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A checklist of the vascular plant flora of Bukit Brown and Lau Sua, and suggestions for improving reporting practices in Biodiversity Impact Assessments

Ying Wei **Jong**

ArborCulture Pte. Ltd., 4 Lorong 7 Toa Payoh, Singapore 310004, Republic of Singapore; Email: yingwei.jong@alumni.duke.edu

Abstract. A checklist of the vascular plant flora of Bukit Brown and Lau Sua was compiled based on herbarium records, previous publications, and opportunistic walks conducted between 2019–2022. In total, the checklist consists of 233 vascular plant species from 77 families, of which 76 species are nationally threatened. Despite being classified as mainly of the 'abandoned plantation' and 'abandoned kampung' sub-types of exotic-dominated secondary vegetation based on the species composition of the dominant canopy trees, the forest understorey at some parcels consisted of species typically found in native-dominated old secondary forest. This provides an example of how forests undergoing succession might exhibit different species compositions between the canopy and the understorey. Therefore, I suggest that in such cases, the understorey showing native-dominated regeneration should be indicated in habitat maps in reports from flora baseline surveys conducted as part of Biodiversity Impact Assessments to better reflect the floristic and conservation value of the forest. I also recommend that forest patches with native-dominated understories in spite of exotic-dominated habitat categorisation based on dominant canopy tree species should be assigned higher importance and more negative impact scores. Multiple patches of secondary forests have already given way for urban developments. Publishing checklists of flora and fauna of existing secondary vegetation will provide easy access of such information to the general public to better facilitate conversations on biodiversity conservation value versus development.

Key words. Bukit Brown, secondary forest, floristic checklist, conservation

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INTRODUCTION

The Greater Bukit Brown complex occupies nearly 400 acres of land and consists of Bukit Brown, Seh Ong, Kopi Sua and Lau Sua cemeteries (All Things Bukit Brown, 2013a; Lim, 2017) (Fig. 1). Bukit Brown cemetery was established in 1922 when the colonial government bought parts of then-private Seh Ong Cemetery to provide public burial grounds for the Chinese community (Remember Singapore, 2011; All Things Bukit Brown, 2013b; Huang, 2014). After Bukit Brown cemetery ceased burial operations by 1973 (Huang, 2014), the forest there has since regenerated and various sightings of plants and animals have been documented (Chong et al., 2010; Nature Society of Singapore, 2012; Tan et al., 2014; Lim, 2014). Lau Sua cemetery was opened in 1892 and previously managed by the Hokkien Huay Kwan, but it is now generally known as part of Bukit Brown cemetery (All Things Bukit Brown, 2012). However, while Lau Sua was previously classified as young secondary forest (see Yee et al., 2011), it is unclear if its floristic diversity and vegetation had been documented as part of Bukit Brown.

Given their close proximity to the Central Catchment Nature Reserve, a floristic checklist of Bukit Brown and Lau Sua is important. Such secondary forests are crucial for the dispersal of native forest species from nature reserves to other isolated forest fragments, in addition to being a refuge for wildlife. With many patches of secondary forests slated for future development, it is important to study and understand their ecological values. This paper is written with three goals: (1) to provide a floristic checklist of Bukit Brown and Lau Sua to complement other existing biodiversity information reported about Bukit Brown; (2) to propose how habitat classification and developmental impact assessment should also consider native-dominated understories and not just canopy trees; and (3) to encourage more information on biodiversity and cultural values of similar secondary forest patches to be made available to the public to facilitate discussions on such forests designated for development.

MATERIAL & METHODS

This study compiles the most comprehensive floristic checklist to-date for the Bukit Brown and Lau Sua areas within the Greater Bukit Brown complex, based on available literature and my site surveys. Bukit Brown is separated from the MacRitchie area of the Central Catchment Nature Reserve (CCNR) by Lornie Road and fragmented internally by Lornie Highway (Land Transport Authority, 2019). Despite its separation from the CCNR by Lornie Road, a forest regeneration study by Lim (2014) showed that forests at Bukit Brown had accumulated more species in 43 years than similar secondary forest plots in Bukit Timah Nature Reserve had in 56 years (Chua et al., 2013), suggesting more successful forest recovery at Bukit Brown despite the physical barrier (Lim, 2014). Lau Sua is located south of Bukit Brown and bounded by Kheam Hock Road, the Pan-Island Expressway and partially by Jalan Mashhor (Fig. 1).

The checklist was compiled based on records from the Herbarium, Singapore Botanic Gardens (SING), a pteridophyte checklist from Tan et al. (2014), a Bukit Brown study plot from Lim (2014), and my surveys. I conducted opportunistic walking surveys to document vascular plant species along the trails of Bukit Brown and Lau Sua between October 2019 and February 2022. The type of trails surveyed ranged from concrete roads to gravel paths to less travelled minor trails in the forest interior. Species that could not be identified on site were photographed with field notes for further identification. The statuses of plant species are based on the checklist by Lindsay et al. (2022), as well as Chong et al. (2009) for cultivated-only exotic (i.e., non-native) species.

