Taxon: Eucalyptus largiflorens F. Muell. **Family:** Myrtaceae

Common Name(s): black box
flooded box
flooded gum
river box

Synonym(s): Eucalyptus bicolor A. Cunn. ex T. Mitch.
Eucalyptus parviflora F.Muell.
Eucalyptus pendula Page ex Steud.

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 1 Feb 2021

WRA Score: 4.0 **Designation:** EVALUATE **Rating:** Evaluate

Keywords: Temperate Tree, Lignotuber, Water-Dispersed, Wind-Dispersed, Coppices

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	n
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	?
301	Naturalized beyond native range		
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		
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		

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	n
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	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	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	>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	y=1, n=-1	y
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)	y=1, n=-1	y
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	y
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 of domestication] "Black box occurs mainly in flat country in the vicinity of watercourses of the MurrayÐDarling system of New South Wales. In southern Queensland it has a scattered distribution, south-west of Miles, north of Goondiwindi, east and south of St George and a few sites to the west as far as Currawunya, south-west of Cunnamulla. It occurs along the flood plains of watercourses of northern and north-western Victoria west from Nathalia and north of Edenhope, and south-west into South Australia, from the southern Strzelecki Desert and along or near the Murray River as far south as Clayton near Lake Alexandrina. There are some scattered occurrences on heavy soil flood plains of the Gawler River north-west of Adelaide and an outlier occurs at Etadunna Station west of Lake Eyre."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. (2021). 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**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 28 Jan 2021]	"Native Australasia AUSTRALIA: Australia [New South Wales, Queensland (e.), South Australia (e.), Victoria (w.)]"

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 27 Jan 2021]	

203	**Broad climate suitability (environmental versatility)**	**n**

Qsn #	Question	Answer
	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 300 m; Hottest/coldest months: 29-35°C/3-5°C; Frost incidence: low to moderate (up to about 15 or more each year in colder areas); Rainfall: 200-570 mm per year, winter max., uniform, summer max."
	Plants for a Future. (2021). Eucalyptus largiflorens. https://pfaf.org/user/Plant.aspx?LatinName=Eucalyptus+largiflorens. [Accessed 29 Jan 2021]	"USDA hardiness 9-11"

204	Native or naturalized in regions with tropical or subtropical climates	n
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Climate: Altitudinal range: near sea level to 300 m; Hottest/coldest months: 29-35°C/3-5°C; Frost incidence: low to moderate (up to about 15 or more each year in colder areas); Rainfall: 200-570 mm per year, winter max., uniform, summer max."
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence

205	Does the species have a history of repeated introductions outside its natural range?	?
	Source(s)	**Notes**
	Useful Temperate Plants. (2021). Eucalyptus bicolor. Temperate Plants Database, Ken Fern. http://temperate.theferns.info. [Accessed 1 Feb 2021]	"Range: Australia - South Australia, Victoria, New South Wales, Queensland" [Limited evidence of introduction outside native range]
	Ritter, M. (2014). Field Guide to the Cultivated Eucalypts (Myrtaceae) and How to Identify Them. Annals of the Missouri Botanical Garden, 99(4), 642-687	[Recorded from California] "Voucher:U.S.A.California,1912,F.Walters.n.(UC-170420)."
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	A total of 124 planted in the Hawaiian Islands: 24 planted on Molokai in 1958 and 100 planted on Hawaii Island in 1957-58

301	Naturalized beyond native range	
	Source(s)	**Notes**
	Imada, C. (2019). Hawaiian Naturalized Vascular Plants Checklist (February 2019 update). Bishop Museum Technical Report 69. Bishop Museum, Honolulu, HI	No evidence
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	Two reports of naturalization documented. Neither were verified in subsequent searches of the cited references.

Qsn #	Question	Answer
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
	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	[Eucalyptus globulus] "The tree invades neighbouring plant communities from initial plantings. By building dense bushes and forests, it displaces native plant species and their associated wildlife with extremely species-poor stands of blue gum. The trees produce a thick litter layer consisting of leaves, bark strips and branch lees, preventing germination and establishment of understorey plants. This is aided by allelochemicals released from leaves (Bossard et ai., 2000). Litter of blue gum is highly flammable and the trees accumulate large amounts of litter, increasing fire hazards. Drifting burning material is common in eucalyptus stands, thus the potential to ignite spot fires is very high"
	Randall, R.P. (2017). A Global Compendium of Weeds. 3rd Edition. Perth, Western Australia. R.P. Randall	A large number of species are cited as naturalized and/or weeds

401	Produces spines, thorns or burrs	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] "Black box is a small to medium-sized tree, usually within the range 10-20 m in height and up to 1 m dbh. The trunk is often of poor form and one-quarter to less than half the tree height, and the crown is open, wide spreading and of irregular shape."

