1-2 mm long; bristles 2-4, reddish brown, plumose; stigmas 2."
	Bryson, C. T., & Carter, R. 2008. The significance of Cyperaceae as weeds. Pp. 15-101. in Naczi, R.F.C. & Ford, B.A. (eds). Sedges, uses, diversity, and systematic of the Cyperaceae, Missouri Botanical Garden Press, St. Louis, MO	"The highly reduced and inconspicuous flowers of most sedges generally go undetected until after they produce seeds, which Muenscher (1955) cited as characteristic of many weeds. Cyperaceae are almost exclusively wind-pollinated (anemophilous)."

606	Reproduction by vegetative fragmentation	y
	Source(s)	Notes
	USDA NRCS. 2008. Plant Fact Sheet - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS Louisiana Plant Materials Center. <a href="http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf">http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf</a> . [Accessed 19 Jan 2016]	"California bulrush is best established with plugs or potted plants derived from divisions of the rhizomes. Production of viable seed has proven unreliable for commercial purposes."
	USDA NRCS & LSU AgCenter Research Extension. 2000. PLANT GUIDE: <i>Schoenoplectus californicus</i> California Bulrush. <a href="http://www.nrcs.usda.gov/">http://www.nrcs.usda.gov/</a> . [Accessed 21 Jan 2016]	"California bulrush spreads primarily by vegetative propagation, producing new stems from an extensive system of underground rhizomes, or , to a limited extent, through seed dispersal."
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"In New Zealand, <i>Schoenoplectus californicus</i> appears to spread locally mainly by growth from pieces of rhizomes detached in flooding, bank collapse, etc."

607	Minimum generative time (years)	2
	Source(s)	Notes
	Theodore Payne Foundation for Wildflowers and Native Plants. 2016. California Native Plant Database - <i>Scirpus californicus</i> . <a href="http://www.theodorepayne.org/mediawiki/index.php?title=Scirpus_californicus">http://www.theodorepayne.org/mediawiki/index.php?title=Scirpus_californicus</a> . [Accessed 21 Jan 2016]	"Growth Rate: Fast"
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Perennials with coarse, creeping rhizomes up to 2 cm in diameter," {Estimated to be 1+ years}

701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y
	Source(s)	Notes

Qsn #	Question	Answer
	T.E.R.:R.A.I.N. 2016. <i>Schoenoplectus californicus</i> (California bulrush). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html</a> . [Accessed 21 Jan 2016]	"It spreads in many ways including water, wind, contaminated soil and feed, machinery, wildlife and it forms dense beds that colonise mobile sand deposits and river margins where it displaces native sedges by out-competing and suppressing their growth."
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"The limited distribution, lack of early collections, and the species' close association with former ports, strongly suggest that <i>S. californicus</i> is adventive." ... " <i>Schoenoplectus californicus</i> may well have arrived in ship ballast dumped on the banks of the Wairoa River during kauri-milling days, in the same way that Manchurian wild rice, <i>Zizania latifolia</i> (Griseb.) Stapf (Cumberland 1966), and alligator weed, <i>Alternanthera philoxeroides</i> (C.Martius) Griseb. (Champion 1990), seem to have been introduced. Spread to the Waikato may have been by a separate introduction, or the result of subsequent movement of shipping from the Dargaville area."

702	Propagules dispersed intentionally by people	y
	Source(s)	Notes
	Floridata. 2015. <i>Schoenoplectus californicus</i> . <a href="http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120">http://mobile.floridata.com/Plants/Cyperaceae/Schoenoplectus%20californicus/1120</a> . [Accessed 19 Jan 2016]	" <i>Schoenoplectus californicus</i> , the giant or California bulrush, is probably the species most likely to be found at garden nurseries in the southern U.S." [Available for sale on many commercial sites]

703	Propagules likely to disperse as a produce contaminant	
	Source(s)	Notes
	T.E.R.:R.A.I.N. 2016. <i>Schoenoplectus californicus</i> (California bulrush). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html</a> . [Accessed 21 Jan 2016]	"It is spread in many ways including water, wind, contaminated soil and feed, machinery, wildlife"
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	[Possibly in the past. Unknown at present] " <i>Schoenoplectus californicus</i> may well have arrived in ship ballast dumped on the banks of the Wairoa River during kauri-milling days, in the same way that Manchurian wild rice, <i>Zizania latifolia</i> (Griseb.)"