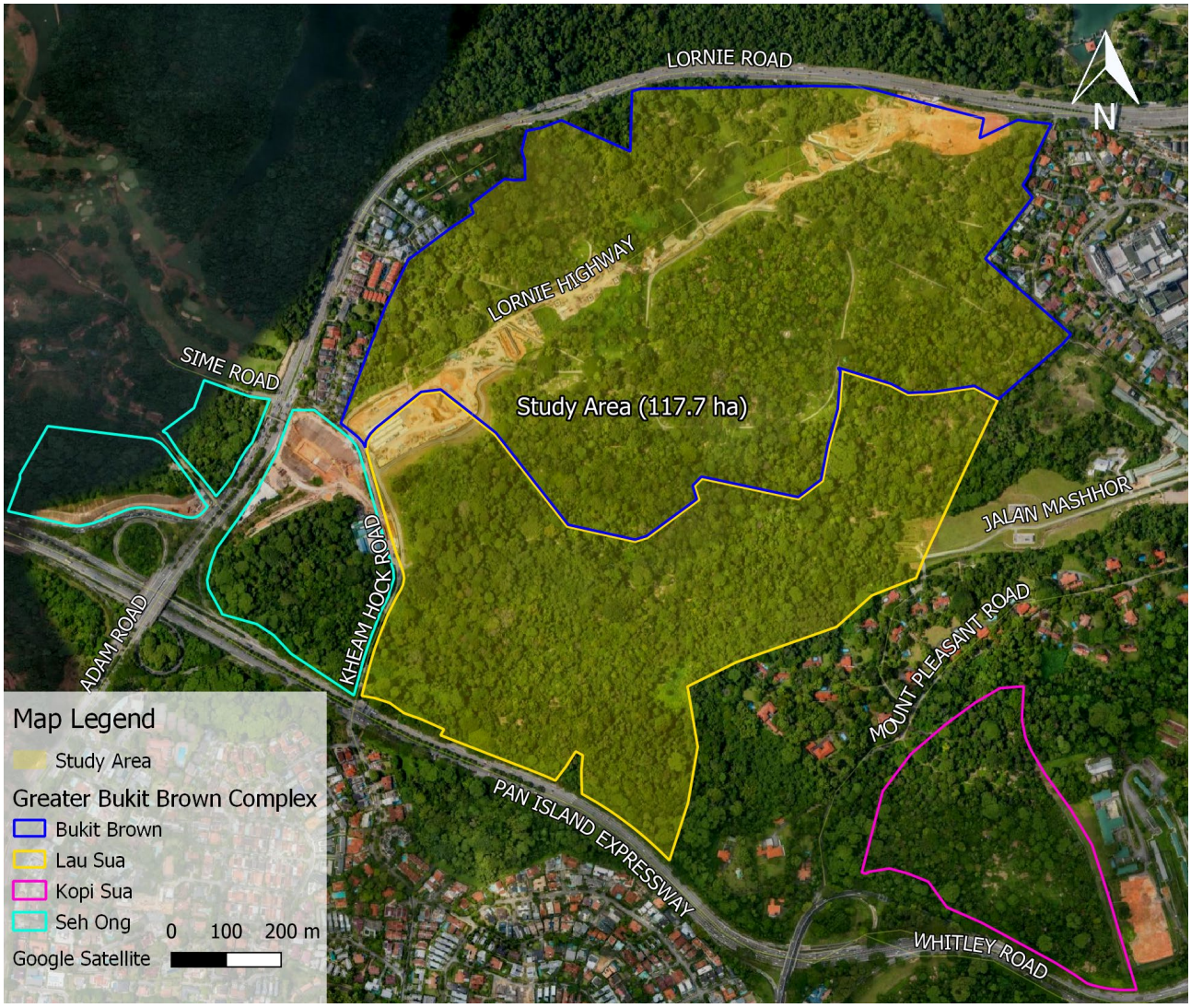

Fig. 1. An overview of the Greater Bukit Brown complex and the study area comprising of Bukit Brown and Lau Sua (Google, 2021).

RESULTS & DISCUSSION

In total, 233 species from 77 families were recorded based on herbarium records, past publications and surveys. Out of the 233 recorded species, 158 species (67.8%) are native, of which 76 species are nationally threatened (Vulnerable, Endangered, Critically Endangered) and one species is Data Deficient (Table 1). Some Critically Endangered (CR) species such as *Peltophorum pterocarpum* (DC.) Backer ex K.Heyne, *Baccaurea motleyana* (Müll.Arg.) Müll.Arg. and *Syzygium myrtifolium* Walp. are likely relics from cultivation. Photographs of some of the CR species are provided in Fig. 2. A non-native species, *Pachira glabra* Pasq., was not recorded in Chong et al. (2009) and seedlings were observed in my study in the vicinity of a fertile tree and hence assessed to be Casual; specimens have been deposited in SING.

Table 1. Numbers of Native, Non-native and Cryptogenic species recorded at Bukit Brown and Lau Sua.