402	Allelopathic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Coppen, J.J.W. (2002). Eucalyptus: The Genus Eucalyptus. Taylor and Francis, London	[Unknown. Members of genus may possess allelopathic chemicals] "Trees of the genus Eucalyptus are frequently surrounded by a grassfree zone and this has led to a search for possible allelochemicals in Eucalyptus species. The results to date indicate that eucalypts may well be a practical, commercial source of such chemicals in the future. In its simplest form this might entail use of the powdered leaves as a natural herbicide. Alternatively, and with a greater understanding of their mode of action, the allelochemicals themselves or suitable derivatives could be used as selective herbicides."

403	Parasitic	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	"Black box is a small to medium-sized tree, usually within the range 10-20 m in height and up to 1 m dbh. The trunk is often of poor form and one-quarter to less than half the tree height, and the crown is open, wide spreading and of irregular shape." [Myrtaceae. No evidence]

404	Unpalatable to grazing animals	
	Source(s)	**Notes**
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"Uses Fodder: No."

405	Toxic to animals	n
	Source(s)	**Notes**
	Useful Temperate Plants. (2021). Eucalyptus bicolor. Temperate Plants Database, Ken Fern. http://temperate.theferns.info. [Accessed 1 Feb 2021]	"Known Hazards None known"
	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

406	Host for recognized pests and pathogens	
	Source(s)	**Notes**
	CABI. (2021). Eucalyptus largiflorens. In: Invasive Species Compendium. Wallingford, UK: CAB International. www.cabi.org/isc	"Major host of: Thaumastocoris peregrinus (bronze bug) Host of (source - data mining): Uraba lugens (eucalypt leaf skeletonizer)"

Qsn #	Question	Answer
	Stone, C., & Bacon, P. E. (1995). Influence of insect herbivory on the decline of black box (Eucalyptus largiflorens). Australian Journal of Botany, 43(6), 555-564	"The contribution of insect herbivory to the canopy decline of Eucalyptus largiflorens F.Muell. (black box) was assessed on nine irrigated properties around Deniliquin in southern central New South Wales. Fully expanded leaves less than 1 year old were sampled from 36 mature trees in June 1993 and again in June 1994 after half the trees had been treated with a systemic insecticide in November 1993. Insect herbivory in treated trees fell significantly from 27 to 9%. It also fell, but to a lesser extent (28-19%, $P < 0.05$), in the untreated trees. The fall in insect herbivory in control trees corresponded to a decrease in rainfall in 1994 when the rainfall was 50% of that for 1993. There was a significant linear relationship between insect herbivory and trunk diameter increment in the untreated trees. There was no consistent relationship between insect herbivory and the visual assessment of crown condition. Although E. largiflorens is described as having both narrow adult and juvenile foliage, adjacent trees in this study differed significantly in their leaf length:breadth ratios. Canopies with a dominance of broader foliage had significantly higher levels of herbivory. Individual trees tended to replace foliage with leaves of similar morphology. It is suggested that this variation in leaf shape may be genetic rather than environmental. If so, landholders could select for trees with narrower foliage which may result in reduced impact of insect herbivory."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Useful Temperate Plants. (2021). Eucalyptus bicolor. Temperate Plants Database, Ken Fern. http://temperate.theferns.info. [Accessed 1 Feb 2021]	"Known Hazards None known"
	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	
	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	[Possibly. May increase fire risk in arid regions when growing in high densities] "On other flat, poorly drained areas usually with heavy soils, black box may occur in almost pure open stands, particularly in the southern arid and semi-arid areas of New South Wales. It may also occur with coolibah (E. coolabah), which becomes more dominant towards the north of the State."

Qsn #	Question	Answer
409	**Is a shade tolerant plant at some stage of its life cycle**	**n**
	Source(s)	**Notes**
	Plants for a Future. (2021). Eucalyptus largiflorens. https://pfaf.org/user/Plant.aspx?LatinName=Eucalyptus+largiflorens. [Accessed 1 Feb 2021]	"It cannot grow in the shade." ... "Prefers a sunny position in a moderately fertile well-drained moisture retentive circum-neutral soil"

Qsn #	Question	Answer
410	**Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)**	**y**
	Source(s)	**Notes**
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"Most common soils are grey clay loams, occasionally dark grey, self-mulching clays and, less commonly, fine red-brown sands. Drainage is often poor."
	Plant Selector + (2021). Eucalyptus largiflorens. http://plantselector.botanicgardens.sa.gov.au/Plants/Details/712. [Accessed 1 Feb 2021]	"Soil Texture Clay, Loam pH Acidic, Alkaline, Neutral Tolerates Lime, Heavy frost, Soil salinity"

Qsn #	Question	Answer
411	**Climbing or smothering growth habit**	**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	"Black box is a small to medium-sized tree, usually within the range 10-20 m in height and up to 1 m dbh. The trunk is often of poor form and one-quarter to less than half the tree height, and the crown is open, wide spreading and of irregular shape."

