Taxon: Flindersia brayleyana F. Muell. **Family:** Rutaceae

Common Name(s): Australian maple
maple silkwood
Queensland maple
red beech
silkwood

Synonym(s): Flindersia brayleana F. Muell.
Flindersia chatawaiana F.M.Bailey

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 28 Apr 2022

WRA Score: 2.0 **Designation:** EVALUATE **Rating:** Evaluate

Keywords: Tropical Tree, Naturalized, Weedy, 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)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)		
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)	y
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed		
305	Congeneric weed	n=0, y = 1*multiplier (see Appendix 2)	n
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic	y=1, n=0	n
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals		
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	y
407	Causes allergies or is otherwise toxic to humans		

Qsn #	Question	Answer Option	Answer
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
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	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		
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	>3
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant	y=1, n=-1	n
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut	y=1, n=-1	n
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)	y=1, n=-1	n
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire	y=1, n=-1	n
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**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	[No evidence] "Queensland maple is restricted in its distribution to northern Queensland where it ranges between Townsville in the south and the Windsor Tableland in the north."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	No evidence

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2022). 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**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"It is endemic to northeast Queensland, Australia. The distribution is in the warm humid, hot humid and the warm sub humid, winter-dry climatic zones. A common species distributed in lowland and highland rainforest."

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	

203	**Broad climate suitability (environmental versatility)**	
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIRO Publishing, Collingwood, Australia	"Climate: Altitudinal range: near sea level to 1200 m; hottest/coldest month: 29–32°C/10–17°C; Frost incidence: low (except upland sites); Rainfall: 1100–3800 mm per year, summer max."

Qsn #	Question	Answer
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Possibly. Restricted to tropical climates, but elevation range exceeds 1000 m] " - Altitude range: 0 - 1200 m - Mean annual rainfall: 1100 - 3800 mm - Rainfall regime: summer - Dry season duration: 1 - 3 months - Mean annual temperature: 14 - 29ºC - Mean maximum temperature of hottest month: 29 - 32ºC - Mean minimum temperature of coldest month: 10 - 17ºC - Absolute minimum temperature: -3 - 6ºC"

204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"It is endemic to northeast Queensland, Australia. The distribution is in the warm humid, hot humid and the warm sub humid, winter-dry climatic zones. A common species distributed in lowland and highland rainforest."

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Asia [China]; Taiwan planted; [India]; Karnataka planted; [Malaysia]; Peninsular Malaysia planted; Sri Lanka planted; Thailand planted; North America; [USA] Hawaii; planted; South America; Paraguay planted; Peru planted; Oceania; [Australia] Queensland natural and planted; Fiji planted; Samoa planted"

Qsn #	Question	Answer
301	**Naturalized beyond native range**	**y**
	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.	"in Hawaii introduced by the Division of Forestry t all of the main island, but most extensive stands planted in Waiakea Forest Reserve, Hawaii, where it is now naturalized. First planted on Oahu in 1935 (Little & Skolmen. 1989)."
	Starr, F., Starr, K. & Loope, L.L. (2004). New plant records from the Hawaiian Archipelago. Bishop Museum Occasional Papers 79: 20-30	[Maui] "F. breyleyana is now also known to be naturalized on East Maui, where it is escaping from forestry plantings into adjacent open wet forest along the Häna Hwy This collection represents a range extension to East Maui. Material examined: MAUI: East Maui, Kühiwa Forest Reserve, Häna Hwy, spreading for forestry plantings into native uluhe (Dicranopteris linearis) dominated areas, 925 ft [28 m], 13 Sep 2002, Starr & Starr 020913-5."
	Oppenheimer, H. L. (2003). New plant records from Maui and Hawai'i Counties. Bishop Museum Occasional Papers. 73: 3-30	[Maui] "On West Maui, one of these plantings is producing viable seed, and the species is reproducing extensively within the planted area. The winged, wind dispersed seeds are also slowly spreading into adjacent, disturbed sites. It is also reproducing and spreading in the Makapipi Rd area of Nähiku, in Häna District on East Maui. Material examined: MAUI: West Maui, Wailuku Dist, Waihe'e, Känoa Ridge, 427 m, 10 Dec 2000, Oppenheimer H120008."