Origin	National Status	Number of Species	Percentage of Species
Native		**158**	**67.8%**
	Data Deficient	1	0.4%
	Least Concern	81	34.8%
	Vulnerable	41	17.6%
	Endangered	17	7.3%
	Critically Endangered	18	7.7%
Non-native		**64**	**27.5%**
	Cultivated only	11	4.7%
	Casual	25	10.7%
	Excluded (Cultivated Only)	1	0.4%
	Naturalized	27	11.6%
Cryptogenic		**11**	**4.7%**
Total Number of Species		**233**	**100%**

Limitations. While some surveys were carried out in minor trails in the forest interior, habitats along roads, paths, and trails are often more disturbed, and the floristic composition of such edge habitats is expected to be different from the less-disturbed forest interior. Therefore, this list might not be fully reflective of the vascular plant community within Bukit Brown and Lau Sua. More native species are expected to be found if the forest interior is thoroughly surveyed.

Suggested enhancements to current Biodiversity Impact Assessment practices. The vegetated areas within Bukit Brown and Lau Sua are rather heterogeneous, but generally best described as the 'Abandoned Kampung' and 'Abandoned Plantation' sub-types of exotic-dominated secondary vegetation owing to the dominance of rubber trees (*Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg.) and fruit trees such as durian and rambutan (Yee et al., 2016). Following current guidelines for Biodiversity Impact Assessments (BIAs), the surveyors are required to assign habitats based on dominant canopy tree species. However, at some 'Abandoned Kampung' and 'Abandoned Plantation' areas of Bukit Brown and Lau Sua, species in the understorey are typically found only in native-dominated young or old secondary forest, such as *Hancea penangensis* (Müll.Arg.) S.E.C. Sierra, Kulju & Welzen, *Aporosa benthamiana* Hook. f., *Elaeocarpus stipularis* Blume and *Xylopia magna* Maing. ex Hook. f. & Thomson. Forest patches at Bukit Brown and Lau Sua can likely form species-rich, mid- to late-successional secondary forests faster than some other forest patches of the same vegetation type. In such patches, if we follow current BIA guidelines and only assign habitats solely based on the trees dominant in the canopy, it does not reflect the potential future state of the forest and will potentially underestimate floristic and conservation values. Without being alerted by information on the state of the understorey, a developer may risk perceiving an 'Abandoned Plantation' forest to be of lower conservation value since it is not regarded as a sensitive habitat type. The developer may not be aware that by developing this land, they not only cause biodiversity loss directly, but also loss of the potential to form native-dominated secondary forests in near future.

I suggest BIA guidelines to be modified to recommend that both the dominant habitat type and the understorey habitat type of secondary forests should be recorded when a forest is observed to exhibit native-dominated regeneration. In a habitat map, these areas can be presented by overlaying a hatched pattern over a habitat polygon (see Fig. 3 for example). When assessing impact significance, given the same habitat type (e.g., 'Abandoned Plantation'), forests with native-dominated understories should be given higher importance and more negative magnitude of impact scores.

Fig. 2. Some critically endangered plants observed at Bukit Brown and Lau Sua. A, *Ailanthus integrifolia* Lam.; B, *Anodendron candolleanum* Wight, C, *Discospermum malaccense* Hook.f.; D, *Hancea penangensis* (Müll.Arg.) S.E.C.Sierra, Kulju & Welzen; E, *Microcos tomentosa* Sm.; F, *Memecylon paniculatum* Jack; G, *Piper baccatum* Blume; H, *Prunus arborea* (Blume) Kalkman; I, *Salacia korthalsiana* Miq.; J, *Trigonachras acuta* (Hiern) Radlk.; K, *Xylopia magna* Maing. ex Hook.f. & Thomson (Photographs by: Jong Ying Wei).

Fig. 3. An example of how a contrasting understorey could be highlighted in a habitat map if it was found to be of different habitat type than that of trees forming the canopy.

Conservation values of secondary forests in the vicinity of nature reserves. Studies have shown that compared to manicured cultivated greenery, remnant natural vegetation is more important in supporting the diversity of wildlife such as birds and butterflies (Chong et al., 2014). Preserving and restoring natural vegetation in urban landscapes is important to mitigate biodiversity decline in urban areas (Hahs et al., 2009; Barth et al., 2015; Prendergast et al., 2022). The proximity of Bukit Brown and Lau Sua to the CCNR and the presence of many threatened native species in the understorey indicates that this site is an important destination site in the dispersal of native species from the nature reserves and thus has a pivotal role in preserving native plant genetic diversity as part of the conservation of Singapore's natural heritage. If such forests are to be cleared for development, the consequences for biodiversity are two-fold, the first being the impact of direct biodiversity loss from habitat removal, and the second being that the conservation potential of the site over and above its current habitat value will also be also lost (Tan et al., 2016). In essence, by clearing forests in the vicinity of nature reserves, we forego the current and future biodiversity value, as well as the biophysical environment and socio-cultural values of such forests (Tan et al., 2016). Despite the ecological value of secondary forests, surveyors tend to have very little information available while conducting desktop research to prepare anticipated flora and fauna checklists for inception reports in impact assessments. Furthermore, they are often given a short time window to conduct studies, resulting in incomplete capture of the full diversity and values of the site. This situation could be improved if more studies are conducted and published for forests being designated for development prior to development, so that the public and relevant stakeholders can make more informed decisions to allow proactive biodiversity-sensitive urban development, planning and design.