Qsn #	Question	Answer
412	**Forms dense thickets**	**y**
	Source(s)	**Notes**
	PlantNET. (2021). New South Wales Flora Online - Eucalyptus largiflorens F.Muell. National Herbarium of NSW, Royal Botanic Garden, Sydney. http://plantnet.rbgsyd.nsw.gov.au. [Accessed 1 Feb 2021]	"Distribution and occurrence: Local community dominant, in grassy woodland on heavy black clay soils in seasonally flooded areas; west from Mungindi and Condobolin."
	Victorian Resources Online. (2021). Black Box - Eucalyptus largiflorens. http://vro.agriculture.vic.gov.au. [Accessed 1 Feb 2021]	"Occurring in monospecific stands or in association with River Red-gum."
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"On flat, poorly drained areas it can occur in almost pure open stands, elsewhere it occurs in woodland or open woodland formations mixed with other eucalypts and acacias."

Qsn #	Question	Answer
501	**Aquatic**	**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	[Terrestrial] "Black box is typically a species of low-lying areas, e.g. broad river flats, depressions in otherwise treeless plains and silted lake beds and, in general, on any ground subject to occasional flooding, to just above the edges of flood plains."

Qsn #	Question	Answer
502	**Grass**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 27 Jan 2021]	Subgenus: Symphyomyrtus Section: Adnataria Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

503	Nitrogen fixing woody plant	n
	Source(s)	**Notes**
	USDA, Agricultural Research Service, National Plant Germplasm System. (2021). Germplasm Resources Information Network (GRIN-Taxonomy). National Germplasm Resources Laboratory, Beltsville, Maryland. https://npgsweb.ars-grin.gov/. [Accessed 27 Jan 2021]	Subgenus: Symphyomyrtus Section: Adnataria Family: Myrtaceae Subfamily: Myrtoideae Tribe: Eucalypteae

504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	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	"Black box is a small to medium-sized tree, usually within the range 10-20 m in height and up to 1 m dbh. The trunk is often of poor form and one-quarter to less than half the tree height, and the crown is open, wide spreading and of irregular shape."

601	Evidence of substantial reproductive failure in native habitat	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] "Black box occurs mainly in flat country in the vicinity of watercourses of the Murray-Darling system of New South Wales. In southern Queensland it has a scattered distribution, south-west of Miles, north of Goondiwindi, east and south of St George and a few sites to the west as far as Currawunya, south-west of Cunnamulla. It occurs along the flood plains of watercourses of northern and north-western Victoria west from Nathalia and north of Edenhope, and south-west into South Australia, from the southern Strzelecki Desert and along or near the Murray River as far south as Clayton near Lake Alexandrina. There are some scattered occurrences on heavy soil flood plains of the Gawler River north-west of Adelaide and an outlier occurs at Etadunna Station west of Lake Eyre."