704	Propagules adapted to wind dispersal	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. <i>Manual of the flowering plants of Hawaii</i> . Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	"Achenes dark brown, smooth, broadly obovate-elliptic, lenticular, 1.8-2 mm long, 1.2-1.4 mm wide, apiculate."
	T.E.R.:R.A.I.N. 2016. <i>Schoenoplectus californicus</i> (California bulrush). <a href="http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html">http://www.terrain.net.nz/friends-of-te-henui-group/weeds/schoenoplectus-californicus-california-bulrush.html</a> . [Accessed 21 Jan 2016]	[Claimed to be wind-dispersed, but achenes do not possess adaptations for wind dispersal] "It spreads in many ways including water, wind, contaminated soil and feed, machinery, wildlife and it forms dense beds that colonise mobile sand deposits and river margins where it displaces native sedges by out-competing and suppressing their growth."

705	Propagules water dispersed	y
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Qsn #	Question	Answer
	<b>Source(s)</b>	<b>Notes</b>
	de Lange, P. J., Gardner, R. O., Champion, P. D., & Tanner, C. C. (1998). <i>Schoenoplectus californicus</i> (Cyperaceae) in New Zealand. <i>New Zealand Journal of Botany</i> , 36(3), 319-327	"In New Zealand, <i>Schoenoplectus californicus</i> appears to spread locally mainly by growth from pieces of rhizomes detached in flooding, bank collapse, etc."
	Banack, S. A., Rondón, X. J., & Diaz-Huamanchumo, W. (2004). Indigenous cultivation and conservation of totora ( <i>Schoenoplectus californicus</i> , Cyperaceae) in Peru. <i>Economic Botany</i> , 58(1), 11-20	"Since <i>S. californicus</i> produces seeds, natural dispersal may be by both birds and oceanic drift (Heiser 1974)."

706	Propagules bird dispersed	
	<b>Source(s)</b>	<b>Notes</b>
	Banack, S. A., Rondón, X. J., & Diaz-Huamanchumo, W. (2004). Indigenous cultivation and conservation of totora ( <i>Schoenoplectus californicus</i> , Cyperaceae) in Peru. <i>Economic Botany</i> , 58(1), 11-20	"Since <i>S. californicus</i> produces seeds, natural dispersal may be by both birds and oceanic drift (Heiser 1974)." [Possibly]
	USDA NRCS. 2008. Plant Fact Sheet - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS Louisiana Plant Materials Center. <a href="http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf">http://plants.usda.gov/factsheet/pdf/fs_scca11.pdf</a> . [Accessed 21 Jan 2016]	[Unknown if viable seeds can be internally dispersed] "The seeds, being less hairy and larger than cattail, are one of the most important and commonly used foods of ducks and of certain marshbirds and shorebirds (Martin et al. 1951)."

707	Propagules dispersed by other animals (externally)	
	<b>Source(s)</b>	<b>Notes</b>
	Williams, P. A., & Champion, P. (2008). Biological success and weediness of existing terrestrial pest plants and aquatic weeds in Northland. Landcare Research Contract Report LC0708/080, Landcare Research, Lincoln	[Unknown. Seeds might adhere to animals moving through water] "Seeding ability Viable seed is set, but seedlings have not been recorded in the field. Dispersal and establishment Rhizome fragments eroded from clumps and spread by water movement. Possibly also spread by machinery and deliberate spread as a constructed wetland plant."

708	Propagules survive passage through the gut	
	<b>Source(s)</b>	<b>Notes</b>
	USDA NRCS. 2006. Plant Guide - California Bulrush - <i>Schoenoplectus californicus</i> . USDA NRCS National Plant Data Center & the Idaho Plant Materials Center. <a href="http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf">http://plants.usda.gov/plantguide/pdf/cs_scca11.pdf</a> . [Accessed 21 Jan 2016]	[Unknown if some seeds are able to survive ingestion] "The seeds, being less hairy and larger than cattail, are one of the most important and commonly used foods of ducks and of certain marshbirds and shorebirds (Martin et al. 1951)."