CONCLUSIONS

Bukit Brown and Lau Sua possess high floristic value owing to the presence of many nationally threatened native species (76 out of the 233 recorded species) in the understorey. Forests undergoing succession may exhibit different species composition between the canopy and the understorey layers. I suggest that understories with native-dominated regeneration should be recorded as part of BIA habitat reporting and factored in impact scoring when evaluating the conservation value of a site. Secondary forests in the vicinity of nature reserves should be conserved as much as possible because they facilitate the dispersal of native flora and fauna and have a high potential to regenerate into later successional

secondary forest. More biodiversity surveys should be conducted and published for similar secondary forest patches in Singapore to facilitate more biophilic urban planning.

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APPENDIX

Checklist of vascular plant species recorded at Bukit Brown and Lau Sua. "SING" refers to past collections at the Singapore Botanic Gardens Herbarium (SING); "This study" refers to opportunistic walks conducted by myself between December 2019 to February 2022. The national status follows Lindsay et al. (2022) and Chong et al. (2009) except for *Pachira glabra* which is a new record and a new status (indicated by +) is proposed.

S/N	Species	Origin	National Status	Record			This Study
				SING	Tan et al. (2014)	Lim (2014)	
	ACANTHACEAE						
1.	*Asystasia gangetica* (L.) T.Anderson subsp. *micrantha* (Nees) Ensermu	Non-native	Naturalized				✓
2.	*Ruellia repens* L.	Uncertain	Cryptogenic				✓
3.	*Strobilanthes reptans* (G.Forst.) Moylan ex Y.F.Deng & J.R.I.Wood	Non-native	Naturalized				✓
4.	*Thunbergia fragrans* Roxb.	Non-native	Naturalized				✓
5.	*Thunbergia laurifolia* Lindl.	Non-native	Casual				✓
	AMARANTHACEAE						
6.	*Cyathula prostrata* (L.) Blume	Native	Least Concern				✓
	ANACARDIACEAE						
7.	*Campnosperma auriculatum* (Blume) Hook.f.	Native	Least Concern				✓
8.	*Mangifera indica* L.	Non-native	Casual				✓
	ANNONACEAE						
9.	*Annona muricata* L.	Non-native	Cultivated only				✓
10.	*Artabotrys suaveolens* (Blume) Blume	Native	Least Concern	✓			✓
11.	*Cananga odorata* (Lam.) Hook.f. & Thomson var. *odorata*	Uncertain	Cryptogenic				✓
12.	*Friesodielsia latifolia* (Hook.f. & Thoms.) Steenis	Native	Least Concern				✓
13.	*Phaeanthus intermedius* (P.Parm.) I.M.Turner & Veldkamp	Native	Vulnerable	✓			
14.	*Polyalthia cauliflora* Hook.f. & Thomson	Native	Vulnerable	✓			
15.	*Xylopia magna* Maingay ex Hook.f. & Thomson	Native	Critically Endangered				✓
16.	*Xylopia malayana* Hook.f. & Thomson	Native	Vulnerable			✓	✓
	APOCYNACEAE						
17.	*Allamanda cathartica* L.	Non-native	Naturalized				✓
18.	*Alstonia angustiloba* Miq.	Native	Least Concern			✓	✓
19.	*Anodendron candolleanum* Wight	Native	Critically Endangered				✓
20.	*Dyera costulata* (Miq.) Hook.f.	Native	Vulnerable				✓
21.	*Plumeria obtusa* L.	Non-native	Cultivated only				✓

S/N	Species	Origin	National Status	Record			This Study
				SING	Tan et al. (2014)	Lim (2014)	
22.	*Strophanthus caudatus* (L.) Kurz	Native	Endangered				✓
	AQUIFOLIACEAE						
23.	*Ilex cymosa* Blume	Native	Least Concern				✓
	ARACEAE						
24.	*Alocasia macrorrhizos* (L.) G.Don	Non-native	Naturalized				✓
25.	*Anadendrum montanum* (Blume) Schott	Native	Vulnerable	✓			
26.	*Dieffenbachia seguine* (Jacq.) Schott	Non-native	Casual				✓
27.	*Epipremnum aureum* (Linden ex André) G.S.Bunting	Non-native	Casual				✓
28.	*Epipremnum giganteum* (Roxb.) Schott	Native	Least Concern				✓
29.	*Epipremnum pinnatum* (L.) Engl.	Non-native	Naturalized				✓
30.	*Syngonium angustatum* Schott	Non-native	Naturalized				✓
	ARALIACEAE						
31.	*Arthrophyllum jackianum* (G.Don) Frodin	Native	Least Concern				✓
	ARECACEAE						
32.	*Caryota mitis* Lour.	Native	Least Concern			✓	✓
33.	*Cocos nucifera* L.	Non-native	Naturalized				✓
34.	*Elaeis guineensis* Jacq.	Non-native	Casual				✓
35.	*Plectocomia elongata* Mart. ex Blume	Native	Vulnerable			✓	
	ASPARAGACEAE						
36.	*Dracaena fragrans* (L.) Ker Gawl.	Non-native	Casual				✓
37.	*Dracaena surculosa* Lindl.	Non-native	Naturalized				✓
	ASPLENIACEAE						
38.	*Asplenium longissimum* Blume	Native	Least Concern		✓		✓
39.	*Asplenium nidus* L.	Native	Least Concern				✓
	ASTERACEAE						
40.	*Mikania micrantha* Kunth	Non-native	Naturalized				✓
	ATHYRIACEAE						
41.	*Diplazium esculentum* (Retz.) Sw.	Native	Vulnerable	✓	✓		
	BIGNONIACEAE						