602	Produces viable seed	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"The germination requirements of E. largiflorens seeds are similar to those of E. camaldulensis. Rainfall events may trigger germination, however rainfall may not be adequate to support subsequent seedling establishment (Trelour 1959, cited by Rogers in prep.). Large scale flood events appear to be required to provide the soil moisture necessary for widespread germination and establishment of E. largiflorens (Trelour 1959, cited by Rogers in prep.). Prior to river regulation these large flood events occurred mainly in spring, on the lower and mid-River Murray floodplain, providing seedlings with moist conditions going into summer (Rogers in prep.). Germination is not limited to spring-summer and has been observed between May–October in the northern parts of the Basin (Roberts and Marston 2000). Light is required for germination of E. largiflorens seed (Grose and Zimmer 1957, cited in Rogers in prep.). Eucalyptus largiflorens seeds can germinate underwater. However, it is not clear how long E. largiflorens germinants can survive while submerged (Jensen 2008)."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"Hybrids with E. gracilis observed."
	Koerber, G. R., Anderson, P. A., & Seekamp, J. V. (2013). Morphology, physiology and AFLP markers validate that green box is a hybrid of Eucalyptus largiflorens and E. gracilis (Myrtaceae). Australian Systematic Botany, 26(2), 156-166	"Prolonged drought and salinity on the Chowilla floodplain of the Murray River have caused deterioration of E. largiflorens F.Muell.Aputative hybrid with E. gracilis F.Muell, green box, withstands the saline conditions. We aimed to substantiate that green box is a hybrid and to test for agreement between morphological and physiological characters with amplified fragment length polymorphisms (AFLP). Mature stands were measured for leaf, trunk, floral, cotyledon, carbon and nitrogen isotope discrimination, specific leaf area (SLA) and AFLP. Green box was placed between E. largiflorens and E. gracilis according to categorical principal components analysis (CATPCA) of 21 morphological and physiological characters and character states. The hybrid index of 11AFLPmarkers that were78%species specific separated E. gracilis and E. largiflorens, and the majority of green box plants displayed indices ranging from 0.42 to 0.53, reflecting mostly additive inheritance. Calculation of the hybrid index with all 232 AFLP markers, using maximum likelihood, similarly placed green box between E. gracilis and E. largiflorens. Our morphological, physiological and AFLP-marker observations substantiated that green box is a hybrid between E. largiflorens and E. gracilis."

604	Self-compatible or apomictic	
	Source(s)	**Notes**

Qsn #	Question	Answer
	Potts, B. M., & Gore, P. L. (1995). Reproductive biology and controlled pollination of Eucalyptus-a review. School of Plant Science, University of Tasmania, Hobart, Tasmania	[Unknown for E. largiflorens] "Eucalypts are generally preferentially outcrossing (Pryor 1976; Griffin et al1987), with high outcrossing rates (e.g. 0.69- 0.84 Moran and Bell 1983; Prober et al. 1990) maintained by varying degrees of self-fertility (Pryor 1976), aided by protandry (Griffin and Hand 1979; Fig. 3.2) and reinforced by selection against the products of self-fertilization in later stages of the life cycle (Potts et at. 1987; Hardner and Potts 1995). Self fertility Most species exhibit a marked reduction in seed yield following self-pollination compared to outcrossing, although within species there is considerable variation in the level of self-fertility (Pryor 1957; Pryor 1976; Table 4.2). In most of the species examined to date, the majority of individuals are partially self-fertile, but individuals range from fully self incompatible to fully self-fertile. Post-mating barriers to self-fertilization are thus rarely complete, and (Eldridge 1976) notes that "persistent attempts at artificial self-pollination have been successful to some degree on almost every tree tested".

605	Requires specialist pollinators	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	[Unspecialized] "Inflorescences: Axillary or terminal panicles, unit inflorescences 7 to 11-flowered; peduncles more or less terete to slightly angular, 0.3-1.1 cm long; pedicels usually angular, 0.1-0.5 cm long, occasionally absent; buds ovoid, 0.3-0.5 × 0.2-0.3 cm, usually with faint ribs from the pedicels continuing along the hypanthia; opercula hemispherical-apiculate or conical."

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"Moderate growth rate. Coppices and root-suckers."

607	Minimum generative time (years)	>3
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	[Unknown, but presumably >4 years] "As for other tree species, maturation time will vary substantially according to growth rate. Under favourable growing conditions, most eucalypts begin to produce seed when aged between 20–40 years (Akeroyd et al. 1998). However, no known studies have established the time necessary for reproductive maturation in E. largiflorens (George 2004)."

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

Qsn #	Question	Answer
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal). Amenochory typically disperses eucalypt seed within a distance of approximately 1–2 times tree height (Jensen et al. 2008a). Hydrochory may lead to the concentration of E. largiflorens seed in flood strandlines. While E. largiflorens seeds float, the buoyancy period in this species is relatively short with seeds beginning to sink after approximately 4 hours (Jensen 2008)." [Small size could facilitate attachment on vehicles, other equipment or footwear, but no direct evidence of this occurring has been found]

702	Propagules dispersed intentionally by people	y
	Source(s)	**Notes**
	Ritter, M. (2014). Field Guide to the Cultivated Eucalypts (Myrtaceae) and How to Identify Them. Annals of the Missouri Botanical Garden, 99(4), 642-687	[Recorded from California] "Voucher:U.S.A.California,1912,F.Walters.n.(UC-170420)."
	Skolmen, R.G. 1980. Plantings on the forest reserves of Hawaii: 1910–1960. Institute of Pacific Islands Forestry, Pacific Southwest Forest & Range Experiment Station, US Forest Service, Honolulu, HI	A total of 124 planted in the Hawaiian Islands: 24 planted on Molokai in 1958 and 100 planted on Hawaii Island in 1957-58
	WRA Specialist. (2021). Personal Communication	Seeds sold online