302	**Garden/amenity/disturbance weed**	**y**
	Source(s)	**Notes**
	Tanimoto, V.M. & Char, W.P. (1992). Alien Plant Control or State Lands Including Natural Areas. Pp 536-550 in Stone, C.P. et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawaii: Management & Research. University of Hawaii CPSU, Honolulu, HI	[A potential environmental weed] "Table 3. Immediate and potential alien plant threats to Pahole Natural Area Reserve." "Incipient Group:" [List includes Flindersia brayleyana (silkwood). Insufficient evidence to classify as an environmental weed, but this reference provides justification that Flindersia be designated as a weed]
	Lott, R., Sexton, G., & Novak, M. (2005). Seed and seedling supply for farm forestry projects in the tropics and subtropics of eastern Australia. Pp. 24-48 In P.D. Erskine et al. (eds) Reforestation in the tropics & subtropics of Australia using rainforest tree species. RIRDC, Canberra	[Garden/amenity/disturbance weed? Yes. Displays weedy attributes, but insufficient evidence to classify as an environmental weed]] "In southeast Queensland, some Landcare groups are now wary of planting Flindersia brayleyana (Queensland maple) adjacent to riparian areas, because of its prolific seed production and ease of germination, from which seedlings could potentially invade remnant vegetation."

303	**Agricultural/forestry/horticultural weed**	**n**
	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**	
	Source(s)	**Notes**
	Woodcock, D. (2003). To restore the watersheds: Early twentieth-century tree planting in Hawai 'i. Annals of the Association of American Geographers, 93(3), 624-635	[Potentially] "Appendix 1: Alien Woody Plants Considered among the Greatest Threats to Native Hawaiian Biota, Together with Dates of First Plantings by Territorial Forestry" [List includes Flindersia brayleyana]

Qsn #	Question	Answer
	Lott, R., Sexton, G., & Novak, M. (2005). Seed and seedling supply for farm forestry projects in the tropics and subtropics of eastern Australia. Pp. 24-48 In P.D. Erskine et al. (eds) Reforestation in the tropics & subtropics of Australia using rainforest tree species. RIRDC, Canberra	[Potentially] "In southeast Queensland, some Landcare groups are now wary of planting Flindersia brayleyana (Queensland maple) adjacent to riparian areas, because of its prolific seed production and ease of germination, from which seedlings could potentially invade remnant vegetation."
	Tanimoto, V.M. & Char, W.P. (1992). Alien Plant Control on State Lands Including Natural Areas. Pp 536-550 in Stone, C.P. et al. (eds.). Alien Plant Invasions in Native Ecosystems of Hawaii: Management & Research. University of Hawaii CPSU, Honolulu, HI	[Potentially] "Table 3. Immediate and potential alien plant threats to Pahole Natural Area Reserve." "Incipient Group:" [List includes Flindersia brayleyana (silkwood). Insufficient evidence to classify as an environmental weed]
	Smith, C.W. (1985). Impact of Alien Plants on Hawaii's Native Biota. Pp. 180-250 in Stone & Scott (eds.). Hawaii's terrestrial ecosystems: preservation & management. CPSU, Honolulu, HI	[Potentially] "The following species now found in Hawai'I need to be monitored because their behavior elsewhere suggests that they could become serious pests." [List includes Flindersia bravleyana]
	Harrington, R. A., & Ewel, J. J. (1997). Invasibility of tree plantations by native and non-indigenous plant species in Hawaii. Forest Ecology and Management, 99(1-2), 153-162	[Potentially] "The greatest understory plant density was observed in Flindersia plantations. However, the density of non-indigenous plants was almost four times that of native plants, and the understory was dominated by regeneration of Flindersia itself." [Stands of Flindersia may facilitate invasion by other non-native plants and prevent native species recruitment]

305	Congeneric weed	n
	Source(s)	**Notes**
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Flindersia australis listed as Naturalized

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] "Trees up to 35 m tall. Leaves pinnately compound, usually opposite, leaflets 6-12 pairs, ovate-elliptic, asymmetrical, 13-20 cm long, 5-7.5 cm wide, glabrous, glandular punctate, margins weakly revolute, apex attenuate, base cuneate to rounded. "