S/N	Species	Origin	National Status	Record			This Study
				SING	Tan et al. (2014)	Lim (2014)	
42.	*Spathodea campanulata* P.Beauv.	Non-native	Naturalized				✓
43.	*Stereospermum fimbriatum* (Wall. ex G.Don) DC.	Non-native	Cultivated only				✓
44.	*Tabebuia rosea* (Bertol.) DC.	Non-native	Casual				✓
	BLECHNACEAE						
45.	*Stenochlaena palustris* (Burm.f.) Bedd.	Native	Least Concern				✓
	CALOPHYLLACEAE						
46.	*Calophyllum pulcherrimum* Wall. ex Choisy	Native	Least Concern				✓
47.	*Calophyllum wallichianum* Planch. & Triana var. *incrassatum* (M.R.Hend. & Wyatt-Sm.)	Native	Vulnerable			✓	
	CANNABACEAE						
48.	*Gironniera nervosa* Planch.	Native	Least Concern			✓	✓
49.	*Gironniera subaequalis* Planch.	Native	Endangered			✓	✓
50.	*Trema cannabina* Lour.	Native	Least Concern			✓	
	CELASTRACEAE						
51.	*Lophopetalum wightianum* Arn.	Native	Endangered			✓	
52.	*Salacia korthalsiana* Miq.	Native	Critically Endangered				✓
	CENTROPLACACEAE						
53.	*Bhesa paniculata* Arn.	Native	Least Concern			✓	
	CHRYSOBALANACEAE						
54.	*Angelesia splendens* Korth.	Native	Vulnerable				✓
55.	*Maranthes corymbosa* Blume	Native	Endangered				✓
	CLUSIACEAE						
56.	*Garcinia mangostana* L. var. *mangostana*	Non-native	Casual				✓
57.	*Garcinia parvifolia* (Miq.) Miq.	Native	Least Concern			✓	
	COMBRETACEAE						
58.	*Combretum sundaicum* Miq.	Native	Vulnerable				✓
59.	*Terminalia catappa* L.	Native	Least Concern				✓
	COMMELINACEAE						
60.	*Commelina diffusa* Burm.f.	Uncertain	Cryptogenic				✓
	CONNARACEAE						

S/N	Species	Origin	National Status	Record			This Study
				SING	Tan et al. (2014)	Lim (2014)	
61.	*Agelaea borneensis* (Hook.f.) Merr.	Native	Least Concern				✓
62.	*Agelaea macrophylla* (Zoll.) Leenh.	Native	Vulnerable				✓
63.	*Rourea aspleniifolia* (G.Schellenb.) Jongkind	Native	Least Concern				✓
64.	*Rourea minor* (Gaertn.) Merr.	Native	Endangered				✓
	CONVOLVULACEAE						
65.	*Erycibe tomentosa* Blume	Native	Least Concern	✓			✓
	CUCURBITACEAE						
66.	*Melothria pendula* L.	Non-native	Naturalized				✓
	CUPRESSACEAE						
67.	*Juniperus chinensis* L.	Non-native	Cultivated only				✓
	CYPERACEAE						
68.	*Cyperus mindorensis* (Steud.) Huygh	Native	Least Concern				✓
	DAVALLIACEAE						
69.	*Davallia denticulata* (Burm.f.) Mett. ex Kuhn	Native	Least Concern				✓
	DILLENIACEAE						
70.	*Dillenia suffruticosa* (Griff. ex Hook.f. & Thomson) Martelli	Native	Least Concern				✓
71.	*Tetracera indica* (Christm. & Panz.) Merr.	Native	Least Concern				✓
	DIOSCOREACEAE						
72.	*Dioscorea sansibarensis* Pax	Non-native	Naturalized				✓
73.	*Dioscorea tenuifolia* Ridl.	Native	Vulnerable	✓			
	EBENACEAE						
74.	*Diospyros blancoi* A.DC.	Non-native	Cultivated only				✓
	ELAEOCARPACEAE						
75.	*Elaeocarpus ferrugineus* (Jack) Steud.	Native	Vulnerable				✓
76.	*Elaeocarpus petiolatus* (Jack) Wall.	Native	Least Concern			✓	✓
77.	*Elaeocarpus stipularis* Blume	Native	Vulnerable				✓
	EUPHORBIACEAE						
78.	*Claoxylon indicum* (Reinw. ex Blume) Hassk.	Native	Least Concern				✓
79.	*Codiaeum variegatum* (L.) A.Juss.	Non-native	Casual				✓