703	Propagules likely to disperse as a produce contaminant	n
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	An infrequently cultivated tree outside native range. No evidence of seed contamination in produce or other silvicultural or horticultural crops or products

704	Propagules adapted to wind dispersal	y
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal). Amenochory typically disperses eucalypt seed within a distance of approximately 1–2 times tree height (Jensen et al. 2008a). Hydrochory may lead to the concentration of E. largiflorens seed in flood strandlines. While E. largiflorens seeds float, the buoyancy period in this species is relatively short with seeds beginning to sink after approximately 4 hours (Jensen 2008). It is not known how long E. largiflorens seeds remain viable under water. Seedlings largely occur after flooding, however, it is not known if flooding triggers seed release."

705	Propagules water dispersed	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal). Amenochory typically disperses eucalypt seed within a distance of approximately 1–2 times tree height (Jensen et al. 2008a). Hydrochory may lead to the concentration of E. largiflorens seed in flood strandlines. While E. largiflorens seeds float, the buoyancy period in this species is relatively short with seeds beginning to sink after approximately 4 hours (Jensen 2008). It is not known how long E. largiflorens seeds remain viable under water. Seedlings largely occur after flooding, however, it is not known if flooding triggers seed release."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal). Amenochory typically disperses eucalypt seed within a distance of approximately 1–2 times tree height (Jensen et al. 2008a). Hydrochory may lead to the concentration of E. largiflorens seed in flood strandlines. While E. largiflorens seeds float, the buoyancy period in this species is relatively short with seeds beginning to sink after approximately 4 hours (Jensen 2008)."

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal)."

708	Propagules survive passage through the gut	n
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	[No evidence of consumption or internal dispersal] "Seed dispersal in E. largiflorens is likely to occur via a combination of amenochory (wind dispersal) and hydrochory (water dispersal)."

Qsn #	Question	Answer
801	**Prolific seed production (>1000/m2)**	**y**
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	[Potentially depending on tree health] "There is little information available on the effects of flooding regime on E. largiflorens seed dispersal. However, tree condition has been reported to have a considerable effect on both the volume of seed released, and the timing of seed release (Jensen et al. 2008a). For example, stressed trees (n = 3) at Banrock Station on the lower River Murray floodplain produced a light continuous seed fall, with maximal output of 5–60 seeds/m2 per month only. A healthy tree at this site released up to 2 356 seeds/m2 per month, with a distinct peak in seed release occurring during October–March (Jensen et al. 2008)."

802	**Evidence that a persistent propagule bank is formed (>1 yr)**	**n**
	Source(s)	**Notes**
	Johns, C . et al. (2009). Environmental Watering for Tree Species in The Living Murray Icon Sites. Murray–Darling Basin Authority, Canberra ACT	"Black box exhibits serotiny, with seeds stored in the tree canopy for 12–24 months before they are released (Jensen 2009). Seeds of this species appear to be transient, with few viable seeds found in the soil seed bank (Jensen 2009)."
	Moxham, C., Duncan, M., & Moloney, P. (2018). Tree health and regeneration response of Black Box (Eucalyptus largiflorens) to recent flooding. Ecological Management & Restoration, 19(1), 58-65	"Indeed, as Black Box does not have a soil seed bank (George 2004), environmental conditions after seed fall are crucial for germination, survival and subsequent long-term sustainability of populations."

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	**y**
	Source(s)	**Notes**
	Marcar, N. 1995. Trees for Saltland: A Guide to Selecting Native Species for Australia. CSIRO Publishing, Melbourne	"Moderate growth rate. Coppices and root-suckers."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. (2021). Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
Unverified reports of naturalization (but no evidence in the Hawaiian Islands)
Other Eucalyptus species are invasive.
Tolerates many soil types
Forms pure stands in native range
Reproduces by wind and water-dispersed seeds.
Able to produce root suckers
Coppices and resprouts after cutting

Low Risk Traits
No reports of invasiveness, but limited evidence of introduction outside native range
Cultivated in full sun (dense shade may limit ability to spread)
Unarmed (no spines, thorns, or burrs)

Second Screening Results for Tree/tree-like shrubs

(A) Shade tolerant or known to form dense stands?> Yes. Forms pure stands in native range
(B) Bird or clearly wind-dispersed?> Yes. Dispersed by wind, and water
(C) Life cycle <4 years? No. Presumably reaches maturity after 4+ years
Outcome = Evaluate further