801	Prolific seed production (>1000/m2)	
	<b>Source(s)</b>	<b>Notes</b>
	Williams, P. A., & Champion, P. (2008). Biological success and weediness of existing terrestrial pest plants and aquatic weeds in Northland. Landcare Research Contract Report LC0708/080, Landcare Research, Lincoln	[Unknown] "Seeding ability Viable seed is set, but seedlings have not been recorded in the field."



Qsn #	Question	Answer
802	Evidence that a persistent propagule bank is formed (>1 yr)	
	Source(s)	Notes
	Royal Botanic Gardens Kew. (2016) Seed Information Database (SID). Version 7.1. <a href="http://data.kew.org/sid/">http://data.kew.org/sid/</a> . [Accessed 21 Jan 2016]	"Storage Behaviour: Orthodox Storage Conditions: 78 % viability following drying to mc's in equilibrium with 15 % RH and freezing for 19 days at -20C at RBG Kew, WP"

803	Well controlled by herbicides	y
	Source(s)	Notes
	Gonzalez, R., Medrano, C., Gutierrez, W., Esparza, D., Anez, D., Montiel, M., & Orono, J. (1997). Evaluation of different control methods of enea ( <i>Typha</i> sp) and junco ( <i>Scirpus californicus</i> ) in pasture of German grass ( <i>Echinochloa polystachia</i> ) in the zone of influence of Limon River. <i>Revista Cientifica</i> , 7(1), 23-30	"In order to evaluate the effect of differents methods for the control of Enea ( <i>Typha</i> sp) and Junco ( <i>Scirpus californicus</i> ) weeds in pasture of German grass ( <i>Echinochloa polystachia</i> ) , two assay were made by considering the abundance of both species, and separated in the same pasture with high infestation." ... "The experimental design was of twelve treatments into the aleatory plots (absolute witness; referencial witness; cut of machete; 2,4-0 Ester; Picloram; Weedone CB (2,4-D plus 2,4-DP); Glifosato; granulated Atrazin; granulated Atrazin plus 2,4-0 Ester; granulated Atrazin plus Picloram; granulated Atrazin plus 2,4-D plus 2,4-0P, and granulated Atrazin plus Glisofato) with seven repetitions." ... "In the assay 2 (Junco control) the analysis showed differences (P<0.01) for the WC variable, resulting the best control granulated Atrazin plus Weedone CB. For the IG variable, the 100% overcome in all of the treatments in relation to the witness, standing out granulated Atrazin, Weedone CB and the mechanic control."

804	Tolerates, or benefits from, mutilation, cultivation, or fire	
	Source(s)	Notes
	USDA Natural Resources Conservation Service. 2016. Conservation Plant Characteristics - <i>Schoenoplectus californicus</i> . <a href="http://plants.usda.gov/java/charProfile?symbol=SCCA11">http://plants.usda.gov/java/charProfile?symbol=SCCA11</a> . [Accessed 21 Jan 2016]	"Resprout Ability: No" ... "Fire Tolerance: High"

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	Notes
	Wagner, W.L., Herbst, D.R.& Sohmer, S.H. 1999. Manual of the flowering plants of Hawaii. Revised edition. University of Hawai'i Press and Bishop Museum Press, Honolulu, HI.	[Unknown] "in Hawai'i naturalized or possibly indigenous, 0-1,220 m, on all of the main islands except Kaho'olawe. First collected on Moloka'i in 1912 (Forbes 409.Mo, BISH)."

**Summary of Risk Traits:**

High Risk / Undesirable Traits

- Elevation range exceeds 1000 m, demonstrating environmental versatility
- Able to grow in tropical climates
- Naturalized (or possibly native) in the Hawaiian Islands, and New Zealand
- Regarded as an environmental weed
- Other *Schoenoplectus* species are invasive
- Possibly allelopathic
- Tolerates many soil types
- Forms dense thickets in native & introduced ranges
- Reproduces by seeds & vegetatively by rhizomes
- Seeds & vegetative fragments dispersed by water
- In addition to water, seeds may be dispersed by wind, contaminated soil & feed, machinery, & wildlife

Low Risk Traits

- Where native, an important component of wetland habitat
- Unarmed (no spines, thorns or burrs)
- Seed production may be limited & may limit dispersal potential
- Non-toxic & palatable to animals & humans
- Herbicides may provide effective control