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80.	*Endospermum diadenum* (Miq.) Airy Shaw	Native	Vulnerable			✓	✓
81.	*Hancea penangensis* (Müll.Arg.) S.E.C.Sierra et al.	Native	Critically Endangered				✓
82.	*Hevea brasiliensis* (Willd. ex A.Juss.) Müll.Arg.	Non-native	Naturalized				✓
83.	*Macaranga bancana* (Miq.) Müll.Arg.	Native	Least Concern				✓
84.	*Macaranga conifera* (Rchb.f. & Zoll.) Müll.Arg.	Native	Least Concern				✓
85.	*Macaranga gigantea* (Rchb.f. & Zoll.) Müll.Arg.	Native	Least Concern			✓	✓
86.	*Macaranga heynei* I.M.Johnst.	Native	Least Concern			✓	
87.	*Macaranga hypoleuca* (Rchb.f. & Zoll.) Müll.Arg.	Native	Least Concern				✓
88.	*Mallotus paniculatus* (Lam.) Müll.Arg.	Native	Least Concern				✓
89.	*Manihot carthagenensis* (Jacq.) Müll.Arg. subsp. *glaziovii* (Müll.Arg.) Allem	Non-native	Naturalized				✓
	FABACEAE						
90.	*Acacia auriculiformis* A.Cunn. ex Benth.	Non-native	Naturalized				✓
91.	*Adenanthera malayana* Kosterm.	Native	Endangered			✓	
92.	*Adenanthera pavonina* L.	Non-native	Naturalized				✓
93.	*Andira inermis* (W.Wright) Kunth ex DC.	Non-native	Casual				✓
94.	*Archidendron jiringa* (Jack) I.C.Nielsen	Native	Vulnerable				✓
95.	*Baphia nitida* G.Lodd.	Non-native	Casual				✓
96.	*Falcataria falcata* (L.) Greuter & R.Rankin	Non-native	Naturalized				✓
97.	*Gliricidia sepium* (Jacq.) Kunth ex Walp.	Non-native	Casual				✓
98.	*Koompassia malaccensis* Maingay ex Benth.	Native	Endangered			✓	
99.	*Parkia timoriana* (DC.) Merr.	Non-native	Cultivated only			✓	
100.	*Peltophorum pterocarpum* (DC.) Backer ex K.Heyne	Native	Critically Endangered				✓
101.	*Pithecellobium dulce* (Roxb.) Benth.	Non-native	Casual				✓
102.	*Pterocarpus indicus* Willd.	Non-native	Casual				✓
103.	*Samanea saman* (Jacq.) Merr.	Non-native	Casual				✓
104.	*Senegalia rugata* (Lam.) Britton & Rose	Uncertain	Cryptogenic	✓			
105.	*Tamarindus indica* L.	Non-native	Casual				✓
	FLAGELLARIACEAE						
106.	*Flagellaria indica* L.	Native	Least Concern				✓

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	GENTIANACEAE						
107.	*Cyrtophyllum fragrans* (Roxb.) DC.	Native	Least Concern				✓
	ICACINACEAE						
108.	*Iodes ovalis* Blume	Native	Vulnerable				✓
	IXONANTHACEAE						
109.	*Ixonanthes reticulata* Jack	Native	Least Concern			✓	✓
	LAMIACEAE						
110.	*Clerodendrum disparifolium* Blume	Native	Least Concern			✓	✓
111.	*Clerodendrum villosum* Blume	Native	Vulnerable				✓
112.	*Hyptis capitata* Jacq.	Non-native	Naturalized				✓
113.	*Premna serratifolia* L.	Native	Least Concern				✓
114.	*Vitex pinnata* L.	Native	Least Concern				✓
	LAURACEAE						
115.	*Cinnamomum iners* (Reinw. ex Nees & T.Nees) Blume	Native	Least Concern				✓
116.	*Litsea elliptica* Blume	Native	Least Concern			✓	✓
117.	*Litsea umbellata* (Lour.) Merr.	Native	Vulnerable			✓	✓
118.	*Nothaphoebe umbelliflora* (Blume) Blume	Native	Least Concern			✓	✓
	LINACEAE						
119.	*Indorouchera griffithiana* (Planch.) Hallier f.	Native	Least Concern	✓			✓
	LYGODIACEAE						
120.	*Lygodium japonicum* (Thunb.) Sw.	Non-native	Naturalized	✓			
	MAGNOLIACEAE						
121.	*Magnolia* × *alba* (DC.) Figlar	Non-native	Cultivated only				✓
	MALVACEAE						
122.	*Durio zibethinus* L.	Non-native	Casual				✓
123.	*Microcos tomentosa* Sm.	Native	Critically Endangered	✓			
124.	*Pachira glabra* Pasq.	Non-native	Casual+				✓
125.	*Scaphium affine* (Mast.) Pierre	Native	Endangered			✓	
126.	*Sterculia cordata* Blume	Native	Critically Endangered				✓