402	Allelopathic	n
	Source(s)	**Notes**
	Bauhus, J., & Schmerbeck, J. (2010). Silvicultural options to enhance and use forest plantation biodiversity. Pp 96-139 in Bauhus et al. (eds.). Ecosystem Goods and Services from Plantation Forests. Earthscan, London, Washington, DC	[No evidence] "Plantations may harbour a surprisingly high proportion of native plant biodiversity. For example, Keenan et al (1997) found over 300 plant species beneath tropical timber plantations of the exotic Pinus caribaea and the natives Araucaria cunninghamii, Flindersia brayleyana and Toona ciliata in Northern Queensland."
	Harrington, R. A., & Ewel, J. J. (1997). Invasibility of tree plantations by native and non-indigenous plant species in Hawaii. Forest Ecology and Management, 99(1-2), 153-162	[No evidence] "The greatest understory plant density was observed in Flindersia plantations. However, the density of non-indigenous plants was almost four times that of native plants, and the understory was dominated by regeneration of Flindersia itself."

403	Parasitic	n

Qsn #	Question	Answer
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"F. brayleana is a medium to tall tree 35-45 m in height.." [Rutaceae]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	McLeod, M. N. (1973). The digestibility and the nitrogen, phosphorus and ash contents of the leaves of some Australian trees and shrubs. Australian Journal of Experimental Agriculture, 13 (62), 245-250	[Unknown for F. brayleyana] "Australian native trees and shrubs provide a valuable source of browse fodder particularly during periods of drought." [Related species, Flindersia maculosa, listed as palatable]
	McDonald, W. J. F., & Ternouth, J. H. (1979). Laboratory analyses of the nutritional value of western Queensland browse feeds. Australian Journal of Experimental Agriculture, 19(98), 344-349	[Unknown for F. brayleyana] "Other reputedly valuable browse species that were relatively digestible included Acacia farnesiana (mimosa bush), A. salicina (doolan), Apophyllum anomalum (broom bush), Canthium olefolium (myrtle tree), Capparis lasiantha, C. loranthifolia and C. mitchellii (the wild orangelnative pomegranate group), Ehretia membranifolia (peach bush), Flindersia maculosa (leopard-wood) and Santalum lanceolatum (plumwood)."

405	Toxic to animals	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	No evidence
	McKenzie, R. (2020). Australia's Poisonous Plants, Fungi and Cyanobacteria: A Guide to Species of Medical and Veterinary Importance. CSIRO Publishing, Clayton South, VIC	No evidence
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	y
	Source(s)	**Notes**
	Kliejunas, J. T. (1979). Effects of Phytophthora cinnamomi on some endemic and exotic plant species in Hawaii in relation to soil type. Plant Disease Reporter 63(7): 602-606	"Most of the exotic species (9 Eucalyptus spp., and Toona australis) were moderately tolerant or moderately susceptible but A. melanoxylon was highly tolerant while Flindersia brayleyana and 2 Eucalyptus spp. were highly susceptible."
	Ko, W. H., Hunter, J. E., & Kunimoto, R. K. (1973). Rhizoctonia disease of Queensland maple seedlings. Plant Disease Reporter 57(11): 907-909	"R. solani was isolated from diseased seedlings of Flindersia brayleyana in nursery beds in Hawaii, where it caused wilting and brown lesions on stems near the soil line. Mixing 100 dry seeds with 1.3 g PCNB (pentachloronitrobenzene) was the simplest effective control treatment. Susceptibility in F. brayleyana was inversely correlated with the age of seedlings. R. solani was also pathogenic to Casuarina equisetifolia, Eucalyptus deglupta, E. grandis, Pinus elliottii, P. pinaster, P. radiata and Toona ciliata var. australis grown ir the same nursery."

Qsn #	Question	Answer
407	**Causes allergies or is otherwise toxic to humans**	
	Source(s)	**Notes**
	Zich F.A., Hyland B.P.M., Whiffin T., Kerrigan R.A. (2020) Flindersia brayleyana. Australian Tropical Rainforest Plants, Edition 8. https://apps.lucidcentral.org/rainforest/. [Accessed 27 Apr 2022]	[Possibly to susceptible individuals working with wood] "The timber of this species can cause dermatitis" [Unlikely, unless milling or working with wood]
	Wagstaff, D.J. (2008). International poisonous plants checklist: an evidence-based reference. CRC Press, Boca Raton, FL	No evidence of toxicity