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127.	*Sterculia parviflora* Roxb. ex G.Don	Native	Critically Endangered			✓	✓
128.	*Sterculia rubiginosa* Vent.	Native	Vulnerable			✓	
	MELASTOMATACEAE						
129.	*Miconia crenata* (Vahl) Michelang.	Non-native	Naturalized				✓
130.	*Melastoma malabathricum* L.	Native	Least Concern			✓	✓
131.	*Memecylon paniculatum* Jack	Native	Critically Endangered				✓
	MELIACEAE						
132.	*Aphanamixis polystachya* (Wall.) R.Parker	Native	Least Concern			✓	✓
133.	*Azadirachta indica* A.Juss.	Non-native	Casual				✓
134.	*Epicharis cuneata* (Hiern) Harms	Native	Vulnerable			✓	
	MORACEAE						
135.	*Artocarpus elasticus* Reinw. ex Blume	Native	Least Concern			✓	✓
136.	*Artocarpus heterophyllus* Lam.	Non-native	Casual				✓
137.	*Artocarpus integer* (Thunb.) Merr.	Uncertain	Cryptogenic				✓
138.	*Ficus aurata* (Miq.) Miq.	Native	Least Concern				✓
139.	*Ficus benjamina* L.	Uncertain	Cryptogenic				✓
140.	*Ficus caulocarpa* (Miq.) Miq.	Native	Endangered				✓
141.	*Ficus elastica* Roxb. ex Hornem.	Non-native	Casual				✓
142.	*Ficus fistulosa* Reinw. ex Blume	Native	Least Concern			✓	✓
143.	*Ficus heteropleura* Blume	Native	Least Concern				✓
144.	*Ficus microcarpa* L.f.	Native	Least Concern				✓
145.	*Ficus punctata* Thunb.	Native	Least Concern				✓
146.	*Ficus religiosa* L.	Non-native	Naturalized				✓
147.	*Ficus stricta* (Miq.) Miq.	Native	Critically Endangered				✓
148.	*Ficus variegata* Blume	Native	Least Concern			✓	✓
149.	*Ficus vasculosa* Wall. ex Miq.	Native	Vulnerable			✓	✓
150.	*Ficus villosa* Blume	Native	Endangered				✓
151.	*Ficus virens* Aiton	Native	Endangered			✓	
152.	*Sloetia elongata* (Miq.) Koord.	Native	Least Concern			✓	
	MYRISTICACEAE						
153.	*Knema conferta* (King) Warb.	Native	Endangered				✓
154.	*Knema latericia* Elmer subsp. *ridleyi* (Gand.) W.J.de Wilde	Native	Endangered				✓
155.	*Knema malayana* Warb.	Native	Endangered				✓

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156.	*Horsfieldia* cf. *polyspherula* (Hook.f.) J.Sinclair	Native	Vulnerable				✓
	MYRTACEAE						
157.	*Rhodamnia cinerea* Jack	Native	Least Concern				✓
158.	*Syzygium aqueum* (Burm.f.) Alston	Non-native	Cultivated only				✓
159.	*Syzygium borneense* (Miq.) Miq.	Native	Least Concern				✓
160.	*Syzygium cerasiforme* (Blume) Merr. & L.M.Perry	Native	Least Concern				✓
161.	*Syzygium cumini* (L.) Skeels	Non-native	Naturalized				✓
162.	*Syzygium grande* (Wight) Walp.	Native	Least Concern			✓	✓
163.	*Syzygium malaccense* (L.) Merr. & L.M.Perry	Non-native	Casual				✓
164.	*Syzygium myrtifolium* Walp.	Native	Critically Endangered				✓
165.	*Syzygium polyanthum* (Wight) Walp.	Native	Least Concern				✓
166.	*Syzygium syzygioides* (Miq.) Merr. & L.M.Perry	Native	Vulnerable				✓
	NEPHROLEPIDACEAE						
167.	*Nephrolepis biserrata* (Sw.) Schott	Native	Least Concern	✓			
	NYCTAGINACEAE						
168.	*Pisonia grandis* R.Br.	Non-native	Cultivated only				✓
	OLACACEAE						
169.	*Strombosia javanica* Blume	Native	Vulnerable			✓	✓
	OPILIACEAE						
170.	*Champereia manillana* (Blume) Merr.	Native	Least Concern				✓
	ORCHIDACEAE						
171.	*Eulophia graminea* Lindl.	Uncertain	Cryptogenic				✓
	OROBANCHACEAE						
172.	*Striga asiatica* (L.) Kuntze	Uncertain	Cryptogenic				✓
	OXALIDACEAE						
173.	*Averrhoa carambola* L.	Non-native	Casual				✓
	PANDACEAE						
174.	*Microdesmis casearifolia* Planch. ex Hook.	Native	Vulnerable			✓	

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	PHYLLANTHACEAE						
175.	*Antidesma bunius* (L.) Spreng.	Non-native	Casual				✓
176.	*Aporosa benthamiana* Hook.f.	Native	Vulnerable			✓	✓
177.	*Aporosa frutescens* Blume	Native	Least Concern			✓	✓
178.	*Aporosa lucida* (Miq.) Airy Shaw var. *lucida*	Native	Vulnerable				✓
179.	*Baccaurea motleyana* (Müll.Arg.) Müll.Arg.	Native	Critically Endangered				✓
180.	*Bridelia stipularis* (L.) Blume	Native	Vulnerable				✓
181.	*Bridelia tomentosa* Blume	Native	Least Concern				✓
182.	*Margaritaria indica* (Dalzell) Airy Shaw	Native	Critically Endangered	✓			✓
	PIPERACEAE						
183.	*Peperomia pellucida* (L.) Kunth	Non-native	Naturalized				✓
184.	*Piper baccatum* Blume	Native	Critically Endangered				✓
185.	*Piper betle* L.	Non-native	Casual	✓			✓
186.	*Piper sarmentosum* Roxb.	Native	Least Concern				✓
	POACEAE						
187.	*Axonopus compressus* (Sw.) P.Beauv.	Non-native	Naturalized				✓
188.	*Centotheca lappacea* (L.) Desv.	Native	Least Concern				✓
189.	*Dendrocalamus asper* (Schult.) Backer ex Heyne	Non-native	Excluded (Cultivated Only)	✓			
	POLYGALACEAE						
190.	*Xanthophyllum eurhynchum* Miq.	Native	Vulnerable				✓
191.	*Xanthophyllum flavescens* Roxb.	Native	Endangered				✓
192.	*Xanthophyllum vitellinum* (Blume) D.Dietr.	Native	Vulnerable				✓
	POLYPODIACEAE						
193.	*Goniophlebium percussum* (Cav.) W.H.Wagner & Grether	Native	Vulnerable				✓
194.	*Microsorum punctatum* (L.) Copel.	Native	Least Concern		✓		
	PRIMULACEAE						
195.	*Embelia ribes* Burm.f.	Native	Least Concern				✓
	PTERIDACEAE						
196.	*Adiantum latifolium* Lam.	Non-native	Naturalized				✓

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197.	*Cheilanthes tenuifolia* (Burm.f.) Sw.	Native	Vulnerable	✓	✓		
198.	*Pteris vittata* L.	Uncertain	Cryptogenic				✓
	RHIZOPHORACEAE						
199.	*Gynotroches axillaris* Blume	Native	Least Concern			✓	
	ROSACEAE						
200.	*Prunus arborea* (Blume) Kalkman	Native	Critically Endangered				✓
201.	*Prunus polystachya* (Hook.f.) Kalkman	Native	Least Concern			✓	✓
	RUBIACEAE						
202.	*Aidia densiflora* (Wall.) Masam.	Native	Vulnerable			✓	✓
203.	*Discospermum malaccense* (Hook.f.) Kuntze	Native	Critically Endangered			✓	✓
204.	*Morinda citrifolia* L.	Native	Least Concern				✓
205.	*Oxyceros bispinosus* (Griff.) Tirveng.	Native	Vulnerable				✓
206.	*Oxyceros longiflorus* (Lam.) T.Yamaz.	Native	Vulnerable				✓
207.	*Paederia foetida* L.	Native	Least Concern				✓
208.	*Timonius wallichianus* Valeton	Native	Least Concern				✓
209.	*Uncaria longiflora* (Poir.) Merr. var. *pteropoda* (Miq.) Ridsdale	Native	Endangered				✓
	RUTACEAE						
210.	*Citrus* × *aurantiifolia* (Christm.) Swingle	Non-native	Cultivated only				✓
211.	*Clausena excavata* Burm.f.	Native	Least Concern				✓
	SAPINDACEAE						
212.	*Dimocarpus lichi* Lour.	Native	Data Deficient				✓
213.	*Guioa pleuropteris* (Blume) Radlk.	Native	Vulnerable	✓		✓	✓
214.	*Guioa pubescens* (Zoll. & Moritzi) Radlk.	Native	Vulnerable				✓
215.	*Lepisanthes rubiginosa* (Roxb.) Leenh.	Native	Least Concern	✓			✓
216.	*Nephelium lappaceum* L.	Uncertain	Cryptogenic				✓
217.	*Pometia pinnata* J.R.Forst & G.Forst.	Native	Endangered				✓
218.	*Trigonachras acuta* (Hiern) Radlk.	Native	Critically Endangered				✓
	SAPOTACEAE						
219.	*Manilkara zapota* (L.) P.Royen	Non-native	Cultivated only				✓
220.	*Palaquium obovatum* (Griff.) Engl.	Native	Vulnerable			✓	✓
221.	*Planchonella obovata* (R.Br.) Pierre	Native	Vulnerable				✓
	SELAGINELLACEAE						
222.	*Selaginella plana* (Desv. ex Poir.) Hieron.	Uncertain	Cryptogenic		✓		

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	SIMAROUBACEAE						
223.	*Ailanthus integrifolia* Lam.	Native	Critically Endangered				✓
	SMILACACEAE						
224.	*Smilax setosa* Miq.	Native	Least Concern				✓
	SOLANACEAE						
225.	*Solanum torvum* Sw.	Non-native	Naturalized				✓
	THELYPTERIDACEAE						
226.	*Amblovenatum opulentum* (Kaulf.) J.P.Roux	Native	Least Concern	✓			
227.	*Christella arida* (D.Don) Holttum	Native	Least Concern	✓	✓		
228.	*Christella parasitica* (L.) H.Lév.	Native	Least Concern		✓		
229.	*Grypothrix triphylla* (Sw.) S.E.Fawc. & A.R.Sm.	Native	Least Concern				✓
230.	*Sphaerostephanos polycarpos* (Blume) Copel.	Native	Least Concern		✓		
	VITACEAE						
231.	*Cissus hastata* Miq.	Native	Least Concern				✓
232.	*Cissus repens* Lam.	Native	Vulnerable	✓			
233.	*Leea indica* (Burm.f.) Merr.	Native	Least Concern				✓