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIR(Publishing, Collingwood, Australia	"Queensland maple grows in a variety of rainforest types and is associated with a large number of rainforest tree species." [No evidence. Unlikely, given rainforest habitat]
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence] "A common species distributed in lowland and highland rainforest." [Unlikely, given rainforest habitat]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Little Jr., E.L. & Skolmen, R.G. (1989). Common forest trees of Hawaii: (native and introduced). USDA Agriculture Handbook No. 679. USDA Forest Service, Washington, D.C.	"Extremely tolerant of shade as seedlings, the trees can seed in on the forest floor and grow up through very heavy overstory shade."
	Thompson, W. A., Stocker, G. C., & Kriedemann, P. E. (1988). Growth and photosynthetic response to light and nutrients of Flindersia brayleyana F. Muell., a rainforest tree with broad tolerance to sun and shade. Functional Plant Biology, 15(2), 299-315.	[Is a shade tolerant plant at some stage of its life cycle? Yes] "Flindersia brayleyana was chosen as a test species because foliage on seedling trees can tolerate deep shade and yet retain a latent capacity to utilise strong sun following advent of medium or wide disturbance gaps."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**
	Paten Park Native Nursery. (2022). Flindersia brayleyana “Queensland Maple”. https://ppnn.org.au/plantlist/flindersia-brayleyana/. [Accessed 27 Apr 2022]	"Soil Adaptable"
	Boland, D.J. , Brooker, M.I.H., Chippendale, G.M., Hall, N., Hyland, B.P.M., Johnston, R.D., Kleinig, D.A., McDonald, M.W. & Turner, J.D. (2006). Forest Trees of Australia. CSIR(Publishing, Collingwood, Australia	"Soils vary from skeletal to deep loams on metamorphics, granite and basalt but the tree reaches its best development on basalt and granite."
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Soils vary from skeletal to deep loams, but this species reaches its best development on basalt and granite. It has become scarce on fertile, red volcanic soils. It needs well drained soils and plenty of water during establishment."

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"F. brayleana is a medium to tall tree 35-45 m in height and to 2.5 m in diameter with a spreading crown."

412	Forms dense thickets	
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[No evidence from native range] "A common species distributed in lowland and highland rainforest."
	Starr, F. & Starr, K. (2011). Plants of Hawaii: Flindersia brayleyana (Queensland maple). http://www.starrenvironmental.com. [Accessed 27 Apr 2022]	[Potentially] "Flindersia brayleyana (Queensland maple) Thicket of saplings at Waihee Ridge Trail, Maui. July 22, 2011" [Thicket of saplings coming up under adult trees. Other reports suggest Flindersia will not exclude other vegetation]

501	Aquatic	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"A common species distributed in lowland and highland rainforest." [Terrestrial]

502	Grass	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"F. brayleana is a medium to tall tree 35-45 m in height and to 2.5 m in diameter with a spreading crown. " [Rutaceae]
	USDA, Agricultural Research Service, National Plant Germplasm System. (2022). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 27 Apr 2022]	Genus: Flindersia Family: Rutaceae Subfamily: Flindersioideae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	Rutaceae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	n
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	[Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers) No] "F. brayleana is a medium to tall tree 35-45 m in height and to 2.5 m in diameter with a spreading crown. The trunk is not buttressed and usually well formed; outer bark grey, flaky, with shallow longitudinal fissures, inner bark reddish or pinkish."

Qsn #	Question	Answer
601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	No evidence

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Bonner, F.T. & Karrfalt, R.P. (eds.). (2008). The Woody Plan Seed Manual. USDA FS Agriculture Handbook 727. Government Printing Office, Washington, D.C.	"In Hawaii, good germination was obtained without any pregermination treatment (Wick 1974). In a test in Queensland, germination rates were 70% in 7 days and 90% in 20 days (Swain 1928)."
	Oppenheimer, H. L. (2003). New plant records from Maui and Hawai'i Counties. Bishop Museum Occasional Papers. 73: 3-30	"On West Maui, one of these plantings is producing viable seed, and the species is reproducing extensively within the planted area. The winged, wind dispersed seeds are also slowly spreading into adjacent, disturbed sites."

603	**Hybridizes naturally**	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown. No evidence found

604	**Self-compatible or apomictic**	
	Source(s)	**Notes**
	Bawa, K. S., & Hadley, M. (Eds.). (1991). Reproductive Ecology of Tropical Forest Plants. UNESCO, Paris, France	[Unknown] "…a hermaphroditic, canopy tree 30-50 m tall, occurring in rain forests around the Cairns region." … "Anthers mature before the stigma (protandrous)." [Protandry may prevent self-pollination]

Qsn #	Question	Answer
605	**Requires specialist pollinators**	**n**
	Source(s)	**Notes**
	Bawa, K. S., & Hadley, M. (Eds.). (1991). Reproductive Ecology of Tropical Forest Plants. UNESCO, Paris, France	"A vast number of insects, mostly 2-12 mm long, visit the flowers, with beetles and flies dominating. Lepidopterans, wasps and bees are less prominent."
	Williams, G., & Adam, P. (1994). A review of rainforest pollination and plant-pollinator interactions with particular reference to Australian subtropical rainforests. Australian Zoologist, 29(3-4), 177-212.	"General unspecialized entomophilous pollination has been recorded in a diverse range of plant taxa from a wide range of Australian rainforest types. These include Eucryphia lucida and E. milliganii in Tasmanian cool temperate rainforest (Ettershank and Ettershank 1990), and Flindersia brayleyana, Alphitonia petriei (Irvine and Armstrong 1988, 1990), Diospyros pentamera, Litsea leefana and Neolitsea dealbata (House 1985, 1989, 1992, 1993) in Queensland tropical rainforest."
	Kanowski, J., Catterall, C. P., Dennis, A. J., & Westcott, D. A (2004). Animal-plant interactions in rainforest conservation and restoration. Cooperative Research Centre for Tropical Rainforest Ecology & Management. Rainforest CRC, Cairns	"Table 1: Australian rainforest plants reported to have insects as pollinators." [Flindersia brayleyana - Reported pollinators = beetles, flies, other]

606	**Reproduction by vegetative fragmentation**	**n**
	Source(s)	**Notes**
	CAB International. (2005). Forestry Compendium. CAB International, Wallingford, UK	"Stand establishment using natural regeneration; planting stock" [No evidence. Spreads by wind-dispersed seed]

607	**Minimum generative time (years)**	**>3**
	Source(s)	**Notes**
	Bonner, F.T. & Karrfalt, R.P. (eds.). (2008). The Woody Plan Seed Manual. USDA FS Agriculture Handbook 727. Government Printing Office, Washington, D.C.	[8+] "A tree usually starts bearing seeds at 8 years of age and produces an abundant crop annually (Wick 1974)."

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**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.	"Seeds 4.5-6 cm long (including membranous wings)" [Adapted for wind dispersal, relatively large, and lack means of external attachment]

Qsn #	Question	Answer
702	**Propagules dispersed intentionally by people**	**y**
	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.	"in Hawai'i introduced by the Divison of Forestry to all of the main islands, but most extensive stands planted in Waiakea Forest Reserve, Hawai'i, where it is now naturalized. First planted on O'ahu in 1935 (Little & Skolmen, 1989)."
	Neal, M.C. (1965). In Gardens of Hawaii. Bishop Museum Press, Honolulu, HI	"The silkwood, a large tree from Queensland, affords much shade. It is also good for reforestation and for its valuable lumber."

703	**Propagules likely to disperse as a produce contaminant**	**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.	"Seeds 4.5-6 cm long (including membranous wings)" [No evidence, and unlikely given relatively large seed size]

704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Staples, G.W., Herbst, D.R & Imada, C.T. 2000. Survey of invasive or potentially invasive cultivated plants in Hawai'i. Bishop Museum Occasional Papers 65: 1-35	"...several Meliaceae, silk oak (Grevillea robusta), and Queensland maple (Flindersia brayleyana), to name just a few, have lately been discovered to be widely naturalized and spreading from forestry reserves into neighboring habitats. Their wind-blown seeds, carried by prevailing trade winds, are the evident means for their spread."
	Doust, S. J., Erskine, P. D., & Lamb, D. (2008). Restoring rainforest species by direct seeding: tree seedling establishment and growth performance on degraded land in the wet tropics of Australia. Forest Ecology and Management, 256(5), 1178-1188.	"Large wind dispersed seeds such as those of F. brayleyana and D. darlingiana also appeared to be more prone to seed damage during the sowing process than fleshy or hard coated species and more limited by moisture availability for germination due to their already dehydrated state."
	Little Jr., E.L. & Skolmen, R.G. (1989). Common forest trees of Hawaii: (native and introduced). USDA Agriculture Handbook No. 679. USDA Forest Service, Washington, D.C.	"Seeds several, flat and winged, 2 inches by 3⁄8 inch (5 cm by 1 cm), light brown, with thin body surrounded by membranous wing."
	Oppenheimer, H. L. (2003). New plant records from Maui and Hawai'i Counties. Bishop Museum Occasional Papers. 73: 3-30	"The winged, wind dispersed seeds are also slowly spreading into adjacent, disturbed sites."

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	Lott, R., Sexton, G., & Novak, M. (2005). Seed and seedling supply for farm forestry projects in the tropics and subtropics of eastern Australia. Pp. 24-48 In P.D. Erskine et al. (eds) Reforestation in the tropics & subtropics of Australia using rainforest tree species. RIRDC, Canberra	[Possibly] "In southeast Queensland, some Landcare groups are now wary of planting Flindersia brayleyana (Queensland maple) adjacent to riparian areas, because of its prolific seed production and ease of germination, from which seedlings could potentially invade remnant vegetation." [Adapted for wind dispersal, but may possibly be moved by water along riparian corridors]

706	**Propagules bird dispersed**	**n**

Qsn #	Question	Answer
	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.	"Seeds 4.5-6 cm long (including membranous wings)" [Not fleshy-fruited, and adapted for wind dispersal]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Little Jr., E.L. & Skolmen, R.G. (1989). Common forest trees of Hawaii: (native and introduced). USDA Agriculture Handbook No. 679. USDA Forest Service, Washington, D.C.	"Fruits (seed capsules) few, clustered, hanging on long stalks, cylindrical, about 21⁄2 inches (6 cm) long, 1 inch (2.5 cm) in diameter, dark brown, becoming slightly five-angled, five-celled, and splitting from apex into five parts. Seeds several, flat and winged, 2 inches by 3⁄8 inch (5 cm by 1 cm), light brown, with thin body surrounded by membranous wing." [No evidence, and fruits and seeds lack means of external attachment]

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Little Jr., E.L. & Skolmen, R.G. (1989). Common forest trees of Hawaii: (native and introduced). USDA Agriculture Handbook No. 679. USDA Forest Service, Washington, D.C.	"Fruits (seed capsules) few, clustered, hanging on long stalks, cylindrical, about 21⁄2 inches (6 cm) long, 1 inch (2.5 cm) in diameter, dark brown, becoming slightly five-angled, five-celled, and splitting from apex into five parts. Seeds several, flat and winged, 2 inches by 3⁄8 inch (5 cm by 1 cm), light brown, with thin body surrounded by membranous wing." [Unlikely to be ingested, and if consumed, would probably be by seed predators rather than dispersers]

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	Bonner, F.T. & Karrfalt, R.P. (eds.). (2008). The Woody Plan Seed Manual. USDA FS Agriculture Handbook 727. Government Printing Office, Washington, D.C.	[Unknown] "In Hawaii, there are between 9,800 and 11,700 seeds/kg (4,400 to 5,300 seeds/lb), or an average of about 10,500 seeds/kg (4,800 seeds/lb) (Wick 1974). In Queensland, Swain (1928) reported a range of 6,600 to 11,000 seeds/kg (3,000 to 5,000 seeds/lb)."
	Bawa, K. S., & Hadley, M. (Eds.). (1991). Reproductive Ecology of Tropical Forest Plants. UNESCO, Paris, France	[Unknown] "The species is mass flowering with numerous terminal panicles of bright white flowers 5-7 mm wide, each with a bright orange central disc surrounding the ovary. En masse flowers are conspicuous."

802	Evidence that a persistent propagule bank is formed (>1 yr)	n
	Source(s)	**Notes**
	Bonner, F.T. & Karrfalt, R.P. (eds.). (2008). The Woody Plan Seed Manual. USDA FS Agriculture Handbook 727. Government Printing Office, Washington, D.C.	"The seeds do not store well and lose their viability within a year. Because seeds are easily damaged, they must be handled gently. The seeds are also very sensitive to chemicals used in storage or fumigation (Wick 1974)."

Qsn #	Question	Answer
	Sanderson, K. D. (1998). Effect of storage conditions on viability of wind-dispersed seeds of some cabinet timber species from Australian tropical rainforests. Australian Forestry, 61(2), 76-81	"This study was undertaken to determine if the longevity of the seeds could be improved by manipulation of storage temperature and moisture conditions. The species tested were Flindersia bourjotiana (F.Muell.), F. brayleyana (F.Muell.),.." ... "Seeds stored under air-conditioning lost germinability rapidly." ... "All the Flindersia species were stored at moisture contents below 10 percent and maintained a relatively high germination rate over time. They appear to belong to the "sub-orthodox" seed type which can be stored for long periods at sub freezing temperatures (Bonner· 1990). Doran et al. (1987) had simular results for F. brayleyana seeds stored over eight years under frozen (-I5°C) and cold room conditions (5°C)."

803	Well controlled by herbicides	
	Source(s)	**Notes**
	WRA Specialist. (2022). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	Tolerates, or benefits from, mutilation, cultivation, or fire	n
	Source(s)	**Notes**
	Walters, G.A. (1972). Coppicing to convert small cull trees to growing stock. Research Note PSW-272. USDA Forest Service, Berkeley, CA	"The potential of converting cull trees of five of the replacement species into growing stock trees by coppicing was evaluated, Australian toon and tropical ash showed the greatest potential for conversion; hoop-pine and Moreton-Bay-chestnut, in termed iate potential; and Queensland-maple, least potential" ... "Queensland-maple shows the poorest sprouting capability. After 2 months, sprouts had developed on only 55 percent of the stumps, and they averaged three sprouts. After 6 months, the percent of the stumps with sprouts dropped to 20 percent. I found no visible cause of the sprout mortality. Little natural pruning occurred on the stumps with sprouts, so all but the dominant sprouts were removed. Of the stumps pruned, resprouting occurred on 66 percent. After they were repruned, no further resprouting occurred. By 2 years, the percent of stumps with sprouts decreased to 15 percent (table 1). Sprouts averaged 7 feet tall. Vigor and form were good for all sprouts. The sprouts are growing well, but they average less than one-third the height of undamaged trees. Undamaged trees averaged 22 feet tall after four growing seasons. The sprouts have not yet become an integral part of the stand."

805	Effective natural enemies present locally (e.g. introduced biocontrol agents)	
	Source(s)	**Notes**
	Kliejunas, J. T. (1979). Effects of Phytophthora cinnamomi on some endemic and exotic plant species in Hawaii in relation to soil type. Plant Disease Reporter 63(7): 602-606	[Unknown] "Most of the exotic species (9 Eucalyptus spp., and Toona australis) were moderately tolerant or moderately susceptible but A. melanoxylon was highly tolerant while Flindersia brayleyana and 2 Eucalyptus spp. were highly susceptible." [Does not appear to be preventing recruitment of species in Hawaiian Islands]

Summary of Risk Traits:

High Risk / Undesirable Traits
• Thrives in tropical climates
• Elevation range exceeds 1000 m
• Naturalized on Maui and Hawaii (Hawaiian Islands)
• Displays weedy characteristics in Hawaii and Australia
• Potential environmental weed
• Host of Rhizoctonia disease and Phytophthora cinnamomi
• Shade tolerant
• Tolerates a wide range of soil types
• Reproduces and spreads by wind-dispersed seeds

Low Risk Traits
• Valued for landscaping and timber, and impacts, if any, reported from non-native plantation settings
• Unarmed (no spines, thorns, or burrs)
• Non-toxic
• Will not spread vegetatively and does not tolerate cutting
• Reaches maturity in 8+ years
• Will not form a persistent seed bank

Second Screening Results for Trees/tree-like shrubs

(A) Shade tolerant or known to form dense stands? Yes. Shade-tolerant. May form thickets in plantations (based on photo-evidence)
(B) Bird- Or clearly wind- dispersed?> Yes. Seeds Wind-dispersed.
(C) Life cycle <4 years? No. Reported to reach maturity in 8+ years
Outcome = Evaluate further